EUROPEAN PATENT SPECIFICATION

POWER SUPPLY UNIT FOR MOBILE TERMINAL AND POWER SUPPLY SWITCHING METHOD FOR MOBILE TERMINAL

UNITÉ D’ALIMENTATION POUR TERMINAL MOBILE ET PROCÉDÉ DE COMMUTATION D’ALIMENTATION POUR TERMINAL MOBILE

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- Texas Instruments: “1.2 A/1.25 MHz, HIGH-EFFICIENCY STEP-DOWN CONVERTER”, 1 October 2003 (2003-10-01), pages 1-20,

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The present invention relates to the field of electronic technology, and more specifically, to a power supply unit and a power supply switching method for mobile terminals.

In today’s social life, cell phones have become an indispensable communications tool and brought tremendous convenience to life. Conventional cell phones are typically powered with batteries. When a cell phone is charged by an external power supply, the cell phone battery still supplies power to the cell phone while being charged, which shortens the service life of the battery and increases the cell phone’s peripheral cost. In addition, it is not compliant with the requirement in the “Chinese Standards for Mobile TD Family Cell Phones” that with an external power supply, the power supply charges the terminal, and the battery is only charged without supplying power to the terminal.

The object of the present invention is to provide a power supply unit and a power supply switching method for mobile terminals, when an external power supply charges the terminal, the terminal can be powered by the power supply, and the battery is only charged without supplying power to the terminal.

US 2005/041352A1 discloses a power control apparatus of a complex terminal which includes a main battery and an auxiliary battery, and a voltage sensor for interrupting supply of the main power from the main battery to the complex terminal and controlling the auxiliary power outputted from a DC/DC converter to be supplied to the complex terminal, when the measured voltage of the main power becomes lower than the predetermined voltage. Texas Instruments: “1.2 N1 .25 MHz, HIGH-EFFICIENCY STEP-DOWN CONVERTER”, 1 October 2003 (2003-10-01), pages 1-20, Dallas, Texas describes a high-efficiency step-down converter optimized for battery powered portable applications.

Therefore, the prior art is to be improved. This problem is solved according to the features of the independent claim(s). Further embodiments result from the depending claims.

The object of the present invention is to provide a power supply unit and a power supply switching method for mobile terminals, when an external power supply charges the terminal, the terminal can be powered by the power supply, and the battery is only charged without supplying power to the terminal.

In order to attain the above object, the present invention employs the following technical solution:

A power supply unit for mobile terminals, comprising the features of claim 1, including a battery, a power supply conversion module, a charging management module and a power supply switching module; said charging management module and power supply switching module both comprise a power supply input port used for connection with an external power supply; said charging management module is connected with the battery and used for charging the battery when an external power supply is connected; said power supply conversion module is connected with said power supply switching module and used for converting the voltage of an external power supply into power supply voltage required by the terminal and controlling on-off state of said power supply switching module such that the power supply switching module is in an on state when no external power supply is connected, the battery supplies power to the mobile terminal, and such that said power supply switching module is off and said power supply conversion module outputs the power supply voltage when an external power supply is connected.

According to an embodiment, the power supply further comprises a system power supply module, said system power supply module is connected in parallel at the output of said power supply conversion module and used for charging and power storage during off time of radio frequency transmission of a mobile terminal and for discharging during radio frequency transmission of the mobile terminal.

According to another embodiment, said power supply conversion module comprises an integrated chip with model number of POWER-DC20C-TPS62040DRC used for converting the voltage of an external power supply into power supply voltage required by a mobile terminal; said power supply switching module comprises a second resistor, a third resistor and a field effect transistor; said second resistor and third resistor are connected in series to form a voltage sampling circuit, one end of said third resistor is connected with said power supply conversion module, a voltage dividing point of said voltage sampling circuit is connected with the gate of said field effect transistor, and the source of said field effect transistor is connected with said battery. Pursuant to an embodiment, the sum of resistance of said second resistor and third resistor is 1.2 KΩ – 1.5 KΩ. According to a next embodiment, said system power supply module comprises a first capacitor and a second capacitor connected in parallel.

According to an exemplary embodiment, said first capacitor and second capacitor are both tantalum capacitors.

