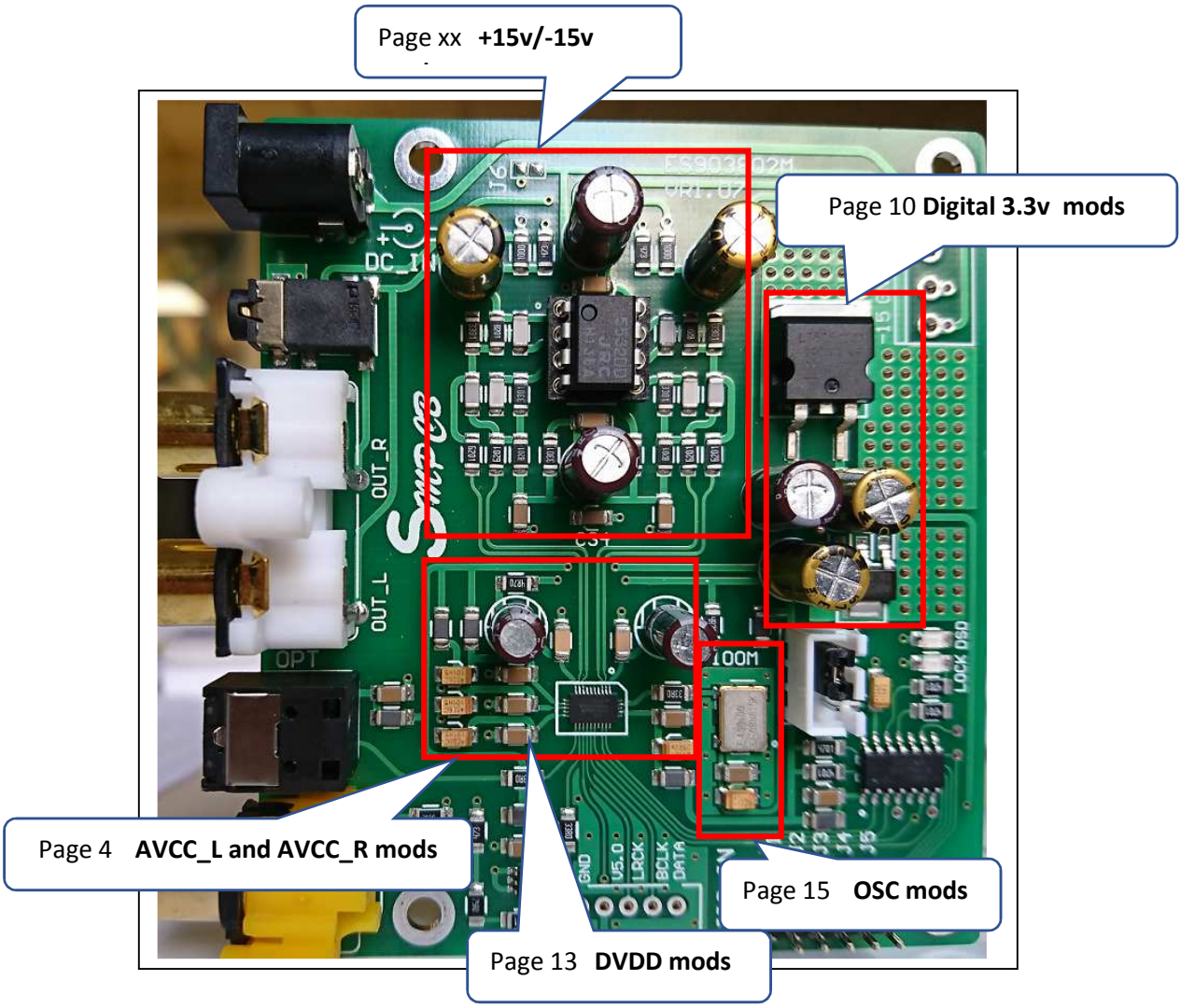
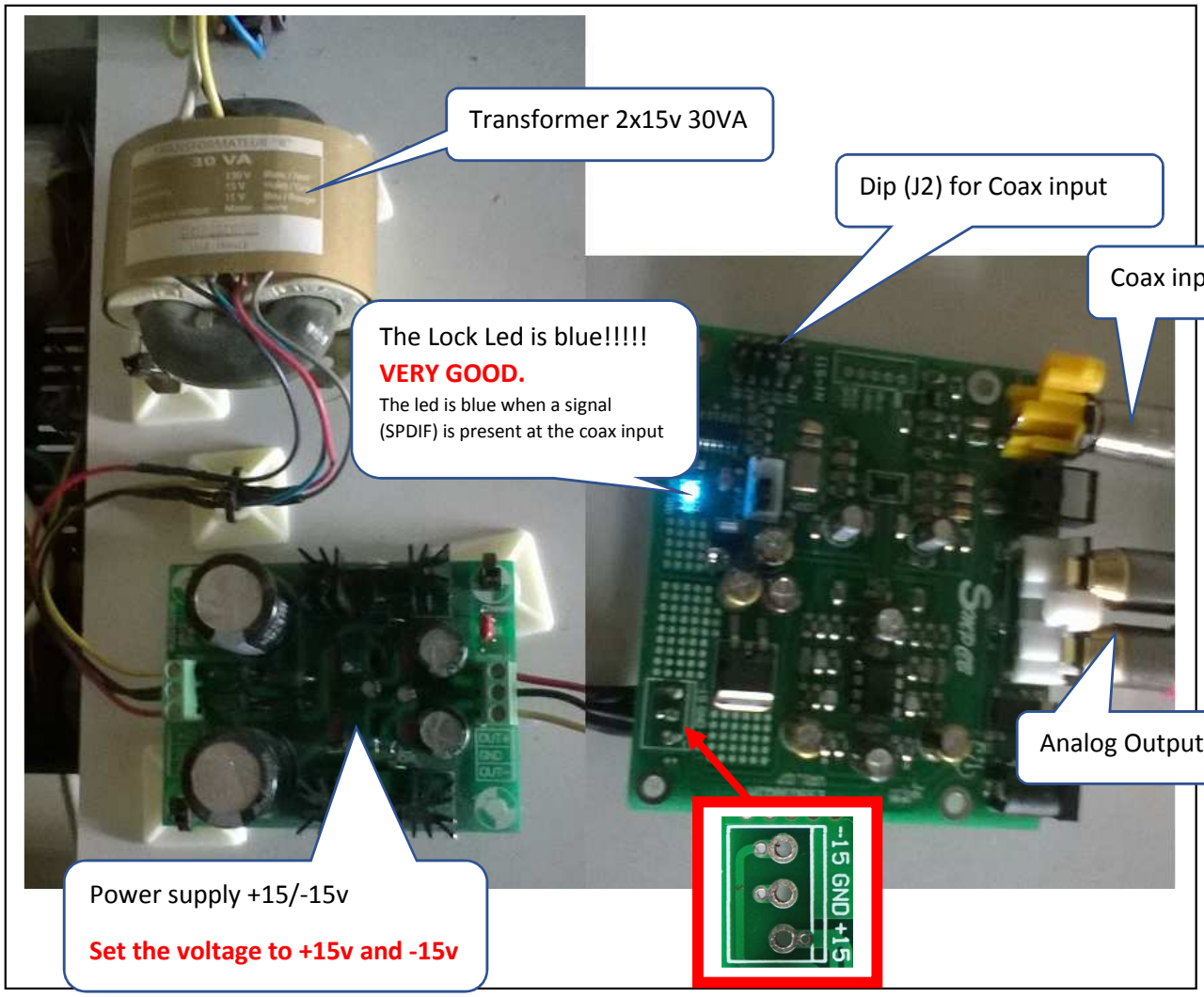
# VR1.07 MODIFICATIONS




