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## The very much non-definitive EAR 834P Modification Guide

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Posted by [Thorsten \(M\)](#) on February 14, 2002 at 08:32:50

Hi,

Given that Romy already let the proverbial Cat out of the Bag (pun intended) I think I may have to make good here....

The EAR 834P is a very simple, but rather smartly designed Circuit, implemented by EAR in a rather skinflint fashion. It's performance is pretty good for the outlay asked here in the UK (where the MM input only Version in basic black sells for under \$ 600. I would not recommend the version with the build in MC Stepups anymore (I used to for a while as the build in transformers are pretty resonable), but for the difference in price between the two versions you can get VERY MUCH superior Stepups that you only need to wire up. More on that later.

The result of the skinflint implementation is that while it offers rather good performance, it is being held back in performance by a number of "cost accountant" parts as well as some potentially smart features, that to me simply don't quite work as well in reality as they should in theory. Still, given the brutally simple design and implementation the sound this thing makes is a credit to TdP's abilities to design effective, commercial products.

But hell, this is supposed to be the "Modification Guide", not an Ode to TdP. The notes below come from scratch building EAR 834P copies, the odd mod to units owned by others and conversations with fellow modketiers. In general the improvements from the measures suggested below is NOT subtle. Credit for the majority of things in here should go to many and varied people (the list is too long to print and some prefer to be known just "Friends" or "Associates" or "Acquaintances" (you know who you are), errors, omissions, gaffes, spelling mistakes and other such are mine of course, solely mine.

In order for what I write to make sense I'll link in for now a Circuit Diagram of the 834P, it may soon have to disappear due to copyright issues, so download and save it now in case you don't have it.



There seem to have been some recent revisions to the Unit. I know about many a unit without C2 and some have an extra resistor in series with the output, supposedly to kill oscillation with excessively capacitive cables.

Tube rolling and the application of major overkill external tube regulated supplies has been discussed already. I'll not again do that in detail, peruse the archives please for details and many views especially on the tube rolling.

Forever onwards EAR and to the stuff for which you have to be able to use a Soldering Iron.

Step 1:

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Replace C1 and C7 with SCR/Angela/Mundorf/Audyn Tinfoil & Polypropylene Cap's NOT with Hoveland's (IMHO). The MIT/REL Polystyrene & Tinfoil or their Tinfoil & Polypropylene may be as good or better, I have not extensively tried them. If you don't have the greenbacks for even SCR Tinfoils mentioned above, try Arcotronics KP 1.72, which I quite like.

If your views differ from mine use whatever capacitors sound "right" to you, may they be TCC Visconol, Vitamin Q or Jensen PIO or even Hoveland. It's your Money and your Phonostage.

Remove C5, R6 & R7, then bridge R7 with a piece of high quality wire. If you want to be sure to stop any possible tendency of oscillation in the cathode follower place a 100 Ohm carbon composite 1/4W Resistor in the R7 Position C5 and R6 remain omitted. If you wish to retain an ECC83 for V3 change R9 from 68K to 120K. If you plan to change the V3 to a 12AU7/ECC82 or at least 12AT7/ECC81 leave it as is in Value.

If C3 & C4 are already silver mica (they were in some Units I came across) leave them as they are, if not try finding good quality NOS non magnetic Silver Mica Units, 1% tolerance to replace them. If C2 is present, and you find the sound of the unit a little too laid back, perhaps lacking in definition and extension of very high frequencies remove it. I like the sound MUCH better without C2. Again, other folks like other Capacitors, make your own selection, but PLEASE do not put some "selected Wima MKP's" in there or crapola like that.

The RIAA Capacitors are among the most sonically critical in any Phonostage, so don't treat them as afterthought, but as the main thing. No Skimping. The Capacitors MUST have 1% or better (lower) tolerance and ideally better than 0.5% matching between channels. I like silver mica (non magnetic) best, tinfoil & polystyrene second tied with magnetic silver mics units. Normal Aluminum Foil Polystyrenes of extended foil construction are another big step down, the generic styroflex are pretty awful and polypropylene & aluminum foil completely useless, but that is just my personal view.

## Step 2:

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Replace C6 with Elna Silmic 100uF/6.3V or if you must Black Gate 100uF/6.3V. The SG Series Sanyo Os-Con's can be used too, but I like neither the tone of the Os-Con or the BG's, they sound a little sharp, etched and aggressive to MY ears. Again, it's your money and unit. Some people liked BG's on the Cathode a lot. Go figure.

