

Wednesday, October 30, 2013

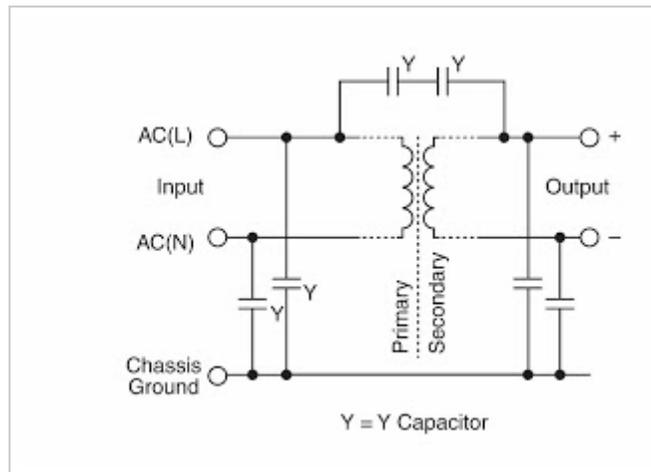
Reducing Switching Power Supply Radiated & Conducted EMI

One application issue that comes across my desk on a regular basis is where a customer has gone to an outside lab to certify their equipment for EMC, and they have failed conducted or radiated noise.

Usually the power supply in question is an open frame type, which does not have the shielding that a metal enclosed power supply has. There are two areas that are worth checking; grounding points and wire harnesses.

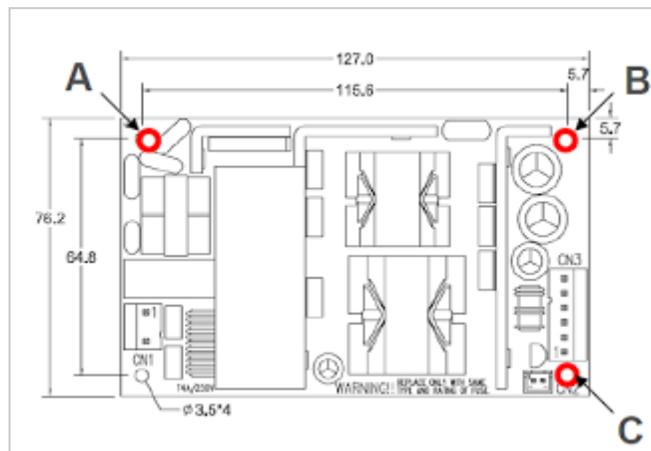
1. Grounding Points

Power supplies utilize decoupling capacitors; two are typically connected from input to earth ground (see below). Likewise, two are connected from the output to earth ground. This keeps the noise currents circulating close to the power supply, rather than allowing them to radiate around the end user's system.



In an enclosed power supply these capacitors will be grounded through the metal case, but with an open frame type, it is up to the user to connect these points to ground. With the power density of products today, there often is more than one point on the power supply printed circuit board that needs to be connected. A common mistake is to only connect one, which can cause excessive radiated and conducted noise.

The installation manual will show which mounting holes / points need to be grounded. In the product below, three mounts should be connected (A, B & C).



The photo below shows the same power supply undergoing EMC testing, and it can be noted that the unit is connected to a metal plate with metal standoffs.



A quick glance of the underside of the printed circuit board will show which mounting holes have traces that need to be grounded. This smaller model has only one grounding point at the bottom right hand side of the board.



2. Wiring harnesses

In the test photo, it can be seen that the cable harnesses are neatly dressed and are kept away from the power supply. Wiring that is positioned above or below the unit will pick up radiated noise, thus defeating the purpose of having the EMI filter components.

If I am assisting customers on site, I always pack some tie-wraps in my tool kit to re-route any offending harnesses.

An earlier blog covers the standards <http://power-topics.blogspot.com/2007/11/guide-to-emc-standards-for-power.html>

Posted by [Power Guy](#)