

HPN/ADSL Connection Reliability Considerations

Pulse TECH TIP #101



Background

While ADSL technology provides the capability to bring the Internet into a subscriber's home or office over existing telephone wiring, there is an issue with the reliability of dry (no DC current flow) ADSL and Home PNA connections.

Oxidation Creates Unreliable Data Connections

In normal telephone installations, an off hook DC current of 20-50 mA flows from the central office 48 V line circuit through all of the wiring and jacks to the phone (see Figure 1). When the various connectors and wiring splices in the phone circuit age and corrode, they can produce an open circuit. With normal telephone usage, the 48 V feed voltage from the central office is able to break down the oxides and reseal the open connections. In this way, the traditional phone circuit continues to operate satisfactorily.

Unfortunately, the addition of ADSL and HPN connections will not be as reliable because there is no DC loop current flowing in this portion of the circuit to clean the jack and plug contacts. In addition, the existing wall jacks may already be aging and corroded. The wiping action of installing a new RJ11 cord for the ADSL or HPN connection can sometimes clean the oxide from the existing wall jack contacts, but it may take several insertions to adequately clean the connection and the effect will only be temporary at best. The surrounding environments will re-oxidize the connection over time, especially when the jacks are located in high humidity areas such as outside walls with air drafts and/or glued paneling (the outgassing of construction materials can accelerate the aging process). As the connections continue to corrode, the transmission will become noisy and intermittent, and will eventually fail completely.

Solution to Maintaining a Reliable ADSL/HPN Connection

There is a simple solution to the reliability problem that is neither costly nor difficult, and it does not require new jack wiring. The solution can be implemented in one of two ways . . .

1. Co-locate the ADSL or HPN modem connection with a telephone device connection such as a phone, answering machine or fax machine. The more frequently this telephone device is used, the more reliable the connection will remain.
 - a. Install a dual line adapter (or a microfilter with a convenience ADSL/HPN jack) into the existing inside wall jack (see Figure 1). Make sure the dual line adapter or filter has at least 50 microinches of gold plating over 100 microinches of nickel insure long life.

Caution: adapters from some distributors may only have 5 microinches of gold flash, which will allow early failures.
 - b. Use a line cord with RJ11 plugs that have a minimum 50 microinches of gold plating. This cord should also be a single pair twisted (not flat) in order to minimize cross talk and RFI. Note that while the traditional 4-conductor, flat cords may be suitable for voice band frequencies and telephones, a 14-foot 4-conductor, flat cords may be suitable for voice band frequencies and telephones, a 14-foot 4-conductor flat cord has only 3 dB of cross talk loss in the upper HPN band between Line 1 and Line 2.
 - c. The manufacturer of the ADSL or HPN modem must also provide the minimum 50 microinches of gold plating on the RJ11 jacks in their modems.

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Solution to Maintaining a Reliable ADSL/HPN Connection (continued)

2. For ADSL or HPN modems that have a pass-through RJ11 telephone jack, connect a telephone, answering machine, or fax machine to this jack. The more frequently this telephone device is used, the more reliable the connection will remain.
 - a. Install an inline microfilter in between the pass-through jack and the telephone device.
 - b. Use a single pair twisted line cord from the wall jack to the modem in order to minimize crosstalk and RFI.

