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(54) **ELECTRONIC DEVICE**

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A61B 90/00	(2006.01)

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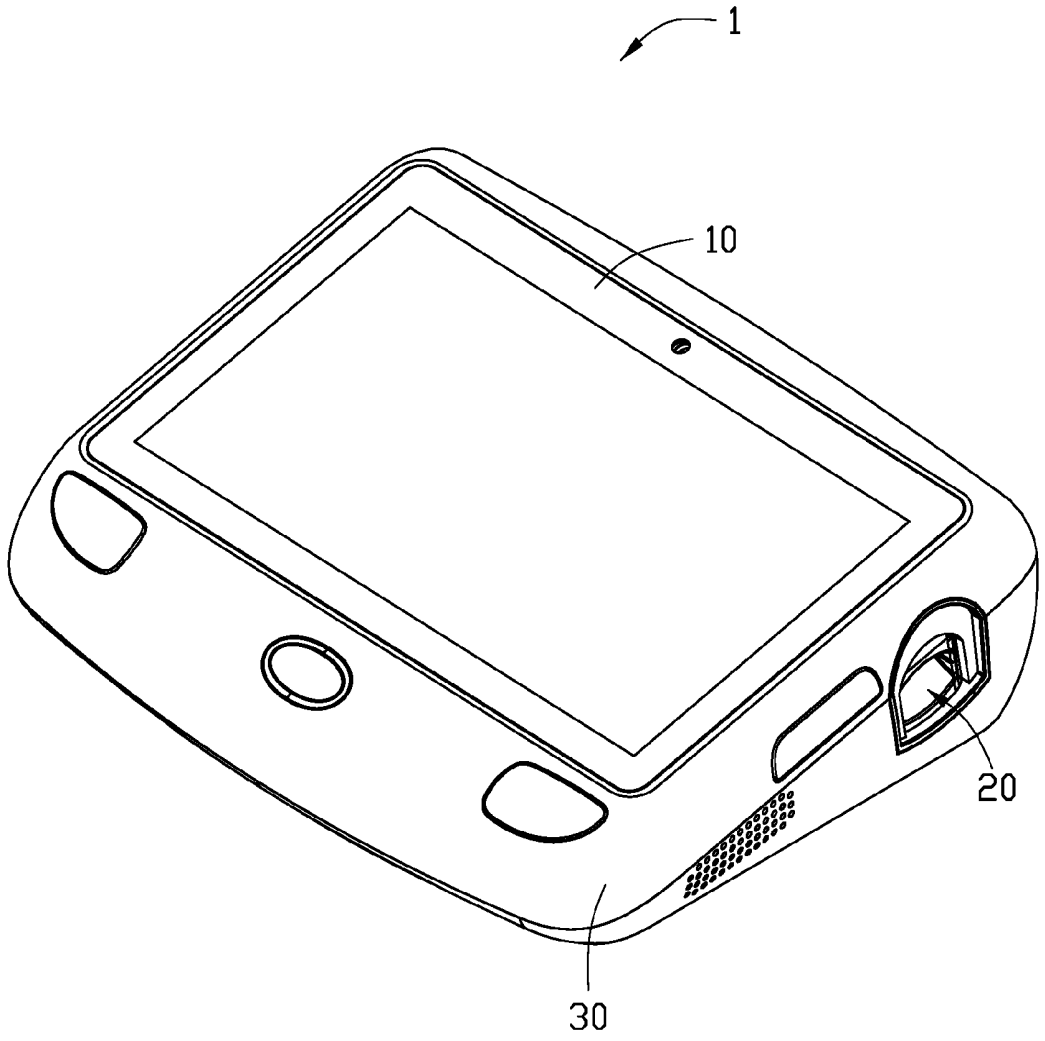
(57) **ABSTRACT**

An electronic device includes a medical testing unit. The medical testing unit includes a medical processor, a number of medical testing modules, and a number of testing subunits. Each testing subunit is electrically coupled to a corresponding medical testing module, the medical processor is electrically coupled to the medical testing modules. The medical processor is used for controlling the testing subunits and the medical testing modules to test physiological parameters of users, and acquire, process, and analyze the physiological parameters to generate health data.



