CLAIMS

1. A stacked integrated component device with multiple energization elements comprising:

a first layer comprising a first surface, and a second layer comprising a second surface, wherein at least a portion of the first surface lays above at least a portion of the second surface;

at least one electrical connection between an electrical contact on the first surface and an electrical contact on the second surface;

at least one electrical transistor, wherein the electrical transistor(s) are comprised in the stacked integrated component device;

a plurality of discrete energization elements, wherein the discrete energization elements are comprised in either or both of the first and second layers;

switching elements configured to combine the energization elements to define different power supply conditions; and

a microcontroller configured to control the power supply conditions that the multiple energization elements are connected to define.

2. The stacked integrated component device of Claim 1, further comprising a switch controller configured to index control signal level changes from the

microcontroller into state changes to the switching elements.

3. The stacked integrated component device of Claim 1, further comprising:

self-test circuitry comprising a sensing element configured to detect current flowing through the energization elements, the self-test circuitry being configured to determine if one of the energization elements is causing an excessive current draw condition.

4. The stacked integrated component device of Claim 3, wherein the self-test circuitry is configured to compare a voltage drop through a resistive element with a reference voltage.

5. The stacked integrated component device of Claim 3 or 4, wherein the self-test circuitry is configured to isolate the cause of the excessive current draw condition by cyclically isolating one at a

time each of a plurality of banks of energization elements by disconnecting a ground return line of a said bank, and determining whether or not the current draw decreases.

6. The stacked integrated component device of Claim 5, wherein the self-test circuitry is configured to perform a further isolation loop if the current draw returns to a normal specification when a said bank has been isolated, wherein the self-test circuitry is configured to disconnect a bias of each energization element in the said bank and to sense the current draw after each energization element has been isolated.

7. The stacked integrated component device of Claim 6, wherein the self-test circuitry is configured to disable the entire said bank from a power supply system if the further isolation loop proceeds through all the energization elements in the said bank without the current draw returning to an acceptable value.

8. The stacked integrated component device of Claim 6 or 7, wherein the self-test circuitry is configured to disconnect a said energization element from the power supply system if the isolation of the said energization element returns the current draw to a normal state.

9. The stacked integrated component device of any preceding claim, wherein the discrete energization elements have a thicknesses less than 200 microns.

10. The stacked integrated component device of any preceding claim, additionally comprising:

a first electrical common connection, wherein the first electrical common connection is in contact with the ground connection of the first discrete energization element;

a second electrical common connection in contact with the ground connection of the second discrete energization element;

a first electrical bias connection in contact with the bias connection of the first discrete energization element; and

a second electrical bias connection in contact with the bias connection of the second discrete energization element.

11. The stacked integrated component device of Claim 10, wherein the first electrical common connection is electrically connected to the second electrical common connection forming a single common connection for the at least two energization elements.

12. The stacked integrated component device of Claim 11, wherein the first electrical bias connection is electrically connected to the second electrical bias connection forming a single bias connection for the at least two energization elements.

13. The stacked integrated component device of Claim 10 wherein:

the first electrical bias connection is electrically connected to a first power supply input of a first integrated circuit; and

the second electrical bias connection is electrically connected to a second power supply input of a first integrated circuit.

14. The stacked integrated component device of Claim 13 wherein:

the first integrated circuit generates a first output power supply; and a second integrated circuit is electrically connected to said first output power supply.

15. The stacked integrated component device of Claim 14 wherein:

the first integrated circuit combines, with at least a first switch, the first power supply input and the second power supply input to create a first output power supply, wherein the first output supply has the equivalent voltage capability of the first energization element and the second energization element; and

the first output supply has the combined electrical current capability of the first energization element and the second energization element.

16. The stacked integrated component Device of claim 14 wherein:

the first integrated circuit combines, with at least a first switch, the first power supply input and the second electrical common connection to create a first output power supply, wherein the first output supply has the equivalent current capability of the lesser of the electrical current capability of the first energization element and the second energization element; and

the first output supply has the combined electrical bias of the first energization element and the second energization element.

17. The stacked integrated component device of Claim 14, wherein all electrical connections from the first and second layers are not connected to any external wired connection of the stacked integrated component device.

18. The stacked integrated component device of any preceding claim, wherein the number of discrete energization elements within the stacked integrated component device exceeds three.

19. The stacked integrated component device of any preceding claim, wherein the number of raw power supplies formed as combinations of multiple energization elements exceeds one.

20. The stacked integrated component device of any preceding claim, wherein at least a first raw power supply formed as a combination of multiple energization elements is connected to a capacitive element.

CLAIMS

1. A stacked integrated component device with multiple energization elements for an ophthalmic lens including powered components, comprising:

a first layer comprising a first surface;

a second layer comprising a second surface, wherein at least a portion of the first layer lays above at least a portion of the second surface such that they overlap only partially and form a three dimensional structure configured to match a profile of the ophthalmic lens;

at least one electrical connection between a first electrical contact on the first surface and a second electrical contact on the second surface;

at least one electrical transistor, wherein the at least one electrical transistor is located within the stacked integrated component device; and

at least a first and a second discrete energization element located within at least one of the first layer and the second layer.

2. The stacked integrated component device of claim 1, wherein the first and the second discrete energization elements each have a thickness of less than 200 microns.

