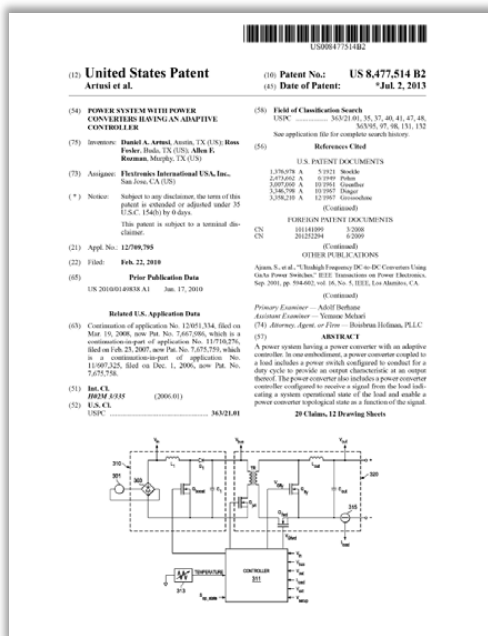


U.S. Patent No. 8,477,514 – Samsung EP-TA845



Title: POWER SYSTEM WITH POWER CONVERTERS HAVING AN ADAPTIVE CONTROLLER

Priority Date: Dec. 01, 2006

Filed Date: Feb. 22, 2010

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Expiration Date: Dec. 01, 2026

Inventors: Daniel A. Artusi; Ross Fosler; Allen F. Rozman

Claims: 6, 7, 8, 10



- All the claim elements identified herein are literally and equivalently present in the Accused Instrumentalities.
- For clarity, the portion of a cited reference that is relied upon for support may also be reproduced in the chart. Also, earlier, later or otherwise different versions of the reference may be available but not specifically cited.
- The portion of the Accused Instrumentality covered by a claim element is typically identified by an arrow and/or outlined in color. Such identification is exemplary, not exclusive or exhaustive. The Asserted Claims are open ended, close ended or improperly restricted. Additional portions of the Accused Instrumentality might also be covered by the claim element but might not be identified in the chart.
- All quantitative figures, qualitative figures and data cited in the chart are subject to measurement and/or computational variation.

Claim 6

A **(SYS) power system**, comprising:

a **(PSC) power system controller** configured to provide a **(COM) signal** characterizing a **(PREQ) power requirement** of a **(PRO) processor system**; and

a **(PC) power converter** coupled to said **(PRO) processor system**, comprising:

a **(PS) power switch** configured to conduct for a **(DC) duty cycle** to provide an **(OC) output characteristic** and an **(OUT) output** thereof, and

a **(CON) power converter controller** configured to receive a **(COM) signal** from said **(PSC) power system controller** to control an **(IOC) internal operating characteristic** of said **(PC) power converter** as a function of said **(COM) signal**.

Claim 7

The **(SYS) power system** as recited in claim 6 wherein

said **(CON) power converter controller** is further configured to provide another **(OS) signal** to control said **(DC) duty cycle** of said **(PS) power switch** as a function of said **(OC) output characteristic** and in accordance with said **(COM) signal**.

Claim 8

The **(SYS) power system** as recited in claim 6 wherein said **(CON) power converter controller** is configured to adjust said **(IOC) internal operating characteristic** over a **(TTIM) period of time**.

Claim 10

The **(SYS) power system** as recited in claim 6 wherein said **(IOC) internal operating characteristic** is selected from the group consisting of:

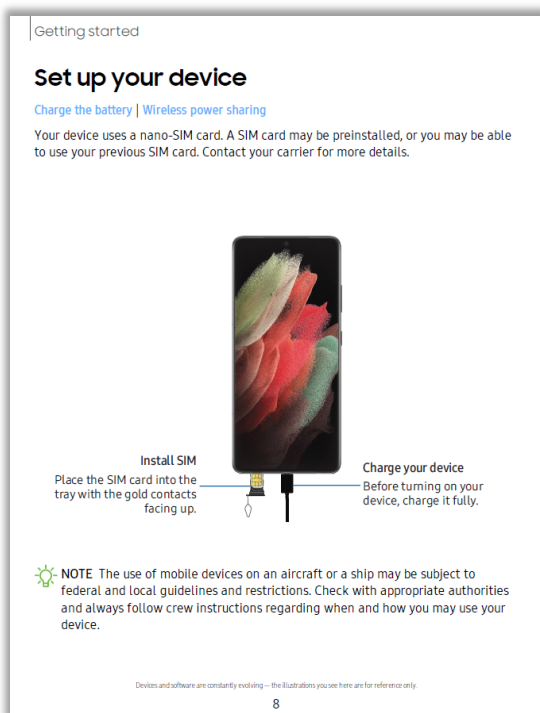
a gate drive voltage level of said **(PS) power switch** of said **(PC) power converter**,