Further, a power supply switching method for mobile terminals by means of the power supply unit for mobile terminals is suggested, wherein said method comprises the following steps of:

A. Detecting whether an external power supply is connected into the mobile terminal; if yes, go to Step B, otherwise, the battery supplies power to the mobile terminal;
B. Stopping the power supply by the battery to the mobile terminal, the external power supply supplies power to the mobile terminal and charges the battery;
According to an embodiment, said Step B comprises:

B1. When the current of the power supply by the external power supply is not sufficient, activating the system power supply module to discharge and supplement the power supply to the mobile terminal.

The present invention provides a power supply unit and a power supply switching method for mobile terminals, which employs a power supply conversion module to convert the voltage of an external power supply into power supply voltage required by the terminal, and a power supply switching module to switch the power supply mode between the battery and the power supply conversion module. It realizes that when the terminal is connected with an external power supply, the external power supply supplies power to the terminal and the battery is only charged without supplying power to the terminal, which meets the requirement in the "Chinese Standards for Mobile TD Family Cell Phones" and is suitable for power supply switching of 3G handsets.

Embodiments of the invention are shown and illustrated in particular in view of the following figures:

Fig.1 is a block diagram of a power supply unit for mobile terminals according to the present invention;

Fig.2 is a circuit diagram of an embodiment of a power supply unit for mobile terminals according to the present invention;

Fig.3 is a flow chart of a power supply switching method for mobile terminals according to the present invention.

To make the object, technical solution and advantages of the present invention clearer and more specific, the present invention is further described in detail below with reference to the accompanying drawings and embodiments.

As required by the "Chinese Standards for Mobile TD Family Cell Phones," with an external power supply, the power supply charges the terminal, and the battery is only charged without supplying power to the terminal. In order to satisfy the above requirement, the present invention provides a power supply unit for mobile terminals as shown in Fig.1 and Fig.2, comprising:

A power supply conversion module 110, a charging management module 120, a power supply switching module 130, a system power supply module 140 and a battery 150.

Said battery 150 is used for supplying power to the mobile terminal, said charging management module 120 and power supply switching module 130 both comprise a power supply input port used for connection with an external power supply (5 V direct current (DC) power supply input from a charger or a computer USB interface). Said charging management module 120 is connected with said battery 150 and used for charging the battery 150 when an external power supply is connected to the mobile terminal. Said power supply conversion module 110 is connected with said power supply switching module 130 and used for converting the voltage of an external power supply into power supply voltage required by the terminal and controlling on-off state of said power supply switching module 130. When no external power supply is connected to the mobile terminal, said power supply conversion module 110 sets said power supply switching module 130 to an on state, and the battery supplies power to the mobile terminal; when an external power supply is connected to the mobile terminal, said power supply conversion module 110 sets said power supply switching module 130 to an off state, and the battery supplies power to the mobile terminal; when an external power supply is connected to the mobile terminal, said power supply conversion module 110 sets said power supply switching module 130 to an on state, and the battery supplies power to the mobile terminal; when an external power supply is connected to the mobile terminal, said power supply conversion module 110 sets said power supply switching module 130 to an off state, and the battery supplies power to the mobile terminal.

As shown in Fig.2, said power supply conversion module 110 comprises an integrated chip U1202 for converting the voltage of an external power supply into power supply voltage required by a mobile terminal, the integrated chip U1202 has a model number of POWER-DC20C-TPS62040DRC. A 5 V DC power supply is input from pins 1, 2, 3, 4, and 6 of the chip U1202, the chip U1202 converts the 5 V DC voltage to a 4.2 V voltage required by a mobile terminal, which is then output from pins 5, 7 and 8 of the chip U1202.

Pin 1 of said chip U1202 is connected with a first resistor R1214 in series and then connected with the input port of the power supply, input ports of pins 4 and 6 of said chip are connected with a first filter circuit 160 and then connected with the input port of the power supply, and pins 2 and 3 of said chip are directly connected with the input port of the power supply.

