

Claims

1. Device for charge collection comprising
 - at least one capacitor stack built by n capacitors and $2n$ switches;
 - 5 • at least one further capacitor outside the at least one capacitor stack as buffer capacitor;
 - at least two additional switches outside the at least one capacitor stack;
 - a DC input source;
 - a CMOS-Logic;
- 10 wherein the $2n$ switches of the at least one capacitor stack couple the n capacitors selectively to the DC input source;
 wherein the n capacitors of the at least one capacitors stack are dedicated to be sequentially charged by the DC input source one after the other;
 wherein the at least one further capacitor outside the at least one capacitors stack is
15 dedicated to be charged from the n capacitors of the capacitor stack at once; and
 wherein $n \in \mathbb{N}$.
2. Device according to claim 1, characterized in that the capacitor stack comprises at least
20 three conductive plates, wherein the conductive plates have a top-side and a bottom-side; and
 wherein the top-side of at least one conductive plate is part of a capacitor and the bottom-side of the at least one conductive plate is part of a neighboring capacitor.
3. Device according to one of the preceding claims, characterized in that the device is an
25 integrated circuit wherein switches are realized as transistors and capacitors are realized by conductive plates from integrated circuit technology.
4. Device according to one of the preceding claims, characterized in that the device
30 comprises two further capacitors outside the capacitor stack as buffer capacitors outside the at least one capacitors stack and four additional switch outside the at least one capacitor stack.
5. Device according to one of the preceding claims, characterized in that the device
35 comprises additionally an inductor.

6. Device according to one of the preceding claims, characterized in that the device comprises several capacitor stacks wherein every capacitor stack is dedicated to charge another capacitor stack and one capacitor stack is dedicated to charge at least one further capacitor outside the capacitor stacks.
- 5 7. Device according to one of the preceding claims, characterized in that the DC input source is a needle or a needle bed in contact with nerve cells, wherein the needles of the needle bed are isolated against each other and connected through to the back-side by a soldering bump.
- 10 8. Device according to claim 7, characterized in that the DC input source is a needle bed in contact with nerve cells, wherein every needle of the needle bed is connected to a capacitor stack by a soldering bump.
- 15 9. Device according to one of the preceding claims, characterized in that the device additionally comprises a coil, which is dedicated to receive a startup energy by magnetic coupling with another coil.
- 20 10. Method for charge collection, comprising at least one capacitor stack build by n capacitors and $2n$ switches, at least one further capacitor outside the capacitor stack as buffer capacitor, at least two additional switches and a DC input source, comprising the steps
- the n capacitors of the capacitor stack are sequentially charged by coupling one capacitor after the other to the DC input source by selectively closing the
 - 25 switches;
 - discharging the n capacitors of the capacitor stack into the at least one further capacitor outside the capacitor stack;
- wherein $n \in \mathbb{N}$.
- 30 11. The method according to claim 10, characterized in that the n capacitors of the capacitor stack are sequentially charged one after the other in n charging cycles and that the n capacitors of the capacitor stack are discharged in an $n+1^{\text{st}}$ cycle into the at least one further capacitor outside the capacitor stack at once.

12. The method according to one of the claims 10-11, characterized in that the n capacitors of the capacitor stack are sequentially charged one after the other in n charging cycles, wherein the first capacitor is charged, afterwards the capacitor which is next to the first one is charged, afterwards the capacitor which is next to the one charged before is charged until all n capacitors are charged.
13. The method according to claim 12, characterized in that after the n capacitors of the capacitor stack are sequentially charged the n capacitors are discharged into a first further capacitor outside the capacitor stack; afterwards the n capacitors of the capacitor stack are sequentially charged in the reversed order and after the n capacitors are charged the n capacitors are discharged into a second further capacitor outside the capacitor stack.
14. The method according to one of claims 10-13, characterized in that the n capacitors of a capacitor stack are discharged at once into one capacitor of a further capacitor stack.
15. The device according to one of claims 1 to 9 or the method according to one of claims 10 to 14, characterized in that bioelectric signals from nerve potential are used as DC input.