3. The stacked integrated component device of claim 1, additionally comprising:

a first electrical common connection in contact with a first ground connection of the first discrete energization element;

a second electrical common connection in contact with a second ground connection of the second discrete energization element;

a first electrical bias connection in contact with the a first bias connection of the first discrete energization element; and

a second electrical bias connection in contact with a second bias connection of the second discrete energization element.

4. The stacked integrated component device of claim 3, wherein the first electrical common connection is electrically connected to the second electrical common connection forming a single common connection for the first and the second discrete energization elements.

5. The stacked integrated component device of claim 4,wherein the first electrical bias connection is electrically connected to the second electrical bias connection forming a single bias connection for the first and the second discrete energization elements.

6. The stacked integrated component device of claim 3, wherein:

the first electrical bias connection is electrically connected to a first power supply input of a first integrated circuit; and

the second electrical bias connection is electrically connected to a second power supply input of the first integrated circuit.

7. The stacked integrated component device of claim 6 wherein:

the first integrated circuit generates a first output power supply; and

a second integrated circuit is electrically connected to said first output power supply.

8. The stacked integrated component device of claim 7 wherein:

the first integrated circuit combines, with at least a first switch, the first power supply input and the second power supply input to create a first output power supply,

the first output supply has a voltage capability equivalent to the first and the second discrete energization elements, and

the first output supply has a combined electrical current capability of the first and the second discrete energization elements.

9. The stacked integrated component device of claim 7, wherein:

the first integrated circuit combines, with at least a first switch, the first power supply input and the second electrical common connection to create a first output power supply,

the first output supply has a current capability of the lesser of the electrical current capability of the first and the second discrete energization elements, and

the first output supply has a combined electrical bias of the first and the second discrete energization elements.

10. The stacked integrated component device of claim 7, wherein each of the electrical connections from the first layer and the second layer are not connected to an external wired connection of the stacked integrated component device.

11. The stacked integrated component device of claim 1, additionally comprising at least a third and a fourth discrete energization element located within the stacked integrated component device.

12. The stacked integrated component device of claim 1, wherein the discrete energization elements create more than one raw power supply.

13. The stacked integrated component device of claim 12, wherein at least a first raw power supply is electrically connected to a capacitive element separate from the discrete energization elements.

14. A stacked integrated component device with multiple energization elements for an ophthalmic lens including powered components, comprising:

a first layer comprising a first surface, and

a second layer comprising a second surface,

wherein at least a portion of the first layer lays above at least a portion of the second layer such that they partially overlap and form a three dimensional structure configured to match a profile of the ophthalmic lens;

at least one electrical connection between a first electrical contact on the first surface and a second electrical contact on the second surface;

at least one electrical transistor, wherein the at least one electrical transistor is located within the stacked integrated component device; and

at least a first and a second discrete energization element located within at least one of the first layer and the second layer,

wherein the first and the second discrete energization elements simultaneously provide power.

15. The stacked integrated component device of claim 14, wherein the first discrete energization element is located within the first layer and the second discrete energization elements is located within the second layer.

16. The stacked integrated component device of claim 14, wherein the first and the second discrete energization elements are both located in either one of the first layer and the second layer.

17. The stacked integrated component device of claim 14, wherein the first discrete energization element generates a first raw battery power and the second discrete energization element generates a second raw battery power.

18. The stacked integrated component device of claim 17, additionally comprising a power management unit electrically connected to the first and the second discrete energization elements, wherein the power management unit receives the first raw battery power from the first discrete energization element and the second raw battery power from the second discrete energization element.

19. The stacked integrated component device of claim 18, wherein the power management unit refines and alters the first raw battery power and the second raw battery power resulting in a refined power output.

20. The stacked integrated component device of claim 19, additionally comprising an integrated passive device in electrical connection with the power management unit, wherein the integrated passive device comprises a number of capacitors connected to at least one of the discrete energization elements.

21. The stacked integrated component device of claim 20, wherein the integrated passive device holds the refined power output provided by the power management unit.

22. The stacked integrated component device of claim 14, additionally comprising a microcontroller located within the stacked integrated component device controlling the discrete energization elements.

23. The stacked integrated component device of claim 22, additionally comprising a switch controller in electrical connection with the microcontroller, wherein the switch controller is configured to change a state of each of a plurality of switches in response to a signal from the microcontroller.

24. The stacked integrated component device of claim 23, wherein the switches control a number of different voltage conditions for the stacked integrated component device.

25. The stacked integrated component device of claim 23, wherein the microcontroller determines whether at least one of the discrete energization elements generates enough power to support a power requirement of the stacked integrated component device.

26. The stacked integrated component device of claim 25, additionally comprising a first and a second antenna, wherein the first antenna is capable of receiving radio frequency signals and the second antenna is capable of receiving wireless energy from an environment of the stacked integrated component device.

27. The stacked integrated component device of claim 23, additionally comprising a plurality of sets of discrete energization elements, wherein a first set of discrete energization elements is connected to only one of a plurality of voltage supply lines and each of the remaining sets of discrete energization elements is connected to each of the voltage supply lines.

28. The stacked integrated component device of claim 27, wherein each of the remaining sets of discrete energization elements is connected to each of the voltage supply lines by a separate switch.

29. The stacked integrated component device of claim 27, wherein each set of discrete energization elements is also connected to a plurality of switches, wherein each of the switches connects to a bias connection of each of the remaining sets of discrete energization elements.

30. The stacked integrated component device of claim 26, wherein the first antenna is electrically connected to the discrete energization elements and the second antenna is connected to an integrated passive device element.