

# ADSL Loop Extender

1-12 Mbps – Express Power – Lowest cost

# IPTV Booster

1-19 Mbps – Express Power – High Performance

# Line Power

1-12 Mbps – Subscriber Line Power

# Where to install Loop Extender



WIDEAREA

# Benefits of ADSL Loop Extender

- Improve reach by 40 to 50%
- Deliver 2-10 times the bandwidth.
- Defer costly remote DSLAM installations.
- New revenues from hopeless causes
- Demonstrate to PSC 100% availability of broadband

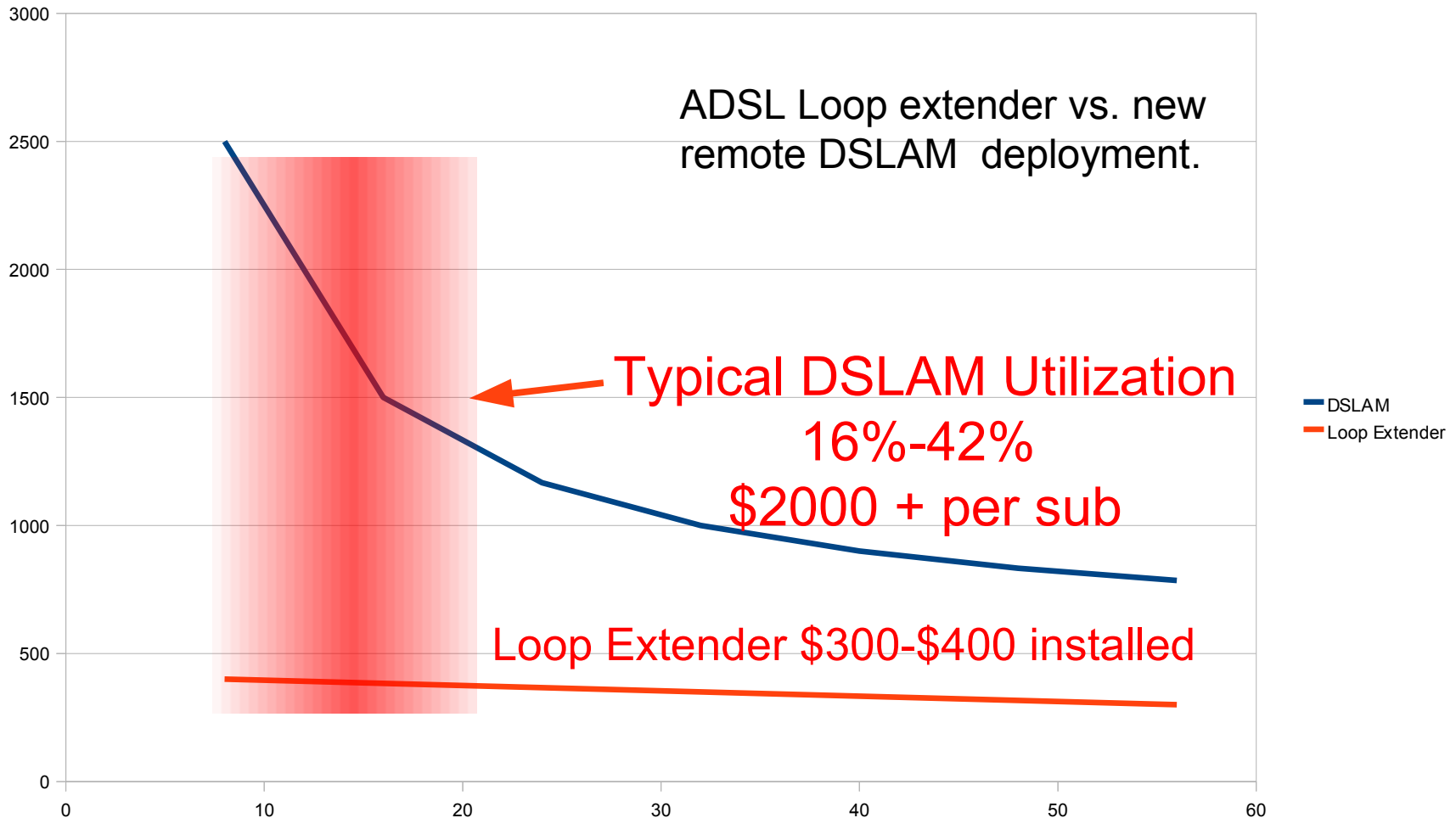
TODAY!



WIDEAREA

# Cost Per Subscriber

ADSL Loop extender vs. new remote DSLAM deployment.



# Remote DSLAM Cost Factors

## 1. Longer deployment cycle...up to 36 months

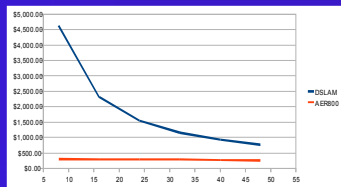
- Erodes customer confidence
- Invites competitive invasion
- Permanent loss of customer / revenue stream/ revenue growth
- \$500 per subscriber lost opportunity cost

## 2. Higher installation costs:

- Fiber construction (Standard industry costs)= \$12k-\$50k per mile
- Bonded T-1 Repeaters= \$4k per mile
- DSLAM equipment = \$3k-\$6k

## 3. Grid Connection (Commercial power) \$400.00 per year plus connection fee

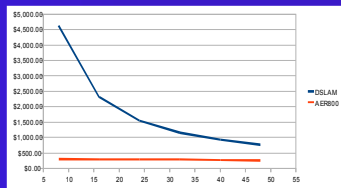
## 4. Low utilization rates ( 14%-40%) significantly raises stranded cost



