



formatronic
electronique globale

CONTROLLED IMPEDANCE

Controlled impedance on PCB tracks

The impedance is measured in Ohms and it allows to measure the quality of the engraving of the tracks. Impedance is an AC (alternative current) characteristic that increases with frequency and becomes critical for printed circuits functioning at frequencies above 200 or 300 MHz. The impedance calculation software is a good starting point for determining the track width (w) and thickness (h) of the insulation of a specific impedance.

As concerns signal traffic in Printed Circuits, when tracks transmit high frequency signals, great care must be taken in the design of the tracks to adapt the impedance to that of the upstream and downstream components. The longer the track or the higher the frequency, the more adaptation is necessary. The Printed Circuit manufacturer will control the impedance by acting on the dimensions and of the spacings of the track and of the insulation. When we look at the stack-up of a multilayer circuit, it must be remembered that the internal impedance controlled tracks are shielded by planes and for this reason, we must take into account only the thickness of the insulation between the sheet layers on both sides of the track if the latter is internal to the PCB.

Controlled impedance board production

The operating speed of electronic components increases, so does the need for controlled impedance PCBs. If the impedance is incorrect, it is difficult to identify the problem once the card is wired. Since the impedance depends on many parameters (width and thickness of the track, thickness of the laminate, etc.), FORMATRONIC tests 100% of the impedance controlled circuits. The test is not made on the printed circuit itself, but on a test coupon of the same panel and manufactured at the same time.

The typical test coupon is a printed circuit that has the same characteristics and stackings as the main circuit. Its controlled impedance tracks have the same dimensions as those of the PCB and are in the same layers. The following indications will give you some idea of the connections between impedance value and dimensions, it must be remembered that these are only approximations in the case of thin tracks.

- The impedance is inversely proportional to the track width.
- The impedance is inversely proportional to the track thickness.
- The impedance is proportional to the thickness of the dielectric.
- The impedance is inversely proportional to the square root of ϵ_r of the dielectric.

For any information, do not hesitate to contact us to 01 30 56 43 80 or by email at contact@formatronic.eu We will be happy to answer you.

