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[Continúa en la página siguiente]

(54) **Title**: TEXTILE MOTHERBOARD, HAVING A MODULAR AND INTERCHANGEABLE DESIGN, FOR MONITORING, REPORTING AND CONTROLLING

(54) **Título** : TARJETA MADRE TEXTIL CON DISEÑO MODULAR E INTERCAMBIABLE PARA MONITOREO, INFORMACIÓN Y CONTROL.

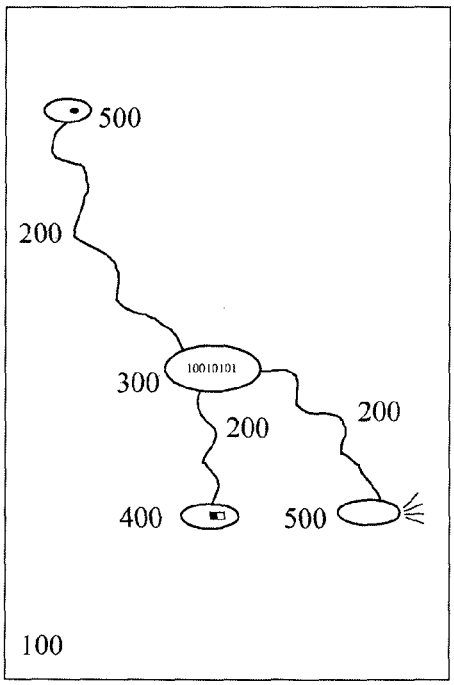

Figura 5

(57) **Abstract**: The invention relates to a textile motherboard (TMT) that can be used in, *inter alia*, clothing, coats, and dressings gowns, and which includes at least one central processing unit (CPU) or a peripheral or a combination of both, for monitoring, reporting and controlling parameters of the wearer. The clothing can be used or worn by a human or non-human user. The textile of the clothing serves as a substrate for forming the TMT. The TMT can have multi-layer structures and VIAs (vertical interconnect access). The traces of the TMT are formed of textile material that can transmit signals between the CPU and information storage means, or the combination with the peripheral(s). The layers, traces and VIAs are incorporated using known textile-handling techniques such as weaving, stamping, or same can be printed onto the textiles. Each component is modular and interchangeable, and is connected to the TMT using textile connectors that can be clips, hooks or similar elements. The TMT, the CPU and the peripherals are washable. The CPU and each peripheral can be mounted on rigid or flexible textile boards or PCBs (printed circuit board), using discrete electronic or photonic elements. The CPU includes a micro-controller, a micro-processor or a comparable element. The peripherals include photonic transducers or electronic transducers, or a combination of both, such as, *inter alia*, capacitive sensors, pulse meters, humidity sensors, thermometers, accelerometers, gyroscopes. The peripherals also include: screens; modules for serial communication via radio frequency (including, *inter alia*, Bluetooth, Zigbee technology), Wi-Fi; and similar elements.

(57) **Resumen**:

[Continúa en la página siguiente]

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La presente invención concierne a una tarjeta madre textil (TMT) utilizable en indumentaria, manteles, batas, etc. que incorpora como mínimo una unidad central de procesamiento (UCP) o un periférico o una combinación de ambos, con la intención de monitorear, informar y controlar parámetros de quien lo porta. La indumentaria puede ser utilizada o portada por un usuario (humano o no). El textil de la indumentaria funge como sustrato para conformar la TMT. La TMT puede contar con estructuras de múltiples capas y VIAs (Vertical Interconnect Access). Las trazas de la TMT se conforman de material textil capaz de transmitir señales entre UCP y un medio de registro de información o la combinación con periférico(s). Las capas, trazas y VIAs se incorporan mediante técnicas conocidas de manipulación de textiles tales como tejido, estampado o pueden ser impresas en los textiles. Cada componente es modular e intercambiable y se conecta a la TMT utilizando conectores textiles que pueden ser broches, ganchos o elementos similares. La TMT, la UCP y los periféricos son lavables. La UCP y cada periférico se pueden montar en tarjetas textiles o PCBs (printed circuit board) rígidas o flexibles, utilizando elementos discretos electrónicos o fotónicos. La UCP incluye un microcontrolador, un microprocesador o un elemento comparable. Los periféricos incluyen transductores fotónicos o transductores electrónicos o combinación de ambos como: sensores capacitivos, pulso, humedad, temperatura, acelerómetros, giroscopios, etc. Los periféricos también incluyen pantallas, módulos de comunicación serial, por radio frecuencia (incluyendo tecnología Zigbee, Bluetooth, etc.) Wi-Fi y elementos similares.

TEXTILE MOTHERBOARD WITH MODULAR AND INTERCHANGEABLE DESIGN TO MONITOR, INFORM AND CONTROL

FIELD OF THE DISCLOSURE.

The present disclosure relates to exemplary embodiments of a textile motherboard arrangement, and more particularly to textile motherboards that may be employed in garments, blankets, towels, tablecloths, gowns, etc., with non exclusive applicability to the medical, commercial, family-care, or sports fields.

MAIN OBJECTIVE OF THE INVENTION.

A main object of the present invention is to render intelligent textiles that may be worn or utilized by users with the end goal of monitoring, informing, or controlling parameters of interest.