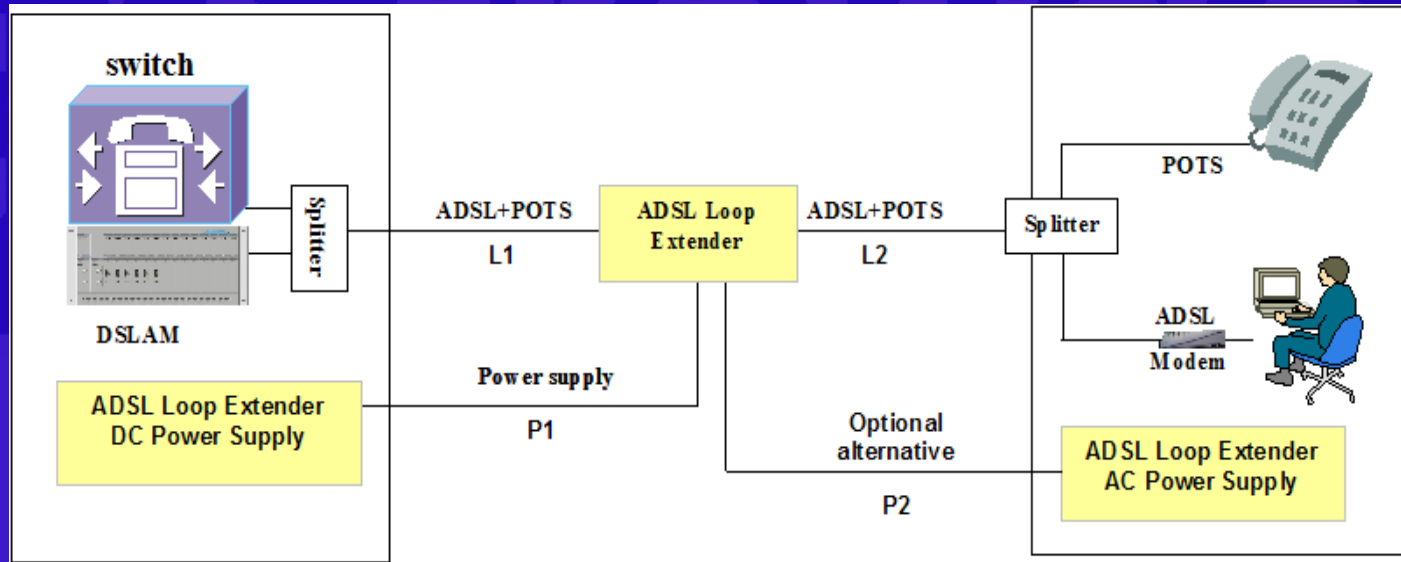
WIDEAREA

# Loop Extender Cost Advantage

1. Fast Deployment Cycle....Immediate Revenue stream
2. Maximizes Assets using existing facilities
3. Simpler, lower cost installation: 10 minutes + travel time
4. High utilization rates (80% to 100%)/No stranded costs
5. 9 month ROI



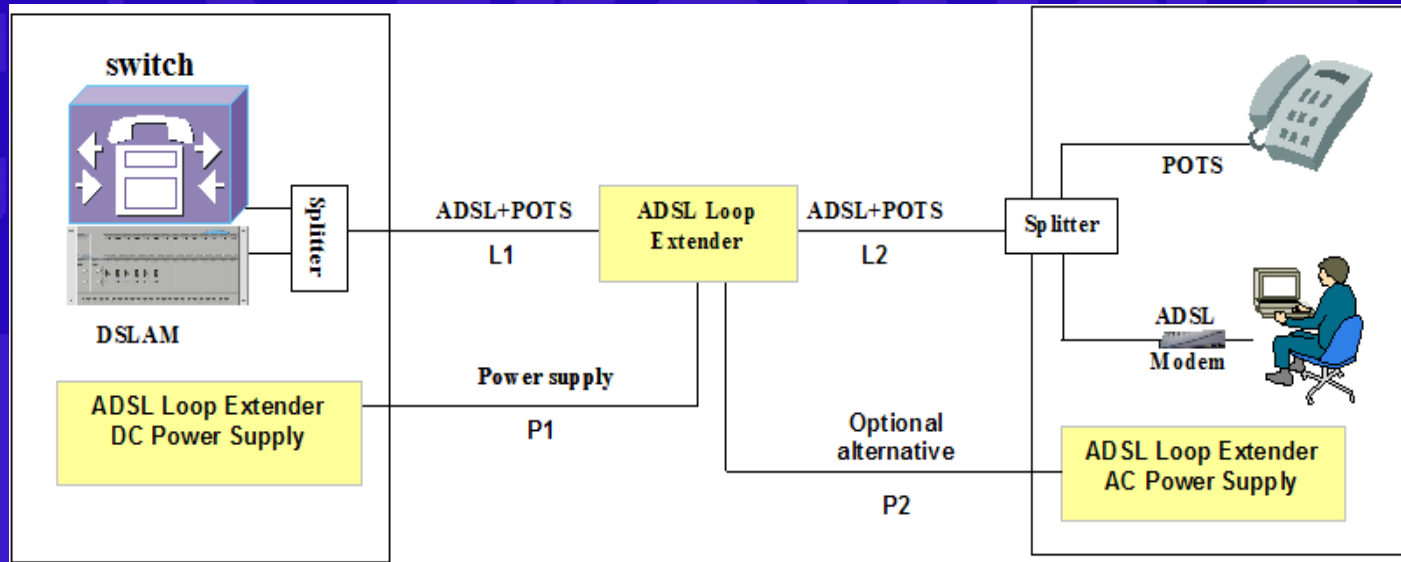
# Express Power Loop Extenders



- 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.

