

**Please read this
document carefully
before installation!**

Express Power

VDSL2 Loop Extender

Installation Manual

Version: 1.0

Preface

This manual provides information on how to best use this product. Please read this manual thoroughly before installation and use. Additionally, please keep this manual handy for ease of reference during installation and troubleshooting.

- The contents of this document may be updated in the future, without prior notice.
- This booklet was created with thorough attention to the content. If, however, you have a question, spot an error, or find a description lacking, please refer to the end of this booklet for information on how to contact us.
- All brand names and trademarks are the property of their respective owners.

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Abbreviation

CO *Center Office*

CPE *Customer Point Equipment*

DSLAM *Digital Subscriber Line Access Multiplexer*

1. General Description

In order to supply much higher bandwidth to users, telecom operators have already upgraded the ADSL2 + network to VDSL2 network step by step. But the VDSL2 bit-rate decreased rapidly with the increase of distance.

The VDSL2 loop extender is installed on the loop between the VDSL2 DSLAM and the user's modem, amplifying VDSL2 signal, extending the coverage of VDSL2 effective bandwidth, improving the downstream bit-rate and bring more stable and reliable VDSL2 broadband service to those longer users.

Feature:

- Fully compatible with ITU-T G.993.2, G994.1
- Fully compatible with all the VDSL2 equipments which comply with these

above standards

- Fully compatible with VDSL2 band profile: 8a, 12a, 17a,30a; PSD mask: EU32, EU64
- At 2.0 Km ~ 2.7 Km (24AWG) distance range, downstream bit-rate has increased significantly with the highest increase of 60%
- Powered by remote power supply
- POTS is available
- IP66 Rated enclosures
- High grade protection from lightning.
- Low power consumption and more environmentally friendly
- Easy to install, deploy, and maintain. no switch to config
- This solution is a cost-effective, quick-to-market solution

2. Technical Specifications

Table 1 Technical Specifications

Operating Environment	Temperature	-40℃~+65℃
	Relative Humidity	5%~95% (Non-condensing)
Input Power Voltage	DC60V~DC155V	
Power Consumption	Less than 0.2W(per port)	
Lightning-proof grade	4000V(10/700μS)	
Number of supported subscribers	AER800-1PV	1 ADSL subscriber
	AER800-4PV	4 ADSL subscribers
	AER800-8PV	8 ADSL subscribers
Dimension(LWH)	AER800-1PV Box	160mm×70mm×48mm
	AER800-4PV Box	215mm×290mm×82mm
	AER800-8PV Box	315mm×290mm×82mm

3. Application

3.1 Equipment connection diagram:

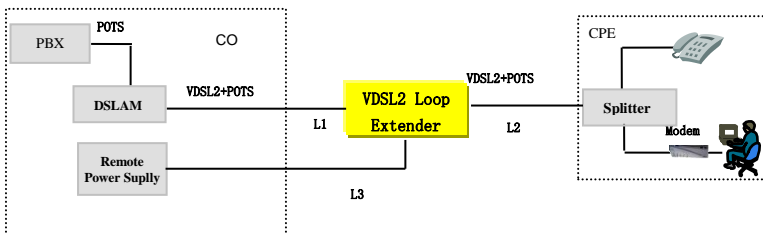


Figure 1、 Express power VDSL2 Loop Extender Connection Diagram

L1: The twist pair connecting extender to DSLAM.

L2: The twist pair connecting extender to Modem.

L3: The power twist pair connecting AEC to extender.

3.2、 The installation range of distance for 24AWG

DSLAM to Extender:	0.9Km ~ 1.8Km; (3Kft ~ 6Kft)
Extender to CPE:	0.6Km ~ 1.8Km; (3Kft ~ 6Kft)
DSLAM - CPE:	1.5Km ~ 2.7Km; (5Kft ~ 9Kft)

4. Physical Structure

- AER800-1PV: Stand-alone 1 port unit.
- AER800-4PV Box: A Box for up to 5 AER800-C1PV cards.
- AER800-8PV Box: A Box for up to 9 AER800-C1PV cards.
- AER800-C1PV: A one port express power VDSL2 loop extender , used to be plugged into the backplane of AER800-4PV and 8PV enclosure.