- The text areas framed in **green** include informations that are personal choice
- The text areas framed in **yellow** include informations from the thread : http://www.diyaudio.com/forums/digital-line-level/314935-es9038q2m-board.html with the permission of the authors.
- These are the modifications **that I have done**, not all the thread mods.
- I think these modifications are simple without surprise !!!!

**Before making the modifications, the card must be tested**




**ES9038Q2M VR1.07 :**
https://www.ebay.fr/itm/ES9038-Q2M-DAC-DSD-Decoder-Support-IIS-DSD-384KHz-Coaxial-Fiber-DOP/272844357070?ssPageName=STRK%3AMEBIDX%3AIT&_trksid=p2057872.m2749.l2649

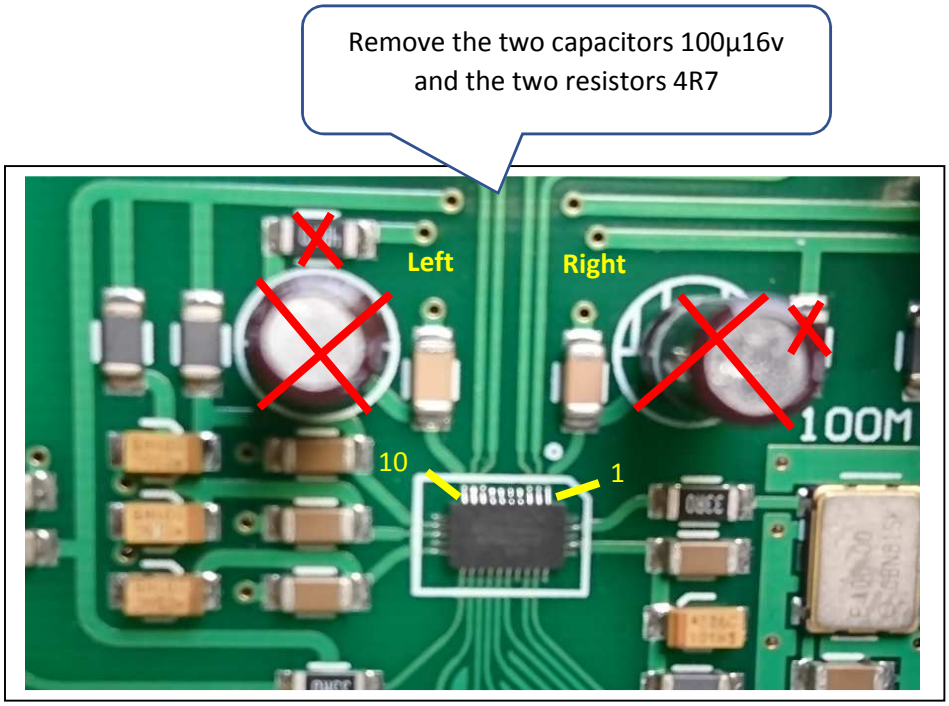
**Transformer :**
***If you have not yet purchased the transformer, this model will be suitable for the modifications .***
https://www.ebay.fr/itm/1pc-30VA-30W-15V-2-6V-2-R-Core-Transformer-for-preamp-DAC-ES9038-ES9038PRO-/142441550942?hash=item212a2d945e