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# Line Power Loop Extender



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# Repeater Units



AER800-1P



ADSL Loop Extender

AER800-1PL

1-12 Mbps – Express Power

AER800-1PB



IPTV Booster (B in the part code)

8-24 Mbps – Express Power

AER800-2P

Line Power (L in the part code)

AER800-2PB

1-14 Mbps – Subscriber Line Power



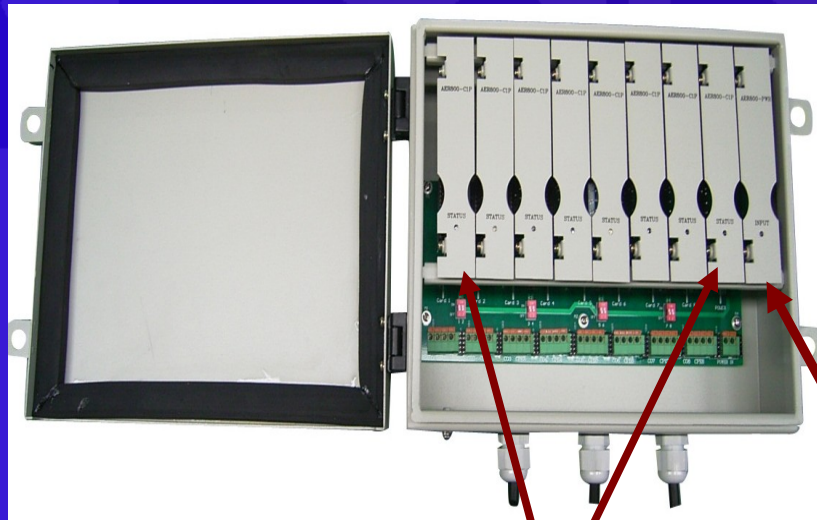
AER800-C1P

AER800-C1PL



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# 4 & 8 port enclosures



AER800-C1P

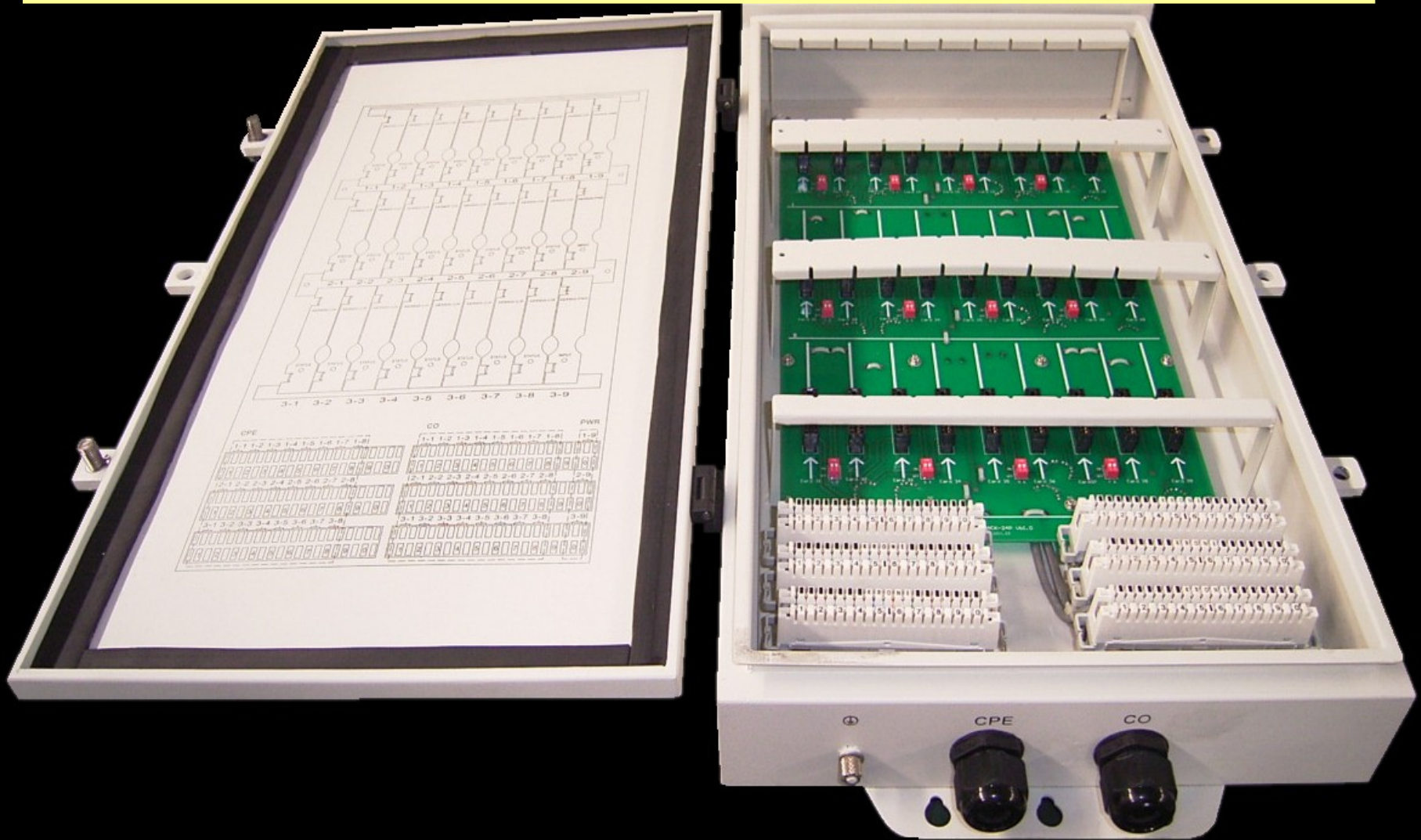
Or AER800-C1PL



AER800-PWR

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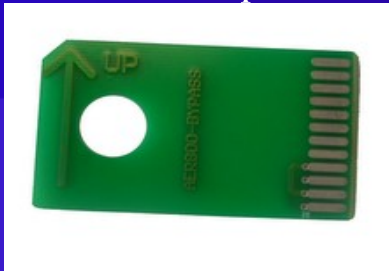
# 24 port enclosure



# Accessories

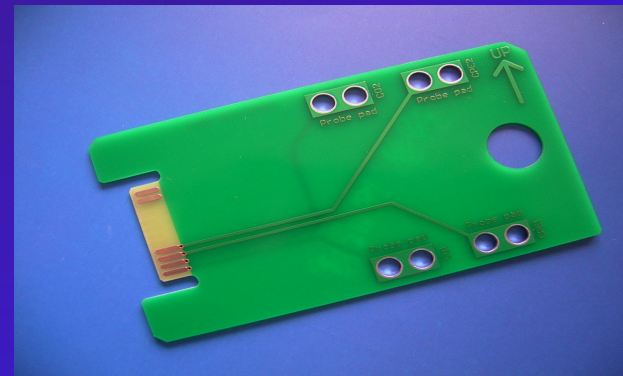
## AER800-BYPASS

Deploy as a thru card when loop extender not required.



