Description

The invention relates to a power supply for supplying a supply voltage to circuitry of a television apparatus during, for example, both run and standby modes of operation of the power supply.

In a television receiver, for example, that is capable of operating in a standby mode, in which power dissipation and heat generation in the television circuit components is low, a standby power supply is typically required for energizing television circuitry that includes, for example, a remote control unit that enables start-up operation during a transition from the standby to the power-up mode.

US-A-4 651 214 discloses a power supply of a television apparatus comprising: a source of input supply voltage; an unregulated stand-by power supply coupled to said source including a storage capacitor for developing a standby supply voltage during both standby mode and power-up mode of said supply; a load circuit of the television apparatus coupled to the storage capacitor of the standby power supply via a disconnect diode and being energised thereby during the standby mode; a source of an on-off control signal such as a remote control signal receiver; and a source of run supply voltage responsive to the on/off signal for generating run-mode power to at least the said load circuit during power-up mode; the arrangement being such that during the transition from stand-by to power-up mode, the unregulated power supply provides an increased load current which discharges the storage capacitor, and the disconnect diode which was forward biased by the standby power supply during stand-by mode becomes reverse biased by the source of run supply voltage so that only the run-supply powers the load circuit during power-up mode.

A standby/power-up power supply may include a standby transformer having a primary winding that is coupled to an alternating current (AC) mains supply source. A voltage that is developed at a secondary winding of the transformer is rectified to produce a DC energizing voltage. The energizing voltage is applied to a supply voltage receiving terminal of the television circuitry that is required to be energized during the standby mode via a series regulator; whereas, during the power-up mode, a run-mode power supply that is inoperative during the standby mode provides a portion of the energizing current. The series regulator regulates the energizing voltage at such terminal during both the power-up and standby modes.

It may be desirable to reduce the power dissipation in the regulator during the power-up mode when the ambient temperature caused by power dissipation in the various circuit components of the television receiver is higher than during the standby mode. Thereby, for example, the temperature at a P-N junction of a series coupled transistor of the regulator is prevented from exceeding a safe level, during the power-up mode.

In accordance with an aspect of the invention, there is provided power supply of a television apparatus, comprising: a source of an input supply voltage; a voltage regulator coupled to said source of input supply voltage for developing at an output terminal of said regulator a first output supply voltage both during a standby mode and during a power-up mode of said power supply; a load circuit of said television apparatus coupled to said output terminal of said regulator and being energized by said first output supply voltage such that a first supply current that is generated in said regulator is coupled to said load circuit to form a load current that flows in said load circuit during said standby mode; a source of an on/off control signal; a source of a run supply voltage responsive to said on/off control signal for generating a second supply current during operation in said power-up mode; switching means, responsive to said on-off control signal, and forming a main current path between said source of said run supply voltage and said output terminal of said regulator when said switching means is conductive for coupling therethrough said second supply current to said load circuit during said power-up mode, that causes a reduction in said first supply current from said regulator such that both said second supply current and said first supply current each form corresponding substantial portions of said load current during said power-up mode.

In accordance with another aspect of the invention, there is provided a television apparatus, comprising: a source of an input supply voltage; a voltage regulator coupled to said source of input supply voltage for developing at an output terminal of said regulator a first output supply voltage both during a standby mode and during a power-up mode; a load circuit of said television apparatus coupled to said output terminal of said regulator and being energized by said first output supply voltage such that a first supply current that is generated in said regulator is coupled to said load circuit to form a load current that flows in said load circuit during said standby mode; a source of an on/off control signal; a deflection winding; a deflection circuit output stage for generating a deflection current in said deflection winding; a source of a run supply voltage coupled to said deflection circuit output stage and responsive to said on/off control signal for generating a second supply current during operation in said power-up mode; and switching means, responsive to said on/off control signal, and forming a main current path between said source of said run supply voltage and said output terminal

of said regulator when said switching means is conductive for coupling there-through said second supply current to said load circuit during said power-up mode that causes a reduction in said first supply current from said regulator such that both said second supply current and said first supply current each form corresponding substantial portions of said load current during said power-up mode.

In the Drawing:

The sole FIGURE illustrates a standby/power-up television power supply including a supply regulator embodying an aspect of the invention.

The sole FIGURE illustrates a portion of a television receiver incorporating a control circuit 100. Such portion of the television receiver includes a bridge rectifier 101 that rectifies a mains supply voltage V_{AC} to produce a DC, unregulated voltage V_{UR}. A conventionally designed output stage, or switched regulator 102 that may include a silicon controlled rectifier (SCR) produces, in a power-up or run mode, a regulated voltage B+ that is coupled to a flyback transformer T1. An input terminal 102c of regulator 102 is coupled to unregulated voltage V_{UR}. Regulated voltage B+ is developed at an output terminal 102d of switch regulator 102.

Transformer T1 is coupled to a collector electrode of a deflection switching transistor Q1 of a horizontal circuit output stage 99 operating at a horizontal rate f_H. A control signal H_r, at the horizontal rate f_H, that is produced in a horizontal processor portion, not shown in the FIGURE, of control circuit 100, is coupled via a horizontal driver 666 to the base electrode of transistor Q1. Signal H_r controls the switching of transistor Q1 to generate a deflection current i_y in a deflection winding L_Y of output stage 99. A retrace voltage V_{w2} is produced in a conventional manner across a winding W2 of transformer T1 in each retrace interval of each horizontal period H. Each retrace interval occurs immediately after transistor Q1 becomes nonconductive.

A DC, run-mode supply voltage V+, that is illustratively +16 volts, is produced by rectifying voltage V_{w2} in a rectifier arrangement 104 that is coupled to winding W2. Voltage V+ is also coupled to various circuits of the receiver to provide them with energy during a power-up mode of the television receiver. Such circuits are depicted as a load 900.

