AudioNoteKits DIY Guide

Understanding the basic skills for building an AudioNote kit and learn a little about the products and the DIY hobby.

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This document is designed to help the first time or even experienced audio kit builder build a successful kit by introducing all the skills required to build a great kit.
Introduction

This document will help you understand all the aspects associated with building an AudioNote Kit. This is great way to prepare either prior to ordering a kit or just before you start to build – Whether you are embarking on your first kit or are quite experienced this manual can shed light on a lot of the topics associated with building our audio gear. It can also help you understand the skills necessary to build your first kit whether it be a DAC, Pre-amplifier, Phono Stage, Single Ended 300B Amplifier or EL34 70W MonoBlock. It will also train you in the basic understanding of the electrical aspects/tools required for the kits so that you will have the basic knowledge to test and debug if necessary your build. Good Luck and enjoy the journey into the wonderful world of audio kit building.

Discussing AudioNoteKits at a local Audio Show. Sept 2011 – Welcome to the wonderful world of AudioNoteKits – Hi End Audio that you build yourself.. Enjoy.
The end result.. Here is a completed Kit – From the original design to the manufacturing to the parts sourcing to the kitting up and manual development. It’s a busy process but the end result can be magical.

The pic above shows a completed **DAC3.1 Signature Version with Balanced IE core o/p transformers**.
What’s inside an AudioNote kit?

**Chassis and a cover** along with several transformers – these could be Mains, Chokes, Output, Interstage, IV etc.!

There will be lots of **hardware** – We supply metric M3, M4, M5 stainless steel hardware throughout individually bagged for each section of the kit!

There will be **resistors** and **capacitors** along with valve bases!

There will be Chassis fittings which include **speaker posts, RCA connectors, XLR sockets**

**Faceplates – both front & rear**

**Tubes** of course!

**Wire** of course – pre twisted different gauges – we use silver plated copper Teflon wire known as PTFE as hookup

**You** will provide a soldering station & solder along with a Philips screwdriver! An M4 nut driver would also be helpful for tightening nuts!
Wow – my kit has just arrived.

There is nothing quite like the arrival of an AudioNote Kit.

This is the L6 70W monoBlock that has just arrived at a customer’s location. Once a kit is received its time to start going through it and separating all the bags and parts and get ready.

Hardware Bag, IEC Bag, Chassis Fittings, M2 Power Supply, Line stage, Wire – These are just some of the typical bags that would be included in an ANKit. We basically break up each task in the kit into a separate bag with its own parts list containing all the components. Wire and Hardware we keep in their own separate bags for the entire kit but these in turn have several sub bags for each section!
Hardware Lesson – The First Bag in any kit.

Since we are focused on Mechanical aspects of the kit we should provide a little lesson in the first ingredient that goes into the kits – HARDWARE. Our Mechanical expert once told me – “Hardware is Beautiful” – I was not sure what he meant but now that I see the copper insert plates, black countersunk screws, stainless steel metric hardware throughout I can understand what he means.

Here are some examples of M4 metric stainless steel hardware – starting from the lower left corner and going clockwise we have a M4 16mm Pan screw, 10mm screw, M4 16mm CSK(flat) screw, Fender Washer M4, standoffs x2, M4 Nut – then in the middle are a standard M4 washer and an M4 serrated washer!

All the AudioNote Kits use high quality stainless steel metric hardware – The Metric system uses the M designations – a typical kit will supply M3 & M4 screws (M4 being the larger) some kits will have M2.5 and M5 & even M6 but in general most of the kit will use M4 screws – A typical Philips screw in the kit will be an M4 PAN Philips SS 10mm – This means it will be 10mm longer which is roughly 3/5” of an inch

Other than screws, nuts and washers you will also see Standoffs in the kits – these are typically also M3 & M4 in size.

It’s amazing how much hardware we go through to supply all the kits! In the early days we would buy 100 M4x10mm and 100 buts – today we buy in 2000-5000 quantities! We spend thousand’s every year on the best stainless steel metric hardware for the kits!
IEC Section – The second bag in any kit.

Every AudioNote Kit comes with what we call the IEC section – IEC is a standard for the AC plug that is in the back of the equipment with the same receptacle – this way the same piece of equipment can work in any country in the world and all the changes is the power chord from that country’s wall socket. The IEC section is what allows the wall voltage to enter our kit and get to the PRIMARY of the Mains transformer where we can start to supply AC voltages to the power supply.

