



Audio Note

AN-E Ltd
Field Coil

LOUDSPEAKERS

OWNER'S INFORMATION



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CE DECLARATION OF CONFORMITY



We declare under our sole responsibility that this product is in conformity with the following standards or standardized documents:

BS EN 60065 in accordance with the regulations 73/23/EEC, 89/336/EEC (from 1 January 1997)

CE 94

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DISPOSAL

This product must not be disposed of as normal household waste. To prevent possible harm to the environment please separate the product from other waste to ensure that it can be recycled in an environmentally safe manner. Please contact your retailer or the appropriate local government office for collection facilities.

INTRODUCTION

Thank you for purchasing this Audio Note (UK) product. With the correct care it should give you many years of pleasure and enjoyment.

Please take the time to read all of the information in this manual before connecting your new component to an electrical supply or your system, to ensure both your safety and satisfaction.

Please note that due to our desire to continually improve products, specifications are subject to change without notice. Therefore it is important to refer to the manual that is supplied with your product for the most accurate information; manuals downloaded from our website or obtained from other sources may no longer fully apply to your product.

If you have any questions regarding the information contained within this document or your new component, please feel free to contact us: -

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AN-E LTD MODELS

AN-E/SPx Ltd	1" silk dome field coil tweeter & 8" Hemp cone field coil bass driver with silver voice coils, AN-SPx internal silver cable. Internal crossover with in-house made custom resistors, copper inductors and custom made polyester capacitors. Birch ply cabinet, real wood veneers. External field coil power supply
AN-E/SOGON Ltd	1" silk dome field coil tweeter & 8" Hemp cone field coil bass driver with silver voice coils, AN-SOGON-LX internal silver cable. Internal crossover with in-house made custom resistors, copper inductors and custom made polyester capacitors. Birch ply cabinet, real wood veneers. External field coil power supply
AN-E/SPx Ltd Signature	1" silk dome field coil tweeter & 8" Hemp cone field coil bass driver with silver voice coils, AN-SPx internal silver cable. External crossover with in-house made custom resistors, copper inductors and Audio Note (UK) copper Mylar capacitors. Birch ply cabinet, real wood veneers. External field coil power supply
AN-E/SOGON Ltd Signature	1" silk dome field coil tweeter & 8" Hemp cone field coil bass driver with silver voice coils, AN-SOGON-LX internal silver cable. External crossover with in-house made custom resistors, silver inductors and Audio Note (UK) copper Mylar capacitors. Birch ply cabinet, real wood veneers. External field coil power supply
AN-E/SOGON Ltd Silver Signature	1" silk dome field coil tweeter & 8" Hemp cone field coil bass driver with silver voice coils, AN-SOGON-LX internal silver cable. External crossover with in-house made custom resistors, silver inductors and Audio Note (UK) silver Mylar capacitors. Birch ply cabinet, real wood veneers. External field coil power supply
AN-E/SOOTTO Ltd Silver Signature	1" silk dome field coil tweeter & 8" Hemp cone field coil bass driver with silver voice coils, AN-SOOTTO-LX internal silver cable. External crossover with in-house made custom resistors, silver inductors and Audio Note (UK) silver Mylar capacitors. Birch ply cabinet, real wood veneers. External field coil power supply
AN-E Speaker Stand	10" high mass black sprayed steel speaker stand. Self assembly, designed for filling with fine sand or metal shot material to maximise mass
AN-E Speaker Stand with internal crossover	Optional for all speakers with external crossovers to house the large copper foil capacitors used in all the SIGNATURE versions of the AN-E speakers, except for AN-E SOGON where the silver capacitors are too large to fit within the cavity available

AN-E LOUDSPEAKERS

Congratulations on your purchase of the AN-E Ltd loudspeakers. We hope and expect them to give you many years of musical enjoyment and trouble-free listening.

The majority of the high-end audio marketplace is occupied by ill-conceived low-efficiency loudspeaker systems. These designs usually consist of several less-than-ideally-matched drivers and a very complex crossover, crammed into a cabinet that exhibits the tonal and textural qualities of reinforced concrete. Their designers are blinded by the dogmatic quest for high sound pressure levels and flat response.

But what of the other factors which are essential for emotionally involving music reproduction? What about coherence, full natural micro - as well as macro - dynamics, inner detail?

What about *LIFE*?

What about *EMOTION*?

Sorry, they're just not part of the "High Performance Audio" design brief. And *Music* suffers for it.

The design of the AN-E Loudspeaker, by contrast, follows an altogether different philosophy. It calls for a cabinet that compliments the chosen drive units, rather than fighting against them. Instead of trying to *kill* the resonances, we tailor the cabinet to place them in frequency bands where they *aid* and *enhance* the operation of the drive units, culminating in a loudspeaker system that makes the most of the preceding amplifier's output.

The material choice for the cabinet is an area where a great deal of research and development has taken place. Over the years, we have tried many different materials and combinations, a time consuming endeavour culminating in the current design, which utilizes the highest quality Birch ply for the entire cabinet. Bracing and internal damping is kept to a minimum and strategically applied to help, not hinder the drivers.

The ported cabinet has been designed to be placed close to room boundaries, where the bass performance is augmented significantly by the additional reinforcement offered by the nearby walls. In this position, it will outperform any similarly sized speaker regardless of origin, thanks in part to the shallow cabinet / wide baffle shape which gives the drivers the best possible operating conditions, allowing them to perform as if they are mounted in a virtual wall. This provides the most undisturbed sound field with the widest and most even dispersion possible from a real world cabinet shape.

The crossover is simple, essentially first order, hardwired and incorporates air-cored chokes and selected bipolar and polypropylene capacitors (either copper foil or silver foil, depending on model.) The internal cabling consists of either 99.99% pure copper or 99.99% pure silver Audio Note (UK) wire, depending on the exact model. (See specifications.)