A second filter 170 is further connected to the output port of the power supply conversion module 110. Signal output of said second filter circuit 170 is connected with the output port of said power supply unit for mobile terminals via a first diode D7.
As shown in Fig.2, in the present embodiment, the first filter circuit 160 and the second filter circuit 170 are consisted of at least two capacitors connected in parallel. In the power supply unit for mobile terminals provided by the present invention, there is no limit on the number of capacitors used in the first filter circuit 160 and the second filter circuit 170, for example, 4 capacitors can be connected in parallel. Said first voltage sampling circuit 190 is consisted of at least two resistors in series. In the power supply unit for mobile terminals provided by the present invention, however, there is no limit on the number of resistors in series. For example, three resistors can be connected in series and then connected with a fourth resistor R1215 in series with the connection point being a voltage dividing point. When an external power supply has an input voltage of 5 V, the voltage output at the voltage dividing point of the first voltage sampling circuit 190 is 4.2 V, namely: the voltage at the output port of the chip U1202 is 4.2 V.

The power supply unit for mobile terminals provided by the present invention is shown in Fig.2. Said power supply switching module 130 comprises a second resistor R30, a third resistor R15 and a field effect transistor Q202. Said second resistor R30 and third resistor R15 are connected in series to form a second voltage sampling circuit 191. One end of said third resistor is connected with said power supply conversion module 110, a voltage dividing point of said second voltage sampling circuit 191 is connected with the gate of said field effect transistor Q202, the source of said field effect transistor is connected with said battery, and the drain of the field effect transistor is connected for supplying power to the mobile terminal.

In the present embodiment, the field effect transistor Q202 is a P-channel field effect transistor having a model number of PDN304P, the VGS switching threshold of the field effect transistor is above -0.8 V. Said field effect transistor Q202 mainly functions as a switch in the present embodiment. When no external power supply is connected to the mobile terminal, the output of the power supply conversion module is low level, said field effect transistor is in an on state, and at this time, the mobile terminal is powered by the battery, when an external power supply is connected to the mobile terminal, the output of said power supply conversion module is high level, said field effect transistor is in an off state, and at this time, the mobile terminal is powered by the external power supply.

At the instant when the external power supply is cut off, moreover, in order for said power supply switching module 130 to smoothly switch the power supply mode for the power supply unit for mobile terminals, the sum of resistance of said second resistor and third resistor is 1.2 KΩ, so as to ensure that when the charger is pulled out, capacitors in the network and gate capacitors of Q202 can quickly discharge against the ground. In the present embodiment, the resistance of said second resistor R15 is 1.2 KΩ and the resistance of said third resistor R30 is 200 Ω, such that while the power supply switching module 130 smoothly switches the power supply mode, it is ensured that a 3.6 V voltage can be allocated to the second resistor R15 (gate of Q202).

In order to solve the issue of insufficient power supply from the power supply unit for mobile terminals, as shown in Fig.2, the power supply unit for mobile terminals further comprises a system power supply module. Said system power supply module 140 is connected in parallel at the output port of said power supply conversion module 110 and used for charging and power storage during off time of radio frequency transmission of a mobile terminal and for discharging to the mobile terminal during radio frequency transmission of the mobile terminal.

Said system power supply module 140 comprises a first capacitor C33 and a second capacitor C1555 connected in parallel. Positive terminals of said first capacitor C33 and second capacitor C1555 are connected with the output port of the power supply unit for mobile terminals, and negative terminals of said first capacitor C33 and second capacitor C1555 are grounded.

When the mobile terminal's radio frequency works in a time division mode, the transient peak current could rise sharply during transmission time slots, and at this time, the power supply conversion module may have insufficient power supply, and said first capacitor C33 and second capacitor C1555 can immediately discharge and supplement the power supply for the terminal, during off time of radio frequency transmission, said first capacitor and second capacitor will be instantly charged and prepared for power supply during the next transmission slot.

In the present embodiment, said first capacitor C33 and second capacitor C1555 are both tantalum capacitors, since tantalum capacitors have advantages such as small volume, large capacity, low drain current, and long service life. It should be noted that the present invention could also use other capacitors capable of charging and discharging, for example, ceramic capacitors or electrolytic capacitors.

The circuit of said charging management module 120 is shown in Fig.2. A chip U56 and a third filter circuit 180. The model of said chip U56 is S13441DV-T1, which functions as a switch in the present embodiment for controlling a battery charging signal. Said third filter circuit 180 is used to filter electromagnetic interference from the battery power supply network and to ensure stability of the battery power supply system.

The negative terminal of said battery 150 is connected with a fifth resistor VR6 in series and then grounded, the positive terminal of said battery is connected with the third filter circuit 180, and then with the signal output ports of pins 1, 2, 5, and 6 of the chip U56. A sixth resistor R655 is further connected between the third filter circuit 180 and the chip U56 in series, and pin 3 of said chip U56 is connected with a seventh resistor R656 in series and then with the input port of the power supply via a second diode D15.

