



Another EMC resource
from EMC Standards

Bonding techniques for creating the RF Reference

Helping you solve your EMC problems

Bonding techniques for creating the RF Reference

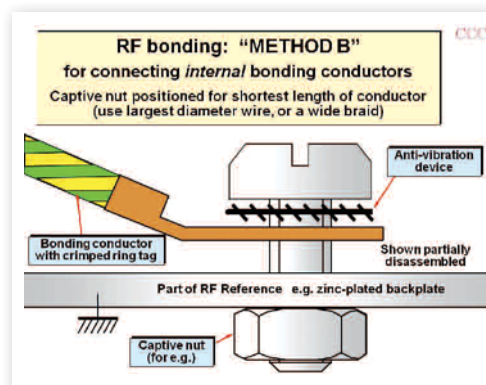
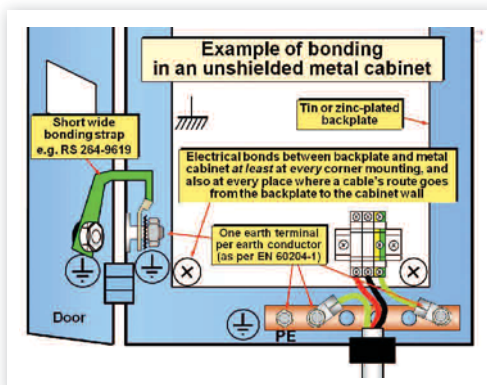
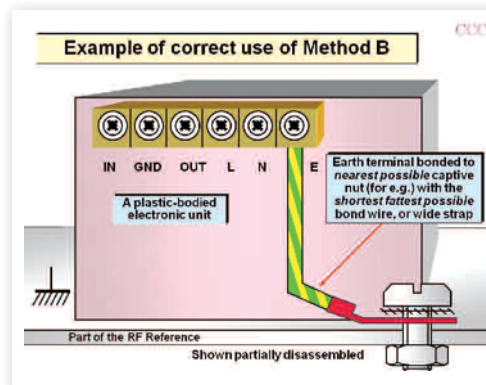
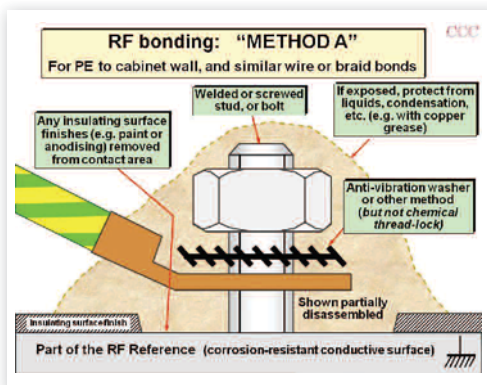
Continuing his current series on good EMC design principles for panel & system builders, Keith Armstrong offers some advice on establishing an RF Reference through appropriate bonding techniques



Cherry Clough Consultants was started by Keith Armstrong in 1990 to help manufacturers reduce costs, time-scales and warranty costs whilst complying with the EMC Directive and other regulations.

Keith has a great deal of experience with the EMC of control panels, systems and installations, of all types and sizes, and with Tim Williams, wrote the only textbook on the subject: "EMC for Systems and Installations" (Newnes, 2000, ISBN 0-7506-4167-3, www.bh.com/newnes, RS Components P/No. 377-6463).

The 'Publications & Downloads' pages at www.cherryclough.com contain a great deal of helpful and practical information on EMC.



In the July 2007 Issue of PSB, I started a series of articles on good EMC design and assembly practices for industrial cabinets. These techniques are good for any assembly in which two or more electronic units/modules/subassemblies are mounted inside a metal box and interconnected. Using these techniques helps get the best EMC performance from unshielded metal boxes, as well as from more costly shielded types. It is easy to spend a lot of money on a properly-shielded cabinet, and then ruin it totally by overlooking one of these EMC practices. The first article in this series concerned the creation of an RF Reference, and it can be downloaded (along with any of my other PSB articles) from www.psbnet.net/company.aspx?CompanyID=12242.

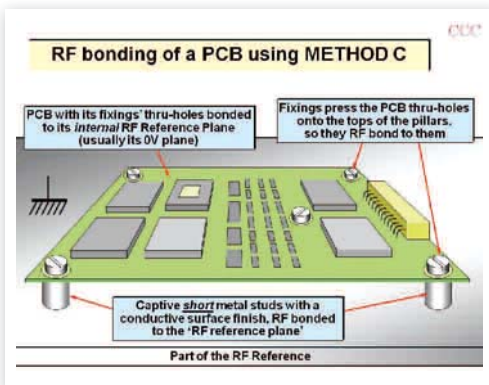
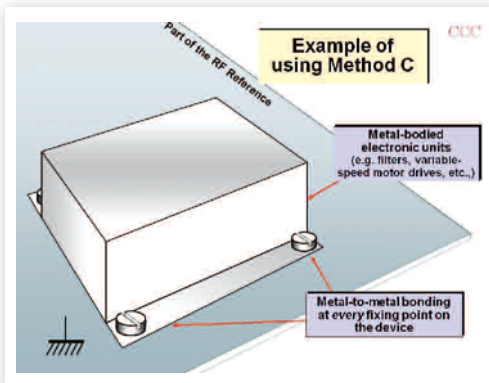
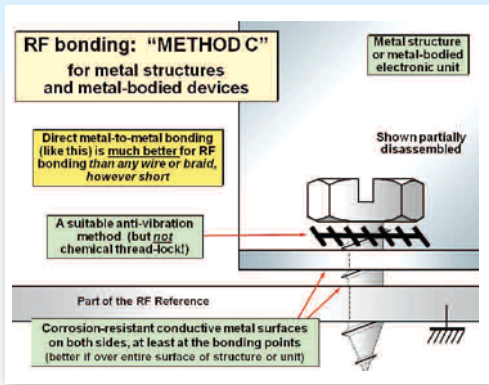
(RF = Radio Frequency).

Without an RF Reference, few EMC design techniques will work very well, or at all.

A backplate can make an excellent RF Reference, as can the surfaces of a metal cabinet. In March 2008 my article covered cable routing in cabinets, and said that cables should always be run close to a common-mode (i.e. induced, stray) current return path, which should form part of the RF Reference.

So it is usually necessary to electrically connect various bits of metal together to create an RF Reference on which all the electronic units/modules are fitted, and along which all the various cables and wire bundles are run.

Here are a number of sketches, taken from one of my training courses, describing a number of practical techniques for bonding parts of RF



References together, and for bonding electronic units to them. They are intended to be self-explanatory, so I won't write any more about them here.

They are called "Method A, B, C", etc. so they can be saved as Work Instructions, which are then referenced on design drawings so that assemblers know what methods to use.

Don't confuse safety bonding with RF-bonding. In many cases it is possible to use the RF-bonding and RF Reference as the safety earth bonding network, but in other cases (especially where very high fault currents are involved) the two networks may need to exist in parallel: large CSA green/yellow wires to an earth busbar for safety, short bonds and metal-to-metal connections for EMC. The RF bonds will create earth loops, but that is actually good practice these days. (Maybe my next article should be about why earth loops are good.)

For more about good EMC engineering practices, download the free REO Guide: "Good EMC Engineering Practices in the Design and Construction of Industrial Cabinets" from <http://www.reo.co.uk/knowledgebase> or read "EMC for Systems and Installations" (Newnes, 2000, ISBN 0-7506-4167-3, RS Components P/No. 377-6463).