AN-E LOUDSPEAKERS continued...

Consistent performance is a major issue in loudspeaker design and unfortunately all drive units vary slight from each other, even if they look the same and have the same basic specification.

Many loudspeaker manufacturer's will tell you that they provide "computer matched" crossovers, and whilst this may be true in one sense (each crossover may have been matched to have the exact same capacitance, inductance and resistance) this essentially "passive" method does not adequately take into consideration the mechanical and acoustic variance present in the drive units themselves, where minute differences in acoustic behaviour will result in quite substantial differences in performance and sound.

Therefore, to obtain the best possible combination of drivers and crossovers, we have developed a dynamic matching process. This ensures that each loudspeaker in a stereo pair matches a 'master curve' and also its partner, to within 0.4dB; to the best of our knowledge, no other loudspeaker manufacturer achieves such close matching and tests 100% of its production.

Another much overlooked area of loudspeaker design is the material choice for the drivers.

It has become very fashionable to use all manner of exotic materials (beryllium, diamond, carbon fibre, ceramics etc.) as cone materials in modern drivers, mainly because it gives the impression that the manufacturer in question is making great strides in their research into better sounding speakers.

The sad fact is none of these materials work as intended, as they all have their own distinct sonic signature, so no matter how the crossover is designed, this sonic signature will be present when the speaker reproduces music. It may be less obvious and audible with some types of music, but ultimately the chosen material will always imprint some of its own signature on whatever sound is reproduced.

In addition, it is vitally important that the sound and characteristics of an individual drive unit are complimentary to those of its chosen partner, so that when an instrument is reproduced by both drive units (which is almost always the case), the upper range does not sound detached from the lower range and visa versa. This is an aspect of performance that cannot be measured by even the most sophisticated test equipment; it can ONLY be judged by listening.

We at Audio Note are keenly aware of this and have deliberately chosen drive units whose sonic signatures are as closely matched as possible. This has led us to favour good, old fashioned paper materials for the woofer cone and impregnated silk for the dome tweeter. These materials, when matched correctly, marry the low and high frequencies seamlessly, providing the best level of performance possible in the real world of acoustics.

DEVELOPMENT OF THE AN-E LTD

Below is a description of the research and development that went into the E Ltd Field Coil 'speakers, written by Audio Note (UK)'s designer in chief, Andy Grove: -

Field coil drive units, using an electromagnet to generate the magnetic field with which the voice coil interacts (by Lorentz Force), date from the earliest days of electrical music reproduction. At the time, not long after the turn of the 20th century, permanent magnet technology was not sufficiently advanced to make a conveniently sized, and priced, speaker drive unit.

Electrical efficiency was much less of a consideration then, and there was often a 'free' source of power for the field coil, by using the speaker field coil as the smoothing choke in the device's power supply. I have several radios and guitar amplifiers which work like this.

Over time, new materials were developed such as iron/nickel alloys (alnico etc.) and later ferrite ceramics (a sintered iron oxide complex) which could provide a compact, and in the case of a ferrite magnet, cheap, source of magnetic field. The increase in electrical efficiency required by battery operated radios made permanent magnets a good fit, as did the potential weight reduction for portable equipment.

Now, the question arises as to why revisit an older, now largely redundant technology?

As is usually the case, you may read comments from armchair experts that wire is wire, magnets are magnets and so forth. That's usually because they don't understand the subject in sufficient depth to realise that there may be subtleties involved that are beyond their current understanding. This is the Dunning-Kruger Effect in action.

Ask guitar players about magnets, though, and they will tell you that there are clear differences in texture and tonality between magnet types. In fact, pickups are constructed with specific materials in order to achieve a desired sound characteristic: A thick sounding, high output ceramic pickup designed for metal won't work well for country pickin' or rockabilly, where alnico is better suited.

The picture is actually similar with guitar speakers, where alnico, ceramic and now neodymium speakers are available with characteristics to suit the type of music being played and, of course, the musician's personal taste.

When it comes to HiFi, though, almost every speaker, from the cheapest bookshelf model to the most expensive floor standing monolith will have ferrite magnets.

Makes no difference right? **Wrong.**

I think the ubiquitous use of ferrite magnets is (apart from cost) down to the belief that tweaking the crossover, bass alignment and cabinet design can perform all the alchemy required to turn base (bass) elements into gold. It's what people are taught, after all.

Although there are physical and audible differences between the different types of permanent magnet materials, they are all just that – permanent magnet materials. They retain magnetism almost like a permanent charge after being "pumped" by an external magnetic field.

DEVELOPMENT OF THE AN-E LTD continued...

Materials that retain magnetism like this are known as *hard* magnetic materials, and many of them are just that – physically hard and brittle. The physics of how a magnetic field is locked in, and remains in place essentially forever, is quite complex – but it is an inherent characteristic of the material itself, at the atomic level, influenced, too, by macroscopic crystal structure.

The materials used in transformers and other devices which must respond to a varying field and not retain any residual after a field has been applied, are known as *soft* magnetic materials and, indeed, many of them are physically soft.

To generate a magnetic field in a soft magnetic material requires an external polarising source, which is the field coil itself in this case. Once current ceases to flow in the field coil, the flux disappears, too.

All moving coil drive units work by a macroscopic manifestation of the Lorentz Force, experienced by *moving* electrons in the voice coil wire, driven through it by the amplifier.

There is a secondary effect, of course, in that the voice coil itself generates a magnetic field, which interacts with the static field itself and the materials used in the magnet's construction. Now, the expectation is that the force experienced by the driver cone will be closely proportional to the product of the magnitudes of voice coil current and static field, so any deviation from that results in non-linearity and distortion.

This is where field coil drivers are conceptually, and audibly, superior to permanent magnet drivers: They are more transparent and detailed, not with unnatural filigree but by way of lower signal-related hash.

