AER800
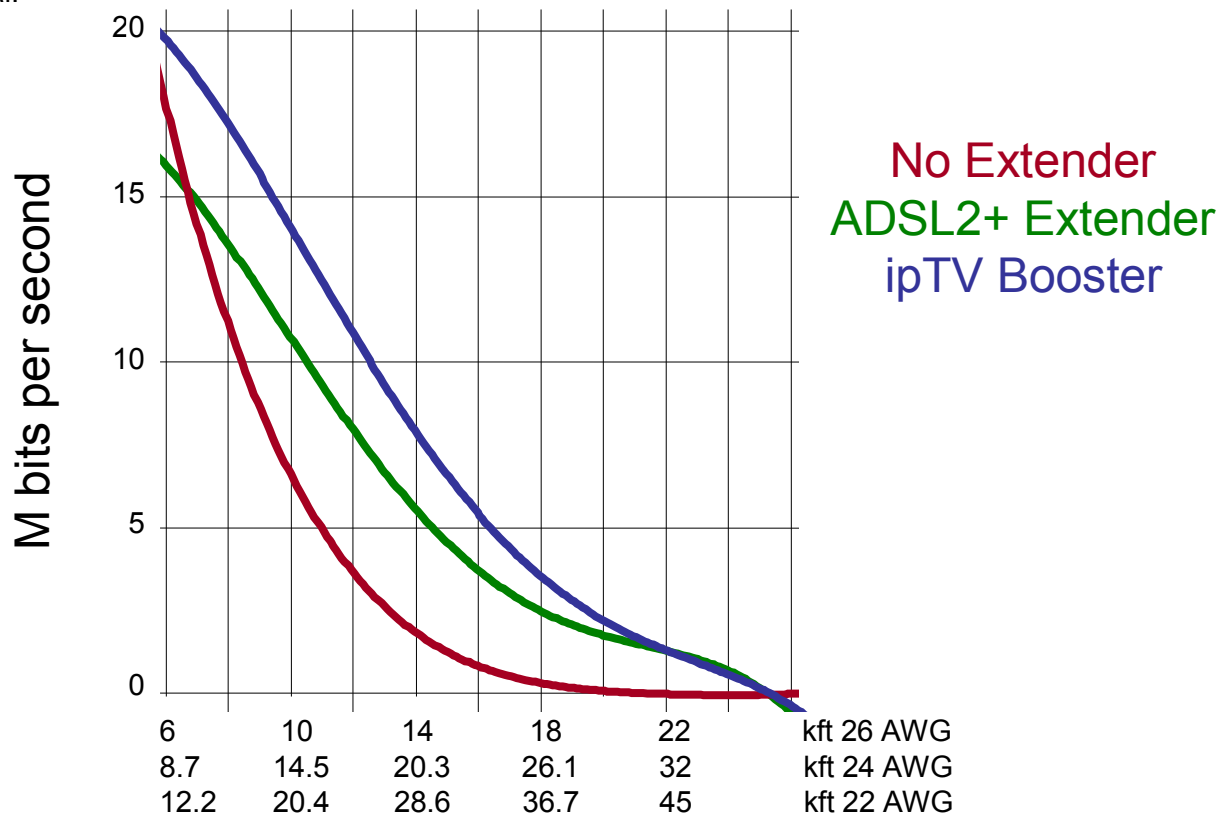
ADSL Loop Extender
Planning & Engineering Manual

BENEFITS:
- Double the customers you can reach.
- Deliver 2-10 times the bandwidth.
- Defer costly remote DSLAM installations.
- Prove broadband demand in marginal markets.
- Avoid customer loss due to broadband service unavailability caused by extra long distance.
- Improve service quality.
- Comprehensive over-voltage protection.
- Easy to install, deploy and maintain.
- Fully compatible with all ADSL/ADSL2+ systems.
- Fully compatible with analog voice.

ADSL technology has great advantages in terms of bandwidth and performance; however, long loops can create difficulties providing consistent broadband services. The *AER800* can extend the coverage of ADSL lines. It will provide systems with better performance-to-cost ratio, improve the equipment utilization rate, and optimize the network. This product will allow you to double the number of subscribers that you can reach while offering more consistent high bandwidth services to your existing customers.

The ADSL Loop Extender is a simple, cost-effective solution used to extend the deployable range of ADSL technologies. This unique approach to ADSL deployment enables service providers to deliver to both POTS and ADSL services on any copper pair. ADSL Loop Extender is an active element installed in the outside loop plant. It operates as an amplifier that amplifies and equalizes the signal.