Voltage V+ is also coupled to a switch mode regulator and pre-driver portion, not shown in the FIGURE, of control circuit 100 to provide a feedback signal. A pulse width modulated signal S_C is generated that controls the duration, in each horizontal interval H, in which switch regulator 102 is conductive. The duty cycle of signal S_C varies, in accordance with a difference between a voltage that is proportional to voltage V+ and a reference voltage that may be produced in a conventional manner. Signal S_C causes regulated voltage B+ to be at a predetermined DC voltage level such as, illustratively, +125 volts. Signals S_c and H_r, and voltages B+ and V+ are produced, illustratively, when control circuit 100 operates in the power-up mode, but are not produced during television receiver standby-mode operation.

A standby transformer TO steps down voltage V_{AC} . The stepped down voltage is rectified in a rectifier arrangement 106 to produce a standby voltage V_{SB} . Standby voltage V_{SB} is coupled to an energizing voltage receiving terminal 120 of control circuit 100 through a series pass regulator 105 that includes a transistor Q3 having a base electrode that is coupled to a cathode of a zener diode 131. Transistor Q3 produces at its emitter an energizing voltage V_{cc} which is filtered by capacitor 66. Voltage V_{cc} is coupled to terminal 120 of control circuit 100. Regulated voltage V+ is coupled to terminal 120 via a resistor R111 and series coupled diode D2, to supply a corresponding portion of a current i_{ps} from voltage V+ only when control circuit 100 operates in the power-up mode. Diode D2, that is nonconductive during the standby mode, prevents current drain via loads 900 and 999 from standby transformer TO.

Voltage V_{cc} provides the operating voltage of a receiver 107 which responds to remotely generated signals. The receiver 107 generates an ON/OFF signal that is coupled via a drain electrode of an MOS transistor 108 to control circuit 100. When transistor 108 is conductive, a low impedance is formed at terminal 109 of control circuit 100. The low impedance occurs after, for example, a user initiates a power-on command via an infra-red communication link that causes a start-up interval to occur. When transistor 108 becomes conductive, it causes a horizontal oscillator, not shown in the FIGURE, to begin operating. Consequently, signals H_r and S_c are generated.

At the beginning of the start-up interval, horizontal driver 666 is energized by standby voltage V_{SB} through diode 67. A current i_c of regulator 105 supplies, by itself, current i_{ps} prior to operation in the power-up mode. Thus, regulator 105 provides the entire current requirement, such as 50 milliamperes, of control circuit 100 and of other television circuitry, referred to herein as a load 998, prior to operation in the power-up mode. During the start-up interval, voltage V+, that was zero before, begins increasing. At the end of the start-up interval, when voltage V+ is sufficiently large, it causes diode D2 to turn-on for developing voltage V_{cc} in the power-up mode from voltage V+.

In accordance with an aspect of the invention, diode D2 supplies a current i_R that is combined with current i_c to supply current i_{ps} during the power-up mode, such that the contribution of each to current i_{ps} is significant. In the example of the invention shown in the FIGURE, each of currents, i_c and i_R contributes 50% to current i_{ps} during the power-up mode. Because of the flow of current i_R to terminal 120, current i_c that is supplied by regulator 105 is, advantageously, significantly reduced relative to its value during standby. At the same time, voltage V_{cc} is maintained regulated by regulator 105.

During run-mode or power-up mode operation, the ambient temperature increases inside the cabinet of the television receiver relative to the inside temperature during standby. The increase in ambient temperature is caused by the heat dissipation of the television receiver circuitry that has become powered up during run-mode operation. The rise in ambient temperature would tend to cause a temperature rise in transistor Q3, requiring a more massive heat sinking structure for the transistor.

In accordance with a feature of the invention, heat dissipation in transistor Q3 is reduced during run-mode relative to that during standby mode. The reduction in the power dissipation enable operation of transistor Q3 at, advantageously, approximately the same collector P-N junction temperature during both the power-up and the standby modes. Advantageously, by utilizing current i_R to provide the corresponding portion of current i_{ps}, a heat dissipation arrangement for transistor Q3, such as, for example, a heat sink, may not be required.

In the power-up mode, the television receiver is fully operative. Conversely, after a power-off command is initiated by the user, transistor 108 becomes nonconductive and forms a high impedance circuit at terminal 109 that causes a standby mode to occur. In the standby mode, deflection current i_y and the raster scanning on the display device of the television receiver are turned-off.

Input supply current i_{ps} is coupled through terminal 120 for providing the energizing current of control circuit 100 and of remote receiver 107. During operation in the power-up mode, a significant portion of current i_{ps} is supplied by rectifier arrangement 104 through diode D2 and D4; whereas, during operation in the standby mode, current i_{ps} is supplied entirely from standby transformer 106 via regulator 105.

Various circuits in the receiver such as, for example, a second IC of the television receiver that provides video processing, that are depicted as a load 999 in the FIGURE, may require, during the power-up mode, a regulated supply voltage, that is depicted as a voltage V_{RUN} in the FIGURE. Voltage V_{RUN} may be required to be at a level that is equal to that of, for example, voltage V_{cc}.It may be desirable to utilize voltage V_{cc} that is regulated by regulator 105 to also provide regulation of voltage V_{RUN}.