The textiles are rendered intelligent by incorporating into them at least one textile motherboard TMB, which can function with analog- and/or digital- electric and/or photonic signals. Furthermore, at least one central processing unit CPU or at least one peripheral may be connected to the TMB, in order to provide one of the abovementioned features to the intelligent textile. In order to bestow flexibility, the TMB design is modular; furthermore, both CPU and peripherals may be utilized interchangeably.

In a first exemplary arrangement of the TMB including CPU and peripherals, the intelligent textile may be able to perform monitoring. For instance, an intelligent textile with a TMB may be capable of monitoring user parameters such as temperature, the selection from a menu of options, solar exposure, pulse, etc.

In another exemplary embodiment of the TMB including CPU and peripherals, the intelligent textile may enable the person wearing it to inform her about events. For instance, an intelligent textile with a TMB may be able to inform the person wearing it about the presence of humidity by means of visual, vibrating, and audible alarms. Furthermore, an intelligent textile with a TMB may inform a portable device, such as a tablet or a smartphone, about further events of the person wearing it, for example during sports events.

Finally, in yet another exemplary arrangement of the TMB including CPU and peripherals designed to control, the intelligent textile may serve as a platform to manipulate various objects of interest. For example, an intelligent textile with a TMB may be able to control the call for assistance to a third person, after e.g. selecting a menu of options; additionally, a comparable embodiment may enable to control the lights of a public establishment.

BACKGROUND INFORMATION.

There exist garments with three electrodes to monitor physiological parameters, such as the arrangement disclosed in the document US 2007/0078324 A1, and granted to Ravindra Wijisiriwardana in 04/05/2007, which consists of a system or a garment that comprises at least three electrodes to monitor at least one physiological event of the person wearing it. Specially, one electrode is utilized to send an inverted noise signal as a feedback mechanism to eliminate the noise generated in the detection process. This system is particularly designed to measure the electrical characteristics of the user, such as cardiograms or cardiac frequency.

Another example of a comparable device is depicted in the document US 8,340,740 B2 granted to Christian Holzer, Thorsten Habel, and Martin Gierich the 25/12/2012, which consists of a garment that enables physiological monitoring. The measuring sensors are integrated into the garment. The device that monitors the physiological properties is located on the back of the garment, and may be integrated and fixed to the garment. It may also be detached from the garment.

A further instance of this type of devices is described in document US 2003/0212319 A1 granted to Alan Remy Magill on the 13/11/2003, which consists of a physiological monitoring garment. In this approach the electricity is conducted by means of fibers from the skin surface to a garment that has a microprocessor, telemetry system, and power supply to monitor and transmit electrocardiogram data. The garment with the microprocessor may be detached, thus enabling the cleaning of the garment in contact with the skin. The system may also be used in reverse order, in order to provide electrical stimulation to the body.

Another example of these types of devices is shown in the document US 2012/0136231 A1 granted to Gal Markel on the 31/05/2012, which consists of a garment that provides physiological and environmental monitoring, as well as location information. This proposal is conformed of a garment or system of garments with the capacity to monitor health. The garment comprises a variety of electrocardiogram sensors, other sensors to monitor health, a processor, conductive fibers, as well as a communication unit in order to send physiological, environmental, and location data.

A final instance of this kind of devices is described in the document WO 2011/131235 A1 granted to Javier Guillen Arredondo and Sergio Guillen Barrionuevo the 27/10/2011, which consists of a monitoring system. This proposal is composed of a monitoring system with one or more sensors adapted to measure one or more parameters, indicative of the physical health of the user. The proposal also includes a system to collect the data and an evaluation system to compare the values with predetermined information. At least one of the sensors is incorporated into a garment.

TECHNICAL PROBLEM TO SOLVE.

Despite the fact that garments exist to monitor physiological parameters, the approaches known in the state-of-the-art do not have a textile motherboard scheme incorporated into the design of the devices.

Moreover even though some devices are detachable, they are not modular and none describe the feature of being interchangeable. For instance, once the device is designed to monitor cardiac frequency, that same design is not able to monitor another parameter, such as temperature.

Also absent in the state-of-the-art is the ability of the textiles to manipulate objects of interest, such as the lights of a public establishment, after selecting a (textile) menu of options.

BRIEF DESCRIPTION OF THE INVENTION.

In order to address the abovementioned problem in the state-of-the-art, it is the object of the present invention to disclose embodiments that provide the structure of a textile motherboard (TMB) The substrate of the TMB, object of the present invention, is conformed of textile material. Furthermore, the TMB may be structured with single-layer or multiple-layer designs, incorporating perforations for layer interconnection. Layers and perforations are conformed of textile materials and are incorporated into the TMB by means of textile manipulation techniques.

The routing of the TMB includes at least two different types of routing: maze routing and X-Y routing. Both routing types may be implemented in the TMB, for instance by utilizing textile printing techniques or by incorporating the routes by following a required pattern using textile manipulation techniques.

The peripherals may be broadly classified as input or output peripherals. In order to yield flexibility, the TMB incorporates terminals in the CPU and peripherals that simplify the modular and interchangeable design of the TMB by employing conventional textile connectors.

