LAN Services Hot Tip #14

June 4, 1992

Link integrity for Twisted Pair (10BASE-T Concentrators, Hubs, and TPAUs)

10BASE-T is the name of an IEEE specification that enables certain types of twisted-pair wiring, such as the high-grade telephone wiring found in most modern office buildings, to carry Ethernet signals. 10BASE-T requires two pairs of twisted-pair wire -- one pair sends, the other pair receives signals -- and a concentrator, or hub, which retransmits signals through its ports to the other devices connected to it.

This standard evolved over a period of years, but wasn't finalized until September 1990, so some features of the final standard aren't supported in earlier, pre-final equipment. One notable feature is link integrity, which is a means of sending and receiving signals between nodes to verify that the link is intact.

New equipment installed at PG&E meets the Final Standard 10BASE-T specification, but two types of 10BASE-T hardware -- Draft D and Final Standard -- coexist on the LAN/WAN. As long as each TPAU (twisted-pair access unit) and concentrator or hub port is properly configured to match the component to which it is connected, the Draft D/Final Standard mix shouldn't pose a problem.

However, incorrectly configured components can cause workstations to hang when logging in or accessing file services, or cause excessive collisions. For example, pre-final-standard concentrator can't respond to the link-integrity signals coming from Final-Standard TPAUs. In such a situation, the link-integrity feature on the TPAU should be disabled. System Administrators need to be aware of the specification level of all components on their LANS, and make sure link integrity is disabled when appropriate.

Please also note that another feature, signal-quality error checking, or SQE, should always be turned off on all equipment connected to the LAN. This feature transmits signals that can be interpreted as collisions, and therefore cause communication problems.

Finally, remember to disconnect any inactive 10BASE-T connections at the patch panel. An active twisted-pair wiring, running from the hub or concentrator to an empty cubicle, can have an ill effect on the LAN. That is, don't take TPAUs and leave the TTP (telephone twisted pair) unconnected, to act like an antenna.

<u>**TPAUs:**</u>
Ungermann-Bass TPAU (ASP300)
This model is Draft D, and therefore does not have the link-integrity feature. However, it does have the SQE feature, which should always be disabled.

Ungermann-Bass TPAU (ASP310)
As shipped, link integrity is enabled. If you're connecting to a pre-Final Standard LAN, disable the link integrity by setting the three dip switches on the front panel of the TPAU as follows:
        Switch 1 Down, or "B"
        Switch 2 Down, or "B"
        Switch 3 Up, or "A"

Ungermann-Bass TPAU (ASP320)
As shipped, link integrity is enabled. If you're connecting to a pre-Final Standard LAN, disable the link integrity by setting the three dip switches on the front panel of the TPAU as follows:
        Switch 1 Down, or "B"
        Switch 2 Down, or "B"
        Switch 3 Up, or "A"

Some models of network interface card, such as the **3C507TP** and **AT&T StarLAN 10** NAU, have onboard transceivers -- and so don't require a TPAU. Link-integrity must be disabled if one of these cards is

connected to a Draft D node. The 3C507TP has a jumper onboard that enables you to disable link-integrity; the AT&T StarLAN 10 NAU has a switch on the back that can be moved from its "enabled" position to disable link-integrity. This card also has a green LED that will be lit if link integrity is enabled.

Concentrators and Hubs:
Ungermann-Bass ECM300
This Ethernet concentrator module for the Access/One is pre-Final Standard, and so does not have link-integrity. Any Final Standard 10BASE-T devices connected to an ECM300 should have link integrity disabled.

Ungermann-Bass ECM310
The ECM310 concentrator module as shipped conforms to Final Standard 10BASE-T, with link integrity enabled. Link-integrity can be disabled by jumper settings on the card. In addition, the NMC (network management console) software must be used to download the appropriate configuration to the card. If the ECM310 looses power, it reverts to a link-integrity enabled state; the configuration must be downloaded again even though the jumper settings on the card are for the disabled state. (NetDirector can also be used to download the configuration.)

Ungermann-Bass ECM320
The ECM320 concentrator module is also Final Standard 10BASE-T as shipped, with link-integrity enabled. Link-integrity for the ECM320 card must be disabled with U-B's NetDirector application; the NMC software does not recognize the ECM320. Note that there are no link-integrity switches on the card. If the ECM320 looses power, it reverts to a link-integrity enabled state, and the configuration must be downloaded from NetDirector.

AT&T StarLAN 10 Hub
There are two models of this hub, one of which is a Draft D-equivalent model, the other of which is Final Standard 10BASE-T. The model that supports Final Standard 10BASE-T contains a bank of 11 link-integrity switches, located above the hub's AUI port. By default, these switches are in the up, or enabled position. Disable a port's link integrity if it's connected to a Draft D-version device.

For additional information, refer to Hot Tip 8 and Hot Tip 11 on the LAN Services Bulletin Board (BBLWSC). Also refer to the LAN Cookbook release 2.0, pages 1-7 through 1-14.