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

ADSL Loop Extender AER800-24P

(For AER800- C1P / C1PL)

Installation Manual

Version 3.0

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Preface

This manual tells users how to use this product. To make the best use of this product, please read the manual thoroughly before use and keep it handy for ease of reference.

- This manual is created for three series of ADSL loop extender.
AER800-24P
AER800-27PL
- The manual may be updated in the future, without prior notice.
- The manual 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 information at the end of the manual and contact us.
- The brand name and trademark are the property of their respective owners.

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1. General Description

ADSL loop extender can extend the coverage of ADSL lines. It will provide systems with higher performance-to-cost ratio, improve the equipment utilization rate and optimize the ADSL network. This product will double the number of subscribers, and offer higher bandwidth services to existing customers of telecommunications operator.

ADSL loop extender is an active element installed in outside loop plant. It works as both amplifier and equalizer.

ADSL loop extender box and the Extender card are as follows:

- AER800-24P box: An enclosure for 3 independent sub-systems, a sub-system for 9 slots.
- AER800-C1P/ C1PL/C1PHL: One port ADSL loop extender for one ADSL subscriber, which can be inserted into the enclosure easily.
- AER800-PWR: One port Power Supply, which can power 1~8 AER800-C1P cards in one sub-system, and can be inserted into the Extender's enclosure easily.

Benefits

- When used as AER800-24P, slot 1-1~1-8, slot 2-1~2-8, and slot 3-1~3-8 are for extender card, slot 1-9, 2-9, 3-9 are for power card.

One sub-system needs one additional copper pairs to power the PWR card and 1~8 AER800-C1P cards. One AER800-24P needs three additional copper pairs to power the three sub-systems.

- When used as AER800-27PL or AER800-27PHL, all the 27 slots are for extender card.



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2. Technical Specifications

Table 1 Technical specifications of AER800-24P

Operating Environment	Temperature	-35°C~+65°C
	Relative Humidity	5%~95% (Non-condensing)
Power Consumption of one AER card	Less than 0.2W(1 AER800-C1P card)	
	Less than 0.2W(1 AER800-C1PL card)	
	Less than 0.5W(1 AER800-C1PHL card)	
Power Consumption of one sub-system	Less than 2W (8 AER800-C1P cards and 1 PWR card)	
Power Consumption of AER800-24P	Less than 6W (24 AER800-C1P cards)	
	Less than 5.4W (27 AER800-C1PL cards)	
	Less than 14W (27 AER800-C1PHL cards)	
Dimension(LWH)	662mm×362mm×94mm	
Number of supported subscribers	24 (AER800-24P)	
	27 (AER800-27PL)	
	27 (AER800-27PHL)	

3. Application

3.1 The Real Lines Connection of Equipment

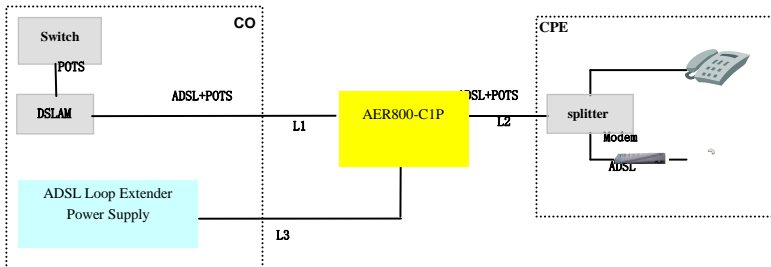
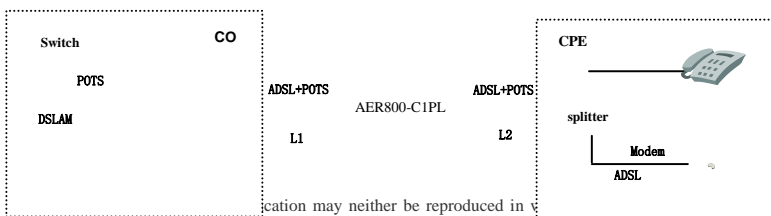


Figure 1 AER800-24P Application Diagram

- 1: The signal twist-pair connecting extender card AER800-C1P to DSLAM.
- L2: The signal twist-pair connecting extender card AER800-C1P to Modem.
- L3: The power twist-pair transiting power to power card AER800-PWR.

