

Claims

1. A mobile wrist watch for communication, comprising:

- an exterior of a metallic case (1) and links (2), where the links are made up of a multitude of metallic parts, being made up of two rows of metallic links, which are connected in the horizontal direction mechanically and in the vertical/radial direction magnetically;
 - a rigid-flex printed circuit board (3), mounted with electrical components which is mechanically fixated and electrically connected to the metallic case and links
- and combined, form a thermoelectric circuit.

2. The mobile wrist watch according to claim 1, wherein only the outer metallic links (2), which are semi circled shaped and connected in the vertical/radial direction, obtain magnetic properties, in order for the parts to position with different angles respective to each other and consequently obtain a final shape similar to an ordinary wrist watch, to minimize any magnetic flux radiated from the same onto the electric components located inside the metallic link chain.

3. The mobile wrist watch according to claim 1, wherein every odd metallic link (2), which are connected in the vertical/radial direction, are connected magnetically in order for the parts to position with different angles respective to each other and consequently obtain a final shape similar to an ordinary wrist watch.

4. The mobile wrist watch according to claim 1, wherein there are a multitude of square shaped rings enclosing alongside the two above mentioned rows of metallic links (2), which move freely along the horizontal length bounded/limited by pegs on each individual square shaped ring's sides.

5. The mobile wrist watch according to claim 1, wherein on the metallic links (2) a plastic surface finish by injection moulding is deposited.

6. The mobile wrist watch according to claim 1, wherein the metallic links (2) have metallic pins (2c), which stem from the former, directed ninety (90) degrees upwards.

5 7. The mobile wrist watch according to claim 1, wherein the metallic links (2) have a plastic film (47) placed on its interior side stretched along the metallic links (2) accumulated length ending inside the metallic case (1) which function is to waterproof electrical components and could be in a form of a bag.

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8. The mobile wrist watch according to claim 1, wherein the rigid-flex printed circuit board (3) has holes located along its sides, which circumference edges are metallic and connected to at least one of the rigid-flex printed circuit board's conductive layers (3a) in order to electrically and/or thermally transfer/connect it to the exterior metallic case (1) and links (2).

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9. The mobile wrist watch according to claim 1 and 5, wherein the exterior metallic case (1) and links (2) functions as a thermal heat sink and electrical ground.

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10. The mobile wrist watch according to claim 1, 5 and 6, wherein the exterior metallic case (1) and links (2) functions as a combination of both a cold source and thermal heat sink thermally connected to the electrical components on the rigid-flex printed circuit board (3) having a minimum of two separate conductive layers (3a) in the rigid-flex printed circuit board being connected to different holes located along the metallic link (2).

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11. The mobile wrist watch according to claim 1, where inside the rigid-flex printed circuit board (3) there is at least one conductive layer (3a) which is electrically and/or thermally connected with the metallic pins (2c) to the metallic- case (1) and link (2) chains.

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12. The mobile wrist watch according to claim 1, the conductive layer 3a could be directly electrically and/or thermally connected to the metallic case 1.

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13. The mobile wrist watch according to claim 1, wherein the rigid-flex printed circuit board (3) and its mounted electrical components are painted with a nonconductive, conformal coating where the latter functions to align the directivity of the heat generated from the respective components to the underlying thermal conductor line (3a) in order to increase the heat obtained in the same.

14. The mobile wrist watch according to claim 1, wherein there is a rigid, slightly curved cantilever beam (45), at one end fixated to the exterior metallic case (1) and at the other end free standing, mounted with an accelerometer (27).

15. The mobile wrist watch according to claim 1 and 14, wherein the rigid, slightly cantilever beam (45) is flexible enough in its vertical direction in order to adapt its height or curvature and thus follow a users vertical hand movements and monitor the user's tremor movement of his or her hand.

16. The mobile wrist watch according to claim 1, 14 and 15, wherein the free standing accelerometer (27) is connected to the electrical circuit by having a flexible printed circuit board made up of at least six (6) conductive layers placed on top of each other alternated with dielectric layers in between.

17. The mobile wrist watch according to claim 1 and 9, wherein there is an additional accelerometer (27) mounted inside the metallic case (1) or links (2) in order to provide additional, comparative measurement data.

18. The mobile wrist watch according to claim 1, wherein there is a medical sensor (42) mounted on the backside/inner exterior of the metallic links (2) which is mechanically and electrically fixed and connected by metallic pins (43) to the rigid-flex printed circuit board 3 inside the metallic case (1) and links (2) and wherein the said sensor is placed in the centre of an medical (transdermal) tape in order to detect glucose- or lactate levels noninvasively from the interstitial fluid in the subcutaneous tissue or monitor the skin conductivity.