The loop extender can be used to extend ipTV services in one of two ways: 1) a single ipTV Booster placed less than 400 ohms (24AWG) from the Central office will generally increase the signal to 12M – 20M or more.   2) when combined with ADSL2+ bonding, two pairs can be utilized to double the effective rate of the extended circuits allowing ipTV service throughout your existing service area. Please consult with your Widearea representative for additional deployment guidelines for these applications.

The loop extender can expand your ADSL service area too. The primary function

www.widearea.us
344 NW Capital Dr.
Lees Summit, MO 64086
+1 (816) 366 2063

of the loop extender is to amplify the downstream signal. This allows improvement in downstream bandwidth which can expand the service reach by 40 – 50% effectively doubling the service area.   Two loop extenders can be placed on a line for additional bandwidth and reach.   Please consult with your Widearea representative for additional deployment guidelines for these applications.

Changes

With version 6.2 of the express powered extenders we have reduced power demand allowing up to 8 subscribers to be powered from one power pair. The repeater modules can be added one subscriber at a time in the AER800-8P and AER800-4P.

With version 8.0 of the line powered extenders we have also reduced power demand and will be able to run from switch power without a power supply in the central office.

ADSL Loop Extenders

AER800-1P single line unit is designed for outdoor line mounting. Its small size (4¾" x 2¾" x 2") also makes it easy to mount on the line, in a cabinet or even inside a pedestal. 116vDC.

AER800-2P 2 line unit is designed for line or pedestal mounting. Needs one power pair. 116vDC

AER800-8P-V5.0 Pole mount design to accept one or two 4 port AER800-4PH modules. Needs one power pair for each 4 port module. 155vDC.

AER800-4P-H-Module Also known as AER800-4PR. This is the card that goes inside the AER800-8P-V5.0 to provide service to 4 subscribers.

AER800-8P-V6.2 Pole mount design to accept one to eight AER800-C1P modules. Needs one power pair and one AER800-POWER module for 8 service pairs. 155VDC.

AER800-4P-V6.2 Like AER800-8P, but only supports 4 service pairs**.**

AER800-C1P-V6.2 Repeater module for AER800-8P-V6.2 or AER800-4P-V6.2**.**

AER800-POWER Power module for AER800-8P-V6.2 or AER800-4P-V6.2**.**

ipTV Boosters

AER*800-1PB* single line unit is designed for outdoor line mounting. Its small size (4¾" x 2¾" x 2") also makes it easy to mount on the line, in a cabinet or even a pedestal. Requires 116vDC.
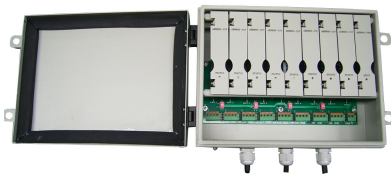
AER*800-2PB* 2 line unit is designed for line or pedestal mounting. Needs one power pair. Requires 116vDC

AER*800-8PB* Pole mount design to accept one or two 4 port modules. Needs one power pair for each 4 port module. Requires 155vDC.

Line Power v8.0

AER*800-8PL-V8.0* Pole mount design to accept one to nine AER800-C1PL modules. Runs on 48vDC power from the service pair.

AER*800-4PL-V8.0* Like AER800-8P, but only supports 5 service pairs*.* Runs on 48vDC power from the service pair.

AER*800-C1PL-V8.0* Repeater module for AER800-8PL-V8.0 or AER800-4PL-V8.0*.* **Both POTS and ADSL services should be on the line. If only ADSL services, you cannot use this product, because the remote power for the extender are**

AER800-8PL-V8.0 Pole mount design to accept one to nine AER800-C1PL modules. Runs on 48vDC power from the service pair.
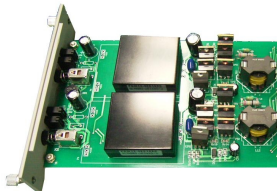
from the telephone switch .

Power Supplies

AEC-RACK pair 3 Rack Unit 13 slot chassis can hold AEC-C2P or AEC-C1PL cards.

AEC-C2P Power card for express power extenders. Can operate in 116vDC or 155vDC mode. Two power supplies per card.

AEC-C1PL Power card for line power extenders before version 8.0

AEC-B1P Power supply for a single express powered extender.