Therefore, transistor Q2, having a collector electrode that is coupled to voltage V+, produces regulated voltage V_{RUN} at an emitter electrode of transistor Q2. The base electrode of transistor Q2 is coupled to the anode of diode D2. The base current of transitor Q2 is provided by resistor R111. The forward voltage drop across diode D2 is summed with voltage V_{cc} to produce at the base of transistor Q2 a voltage that is higher by diode D2 voltage drop that is, approximately, 0.7 volts in a silicon diode. Consequently, voltage V_{RUN}, that is smaller than the base voltage of transistor Q2 by approximately the same voltage drop that is developed across diode D2, is equal to voltage V_{cc}. A current i_{RUN} that is supplied via transistor Q2 to load 999 is outside the current path of current i_{ps} that is coupled to control circuit 100 via terminal 120.

Temperature related changes of the voltage across the base-emitter junction of transistor Q2, are temperature compensated by diode D2 to render voltage V_{RUN} regulatedand temperature compensated. Using resistor R111, diode D2 and regulator 105 for controlling transistor Q2 to obtain regulation of voltage V_{RUN}, advantageously, eliminates the need for separate resistor, diode and regulator that would have otherwise been required for providing the base voltage of transistor Q2.

During operation in the power-up mode, voltage V+, that is coupled via resistor R111, causes diode D2 to be conductive. Resistor R111 is required for developing a voltage drop that is equal to the difference between voltage V+ and a sum voltage of voltage V_{cc} and the forward voltage drop across diode D2.

During the standby mode, it is undesirable to load standby transformer TO by any of load 900, load 999, resistor R111 and transistor Q2, because the cost of transformer TO is directly related to the standby current requirement from, or loading of, transformer TO. Diode D2, advantageously, prevents the loading of transformer TO during the start-up interval, as long as voltage V+ is not sufficiently large to turn on diode D2. Similarly, during the standby mode, each of load 900, load 999, resistor R111 and transistor Q2 is, advantageously, isolated from standby transformer TO by diode D2 that is non-conductive.

Claims

1. A power supply of a television apparatus, comprising:

   a source (V_{AC}) of an input supply voltage;

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In accordance with an aspect of the invention, diode D2 supplies a current i_R that is combined with current i_c to supply current i_{ps} during the power-up mode, such that the contribution of each to current i_{ps} is significant. In the example of the invention shown in the FIGURE, each of currents, i_c and i_R contributes 50% to current i_{ps} during the power-up mode. Because of the flow of current i_R to terminal 120, current i_c that is supplied by regulator 105 is, advantageously, significantly reduced relative to its value during standby. At the same time, voltage V_{cc} is maintained regulated by regulator 105.

During run-mode or power-up mode operation, the ambient temperature increases inside the cabinet of the television receiver relative to the inside temperature during standby. The increase in ambient temperature is caused by the heat dissipation of the television receiver circuitry that has become powered up during run-mode operation. The rise in ambient temperature would tend to cause a temperature rise in transistor Q3, requiring a more massive heat sinking structure for the transistor.

In accordance with a feature of the invention, heat dissipation in transistor Q3 is reduced during run-mode relative to that during standby mode. The reduction in the power dissipation enable operation of transistor Q3 at, advantageously, approximately the same collector P-N junction temperature during both the power-up and the standby modes. Advantageously, by utilizing current i_R to provide the corresponding portion of current i_{ps}, a heat dissipation arrangement for transistor Q3, such as, for example, a heat sink, may not be required.

In the power-up mode, the television receiver is fully operative. Conversely, after a power-off command is initiated by the user, transistor 108 becomes nonconductive and forms a high impedance circuit at terminal 109 that causes a standby mode to occur. In the standby mode, deflection current i_y and the raster scanning on the display device of the television receiver are turned-off.

Input supply current i_{ps} is coupled through terminal 120 for providing the energizing current of control circuit 100 and of remote receiver 107. During operation in the power-up mode, a significant portion of current i_{ps} is supplied by rectifier arrangement 104 through diode D2 and D4; whereas, during operation in the standby mode, current i_{ps} is supplied entirely from standby transformer 106 via regulator 105.

Various circuits in the receiver such as, for example, a second IC of the television receiver that provides video processing, that are depicted as a load 999 in the FIGURE, may require, during the power-up mode, a regulated supply voltage, that is depicted as a voltage V_{RUN} in the FIGURE. Voltage V_{RUN} may be required to be at a level that is equal to that of, for example, voltage V_{cc}.It may be desirable to utilize voltage V_{cc} that is regulated by regulator 105 to also provide regulation of voltage V_{RUN}.

Therefore, transistor Q2, having a collector electrode that is coupled to voltage V+, produces regulated voltage V_{RUN} at an emitter electrode of transistor Q2. The base electrode of transistor Q2 is coupled to the anode of diode D2. The base current of transitor Q2 is provided by resistor R111. The forward voltage drop across diode D2 is summed with voltage V_{cc} to produce at the base of transistor Q2 a voltage that is higher by diode D2 voltage drop that is, approximately, 0.7 volts in a silicon diode. Consequently, voltage V_{RUN}, that is smaller than the base voltage of transistor Q2 by approximately the same voltage drop that is developed across diode D2, is equal to voltage V_{cc}. A current i_{RUN} that is supplied via transistor Q2 to load 999 is outside the current path of current i_{ps} that is coupled to control circuit 100 via terminal 120.

Temperature related changes of the voltage across the base-emitter junction of transistor Q2, are temperature compensated by diode D2 to render voltage V_{RUN} regulatedand temperature compensated. Using resistor R111, diode D2 and regulator 105 for controlling transistor Q2 to obtain regulation of voltage V_{RUN}, advantageously, eliminates the need for separate resistor, diode and regulator that would have otherwise been required for providing the base voltage of transistor Q2.

During operation in the power-up mode, voltage V+, that is coupled via resistor R111, causes diode D2 to be conductive. Resistor R111 is required for developing a voltage drop that is equal to the difference between voltage V+ and a sum voltage of voltage V_{cc} and the forward voltage drop across diode D2.