The effect is not that there is more in terms of *quantity* from the speakers, there isn't, there's actually less. They sound calmer, more relaxed and graceful, yet there is now more *information* – in terms of tonality, subtle inflexion, and atmosphere. What was previously obscured is now revealed. The scales have fallen from your ears!

What's interesting and verging on the profound here is that almost every speaker you have ever heard has suffered from the same problem, and you will be so used to it, it's not until it vanishes that you notice it was there in the first place.

It's almost like suffering defective vision from childhood, and then being given glasses for the first time.

There are valid conceptual explanations for the presence of this subliminal hash, one being Barkhausen noise, which is a kind of stepping or quantisation effect experienced by magnetic materials during magnetisation cycles, and hysteresis distortion, which is a little more difficult to explain, but causes noise and distortion. Both are far, far more pronounced in permanent magnet materials.

Although it had been talked about over the years, we finally decided to undertake the job of developing a field coil version of the AN-E.

We were hampered by covid induced delays and supply chain issues, however, after some initial calculations and modeling, we quite quickly arrived at working prototype drive units which were close to the alnico E drivers, and they did sound good. These were machined from EN1A and EN3B mild steel, which is widely available and easy to work with.

DEVELOPMENT OF THE AN-E LTD continued...

There was just one problem – both woofer and tweeter magnets were incredibly inefficient and generated a tremendous amount of heat, too much to be considered even close to production...

And there began the real journey of getting the efficiency up and the size down to practical levels, and that meant extensive research into materials and production methods.

It was obvious that using the “bent metal” kind of construction used in many of the older radio speakers was unlikely to work given our experience with the machined mild steel. So it looked like we were going to have to entirely machine the magnet, both the poles and the pot, which would most likely be difficult and expensive with a high permeability iron (it’s so soft). The alternative was to investigate casting, along the lines of Western Electric’s classic drivers.

After several iterations of dimensions we arrived at what seemed to be two workable magnet designs, one for the tweeter, one for the woofer, and began discussions with a foundry in Britain’s Black Country, which has a long history of metalworking.

Working with them did reveal limits to what would be practical, not just in terms of physical design, but also the material used. We even discussed formulating a particular iron alloy with them, but on consideration they declined, which seemed to have driven us into a dead end.

However, during a visit there, at the height of covid, we had quite an interesting discussion with their resident metallurgist, which inspired us to try what’s called a fully ferritised heat treatment on one of their cast iron materials. Understanding what that material is like on a microscopic level got us thinking that it might work.

To speed things up, we ordered some pre-cast bar stock of similar composition, had a local shop machine it into a representation of what the castings might eventually look like and built magnets with them. It became apparent that poles made of this material would not work, so they would have to be pure iron (we use a special type called Telar 57). However, the magnet “pot”, the outside of the magnet assembly and return path of the magnetic flux, worked perfectly.

This actually proved our understanding was roughly correct, but also flew directly in the face of perceived knowledge - that iron used in magnets must be low carbon, while nodular iron is very high carbon. The secret is in the subtleties of the alloy formulation and in the heat treatment, which creates a matrix of carbon-depleted iron containing nodules of graphite. Much like raisins in a cake.

It’s actually surprising to feel the difference in density between a piece made from nodular iron and one made from steel, and that space taken up by carbon nodules (displacing iron) within it is why we couldn’t use it for the poles or top-plate. However, in the pot casting, it’s easy to add another few mm of thickness to compensate.

After a *lot* of discussion with the foundry, we finally had designs that could be reliably cast, so we went ahead and ordered the moulds and samples.

It was a long wait, due to covid, and it was quite nerve racking building a set of drivers with them but, to our great relief, the cast samples were even better than those machined from stock!

To put it into perspective, the very first mild steel prototype bass unit consumed around 45 watts, the latest design consumes about 15 watts.

DEVELOPMENT OF THE AN-E LTD continued...

That largely landmarked completion of development work on the magnets as all the problems with them had been solved satisfactorily and they sounded excellent, so we ordered sets of parts for a production run.

This left two more major electrical aspects to consider; the power supply and the crossover, both of which underwent rigorous scrutiny.

The original power supplies were passive, made of transformers, capacitors, chokes and resistors. There was some discussion as to how to implement that, and it became obvious that the speaker was actually very sensitive to what was feeding it DC power.

Sometimes it's the listening but not listening consciously that reveals subtleties in audio design, and that's how we discovered just *how* sensitive these speakers are to the PSU, both its electrical parameters and the parts used.

The problem with the passive supply was twofold: Firstly, it's ability to absorb back emf from the field coil, and secondly stability to mains voltage variations.

There was some discussion about creating a supply which was 'lean and mean' with small capacitors and fast response. However, a simple experiment with a large capacitor connected via crocodile clips showed that wasn't the right direction to be headed in.

There is also a fairly tight Goldilocks zone for the supply voltage within which the drivers units like to sit, especially the bass unit. Drifting out of the zone upsets the overall feel of the bass, becoming too stiff or loose depending on the voltage drifting up or down due to mains fluctuations.

In order to make something stable and convenient we decided to develop an active power supply, based on an in-house mains transformer and stabiliser circuitry developed from the filament supplies used in the M3 to M10 preamps. The DC operating point is locked down fairly tightly, yet, when transitioning into the audio band, the output impedance rises slightly, to avoid an unnatural grip. In a practical sense, they are quiet, compact and cool running as well.

'Speakers higher up in the range may benefit from a more exotic power supply, but that's something for the future.

There was much work done on the crossover, not so much as to develop a new type, but in order to ensure the combined profiles of the field coil drivers (with their fundamentally different mode of operation) and crossover together would be a natural evolution of the existing AN-E as a whole, with a clear tonal lineage.

It was found that much of the original crossover functioned perfectly well in the new speaker, which means the existing speaker product grid of cables and components will also work. There is one slight difference, though, in that a new hand-made resistor was developed specifically for these speakers.

