

Monday, April 18, 2016

What is a Power Supply Standby Voltage?

The standby voltage is generated by a power supply circuit within the main power converter. This became widely used in 1995 when the ATX specification was published to allow a desktop computer to be put into a sleep-mode to save energy. The standby voltage supplies a small amount of power to the motherboard enabling the computer to quickly restart, rather than performing a full, lengthy, boot cycle. The term “standby” is often confused with an auxiliary output, which has a different function.

A standby voltage is generated by a separate switching circuit and is not affected by the use of the remote on/off signal or even an overload condition on the main output of the power supply. A typical block diagram is shown below.

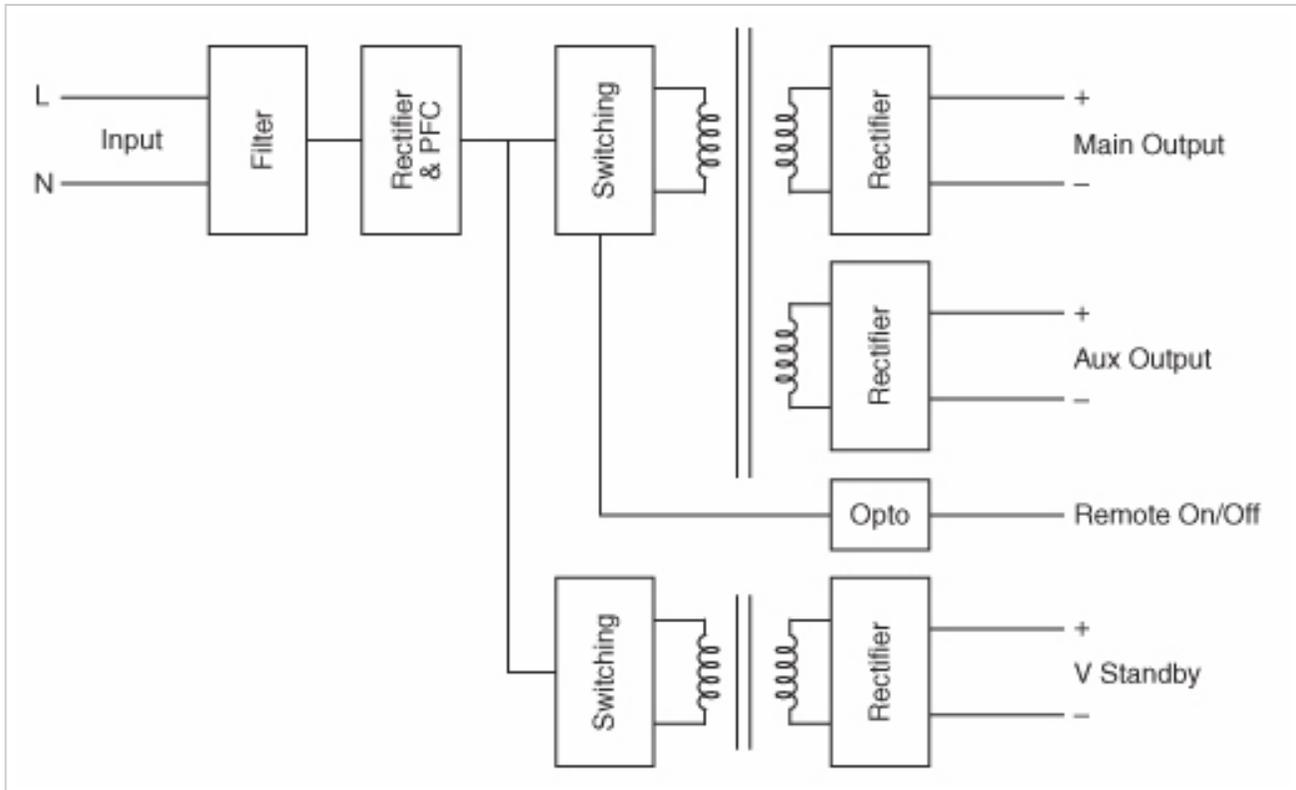


Figure 1 Block diagram of a typical power supply with a standby output

The main and the standby switching converters share the high voltage output voltage (typically around 380Vdc) from the rectifier & PFC circuit. This saves cost by not duplicating the rectification and filtering components. It can be seen that they are independent of each other and the remote on/off control is only applied to the main converter.

