DESCRIPTION

POWER SUPPLY CONTROLLER AND INFORMATION PROCESSOR

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is national stage application of International Application No. PCT/JP2015/079549, filed October 20, 2015, which designates the United States, incorporated herein by reference, and which claims the benefit of priority from Japanese Patent Application No. 2014-214921, filed October 21, 2014, the entire contents of which are incorporated herein by reference.

FIELD

An embodiment described herein relates generally to a power supply controller and an information processor.

BACKGROUND

Information processors, used in the field of industrial systems such as communication equipment, broadcasting equipment, or factory equipment, have been demanded to achieve higher reliability. In view of this, information processors are internally or externally provided with auxiliary power units to supply backup power to the information processors for a certain period of time at the time of power failures or trouble in power supply during system operation. Thereby, systems can continue their operation and are prevented from failures including program or data destruction.

Rechargeable secondary batteries are typically used for auxiliary power units. Secondary batteries include lead acid batteries, nickel-cadmium batteries, nickel-hydride batteries, and lithium-ion batteries. Such secondary batteries have a problem with longevity which tends to be shortened along with an increase in the number of charges and discharges.

CITATION LIST

Patent Literature

Patent Literature 1: Patent Laid-open Application Publication No. 2010-16996

SUMMARY OF THE INVENTION

Problem to be Solved by the Invention

The present invention aims to provide a power supply controller and an information processor which can elongate the longevity of batteries.

Means for Solving Problem

According to one embodiment, a power supply controller receives power supply from an external power source to supply power to a system controller of an information processor. The power supply controller includes a capacitor that stores the power supplied from the external power source; a battery to be charged with the power supplied from the external power source; an external power supervisor that determines whether or not a voltage value of the external power source is equal to or lower than a

certain first reference voltage value; a first switch that switches from the external power source to the capacitor to supply the power to the system controller when the external power supervisor determines that the voltage value of the external power source is equal to or lower than the certain first reference voltage value; a capacitor supervisor that determines, during the power supply from the capacitor, whether or not a charge level of the capacitor is equal to or lower than a certain reference charge level; a second switch that switches from the capacitor to the battery to supply the power to the system controller when the capacitor supervisor determines that the charge level of the capacitor is equal to or lower than the certain reference charge level; and a power supply that supplies output power to the system controller.

BRIEF DESCRIPTION OF DRAWINGS

FIG. 1 illustrates the configuration of an information processor including a power supply controller according to a first embodiment.

FIG. 2 is a flowchart of a backup power supply by the power supply controller in the first embodiment.

FIG. 3 illustrates the configuration of an information

16, a DC power step-down converter circuit 17, a real-time clock circuit (hereinafter, referred to as RTC)/memory 18(RTC and memory, RTC, memory). These circuits are supplied with the DC power from the battery switching circuit 12. The internal control circuit 15 works to control the system with the CPU or LSI. The expansion card 16 incorporates a print circuit board for expanding the functions of the system controller 20. The DC power step-down converter circuit 17 is intended to supply DC power to the RTC/memory 18 described below and step down a voltage to the operation voltage of the RTC/memory 18. The RTC/memory 18 is a memory device that stores time and data and drives by DC power source (not illustrated) such as primary batteries while the system controller 20 is not supplied with DC power and the system of the information processor stops operation. The RTC/memory 18 is supplied with the DC power at the step-down voltage from the power step-down converter circuit 17.

In addition to the above circuits, the hard disc drives 4, the optical drive 5, and the cooling fan 6 are connected to the CPU substrate 3 and supplied with the DC power from the battery switching circuit 12.