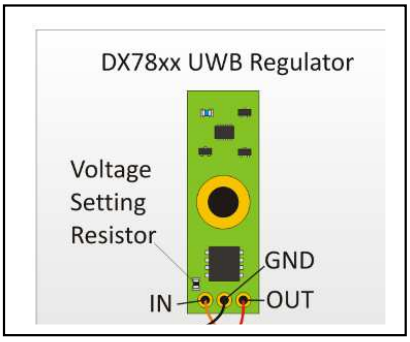
**Power supply +15/-15v :**
https://www.ebay.fr/sch/i.html?_odkw=diy+power+supply+%2B15+-15v&LH_PrefLoc=2&_osacat=0&_from=R40&_trksid=m570.l1313&_nkw=diy+power+supply+LM317+LM337&_sacat=0

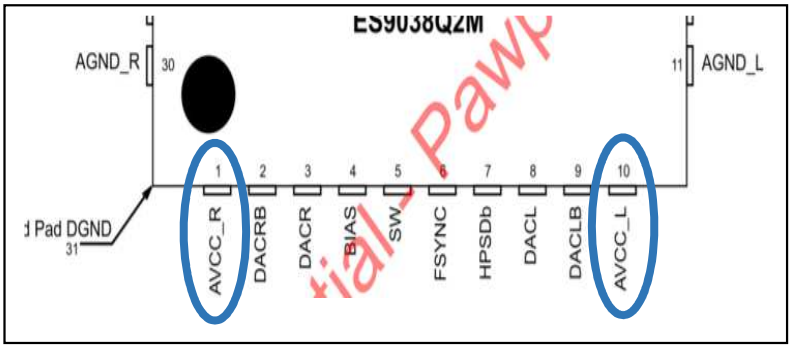
**Before making the modifications, the card must be tested**

The mods can also be done on the **ES9038Q2M VR1.06 ( see the DVDD mods)**

## AVCC_L and AVCC_R mods

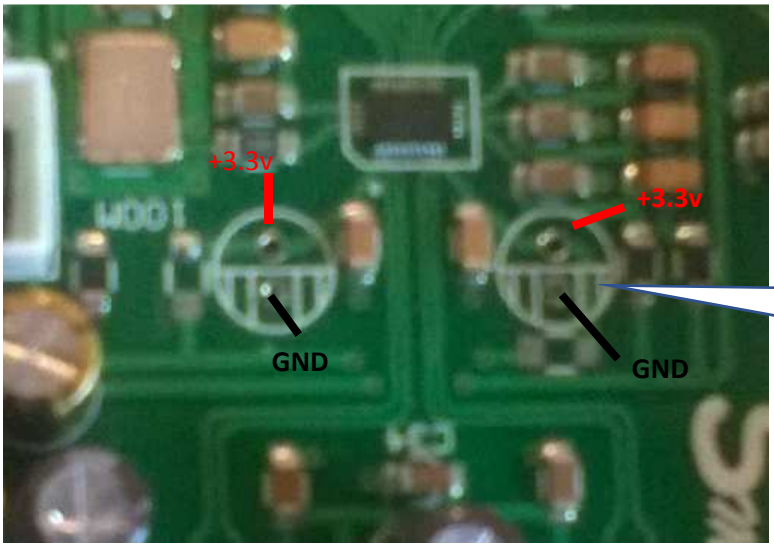


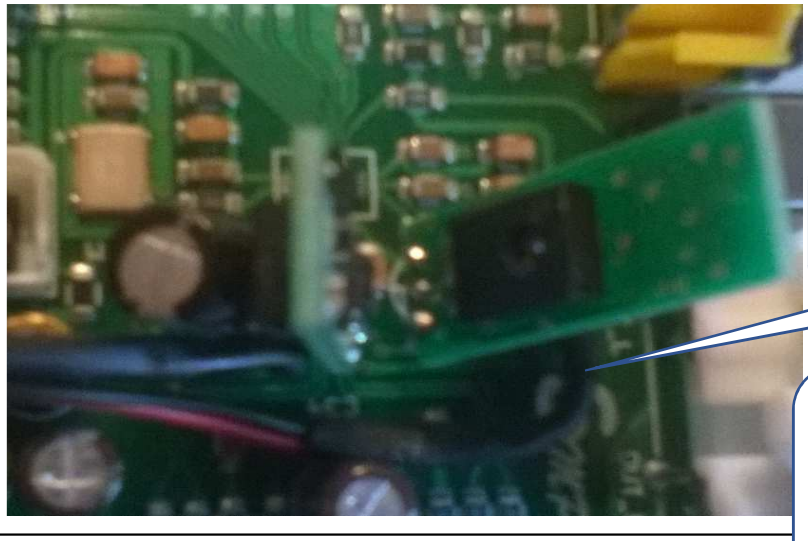




The “super regs “ for **AAVCC_L and AVCC_R and +15v/-15v** are ***my choice*** *(I already had them )*