- AER800-PWR: One port power supply, which can power for 1~8 AER800-C1PV cards, used to be inserted into the backplane of AER800-4PV and 8PV enclosure.

4.1 AER800-1PV Box



Figure 2 AER800-1PV Box

Table 2 - Twist-pair Connection Description of AER800-1PV

Color	Connection
Orange/White (A/B)	to DSLAM
Green/White (A/B)	to Modem

4.2 AER800-4PV Box

1~4 AER800-C1PV



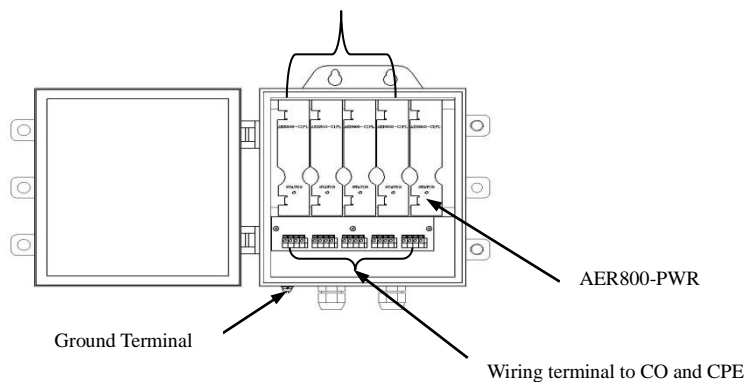


Figure 3 AER800-4PV Box

4.3、AER800-8PV Box

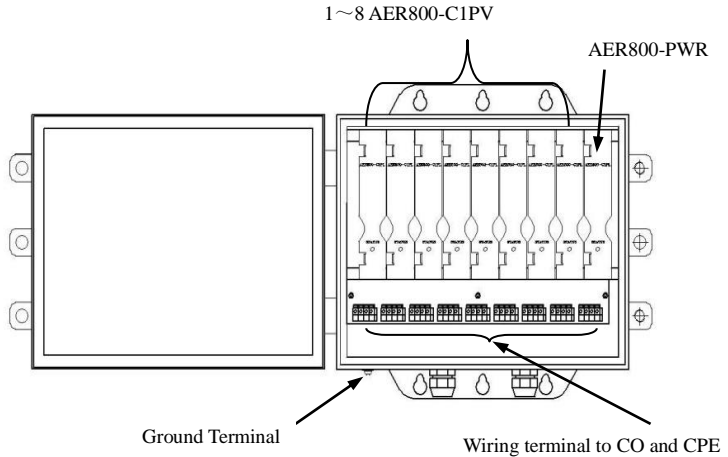


Figure4 AER800-8PV Box

4.4.The AER800-C1PV and AER800-PWR card

ALL cards is plug and play.

The backplane of the AER800-xPV series enclosures contain wiring terminals for connecting the extender to the existing loop plant. “CO” connects the twist pair from the DSLAM to AER800-C1PV, “CPE” connects the twist pair to the customer modem. “POWER IN” connects the twist pair from remote power at CO.

In AER800-4PV, AER800-1PV must be plugged in slot 1 to 4, AER800-PWR in slot 5.

In AER800-8PV, AER800-1PV must be plugged in slot 1 to 8, AER800-PWR in slot 9.

5、 AEC remote power supply series

5.1 AEC-B1P (1 port output)



Figure 5 AEC-B1P

Attention: Two-core power cord without plug: used for DC48V power input, no polarity.

Three-core power cord with plug: used for AC 110V/220V power input.