When a 5 V external power supply is connected into a mobile terminal, the current is rectified via the second
In the present embodiment, the third filter circuit 180 is a circuit consisting of a plurality of capacitors and an eighth resistor VR50 connected in parallel, wherein the number of capacitors connected in parallel can be 4.

To better understand the present invention, the working principle of the present invention is described in detail below with a TD/GSM dual-mode cell phone as an example.

As shown in Fig. 2, when no external power supply (5 V power supply input from a charger or a USB) is connected to the terminal, the power supply conversion module 110 does not work. Therefore, the voltage output from the power supply conversion module 110 is low level, the gate G of the P-channel field effect transistor Q202 is low level, and said field effect transistor Q202 is open. At this time, the battery 150 supplies power to the terminal system via Q202.

When a 5 V external power supply (5 V power supply input from a charger or a USB) is connected to the mobile terminal, said power supply conversion module begins to work. Chip U1202 inside the power supply conversion module converts the 5 V voltage to 4.2 V and supplies power to the terminal via the output port. At the same time, the voltage of the power supply switching module is 4.2 V, and through voltage sampling process by the second resistor R30 and the third resistor R15, the power supply allocated to the gate G of the effect transistor Q202 is 3.6 V, said voltage makes sure that the mobile terminal will not open the field effect transistor Q202 in a voltage range of 3.3 V ~ 4.2 V. As a result, the battery stops the power supply to the terminal, but the circuit portion of the charging management module 120 is still in a working state. Specifically: when an external power supply is connected into a mobile terminal, the chip U56 is set to an on state such that the 5 V power supply charges the battery, and when the battery is fully charged, the chip U56 is turned off automatically, the charging management module stops working, and the terminal is still powered by the external power supply. However, the supply current of the power supply conversion module 110 is typically smaller than 1 A. While a TD/GSM dual-mode cell phone's radio frequency works in a time division mode, the transient peak current during transmission could reach 2 A or higher. Therefore, the power supply conversion module may have insufficient power supply. At this time, tantalum capacitors of the system power supply module discharge and rectify for the terminal, during off time of radio frequency transmission, said tantalum capacitors will be instantly charged and prepared for power supply during the next transmission slot. In this way, the requirement can be satisfied that when an external power supply is connected, the external power supply charges the terminal, and the battery is only charged without supplying power to the terminal, which is also suitable for charging switch for 3G handsets.

In the case where the terminal is powered by an external power supply and the battery is only charged without supplying power to the terminal, if the external power supply is cut off at this moment, the power supply conversion module 110 will instantly stop working. If the field effect transistor Q202 cannot be opened promptly at this time, the battery will not be able to immediately supply power to the system power supply module, resulting in power cutoff to the terminal. Therefore, the present invention employs a sum of resistance of the second resistor R30 and the third resistor R15 of 1.2 KΩ ~ 1.5 KΩ such that the capacitor energy storage in the second filter circuit 170 of the power supply conversion module and the gate G junction capacitor energy storage of the field effect transistor Q202 can quickly discharge against the ground when the external power supply is cut off. As a result, the gate G voltage of the field effect transistor Q202 drops quickly to reach a state that Q202 is re-open, such that the battery quickly begins to supply power to the system power supply module. When the charger is pulled out, therefore, a smooth switching can be realized that the battery quickly restores power supply to the terminal system and the terminal still works normally.

The present invention provides a corresponding power supply switching method for mobile terminals by means of the power supply unit for mobile terminals, as shown in Fig. 3, comprising the following steps of:

100. The power supply conversion module detects whether an external power supply is connected into the mobile terminal; if yes, go to Step 300, otherwise, go to Step 200;

200. Activate the battery to supply power to the mobile terminal;

300. When an external power supply is connected into the mobile terminal, stop the power supply by the battery to the mobile terminal, the power supply conversion module converts the power supply mode, activates the external power supply to supply power to the mobile terminal and charges the battery;

400. When the current of the power supply by the external power supply is not sufficient, activate the system power supply module to discharge and supplement the power supply to the mobile terminal.