**AVCC_L and AVCC_R mods**




I plugged directly the two regs in place the capacitors

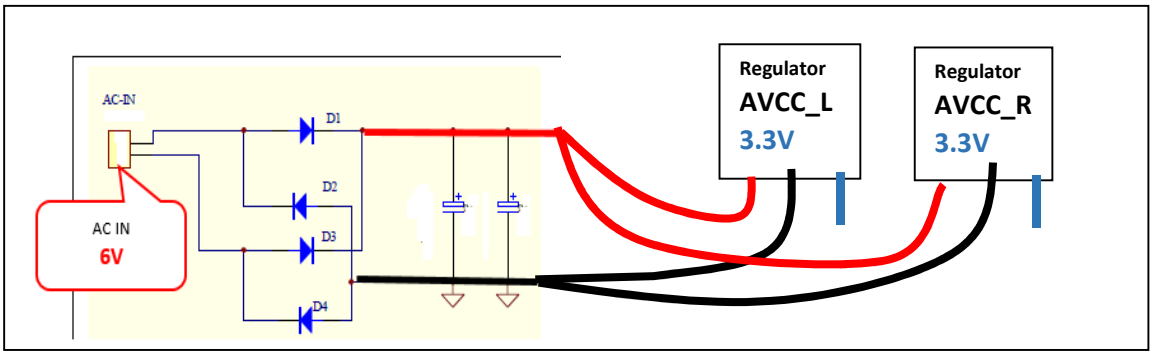


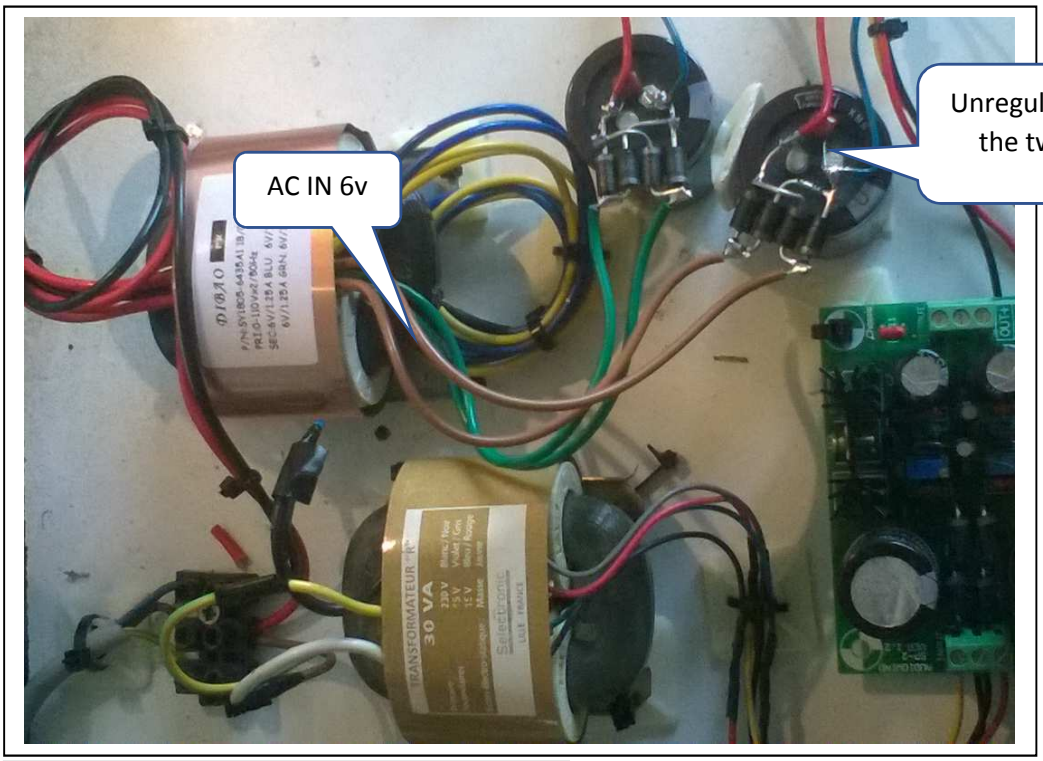
The wires ( +V and GND non regulated ) are soldered directly on the regulator

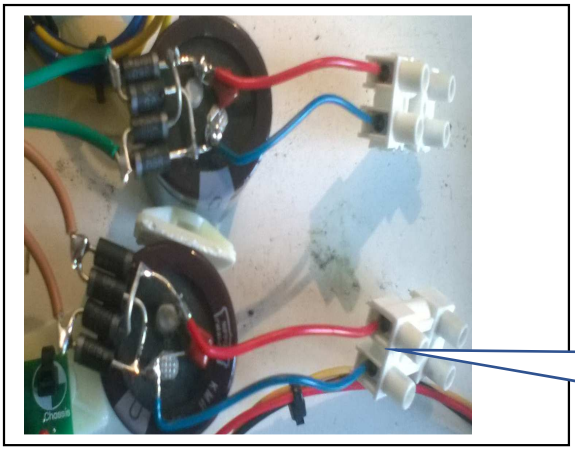
**The links are short but it's not very easy to do the job.**

The 100µf capa are soldered on the regulator's pins

## AVCC_L and AVCC_R mods



**AVCC_L and AVCC_R mods**

The unregulated voltage is “a  solution” you can use what you want before the regs 3.3v.