The increased transparency of the field coil drivers exposed shortcomings in off-the-shelf resistors, and that is the influence of the substrate material – almost always some type of ceramic, usually alumina (fused aluminium oxide).

There is always a subtle (or sometimes not so subtle) ceramic "zing" to those resistors and, once again, as they are used absolutely everywhere, it's unlikely you have ever heard a speaker without that characteristic.

DEVELOPMENT OF THE AN-E LTD continued...

To avoid it, we developed our own hand-wound resistor using a phenolic former. That entirely eliminated the problem, and exposed another layer of inner detail, which was previously obscured.

The drivers are substantially bigger and heavier than even the alnico versions and this required modifications to the cabinet, the tweeter faceplate and the woofer basket.

With regard to sound quality, the tweeter faceplate is the most interesting and was actually very time consuming to get right.

We entirely redesigned the faceplate mounting surface so it is much more firmly coupled to the magnet body metalwork and uses a cork gasket to aid with damping. Additionally, after numerous trials with aluminium and various plastic materials, we arrived at a non-magnetic steel alloy, over which a powder coat is applied.

During this rather long journey, we did make a lot of side discoveries that might make it into future, even more high-end speakers, we shall see...

Andy Grove, Chief Designer, Audio Note (UK), October 2023

UNPACKING AND INSTALLATION

Please take care when unpacking you're AN-E Ltd loudspeakers. Choose a clean, clear location to unpack them.

Be aware that each loudspeaker is heavy; before attempting to unpack or lift them, check their weight and if necessary use more than one person so that they can be moved safely and easily.

We recommend that you retain and carefully store all of the original packing materials, in case transportation / shipping is required at a later date.

Select a suitable location for the loudspeakers. This should be a dry, dust free and level area, preferably shielded from direct sunlight and free from vibration. Also ensure that the location is stable and capable of carrying the weight of each loudspeaker and its stand.

For optimal tonal balance, the AN-E Ltd should be used on a spiked, high mass stand, around 24 - 27cm (10 inches) in height (available separately), so that the tweeter is positioned at roughly ear height for the chosen listening position.

The ported enclosure of the AN-E Ltd has been designed to be placed close to room boundaries, where the bass performance is augmented significantly by the additional reinforcement from the nearby walls.

Some experimentation is advised when choosing a suitable location to obtain the best performance 'in room'. All rooms are different, both physically and more importantly acoustically, however, we generally recommend placing the loudspeakers in corners or at least against a solid rear or side wall; this is the best 'starting point' to work from. If bass performance is too strong, slowly move the loudspeakers further into the room, making sure that the distance between the rear and side walls remains the same for both loudspeakers.

If there is a noticeable 'hole' in the middle of the two loudspeakers, producing a pronounced 'left / right' effect, move them closer together in small increments, until a solid, central presentation is achieved.

You may also find a degree of 'toe-in' to be appropriate; angle the loudspeakers so that both front faces are visible and pointing directly towards the main listening position. A few degrees of movement in either direction – revealing more or less of the cabinet sidewalls when viewed from the listening position – may also be advantageous.

Once a suitable position offering the most acceptable bass and stereo presentation has been found, make sure the loudspeakers are level and securely positioned. The use of a spirit level for accurate levelling is advised, and a small amount of 'Blue Tack' will secure the loudspeaker cabinets to their stands.

If you experience any difficulty positioning you're AN-E Ltd satisfactorily, please consult your Audio Note (UK) Dealer, who will be happy to assist you. Alternatively, please contact us directly.

As we design all our speakers to be primarily used with high quality valve amplification, the AN-E Ltd will always perform at its best when partnered with a suitably composed Audio Note (UK) system.

CONNECTION (internal crossover models)

BEFORE ATTEMPTING TO CONNECT THE AN-E TO YOUR AMPLIFIER, ENSURE THAT IT IS DISCONNECTED FROM THE MAINS SUPPLY!

Choose loudspeaker cables that are long enough to comfortably reach from your amplifier to the AN-E Ltd without stretching or pulling tightly; it is always better to have a loudspeaker cable that is too long rather than too short.

On the rear of each loudspeaker are two pairs of binding posts.

Viewed vertically, the two on the LEFT are for **HIGH FREQUENCY (HF)**.

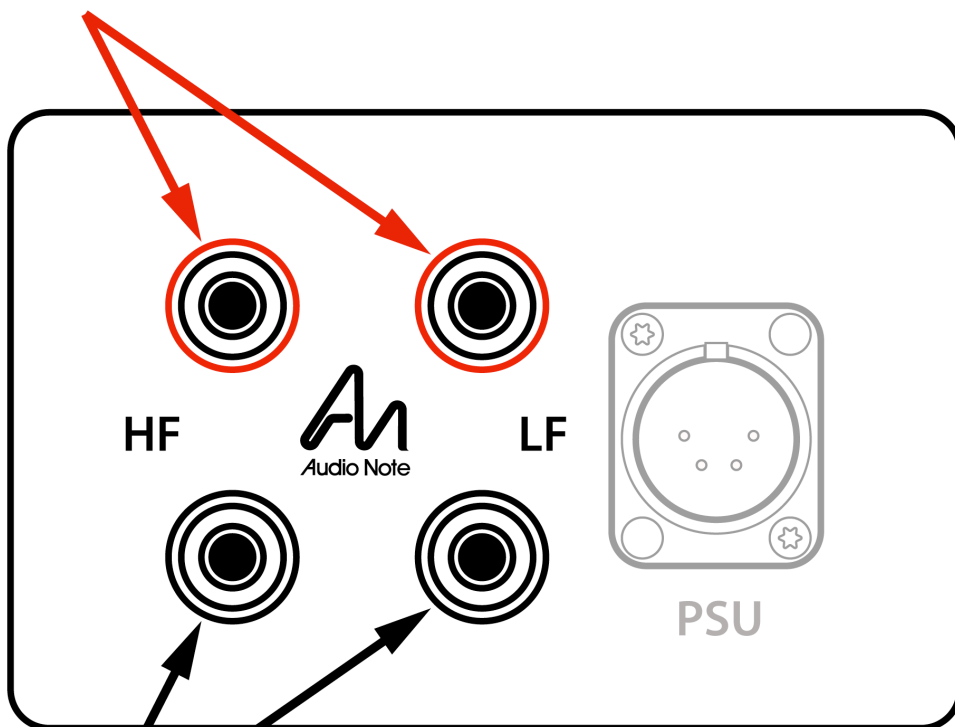
The two on the RIGHT are for **LOW FREQUENCY (LF)**.