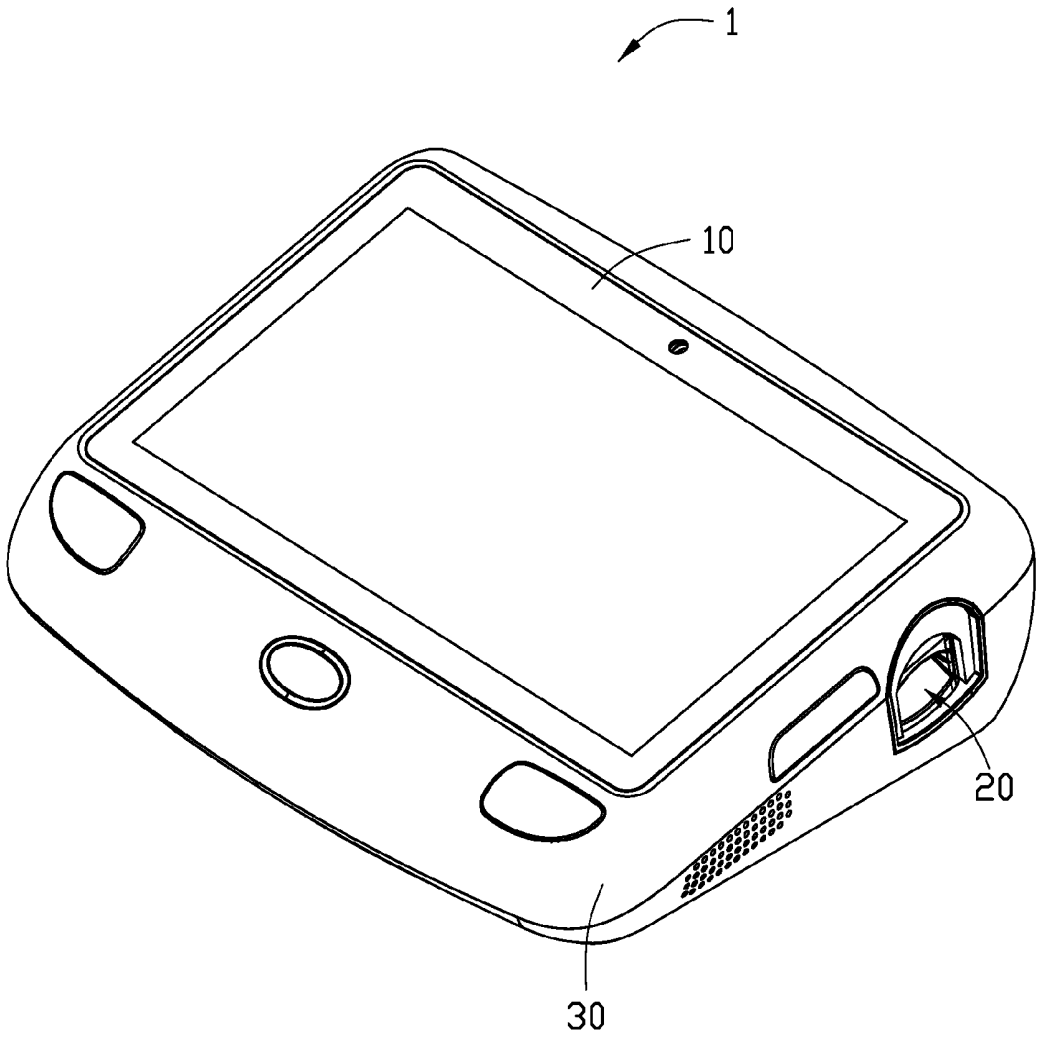


FIG. 1

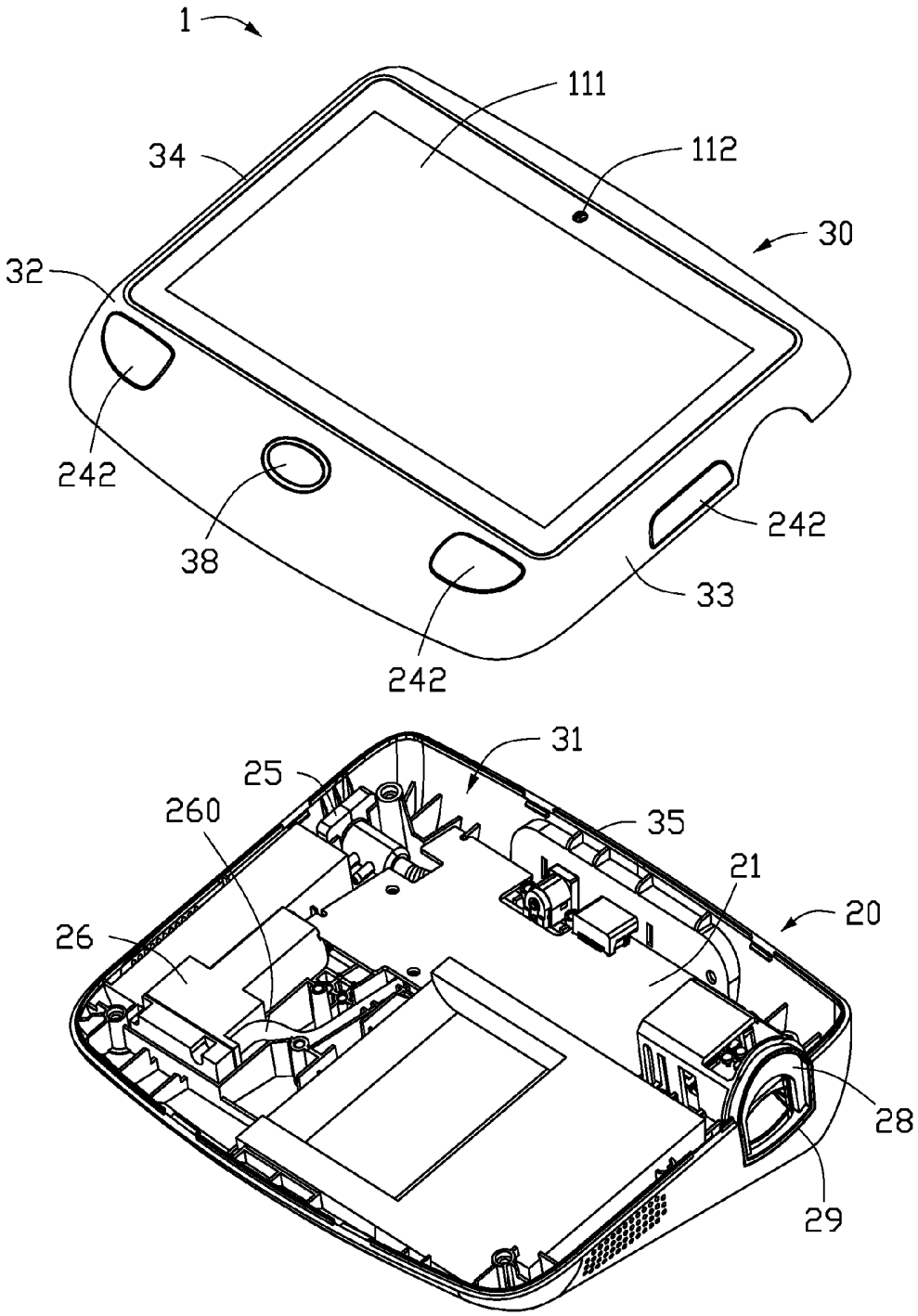


FIG. 2

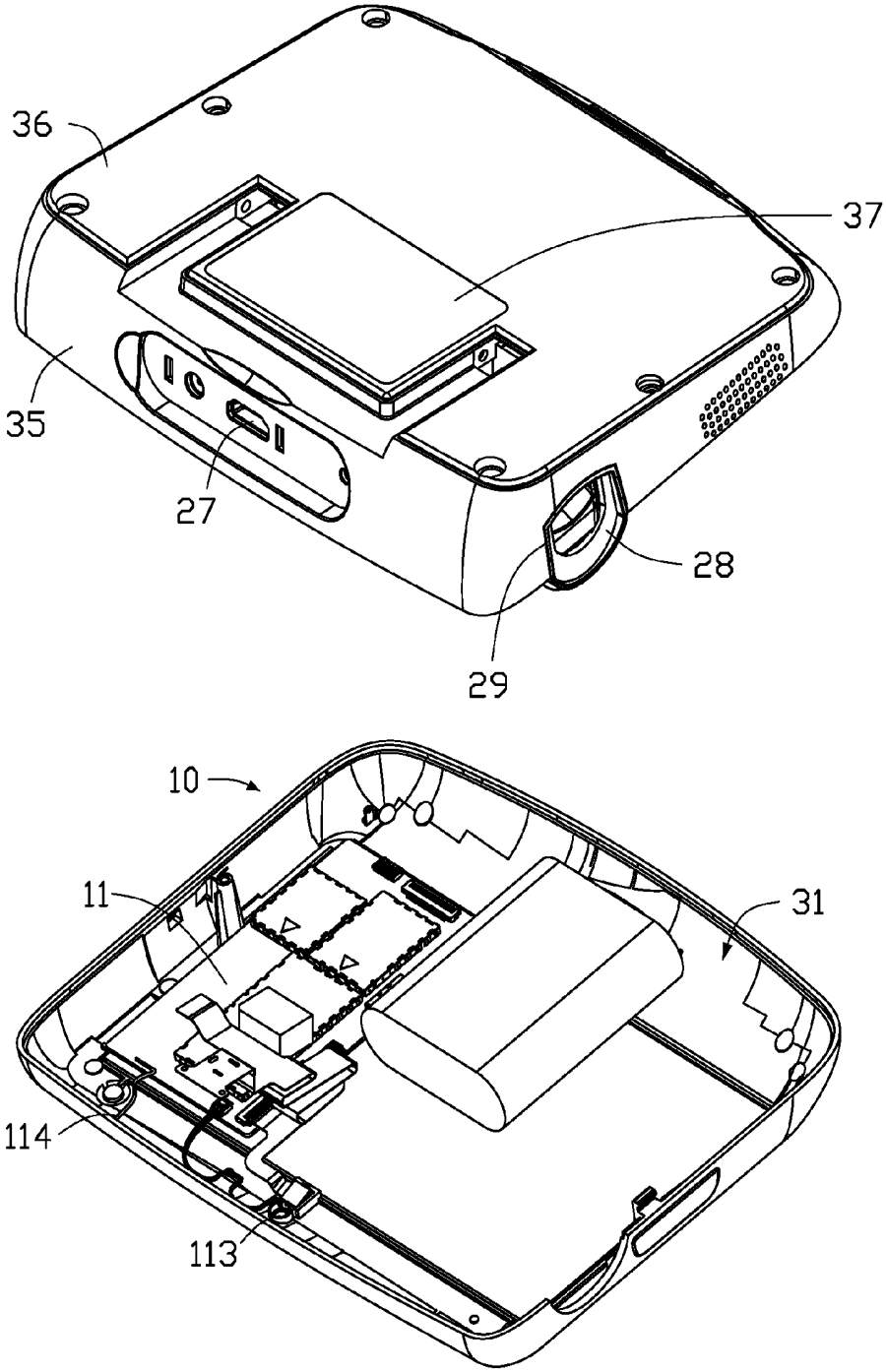


FIG. 3

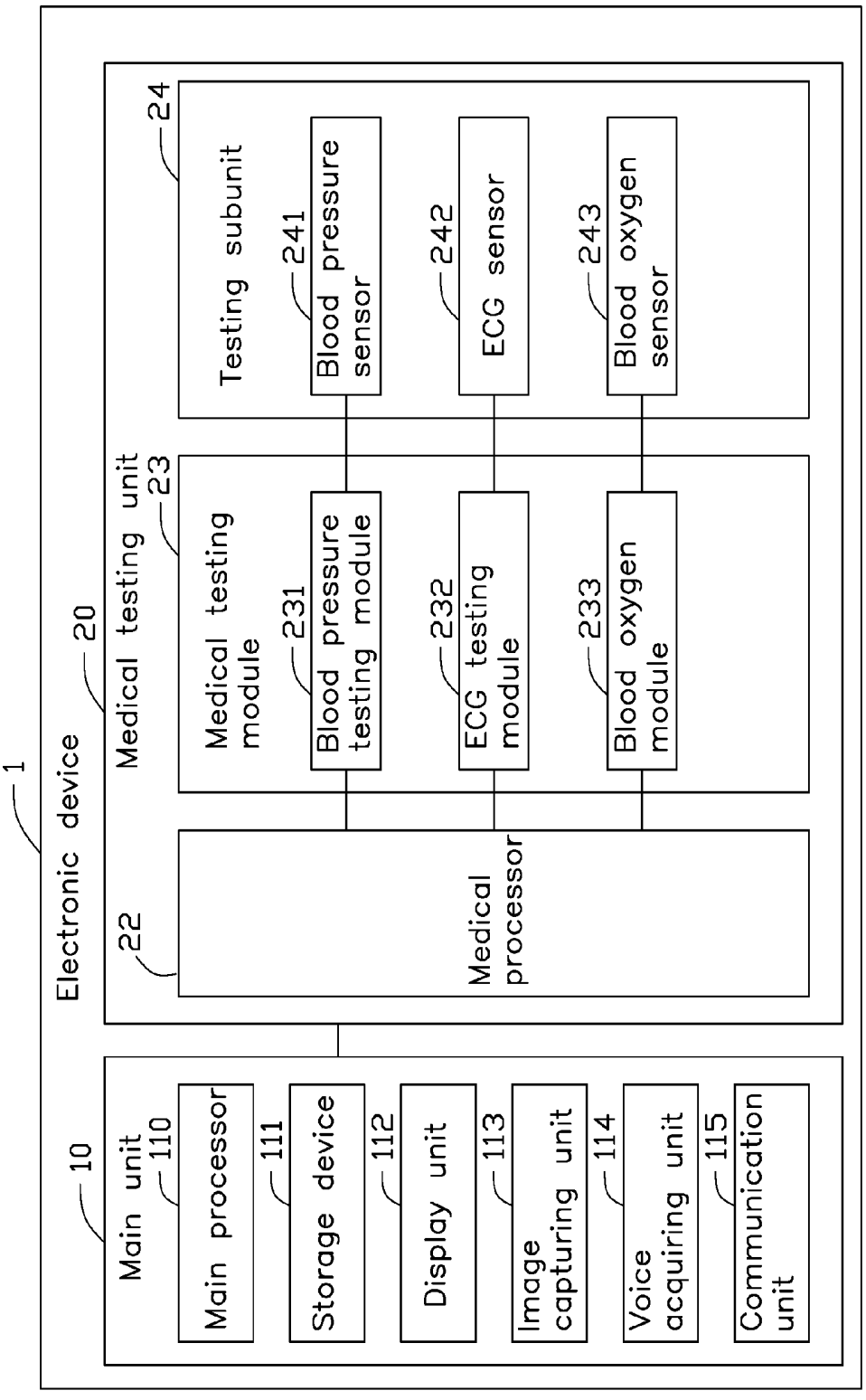

1
Electronic device
10
Main unit
110
Main processor
111
Storage device
112
Display unit
113
Image capturing unit
114
Voice acquiring unit
115
Communication unit
20
Medical testing unit
22
Medical processor
23
Medical testing module
231
Blood pressure testing module
232
ECG testing module
233
Blood oxygen module
24
Testing subunit
241
Blood pressure sensor
242
ECG sensor
243
Blood oxygen sensor

FIG. 4

ELECTRONIC DEVICE

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority to Chinese Patent Application No. 201610890032.2 filed on Oct. 12, 2016, the contents of which are incorporated by reference herein.

FIELD

[0002] The subject matter herein generally relates to medical devices, and particularly to an electronic device with a medical testing function.

BACKGROUND