## AVCC_L and AVCC_R mods

**Different options for the 3.3V**

**Super Regs:**

https://www.partsconnexion.com/NCLASSD-70907.html

https://sparkoslabs.com/product/ss78xx-discrete-voltage-regulator/

**LT3042/LT3045 regulators:**

http://www.diyaudio.com/forums/power-supplies/270681-ultra-low-noise-psrr-ldo-lt3042.html

https://www.ebay.fr/itm/LT3042-Low-voltage-RF-Ultra-high-PSRR-Linear-Regulator-Power-Module-20V-200mA/123119785977?hash=item1caa82d7f9:g:ItEAAOSwKApa8AGj

https://www.ebay.fr/itm/DC-3-5V-20V-To-DC-5V-LT3042-Ultra-Low-Noise-Voltage-Regulator-Module-Board/183170480308?hash=item2aa5cfb8b4:g:4q4AAOSw8BRay1nP

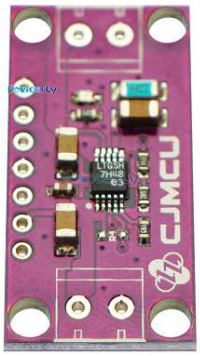
https://www.ebay.fr/str/LDOVR?_trksid=p2047675.l2563

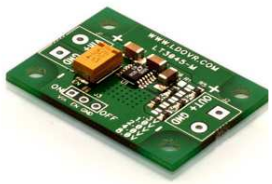
https://www.ebay.fr/itm/LT3045-ultra-low-noise-0-8-Vrms-500mA-LDO-voltage-regulator-LM31x-3-3-5-12-15V/253667091767?hash=item3b0fbca537:g:8yoAAOSwTORa67yu

https://www.ebay.fr/itm/LT3045-3V-6v-9V-12V-Linear-Regulator-Power-Supply-Board-DC-Converter/152977171652?hash=item239e2664c4:g:IkMAAOSwyHRaxHAR

**LT1963:**

https://fr.aliexpress.com/item/5-pcs-LT1963-LT1963EQ-Puissance-Convertisseur-12-V-5-V-DC-DC-module-D-alimentation-5/32833900416.html



Advices for the **AVCC_L and AVCC_R mods:**

**For an easier job , these two regulators seem to me a good solution.**

My favorite !!! LDVOR you can select the voltage…. so you can used them after for other projects.

The price is not so expensive 19€ …
The LT3045 price is around 5€ , PCB + capacitors + resistors
Smd components are not easy to solder !!!!!!

http://www.diyaudio.com/forums/digital-line-level/314935-es9038q2m-board-242.html

Post #2411 by **Markw4**

As we all know, super regs have great specs on paper. I noticed they have some 1/f noise however that some people thought was negligible. So people started using them for things like dac AVCC supplies. Then some people tried LiFePO4 batteries (using batteries is an old idea however) and thought they sounded better, then they started trying using supercaps and thought they sound best. But, they never did figure out why the seemingly ideal super regs didn't sound as good as they expected.

Also, many people missed the above course of events and still think super regs are best.

A few people did take heed though to the 1/f noise and increased Cset to the maximum value of 22uf. Also, using any bigger than 22uf caps with them just reduces regulation bandwidth, so it doesn't help. Using bigger caps even 22uf also slows down start up time which can cause other problems, although there is a way to fix that, most people don't know how, or don't seem to be able to manage the tiny work required.

Even with bigger Cset of 22uf, there is still some reason to believe that too much noise exists at the low end of the audio band which could be problematic for some applications like AVCC and should be further improved. In one of the LT304x data sheets it shows how to use an LTC6655 reference with the LT304x as a buffer to get lower noise at the lower end of the audio band, but I am not aware of anyone bothering because they think the noise numbers look small and they don't bother to measure to see.

Who cares if there is 1/f noise below 1kHz that increases a lot by the time frequency gets down to 10Hz? I do for one, because if using the super reg for AVCC, not only does that noise add to audio output noise, it also intermodulates with the audio signal, turning it into distorted mush compared to clean like it should be. Remember, AVCC has no PSRR at all, so any noise there is bad.

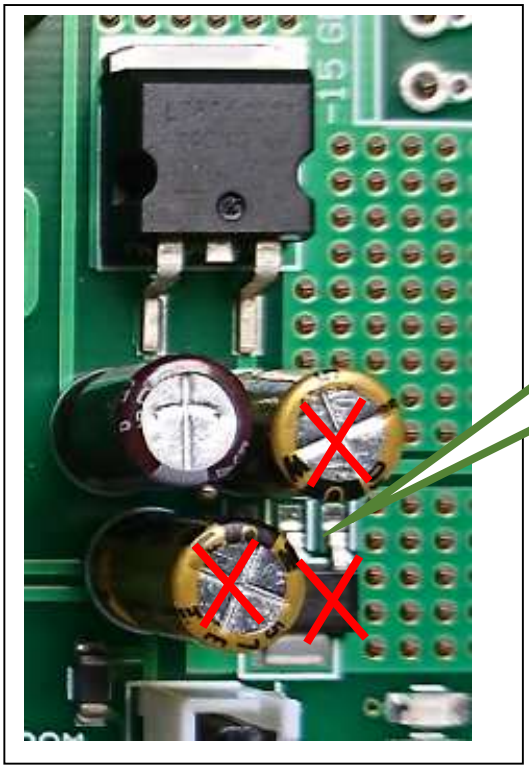
HOWEVER, I still think using an unmodified super reg module for AVCC has to be better than the dirty LC filter used by default on the Chinese dac boards. That is why I said if you can get people to try it and they like the improvement maybe they will keep modding and get interested in even better sound.