The auxiliary output is supplied from an additional winding on the main converter transformer. If the main output is turned off by the remote on/off, the auxiliary output will also turn off. An auxiliary output is often used to power an external cooling fan if the power supply has a forced air cooling rating. In this case if the auxiliary output is not present when the power supply output is inhibited, it does not matter as the main converter will not be providing any load and will not require additional cooling.

Figure 2 demonstrates how the various outputs and function interact with each other. If AC power is removed for any significant length of time (10-50ms), then of course all the outputs on the power supply stop functioning.

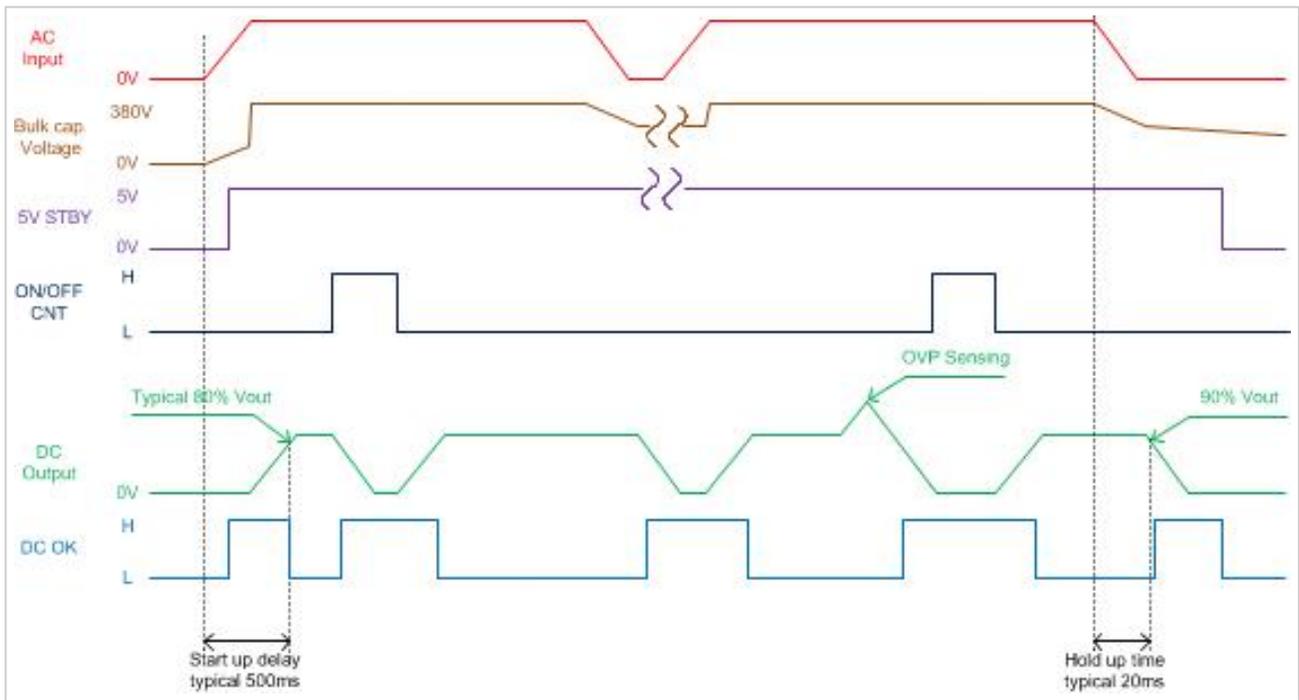


Figure 2 – Timing diagram

Many power supply designers also use the standby converter to power any “housekeeping” circuitry on the output of the main converter. This allows an “enable” type remote on/off to be offered, where the signal is pulled low to activate the main converter. Without a standby circuit, an external voltage has to be applied to the remote on/off to inhibit the power supply.

Manufacturers of mid to high power converters with a standby voltage will often state the off-load power draw, or off-load power consumption, with the remote on/off activated from the standby voltage.

Power Guy