AEC-B1P-A110 110vAC in, 116vDC out.
AEC-B1P-D48 48vDC in, 116vDC out.
AEC-B1PH-A110 110vAC in, 155vDC out.
AEC-B1PH-D48 48vDC in, 155vDC out.

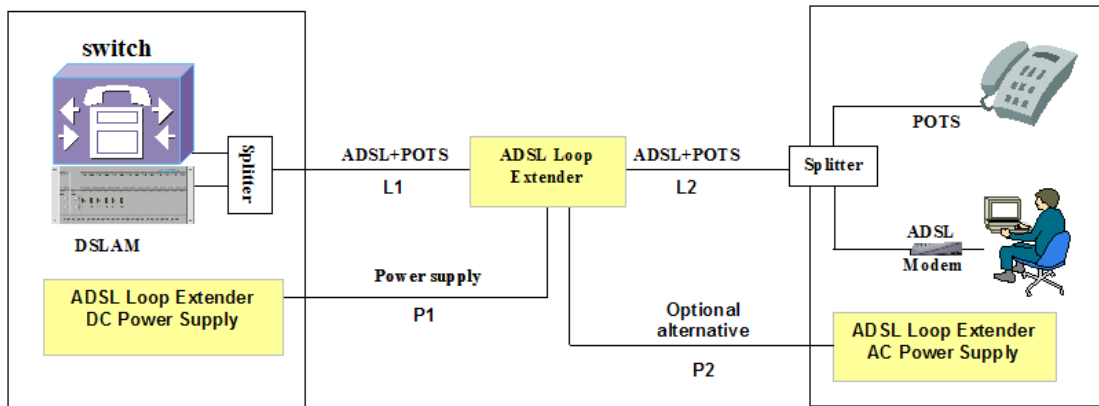*AEC-RACK* pair 3 Rack Unit 13 slot chassis can hold AEC-C2P or AEC-C1PL cards.

AEC-B1PL Stand alone power supply for a single line power extender before version 8.0

AEC-B4PH-D48 Four express power supplies in 1 Rack Unit.

Equipment Installation Diagram

AER800 Network Application Diagram

L1: The signal wire pair connecting ADSL Loop Extender to CO equipment.
L2: The signal wire pair connecting ADSL Loop Extender to CPE equipment.
P1: DC power derived from -48v plant in CO.
P2: Optional power derived from AC at customer premise or unmetered drop.

Power Engineering

The power supply must be located in a protected environment with a short 12 AWG or better connection to power source. To avoid the number one mistake made in installation: **Please do not put the power supply in the pedestal.** A reliable ground connection must be made. The maximum distance to the loop extender from the power supply is 1200 ohms. You should order the corresponding type of power supply according to the available power source.

Product Code	AEC-B1P-DC48	AEC-B1P-A110	AEC-B1PH-DC48	AEC-B1PH-A110	AEC-B4P-DC48	AEC-B4PH-DC48	AEC-C2P
AER800-1P	✔	✔			✔		✔
AER800-2P	✔	✔			✔		✔
AER800-1PB			✔	✔		✔	✔
AER800-2PB			✔	✔		✔	✔
AER800-8PB			✔	✔		✔	✔
AER800-4P			✔	✔		✔	✔
AER800-8P			✔	✔		✔	✔

There are two operating voltages for loop extenders. AER800-1p and 2p operate on 115vDC; AER800-8p and all ipTV boosters operate on 155vDC. Please consult the chart above to insure that you order the correct power supply for your application.