According to the above method, the present invention provides a power supply unit for mobile terminals, which employs a power supply conversion module to convert the voltage of an external power supply into power supply voltage required by the terminal, and a power supply switching module to switch the power supply mode between the battery and the power supply conversion module. It realizes that when the terminal is connected with an external power supply, the external power supply supplies power to the terminal and the battery is only charged without supplying power to the
terminal, which meets the requirement in the "Chinese Standards for Mobile TD Family Cell Phones" and is suitable for power supply switching of 3G handsets.

Claims

1. A power supply unit for mobile terminals, comprising

   - a battery (150),
   - a power supply conversion module (110),
   - a charging management module (120) and
   - a power supply switching module (130);

   wherein

   - said charging management module and power supply switching module both comprise a power supply input port for connection with an external power supply;
   - said charging management module (120) is connected with the battery and is adapted for charging the battery when an external power supply is connected;
   - said power supply conversion module (110) is connected with said power supply switching module (130) and is adapted for converting the voltage of the external power supply into power supply voltage required by the mobile terminal and for controlling on-off state of said power supply switching module (130) such that the power supply switching module (130) is in an on state when no external power supply is connected and the battery (150) supplies power to the mobile terminal, and such that said power supply switching module (130) is off and said power supply conversion module (110) outputs the power supply voltage to the mobile terminal when an external power supply is connected,

   - wherein said power supply switching module (130) comprises a second resistor (R15), a third resistor (R30) and a field effect transistor (Q202), said second resistor and third resistor are connected in series to form a voltage sampling circuit (191), one end of said third resistor is connected with said power supply conversion module (110), a voltage dividing point of said voltage sampling circuit is connected with a gate of said field effect transistor, a source of said field effect transistor is connected with said battery (150), and a drain of said field effect transistor is connected for supplying power to the mobile terminal; and

   - wherein the power supply conversion module (110) comprises an output port for supplying the power supply voltage to the mobile terminal and the third resistor of the power supply switching module (130) is connected to that output port.

2. The power supply unit according to claim 1, wherein it further comprises a system power supply module (140), said system power supply module is connected to the output of said power supply conversion module (110) and adapted for charging and power storage during off time of radio frequency transmission of a mobile terminal and for discharging during radio frequency transmission of the mobile terminal.

3. The power supply unit according to any of the preceding claims, wherein said power supply conversion module (110) comprises an integrated chip for converting the voltage of the external power supply into the power supply voltage required by the mobile terminal;

4. The power supply unit according to any of the preceding claims, wherein the sum of resistance of said second resistor and third resistor is 1.2 kΩ ~ 1.5 kΩ.

5. The power supply unit according to claim 2, wherein said system power supply module (140) comprises a first capacitor and a second capacitor connected in parallel.

6. The power supply unit according to claim 5, wherein said first capacitor and second capacitor are both tantalum capacitors.

7. A power supply switching method for mobile terminals by means of the power supply unit for mobile terminals according to any of the preceding claims, wherein said method comprises the following steps of:

   A: detecting whether an external power supply is connected into the mobile terminal; if yes, go to Step B,
otherwise, the battery (150) supplies power to the mobile terminal;
B: stopping the power supply by the battery (150) to the mobile terminal, the external power supply supplies power to the mobile terminal and charges the battery (150);

8. The method according to claim 7, wherein said power supply unit is according to claim 2 and said Step B comprises:
B1: when the current of the power supply by the external power supply is not sufficient, activating the system power supply module (140) to discharge and supplement the power supply to the mobile terminal.

Patentansprüche

1. Netzteileinheit für mobile Endgeräte, die umfasst:
- eine Batterie (150),
- ein Netzteilkonvertierungsmodul (110),
- ein Ladeverwaltungsmodul (120) und
- ein Netzteilschaltmodul (130);

