

# SMART COIL

**Expand your high-speed DSL coverage by reaching customers at distances up to 24Kft. using legacy copper pairs.**

Smart Coil provides the line conditioning benefit of a common load coil for POTS traffic while allowing an ADSL signal to pass through. With Smart Coil, a loop that was providing either POTS or ADSL exclusively can instead handle both services on a single copper pair.

Voice quality commonly deteriorates on unloaded pairs at distances beyond 18Kft. Load coils have long been used to extend high quality voice service to customers beyond this distance. However, common load coils limit the high frequency spectrum used by ADSL, requiring an additional pair or refusal of ADSL service. Smart Coil removes the loop length limitations of POTS and allows ADSL to reach its full attainable distance.

## **Economic Benefits**

A service provider's legacy copper network is a major financial asset. Telephone companies place the value of a single copper pair from several hundred to over a thousand dollars. Used in conjunction with the latest digital technology, Smart Coil-equipped legacy copper pairs help not only retain but increase revenue from customers.



## **With Smart Coils, service providers can:**

- Increase customer retention
- Grow revenue
- Improve return on plant investment

## ***DSL Extension Beyond 18Kft Using Smart Coil***

<b>DSL Rate<sup>1</sup></b>	<b>Smart Coil only (on 24 AWG)</b>	<b>Smart Coil with a DSL Line Conditioner (on 24 AWG)<sup>2</sup></b>
Up to 512 Kbps	18-24 Kft	18-28 Kft
Up to 768 Kbps	18-22 Kft	18-28 Kft
Up to 1.5 Mbps	18-20 Kft	18-25 Kft
Up to 3.0 Mbps	<i>Not Obtainable</i>	18-22 Kft

<sup>1</sup> Smart Coil does not increase the rate nor the reach of the DSL signal, but rather allows DSL to reach its maximum distance. Rate levels shown are typical, but not guaranteed.

<sup>2</sup> Rates shown reflect the performance of Smart Coil with Charles' AdrenaLine DSL Line Conditioner. Smart Coil is also compatible with other manufacturers' DSL Line Conditioning products. Attainable distances will vary depending on the conditioner used.



## Features/Benefits

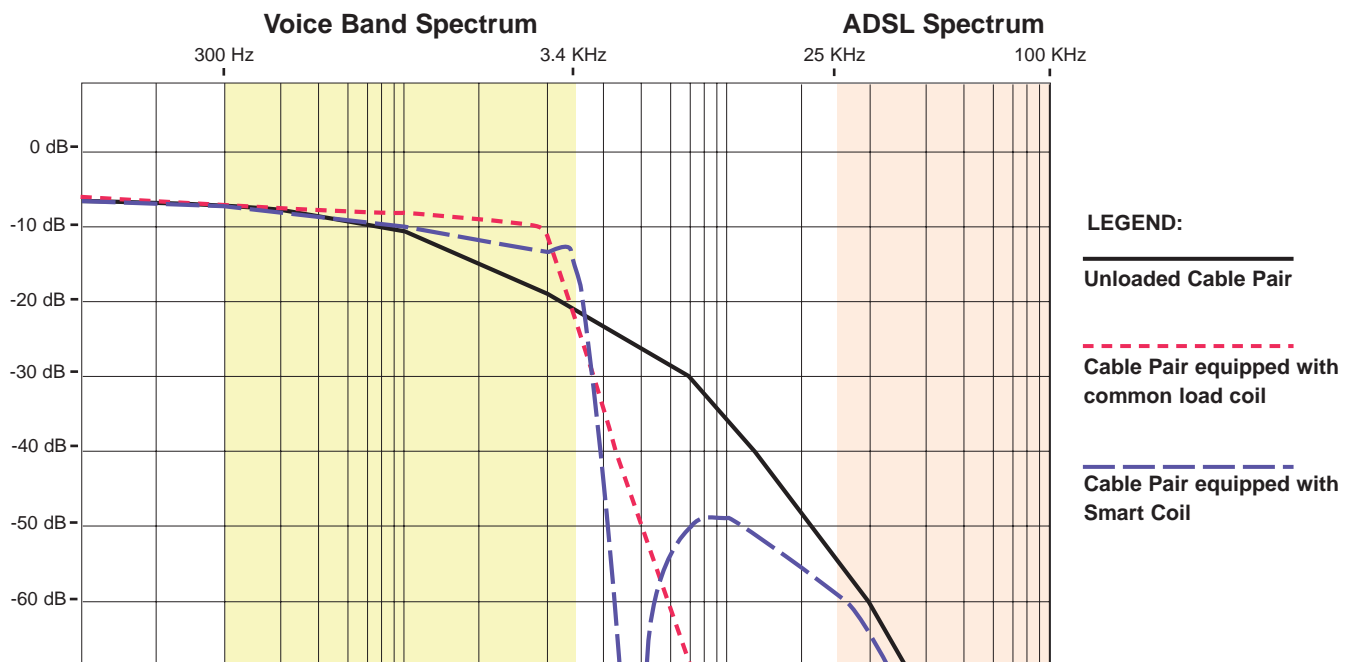
- Condition new and existing loops for ADSL and POTS beyond current distance limits over a single pair
- Allow ADSL to reach its full distance
- Increase revenue by capturing new ADSL customers who were previously denied service
- Designed and manufactured for reliable performance in severe environmental conditions: 100% sealed for environmental toughness and a long, trouble-free life
- Integrate easily into existing plant
  - Compatible with common coils: upgrade entire loop or just one load point
  - Fits both 66mH and 88mH spacing: keep same splice location
  - Same form factors as common coil cases
- Exceed applicable Telcordia and RDUP standards
- CLASS compatible
- Qualify for RDUP funding when used in xDSL extension applications