During the standby mode, it is undesirable to load standby transformer TO by any of load 900, load 999, resistor R111 and transistor Q2, because the cost of transformer TO is directly related to the standby current requirement from, or loading of, transformer TO. Diode D2, advantageously, prevents the loading of transformer TO during the start-up interval, as long as voltage V+ is not sufficiently large to turn on diode D2. Similarly, during the standby mode, each of load 900, load 999, resistor R111 and transistor Q2 is, advantageously, isolated from standby transformer TO by diode D2 that is non-conductive.

Claims

1. A power supply of a television apparatus, comprising:

a source (V_{AC}) of an input supply voltage;

a voltage regulator (105) coupled to said source of input supply voltage for developing at an output terminal (120) of said regulator a first output supply voltage (V_{CC}) both during a standby mode and during a power-up mode of said power supply;

a load circuit (998) of said television apparatus coupled to said output terminal (120) of said regulator and being energized by said first output supply voltage such that a first supply current (i_C) that is generated in said regulator is coupled to said load circuit to form a load current (i_{PS}) that flows in said load circuit during said standby mode;

a source (107) of an on/off control signal;

a source (104) of a run supply voltage (V+) responsive to said on/off control signal for generating a second supply current (i_R) during operation in said power-up mode;

switching means (D2), responsive to said on-off control signal, and forming a main current path between said source (104) of said run supply voltage (V+) and said output terminal (120) of said regulator (105) when said switching means (D2) is conductive for coupling therethrough said second supply current (i_R) to said load circuit (998) during said power-up mode, that causes a reduction in said first supply current (i_C) from said regulator (105) such that both said second supply current (i_R) and said first supply current (i_C) each form corresponding substantial portions of said load current (i_{PS}) during said power-up mode.

2. A power supply according to claim 1 characterized in that said switching means (D2) also couples, during said power-up mode, said first output supply voltage (V_{CC}) that is developed at said output terminal (120) of said regulator (105) to a second output terminal (emitter of Q2) to regulate at said second output terminal a second output supply voltage (V_{RUN}) that during said standby mode is isolated by said switching means (D2) from said output terminal (120) of said regulator (105).

3. A power supply according to claim 2 characterized in that said switching means comprises a diode (D2) having a first terminal (anode) that is coupled to said source (104) of said run supply voltage (V+) and a second terminal (cathode) that is coupled to said output terminal (120) of said regulator (105).

4. A power supply according to claim 3 characterized in that said switching means further comprises, a transistor (Q2), wherein said diode (D2) is interposed between a control electrode (base) of said transistor (Q2) and said output terminal (120) of said regulator (105) and wherein a resistor (R111) is coupled between said control electrode (base) of said transistor (Q2) and said source (104) of said run supply voltage (V+) that causes said diode (D2) to be conductive only when said run supply voltage (V+) is generated.

5. A power supply according to claim 4 characterized in that said diode (D2) isolates said source (104) of said run supply voltage (V+) from said regulator (105) prior to said power-up mode.

6. A power supply according to claim 5 characterized in that a second load (999) is coupled to a main current conducting electrode (emitter) of said transistor (Q2) and wherein said diode (D2) isolates said regulator (105) from said second load (999) prior to said mode when said run supply voltage is turned-off.

7. A power supply according to claim 4 characterized in that said diode (D2) provides temperature compensation for variations of a base-emitter junction voltage in said transistor (Q2) to produce a temperature compensated third output supply voltage (V_{RUN}) at an emitter electrode of said transistor (Q2).

8. A power supply according to claim 1 characterized in that said source (106) of said input supply voltage (V_{SB}) comprises a step-down transformer (TO) coupled to a main supply voltage (V_{AC}), and a rectifier (106) having an input terminal that is coupled to said step-down transformer (TO) for generating said input supply voltage (V_{SB}) by rectifying a voltage that is developed at said step-down transformer (TO).

9. A power supply according to claim 1 characterized in that said source of said run supply voltage comprises a deflection circuit (99) responsive to a control signal (H_f) at a frequency that is related to a deflection frequency.

10. A power supply according to claim 9 characterized in that said source of said run supply voltage further comprises a flyback transformer (T1) for generating in a winding (W2) of said flyback transformer (T1) a voltage (V_{W2}) at a frequency that is related to said deflection frequency and a rectifier (D4) coupled to said winding (W2) of said flyback transformer (T1) for rectifying a voltage that is generated in said winding (W2) to generate said run supply volt-

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age (V+).

11. A power supply according to claim 1 characterized in that said on/off control signal is generated in a remote receiver (107).

12. A power supply according to claim 1 characterized in that said regulator (105) comprises a transistor (Q3) having a first main current conducting electrode (collector) that is coupled to said source (106) of said input supply voltage (V_{SB}), having a second main current conducting electrode (emitter) that is coupled to said output terminal (120) of said regulator (105) and having a control electrode (base) that is coupled to a source (131) of a reference signal at a reference level that causes said first output supply voltage (V_{CC}) to be maintained at substantially the same level both during and prior to said power-up mode.

13. A power supply according to claim 12 characterized in that said source of reference signal comprises a zener diode (131) such that said reference level is produced at a terminal (cathode) of said zener diode (131).

14. A power supply according to claim 12 characterized in that, during said power-up mode when said second supply current (i_R) is generated, said second supply current (i_R) causes said first output supply voltage that is developed at an emitter electrode of said transistor to increase slightly that, in turn, causes an emitter current (i_C) that flows in an emitter electrode of said transistor (Q3) to decrease significantly relative to its value prior to said power-up mode.

