

The Art of Power Starving

or how to make dead battery music

It has been known since the early days of music electronics that electronic instruments sometimes produce strange sound artifacts during power on and off.

Also, that battery-powered devices change their sound or even behave completely differently at the end of their battery life.

In recent decades, this has led to the development of instruments in the experimental music electronics scene that deliberately exploit this effect of “power starving”.

The insertion of a variable resistor between the (stable) power supply and a sound generator, which can be a simple oscillator, is widely used. This variable resistor, also known as a “dead battery potentiometer”, simulates the increasing internal resistance of a battery during progressive discharge.

This means that power starving can be set reproducibly, even with mains-powered instruments or instruments fitted with new batteries.

Alternatively, solar cells were also used to power the CMOS oscillators, which we are currently studying.

Thus power starving could be controlled via adjustable LED lighting.

Experiments have shown that it can be musically useful to be able to additionally reduce the operating voltage with a second potentiometer.

In recent years, the friends of the Kulturgüterschuppen have dug up this topic again and made new experiments.

It turned out that a real adjustable current limiter, aka constant current source (CCS), could further expand the sound space when “power starving”.

Finally, we wanted to make the 3 parameters voltage, internal resistance and current limiting voltage controllable in addition to potentiometers.

As only operating voltages $<5V$ and currents of a few mA are required for the CMOS oscillators, simple opamp circuits are sufficient.

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