wobei
- sowohl das Ladeverwaltungsmodul als auch das Netzteilschaltmodul einen Netzteileingangsport zum Verbinden mit einem externen Netzeil umfassen;
- das Ladeverwaltungsmodul (120) mit der Batterie verbunden ist und ausgelegt ist zum Laden der Batterie, wenn ein externes Netzeil angeschlossen ist;
- wobei das Netzteilkonvertierungsmodul (110) mit dem Netzteilschaltmodul (130) verbunden ist und ausgelegt ist zum Konvertieren der Spannung des externen Netzteils in eine Netzteilspannung, die von dem mobilen Endgerät benötigt wird, und zum Steuern des Ein-Aus-Zustands des Netzteilschaltmoduls (130) so, dass sich das Netzteilschaltmodul (130) in einem Ein-Zustand befindet, wenn kein externes Netzeil angeschlossen ist und die Batterie (150) Energie zu dem mobilen Endgerät liefert, und so, dass das Netzteilschaltmodul (130) ausgeschaltet ist und das Netzteilkonvertierungsmodul (110) die Netzteilspannung an das mobile Endgerät ausgibt, wenn ein externes Netzeil angeschlossen ist,
- wobei das Netzteilschaltmodul (130) ein zweites Widerstandselement (R15), ein drittes Widerstandselement (R30) und einen Feldeffekttransistor (Q202) umfasst, das zweite Widerstandselement und das dritte Widerstandselement in Reihe geschaltet sind, um eine Spannungsabstastung (191) zu bilden, ein Ende des dritten Widerstandselementes mit dem Netzteilkonvertierungsmodul (110) verbunden ist, ein Spannungsteilungs- punkt der Spannungsabstastung mit einem Gate des Feldeffekttransistors verbunden ist, eine Source des Feldeffekttransistors mit der Batterie (150) verbunden ist und ein Drain des Feldeffekttransistors zum Liefern von Energie zu dem mobilen Endgerät geschaltet ist; und
- wobei das Netzteilkonvertierungsmodul (110) einen Ausgangsport zum Liefern der Netzteilspannung an das mobile Endgerät umfasst und das dritte Widerstandselement des Netzteilschaltmoduls (130) mit diesem Ausgangsport verbunden ist.

2. Netzteileinheit nach Anspruch 1, wobei diese ferner ein Systemnetzteilmodul (140) umfasst, wobei das Systemnetzteilmodul mit dem Ausgang des Netzteilkonvertierungsmoduls (110) verbunden ist und ausgelegt ist zum Laden und Energiespeichern während der Aus-Zeit der Funkfrequenzübertragung eines mobilen Endgeräts und zum Entladen während der Funkfrequenzübertragung des mobilen Endgeräts.

3. Netzteileinheit nach einem der vorhergehenden Ansprüche, wobei das Netzteilkonvertierungsmodul (110) einen integrierten Chip zum Konvertieren der Spannung des externen Netzteils in die Netzteilspannung, die von dem mobilen Endgerät benötigt wird, umfasst.

4. Netzteileinheit nach einem der vorhergehenden Ansprüche, wobei die Summe des Widerstands des zweiten Widerstandselementes und des dritten Widerstandselementes 1,2 KΩ ~ 1,5 KΩ beträgt.

5. Netzteileinheit nach Anspruch 2, wobei das Systemnetzteilmodul (140) einen ersten Kondensator und einen zweiten Kondensator, die parallelegeschaltet sind, umfasst.
6. NetzteilEinheit nach Anspruch 5, wobei sowohl der erste Kondensator als auch der zweite Kondensator Tantalkon-
densatoren sind.

7. Netzteilschaltverfahren für mobile Endgeräte unter Verwendung der NetzteilEinheit für mobile Endgeräte nach einem
der vorhergehenden Ansprüche, wobei das Verfahren die folgenden Schritte umfasst:

A: Detektieren, ob ein externes Netzteil mit dem mobilen Endgerät verbunden ist; falls ja, Weitergehen zu Schritt
B, andernfalls liefert die Batterie (150) Energie zu dem mobilen Endgerät;
B: Stoppen des Lieferns von Energie durch die Batterie (150) zu dem mobilen Endgerät, wobei das externe
Netzteil Energie zu dem mobilen Endgerät liefert und die Batterie (150) lädt.

8. Verfahren nach Anspruch 7, wobei die NetzteilEinheit Anspruch 2 entspricht und Schritt B umfasst:

B1: wenn der Strom der Energieversorgung durch das externe Netzteil nicht ausreichend ist, Aktivieren des
Systemnetzteilmoduls (140) zum Entladen und Ergänzen der Energielieferung zu dem mobilen Endgerät.