So basically this section comprises of the IEC plug, the rocker switch, fuses, ground lug and the specially made cables that we prepare for you so you can simply interconnect between the IEC and the rocker. In some kits we will get you to add a crimp to the end of a transformer wire and then add some heat shrink to this – We guide you through step by step – the nice thing is that by following our procedure and using our premade cables you will have a very clean and safe IEC section on your kit that you will be proud of.
Wire - Let’s talk about the wire that comes in every kit.

The AudioNote Kits come with a number of different types of wire – We use a solid core wire on the Primary of the Mains to configure for the world voltage – Then on the secondaries we use an 18g copper stranded wire for hookups from the Mains transformer secondary to the M2 Power Supply.

Then we move to a Silver Plated stranded Teflon (PTFE) wire for all Hookups including filaments and High Voltage (B+, HT)

We have a separate Kit Bag called “Wire” that will be made up of several subsections of bags associated with wire from different parts of the kit -
Here is an example of a pair of Kit Bags – the bags are marked as in bag #1, Bag#2 etc.. And they will sometimes have their specific designation noted such as in Bag#3 – this is for the 300B filaments in a MonoBlock amplifier. Typical kit will contain about 7 kit bags. We prepare the wire by twisting in some cases or leaving straight or terminating for you in preparation.

Here you can see the shielded AN-A cable that we prepare for you in advance – this cable is typically used from an input RCA for the audio signal – with a shielded cable the ground shield is
wrapped around the audio signal ensuring no noise pickup for any kind of distance run through the kit.

**TOOLS**

Besides your solder, soldering iron and voltmeter – these are the other critical tools that you will want to supply to build the kit. (Top left corner.) A good Philips screwdriver, a wire stripper – and a wire cutter – Usually the stripper will have a cutter on it as well but the stripper allows you to get into tight places.

Let’s move on to some of the Components used in the kits.
Welcome to the Mains Transformer.

Every Kit has a Mains transformer. The Mains or Power Transformer will convert the AC voltage that comes out of the wall through the IEC plug into useful AC voltage that we can use in the amplifier, pre-amp, DAC etc.

Shown above are 3 mains transformers from the kit family – on the left is the Mains transformer used for the L2 L3 DAC product lines. In the middle is the Mains used for the 300B amplifiers (we have two different varieties) and another variety for the EL34 amplifiers. The Mains on the right is a large double capacity EL34 Mains used in the L4 & L6 amplifiers as an option. Really good mains transformers are expensive to make but influence the sound greatly. We have gone to great lengths to design very high quality manufactured Mains transformers that result in ultra quiet operation.
Getting started on a kit.

Shown above is a typical starting point for the L2 L3 DAC line up of kits where we would first install the feet then followed by the Mains transformer and Choke (shown above) along with the IEC section.

Once you start on a kit you will spend the first session mainly working on mechanical assembly which will involve mounting transformers and feet and chassis ground screws, IEC and rocker which is a snap in device.

Then we move on to the subject of some soldering.
Before starting on your first kit you will need to learn the basics of soldering – Usually about 20 minutes of practice and you will be in good shape. The key to soldering is having the right temperature and the right solder to make your connections nice and clean. The only real way to learn how to solder is to get a soldering iron and some solder and some components and practice away – If you want to request some practice parts with your kit we will be happy to send them along no charge.

You will want to buy a solder station which contains a stand and a sponge ideally – check out the Weller line where you can pick up either a temperature adjustable soldering station or one where the temperature is controlled by the type of tip –

Either one is fine and you will spend anywhere between 70-150$ on a unit.

TYPE of solder :

I am using a 22 guage TIN solder for my project – this is a good solder to get started with – you may want to investigate solder containing silver for some projects
SOME SOLDERING TRICKS

There are a few basic skills that you need for soldering and it will make your build very easy.

Let’s start with soldering a resistor to a PCB – one of our easiest tasks.