Now you know why I don't use super regs for my dacs in critical places like AVCC or recommend them for that. If I could comparatively measure the AVCC circuit I use and various super reg circuits then I could tell you more exactly what I think is okay or not so good. Since I am not equipped to do that in terms of test equipment and I also don't have the time to do a lot of that type of work either, what I do is recommend a circuit that doesn't have any known issue like the 1/f issue super regs have.

If you think about it, it shouldn't be too surprising. Super regs are also called RF regulators and are sold as super precision power supply regulators RF circuits operating above audio frequencies. I would go even further and say they should be fine for use to power any kind of circuits that don't care about noise below 1kHz. That wouldn't be AVCC use, of course.

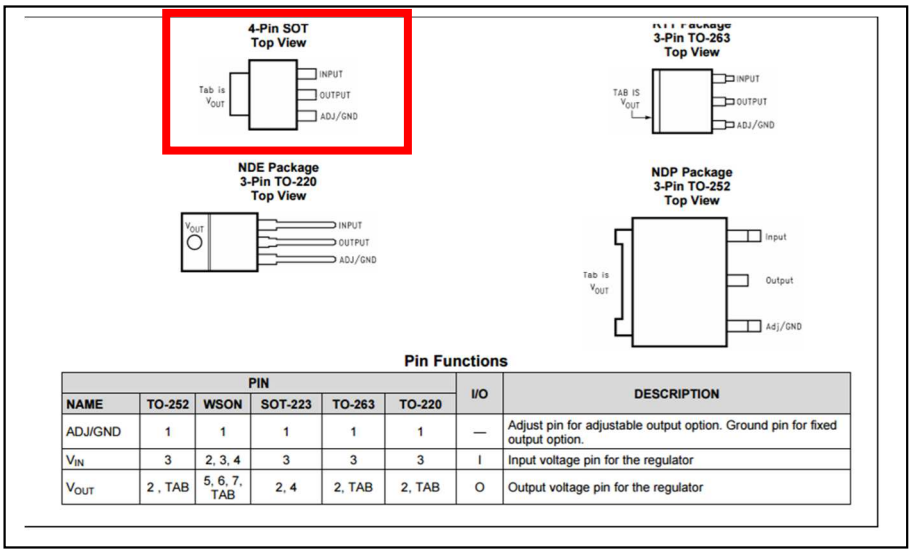
**For those who start this project and without real experience, the LT3042/LT3045 seem to be a good choice.**

## Digital 3.3v mods



Remove the two capacitors 47µf 50v

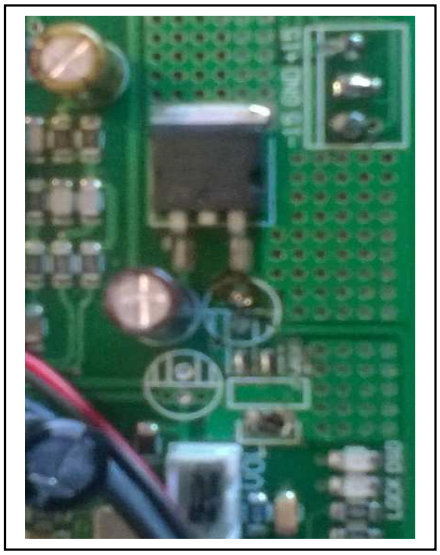
And the 3.3v regulator

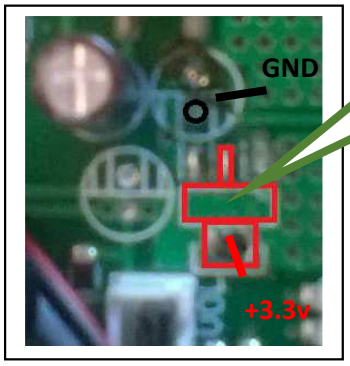



**Pin Functions**

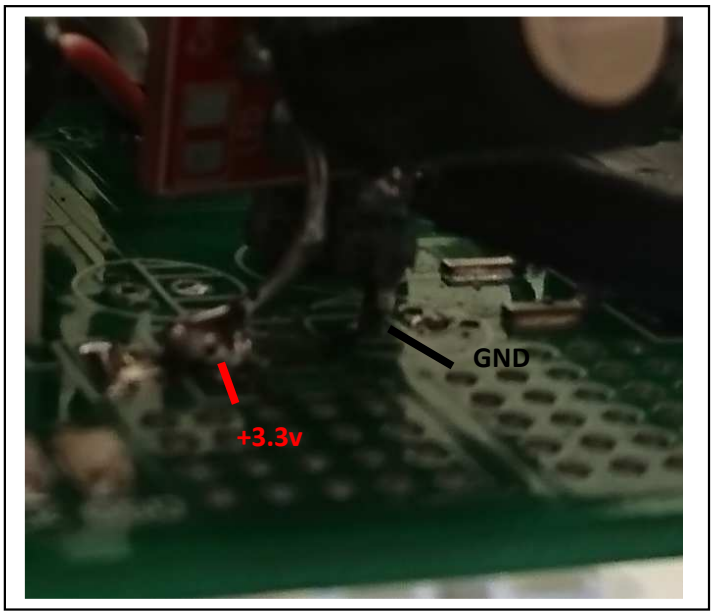
| PIN | | | | | | I/O | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| NAME | TO-252 | WSON | SOT-223 | TO-263 | TO-220 | | |
| ADJ/GND | 1 | 1 | 1 | 1 | 1 | — | Adjust pin for adjustable output option. Ground pin for fixed output option. |
| $V_{IN}$ | 3 | 2, 3, 4 | 3 | 3 | 3 | I | Input voltage pin for the regulator |
| $V_{OUT}$ | 2 , TAB | 5, 6, 7, TAB | 2, 4 | 2, TAB | 2, TAB | O | Output voltage pin for the regulator |