## Technical Information

On an unloaded cable pair, signal roll-off is evident even before 1KHz and continues to degrade voice quality throughout the audible range (up to 3.4 KHz). This is caused by the inherent transmission line parallel capacitance between the Tip and Ring being significantly higher than the inherent transmission line series inductance of Tip and Ring.

On a loaded cable pair, no significant signal roll-off occurs until 3KHz, which effectively equalizes the signal throughout the voice band spectrum. However, the added inductance of common load coils effectively blocks the entire ADSL spectrum, which begins at 25KHz. With Smart Coils installed in place of common load coils signal equalization is maintained throughout the voice band spectrum, while the ADSL signal is maintained at levels similar to an unloaded pair.

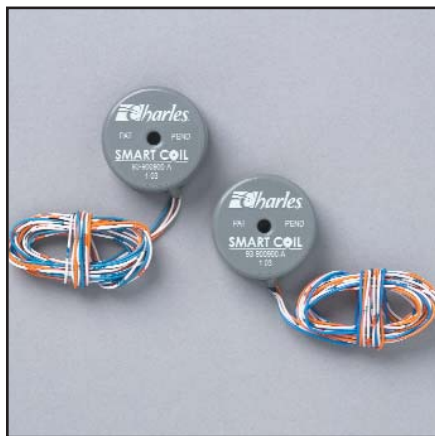
### TYPICAL CABLE FREQUENCY RESPONSE



## Application Notes

- Existing plant, whether 66mH or 88mH, can be upgraded with Smart Coil. Spacing is typically 4.5Kft for 66mH and 6Kft for 88mH, with the first coil from the central office at half these intervals.
- Technicians must condition the pair for ADSL by removing bridge taps, build outs, etc.
- It is normal for Smart Coil to introduce 1 to 2 dB additional loss compared to a common load coil. This loss can also slightly reduce ADSL data rates compared to Dry/Naked DSL on an unloaded loop.
- Tests should be run with single Smart Coils on loops with Voice Frequency Repeaters to assure compatibility before full scale Smart Coil deployment.
- Smart Coil does not show the same impedance on an ohm meter as compared to a common coil.
- Smart Coil does not interfere with transmission of T1.
- Smart Coil is not recommended for deployment on pairs carrying any of the HDSL heirarchy or ISDN.

Smart Coils are available in multiple form factors, for use in aerial, above ground, or direct buried applications:



Smart Coil Single Coils



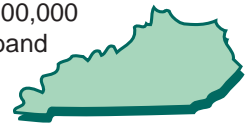
Smart Coil Singles  
in a Kwik Kase™



770-Type  
Smart Coil Case

## Smart Coils and ConnectKentucky

ConnectKentucky is a public-private partnership formed to accelerate broadband accessibility in the Bluegrass State. Its mission is to accelerate the growth of technology in support of community and economic development, improved healthcare, enhanced education, and more effective government. Launched in 2004, ConnectKentucky raised broadband availability to the commonwealth's residents from 60% to 94% in three years. Fully 500,000 previously unserved households representing 1.2 million residents have gained access to broadband services. Smart Coils played an important role in the initiative and were utilized in many areas to extend broadband throughout the state.