Revendications

1. Unité d’alimentation pour terminaux mobiles, comportant

- une batterie (150),
- un module (110) de conversion d’alimentation,
- un module (120) de gestion de charge et
- un module (130) de commutation d’alimentation ;
- ledit module de gestion de charge et ledit module de commutation d’alimentation comportant tous deux une
prise d’entrée d’alimentation destinée à être reliée à une alimentation externe ;
- ledit module (120) de gestion de charge étant relié à la batterie et étant prévu pour charger la batterie lorsqu’une
alimentation externe est branchée ;
- ledit module (110) de conversion d’alimentation étant relié audit module (130) de commutation d’alimentation
et étant prévu pour convertir la tension de l’alimentation externe en une tension d’alimentation requise par le
terminal mobile et pour commander l’état de marche-arrêt dudit module (130) de commutation d’alimentation
de telle sorte que le module (130) de commutation d’alimentation se trouve en état de marche lorsqu’aucune
alimentation externe n’est branchée, la batterie (150) assurant l’alimentation du terminal mobile, et de telle sorte
que ledit module (130) de commutation d’alimentation soit éteint et que ledit module (110) de conversion
d’alimentation délivre la tension d’alimentation au terminal mobile lorsqu’une alimentation externe est branchée,
- ledit module (130) de commutation d’alimentation comportant une deuxième résistance (R15), une troisième
résistance (R30) et un transistor (Q202) à effet de champ, ladite deuxième résistance et ladite troisième résis-
tance étant reliées en série pour former un circuit (191) de prélèvement de tension, une extrémité de ladite
troisième résistance étant reliée audit module (110) de conversion d’alimentation comportant une deuxième résistance (R15), une troisième résistance (R30) et un transistor (Q202) à effet de champ, ladite deuxième résistance et ladite troisième résistance étant reliées en série pour former un circuit (191) de prélèvement de tension, une extrémité de ladite

troisième résistance étant reliée audit module (110) de conversion d’alimentation comportant une deuxième résistance (R15), une troisième résistance (R30) et un transistor (Q202) à effet de champ, une source dudit
transistor à effet de champ étant reliée à ladite batterie (150), et un drain dudit transistor à effet de champ étant
branché pour assurer l’alimentation du terminal mobile ; et
- le module (110) de conversion d’alimentation comportant une prise de sortie servant à fournir la tension
d’alimentation au terminal mobile et la troisième résistance du module (130) de commutation d’alimentation
étant reliée à la prise de sortie en question.

2. Unité d’alimentation selon la revendication 1, comportant en outre un module (140) d’alimentation de système, ledit
module d’alimentation de système étant relié à la sortie dudit module (110) de conversion d’alimentation et prévu
en vue d’une charge et d’un stockage d’électricité pendant le temps d’extinction de l’émission en radiofréquences
d’un terminal mobile et en vue d’une décharge pendant l’émission en radiofréquences du terminal mobile.

3. Unité d’alimentation selon l’une quelconque des revendications précédentes, ledit module (110) de conversion
d’alimentation comportant une puce intégrée destinée à convertir la tension de l’alimentation externe en une tension
d’alimentation requise par le terminal mobile.

4. Unité d’alimentation selon l’une quelconque des revendications précédentes, la somme des résistances de ladite
deuxième résistance et de ladite troisième résistance étant de 1,2 KΩ à 1,5 KΩ.
5. Unité d'alimentation selon la revendication 2, ledit module (140) d'alimentation de système comportant un premier condensateur et un deuxième condensateur reliés en parallèle.

6. Unité d'alimentation selon la revendication 5, ledit premier condensateur et ledit deuxième condensateur étant tous deux des condensateurs au tantale.

7. Procédé de commutation d'alimentation pour terminaux mobiles au moyen de l’unité d'alimentation pour terminaux mobiles selon l’une quelconque des revendications précédentes, ledit procédé comportant les étapes suivantes consistant à :
   A : détecter si une alimentation externe est branchée sur le terminal mobile ; si oui, aller à l’étape B, autrement, la batterie (150) assure l'alimentation du terminal mobile ;
   B : arrêter l'alimentation du terminal mobile par la batterie (150), l'alimentation externe assurant l'alimentation du terminal mobile et chargeant la batterie (150).

8. Procédé selon la revendication 7, ladite unité d'alimentation étant selon la revendication 2 et ladite étape B comportant l’action consistant :
   B1 : lorsque le courant de l'alimentation par l'alimentation externe n'est pas suffisant, à activer le module (140) d'alimentation de système pour qu'il se décharge et complète l'alimentation du terminal mobile.
Fig. 2
REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description


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