**Digital 3.3v mods**

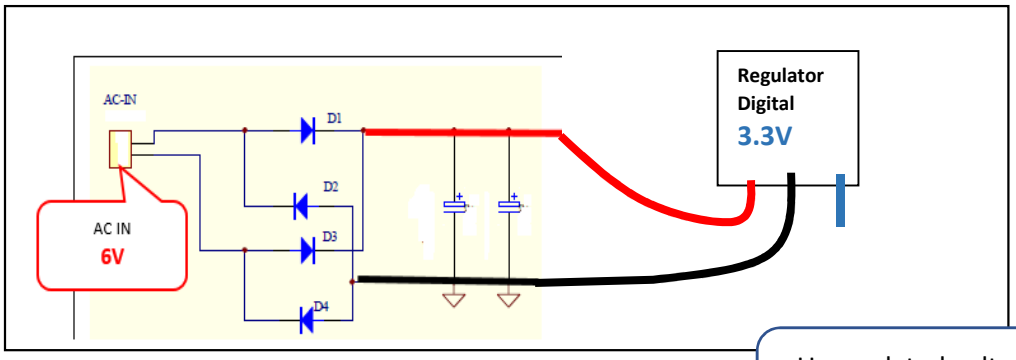




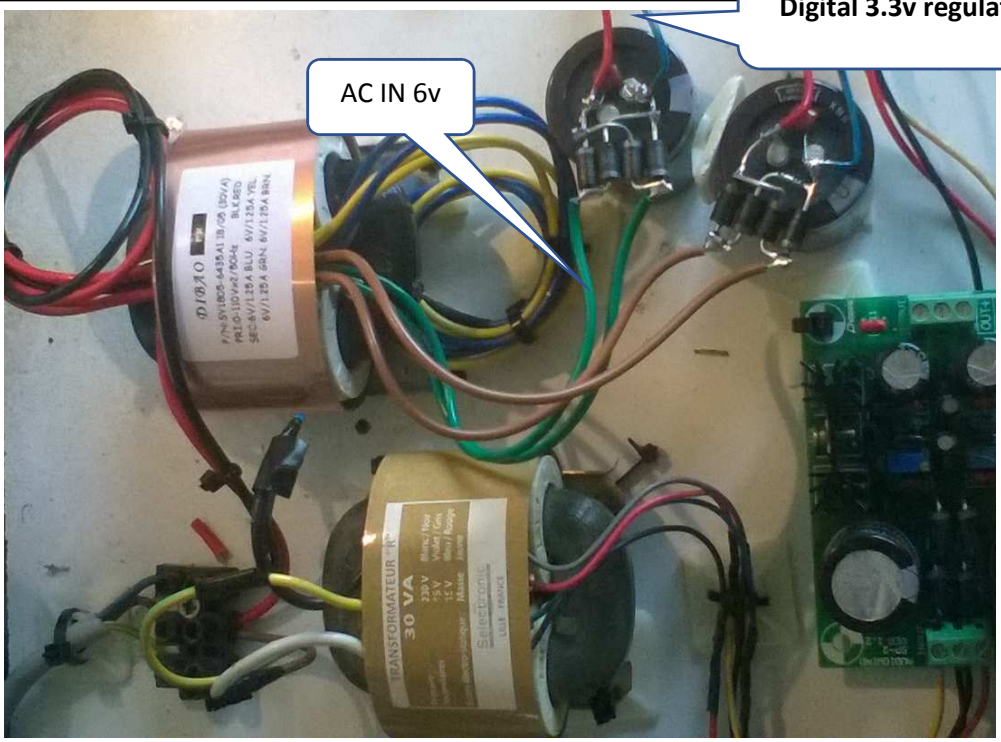

I scratched this part to solder directly the module 3.3v

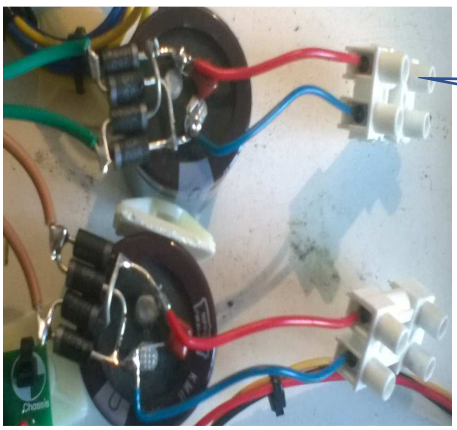


**Digital 3.3v mods**




Unregulated voltage for the **Digital 3.3v regulator** : 8.5v



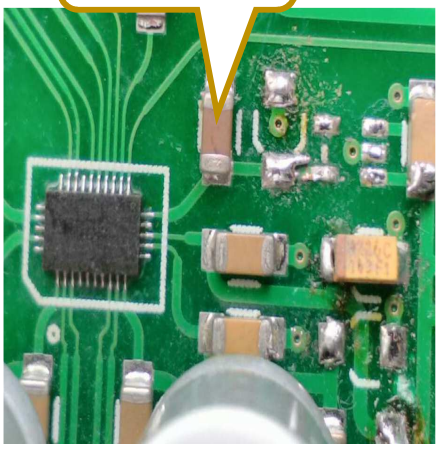
Connected to the **Digital 3.3v regulators**

## DVDD mods

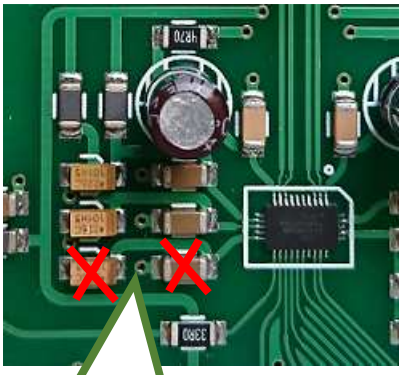
http://www.diyaudio.com/forums/digital-line-level/314935-es9038q2m-board-239.html#post5524990

