



## Application Note Mitigation of Disturbance with AdrenaLine

### AdrenaLine

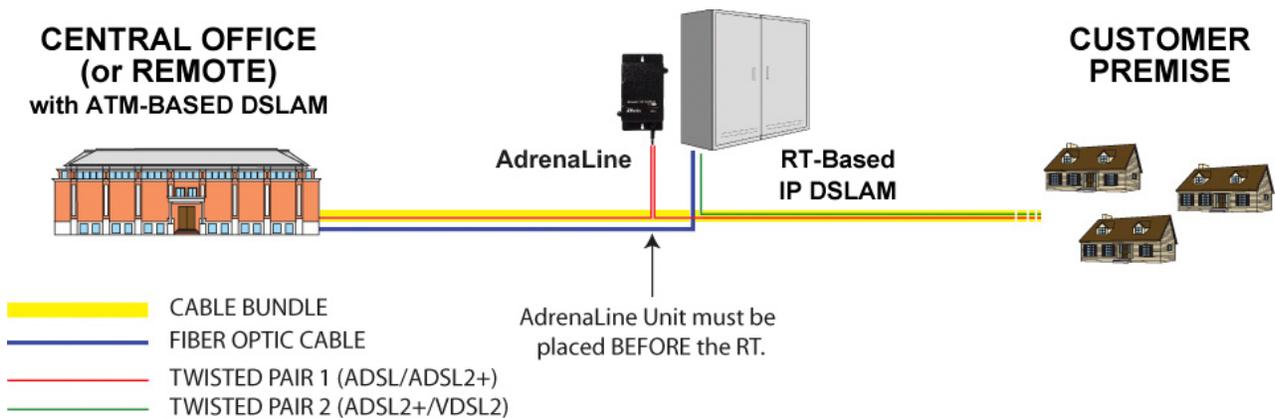
The primary uses for AdrenaLine are 1) boost DSL bandwidth for a given distance or 2) increase the reach of existing DSL services. AdrenaLine is able to compensate for distance, wire gauge, and other variables on the DSL line through bi-directional noise filtering and signal amplification. With AdrenaLine, a DSL pair will experience improved signal to noise ratio and mitigation of cross-talk, both of which provide the benefits of increased bandwidth and reach.

### Disturbance Mitigation Application

AdrenaLine has also been used to specifically mitigate cross-talk created by midspan disturbers such as T1 repeaters, HDSL repeaters, and other DSL technologies. When signal sources are introduced into a DSL cable bundle, these signals are called “disturbance” to the DSL signal. Disturbance reduce DSL signal to noise ratio, such that it is no longer able to provide the same bandwidth or reach as it did prior to the introduction of the disturbance. Thus end customers will no longer receive the level of service they previously had, or may even be prevented from having service at all. Telcos that upgrade their networks by deploying remote DSLAMs must give attention to this disturbance issue, as the “upgrade” to new services could actually downgrade their existing ones.

### Example – RT DSLAM Deployment

One example of the use of AdrenaLine to counter the effects of introducing a mid-span disturbance is shown below:





In this diagram, Telco customers have been served by a Central Office based ATM DSLAM for several years (red line). The telco now has decided to provide advanced services such as HDTV, and thus has begun to deploy fiber-fed remote IP DSLAMs. While a fiber link between the C.O. and the RT feeds the new DSLAM (blue line), the existing twisted pair cable bundle (yellow line) still serves the end customers. The cable bundle now contains both existing DSL services (red line) provided from the C.O., and new DSL/Video services from the RT (green line). At the RT, the DSL signal originating from the RT is much stronger than the DSL signal originating from the C.O., thus creating a significant disturbance to the C.O. based DSL signal. The effect of this disturbance is reduced bandwidth, even to the point of preventing the C.O. DSL line from achieving synchronization.

Because AdrenaLine conditions the line, boosting bandwidth and reach, it is able to help mitigate this mid-span disturbance. AdrenaLine must be placed on the C.O. based DSL pair between the C.O. and the RT. With AdrenaLine, the C.O. based DSL receives sufficient boost in bandwidth such that the placement of a disturber, such as a remote IP DSLAM, will not be noticeable to the end customer.



Further information on Charles Industries products may be found at:  
<http://www.charlesindustries.com>

Charles Industries, Ltd.  
5600 Apollo Drive  
Rolling Meadows, Illinois 60008-4049  
Telephone: 847.806.6300  
FAX: 847.806.6231