Here you can see where soldering iron meets solder – I usually find the hottest part of the tip is not the very end of the tip but rather the side of the tip – if you bring the soldering iron and the solder together on an angle as shown in the pic below you will get a nice FLOW

Success!!
BASIC SOLDERING

Here’s a close up pic of some nice solder joints – you can solder on the top side of the board and the bottom if you wish

TINNING........

Possibly the most valuable lesson you will learn in this document is the basics of tinning – Tinning is the act of applying solder to a surface – usually a wire so that it can then adhere to another surface – For example – If I had some stranded wire as shown and I wanted to solder it to a PCB hole – you could just stick the wire in the hole and start to apply solder – but it will take some time for the solder to adhere to the wire surface – then it needs to adhere to the hole – so to make things easier – we will TIN the wire as shown – then insert it into the hole and then apply a just a little solder and you will see how easily the wire will now connect to the hole.

Lets strip some wire!
Wire stripper in position!!

The stripped wire now showing the stranded wires

Tinning the wire –

NOTE: Any stranded wire will have a very thin clear coating on it that basically wants to resist solder – So by tinning the wire in other words heating up the wire and adding solder we dissolving this thin coating and applying the TIN right to the stranded wire – Now this wire will be very easy to solder to another surface!
Tinned wire – you can see the tinned wire and the untinned wire – Tinned wire can be much easier to work with when trying to solder it to surfaces!

Here is the tinned wire after it has been clipped!

And now we insert the tinned wire into the hole on the PCB –

NOTE: Stranded wire will typically have a coating on it – and when you go to solder the wire to a PCB the stranded wire coating needs to burn off – by tinning you have already done this – so it is much quicker now for the tinned wire to adhere to the solder hole on the PCB.
Here is an example of a typical solder joint. Very nice little cone like a volcano and shiny..

RESISTORS & CAPACITORS

Every electronic audio circuit is made up mainly of resistors and capacitors. We should have a basic understanding of what they do, what they look like and how we will install them in our kit. Let's start with resistors.

A resistor is a linear, passive two-terminal electrical component that implements electrical resistance as a circuit element. The current through a resistor is in direct proportion to the voltage across the resistor's terminals. Thus, the ratio of the voltage applied across a resistor's terminals to the intensity of current through the circuit is called resistance. This relation is represented by Ohm's law:

\[ I = \frac{V}{R} \]

A resistor has a color code on it with each color representing a number between 0 and 9. So you can learn to understand the value of a resistor by reading the colors – another good way is to take your ohm meter and just measure the value of a resistor – Typical resistor values you will see in a kit are between 100R or 100 ohms and 1 Meg ohm (1M). A typical nomenclature for understanding resistor values is as follows:

- 1K = 1000 ohms
- 2K7 = 2700 ohms
- 100R = 100 ohms
- 1M2 = 1,200,000 ohms

Note how the letter is used as the decimal point!
We have a nice resistor calculator on the audionotekits web site and there are plenty of good ones on the web where you can select the color codes and find out the value or vice versa.

Last comment on resistors is that they come in different wattages – typically we use 1/2W, 1W and 2W resistors – in some applications where more power is used we have 3W, 5W and 10W resistors. For example on the 300B cathode we use 2 x 1500ohm 10W resistors in parallel.

When two resistors are in parallel their overall resistance will be \( \frac{1}{2} \). for example 1K5 // 1K5 = 750 ohms. When resistors are in series they add up 1K in series with 1K = 2K

**Measuring Resistor values** – The easiest way to measure a resistor value is to use your voltmeter and set it to OHMS and make a measurement on each side of the resistor – the resistor in the pic below measures 10K ohms – you can also use the color code chart – check out many resistor color code calculators on the internet -

![Image of a multimeter and resistor]
Electrolytic Capacitors

There are several types of capacitors that we use in audio circuits – Electrolytic, FILM, silver mica are the three major types – then there are a number of brands that make capacitors: Mundorf, Jensen, AudioNote, Black Gate etc..

Let’s take a quick look at ELECTROLYTIC CAPACITORS as you will be using them quite a bit.

The first thing to understand about Electrolytic capacitors is that they are “Polarizes” which means that they have an orientation of PLUS and MINUS – In other words they need to be installed in the circuit with the correct polarity or they won’t work properly and they usually will explode at some point. Now it’s easy to know which way they go in- The capacitor will have a big stripe on the NEGATIVE side and we mark all the PCB’s with a + sign to show which is the POSITIVE side.