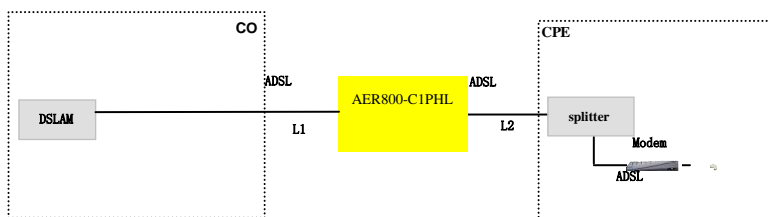


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Figure 2 AER800-27PL Application Diagram

L1: The signal twist-pair connecting extender card AER800-C1PL to DSLAM.

L2: The signal twist-pair connecting extender card AER800-C1PL to Modem.

**Figure 3 AER800-27PHL Application Diagram**

L1: The signal twist-pair connecting extender card AER800-C1PHL to DSLAM.

L2: The signal twist-pair connecting extender card AER800-C1PHL to Modem.

3.2 Resistance and Length Demand

The recommended installation conditions are as follows.

- 24 AWG(0.5mm)twist-pair

Table 2 Demand of loop resistance and length

Route	24P/27PHL			27PL		
	Loop Resistance (Ohms)	Length		Loop Resistance (Ohms)	Length	
		K ft	Km		K ft	Km
L1(CO-Extender)	344~1032	6.6~19.7	2.0~6.0	480~1032	9.2 ~ 19.7	2.8 ~ 6.0
L2(Extender-CPE)	86~929	1.6~17.7	0.5~5.4	54~929	1.0 ~ 17.7	0.3 ~ 5.4
L(CO-Extender-CPE)	568~1445	10.8~27.7	3.3~8.4	572~1445	10.8 ~ 27.7	3.3 ~ 8.4

- 26 AWG(0.4mm) twist-pair

Table 3 Demand of loop resistance and length

Route	24P/27PHL			27PL		
	Loop Resistance (Ohms)	Length		Loop Resistance (Ohms)	Length	
		K ft	Km		K ft	Km
L1(CO-Extender)	444 ~ 1332	4.9 ~ 14.8	1.5 ~ 4.5	635~1250	7.5~14.8	2.3~4.5
L2(Extender-CPE)	88 ~ 1184	1.0 ~ 13.2	0.3 ~ 4.0	28~1184	0.3~9.8	0.1~4.0
L(CO-Extender-CPE)	680 ~ 1776	7.5 ~ 19.7	2.3 ~ 6.0	690~1650	8.2~19.7	2.5~6.0