An EDLC attaching connector 21a is for attaching the EDLC 7 and enables attachment and detachment of the EDLC 7 to/from the power supply controller 19 (EDLC switching circuit 11 (first switch)). A battery attaching connector 21b is for attaching the battery 8 and enables attachment and detachment of the battery 8 to/from the power supply controller 19 (battery switching circuit 12 (second switch)). Herein, the system controller 20 receives the DC power from the battery switching circuit 12, and is thus a load of the power supply controller 19. The EDLC 7 and the battery 8 can be regulated in the

CLAIMS

1. A power supply controller that receives power supply from an external power source to supply power to a system controller of an information processor, the power supply controller comprising:

a capacitor that stores the power supplied from the external power source;

a battery to be charged with the power supplied from the external power source;

an external power supervisor that determines whether or not a voltage value of the external power source is equal to or lower than a certain first reference voltage value;

a first switch that switches from the external power source to the capacitor to supply the power to the system controller when the external power supervisor determines that the voltage value of the external power source is equal to or lower than the certain first reference voltage value;

a capacitor supervisor that determines, during the power supply from the capacitor, whether or not a charge level of the capacitor is equal to or lower than a certain reference charge level;

a second switch that switches from the capacitor to the battery to supply the power to the system controller when the capacitor supervisor determines that the charge level of the capacitor is equal to or lower than the certain reference charge level; and

a power supply that supplies output power to the system controller.

2. The power supply controller according to claim 1,

wherein

the capacitor is attachable to and detachable from the first switch.

3. The power supply controller according to claim 1 or 2, wherein

the battery is attachable to and detachable from the second switch.

4. The power supply controller according to claim 1, wherein

the capacitor connected to the first switch and the battery connected to the second switch are integrated into a unit, and the unit is attachable to and detachable from the first switch and the second switch.

5. The power supply controller according to any one of claims 1 to 4, further comprising:

a battery supervisor that determines, during the power supply from the battery, whether or not a voltage value of the battery is equal to or lower than a certain second reference voltage value; and

a notifier that outputs a result of the determination to the system controller when the battery supervisor determines that the voltage value of the battery is equal to or lower than the certain second reference voltage value.

6. An information processor comprising a system controller, and a power supply controller that receives power supply from an external power source to supply power to the system controller, wherein

the power supply controller comprises:

a capacitor that stores the power supplied from the external power source;

a battery to be charged with the power supplied from the external power source;

an external power supervisor that determines whether or not a voltage value of the external power source is equal to or lower than a certain first reference voltage value;

a first switch that switches from the external power source to the capacitor to supply the power to the system controller when the external power supervisor determines that the voltage value of the external power source is equal to or lower than the certain first reference voltage value;

a capacitor supervisor that determines, during the power supply from the capacitor, whether or not a charge level of the capacitor is equal to or lower than a certain reference charge level;

a second switch that switches from the capacitor to the battery to supply the power to the system controller when the capacitor supervisor determines that the charge level of the capacitor is equal to or lower than the certain reference charge level; and

a power supply that supplies output power to the system controller.

7. The information processor according to claim 6, wherein the power supply controller further comprises:

a battery supervisor that determines, during the power supply from the battery, whether or not a voltage value of the battery is equal to or lower than a certain second reference voltage value; and

a notifier that outputs a result of the determination to the system controller when the battery supervisor determines that the voltage value of the battery is equal

to or lower than the certain second reference voltage value.

8. The information processor according to claim 7, wherein

the system controller controls an operating system when notified from the power supply controller that the voltage value of the battery is equal to or lower than the certain second reference voltage value.

9. The information processor according to claim 8, wherein

the system controller boots the operating system when, after completion of the control over the operating system, the external power supervisor determines that the voltage value of the external power source is equal to or lower than the certain first reference voltage value.

10. The information processor according to any one of claims 7 to 9, wherein

the system controller comprises a memory device that holds data of the information processor when the voltage value of the external power source is equal to or lower than the certain first reference voltage value; and

the power supply controller further comprises a DC power switch that directly supplies the power from the battery to the memory device when the external power supervisor determines that the voltage value of the external power source is equal to or lower than the first reference voltage value.