You can see in the pic above the white stripe on the side of the capacitor that denotes the Negative
FILM CAPACITORS

Above are the three levels of AudioNote Film capacitors – Film caps that are used in the audionote kits have values typically such as .1uf 600v, .22uf 600v, .47uf 600v – These caps are what the actual Audio signal goes through in 9 out of 10 cases – this is why they are critical for sound quality – We use the AudioNote TIN Film caps (on the left) in the standard versions of the kits – these caps cost in the 25$ range. The AN copper film caps are twice the price and are usually ordered in a signature Kit. The AudioNote Silver caps are very expensive in the 400$ range for example.

There are many other companies in the audio industry that make FILM caps for signal path and many DIY’ers will try different caps to get an understanding of the different Sounds – Mundorf for example make a range of FILM caps also and we use their Mundorf Supreme cap in a number of situations.

Unlike the electrolytic cap these caps are not polarized – some mfg’s though do suggest that you orient them a certain way with respect to the direction of the audio signal – and AudioNote Does this also. The good news is they won’t blow up or behave badly if they are put in either orientation.

A view of some of the different sizes of caps for the different values – typically the larger the value such as .47 or 1 uf are larger than the 0.047 or .1 caps! .22 caps are used most often as the main signal cap between tube stages in the pre-amplifiers and amplifiers like the L4 series and 300B!
TUBE BASICS - AC Voltages & DC Voltages

Well it’s a good idea to understand the very basics of how a tube works to amplify an audio signal – It will also help when it comes to some basic debugging – you don’t have to know everything about audio electronics but a few basic checks will tell us if it’s even possible for the tube to work properly –

Basically there are two worlds of electricity when we go to debug some circuitry – the first is AC and the second is DC. DC is simply a static voltage that you measure at a point – like a battery that is 9V for example or an audio power supply that supplies 260V DC

AC is an alternating current of a particular frequency – this is basically a sin wave or in the case of an actual audio signal it’s a number of sin waves all combined together.

ACTUALLY AND THIS IS A VERY IMPORTANT POINT – AC VOLTAGE can really just be DC voltage that changes value – suppose you measure 260v DC at a point – and then 1 second later it reads 270v and then 1 second later it reads 250v DC and then 1 second later it reads 260 again and so on – this would be considered an AC signal – which seems to have a 20 volt swing and seems to take 3 seconds to repeat its cycle. My example shows a very slow or low frequency change in voltage but it is still an AC signal. When we input an audio signal into our circuit which is a set of DC voltages –we actually modulate or ADD our AC signal onto the DC signal – so we may have had for example a 260v DC level but we added a 20V AC signal onto it so when we went to measure our DC signal at different time points we got different values. – This is a key point because we add our AC signal to the DC and then the tube amplifies it to create a new AC signal which again is sitting on DC and then we use a capacitor to filter out the DC component – and the end result is our 20v signal oscillating around zero.

Before we even listen to any amp we must first test for “DC conditions” – in other words are all the DC voltages throughout the amp correct such that the circuit can actually pass an AC signal over top of it.
BASIC TUBE AMPLIFICATION UNDERSTANDING

When I went to electronics college we learned all about the Transistor amplifier. We had a lot of formulas and most of us in the class could do all the calculations with the formulas and come up with the right answers for the test. But the basic concept of how the transistor actually amplified or even worked was missing – no one in my class could really explain how it really worked – they taught us the physics side of it with electrons being attracted from one side to another and then a lot of high level formulas where you inserted values in to calculate the various resistors and voltages to be used to achieve some sort of gain. –I thought that there had to be a simple explanation as to how it really worked rather than a lot of formulas and discussions about electrons moving around. One day I decided to step a sine wave through the amplifying device to see if I could make some sense of it. What happened to all the voltages as my sin wave went in slow motion into the transistor or tube. I came up with some simple basics that anyone can follow. Funny enough I have used these basic rules to debug many circuits over the years and explain basic operation to many kit builders. – Very knowledgeable electronics people may scoff at these simple rules but if you are starting from scratch like we all were in electronics college – these simple rules will give you a basic understanding of how the amplifier circuit works..