4. Products Structure

4.1 AER800-24P box

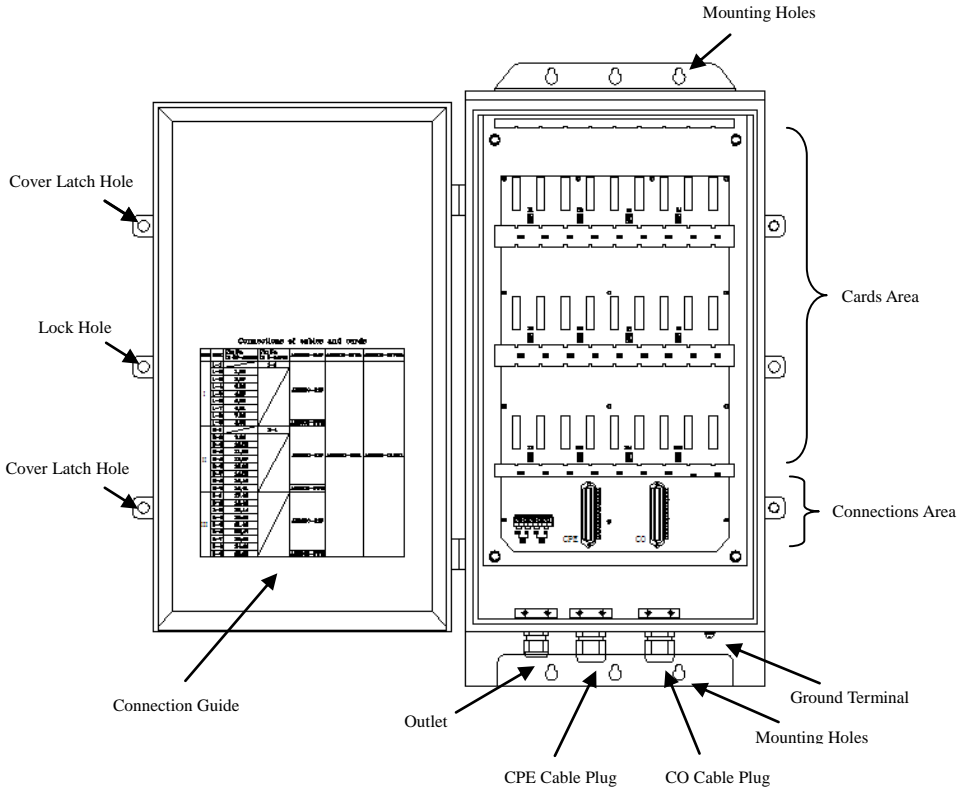


Figure 4 AER800-24P box

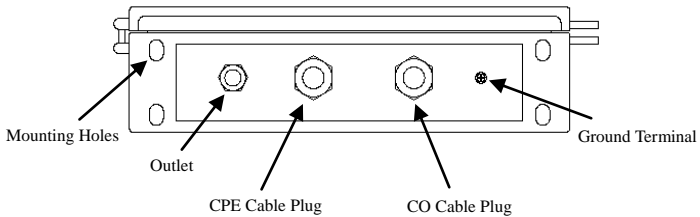


Figure 5 Bottom view of AER800-24P box

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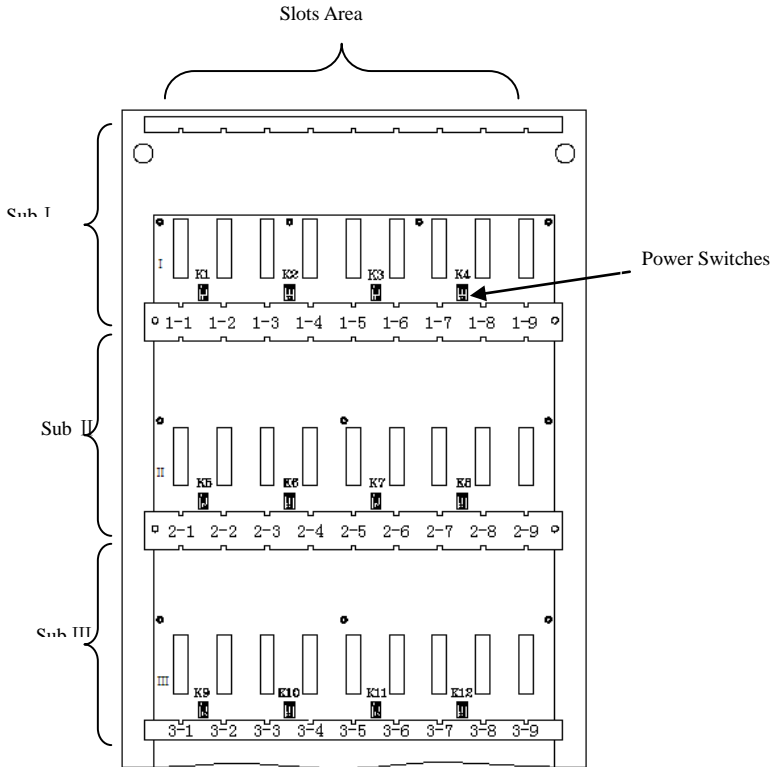