Each binding post is colour coded, either **RED** or **BLACK**.

The **RED** binding posts (top two) connect to the **RED / POSITIVE** (often marked '+') loudspeaker outputs on your amplifier.

The **BLACK** binding posts (bottom two) connect to the **BLACK / NEGATIVE** (often marked '-') loudspeaker outputs on your amplifier.

Positive connections +



Negative connections -

CONNECTION (internal crossover models) continued...

On the rear of your amplifier, identify the loudspeaker output terminals; they should be labeled 'LEFT' and 'RIGHT'.

Facing your amplifier and loudspeakers, connect the left loudspeaker to the 'LEFT' loudspeaker outputs on your amplifier, and the right loudspeaker to the 'RIGHT' loudspeaker outputs on your amplifier.

If your amplifier is equipped with multiple loudspeaker output terminals, consult the manual for the unit to ascertain the appropriate connection regime.

The facility to split the crossover of the AN-E Ltd allows the speakers to be operated in a bi-wired or bi-amplified mode. The crossovers are split by removing the connecting links between the HF and LF terminals on the rear of the speaker.

Bi-wiring This involves running two sets of cables to the rear of each speaker, so that the Low Frequency (LF) section of the crossover is fed by one set and the High Frequency (HF) section by the other. Both sets of cables are attached together to the corresponding pair of terminals on the back of the amplifier.

We strongly recommend bi-wiring the AN-E Ltd with a suitable loudspeaker cable from the Audio Note (UK) range.

Bi-amping This involves using two stereo or four mono power amplifiers to drive the loudspeakers. If you intend to 'bi-amp' the AN-E Ltd, please consult your amplifiers manual(s) for the appropriate connection regime.

If you are in any way uncertain as to the correct method of connection for your amplifier or loudspeakers, please consult your Audio Note (UK) dealer.

Special Note – Make sure that all connections are tight and clean. For best results and performance, we recommend our own Audio Note (UK) range of interconnects and loudspeaker cables. For further information, please consult your nearest Audio Note (UK) dealer, or alternatively please feel free to contact us directly.

CONNECTION (external crossover models)

BEFORE ATTEMPTING TO CONNECT THE AN-E LTD CROSSOVER TO YOUR AMPLIFIER, ENSURE THAT IT IS DISCONNECTED FROM THE MAINS SUPPLY!

Choose loudspeaker cables that are long enough to comfortably reach from your amplifier to the AN-E Ltd crossover without stretching or pulling tightly; it is always better to have a loudspeaker cable that is too long rather than too short! It is also vitally important to ensure that the crossover chassis is positioned close enough to the AN-E Ltd so that the connecting cables between the 'speaker cabinet and the crossover are not stretching or pulling tightly.

Ensure that each external crossover is connected to its matching AN-E Ltd!

On the rear of each external crossover chassis are four pairs of binding posts, eight in total.

The four on the LEFT (labeled 'IN') are for connection from the amplifier to the crossover.

The four on the RIGHT (labeled 'OUT') are for connection from the crossover to the loudspeaker.

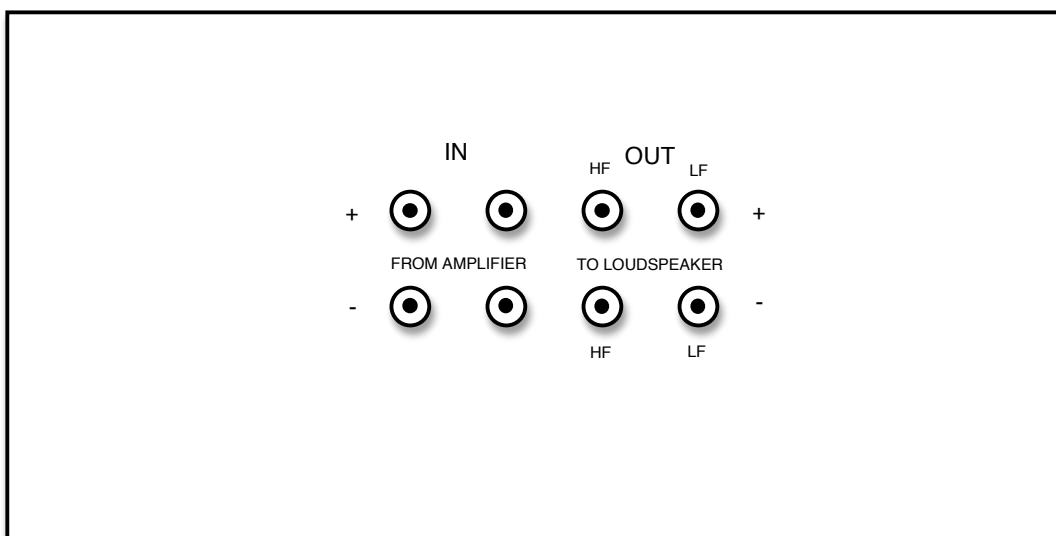
Each binding post is colour coded either **RED** or **BLACK**.

The **RED** binding posts (top) connect to the **RED / POSITIVE** (often marked '+') loudspeaker outputs on your amplifier / connecting cables to the AN-E.