a switching frequency of said **(PC) power converter**, and

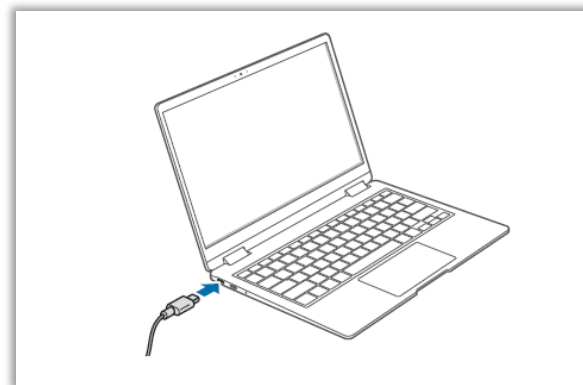
an **(DCBV) internal direct current bus voltage** of said **(PC) power converter**.

Claim 6

A (SYS) power system, comprising:



Samsung Electronics America, Inc., User Manual for Samsung Galaxy S21 5G, S21+ 5G, and S21 Ultra 5G at p. 8 (2021).



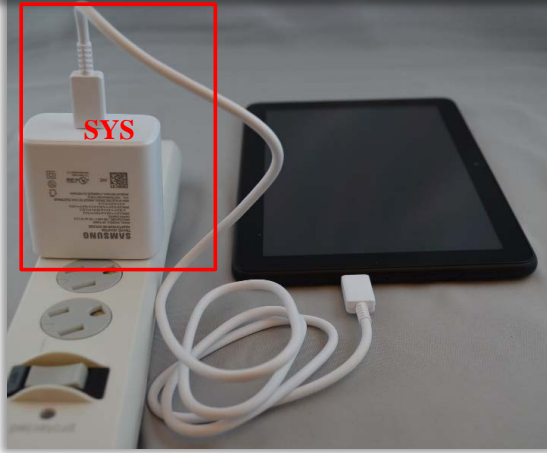
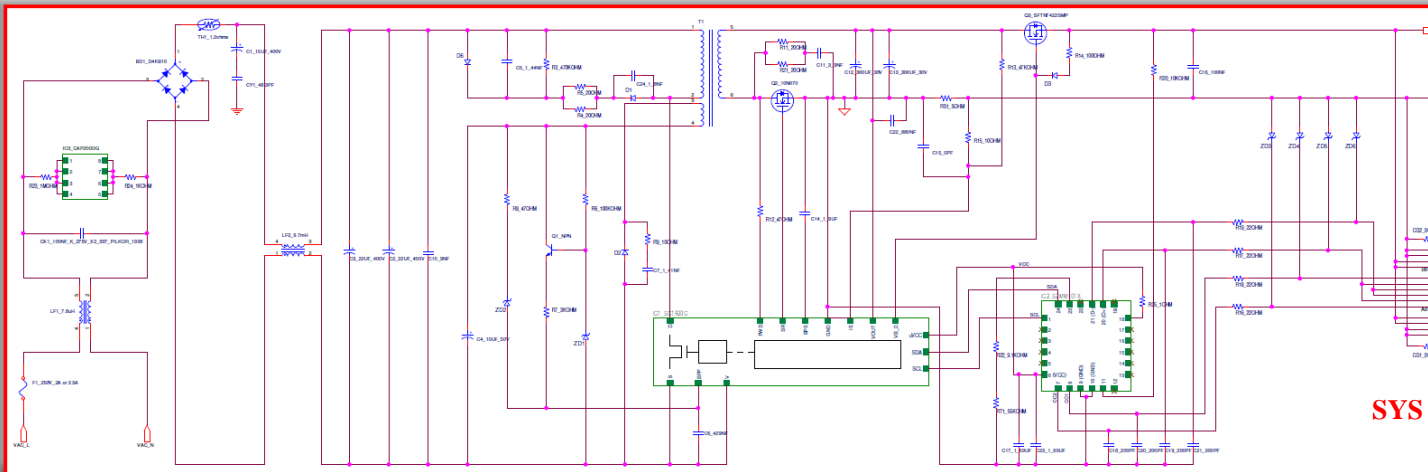
Samsung Electronics Co., Ltd., Users Guide for Samsung EP-TA865 at p. 71.