[0003] Medical products, such as sphygmomanometers, blood glucose meters, and ECG testers are in use. However, these medical products only have single medical testing function, which is inconvenient for users to test a number of medical items at the same time.

BRIEF DESCRIPTION OF THE DRAWINGS

[0004] Many aspects of the disclosure can be better understood with reference to the following drawings. The components in the drawings are not necessarily drawn to scale, the emphasis instead being placed upon clearly illustrating the principles of the disclosure. Moreover, in the drawings, like reference numerals designate corresponding parts throughout the several views.

[0005] FIG. **1** is a schematic view illustrating an exemplary embodiment of an electronic device.

[0006] FIG. **2** is an exploded view illustrating an exemplary embodiment of the electronic device in FIG. **1**.

[0007] FIG. **3** is an exploded view from another angle of the electronic device in FIG. **2**.

[0008] FIG. **4** is a block diagram illustrating an exemplary embodiment of the electronic device in FIG. **1**.

DETAILED DESCRIPTION

[0009] It will be appreciated that for simplicity and clarity of illustration, where appropriate, reference numerals have been repeated among the different figures to indicate corresponding or analogous elements. In addition, numerous specific details are set forth in order to provide a thorough understanding of the exemplary embodiments described herein. However, it will be understood by those of ordinary skill in the art that the exemplary embodiments described herein can be practiced without these specific details. In other instances, methods, procedures, and components have not been described in detail so as not to obscure the related relevant feature being described. Also, the description is not to be considered as limiting the scope of the exemplary embodiments described herein. The drawings are not necessarily to scale and the proportions of certain parts have been exaggerated to better illustrate details and features of the present disclosure.

[0010] The present disclosure, including the accompanying drawings, is illustrated by way of examples and not by way of limitation. Several definitions that apply throughout this disclosure will now be presented. It should be noted that references to "an" or "one" exemplary embodiment in this disclosure are not necessarily to the same exemplary embodiment, and such references mean "at least one."

[0011] The term "comprising" means "including, but not necessarily limited to", it specifically indicates open-ended inclusion or membership in a so-described combination, group, series, and the like.

[0012] FIG. **1** illustrates an exemplary embodiment of an electronic device **1**. The electronic device **1** includes, but is not limited to, a main unit **10**, a medical testing unit **20**, and a casing **30**. In at least one exemplary embodiment, the electronic device **1** can be a smart phone, a personal computer, or a PDA (Personal Digital Assistant). FIG. **1** illustrates only one example of the electronic device **1**, other examples can include more or fewer components than illustrated, or have a different configuration of the various components in other exemplary embodiments.