post #2386 by **janos_904**

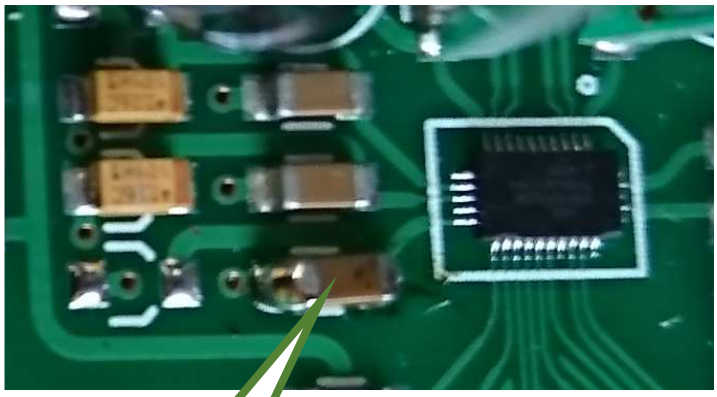
**VR1.06**
4.7 uF X7R



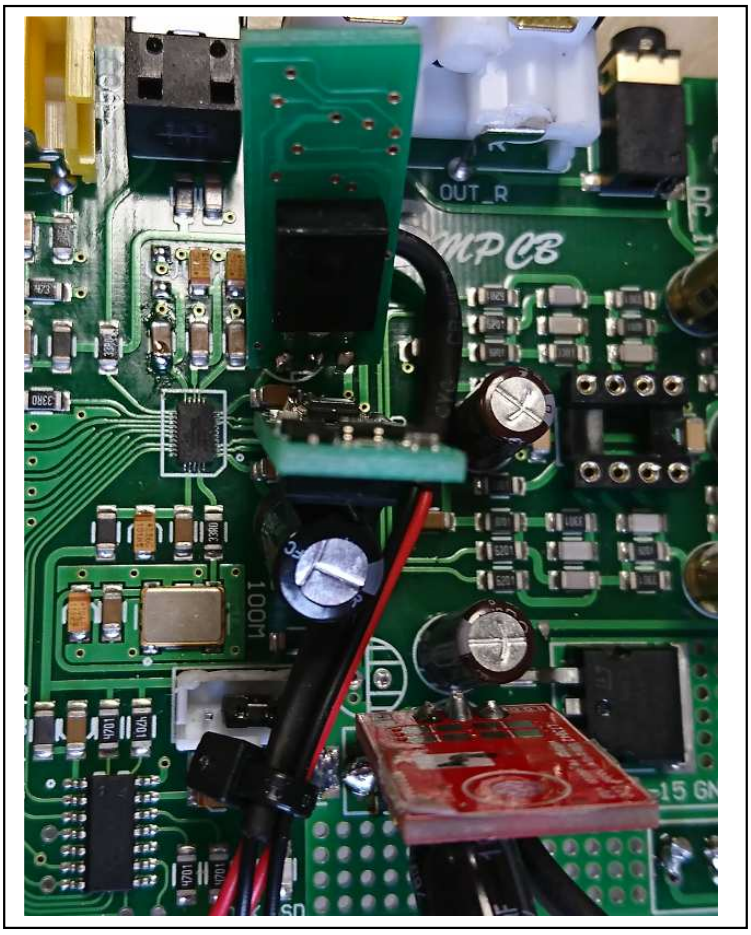
**DVDD Supply**
The ES9038Q2M is equipped with a regulated DVDD supply powered from DVCC. The internal DVDD regulator must be decoupled to DGND with a capacitor that maintains a minimum value of 1µF at 1.2V over the target operating temperature range. The recommended capacitor for decoupling DVDD is a 4.7µF ±20%, X5R 6.3V 0402.



**VR1.07**
Remove the two components



4.7µf XR7


OUT_R
100M