Finally, the implementation of an interchangeable TMB design, including input and output peripherals, enables the user to manipulate objects of interest, such as the lights of a public establishment, after selecting a menu of options.

BRIEF DESCRIPTION OF DRAWINGS.

Figure 1A.- Shows a design of a plausible embodiment of a single-layer textile motherboard (TMB);

Figure 1B.- Depicts the cross section of a plausible embodiment of a multiple-layer textile motherboard wherein the use of "VIAs" for the interconnection between the multiple layers is highlighted;

Figure 2A.- Illustrates the utilization of textile materials to conform a TMB, such as the embodiment depicted in Figure 1A;

Figure 2B.- Shows the cross section of an embodiment of a multiple-layer textile motherboard wherein the layers are incorporated into the front- and back- parts of the textile, and are isolated in the middle part;

Figure 2C.- Depicts the implementation of X-Y routing in a textile garment, assuming that the routing is performed on the top layer of the motherboard;

Figure 3.- Shows a layout embodiment of an intelligent vest with exchangeable input and output devices;

Figure 4.- Illustrates the employment of conventional textile connectors that facilitate the modular and exchangeable design;

Figure 5.- Depicts an embodiment in the form of an intelligent tablecloth, which enables the user to manipulate objects of interest, such as the lights of a public establishment, after selecting a (textile) menu of options.

DETAILED DESCRIPTION OF THE INVENTION.

The present disclosure relates to an apparatus that may be employed in garments, blankets, towels, tablecloths, gowns, etc., which may consist of a *first element* (100), a *second element* (200), a *third element* (300), a *fourth element* (400) and a *fifth element* (500).

The *first element* (100) consists of a textile motherboard (100), TMB. The design of the TMB is modular and permits to interchange elements within the TMB. The

TMB utilizes connectors to incorporate exemplary components such as central processing units (102) or peripherals (103).

An exemplary embodiment of the present disclosure of the TMB (100) is depicted in Figure 1A. According to this exemplary embodiment, the TMB (100) consists of at least one substrate layer, with at least one conductive routing (101), and at least one terminal connected to the at least one conductive routing wherein exemplary components, such as a CPU (102) or a peripheral (103) or a combination thereof, may be installed. The TMB (100) defines an electronic or a photonic circuit, which is a function of the arrangement of peripherals (103) and CPU (102) utilized, wherewith information may be monitored, manipulated, as well as emitted with the object of signalizing, or informing, or controlling depending on the intended purpose of the product that incorporates the TMB.

In Figure 1B, an exemplary embodiment of the TMB is shown to exhibit a multiple-layer structure (104) in addition to perforations for the interconnection between layers (109, 110, 111); known as Vertical Interconnect Accesses or "VIAs" to those skilled in the art.

A first exemplary layer (105) may serve as a platform to guide a first digital or analog signal. A second exemplary layer (106) may serve as a platform to guide a second digital or analog signal. A third exemplary layer (107) may serve as a platform to provide a constant electric or photonic signal. A fourth exemplary layer (108) may serve as a platform to provide a reference. The foregoing descriptions of the third and fourth exemplary layers could for instance provide +5V and 0V signals, respectively. The aforementioned layers may be employed repetitively, as deemed necessary by a design. This layer structure is illustrative and does not limit the embodiments of a particular TMB.

According to the exemplary embodiment of the present disclosure shown in Figure 1B, layer interconnection ensues by utilizing perforations (109, 110, 111) or Vertical Interconnect Accesses, known as "VIAs" to those skilled in the art. A first exemplary VIA that can be employed is the tag VIA (109). A second

exemplary VIA that may be utilized is the thru VIA (110). A third exemplary VIA that can be used is the sequential VIA (111). Additional exemplary VIAs that may be employed include photo-defined, controlled depth, or buried VIAs. This list of VIAs is illustrative and does not limit the embodiments of a particular TMB.

The *second element* (200) consists of textile material with the capacity to transmit and isolate digital- and/or analog- electric and/or photonic signals, or a combination thereof. In Figure 2A an exemplary embodiment of a TMB substrate, which is conformed of textile material, is depicted. In such exemplary substrate (100), routing structures (200) may be incorporated to guide signals to and from components (201).

The routing structures (200) within the TMB (100) may consist of electric textile conductors, a textile arrangement that incorporates fiber optics or waveguides, as well as printed or stamped textiles with the conductive routing.

An exemplary TMB may consist of knitted or weaved textiles, such as those known in the art, which define a substrate layer (100), and wherein conductive textiles (200) may be intercalated appropriately, in order to define the intended routings for the circuit. Exemplary conductive textiles (200) may extend from a terminal up to a CPU (201) or may exhibit a desired extension for a specific function, thus defining a determined conductive routing.

According to the exemplary embodiment of the present disclosure shown in Figure 2B, a TMB may implement multiple textile structures, such as knitted or weaved textiles, as well as stampings or printings that serve as layers (104), and that define independent conductive routings (202, 203, 204, 205), wherein isolating layers may be superposed in order to avoid interference between routings, and wherein the interconnection between the different conductive routings may be done by means of textile VIAs (206)

According to one exemplary embodiment of the present disclosure, a TMB may incorporate a substrate layer (100) that simultaneously functions as an isolating

layer. Moreover, the configuration of knitted or weaved textiles, stampings, or printings (200), which define the conductive routings, may be placed adjacent one to the other in a single plane, separated by isolating layers. According to still another exemplary embodiment of the TMB, a configuration of knitted or weaved textiles, stampings, or printings (104), which define the conductive routings, may be placed superposed (202, 203, 204, 205) in an alternating manner with isolating layers.