## AER800-Test

Test access card



## AER800-BOLTS



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# Power Supplies

Use in Central Office or remote cabine

Input – 48V DC or 110V AC

Output – 116 DC or 155V DC



AEC-B1P-A110  
AEC-B1P-D48  
AEC-B1PH-A110  
AEC-B1PH-D48



AEC-B4P-D48  
AEC-B4PH-D48



AEC-RACK  
AEC-C2P-D48

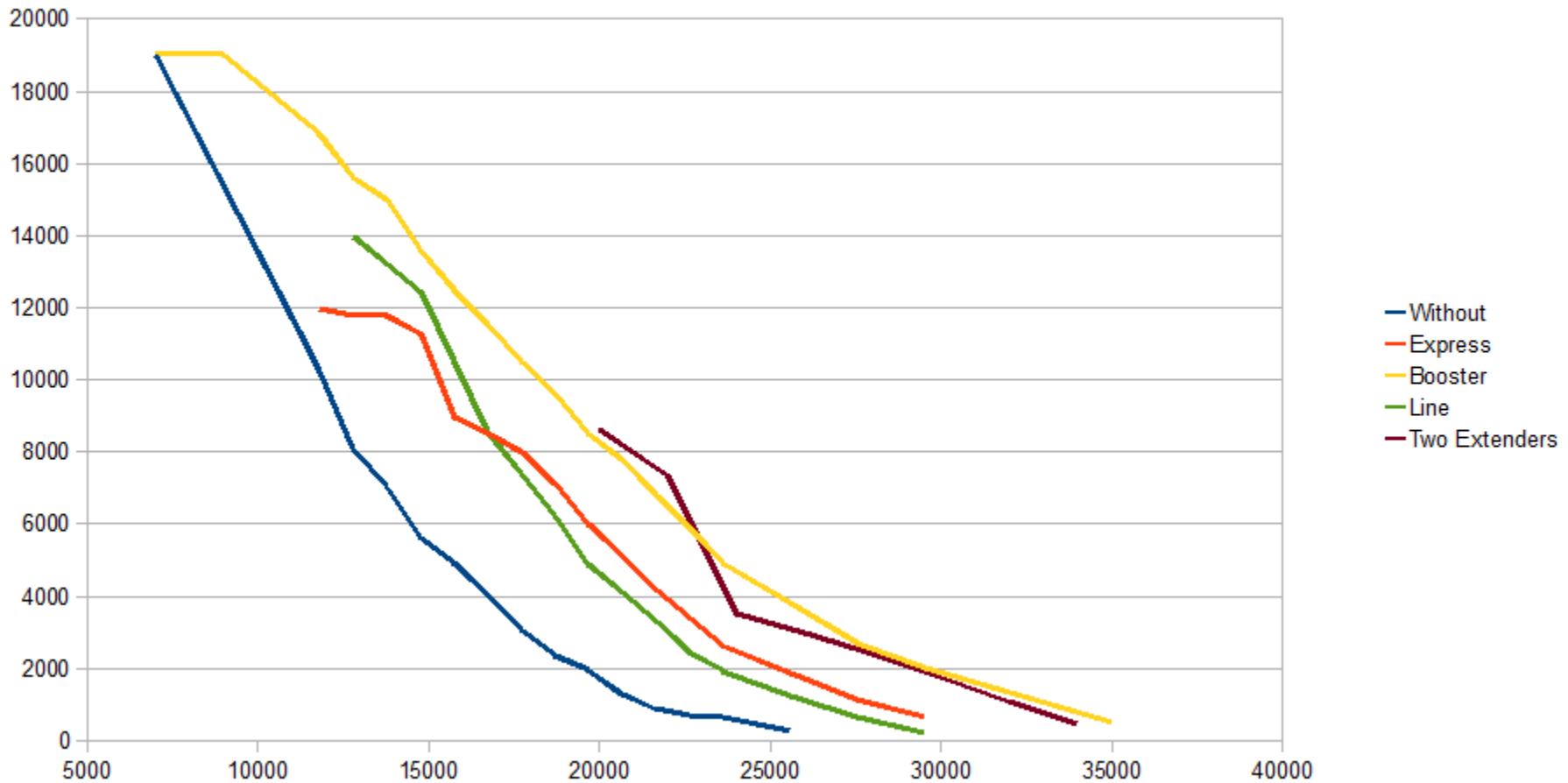
# ADSL Tester WAT-2A

- Low Cost hand held test set
- Works like a modem
- LED Shows line statistics
- Simplifies troubleshooting at PED or NID



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# Reach / Rate (24 AWG)