[0013] Referring to FIG. **2**, the casing **30** defines a receiving space **31**, and includes an upper surface **32**, a first side **33**, a second side **34**, a third side **35**, a bottom surface **36**, and a bracket **37**. A button **38** is arranged on the upper surface **32**, the button **38** can be triggered to start or shut down the electronic device **1**, and to activate or to pause a medical testing. For example, when the button **38** is pressed for longer than a first predetermined period (eg. eight seconds), the electronic device **1** starts or shuts down, when the button **38** is pressed for less than a second predetermined period (eg. two seconds), the electronic device **1** activates or pauses the medical testing.

[0014] The third side **35** is adjacent to the first side **33** and the second side **34**. The bracket **37** is rotatably arranged on the bottom surface **36**, the bracket **37** is used for supporting the casing **30**, thus an angle is formed between the casing **30** and a supporting object.

[0015] Referring to FIG. **3**, the main unit **10** and the medical testing unit **20** are received in the receiving space **31** of the casing **30**. The main unit **10** is used for performing basic functions of the electronic device **1**, such as web surfing, video and audio playing, mobile communication, and wireless communication etc. In at least one exemplary embodiment, the main unit **10** at least includes a main board **11**. A main processor **110** (shown in FIG. **4**) is arranged on the main board **11**. In at least one exemplary embodiment, the main processor **110** can be a central processing unit (CPU), a microprocessor, or other data processor chip that performs functions of the electronic device **1**, such as SoC (System on Chip).

[0016] Referring to FIG. **4**, the main unit **10** further includes a storage device **111**, a display unit **112**, an image capturing unit **113**, a voice acquiring unit **114**, and a communication unit **115**. In at least one exemplary embodiment, the storage device **111** can include various types of non-transitory computer-readable storage mediums. For example, the storage device **111** can be an internal storage system, such as a flash memory, a random access memory (RAM) for temporary storage of information, and/or a read-only memory (ROM) for permanent storage of information. The storage device **111** can also be an external storage system, such as a hard disk, a storage card, or a data storage medium.

[0017] In at least one exemplary embodiment, the display unit **112** can be a touch screen. The display unit **112** is arranged in the casing **30**, and is used for displaying media content of the electronic device **1** and health data of users. The image capturing unit **113** can be a camera, the image capturing unit **113** is arranged in the casing and exposed out of the display unit **112**. The image capturing unit **113** is used

for capturing images and recording videos. The voice acquiring unit **114** can be a microphone, the voice acquiring unit **114** is used for acquiring voice of users. The communication unit **115** includes a wireless communication module, the wireless communication module is used for performing WI-FI communication, BLUETOOTH communication, 2G communication, 3G communication, and/or 4G communication.

[0018] The medical texting unit **20** at least includes a medical board **21**. The medical board **21** is integrated with a medical processor **22**, a number of medical testing modules **23**, and a number of testing subunits **24**. Each testing subunit **24** corresponds to a medical testing module **23**. In at least one exemplary embodiment, the medical processor **22** can be a MCU (Microcontroller Unit). The medical board **21** is electrically coupled to the main board **11**. Each testing subunit **24** is electrically coupled to a medical testing module **23**. The medical processor **22** is used for controlling the testing subunits **24** and the medical testing modules **23** to test physiological parameters of the users, and acquire, process, and analyze the physiological parameters to generate the health data.

[0019] The medical testing unit **20** is electrically coupled to the main processor **110**. The medical testing unit **20** can transmit the generated health data to the main processor **110**. A health management application (not shown) is run in the electronic device **1**, thus the main processor **110** can process (eg. store, display, or transmit) the health data in combination with the health management application.

[0020] In at least one exemplary embodiment, the electronic device **1** makes the best use of space by defining two main boards (the main board **11** and the medical board **21**), thus avoiding tight gaps between the electronic components of the electronic device **1**. In addition, the main processor **110** and the medical processor **22** share out the work and cooperate with each other, to avoid single processor performing too many functions and being overloaded. In other exemplary embodiment, the electronic device **1** also can include one main board. The main unit **10** and the medical testing unit **20** are arranged on the main board.