## Using Smart Coils with Charles AdrenaLine DSL Conditioners

The AdrenaLine DSL Conditioner is a remarkable leap forward in the evolution of DSL. AdrenaLine is a revolutionary line conditioning product that is easily deployed over legacy copper. It enhances DSLAM performance by significantly improving rate and reach. AdrenaLine offers service providers a cost-effective, quick-to-market DSL solution for retaining current customers, capturing greater market share and generating new revenue.

When used together with Smart Coils, AdrenaLine allows service providers to deploy DSL services on copper loops of up to 28Kft. This solution helps providers in their effort to provide affordable universal DSL to their entire serving area with minimal capital expenditure and labor.

For more information about AdrenaLine, please ask your Charles representative or visit [www.charlesindustries.com](http://www.charlesindustries.com).



# Ordering Information

Single Smart Coils can be conveniently and neatly installed in aerial terminals and pedestals with the compact Kwik Kase coil tube. The U-shaped design (a 2/3 enclosed ABS plastic tube) allows technicians to mount the tubes easily with provided bolting hardware, then add only the amount of coils needed. Order Kwik Kase tubes and coils separately.

Leads on Charles' Smart Coils are orange/white pair, blue/white twisted together to form a quad. Pair identification is fast and easy. Lead wires used on single coils are compatible with filled cable.

<u>Charles Part #</u>	<u>Item Description</u>	<u>Diameter</u>	<u>Length</u>	<u>Weight</u>
<b>Smart Coil Singles</b>				
93-900900-B	Smart Coil Ready Access Single Coil	1.7"	.6"	2 oz.
<b>Kwik Kases (tube only, order Smart Coil Singles separately to populate)</b>				
010077	6-pair Kwik Kase	1.9"	4.3"	3 oz.
010074	12-pair Kwik Kase	1.9"	8.1"	4 oz.
010075	18-pair Kwik Kase	1.9"	12.1"	5 oz.
010076	25-pair Kwik Kase	1.9"	16.6"	6 oz.
<b>Kwik Kases (fully populated tubes)</b>				
93-900901-B	6-pair Kwik Kase with 6 Smart Coils	1.9"	4.3"	15 oz.
93-900902-B	12-pair Kwik Kase with 12 Smart Coils	1.9"	8.1"	1.75 lb.
93-900903-B	25-pair Kwik Kase with 25 Smart Coils	1.9"	16.6"	4 lb.

### 770-Type Smart Coil Cases

93-900911-B	25-pair, 10 ft. air core stub	4"	6"	9 lb.
93-900912-B	25-pair, 10 ft. encapsulant-filled stub	4"	6"	9 lb.
93-900916-B	50-pair, 10 ft. air core stub	4"	10"	15 lb.
93-900917-B	50-pair, 10 ft. encapsulant-filled stub	4"	10"	15 lb.
93-900921-B	100-pair, 10 ft. air core stub	4"	17"	25 lb.
93-900922-B	100-pair, 10 ft. encapsulant-filled stub	4"	17"	25 lb.
93-900926-B	200-pair, 10 ft. air core stub	8"	12"	55 lb.
93-900927-B	200-pair, 10 ft. encapsulant-filled stub	8"	12"	55 lb.
93-900931-B	300-pair, 10 ft. air core stub	8"	15"	80 lb.
93-900932-B	300-pair, 10 ft. encapsulant-filled stub	8"	15"	80 lb.
93-900936-B	600-pair, 10 ft. air core stub	8"2		
93-900937-B	600-pair, 10 ft. encapsulant-filled stub	8"	26"1	
93-900941-B	900-pair, 10 ft. air core stub	8"3		
93-900942-B	900-pair, 10 ft. encapsulant-filled stub	8"	30"3	

**Note: The cable stub provided is PASP type plastic insulated color coded conductors. Cable lengths may be selected in 5' increments from 10' to 30' (please call for additional part numbers). Stubs are 24 GA through 300 pair cases and 26 GA above 300 pair cases.**

### Mounting Brackets for 770-Type Smart Coil Cases

260027	4" diameter Pole Mounting Bracket,
039828	4" diameter Pole Mounting Bra
260004	8" diameter Pole Mounting Bracket,
039829	8" diameter Pole Mounting Bra
032647	8" diameter Manhole Mountin



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