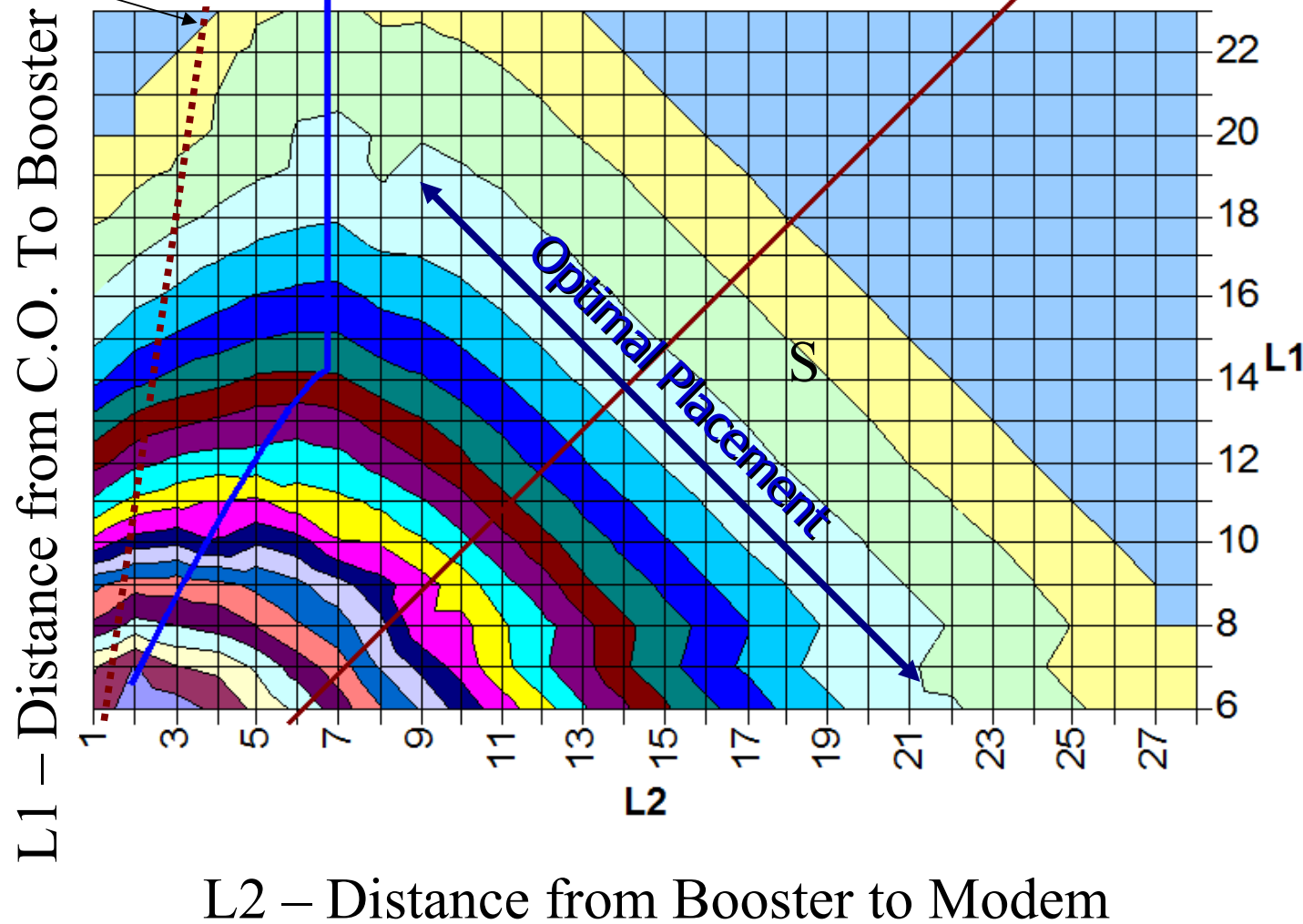


# Optimal Placement

Minimum Beneficial L2

Minimum Optimal L2

Midpoint

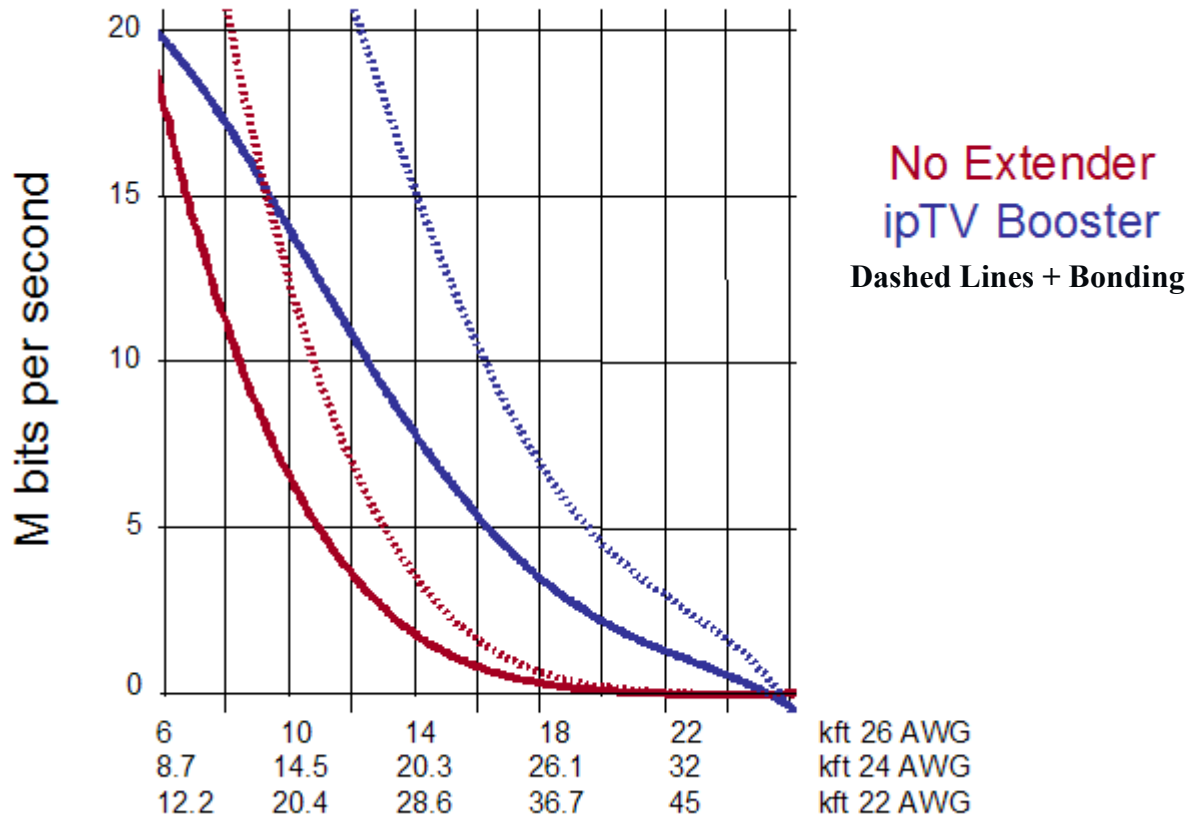


- 0
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- 13
- 14
- 15
- 16
- 17
- 18
- 19

