Ground plane

[AN-345]

Let us consider this simple case:

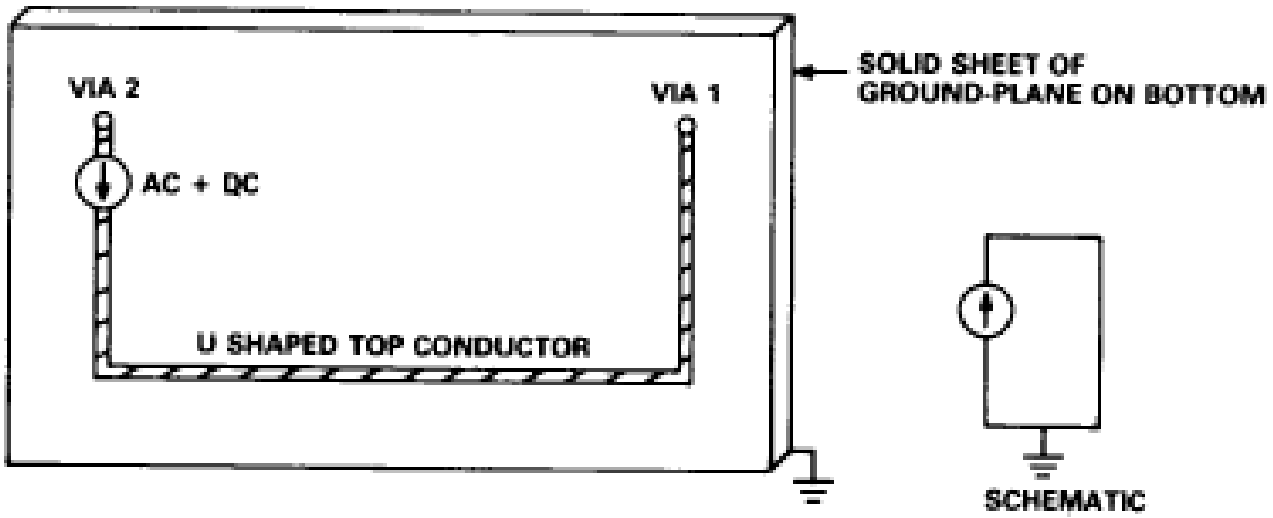

Figure 7. Schematic and layout of current source with U-shaped trace on pc board and return through ground plane.

In DC, current follows the lower *resistance* path

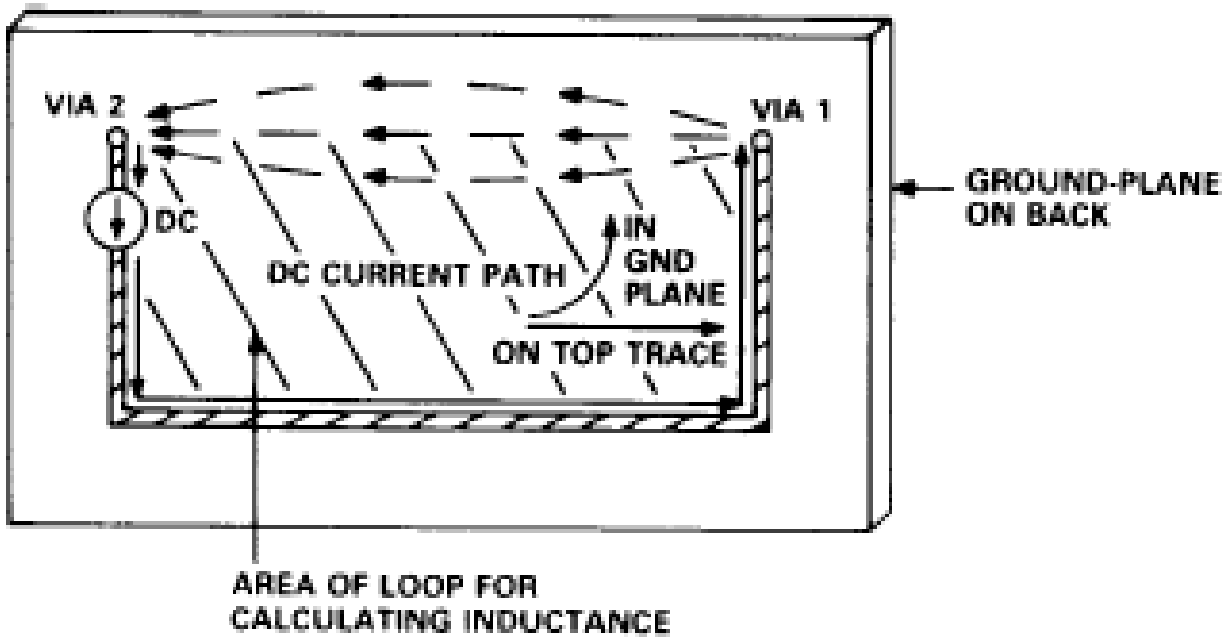

Figure 8. DC current path for Figure 7.