15. A power supply according to claim 1 characterized in that, during said power-up mode, when an ambient temperature inside an enclosure that includes said television apparatus is higher than during said standby mode, said first supply current (i_C) is lower than during said standby mode and therefore causes power dissipation in said regulator (105) to be less than prior to said power-up mode, to provide temperature compensation in a P-N junction of a transistor (Q3) that is said regulator (105).

16. A television apparatus, comprising:

a source (V_{AC}) of an input supply voltage;

a voltage regulator (105) coupled to said source of input supply voltage for developing at an output terminal (120) of said regulator a first output supply voltage (V_{CC}) both during a standby mode and during a power-up mode;

a load circuit (998) of said television apparatus coupled to said output terminal (120) of said regulator (105) and being energized by said first output supply voltage (V_{CC}) such that a first supply current (i_C) that is generated in said regulator is coupled to said load circuit to form a load current that flows in said load circuit during said standby mode;

a source (107) of an on/off control signal;

a deflection winding (L_Y);

a deflection circuit output stage (99) for generating a deflection current (i_y) in said deflection winding;

a source (104,D4) of a run supply voltage (V+) coupled to said deflection circuit output stage (99) and responsive to said on/off control signal for generating a second supply current (i_R) during operation in said power-up mode; and

switching means (D2), responsive to said on/off control signal, and forming a main current path between said source (D4) of said run supply voltage and said output terminal (120) of said regulator (105) when said switching means (D2) is conductive for coupling therethrough said second supply current to said load circuit during said power-up mode that causes a reduction in said first supply current (i_c) from said regulator (105) such that both said second supply current (i_R) and said first supply current (i_s) each form corresponding substantial portions of said load current during said power-up mode.

Patentansprüche

1. Netzteil eines Fernsehgerätes, enthaltend:
   - eine Quelle (V_{AC}) einer Eingangs-Versorgungsspannung;
   - einen Spannungsregler (105), der mit der Quelle von Eingangs-Versorgungsspannung gekoppelt ist, zum Bilden einer ersten Ausgangs-Versorgungsspannung (V_{CC}) an einem Ausgangs-Anschluß (120) des Reglers sowohl während eines Standby-Modus als auch während eines Leistungs-Modus (power-up mode) des Netzteiles;
   - eine Lastschaltung (998) des Fernsehgerätes, die mit dem Ausgangs-Anschluß (120) des Reglers gekoppelt ist und die von der ersten Ausgangs-Versorgungsspannung so versorgt wird, daß ein erster, in dem Regler erzeugter Versorgungsstrom (i_c) an die Lastschaltung gekoppelt wird, um einen Laststrom (i_{PS}) zu bilden, der in der Lastschaltung während des Standby-Modus fließt;

- eine Quelle (107) eines Ein/Aus-Steuersignals;
- eine Quelle (104) einer Betriebs-Versorgungsspannung (V+), die auf das Ein/Aus-Steuersignal anspricht, zum Erzeugen eines zweiten Versorgungsstroms (i_R) während des Betriebs im LeistungsModus;
- Schaltmittel (D2), das auf das Ein/Aus-Steuersignal anspricht und das einen Haupt-Strompfad zwischen der Quelle (104) der Betriebs-Versorgungsspannung (V+) und dem Ausgangs-Anschluß (120) des Reglers (105) bildet, wenn das Schaltmittel (D2) leitend ist, um den zweiten Versorgungsstrom (i_R) an die Lastschaltung (998) während des Leistungs-Modus zu koppeln, wodurch der erste Versorgungsstrom (i_C) des Reglers (105) so verringert wird, daß der zweite Versorgungsstrom (i_R) und der erste Versorgungsstrom (i_C) jeder entsprechende wesentliche Teile des Laststromes (i_{PS}) während des Leistungs-Modus übernehmen/bilden.

2. Netzteil nach Anspruch 1, dadurch gekennzeichnet, daß das Schaltmittel (D2) während des Leistungs-Modus auch die an dem Ausgangs-Anschluß (120) des Reglers (105) gebildete erste Ausgangs-Versorgungsspannung (V_{CC}) an einen zweiten Ausgangs-Anschluß (Emitter von Q2) koppelt, um eine zweite Ausgangs-Versorgungsspannung (V_{RUN}) an dem zweiten Ausgangs-Anschluß zu regeln, die während des Standby-Modus über das Schaltmittel (D2) von dem Ausgangs-Anschluß (120) des Reglers (105) getrennt/isoliert ist.

3. Netzteil nach Anspruch 2, dadurch gekennzeichnet, daß das Schaltmittel eine Diode (D2) enthält, mit einem ersten Anschluß (Anode), der an die Quelle (104) der Betriebs-Versorgungsspannung (V+) gekoppelt ist, und mit einem zweiten Anschluß (Kathode), der an den Ausgangs-Anschluß (120) des Reglers (105) gekoppelt ist.

4. Netzteil nach Anspruch 3, dadurch gekennzeichnet, daß das Schaltmittel weiter einen Transistor (Q2) enthält, wobei die Diode (D2) zwischen einer Steuerelektrode (Basis) des Transistors (Q2) und dem Ausgangsanschluß (120) des Reglers (105) eingefügt ist, und wobei ein Widerstand (R111) zwischen der Steuerelektrode (Basis) des Transistors (Q2) und der Quelle (104) der Betriebs-Versorgungsspannung (V+) gekoppelt ist, wodurch die Diode (D2) nur dann leitfähig wird, wenn die Betriebs-Versorgungsspannung (V+) erzeugt ist/wird.

5. Netzteil nach Anspruch 4, dadurch gekennzeichnet, daß die Diode (D2) die Quelle (104) der Betriebs-Versorgungsspannung (V+) von dem Regler (105) vor dem Leistungs-Modus trennt/isoliert.