So above we have a generic device which could be either a tube or a transistor – let’s call it a tube and give it the proper pin names – there are basically three pins and this would be considered a TRIODE like a 300B single ended TRIODE.. Let’s start with the CATHODE of the tube – This is the most important point on the tube for debugging – if you have a correct voltage on this tube you can be close to guaranteed that your tube is ready for operation – in other words the tube is now like a horse about to take off down the track.
Let’s look at some other things in this picture – we have something called HT or High Tension – this is basically the HIGHEST LEVEL DC voltage that we are going to use to RUN our tube – this is what the power supply will supply to the tube. – It sits at this voltage all the time – does not change.

At the bottom of the tube you can see GND – this is ground potential or zero volts.

One of the most important facts about this current flow is that the actually current does not change “much” – it’s called a constant current source – If the tube is set up for 2ma to flow through it then that is a constant – \( R = \frac{V}{I} \) – so if the resistance is fixed and the current is fixed
When a tube has been properly BIASED* and is working correctly a big current flow will occur from HT to GROUND – think of it as a river flowing in one direction..

- BIAS means we are going to set up certain voltages and resistors in order that the tube can actually operate – it’s like getting an aquarium ready of a certain size and a certain water temperature such that a fish of a specific size and comfortably live in thrive in the aquarium.

So how do we start preparing a tube so that it can operate correctly and amplify our signal

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* TUBE BASICS - CURRENT FLOW

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Let’s start by adding a resistor in the current flow path – This resistor is called the CATHODE resistor because it sits between the cathode of the tube and GROUND. Most of us know the famous equation $R=V/I$ which stands for Resistance equals Voltage divided by current – I can’t tell you HOW many times I used that formulae during electronics college. By using this formulae we can calculate how much current we want to have flow through the tube – by putting a resistor in here of a certain value we will control the CURRENT flow in the tube – I have put a 1K resistor which equals 1000 ohms – which gives me a cathode voltage of 2V which is in the range
of our generic tube and a current flow through the tube of 2 ma which is also within spec of our TUBE.

Whether it’s a 300B with a cathode voltage of 70V DC or a 6SH7 with a cathode voltage of 1.5V - every tube has a cathode voltage and an associated current flow. And By using your voltmeter you can measure the cathode voltage of any tube – if you measure a cathode voltage of 0v you know for a fact that this tube is not conducting any current and is not operating.

Now by installing an ANODE resistor we can control the voltage drop from the HT to the ANODE of the tube – our tube spec manual will say that it likes to see no more than say 150v at the ANODE – therefore we would come up with a resistor that would drop 100V (from 250 to 150) given the amount of current flowing through the tube – in our case 2ma – so \( R = \frac{V}{I} = \frac{100}{2ma} = 50000 \) or 50K

So now we have our two resistors selected along with our HT voltage and cathode resistor and operating current.

We are all set - our tube is now operating –
I like to use the analogy of a swimming pool with enough water in it – let’s say 6 feet deep such that a swimmer can now comfortably swim across the pool – the specifications for a 5’10” women to swim in this pool is that we have a minimum of 6” of water in the pool and no more that 8’ of water (this is where the pool overflows).

Now let’s look at what we do when we input an AC or audio signal of a frequency in the audio spectrum e.g. 1Khz into the tube – Well the voltage at the grid is fixed at our tube – (It would typically be 6v higher than the voltage at the cathode) – So we now input a voltage at the GRID.
Now here is the trick to how the whole thing works – think of us “wiggling” the 2V DC at the grid – we wiggle is between 1.8v and 2.2V – so its a little 4v wiggle. – what is happening here is the little audio signal that is 4v peak to peak and looks like a sin wave is “wiggling the DC voltage at the GRID – NOW the interesting thing about the way a tube or a transistor is constructed is that the voltage at the GRID is directly linked to the voltage at the cathode –

So by wiggling the DC voltage at the GRID we are also wiggling DC voltage by the same amount at the CATHODE – so now we see a 4v DC voltage swing at the CATHODE which is mirroring the GRID – BUT we are feeding a bigger constant current flow THROUGH the tube path – see next diagram.
So basically what happens now is that as we adjust the 2V at the cathode by adding 2 volts to it we have increased our current flow slightly – this **same current** flow is now going across the anode resistor but the large resistor at the anode causes a bigger VOLTAGE drop than the 2 v – the drop across the anode resistor now could be 2v – so this is a 10x increase and this would be considered a 10x gain – so what we have is a mirror action where whatever wiggle occurs as the grid gets mirrored to the cathode and then amplified by the bigger voltage drop across the ANODE resistor – I have an example at the back of this document showing the math and how this is arrived at.