[0021] In at least one exemplary embodiment, the medical testing modules **23** include, but are not limited to, a blood pressure testing module **231**, an ECG (electrocardiogram) testing module **232**, and a blood oxygen testing module **233**. The modules **231-233** can be collections of software instructions stored in the electronic device **1** and executed by the medical processor **22**. The modules **231-233** also can include functionality represented as hardware or integrated circuits, or as software and hardware combinations, such as a special-purpose processor or a general-purpose processor with special-purpose firmware.

[0022] The testing subunits **24** includes, but are not limited to, a blood pressure sensor **241**, at least three ECG sensors **242**, and a blood oxygen sensor **243**.

[0023] As illustrated in FIG. **2**, in the least one exemplary embodiment, a blood testing port **25** and an air pump **26** are arranged on the medical board **21**. The blood testing port **25** is exposed out of the second side **34** of the casing **30**. The blood pressure sensor **241** and the air pump **26** are connected to a blood pressure testing sleeve (not shown) through the blood pressure testing port **25**. The blood pressure sensor **241** is used for detecting pressure signals. The air pump **26** is used for inflating or deflating the blood pressure testing sleeve.

[0024] When testing the blood pressure parameter of a user, one end of the blood pressure testing sleeve is connected to the blood pressure testing port **25**, and the other end is sleeved on an arm of the user. The medical processor **22** controls the air pump **26** to inflate the blood pressure testing sleeve, thus applying pressure to the arm of the user, and can control the air pump **26** to deflate the blood pressure testing sleeve, thus removing the applied pressure. The blood pressure sensor **241** detects the pressure signals during inflating or deflating the blood pressure testing sleeve, and transmits the pressure signals to the blood pressure testing module **231**, then the blood pressure testing module **231** can determine the blood pressure parameter of the user according to the pressure signals.

[0025] In at least one exemplary embodiment, the testing subunits **24** include four ECG sensors **242**. Two ECG sensors **242** are arranged on the upper surface **32** of the casing **30**, the other two ECG sensors **242** are respectively arranged on the first side **33** and the second side **34** of the casing **30**. The ECG sensor **242** can be an ECG signal acquiring electrode.

[0026] When testing the ECG of the user, the user can touch any three ECG sensors **242** with three fingers, then the ECG sensors **242** can detect the ECG signals of the user, and transmit the ECG signals to the ECG testing module **232**. The ECG testing module **232** can determine the ECG of the user according to the ECG signals.

[0027] In at least one exemplary embodiment, the medical board **21** further defines an ECG testing port **27**, the ECG testing port **27** is exposed out of the third side **34** of the casing **30**, and is used for connecting with an external ECG testing device (not shown).

[0028] In at least one exemplary embodiment, the blood oxygen sensor **243** can be an infrared sensor. The blood oxygen sensor **243** is used for receiving and transmitting infrared rays. The main board **21** further includes a finger clamping device **28** and a blood oxygen testing port **29**, the finger clamping device **28** and the blood oxygen testing port **29** are arranged on the first side **33** of the casing **30**. The finger clamping device **28** is exposed out of the blood oxygen testing port **29**, and is used for clamping at least one finger of the user.

[0029] When testing the blood oxygen parameter of the user, the user can insert the finger into the finger clamping device **28**. The blood oxygen sensor **243** transmits infrared rays, receives the infrared rays reflected by the user finger, and feeds the transmitted infrared signals and received infrared signals back to the blood oxygen testing module **233**. The blood oxygen testing module **233** can determine the blood oxygen parameter of the user according to the infrared signals.

[0030] In at least one exemplary embodiment, the electronic device **1** further can be connected to other external medical devices through the communication unit **115**, such as blood glucose testing devices, body fat testing devices etc., and acquire the relevant physiological readings, such as blood glucose and body fat levels or values, from these medical devices.

[0031] In at least one exemplary embodiment, the electronic device **1** further can adopt the communication unit **115** for network communication, such as the Internet communication, the 2G communication, the 3G communication, or the 4G communication. Thus, the user can make a video call or voice call with online doctors, and transmit the health

data to the online doctors, then the online doctors can evaluate a health index of the user according to the health data, and issue advice.

[0032] In at least one exemplary embodiment, not only does the electronic device **1** have basic computer functions, but also has medical testing functions, and can connect to the online doctors through the network communication, which is convenient for the users.

[0033] It is believed that the present embodiments and their advantages will be understood from the foregoing description, and it will be apparent that various changes may be made thereto without departing from the spirit and scope of the disclosure or sacrificing all of its material advantages, the examples hereinbefore described merely being exemplary embodiments of the present disclosure.