6. Netzteil nach Anspruch 5, dadurch gekennzeichnet, daß eine zweite Last (999) an eine Haupt-Stromführungs-Elektrode (Emitter) des Transistors (Q2) gekoppelt ist und wobei die Diode (D2) den Regler (105) von der zweiten Last (999) vor dem Modus isoliert/trennt, wenn die Betriebs-Versorgungsspannung abgeschaltet ist.

7. Netzteil nach Anspruch 4, dadurch gekennzeichnet, daß die Diode (D2) Temperaturkompensation hinsichtlich Änderungen/Schwankungen einer Basis-Emitter-Übergangsspannung des Transistors (Q2) bewirkt, um eine temperaturkompensierte dritte Ausgangs-Versorgungsspannung (V_{RUN}) an einer Emitterelektrode des Transistors (Q2) zu erzeugen.

8. Netzteil nach Anspruch 1, dadurch gekennzeichnet, daß die Quelle (106) der Eingangs-Versorgungsspannung (V_{SB}) einen an die Haupt-Stromversorgung (V_{AC}) gekoppelten Abwärts-Transformator (T0) und einen Gleichrichter (106) enthält, der einen mit dem Abwärts-Transformator (T0) gekoppelten Eingangs-Anschluß enthält, zum Erzeugen der Eingangs-Versorgungsspannung (V_{SB}) durch Gleichrichten einer an dem Abwärts-Transformator (T0) gebildeten Spannung.

9. Netzteil nach Anspruch 1, dadurch gekennzeichnet, daß die Quelle der Betriebs-Versorgungsspannung eine auf ein Steuersignal (H_r) mit einer auf eine Ablenkfrequenz bezogenen Frequenz ansprechende Ablenk-Schaltung (99) enthält.

10. Netzteil nach Anspruch 9, dadurch gekennzeichnet, daß die Quelle der Betriebs-Versorgungsspannung weiter einen Rücklauf-Übertrager (T1) zum Erzeugen einer Spannung (V_{W2}) in einer Wicklung (W2) des Rücklauf-Übertragers (T1) mit einer Frequenz, die auf die Ablenkfrequenz Bezug hat, und einen Gleichrichter (D4) enthält, der mit der Wicklung (W2) des Rücklauf-Übertragers (T1) gekoppelt ist, zum Gleichrichten einer Spannung, die in der Wick-

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lung (W2) erzeugt wird, um die Betriebs-Versorgungsspannung (V+) zu erzeugen.

11. Netzteil nach Anspruch 1, dadurch gekennzeichnet, daß das Ein/Aus-Steuersignal von einem Fernbedienungs-Empfänger (107) erzeugt ist.

12. Netzteil nach Anspruch 1, dadurch gekennzeichnet, daß der Regler (105) einen Transistor (Q3) enthält, mit einer ersten, mit der Quelle (106) der Eingangs-Versorgungsspannung (V_{SB}) gekoppelten Haupt-Stromführungs-Elektrode (Kollektor), mit einer zweiten, mit dem Ausgangs-Anschluß (120) des Reglers (105) gekoppelten Haupt-Stromführungs-Elektrode (Emitter) und mit einer, an eine Quelle (131) eines Referenz-Signals mit einem Referenz-Pegel gekoppelten Steuer-Elektrode (Basis), um die erste Ausgangs-Versorgungsspannung (V_{CC}) auf im wesentlichen demselben Pegel während und vor dem Leistungs-Modus zu halten.

13. Netzteil nach Anspruch 12, dadurch gekennzeichnet, daß die Quelle des Referenz-Signals eine Zenerdiode (131) enthält, um den Referenz-Pegel an einem Anschluß (Kathode) der Zenerdiode (131) zu erzeugen.

14. Netzteil nach Anspruch 12, dadurch gekennzeichnet, daß während des Leistungs-Modus, wenn der zweite Versorgungsstrom (i_R) erzeugt wird, der zweite Versorgungsstrom (i_R) ein leichtes Ansteigen der an einer Emitter-Elektrode des Transistors gebildeten ersten Ausgangs-Versorgungsspannung bewirkt, um einen Emitterstrom (i_C), der in einer Emitterelektrode des Transistors (Q3) fließt, relativ zu seinem Wert vor dem Leistungs-Modus signifikant zu verringern.

15. Netzteil nach Anspruch 1, dadurch gekennzeichnet, daß während des Leistungs-Modus, wenn eine Außen-Temperatur in einer Einfassung, die das Fernsehgerät enthält, größer ist als während des Standby-Modus, der erste Versorgungsstrom (i_C) geringer als während des Standby-Modus ist, wodurch die Verlustleistung in dem Regler (105) gegenüber dem Zustand vor dem Leistungs-Modus verringert wird, um Temperaturkompensation in einem P-N-Übergang eines Transistors (Q3) bereitzustellen, der der Regler (105) ist.