Exemplary interconnections between knitted or weaved textiles localized in a single layer can be implemented by employing other knitted or weaved textiles, which define the aforementioned exemplary interconnections. Exemplary interconnections between printings localized in a single layer can be implemented by employing other printings, which define the aforementioned exemplary interconnections. Exemplary interconnections between stampings localized in a single layer can be implemented by employing other stampings, which define the aforementioned exemplary interconnections.

Exemplary interconnections between knitted or weaved textiles localized in multiple layers can be implemented by employing other knitted or weaved textiles, which define the aforementioned exemplary interconnections. Exemplary interconnections between printings localized in multiple layers can be implemented by employing other printings, which define the aforementioned exemplary interconnections. Exemplary interconnections between stampings localized in multiple layers can be implemented by employing other stampings, which define the aforementioned exemplary interconnections.

Exemplary interconnections between textiles localized in multiple layers can be implemented by using textile VIAs between the corresponding textiles. Exemplary interconnections between printings localized in multiple layers can be implemented by using textile VIAs between the corresponding printings. Exemplary interconnections between stampings localized in multiple layers can be implemented by using textile VIAs between the corresponding stampings.

The exemplary conductive routings (200), layers (202, 203, 204, 205), and VIAs (206) are conformed of textile material and are implemented by employing textile manipulation techniques. A first layer (202) may be incorporated into the front section of a textile. A second layer (203) and a third layer (204) may be isolated. A fourth layer (205) may be incorporated into the back section of a textile. Moreover, each of the first (202), second (203), third (204), and fourth (205) layers may be conformed by utilizing individual textiles.

The exemplary conductive routings (200), layers (202, 203, 204, 205), and VIAs (206) of a TMB (100) may be implemented by employing known textile manipulation techniques such as knitting, weaving, stamping, perforating, or may also be printed on the textiles.

The exemplary embodiment of the present disclosure shown in Figure 2C depicts the routing of a TMB (100). The routing of a TMB (100) includes at least two different types of routings: maze routing and X-Y routing (207). Both routing types may be implemented in a TMB (100), for instance by utilizing textile printing techniques or by incorporating the routes by following a required pattern using textile manipulation techniques. The routing guides the signals between the CPU (208) and a means to register information (209) or between the CPU and the combination of peripherals (209).

The *third element* (300), *fourth element* (400), and *fifth element* (500) consist of a CPU (300), input peripherals (400), and output peripherals (500) connected to a TMB (100), which are shown in an exemplary embodiment in Figure 3. Such exemplary embodiment of a TMB (100) may be characterized by allowing the interchange of CPU (300) or peripheral elements (400, 500), in order to monitor different variables, signalize, inform, or control. In this exemplary embodiment, TMB (100), routing (200), CPU (300), and peripherals (400, 500) are washable.

Exemplary CPU (300) and peripherals (400, 500) may be mounted on textile boards, as well as rigid or flexible printed circuit boards PCBs. Each exemplary board may incorporate discrete electronic elements (such as resistors, integrated

circuits, capacitors, etc.) or discrete photonic elements (such as Bragg gratings, beam dividers, interferometers, etc.)

An exemplary CPU (300) may consist of a photonic or an electronic device that processes signals sent by the peripheral elements, and sends information by employing appropriate peripheral elements. Exemplary CPUs (300) may include a microcontroller or a microprocessor or a comparable element.

The CPU (300) connects with the peripherals (400, 500) employing the textile routing (200). The TMB (100) peripherals (400, 500) may be broadly classified as input (400) and output (500) devices.

Exemplary input peripherals (400) consist of elements such as photonic transducers or electronic transducers or combinations thereof. Therefore, exemplary input peripherals (400) may include capacitive sensors or temperature sensors or accelerometers or respiratory frequency sensors or humidity sensors or magnetometers or chest expansion sensors or gyroscopes or pulse sensors or muscular activity sensors or similar devices.

Exemplary output peripherals (500) may include elements like a screen or a vibration device or an audible device or an illuminating device or a device capable of emitting information or a memory module or a serial communications module or a radio frequency communications module (using Zigbee technology, Bluetooth, etc.) or a “Wi-Fi” communications module or similar devices.

In order to yield flexibility, the TMB (100) incorporates terminals, in the CPU (600) and peripherals (601), which simplify the modular and interchangeable design by employing conventional textile connectors such as snaps, hooks and eyes, hooks and loops (Velcro), or similar elements. This aspect of the invention is illustrated in the exemplary embodiment of Figure 4. Furthermore, the exemplary terminals exhibit appropriate characteristics in order to be able to interchange the CPU (600) or the peripheral elements (601) to monitor different variables, signalize, inform, or control.

Each terminal is adhered to a determined routing, by using textile manipulation techniques, which enables the conduction of signals between elements of a TMB. For instance, an exemplary terminal in the form of a snap (601) may be sewed to the corresponding routing (602) to facilitate the communication between a peripheral (601) and a CPU (600).