OK so this gives us an idea of how are sin wave is amplified
SO by feeding a constant current across a small resistor (cathode) and a bigger resistor (ANODE) we are able to reproduce the wiggle we saw at the GRID. This wiggle is our audio signal which is actually a very complicated signal made up of many sin waves of all sorts of different amplitudes and frequencies which make up the music we listen to.

In an amplifier output stage we actually don’t have an ANODE resistor but rather the primary or input of a transformer which would have a resistance of say 1K5 – it looks like a resistor to the tube but it is actually a transformer that then transformers this amplified wiggle to the secondary – it’s all quite genius. And this is only the very beginning.
What is the FILAMENT?

This is an important concept when dealing with tube audio gear. You know when you see a tube glowing in the dark in some audio gear – what gives it that glow? It’s the filament voltage that is applied to the tube – on a typical tube like a 12AU7 for example there are two pins out of the 9 that are reserved for the filament voltage – By providing 12.3V DC to pins 4&5 of this tube you are satisfying the filament voltage requirement – without a filament voltage applied to a tube – it will not work. Some tubes like the 6922 tube used in the DAC2.1 only accept a 6.3V filament voltage – now it can be AC or DC. We make it DC so that there is less chance of hum to occur. Other tubes like the 12au7, 12ax7, 5687 and many others accept either 6.3V or 12.3V.

Now if you are wiring up for 12v on a 5687 you use pins 4 & 5 – If you are wiring up a 5687 for 6.3V then you have to connect pins 4 & 5 together and connect your 6.3V to 4-5 and the pin 9.

The 5U4G rectifier tube used in the kit1 and the Legend and interstage Monoblocks uses 5V AC for the filament- the 300B uses 5v DC or AC – again we use DC – the 6SH7 in the MonoBlocks uses 6.3V AC – so as you can see there are all sorts of combinations for getting filament voltages to a tube. Usually filament currents are small like on the 12AU7 you are dealing with 300ma. On an EL34 in CLASS AB mode (the mode we run the L4 EL34 amplifier in) we are using 6A AC filaments – that’s a lot of current flowing out of the wall. And thus the great sound.

Ok with a small understanding of filament voltages required for a tube let’s take a look at schematics and understand some of the basics.

Here on the left we can see a 12au7 which has two amplification sections in it – you can see pin1 is the ANODE of the first device, pin 2 is the GRID where the audio signal goes into – and pin 3 is the CATHODE.

Then you see pins 4 9 & 5. These are the filament pins – this tube can be configured for either a 12V filament or a 6v filament –

In 12v mode you connect to pins 4&5 – the filament is shared by both halves of the tube!

In 6.3V filament mode pins 4 & 5 are connected together and the voltage is apply to 4/5 and 9.
Let’s take a look at a schematic and see if we can understand the various components.

This is the power supply schematic for the L2 L3 DAC2.1 3.14.1 series of products – over on the LEFT hand side we see the PRIMARY of the Mains transformer – this is connected to the wall voltage of 120V AC - on the right side of the double line representing the transformer we have the transformer SECONDARY’s – at the top we have 0 -6.3V - this is a 6.3V AC that we will use to supply the filament voltage to the 6X5 rectifier tube – The rectifier tube converts the AC voltage into a full wave rectified signal which is almost like DC which we can smooth out and use for our HT voltage in our power supply.
We can see V2 in the top left hand corner representing the 6X5 tube – Pins 7 & 2 are our filament pins – pin 8 is the output of the rectifier which connects to a 100ohm resistors (100R) and then connects into a CHOKE – this is the little transformer you see in the pic below – A choke transformer is basically a single wire going in wrapped around a core and then goes out – it causes voltages that want to change quickly to not allow this – so it acts to smooth out the DC voltage that came out of the rectifier.