16. Fernsehgerät, enthaltend:
- eine Quelle (V_{AC}) einer Eingangs-Versorgungsspannung;
- einen Spannungsregler (105), der mit der Quelle von Eingangs-Versorgungsspannung gekoppelt ist, zum Bilden einer ersten Ausgangs-Versorgungsspannung (V_{CC}) an einem Ausgangs-Anschluß (120) des Reglers sowohl während eines Standby-Modus als auch während eines Leistungs-Modus (power-up mode);
- eine Lastschaltung (998) des Fernsehgerätes, die an den Ausgangs-Anschluß (120) des Reglers (105) gekoppelt ist und von der ersten Ausgangs-Versorgungsspannung (V_{CC}) so versorgt wird, daß ein in dem Regler erzeugter erster Versorgungsstrom (i_C) an die Lastschaltung gekoppelt wird, um einen Laststrom zu bilden, der in der Lastschaltung während des Standby-Modus fließt;
- eine Quelle (107) eines Ein/Aus-Steuersignals;
- eine Ablenkwicklung (L_Y);
- eine Ablenkschaltungs-Ausgangsstufe (99) zum Erzeugen eines Ablenkstroms (i_y) in der Ablenkwicklung;
- eine Quelle (104,D4) einer Betriebs-Versorgungsspannung (V+), die mit der Ablenkschaltungs-Ausgangsstufe (99) gekoppelt ist und auf das Ein/Aus-Steuersignal anspricht, zum Erzeugen eines zweiten Versorgungsstroms (i_R) während des Betriebs in dem Leistungs-Modus;
- Schaltmittel (D2), das auf das Ein/Aus-Steuersignal anspricht und einen Haupt-Strompfad zwischen der Quelle (D4) der Betriebs-Versorgungsspannung und dem Ausgangs-Anschluß (120) des Reglers (105) bildet, wenn das Schaltmittel (D2) leitend ist, um (dadurch) den zweiten Versorgungsstrom an die Lastschaltung während des Leistungs-Modus zu koppeln und eine Verringerung des ersten Versorgungsstroms (i_C) des Reglers (105) so zu bewirken, daß sowohl der zweite Versorgungsstrom (i_R) als auch der erste Versorgungsstrom (i_a) entsprechende wesentliche Anteile des Laststromes während des Leistungs-Modus bilden.

Revendications

1. Alimentation pour appareil de télévision comprenant :

une source (V_{AC}) d'une tension d'alimentation d'entrée ;

un régulateur de tension (105) couplé à ladite source de tension d'alimentation d'entrée pour développer à une borne de sortie (120)

dudit régulateur une première tension d'alimentation de sortie (V_{CC}) à la fois pendant un mode d'attente et pendant un mode sous tension de ladite alimentation ;

un circuit de charge (998) dudit appareil de télévision couplé à ladite borne de sortie (120) dudit régulateur et qui est activé par ladite première tension d'alimentation et de sortie de telle sorte qu'un premier courant d'alimentation (i_c) qui est généré dans ledit régulateur soit couplé audit circuit de charge pour former un courant de charge (i_{ps}) qui circule dans ledit circuit de charge pendant ledit mode d'attente ;

une source (107) d'un signal de commande marche/arrêt ;

une source (104) d'une tension d'alimentation de fonctionnement (V+) sensible audit signal de commande marche/arrêt pour produire un second courant d'alimentation (i_R) pendant un fonctionnement dans ledit mode sous tension ;

un moyen de commutation (D2), sensible audit signal de commande de marche/arrêt et formant un trajet de courant principal entre ladite source (104) de ladite tension d'alimentation de fonctionnement (V+) et ladite borne de sortie (120) dudit régulateur (105) lorsque ledit moyen de commutation (D2) est conducteur pour coupler à travers lui ledit second courant d'alimentation (i_R) audit circuit de charge (998) pendant ledit mode sous tension , ce qui entraine une réduction dudit premier courant d'alimentation (i_c) à partir dudit régulateur (105) de telle sorte qu'à la fois ledit second courant d'alilmentation (i_R) et ledit premier courant d'alimentation (i_c) forment chacun des parties importantes correspondantes dudit courant de charge (i_{ps}) pendant ledit mode sous tension.

2. Alimentation selon la revendication 1 caractérisée en ce que ledit moyen de commutation (D2) couple également, pendant ledit mode sous tension, ladite première tension d'alimentation de sortie (V_{CC}) qui est développée à ladite borne de sortie (120) dudit régulateur (105) à une seconde borne de sortie (émetteur de Q2) pour réguler à ladite seconde borne de sortie une seconde tension d'alimentation de sortie (V_{RUN}) qui pendant ledit mode d'attente est isolée par ledit moyen de commutation (D2) de ladite borne de sortie (120) dudit régulateur (105).

3. Alimentation selon la revendication 2 caractérisée en ce que ledit moyen de commutation comprend une diode (D2) comportant une première borne (anode) qui est couplée à ladite source (104) de ladite tension d'alimentation de fonctionnement (V+) et une seconde borne (cathode) qui est couplée à ladite borne de sortie (120) dudit régulateur (105).

4. Alimentation selon la revendication 3 caractérisée en ce que ledit moyen de commutation comprend, de plus , un transistor (Q2) , dans lequel ladite diode (D2) est interposée entre une électrode de commande (base) dudit transistor (Q2) et ladite borne de sortie (12à) dudit régulateur (105) et dans lequel une résistance (R111) est couplée entre ladite électrode de commande (base) dudit transistor (Q2) et ladite source (104) de ladite tension d'alimentation de fonctionnement (V+) ce qui entraine ladite diode (D2) à être conductrice seulement lorsque ladite tension d'alimentation de fonctionnement (V+) est produite.

5. Alimentation selon la revendication 4 caractérisée en ce que ladite diode (D2) isole ladite source (104) de ladite tension d'alimentation de fonctionnement (V+) dudit régulateur (105) avant ledit mode sous tension.

6. Alimentation selon la revendication 5 caractérisée en ce qu'une seconde charge (999) est couplée à une électrode de conduction de courant principal (émetteur) dudit transistor (Q2) et dans lequel ladite diode (D2) isole ledit régulateur (105) de ladite seconde charge (999) avant ledit mode lorsque ladite tension d'alimentation de fonctionnement est interrompue.

7. Alimentation selon la revendication 4 caractérisée en ce que ladite diode (D2) fournit une compensation thermique pour les variations d'une tension de jonction base-émetteur dans ledit transistor (Q2) afin de produire une troisième tension d'alimentation de sortie à compensation thermique (V_{RUN}) au niveau d'une électrode d'émetteur dudit transistor (Q2).