Many electric utilities provide "Unmetered Electric Service" at a rate as low as $5 per month for powering billboards, security lights and communications equipment drawing low power. Because the loop extender has a wide range of possible placements, it is generally possible to locate it near electric facilities. To enable this option as you grow, we recommend placing the loop extender in a location near local power.
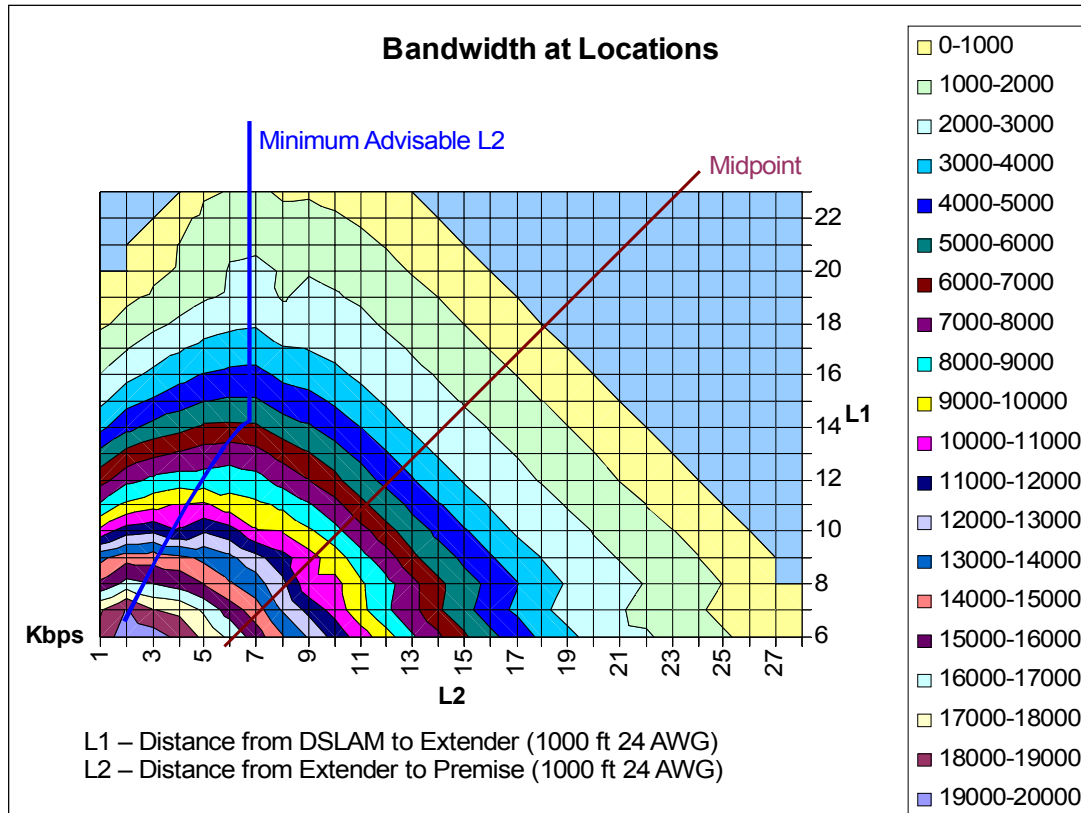
Voice Engineering

Voice will pass through the loop extender even in power outage conditions. The use of "Smart Coils" for loading is recommended for longer loops at normal copper intervals for the Voice (POTS) transmission. Smart Coils, allow the transparent passage of DSL Data while providing loading for voice.

Loop Engineering

The loop extender has both minimum and maximum loop length requirements for both input and output loops. The best way to plan your installation is to go to www.widearea.us then go to Support>Tools. Enter your loop length and wire gauge information and the tool will suggest a range of locations to place the loop extender.

The loop extender is very flexible in the location in which it will work. The diagram below offers an alternative way to estimate bandwidth and shows the optimal placement for the ipTV booster. To use this graph, estimate the distance from DSLAM to extender (L1) and extender to modem (L2). Where L1 and L2 intersect, find the color band in the legend. This color band will tell you the bandwidth in kbps that you should expect. The chart shows that there is a lot of flexibility in the placement of the loop extender. You can usually move the loop extender several pedestals from the midpoint without affecting throughput.

Bandwidth at Locations

Minimum Advisable L2

Midpoint

L1

Kbps

L2

L1 – Distance from DSLAM to Extender (1000 ft 24 AWG)
L2 – Distance from Extender to Premise (1000 ft 24 AWG)

Legend:
- 0-1000
- 1000-2000
- 2000-3000
- 3000-4000
- 4000-5000
- 5000-6000
- 6000-7000
- 7000-8000
- 8000-9000
- 9000-10000
- 10000-11000
- 11000-12000
- 12000-13000
- 13000-14000
- 14000-15000
- 15000-16000
- 16000-17000
- 17000-18000
- 18000-19000
- 19000-20000

The diagram above is for 24AWG wire. To translate to other wire gauges, use the Bandwidth Estimator tool which can be downloaded from the widearea.us site.

If the distance between the loop extender and the modem is short, the LA800 loop attenuator can be used. The LA800 is to be installed between splitter and modem when used on a line with analog voice. Every field technician should carry an LA800 to aid troubleshooting. The frequency response of the LA800 is limited to 500khz, so you should limit your use of this product for low speed demands (<3Mbits) or testing.