C5 & C3 are electrolytic capacitors which we have discussed and you can see the + side (white box) and the negative side going to Ground – see the Ground symbol at the bottom of C3.
The other tube in this pic is the ECL82 and each circle represents half of the ECL82 – this tube has two separate functioning parts in it.

The bottom half of the schematic shows the circuit for the DC filament voltage that gets generated.

Above is the schematic for the L1 EL84 integrated amplifier. It shows just one channel of this stereo amp – See if you can go through this schematic and recognize capacitors and resistors and tubes and maybe an output transformer.
**Interwiring**

When it comes to tube audio we use both hardwiring and PCB for different applications – in some cases PCB makes the most sense – in other areas hardwiring makes more sense.

We have some nice graphics for hardwiring and interwiring the kits – check out the final slide in the Legend MonoBlocks for wiring all the components together.

Now the nice thing is that this is a gradual process – you start with simple wiring of basic things and slowly add on
Here is an initial slide on the Legend MonoBlock showing the three chassis ground connections – the slides we provide will step you through the interwiring phase one wire at a time. Below you can see a filament board being installed (red box above).

If you check out the [www.audionotekits.com](http://www.audionotekits.com) web site you will see the interwiring charts for the Legend and the Interstage MonoBlocks! We will soon have guides for all the kits displayed on the web pages!

We find the best way to guide you through the kit build is with graphics and photographs – we typically supply hi res pics on disk of all the pics that are in the manual so if you really need to zoom in on a section to see what is going on you can do so!
GUIDED TOUR THROUGH SOME GEAR AT AUDIONOTEKITS

Valve Bases and Configurable Insert Plates.

Here’s a chance to look at the valve bases we use in many of the kits – Legend, Interstage L4, L6 – We use a combination of several types of valve bases for the kits 4pin, 8pin and 9 pin (and coming soon a 7 pin for a new L1 series tube power supply.) Here we have a front insert plate for the MonoBlocks getting prepared.

Below is a photo after the front insert plate has been installed.
Here we are preparing the RCA connectors on an integrated amplifier – we take a single ground wire connecting all the RCA’s over to the VOL pot.
Ahhh the completed L4 EL34 PCB – Our PCB’s are ultra thick and sturdy with all the best grounding strategies in place so that anyone can install all the components, run a few tests and have a perfectly working amplifier.

We have a lot of EXCELLENT professional build pics of the kits so that you can try and mimic as best you can the way a professional builder would go about building. Any jobs that we think you would have trouble with we prepare for you in advance – such as the IEC cabling, the shielded cable terminations, the twisting of wires etc. etc..

We added extension kits to the pre-amplifier and integrated amplifier line such that you would have very short wire lengths in the kit thus reducing any chance of hum or noise pickup.
Here’s a sample of our expertly built L3 pre-amp with extender kit for the Selector switch.
Here’s a shot of the output stage used in the DAC3.1 and L3 pre-amps – We have a PCB for this section as well as a hardwired Board which has big ground traces.

The final presentation of the kit can be like the best of Finished product – you can very proud of an AudioNoteKit as the center piece of your audio system.
Rear view of our L3 Line Pre-amp – transformer coupled above and the

Our new version L2 Line/Phono Pre-amplifier below with extender kit for short wire lengths.
**Tube Amplification** – Our recently released 70W EL34 MonoBlock is actually a very easy kit to build. The key is the perfectly designed PCB that takes care of all the grounding and signal connection issues.

Below the L4 EL34 Integrated – 35W – all the Audionote kits have that finished product presentation – no one will ever know you built a kit.
We typically ship lots of hi res pics with the kits so that you can see the details of a professional build – You may not quite get to this level of build on your first kit but you can try and emulate what you see!

RCA wiring on the inside

And on the outside!
AudioNoteKits is well known for its Single Ended Product line. Here is a pic of the Legend MonoBlock – a single or parallel 300B or 2A3 amplifier – We use the insert plates to configure for a single or parallel operation. Our new releases now ship the copper insert plates for a stunning look and sound.

Hope you enjoyed the quick guided tour of AudioNote Kits – You may have learned a few things or at least gathered some insight into what is involved in building your own Audio Kit.

Stay tuned for an upcoming Product Line Guide similar to this where we will go through the product line explaining the different configurations and where is the best fit for the various AudioNote Kit offerings in your system.