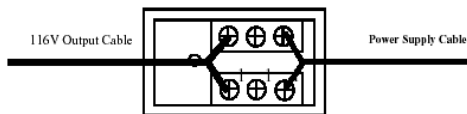


Figure.6 AEC-B1P connector wiring diagram

5.2 AEC-B4P (4 port output)



Figure 7 AEC-B4P front panel

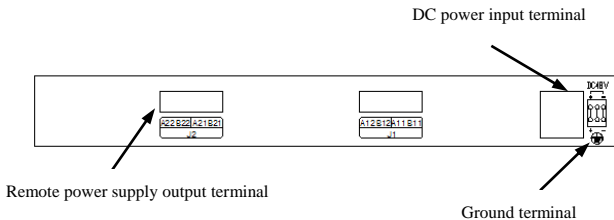


Figure 8 AEC-B4P back panel

Table 3- The description of terminal

Terminal		Description		
K11	PWR11	J1		First output of first group
		A11	B11	
K12	PWR12	J1		Second output of first group
		A12	B12	
K21	PWR21	J2		First output of second group
		A21	B21	
K22	PWR22	J2		Second output of second group
		A22	B22	

5.3 AEC-RACK (maximum 2×13 port output)

AEC-RACK is a rack for AEC-C2P embedded. One rack can be inserted into 13 cards. AEC-C2P is 2 ports output power supply. One port can supply for one AER800-1PV or one AER800-4PV, or one AER800-8PV.

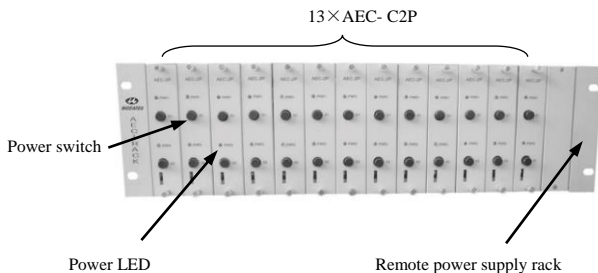


Figure 9 AEC-RACK front panel

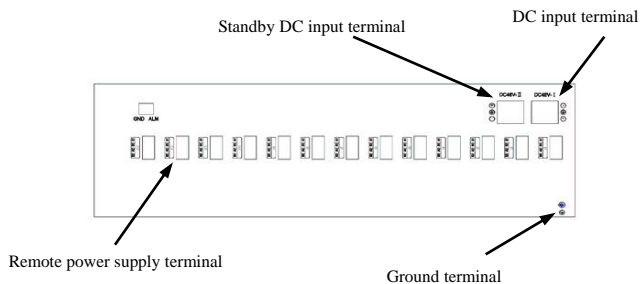


Figure 10 AEC-RACK back panel

Table 4- The description of terminals

Terminal		Description	
K1	PWR1	J _n	
		A1	B1
K2	PWR2	J _n	
		A2	B2

Note: In this table, the “n” is the number of the outlet “1~13”

In figure 10, DC48V is input through the 2×3 cord “DC48V-I”. The “DC48V-II” is only used in testing in the factory. In the lower right hand corner, there is a screw through which the rack is grounded. The outlet “J1~J13” are the DC116V output terminals.

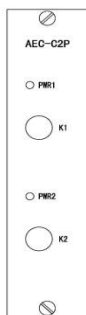


Figure 11 The panel of AEC-C2P

In figure 11, LED “PWR1” and “PWR2” indicates the status of the card. After power supply is connected, press the button “K1” and “K2”, and the corresponding PWR LED should be light.

6. Installation Procedure

6.1 Unpack

Unpack equipment carefully, check for completeness against the purchase order. Notify the supplier if items are missing.

Note: Save packing material. All equipment returned must be packed in the original packing material.

Inspect equipment for shipping damage, including bent or loose hardware, and broken connectors. If equipment was damaged in transit, contact the supplier.

6.2 Install the remote power supply

Generally, the Power Supply is installed at CO side. The type of power supply ordered should be right, either AC110V /AC220V or DC48V. One Spare copper

pair is needed for deliver power to AER800-1/4/8PV. Before installation, the DC 48V or AC110V~AC220V power supply should be grounded reliably.

DC 48V Power input is non-polarity.The output of DC116V is also non-polarity.

Attention:

1. Ground terminal should be grounded reliably. Copper-core wire with no less than 2.5mm² section area is required as ground wire.
2. Remote power supply should not be turned on until the extender installation is finished.
3. When the power supply wire is active, do not touch both two wires of the twist pair simultaneously.