The **BLACK** binding posts (bottom) connect to the **BLACK / NEGATIVE** (often marked '-') loudspeaker outputs on your amplifier / connecting cables to the AN-E.

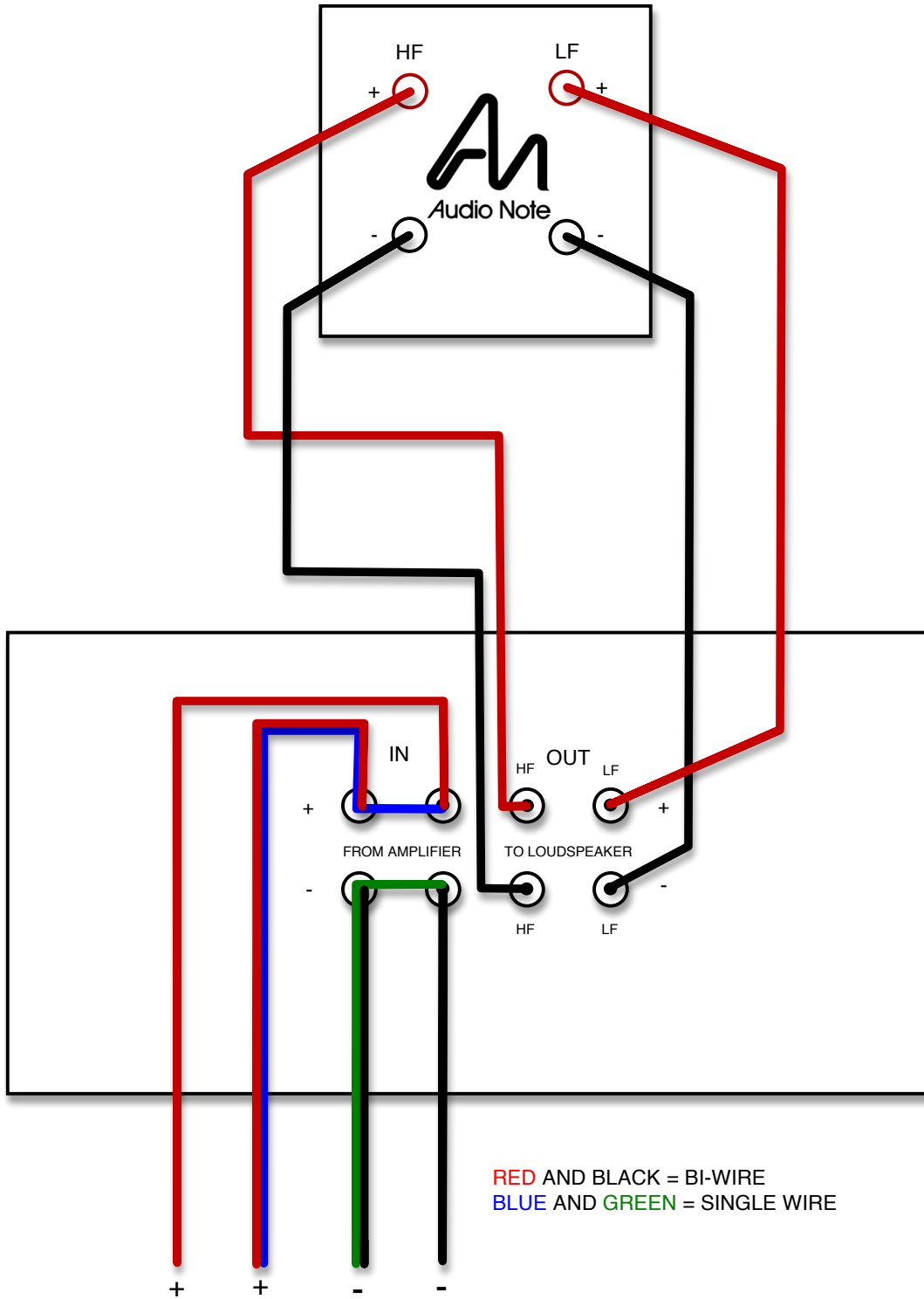
As with the internal crossover models, it is possible to connect the external crossover to the amplifier in either single wired or bi-wired operation, or to bi-amplify. Please refer to the descriptions of both operating methods in the 'internal crossover models' section. Your Audio Note (UK) Dealer will be pleased to advise you further, should you have any questions.

EXTERNAL CROSSOVER CONNECTIONS



CONNECTION (external crossover models) continued...

