

Uniprise® Solutions

Tech Tips

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Uniprise Tech Tips are prepared by the product development community at CommScope, and are designed to inform its readers about the latest technical developments in our industry.

Are Your Lines Crossed?

Have you ever picked up your telephone to make a call, only to hear another conversation taking place on the line? When “lines are crossed,” you can’t make a phone call, and that’s frustrating. How does this interference happen? That’s easy – someone else’s equipment is transmitting or receiving on the same frequency for which your equipment is designed, and, at least in the case above, both of you are “sharing” the same signal.

The same holds true for the network cabling world. While data is being transmitted over copper cable – or group of cables – those signals will be “shared” by two copper wires in a twisted pair as the signals travel toward their destination. This unwanted sharing of signals between the two wires is known as “crosstalk,” and we try to minimize crosstalk as much as possible.

Crosstalk is a performance measurement of cable, and this measurement can be taken at the end closest to the transmitting equipment (near end cross talk, or NEXT). Far end crosstalk (FEXT) refers to the undesired coupling of signals from the transmit pair onto the receive pair at the other, or far, end. For Gigabit applications this is an important parameter; but for 10/100 BaseT applications, the NEXT values are more important. Whether NEXT or FEXT, lower crosstalk measurements mean cleaner, more balanced transmissions of data. Crosstalk can be minimized by retaining the cable pair twist configuration as much as possible when terminating the cable on the connecting hardware.



A common piece of measuring equipment, the Framescope 350

Power Sum Crosstalk

When additional bandwidth is needed for higher throughput applications, such as Gigabit Ethernet, all four pairs are required to carry the increased load. This increased complexity also brings about the potential for increased noise. In other words, each twisted pair will be impacted by the three other pairs within that cable (see figure 1). Power Sum Crosstalk is derived from the summation of each of the NEXT measurements. As with pair-to-pair crosstalk, this power-sum calculation can also quantify the amount of crosstalk at the near end (PSNEXT) or far end (PSFEXT).

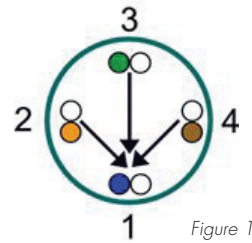


Figure 1

Since PSNEXT is a calculation based on NEXT measurements, troubleshooting for PSNEXT failures reduces to troubleshooting for NEXT problems. Once a technician has isolated and repaired the NEXT problem, PSNEXT will automatically improve. Troubleshooting NEXT requires a field tester with the ability to look down the cable and see where the crosstalk is happening.

Alien Power Sum Crosstalk

When cables are adjacent to each other, coupling from one cable can affect pairs in the other cables. This effect is called Alien Crosstalk (see figure 2).

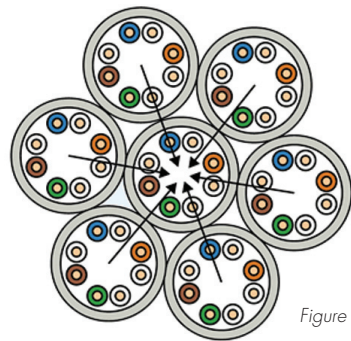


Figure 2

For UTP cables that are closely bundled together for a distance of more than 15 meters, Alien Crosstalk can be a concern. Alien Crosstalk, unlike internal crosstalk, is unpredictable because it could be coming from multiple combinations of cables.

Alien Crosstalk will be more of an issue with the coming of 10 Gig Copper Cabling, and the IEEE working group is making sure limits are in place to allow acceptable bit error rate performance. TIA/EIA TR-42.7 is working on standardizing component performance and test methods. At the time of this publication these requirements were not yet fully defined.

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