

Power Tips: Centralized Control Makes Power Supply Design Easier



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When I designed my first AC/DC power supply for LCD TVs 10 years ago, I added many extra protection circuits to ensure that the power supply met regulations like safety and energy-efficient standards. [Figure 1](#) shows a simplified block diagram of an LCD TV power supply 10 years ago.

I applied a bleed resistor to make sure that the x-capacitors in the electromagnetic interference filter discharged to a human-safe voltage level within a certain amount of time and met the EN60950 safety standard. I applied an additional auxiliary power supply to meet [Energy Star](#) requirements while in standby mode. The power supply also needed external input undervoltage protection (UVP) and DC/DC on/off hysteresis circuits to ensure survival during AC on/off cycling and other key tests.

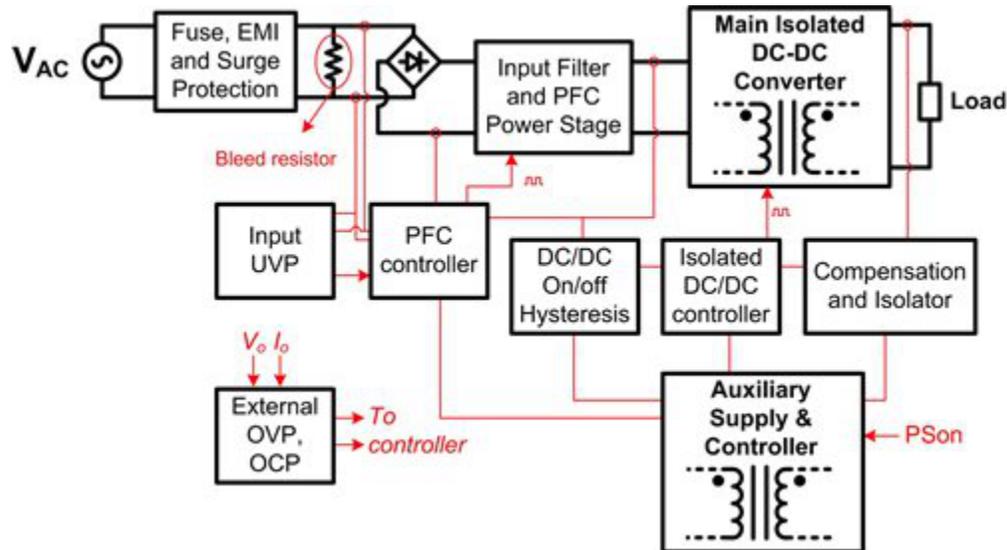


Figure 1. A Simplified LCD TV Power-Supply Block Diagram 10 Years Ago

With so many circuitries on a power supply, the overall bill of material cost is hard to reduce and printed circuit board wiring gets more difficult. Thanks to power electronics and semiconductor technology progress, we are now able to integrate many of the external circuitries I added 10 years ago into a single IC. For example, the [UCC29950](#) is a centralized controller has the capability to drive both a continuous conduction mode PFC circuit and LLC resonant converter with integrated input UVP, x-capacitor discharge and DC/DC on/off hysteresis. Moreover, the centralized control scheme allows the IC to gather information from both PFC and LLC stages and to enter standby mode or not.

A power supply can have low power consumption at no load even without an additional auxiliary supply when applying the [UCC29950](#). Thus, the power-supply block diagram will be much simpler (see [Figure 2](#)) and yet still provide the same functions as those shown in [Figure 1](#).

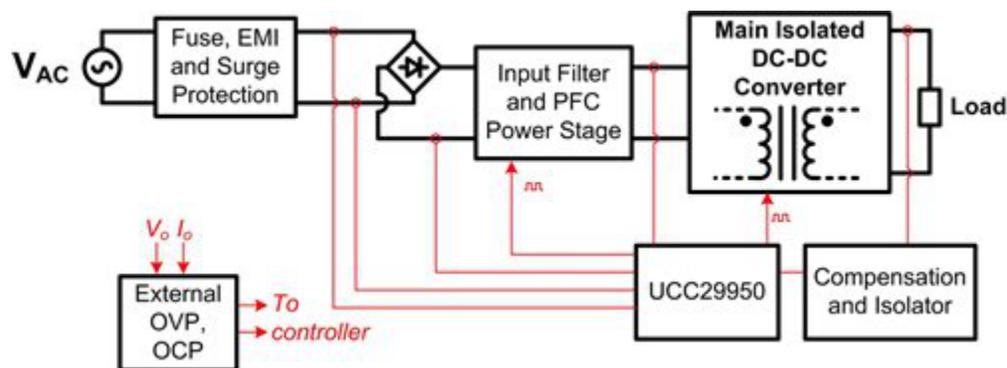


Figure 2. A Simplified UCC29950 "Standbyless" Power-supply Block Diagram

A power supply with centralized control can greatly reduce component counts and circuit cost. With many protection functions integrated into the controller, the reliability increases and there is less chance for the power supply to run into a catastrophic failure. Other than the [UCC29950EVM-631](#), another notable power-supply reference design with the [UCC29950](#) centralized controller (meeting [80 Plus Gold](#) for 115 V_{AC} internal power supplies) is the TI Designs High Efficiency 350W AC/DC Power Supply Reference Design.

Additional Resources

- See the test results of the [UCC29950EVM-631](#)
- Explore more [power-supply topics](#)
- Watch Power Tips [videos](#) to help with your design challenges

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