AN-E LTD CONNECTION PANEL



LOUDSPEAKER CONNECTIONS FROM AMPLIFIER

CONNECTION OF THE PSU

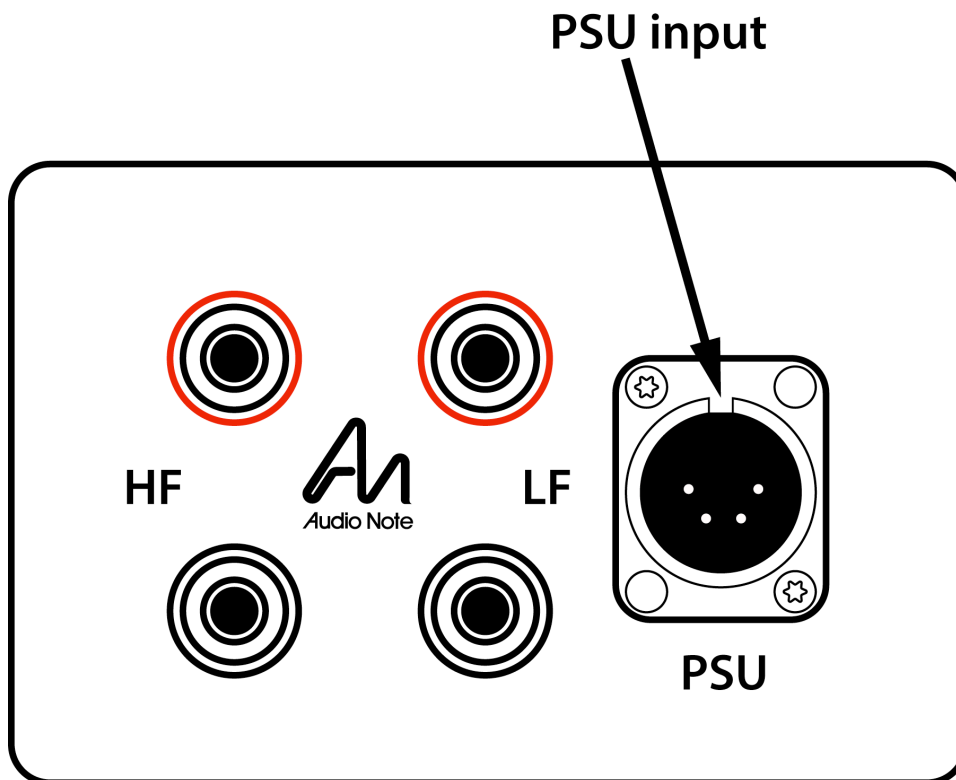
Each AN-E Ltd is equipped with a dedicated external power supply. It is essential that the correct PSU is attached to its corresponding 'speaker. ***Check the serial number on the rear of each PSU, and connect it to the matching AN-E Ltd 'speaker.***

Choose a stable position for the PSU that is close to its matching AN-E Ltd 'speaker. Each 'speaker is supplied with a 1.5m long AN-LEXUS umbilical cable that runs between PSU and 'speaker, and this must not be stretched or under strain. The PSU also needs to be close enough to the required mains electrical supply socket, so that the supplied mains cable is not stretched or under strain.

MAKE SURE THE PSU IS DISCONNECTED FROM THE MAINS SUPPLY AND THE FRONT PANEL 'MAINS ON' SWITCH IN THE 'OFF' POSITION (ROTATED ANTICLOCKWISE).

You may now connect the PSUs to the AN-E Ltd 'speakers. Each umbilical cable is fitted with Neutrik four pin XLR connectors.

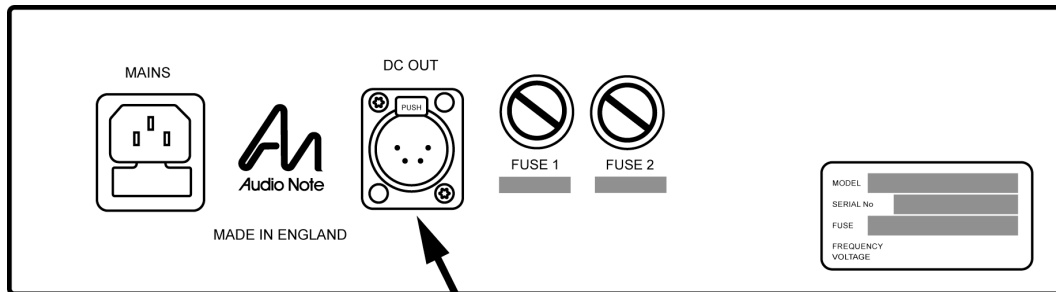
Look at the rear of the 'speaker and identify the **four pin male XLR PSU input socket**: -



Identify the female XLR plug on the umbilical cable and insert it into the socket, making sure the plug is fully inserted and the connection is solid. You should feel a 'click' when the plug is correctly inserted (to remove the plug, press the latch button located at the top of the plug).

CONNECTION OF THE PSU continued...

Look at the rear panel of each PSU and identify the **four pin female XLR** PSU output connection socket: -

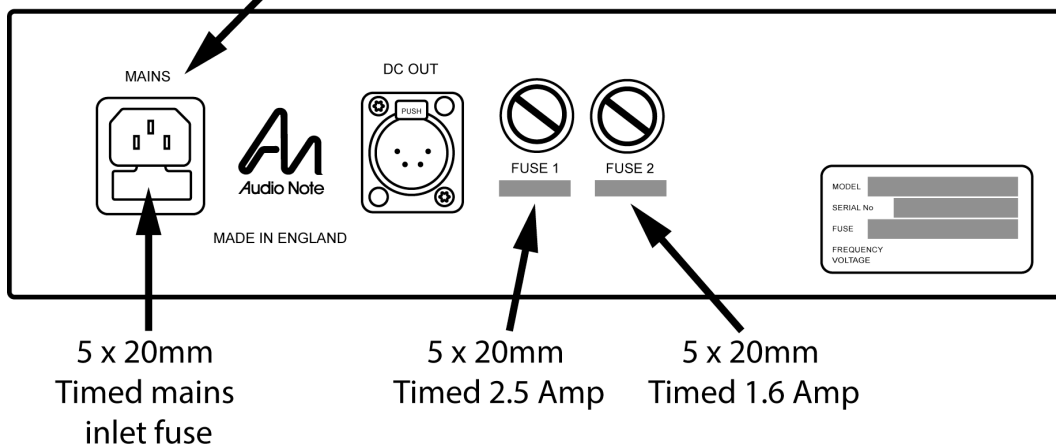


PSU output

Identify the male XLR plug on the umbilical cable and insert it into the socket, making sure the plug is fully inserted and the connection is solid. You should feel a 'click' when the plug is correctly inserted (to remove the plug, press the latch button located at the top of the socket).

Each PSU is equipped with an IEC 320 mains inlet socket. Once the umbilical cables are correctly installed, use the supplied mains cable to connect each PSU to the local mains supply.

Mains power input



There are three fuses in each PSU, located in holders on the rear panel. Refer to the 'Specifications' table on page 19 for the correct value of mains inlet fuse for your local mains electrical supply.