In AC, current follows the lower *impedance* path => it tries to lower the *area*

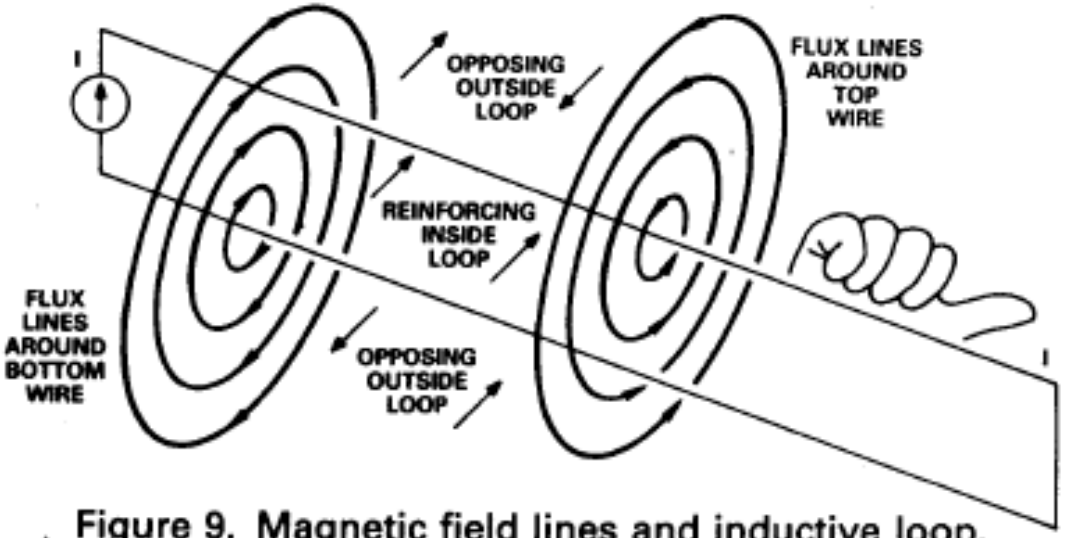

Figure 9. Magnetic field lines and inductive loop.

