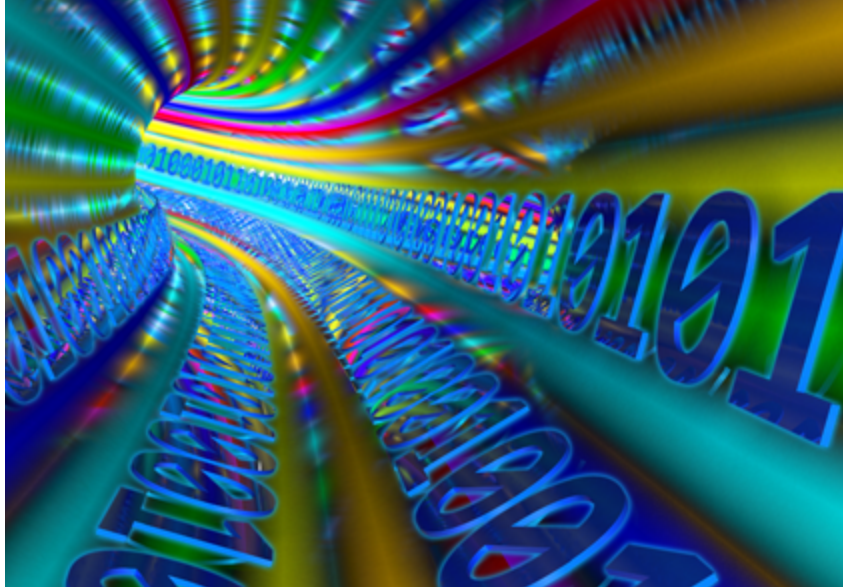


## *The Principle of Shielded Lan Cable*



*Screened and shielded twisted-pair copper cabling system has been around for a while and mostly in Europe.*

*The shielded cabline system is composed by an ordinary unshielded cabling system with an outer metal shield, this metal shielding layer is used for reflection, absorption and to prevent electromagnetic interference and electromagnetic radiation, this shielding system is very comprehensive making full use of balance principle of Twisted pair cabling, which has a very good electromagnetic compatibility (EMC) characteristics.*

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*Electromagnetic compatibility (EMC) refers to the electronic equipment or network system that has a certain ability to resist electromagnetic interference, and does not produce excessive electromagnetic radiation. In other words, the equipment or network system is required to work in a relatively harsh electromagnetic environment, and at the same time can not radiate excessive electromagnetic interference to interfere with other equipment and network around it.*

*The balance of the U/UTP (unshielded) cables does not depend only on the quality of the components themselves (such as twisted pair), but is affected as well by the surrounding environment. Because the U/UTP (unshielded) in metallic surroundings, magnetic field, the pulling during set up, bending, etc. will damage its balance characteristics, thereby reducing EMC performance.*

*So, to get a lasting balance of the characteristics, there is only one solution: add to all the cores a layer of aluminium foil to ground. Aluminium foil adds protection to the fragile twisted pair wires, while creating a balanced environment for U/UTP (unshielded) cables. Thus forming what we now call the shielded cable.*

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*The shielding principle of Shielded cabling is different from the twisted pair balance offset principle, shielded cables are divided in four pairs of twisted cable where to the pair outside a layer or two of aluminium foil/ metal braid is added, the use of this metal protection is intended to help with electromagnetic wave reflection, absorption and the skin effect. The so-called skin effect refers to the distribution of current within a conductor, being this current density larger in the surface of the cable, and decreases with greater depths in the conductor, the higher the frequency the smaller the skin depth, that is, the higher the frequency, the stronger*

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*the penetration of electromagnetic waves. Effectively preventing external electromagnetic interference into the cable, as well as to prevent the leaking of internal signal radiation and the interference with other equipment.*

*Tests show that the frequency of more than 5MHz of electromagnetic waves can penetrate 38 $\mu$ m thick aluminium foil. If the thickness of the shielding layer exceeds 38  $\mu$ m, the electromagnetic interference frequency inside the cable that goes through the shield layer is well under 5 MHz. And for low frequency interference below 5MHz the principle of balanced twisted pairs can be applied to effectively offset the interference.*