HD audio MICROMEGA

ACTS®

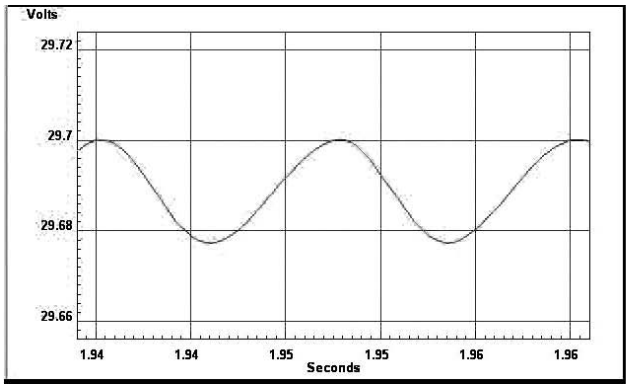
Power supply

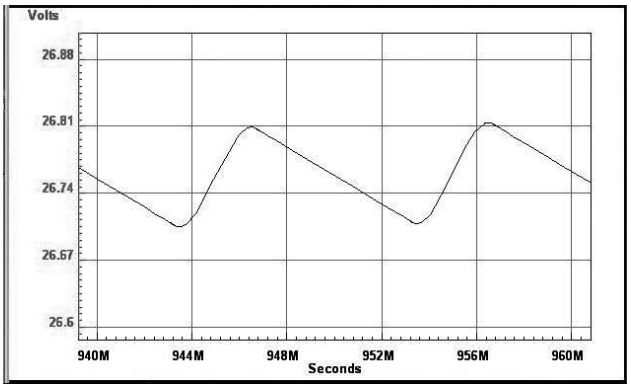
Facing reality

Although it is known from everyone that the power supply has an influence on the final quality of a product, it seems important to mention that two aspects of audio reproduction are going more and more against each other: resolution of the audio signals and quality of the mains supply.
On one end the resolution of audio components is getting better and better over the years and it is not rare to face dynamic ranges of over 120dB with distortion figures in the same area.
On the other end, the mains supply quality is getting worse every day, not because of voltage variation but mainly because of the spectral content of the mains supply. Since a while now people had the idea to transmit data through the mains line. One of the first applications has been the use of the mains line to read the value of your home mains meter to avoid sending someone to do this job. The technology is stepping forward and it is now possible to transmit high data rates on the mains line. It is very convenient for the electricity companies to offer such possibilities when almost everyone today got a mains line supply. No need for fibre optics, extra telephone lines … Just hook up the right box to your mains line and you can get Internet today and Digital TV tomorrow.
What are the changes for the music lover or the audiophile? Many!!!
There are very few companies today paying extreme attention to the power supply of audio products. We could even say that most companies are turning to SMPS (Switched Mode Power Supply) for the sake of simplicity and cost reduction. All DVD players and recorders, TV sets, Set Top boxes, Flat Screen displays, Projectors and many more are powered with a SMPS. These supplies are all designed within the borders of the actual regulation. However, none of these regulations have been made with audio reproduction in mind. The situation, seen from this end, can only get worse. For almost 20 years, MICROMEGA has dedicated all his efforts to musical sound reproduction and it was time to do something.

Curing the problem at the root

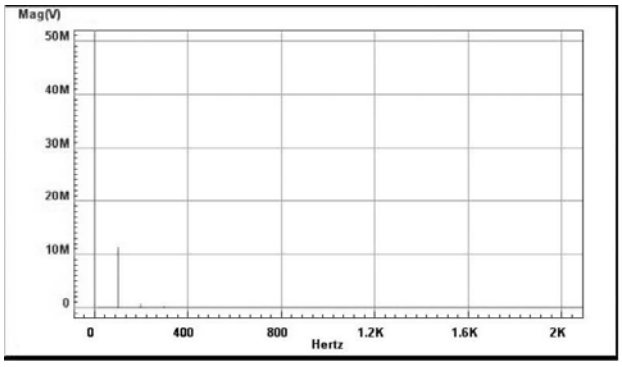
We have identified the problem of the poor quality of the mains line supply. The solution adopted by MICROMEGA is based on inherent electrical properties of the construction of some types of transformers. This solution is mostly applicable with these specific transformers in order to reach the expected improvement.
The idea is to tune the secondary of the transformer to the quadruple of the mains frequency and to minimize instantaneous current demand from the rectifiers, cancelling rectifiers switching peaks and having the rectifiers to work in such a mode that current and voltage are synchronous where the rectifiers provide almost the same average current during the complete cycle of the rectified wave. A smoothing inductor associated with large reservoir capacitors give a pure sinusoidal ripple which value does not exceed 25mV peak-peak.
The pictures below show on the left the ripple on the smoothing caps of the ACTS® power supply under load, when on the right side, the same supply under the same load without the ACTS® tuning