A final exemplary embodiment of the present disclosure, shown in Figure 5, depicts a TMB (100), including routing (200), CPU (300), input (400), and output (500) peripherals to enable a user to manipulate objects of interest, such as the lights of a public establishment, after selecting a (textile) menu of options.

The foregoing merely illustrates the principles of the disclosure. Various modifications and alterations to the described embodiments will be apparent to those skilled in the art in view of the teachings herein.

PREFERRED APPROACHES TO IMPLEMENT THE INVENTION.

By utilizing a TMB conformed of specific CPU and peripherals, a garment may be able to monitor, inform, and control. For instance, an intelligent textile in the form of a gown with a peripheral, periodically scanned by a CPU, may be utilized to monitor temperature and inform about the presence/absence of fever, and may control with a button the call for assistance. Moreover, due to the modular and interchangeable design, the input peripheral may, for instance, be changed from a temperature detector to a pulse detector.

By employing a determined arrangement of TMB, CPU, and peripherals, an intelligent textile may enable the person wearing it to inform her about events. For instance, an intelligent textile may be able to inform about the presence of humidity by means of visual, vibrating, and audible alarms. Furthermore, an intelligent textile may be capable of informing a portable device, such as a tablet or a smartphone, about further events of the person wearing it, for example during sports events.

Finally, by implementing a specific arrangement of TMB, CPU, and peripherals designed to control, an intelligent textile may serve as a platform to manipulate various objects of interest. For example, an intelligent textile may be able to control the call for assistance to a third person, after selecting a menu of options; as well as enabling the control of lights of a public establishment.

CLAIMS.

1. A textile motherboard, characterized by the implementation of at least one substrate layer which consists of textile material; a conductive routing; at least one terminal attached to the conductive routing; at least one central processing unit (CPU) or at least one peripheral element or a combination thereof; wherein the conductive routing consists of an interwoven route within the textile that conforms the substrate layer; additionally both the central processing unit (CPU) and the peripheral element exhibit appropriate characteristics to connect to the terminal and to enable the guiding of signals through the conductive routing.

2. A textile motherboard according to claim 1, characterized by the implementation of a central processing unit (CPU) in the form of a microcontroller or a microprocessor or a comparable element.

3. A textile motherboard according to claim 1, characterized by the implementation of a peripheral in the form of an input element such as a photonic transducer or an electronic transducer or a combination thereof.

4. A textile motherboard according to claims 1 and 3, characterized by the implementation of photonic transducers or electronic transducers in the form of capacitive sensors or temperature sensors or accelerometers or respiratory frequency sensors or humidity sensors or magnetometers or chest expansion sensors or gyroscopes or pulse sensors or muscular activity sensors or similar devices.

5. A textile motherboard according to claim 1, characterized by the implementation of a peripheral in the form of an output peripheral, such as a screen or a vibration device or an audible device or an illuminating device or a device capable of emitting information or a memory module or a serial communications module or a radio frequency communications

module (using Zigbee technology, Bluetooth, etc.) or a "Wi-Fi" communications module or similar devices.

6. A textile motherboard according to claim 1, characterized by the implementation of a terminal with the appropriate characteristics to enable the interchange of central processing units (CPU) or peripheral elements, in order to monitor different variables or to inform or to signalize or to control operations of alike elements.

7. A textile motherboard according to claim 1, characterized by the implementation of a conductive routing in the form of an electric textile conductor.

8. A textile motherboard according to claim 1, characterized by the implementation of a conductive routing in the form of a textile arrangement that incorporates a fiber optic.

9. A textile motherboard according to claim 1, characterized by the implementation of a conductive routing in the form of a textile arrangement that incorporates a waveguide.

10. A textile motherboard according to claim 1, characterized by the implementation of a terminal in the form of a snap or a hook or an eye or a hook and loop (Velcro) system or a similar element attached to the conductive routing.

11. A textile motherboard, characterized by the implementation of at least one substrate layer which consists of textile material; a conductive routing; at least one terminal attached to the conductive routing; at least one central processing unit (CPU) or at least one peripheral element or a combination thereof; wherein the conductive routing consists of a printing or a stamping of conductive material within the textile that conforms the substrate layer; additionally both the central processing unit (CPU) and the peripheral

element exhibit appropriate characteristics to connect to the terminal and to enable the guiding of signals through the conductive routing.

12. A textile motherboard according to claim 11, characterized by the implementation of a central processing unit (CPU) in the form of a microcontroller or a microprocessor or a comparable element.

13. A textile motherboard according to claim 11, characterized by the implementation of a peripheral in the form of an input element such as a photonic transducer or an electronic transducer or a combination thereof.

14. A textile motherboard according to claims 11 and 13, characterized by the implementation of photonic transducers or electronic transducers in the form of capacitive sensors or temperature sensors or accelerometers or respiratory frequency sensors or humidity sensors or magnetometers or chest expansion sensors or gyroscopes or pulse sensors or muscular activity sensors or similar devices.