M bits / Sec

# Loop Extender plus Bonding

Reach everybody with ipTV




# Bandwidth Estimator

## www.widearea.us

Strowger Inc.

File About



Arial lines are effected by temperature, you may enter an air temperature here to see its effects.

120 °F

Results

No Extender: 3546 Kbps  
AER800: **7826 Kbps**  
ipTV Booster: **10698 Kbps**

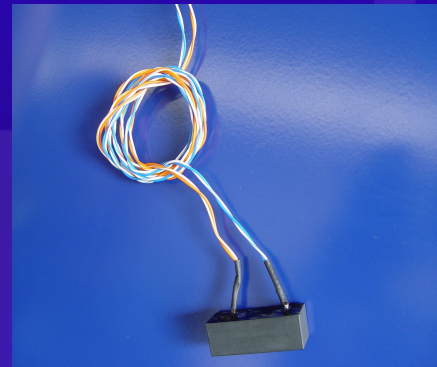
Calculate Reset

	Wire Gauge	Cable Type	Actual Length(Ft.)	OHMS	Attenuation	
1	26	Buried	1000	83.3	4.43	
2	26	Buried	1000	83.3	4.43	
3	26	Buried	1000	83.3	4.43	
4	26	Buried	1000	83.3	4.43	
5	26	Buried	1000	83.3	4.43	
6	26	Arial	1000	91.67998	4.875658	Extender is OK at end of this section
7	24	Arial	1000	57.12114	3.698016	Extender is OK at end of this section
8	24	Arial	2000	114.24228	7.396032	Extender is OK at end of this section
9	24	Arial	2000	114.24228	7.396032	Extender is OK at end of this section
10	24	Arial	2000	114.24228	7.396032	Extender is OK at end of this section
11	19	Arial	2000	35.43932	4.094232	
12	24	Buried	0	0	0	
13	24	Buried	0	0	0	
14	24	Buried	0	0	0	
Totals:			15000	943.46728	57.006002	

# Smart Loads



SML-25



SML-1



SML-8

# Underground / Manhole

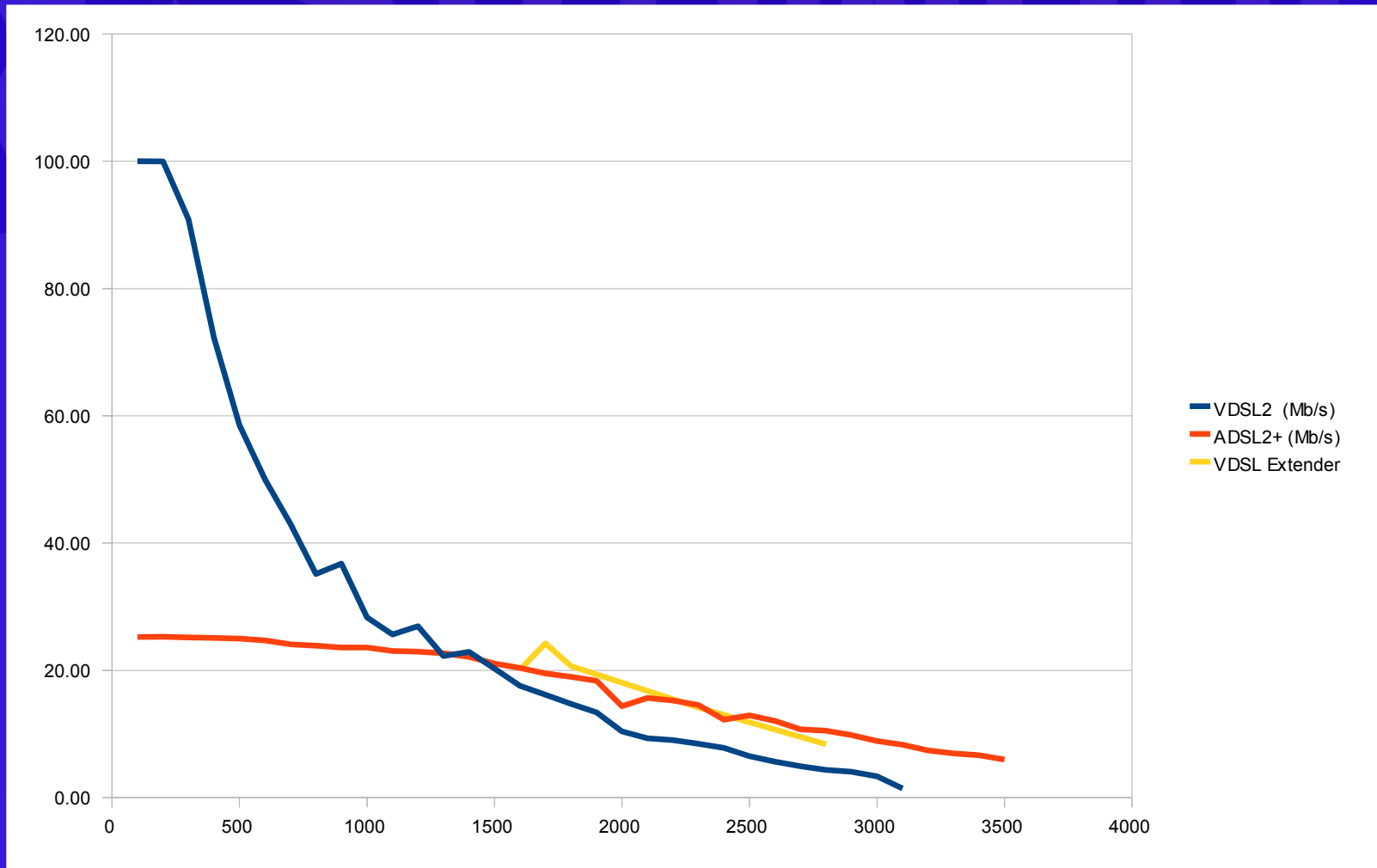
The loop extender placement flexibility enables you to avoid most underground installations.