OPERATION

Once all the connections are completed and checked, ensure that the volume control for your amplifier is at the minimum setting. Make sure all source components and amplifiers are switched on BEFORE switching on the AN-E Ltd PSUs; to protect your AN-E Ltd loudspeakers from damage, always make sure they are the LAST pieces of equipment to be switched on and the FIRST to be switched off.

To power up your AN-E Ltd 'speakers, simply rotate the 'MAINS ON' switches mounted on the fascias of each PSU in a clockwise direction. The red LED mounted in the centre of each fascia should light up, showing that power is now being fed to the 'speakers.

Running in

While we fully expect your AN-E Ltd loudspeakers to produce beautiful music, they may not do so from the first moment out of the box. Don't be alarmed; this is perfectly normal.

Loudspeakers have a running in period, during which time the drive units "loosen up". During this period, the sound may be somewhat dry, bright and constricted. As the suspension and cone materials of both drive units "soften up", bass will become more rich and full, treble will become more smooth and extended, and the true sound of the AN-E Ltd will be revealed.

We expect the AN-E Ltd to have a running in period of around 100 hours, which for the average listener will take about a month, based on three hours of listening per day. This period can however vary considerably due to factors such as music types, listening volume and type of amplification used. (Loud heavy metal or Mahler symphonies are especially effective!)

If the rest of your system is of commensurate quality, you may notice that when you haven't played your AN-E for a week or longer, they seem to experience a lesser version of this running-in process again. Everything will be completely back to normal within 5 to 10 hours.

After the initial running in period, you're AN-E Ltd 'speakers will reach optimal operating condition 30 minutes after switch on.

DO NOT LEAVE THE AN-E LTD SWITCHED ON CONTINUOUSLY. IF YOU ARE NOT LISTENING TO THEM, SWITCH THEM OFF!

Cleaning

No special maintenance is required for your AN-E Ltd loudspeakers. Use a soft, clean lint free cloth to remove any surface marks from the cabinets. For finger marks / grease, use a soft, clean lint free cloth, very lightly moistened with a solution of warm water and mild detergent. Do not use any alcohol or solvent based cleaning products, as they may damage the finish of the cabinet.

Under no circumstances should you attempt to clean the drive units of your loudspeaker.

Playing some loud music will displace any dust that has collected on the drive units!

TECHNICAL SPECIFICATIONS

CHARACTERISTIC IMPEDANCE	6 Ohms
SENSITIVITY (for 1 Watt at 1 Meter)	97 dB
FREQUENCY RESPONSE	18Hz to 23Khz, +/- 6dB in room
MINIMUM AMPLIFIER POWER	8 Watts RMS per channel
MAXIMUM AMPLIFIER POWER	150 Watts (unclipped) RMS per channel Peak
DRIVER COMPLEMENT	8" foam surround bass driver with Hemp cone, high flux field coil magnet assembly, silver wire voice coil 1" silk dome tweeter, high flux field coil magnet assembly, silver wire voice coil
UNIT WEIGHT	29 KG approximate per 'speaker (internal crossover models) 4kg per PSU
SHIPPING WEIGHT (ORIGINAL PACKAGING)	32 KG approximate per 'speaker (internal crossover models) 4.5Kg per PSU
FUSES	Mains Inlet: - 5 x 20mm 500mA Timed, 220/240V 5 x 20mm 1A Timed, 110V/120V Fuse 1: - 5 x 20mm Timed, 2.5A Fuse 2: - 5 x 20mm Timed, 1.6A
UNIT DIMENSIONS	790mm (h) x 360mm (w) x 270mm (d) per loudspeaker (internal crossover models) 96mm (h) x 300mm (w) x 310mm (d) per PSU
SHIPPING DIMENSIONS (ORIGINAL PACKAGING)	890mm (h) x 460mm (w) x 370mm (d) per loudspeaker (internal crossover models) 196mm (h)x 400mm (w) x 410mm (d) per PSU
NOTE	Due to Audio Note (UK)'s ongoing research and development program, specifications are subject to change without notice.

WARRANTY INFORMATION

Audio Note (UK) warrants this product to be free from defects in materials and workmanship for two years from the original date of purchase from an appointed Audio Note (UK) dealer, and agrees to covers the cost of parts and associated labour required to correct such defects, subject to terms & conditions.

This Warranty is offered to the first purchaser only.

If the product fails in normal domestic use and during the Warranty period due to the above described faults or defects, Audio Note (UK) will, at its discretion, repair or replace the item free of charge within a reasonable time once it has been returned to Audio Note (UK) or an appointed Audio Note (UK) dealer or service engineer.

Audio Note (UK) is not liable for any shipping charges incurred whilst transporting the product to or from Audio Note (UK) or an appointed Audio Note (UK) dealer or service engineer, should the item require service or repair during or after the Warranty period.

If the product must be shipped, please use the original packaging materials and include a copy of the original sales receipt along with a note explaining, in as much detail as possible, the problems you are experiencing with the unit.

Only use a reputable Courier Service or Shipping Agent, and ensure that your product is insured during transit.

Any servicing, repairs or modifications not authorized by Audio Note (UK), or carried out by persons other than appointed Audio Note (UK) service engineers will invalidate any warranty.

This Warranty does NOT cover: -

Damage sustained whilst in the possession of a shipping agent, retailer or consumer and not caused as a direct result of defects in materials or workmanship.

Damage caused by normal wear and tear.

Damage or defects caused by abnormal or unreasonable use.

Damage caused by accident, acts of nature, misuse or neglect.

Damage caused by a failure to follow the operating and installation instructions supplied with the product.

Damage caused by improper or careless cleaning.

Audio Note (UK) reserves the right to refuse warranty for any component of which the serial number has been removed, defaced or tampered with.

CONTACT INFORMATION

If in the future your Audio Note (UK) product requires servicing, or if you require technical support or have any questions regarding this or any of our other products, please contact your local Audio Note (UK) dealer.

Alternatively, please feel free to contact us directly: -

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