15. A textile motherboard according to claim 11, characterized by the implementation of a peripheral in the form of an output peripheral, such as a screen or a vibration device or an audible device or an illuminating device or a device capable of emitting information or a memory module or a serial communications module or a radio frequency communications module (using Zigbee technology, Bluetooth, etc.) or a "Wi-Fi" communications module or similar devices.

16. A textile motherboard according to claim 11, characterized by the implementation of a terminal with the appropriate characteristics to enable the interchange of central processing units (CPU) or peripheral elements, in order to monitor different variables or to inform or to signalize or to control operations of alike elements.

17. A textile motherboard according to claim 11, characterized by the implementation of a terminal in the form of a snap or a hook or an eye or a hook and loop (Velcro) system or a similar element attached to the conductive routing.

18. A textile motherboard, characterized by the implementation of at least one substrate layer which consists of textile material; a conductive routing; at least one terminal attached to the conductive routing; at least one central processing unit (CPU) or at least one peripheral element or a combination thereof; wherein the conductive routing consists of an interwoven route within the textile that conforms the substrate layer; additionally both the central processing unit (CPU) and the peripheral element exhibit appropriate characteristics to connect to the terminal and to enable the guiding of signals through the conductive routing; wherein multiple textile layers define independent conductive routings, separated by isolating layers, in order to avoid interference between such routings; and wherein the interconnection between the different conductive routings may be implemented by means of textile Vertical Interconnect Accesses, known as “VIAs” , or by means of textiles that define the interconnections.

19. A textile motherboard according to claim 18, characterized by the implementation of a central processing unit (CPU) in the form of a microcontroller or a microprocessor or a comparable element.

20. A textile motherboard according to claim 18, characterized by the implementation of a peripheral in the form of an input element such as a photonic transducer or an electronic transducer or a combination thereof.

21. A textile motherboard according to claims 18 and 20, characterized by the implementation of photonic transducers or electronic transducers in the form of capacitive sensors or temperature sensors or accelerometers or respiratory frequency sensors or humidity sensors or magnetometers or

chest expansion sensors or gyroscopes or pulse sensors or muscular activity sensors or similar devices.

22. A textile motherboard according to claim 18, characterized by the implementation of a peripheral in the form of an output peripheral, such as a screen or a vibration device or an audible device or an illuminating device or a device capable of emitting information or a memory module or a serial communications module or a radio frequency communications module (using Zigbee technology, Bluetooth, etc.) or a "Wi-Fi" communications module or similar devices.

23. A textile motherboard according to claim 18, characterized by the implementation of a terminal with the appropriate characteristics to enable the interchange of central processing units (CPU) or peripheral elements, in order to monitor different variables or to inform or to signalize or to control operations of alike elements.

24. A textile motherboard according to claim 18, characterized by the implementation of a conductive routing in the form of an electric textile conductor.

25. A textile motherboard according to claim 18, characterized by the implementation of a conductive routing in the form of a textile arrangement that incorporates a fiber optic.

26. A textile motherboard according to claim 18, characterized by the implementation of a conductive routing in the form of a textile arrangement that incorporates a waveguide.

27. A textile motherboard according to claim 18, characterized by the implementation of a terminal in the form of a snap or a hook or an eye or a hook and loop (Velcro) system or a similar element attached to the conductive routing.

28. A textile motherboard according to claim 18, characterized by the implementation of an isolating layer that simultaneously functions as a substrate layer.

29. A textile motherboard according to claim 18, characterized by the implementation of multiple layers, which define the conductive routings, placed adjacent one to the other in a single plane, separated by isolating layers.

30. A textile motherboard according to claim 18, characterized by the implementation of multiple layers, which define the conductive routings, placed superposed in an alternating manner with isolating layers.

31. A textile motherboard according to claim 18, characterized by the implementation of textile Vertical Interconnect Accesses, known as "VIAs", in the form of a tag VIA or a thru VIA or a sequential VIA or a photo-defined VIA or a controlled depth VIA or a buried VIA or similar VIAs implementations.

32. A textile motherboard, characterized by the implementation of at least one substrate layer which consists of textile material; a conductive routing; at least one terminal attached to the conductive routing; at least one central processing unit (CPU) or at least one peripheral element or a combination thereof; wherein the conductive routing consists of a printing or a stamping of conductive material within the textile that conforms the substrate layer; additionally both the central processing unit (CPU) and the peripheral element exhibit appropriate characteristics to connect to the terminal and to enable the guiding of signals through the conductive routing; wherein multiple printing or stamping layers define independent conductive routings, separated by isolating layers, in order to avoid interference between such routings; and wherein the interconnection between the different conductive routings may be implemented by means of textile

Vertical Interconnect Accesses, known as "VIAs", or by means of printings or stampings that define the interconnections.

33. A textile motherboard according to claim 32, characterized by the implementation of a central processing unit (CPU) in the form of a microcontroller or a microprocessor or a comparable element.

34. A textile motherboard according to claim 32, characterized by the implementation of a peripheral in the form of an input element such as a photonic transducer or an electronic transducer or a combination thereof.

35. A textile motherboard according to claims 32 and 34, characterized by the implementation of photonic transducers or electronic transducers in the form of capacitive sensors or temperature sensors or accelerometers or respiratory frequency sensors or humidity sensors or magnetometers or chest expansion sensors or gyroscopes or pulse sensors or muscular activity sensors or similar devices.

