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## **T1 and Crosstalk – Why Individually Shielded Twisted Pair (ISPT) wire should be used for in-house T1 cabling**

March 10, 2003 by Russ Straayer, Data Comm for Business, Inc.

When extending T1 lines from the phone company demarc to customer equipment, Individually Shielded Twisted Pair (ISTP) wire should be used. The reason for using ISTP is because of the susceptibility of T1 signals to Near End Cross Talk (NEXT) problems.

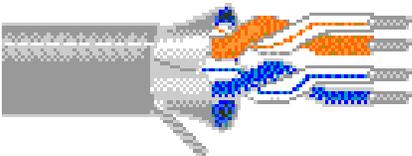
In tests done by ADC Kentrox\*, they found that with a signal difference of 7.5 dB between the transmit and the receive pair, Near End Cross Talk is often a problem. The stronger transmit signal gets coupled into the lower level receive signal. ISTP shields the receive pair from the transmit pair to eliminate the signal coupling.

When there is signal coupling, the result is bi-polar violations (BPVs) or even loss of synchronization. DCB has witnessed this problem on cable lengths of less than 10 feet from demarc to customer equipment. When the phone company delivers T1 over HDSL or fiber, the transmit/receive signal difference is well under 7.5 dB (the difference is typically 0 dB), so NEXT is not a problem for cable lengths under several hundred feet. However, if the T1 signal is delivered to the customer over twisted pair cable using T1 repeaters, it is very possible to have signal levels under  $-7.5$  dB at the demarc. In such cases, BPVs are a likely problem if ISTP is not used for customer premise wiring.

Unshielded Twisted Pair (UTP) has cable characteristics very similar to ISTP. However, due to the unshielded nature of UTP, the proximity of the unshielded transmit and receive cable pairs is likely to cause NEXT, resulting in T1 link errors.

There are several sources for Individually Shielded Twisted Pair Cable:

- Beldon # 7838A
- Comm Scope # 21102D
- General Cable # 7056880
- Madison Cable # 14035
- Quabbin Wire & Cable # 9770



\* "The Extended Demarc Problem", by Steve Pinkston, ADC Kentrox, March, 1999