## Step 3:

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Change over C8 and C9 to larger value, "known good" sounding electrolytics, I'd be tempted to specify at least 100uF/385V Nippon Chemi Con (radial leads) VX series, these will be a VERY "tight fit". Also find a way to bypass them with at least 0.47uF Wima MKP04 or better (tight fit again). You could use Black Gates again, or Elna Cerafine if you can find them, the Cerafines I quite like, the Black Gates I don't like that much.

If I'd build another unit from scratch I would use a pair of Ansar

Supersound 32uF + 32uF 400V, but these are 4" long and 2.5" in diameter, no way you get them inside the original EAR case. And they cost around 50 Bucks each too.... ;-)

They are available from Cricklewood Electronics in London, you'll have to e-mail them for details.

<http://www.cricklewoodelectronics.com/>

If you modify an existing unit retaining the on-board supply change D1 & D2 to soft switching, superfast types and place a 100 Ohm 2W Resistor between the transformer HT secondary and the Diodes.

In a scratch build unit I actually would/do use a 240-0-240V Mains transformer and a Valve Rectifier (6X4/EZ90 or 6CA4/EZ80/EZ81), and make two electrically independent supplies, with the HT Rail in the EAR split up between the channels, so that C8 and C9 doubled up, R13 doubled up but changed to 200/220K per channel and R14 doubled up and changed to 20/22k per Channel.

Transformers and rectifiers really belong into a separate chassis, so C10 and on are off board, I'd recommend per channel a filter chain using 3 pcs each of 510 Ohm Resistors and 3 each of Nippon Chemi Con 47uF/450V Axial Electrolytic Capacitors (Radioshack in the US sells them) or better for that. Of course such an external unit may be added to an original EAR and the HT MAY be split up there too as detailed above if the original supply is stripped out to make room.

To me such a supply sounds much better on pretty much all accounts compared to the original. I have tried both a completely split supply (two transformers and all separate from there on) and "semi" Dual Mono Supplies that have a common Transformer and rectifier and split up after that.

I have found (not only for the EAR and other phonostages) that if only one main supply exists the arrangement originally used in the EAR is the better one. If you have two complete separate supplies, bring the two grounds together near the Input, to signal ground and split the PSU Rail as discussed above, taking care to return the negative side of the second added capacitors directly to the same point where the original capacitor is connected.

## Step 4:

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Place a 1 Ohm 2W Resistor between the LT winding and the Diode Bridge D3, ideally replace D3 by individual schottky diodes. This will reduce the LT Voltage. If it

is at around 34V already you can leave R16 (33R) alone, otherwise adjust the value until you get 34V across all the heaters together.

As the heaters are in series in the original EAR 834P it is essential if you "tuberoll" to make ABSOLUTELY CERTAIN that the used Valves have identical heater ratings. Some special quality Valves have got higher heater current draws and thus should not be used in the EAR.

Step 5:

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For the last few bits try changing Resistors, I agree this is seriously now in the margins, but I still find quite material changes in sound with changes in resistors. The ones with largest impact are:

R1  
R2  
R12

Also the series resistor in the output if fitted has been reported as quite critical.

Also with some notable influence are:

R3  
R8  
R9  
R10

You are likely to even hear small changes from the other remaining resistors, but these will be quite small.

Depending upon the desired "tone" use whatever gives you what you like, Vishay/Caddock for detail, Allan Bradly (need to be temperature cycled in the oven to stabilise their value and then selected afterwards R2 and R12 are value critical) for warm and fuzzy vintage sound or Kiwame for a sound almost as cosily warm but slightly more modern, Rhopoint non inductive precision wirewound for a "neutral" sound, but the Rohpoints sadly don't come in 750k. I guess I myself would use Caddock/Vishay R12 and Rhopoint for the rest.

Step 6:

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If you have the MM/MC Version bypass the internal Stepups and the switching, on all versions you may find that higher quality RCA connectors (Cardas would be my take) may improve the sound further.

As MC Stepup I would at this time recommend the Stevens & Billington TX103, depending upon the needs of your cartridge set up for a 1:10 or 1:5 Stepup. The lower stepup ratio is preferable if your pickup has enough output. The S&B TX 103 vs EAR has been discussed here previously, no need to get into more details. You get the raw transformers and wire them up, finished. Mine are still without case, just raw transformers with wiretails.

I hope this info is of use to someone, I appreciate feedback from those that have done the mods and remember, YMMV, presented here are ideas, part choices and procedures that make sense to me, they may be the polar opposite from what you like.

That said, a suitably modded or scratch build EAR 834P plus a pair of Stevens & Billington TX-103's will give tremendous performance for the final bottom line investment and is likely to embarrass some of the higher cost "spread" that is around in the High End.

Later T

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