8. Alimentation selon la revendication 1 caractérisée en ce que ladite source (106) de ladite tension d'alimentation d'entrée (V_{SB}) comprend un transformateur abaisseur (TO) couplé à une tension d'alimentation principale (V_{AC}) et un redresseur (106) comportant une borne d'entrée qui est couplée audit transformateur abaisseur (TO) pour produire ladite tension d'alimentation d'entrée (V_{SB}) en redressant une tension qui est développée au niveau dudit transformateur abaisseur (TO).

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9. Alimentation selon la revendication 1 caractérisée en ce que ladite source de ladite tension d'alimentation de fonctionnement comprend un circuit de déviation (99) sensible à un signal de commande (H_R) à une fréquence qui est reliée à une fréquence de déviation .

10. Alimentation selon la revendication 9 caractérisée en ce que ladite source de ladite tension d'alimentation de fonctionnement comprend de plus un transformateur de retour de balayage (T1) pour produire dans un enroulement (W2) dudit transformateur de retour (T1) une tension (V_{W2}) à une fréquence qui est reliée à ladite fréquence de déviation et un redresseur (D4) couplé audit enroulement (W2) dudit transformateur de retour (T1) pour redresser une tension qui est produite dans ledit enroulement (W2) pour générer ladite tension d'alimentation de fonctionnement (V+).

11. Alimentation selon la revendication 1 caractérisée en ce que ledit signal de commande de marche/arrêt est généré dans un récepteur distant (107).

12. Alimentation selon la revendication 1 caractérisée en ce que ledit régulateur (105) comprend un transistor (Q3) comportant une première électrode de conduction de courant principal (collecteur) qui est couplée à ladite source (106) de ladite tension d'alimentation d'entrée (W_{SP}), comportant une seconde électrode de conduction du courant principal (émetteur) qui est couplée à ladite borne de sortie (120) dudit régulateur (105) et comportant une électrode de commande (base) qui est couplée à une source (131) d'un signal de référence à un niveau de référence qui entraine la dite première tension d'alimentation de sortie (V_{CC}) à se maintenir sensiblement au même niveau à la fois pendant et avant ledit mode sous tension.

13. Alimentation selon la revendication 12 caractérisée en ce que ladite source du signal de référence comprend une diode zéner (131) de telle sorte que ledit niveau de référence est produit à une borne (cathode) de ladite diode zéner (131).

14. Alimentation selon la revendication 12 caractérisée en ce que, pendant ledit mode sous tension lorsque ledit second courant d'alimentation (i_R) est généré, ledit second courant d'alimentation (i_R) entraine ladite première tension d'alimentation de sortie qui est développée au niveau d'une électrode d'émetteur dudit transistor à augmenter légèrement, qui , à so tour, entraine un courant d'émetteur ,(i_C), qui circule dans une électrode d'émetteur dudit transistor (Q3) à décroitre de façon significative par rapport à sa valeur avant ledit mode sous tension.

15. Alimentation selon la revendication 1 caractérisée en ce que, pendant ledit mode sous tension, lorsqu'une température ambiante à l'intérieur d'une enceinte qui inclut ledit appareil de télévision est plus élevée que pendant ledit mode d'attente, ledit premier courant d'alimentation (i_C) est plus petit que pendant ledit mode d'attente, et par conséquent , entraine une dissipation d'énergie dans ledit régulateur (105) à être moindre qu'avant ledit mode sous tension, pour fournir une compensation thermique dans la jonction P-N d'un transistor (Q3) qui est ledit régulateur (105).

16. Appareil de télévision, comprenant :

une source (V_{AC}) d'une tension d'alimentation d'entrée ;

un régulateur de tension (105) couplé à ladite source de tension d'alimentation d'entrée pour développer à une borne de sortie (120) dudit régulateur une première tension d'alimentation de sortie (V_{CC}) à la fois pendant un mode d'attente et pendant un mode sous tension ;

un circuit de charge (998) dudit appareil de télévision couplé à ladite borne de sortie (120) dudit régulateur (105) et qui est actionné par ladite première tension d'alimentation de sortie (V_{CC}) de façon qu'un premier courant d'alimentation (i_c) qui est généré dans ledit régulateur soit couplé audit circuit de charge pour former un courant de charge qui circule dans ledit circuit de charge pendant ledit mode d'attente ;

une source (107) d'un signal de commande de marche/arrêt ;

un enroulement de déviation (L_y) ;

un étage de sortie de circuit de déviation (99) pour générer un courant de déviation (i_y) dans ledit enroulement de déviation ;

une source (104, D4) d'une tension d'alimentation de fonctionnement (V+) couplée audit étage de sortie du circuit de déviation (99) et sensible audit signal de commande de marche/arrêt pour produire un second courant d'alimentation(i_R) pendant un fonctionnement dans ledit mode sous tension ; et

un moyen de commutation (D2) sensible audit signal de commande de marche/arrêt, et formant un parcours de courant principal entre ladite source (D4) de ladite tension d'alimenta-

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tion de fonctionnement et ladite borne de sortie (120) dudit régulateur (105) lorsque ledit moyen de commutation (D2) est conducteur pour coupler à travers lui ledit second courant d'alimentation audit circuit de charge pendant ledit mode sous tension , ce qui entraine une réduction dudit premier courant (i_C) venant dudit régulateur (105) de telle sorte qu' à la fois ledit second courant d'alimentation (i_R) et ledit premier courant d'alimentation (i_a) forment chacun des parties importantes correspondantes dudit courant de charge pendant ledit mode sous tension.