JANTZEN AUDIO

Upgrading Crossovers

Please note that many of the points in this article are valid for both vintage speakers and more modern speakers as well.

As a general note, it is important to mention that we get the most evident and immediate changes to the sonic profile of the speakers, when exchanging/upgrading capacitors.

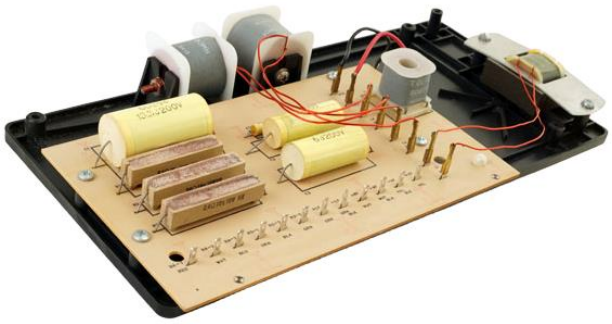
Induction coils have an equally important function, but for other reasons that relates more to overall performance and not so much the sonic profile itself.

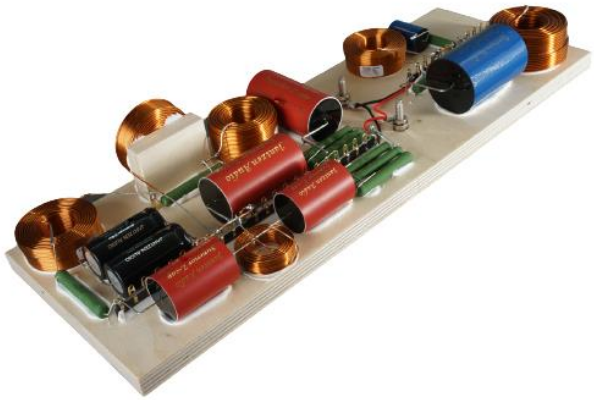
When upgrading your vintage or new speakers using either completely re-designed crossovers or by upgrading the stock crossovers with better components, it is important to consider a few things.

For vintage speakers specifically:

Do you want your speakers to sound different or *"better"* according to more modern notions of how speakers *"should* sound"?

Or do you want to keep the original "vintage" sound of your speakers, for good or bad?





Crossover upgrade DIY kits for vintage speakers:

Jantzen Audio offers some DIY crossover upgrade kits for a handful of vintage speaker models, which were all designed by loudspeaker designer, Mr. Troels Gravesen.

The idea behind the re-designed crossovers was to correct what Mr. Gravesen perceived as shortcomings and to make the speakers perform at their full potential.

We would advise that you read Mr. Gravesen's articles for the re-designed crossovers and the feedback from customers who upgraded their vintage speakers using the re-designed crossovers, before deciding if it is right for you.

General things to consider before taking on an upgrade project:

- Do you have the required experience with crossover assembly?
- Will there be room in your enclosures for the larger crossover boards that upgrading to better components will most often require, or are you willing to make external crossovers?
- Mostly relating to vintage speakers, what is the condition of the drivers and are they in proper working condition?
  If not, your first step should be to have your drivers repaired / refurbished!
- If the drivers are not in optimal working condition, you cannot be sure that the driver(s) will perform the same as it/they did some 30-50 years ago, thus the crossover may need to be redesigned with the necessary changes to factor in frequency response, phase, and impedance.

Considerations for resistors:

If you are going to upgrade your crossovers and spend both time and money on the project, you may as well also upgrade stock (lower-grade) resistors to some good quality wire-wound resistors, like the Jantzen Audio Superes resistors.

Considerations for capacitors:

Generally we would recommend concentrating on upgrading the capacitors that are in direct line with the tweeters and the mid-range drivers.

This goes for both newer and vintage speakers.

Mainly for vintage speakers, the stock electrolytic capacitors can be e.g., 30 years old and should be exchanged.

We recommend exchanging old electrolytic capacitors to new 5% tolerance electrolytic capacitors or possibly upgrading them to MKT (polyester film) or MKP (standard type metalized polypropylene foil).

For the tweeters and mid-range capacitors, it makes sense to use high-end (expensive) capacitors, but for the bass section we recommend simply using good quality electrolytic or MKT/ Standard MKP capacitors, as it is overkill to use high-end capacitors for bass section dedicated capacitor positions.

It is also important to note that specifically for vintage speakers, the capacitor values used were often from the “old e-row” of values and today it is rare to find values like e.g., 1, 2, 3, 4 and 5uF when it comes high-end modern capacitors, which are most often only offered in the “modern e-row” of values.

There will therefor often be a need to couple two or more capacitors in parallel to obtain the right capacitor value – take this into account when simulating the new and larger crossover boards!

Considerations for induction coils:

- What is the condition of stock inductors and is it necessary to exchange them?
- If you want to exchange / upgrade the stock inductors, you will have to pay extra attention to the ohmic resistance of the coils (DRC), as this may be an essential part of the crossover functioning.
- If you wish to exchange the stock inductors, it is necessary to measure the Ohmic resistance of the inductors with a precision milliohm meter. A standard multimeter is not good enough for this, as we are measuring resistance of e.g., 0.1-0.5 Ohm.
- Do your speakers have L-Pads/Attenuators, and do you have the know-how to transfer those to the new crossover boards? Alternatively, would you be willing to sacrifice such features when upgrading the crossovers?

What Jantzen Audio can and cannot offer:

- We **only** offer DIY crossover upgrade kits for the following speakers:
  - B&W 802 Matrix
  - JBL L100 (4310 / 4311)
  - JBL L112
  - Tannoy MG15/MG12 monitors
  - Yamaha NS1000
- We cannot offer to design custom new crossovers for vintage speakers, as it would require Mr. Gravesen to have the speakers in his workshop, which is extremely time consuming and unrealistically costly
- We can offer general advice about component upgrades (mainly capacitors), **if** we are sent the following material:
  - Crossover schematics with component values for your specific model
  - If you wish to exchange / upgrade the induction coils, we also need to know the DCR value (resistance) of the coils, or at least the inductance value **and** wire gauge of the stock coils, so we can estimate the ohmic DCR target values
  - High-res photos of your stock crossovers to determine which types of coils, capacitors and resistors were used
  - If your speakers feature special coils with “inductance selection taps” or any kind of novelty coils with specific or special functionality, our induction coils will not be a suitable replacement and you will need to transfer these special stock coils to the new crossovers.