36. A textile motherboard according to claim 32, characterized by the implementation of a peripheral in the form of an output peripheral, such as a screen or a vibration device or an audible device or an illuminating device or a device capable of emitting information or a memory module or a serial communications module or a radio frequency communications module (using Zigbee technology, Bluetooth, etc.) or a "Wi-Fi" communications module or similar devices.

37. A textile motherboard according to claim 32, characterized by the implementation of a terminal with the appropriate characteristics to enable the interchange of central processing units (CPU) or peripheral elements, in order to monitor different variables or to inform or to signalize or to control operations of alike elements.

38. A textile motherboard according to claim 32, characterized by the implementation of a terminal in the form of a snap or a hook or an eye or a hook and loop (Velcro) system or a similar element attached to the conductive routing.

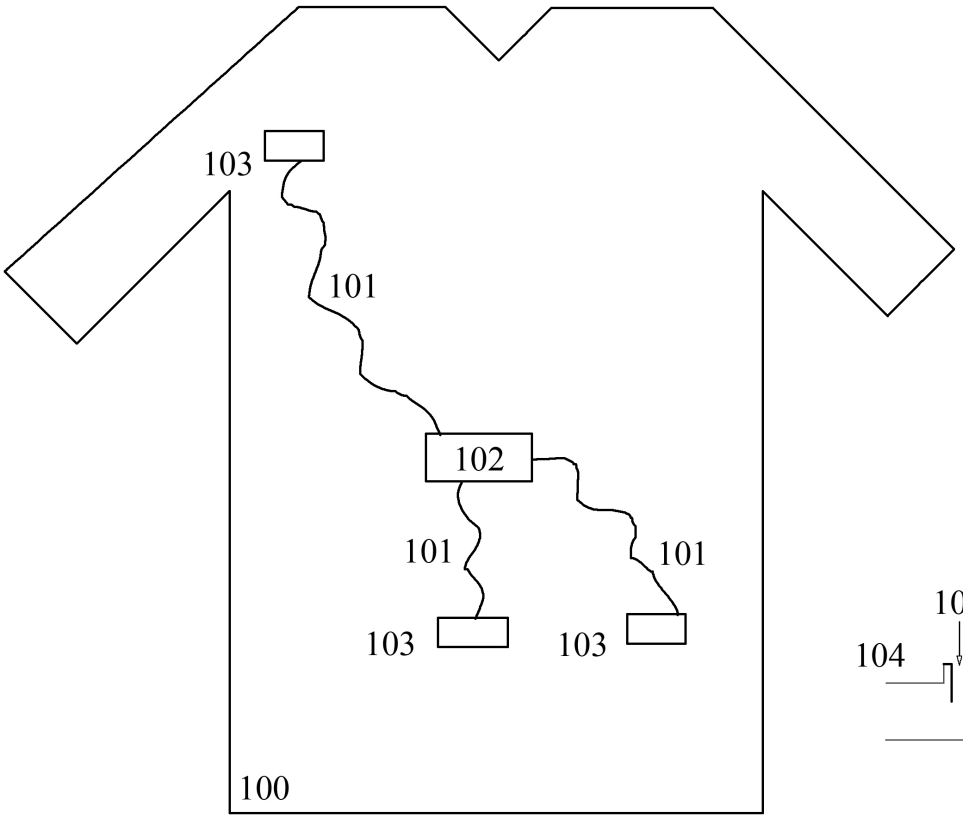
39. A textile motherboard according to claim 32, characterized by the implementation of an isolating layer that simultaneously functions as a substrate layer.

40. A textile motherboard according to claim 32, characterized by the implementation of multiple stamping or printing layers, which define the conductive routings, placed adjacent one to the other in a single plane, separated by isolating layers.

41. A textile motherboard according to claim 32, characterized by the implementation of multiple stamping or printing layers, which define the conductive routings, placed superposed in an alternating manner with isolating layers.

42. A textile motherboard according to claim 32, characterized by the implementation of textile Vertical Interconnect Accesses, known as “VIAs”, in the form of a tag VIA or a thru VIA or a sequential VIA or a photo-defined VIA or a controlled depth VIA or a buried VIA or similar VIAs implementations.