19. The mobile wrist watch according to claim 1, wherein there is a viewfinder display (28) placed in the metallic case (2) or link (3) facing outwards.

5 20. The mobile wrist watch according to claim 1 and 19, wherein there is an image camera sensor (29) placed, on the adjacent side of the metallic case, in the metallic link facing outwards; in such a way so the viewfinder display (28) and image camera sensor (29) is along the same (x-axis) plane.

10 21. The mobile wrist watch according to claim 1, and 20, wherein there is an objective lens (30) which is mounted or fixated magnetically on top of an image sensor (29).

15 22. The mobile wrist watch according to claim 1, 20 and 21, wherein the objective lens (30) is fixated to an arm (36) which revolves around one end and fixated at the other end (37) to the metallic link (2) protecting the former partly when positioned inside the latter.

20 23. The mobile wrist watch according to claim 1, 19 and 20, wherein the above mentioned viewfinder (28) is mounted mechanically on an exterior module (39) which moves along the metallic link (2) and is electrically connected to the electrical circuit by a rollable flexible printed circuit board (3b) keeping the latter stretched independent of its length.

25 24. The mobile wrist watch according to claim 1, 19, 20 and 23, wherein the above mentioned viewfinder (28) has a metallic shielding (40) in the form of a roof fixated to the metallic case (1) or link (2).

30 25. The mobile wrist watch according to claim 1, 20 and 23 wherein there is a combination of a projection device (31) mounted at one end of the metallic case (1) and an image sensor (29) mounted inside the above described exterior, movable module (39), along with the viewfinder (28), to optimize the simultaneous projection and image acquiring during a mobile video conversation.

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26. The mobile wrist watch according to claim 1 wherein there is a pressure sensor (33) located at the end of the rigid-flex printed circuit board (3) facing inwards in order to continuously monitor the pulse of the user.

5 27. The mobile wrist watch according to claim 1, 14 -21 wherein there is a temperature sensor (not shown) located at the end of the rigid-flex printed circuit board (3) facing inwards in order to continuously monitor the temperature of the user.

10 28. The mobile wrist watch according to claim 1, 19 -24 wherein the above mentioned pressure sensor (33) alternatively functions as a snapshot/recording button when used for photography or filming.

15 29. The mobile wrist watch according to claim 1 wherein there is a top display (44a) located in the top region of the metallic case (1) constituted of three different types of polymers, from top to bottom: a (i). shape memory (44d) (ii). lenticular lens (44c) and (iii). organic light emitting diode (oled) (44b), to, combined or separately, obtain physically or virtually a wide range of physical shapes and images which simultaneously results in (i). an
20 increased esthetic user experience (ii). Braille symbols, in order for blind people to receive realtime communication information or (iii). form a reduced (simple) keyboard with symbols in order for the user to communicate with simple text or numbers or (iv). display another person when performing a video conversation or (v). display and physically
25 animate a figure or picture to the user's liking.

30 30. The mobile wrist watch according to claim 1 wherein as an alternative to the metallic link (2), there is a non-metallic, bendable material (46) which encapsulates the electronic components mounted on the rigid-flex printed circuit board (3) all the while obtaining a final shape similar to a partial circle protecting against physical or chemical damage from the exterior environment.

35 31. The mobile wrist watch according to claim 1 and 30 wherein the non-metallic, bendable material (46) is made of plastic or rubber, where on its exterior side, a layer of textile or leather is mounted.

32. The mobile wrist watch according to claim 1, 8, 11 and 12 wherein there is at the end of atleast one conductive layer (3a) a thermally connected metallic area on the top layer functioning as a heat spreader (47) which the thermoelectric generator (45) is mounted on top in order to have a thermal connection between the two; additionally, on top of the thermoelectric generator (45), the metallic case (1) is locally formed inwards in order to thermally connect to the former; where the respective thermal connections constitutes the hot- and cold source respectively for the thermoelectric generator (45).
33. The mobile wrist watch according to claim 1, 8, 11 and 12 wherein the thermoelectric generator (45) is mounted or integrated on top of each individual electronic component where the latter functions as a heat source; additionally, on the other, top side the metallic link (2) is locally formed inwards in order to thermally connect and thus function as the cold source for the thermoelectric generator (45).
34. The mobile wrist watch according to claim 1 wherein the order and placement/positioning of the electronic components along the metallic link (2) are of significant importance in order for their individual tasks to serve the overall purpose to provide additional degrees of physical latitude for ther user.
35. The mobile wrist watch according to claim 1 wherein it performs tasks of mobile computing, imaging handling, medical monitoring and communicating with far and nearby electronic devices wirelessly with established radiofrequency technologies.