We are working on an AER800-2PL card that will fit in a standard repeater housing. We need your comments about most common housing used.

Do you have long underground loops that you need an underground version?



# VDSL Extender



The logo for Strowger, featuring a stylized 'S' composed of four horizontal arrows pointing left and right, stacked vertically.

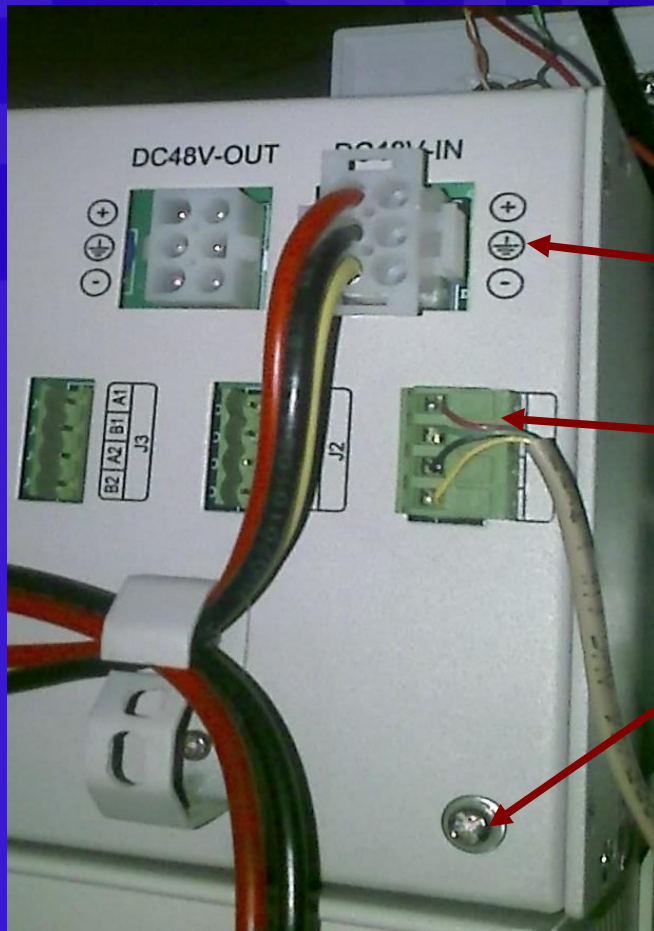
# Strowger

## Installation Tips



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# Installation – AEC RACK



-48vDC input to 7-10A fuse

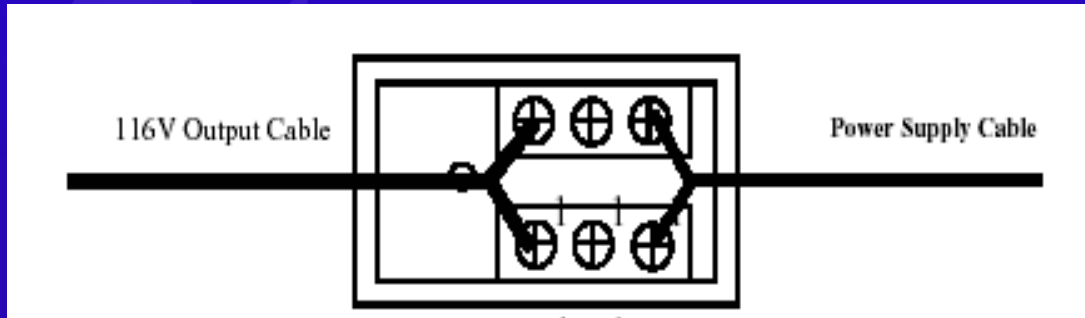
Two 116/155vDC outputs per slot to main distribution frame. Polarity not important. Current limited to 60mA.

Surge Ground. 14AWG min.