Figure 1A



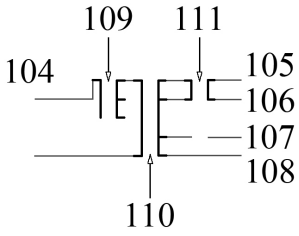


Figure 1B

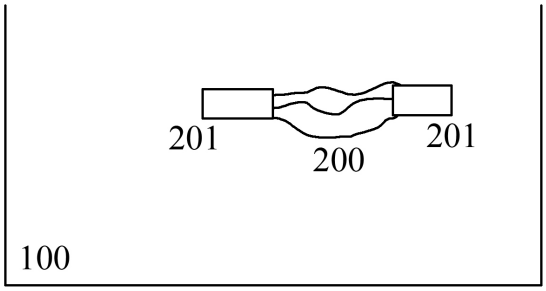


Figure 2A

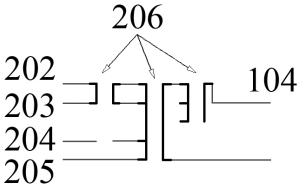
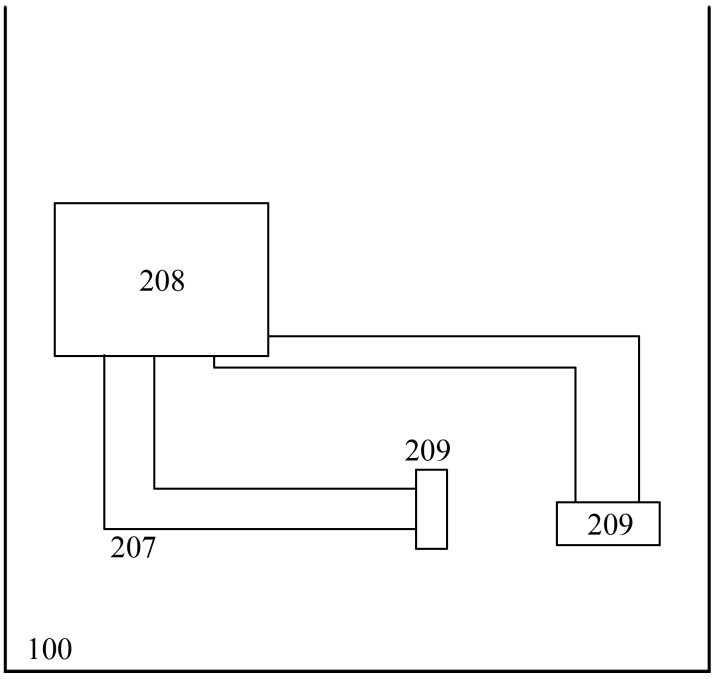


Figure 2B

Figure 2C



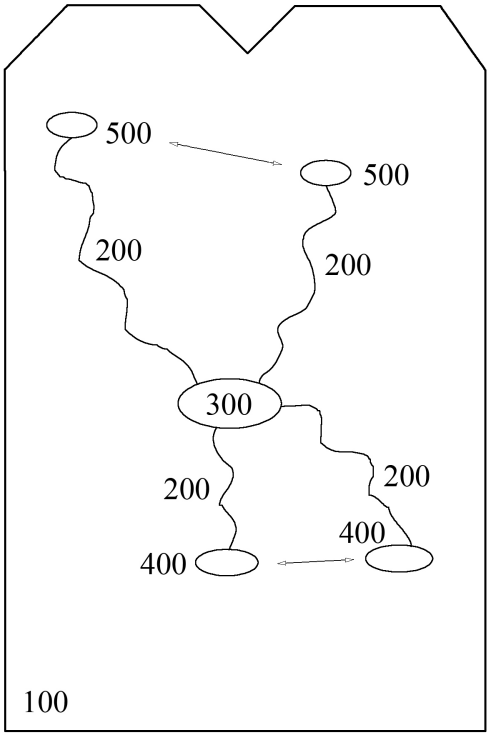


Figure 3

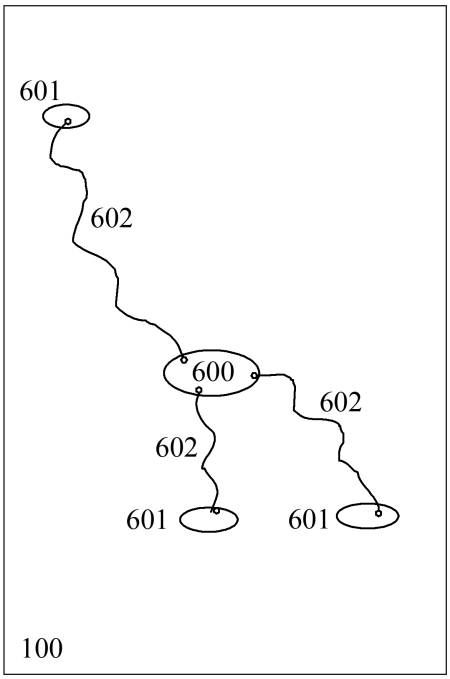


Figure 4

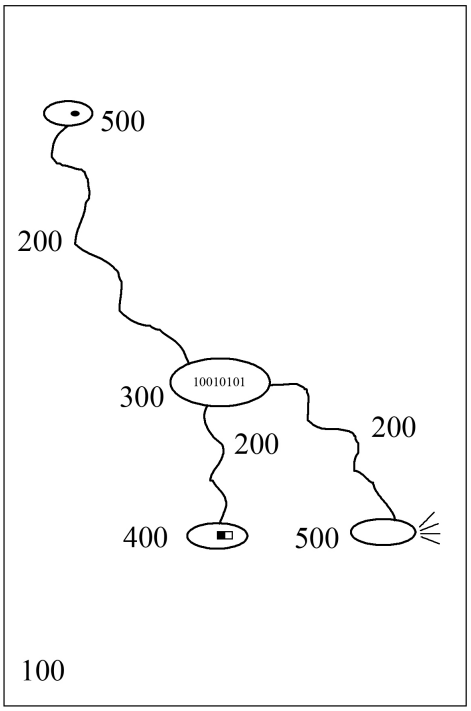


Figure 5