These are typical examples of Samsung generally instructing users of its power converters to couple them to loads.

U.S. Patent No. 8,477,514 – Samsung EP-TA845

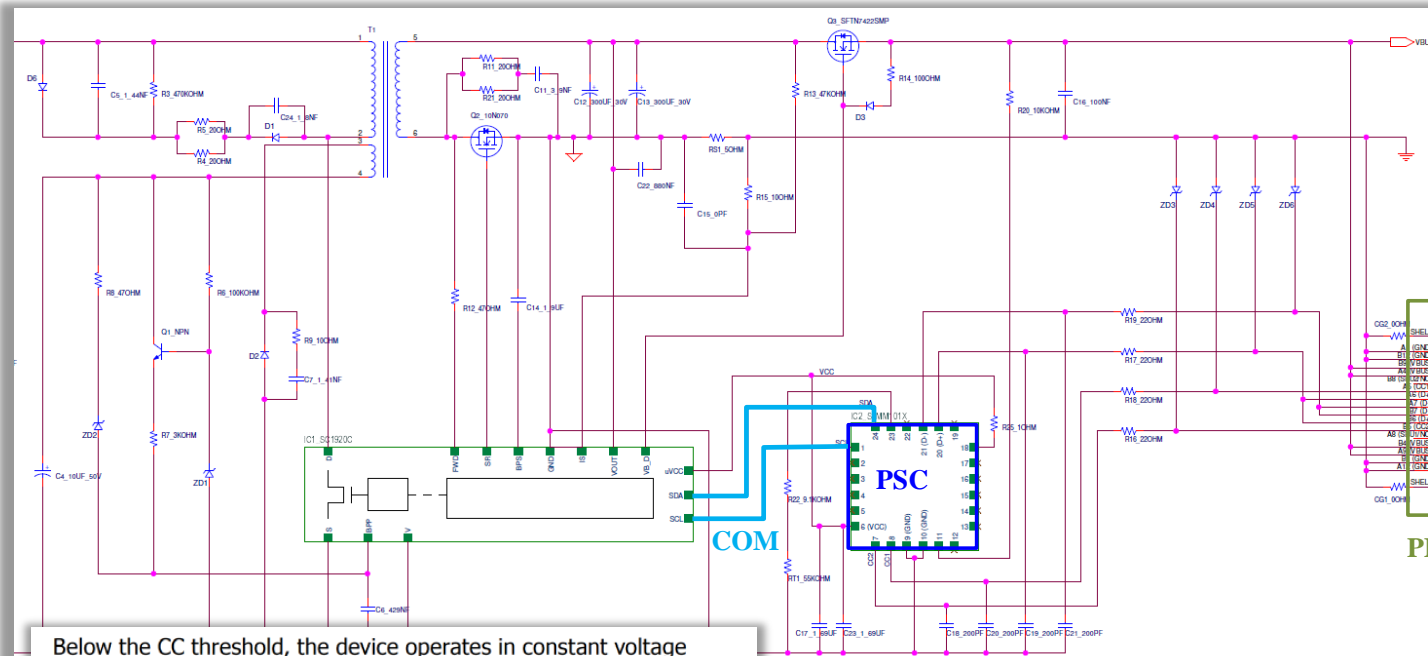
Claim 6

A (SYS) power system, comprising:



Claim 6

a (PSC) power system controller configured to provide a (COM) signal characterizing a (PREQ) power requirement of a (P) processor system; and



Below the CC threshold, the device operates in constant voltage mode. The output voltage is set by the I²C interface.

In this design, (U2) is the USB PD controller. It gets its supply from the μ VCC pin of the InnoSwitch3-Pro IC. Output voltage requests are sent by the IC (U2) to InnoSwitch3-Pro through the I²C communication lines (SDA and SCL) when sink requests for the same. The μ VCC pin needs a decoupling capacitor C14.

PREQ

USB PD protocol is communicated over either CC1 or CC2 line depending on the orientation in which the Type-C plug is connected.

Source(s): [2]

InnoSwitch3-Pro Functional Description

The InnoSwitch3-Pro combines a high-voltage power MOSFET along with both primary-side and secondary-side controllers in a single device.

The architecture incorporates a novel inductive coupling feed-back scheme using the package lead frame and bond wires to provide a safe, reliable, and low-cost means to communicate accurate output sensing of the output voltage and output current on the secondary side to the primary IC.

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