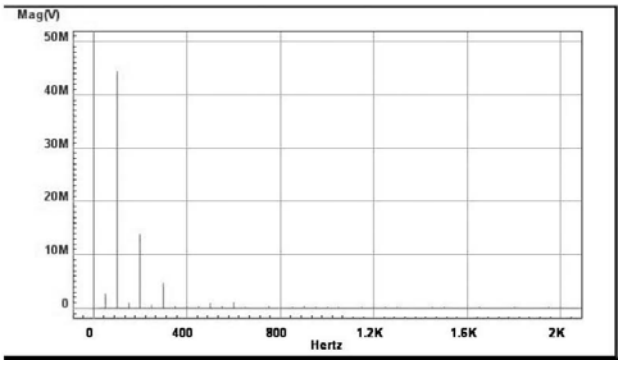




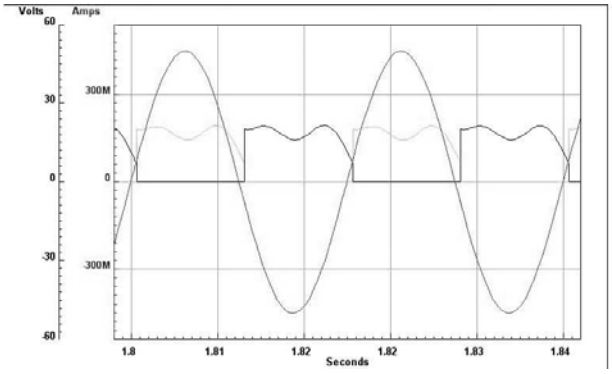
On the left picture, the ripple is almost perfectly sinusoidal and its value reaches 22mV peak to peak. On the right picture, the ripple is typically triangular and its value reaches 110mV, 5 times the value of the ripple appearing on the ACTS® power supply.

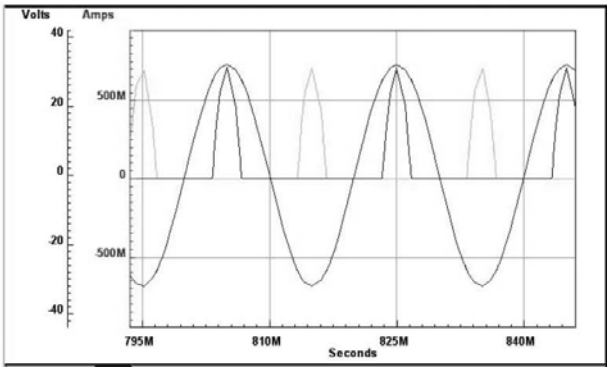
Moreover, when we make a FFT analysis of both supplies compared under the same load, the advantage of the ACTS® power supply is even more obvious.
On the left side the ACTS® power supply exhibits the fundamental 2 rays where the ray at 100 Hz is way down and no other ray can be seen. On the right end side picture of the standard power supply the spectrum is much broader and the content is far more dense.





On the picture below the current versus voltage can be observed in both types of supplies under the same load condition. Once again, the ACTS® power supply exhibits far superior performance with a current density almost equal during the complete time of the voltage wave, where on the right picture, the current through the diodes has an extremely narrow area with an extremely sharp change in current direction when the voltage reaches its peak.
.





Conclusion

This technical brief describes the functionality of the front end of the new ACTS® MICROMEGA power supply. The back end (the active regulation stage) is different from one product to the other. In any case the ACTS® power supply offers the regulators a very clean supply. Measurements have been made and the rejection of the ACTS® power supply front end is better that 200dB above 1 kHz.
The ACTS® power supply is the ideal solution for audio products where transparency is required. The goal of the design team was to create a power supply that would take into account the flaws of the ac mains line and feed all circuitry with the necessary power to perform their task without compromise.
True music reproduction does not suffer mediocrity.

AUDIS sarl, 13-15 rue du 8 mai 1945 - 94470 Boissy Saint Léger - FRANCE

Tel: 01 4382 8860 Fax: 01 4382 6129 E-mail : info@micromega-hifi.com Internet: www.micromega-hifi.com