What is claimed is:

1. An electronic device comprising:

a medical testing unit comprising a medical processor, a plurality of medical testing modules, and a plurality of testing subunits, wherein each testing subunit is electrically coupled to a corresponding medical testing module, the medical processor is electrically coupled to the medical testing modules, the medical processor is used for controlling the testing subunits and the medical testing modules to test physiological parameters of users, and acquire, process, and analyze the physiological parameters to generate health data.

2. The electronic device according to claim **1**, further comprising:

a main unit comprising a main processor, wherein the main processor is electrically coupled to the medical testing unit, the main processor is used for receiving and processing the generated health data.

3. The electronic device according to claim **2**, wherein the main unit further comprising a main board, the main processor is arranged on the main board; the medical testing unit further comprising a medical board, the medical processor, the plurality of medical testing modules, and the plurality of testing subunits are arranged on the medical board.

4. The electronic device according to claim **2**, further comprising:

a casing defining a receiving space, wherein the receiving space is used for receiving the main unit and the medical testing unit.

5. The electronic device according to claim **4**, further comprising:

a bracket rotatably mounted on the casing, wherein the bracket is used for supporting the casing.

6. The electronic device according to claim **4**, further comprising:

a button mounted on the casing, wherein the button is used for starting or shutting down the electronic device, and activating or pausing a medical testing.

7. The electronic device according to claim **2**, wherein the main unit further comprising:

a storage device; and/or

a display unit used for displaying media content of the electronic device and the health data of the users; and/or

an image capturing unit used for capturing images and recording videos; and/or

a voice acquiring unit used for acquiring voice of the users.

8. The electronic device according to claim **2**, wherein the main unit further comprising:

a communication unit used for performing WiFi communication, bluetooth communication, 2G communication, 3G communication, and/or 4G communication, wherein the electronic device acquires the health data from external medical devices through the communication unit.

9. The electronic device according to claim **1**, wherein the plurality of medical testing modules comprising a blood pressure testing module, the plurality of testing subunits comprising a blood pressure sensor, wherein the blood pressure testing module and the blood pressure sensor are used for testing blood pressure parameter of the user.

10. The electronic device according to claim **9**, further comprising a blood testing port and an air pump, wherein the blood pressure sensor and the air pump are connected to a blood pressure testing sleeve through the blood pressure testing port, the blood pressure sensor is used for detecting pressure signals, the air pump is used for inflating or deflating the blood pressure testing sleeve.

11. The electronic device according to claim **1**, wherein the plurality of medical testing modules comprising an ECG testing module, the plurality of testing subunits comprising at least three ECG sensors, wherein the ECG testing module and the ECG sensors are used for testing ECG parameter of the user.

12. The electronic device according to claim **11**, wherein the electronic device further defines an ECG testing port, the ECG testing port is used for connecting with an external ECG testing device.

13. The electronic device according to claim **1**, wherein the plurality of medical testing modules comprising a blood oxygen testing module, the plurality of testing subunits comprising a blood oxygen sensor, wherein the blood oxygen testing module and the blood oxygen sensor are used for testing blood oxygen parameter of the user.

14. The electronic device according to claim **13**, wherein the blood oxygen sensor is an infrared sensor, the blood oxygen sensor is used for receiving and transmitting infrared rays, the electronic device further comprising a finger clamping device, the finger clamping device is used for clamping at least one finger of the user.

* * * * *

专利名称(译)	电子设备		
公开(公告)号	US20180098741A1	公开(公告)日	2018-04-12
申请号	US15/719702	申请日	2017-09-29
[标]发明人	LU ZHAN SHENG LEE CHIEH YU		
发明人	LU, ZHAN-SHENG LEE, CHIEH-YU		
IPC分类号	A61B5/00 A61B5/021 A61B5/0428 A61B5/1455 A61B90/00		
CPC分类号	A61B5/7475 A61B5/02141 A61B5/0428 A61B5/14552 A61B5/6826 A61B5/7445 A61B90/361 A61B2560/045 A61B2560/0493 A61B2562/227 A61B5/0205 A61B5/021 A61B5/0402 A61B5/14542 A61B5/0006 A61B5/0022 A61B5/02225 A61B5/0404 A61B5/14551 A61B2560/0431 G16H40/67		
优先权	201610890032.2 2016-10-12 CN		
外部链接	Espacenet USPTO		

摘要(译)

电子设备包括医学测试单元。医学测试单元包括医疗处理器，多个医学测试模块和多个测试子单元。每个测试子单元电耦合到相应的医学测试模块，医学处理器电耦合到医学测试模块。医疗处理器用于控制测试子单元和医学测试模块，以测试用户的生理参数，并获取，处理和分析生理参数以生成健康数据。