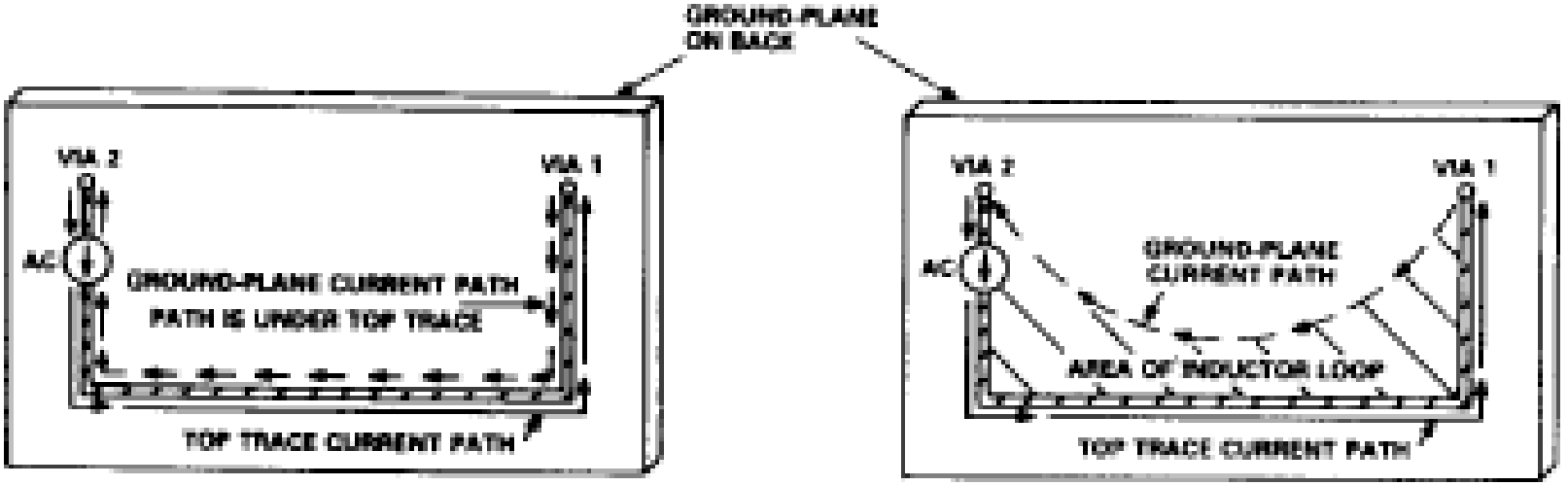

Figure 10. AC current path without (left) and with (right) resistance in ground plane.

E.g.: suppose path A critical (high speed signals), B not critical

- if, at the crossing point, ground is removed on the back plane, and B goes below A with two vias:
  - interrupted ground plane makes A return loop larger
  - inductance *L* is introduced => induced voltage drop
- simple fix: install a wire across the cut in the ground plane

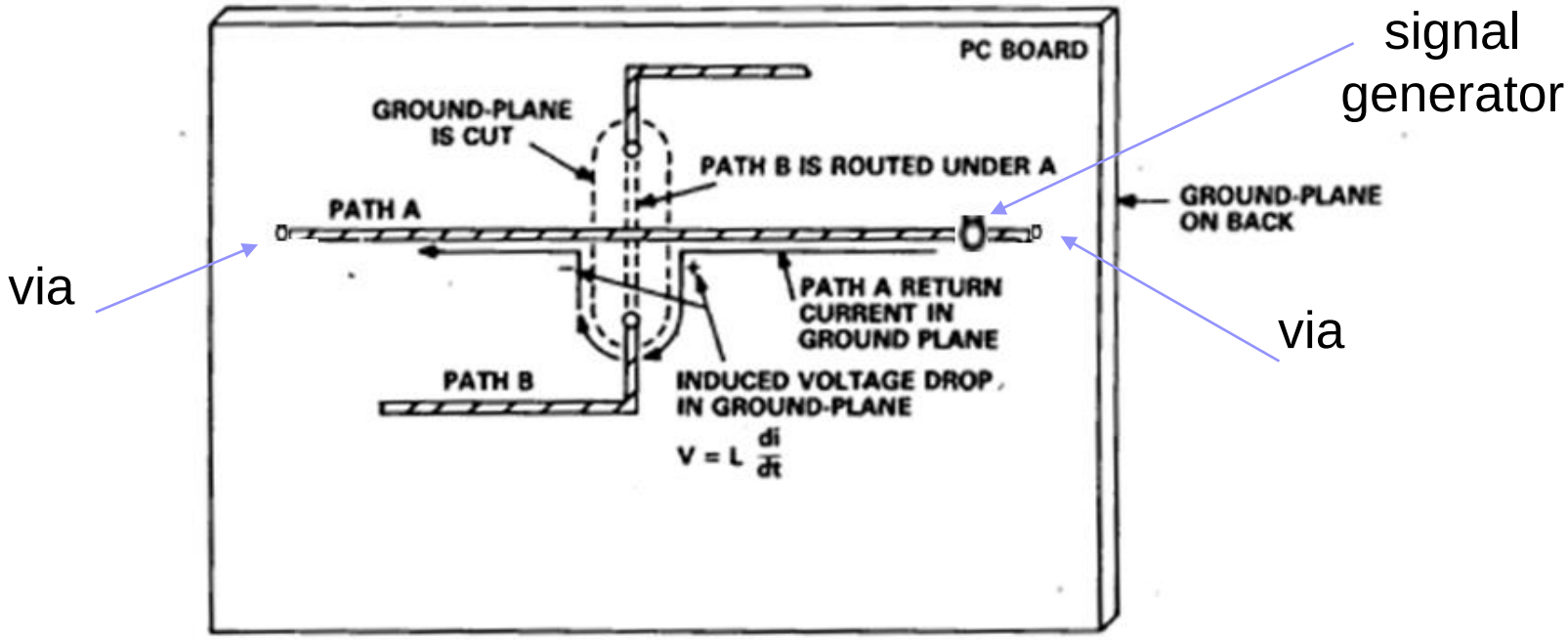

Figure 11. Typical PC layout problem, with paths crossing.