Conclusion

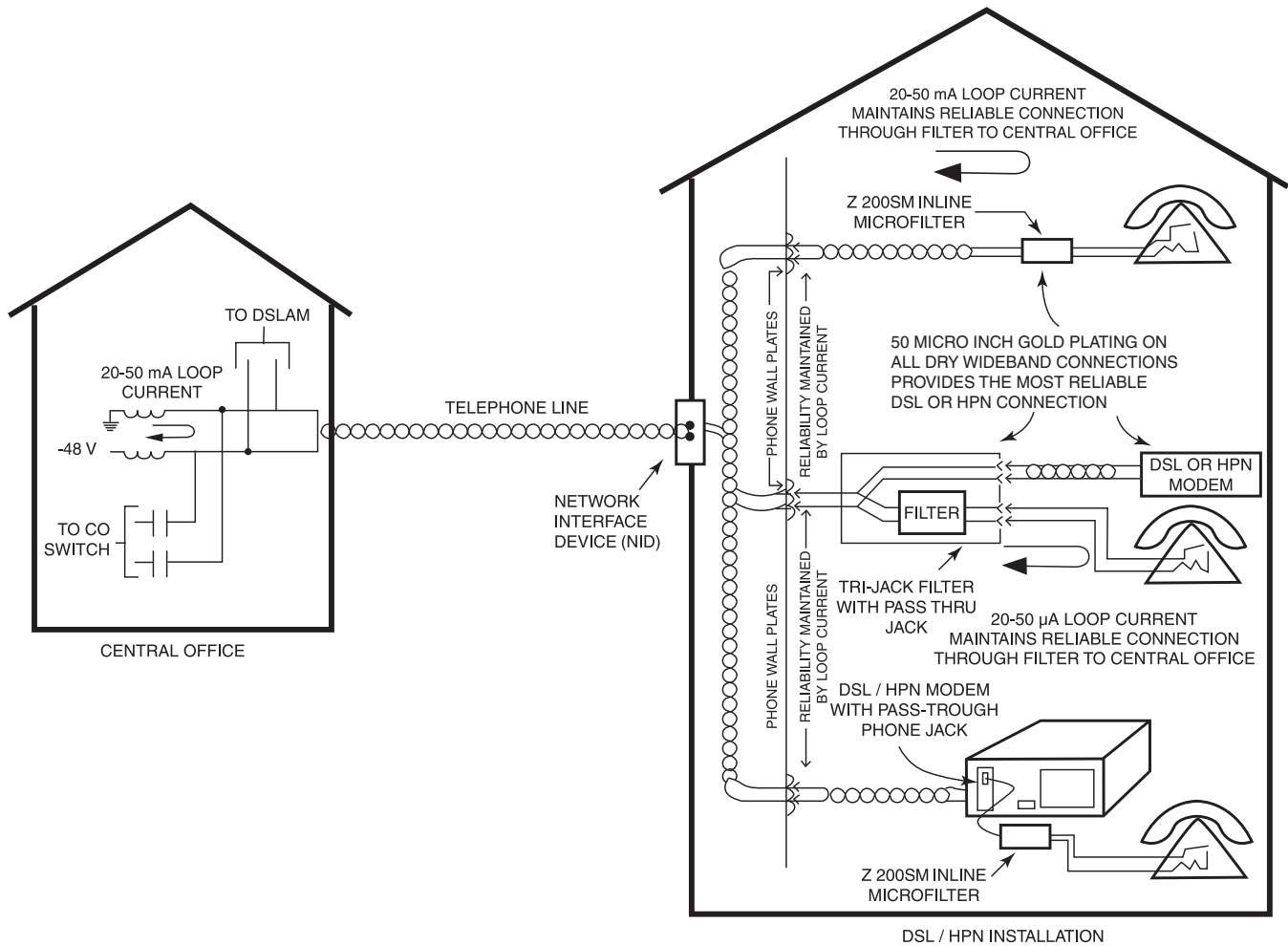
Telephone-line loop current maintains a reliable connection to telephones, fax machines and answering machines through the existing wall jacks. Gold-plated contacts on the co-located dual jack adapter (or on the convenience jack of the microfilter) maintain reliability for the dry ADSL/HPN modem portion of the circuit. The cost increase to specify a minimum 50 micro inches of gold plating on all plugs and jacks in the dry circuit is minimal when compared to the overall increase in reliability. All Excelsus RJ11 filters, adapters and cords have 50 microinches of gold over 100 microinches of nickel.

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Figure 1: Reliability Considerations



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