Twisted Pair Wiring: Color Me "Confused"

October 18, 1996

The topic of this issue's Technical Focus might seem a bit trivial to those who have never had to actually connect a pair of short range modems. Those who have -- and did not have the benefit of a few prior insights -- probably remember the experience well!! One of the most confusing elements for the uninitiated can be connecting the proper pairs (in a twisted pair cable) to the proper terminals. This sound simple until one examinse the "candy store" array of wire colors in a four-pair cable. What does it all mean? Here is a simple lesson in connecting pairs correctly:

Step 1 - Recognize that the cable manufacturer has color coded the wires to tell you which ones are twisted together in pairs. For example, red wire/black stripe is twisted together with black wire/red stripe; they are a pair. Black wire/white stripe is twisted together with white wire/black stripe; they are a pair.

Step 2 - Realize that particular signals are meant to travel on particular pairs. If these signals are separated (split) and sent along *different* pairs, the electrical benefit of the twisted pairs will be lost and the connection will not work. This is a very common technical support problem.

A basic diagram of a proper two-pair short range modem connection appears below. Notice how the *polarities* of the signals (+ or -) correspond to the *pairing* of the wires. This pairing is part of the "secret" that enables short range modems to achieve such remarkable distances.

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  RJ45                           RJ45
rcv- -- 3  (black/red stripe)   5 --- xmt-
xmt+ -- 4  (white/black stripe) 6 --- rcv+
xmt- -- 5  (black/white stripe) 3 --- rcv-
rcv+ -- 6  (red/black stripe)   4 --- xmt+
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7622 Rickenbacker Drive, Gaithersburg, MD 20879 USA
Phone: +301-975-1000 or Fax: +301-869-9293