# Installing AEC-B1P-D48



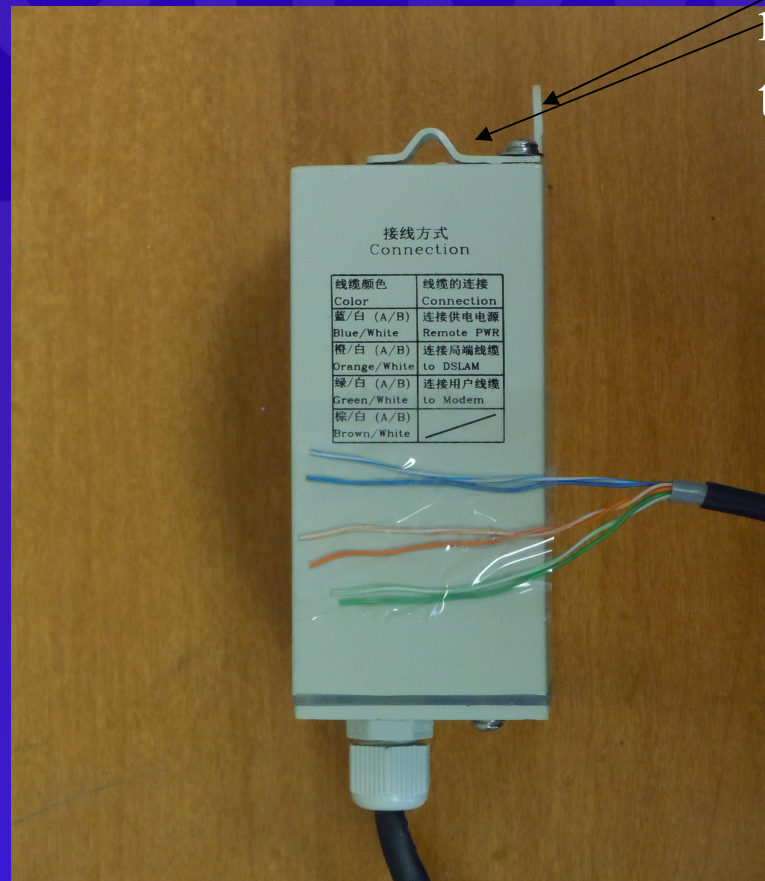
# Power Supplies

- **Can also be installed in remote DSLAM cabinet with AC or 48v DC source**
- **All Power Supplies must be powered directly from fused battery!**
- **Never use switch line card to power a power supply!**
- **Power supply DOES NOT go in the ped**
- **Accept no more than 2v/1000 ft loss**

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# Installing 1P & 2P

Supports pole or wire mount, or just slip it in the back of the pedestal

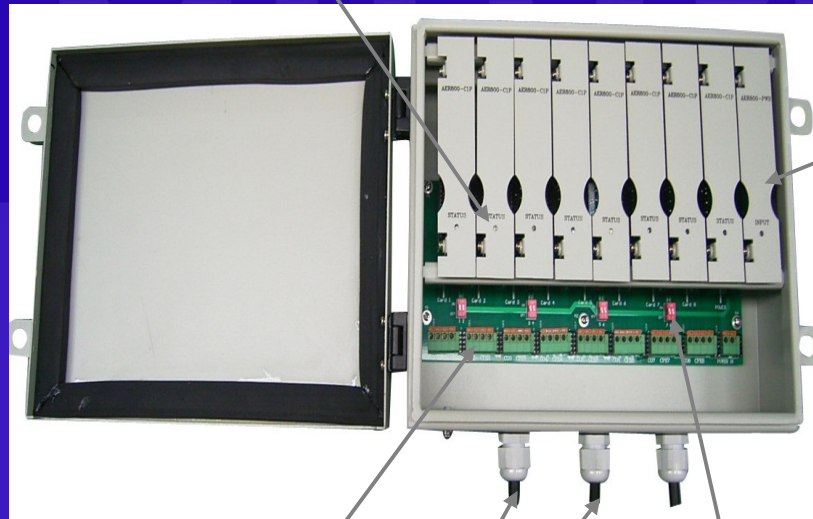


Blue – Power  
Orange – C.O.  
Green - Customer

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# Installing 4, 8 and 24 ports

Power LED



Power Card  
Express Power only

Terminate Cable Pairs

For noise control,  
use separate cable  
for in and out

EXPRESS PWR SLOT ON/OFF

Unused slots can create noise,  
Turn them off.

Don't forget to turn them on!

# Line Power Voice Troubleshooting

- Remote unit uses 4.2mA with switch in "small current" mode. Be sure the switch is in the "small" position. "large" is only used for extremely short L1 and can create OOS problems on some switches. See manual for more details.
- Watch for leakage current. Check current usage on the line before you install.
- Voltage at remote unit varies with distance from the C.O. And will change when phone on/off hook. Voltage is not a good indicator of trouble; check that current is 4mA when phone is on hook.
- Your switch has an off-hook resistance specification. Measure voltage and current at the switch. If  $\text{Voltage} / \text{Current} <$  specification (8-10k ohms) with phone on hook, you need to look for leakage currents.

**On hook Voltage / Current > switch spec.**

**On hook Current = 4-4.2mA**

# Noise Margin

- Noise Margin is the amount by which a signal **exceeds** the minimum amount for proper operation. It exists to provide additional tolerance for error bursts.
- Normally, Noise margin should be 6-10 for proper operation.
- If your meter shows Noise Margin is 20, you lost 10dB or 5000 feet.
- Noise Margin is also called Signal to Noise Ratio Margin. Not the same as Signal to Noise Ratio.

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# Sync Tips

- You must be at least 200 ohms from the extender to test sync.
- Try sealing current to bond the connections: ring the phone.
- Check that Noise Margin Target setting in DSLAM is between 6 and 10. If your Noise Margin is  $> 10$  you can't reach as far.
- If you drop the Noise Margin **Target** to 1 and **minimum** data rate to 32k you can get sync if is possible at all. Then slowly increase these parameters until you reach the desired service level.
- Walk the circuit back ped by ped. Compare the data rate you achieve with the Bandwidth Estimator.
- What does the DSLAM error history say?

# Tandem Extenders

- Two loop extenders on the same circuit can improve downstream speeds on longest loops.
- IpTV booster has switch inside that increases range by up to 1 additional mile (38kft on 24AWG)
- Tandem extenders should not be your first installation!

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# Why Widearea?

- Lowest cost solution
- Widest selection of locations to install
- Automatically adjusts gain for changing line conditions
- Highest bandwidth
- Complies with NEBS, IP66, UL, FCC
- Multi-port models available / Compact size
- The most lines in service

The logo for Widearea, featuring a stylized 'LA' monogram inside a dark blue oval. Below the oval, the word 'WIDEAREA' is written in a light blue, sans-serif font.

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# Thanks A Lot!

- Strowger, Inc.
- [www.strowger.com](http://www.strowger.com)
- [www.widearea.us](http://www.widearea.us)
- Office number: (816) 272-1826