6.3 Install the ADSL loop extender

6.3.1 Fix the AER800-1/4/8PV box in the junction cabinet or at the supplied mounted brackets. Ground the box through the grounding screw in the bottom outside the box.

Copper-core wire with no less than 2.5mm² section area is required as ground wire. One end of the wire should connect to loop extender's ground terminal. The other end of the wire should connect to a good ground point.

6.3.2 Connect the cable

AER800-1PV: Connect the power line with blue/white pair wire, CO signal line with orange/white, CPE signal line with green/white pair wire.

AER800-4/8PV: Connect the power input line into the AER800-PWR. Connect the signal line to AER800-C1PV, the line from DSLAM to the "CO" socket, the line to the modem to the "CPE" socket.

The power supply should not be turn on until the extender installation is finished.

6.3.3 Power on

Power on after confirming that all the twist-pair cables are connected correctly and box is securely installed.

For AER800-4/8PV, when AER800-C1PV card is used, please make sure "power switch bit" is set to "ON", when AER800-C1P card is not used, please make sure "power switch bit" is set to "OFF".

7. Troubleshooting**Checks at the Central Office**

- For express power models, do not draw power from a line with dial tone. The 48vDC loop extender power supply must be battery fed to work properly.
- Is the power supply grounded? The power supply ground is for dumping surges to ground. Do not attach to frame ground.
- Check the output of the power supply, do you get 122vDC?

- check the VDSL2 DSLAM configur, is band profile 8a,12a,17a or 30a, is PSD mask EU32, EU64

Checks at the Pedestal

- The minimum distance (on 24AWG) from the Central Office for extender installation is 3Kft for express power extender.
- Verify that you are getting 122vDC on the power pair with no load (disconnected from the blue pair of the loop extender). When attached to the extender, power should be diminished by no more than 1-2v per thousand feet.
- DO NOT put the power supply in the pedestal.
- Is the LED on the extender on?
- Is the extender grounded? Bonded? The ground, cable sheath, and extender should all be bonded together at the extender and as frequently as possible elsewhere. Lack of bonding will allow significant interference from AC power, AM radio, electric fences and similar problems. Lack of bonding will also make you a prime target for lightning and other surges. If you can't bond, don't ground the extender. If you can't ground, you have to take steps to isolate the enclosure from ground too. Grounding & Bonding together is preferred.
- Does the loop distance match the installation condition? . If not, re-check distances, connections and eliminate loads.
- Does modem sync at the pedestal without the extender connected? The sync rate at this location is the maximum the extender can deliver down range. If you can't get sync, the extender will not work at this location.

Checks at the Customer Premise

- Customer premise should be at least 3Kft (on 24AWG) from the extender for optimal performance. It will work at shorter distances with sub-optimal performance.
- Does the service stay up when the phone is off hook? When the phone rings?
- Does the modem run without errors?

Table 5 – Express power ADSL extender Troubleshooting

Problem Description		Possible Reason	Suggested Resolution
Equipment does not work after connected. Status LED is OFF.		CO side cable is not connected properly.	Check CO side cable.
No Sync.	AER800-C1PV status LED is on.	Cables at DSLAM or Modem side are connected on wrong side.	Correct the cable connection.
		Line quality issues.	Diagnose cable for proper Ohms/Attenuation values.
		There is a telephone before the splitter on CPE side.	Discard the telephone before the splitter on CPE side.
		VDSL2 loop extender is not connected properly.	Correct the cable connection, or check whether the distance between the DSLAM, extender, and Modem is within recommended values.
		L1 or L2 is too short.	Check that loop extender placement meets engineering requirements.
		SNR Margin is too high.	Reduce SNR Margin setting on the DSLAM until a connection is made. We suggest using SNR Margin < 10. Testing with SNR margin = 1 can provide useful hints during troubleshooting.
Internet is slow, frequent disconnects.	Possible PC issues, virus, hardware malfunction, etc.	Verify issue with test set or a known good piece of hardware. Check statistics on modem and DSLAM.	
	Parallel open wire at CPE is too long or the connector is rusted.	Change the parallel cable to copper twisted-pair.	
	The CPE side cable has too many connectors.	Avoid exposed connectors, use good quality cable.	