

JANTZEN AUDIO

Upgrading Crossovers

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Please note that some of the points in this article about vintage speakers, are also valid for 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.

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.

General thoughts regarding vintage speakers:

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

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?

When upgrading to a higher grade of components (mainly capacitors) for re-designed crossovers or as a one-to-one swap using the stock crossover values, it *may* change the sound to various degrees, and you may or may not like that change.

There is no way to know exactly what will happen if you exchange or upgrade components, but as a very generalized rule of thumb; using better components will often mean that the speakers will gain transparency and detail richness (mainly relating to capacitors).

You will always need to do your own experimenting and to listen to your speakers in the old and new crossover versions over an extended period to determine if you like the potential improvement/change compared to how the speakers sounded originally.

We cannot tell you how our different capacitor models will sound in your specific speakers

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.

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 (DCR), 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?

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.

What we can and cannot help with:

- We **cannot** offer to design custom new crossovers for both vintage and newer speakers.
It would require that we had the speakers in the workshop, which is an extremely time consuming and unrealistically costly task.
- We **can** offer general advice about component upgrades, if we receive all the information in the checklist below:

Checklist for component advice:

- You will need the crossover schematics with component positions and values (including DCR values for the coils)
- You will need to make good quality photo(s) of your stock crossovers that clearly show what type the stock coils, capacitors, and resistors are
- You will need to send us a full list of the component values, positions and where they are located (bass, mid, tweeter sections).
You will also need to send us the crossover schematics and the photo(s) of the stock crossovers