Figure 6 AER800-24P Cards Area

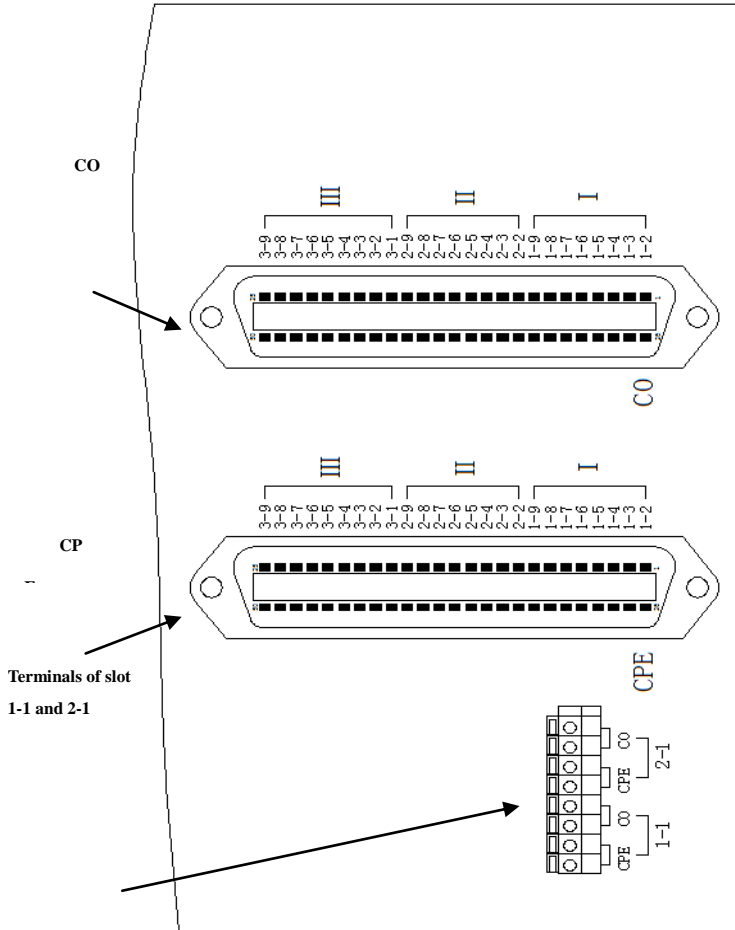


Figure 7 AER800-24P box connections area

Connections Area includes two 50-core-plugs and one 8-core-plug as figure 7, the detail connection is subscribed in table 4.

Table 4 Connections of cables and cards

Sub	Slot	Pin No. In 50-cores	Pin No. in 8-cores	AER800-24P	AER800-27PL	AER800-27PHL
I	1-1		1-1	AER800-C1P	AER800-C1PL	AER800-C1PHL
	1-2	1,26				
	1-3	2,27				
	1-4	3,28				
	1-5	4,29				
	1-6	5,30				
	1-7	6,31				
	1-8	7,32				
	1-9	8,33		AER800-PWR		
II	2-1		2-1	AER800-C1P	AER800-C1PL	AER800-C1PHL
	2-2	9,34				
	2-3	10,35				
	2-4	11,36				
	2-5	12,37				
	2-6	13,38				
	2-7	14,39				
	2-8	15,40				
	2-9	16,41 16,41		AER800-PWR		
III	3-1	17,42		AER800-C1P	AER800-C1PL	AER800-C1PHL
	3-2	18,43				
	3-3	19,44				
	3-4	20,45				
	3-5	21,46				
	3-6	22,47				
	3-7	23,48				
	3-8	24,49				
	3-9	25,50	AER800-PWR			

There are four switches in one sub-system. They are between the cards number 1 and 2, 3 and 4, 5 and 6, 7 and 8. One switch includes two bits, left bit is used to power the card on the left, the right one is used to power the card on the right.

Table 5 Correspondence of Switches and cards

Switch		Extender Card Slot
K1	Left bit	1-1
	Right bit	1-2
K2	Left bit	1-3
	Right bit	1-4
K3	Left bit	1-5
	Right bit	1-6
K4	Left bit	1-7
	Right bit	1-8
K5	Left bit	2-1
	Right bit	2-2
K6	Left bit	2-3
	Right bit	2-4
K7	Left bit	2-5
	Right bit	2-6
K8	Left bit	2-7
	Right bit	2-8
K9	Left bit	3-1
	Right bit	3-2
K10	Left bit	3-3
	Right bit	3-4
K11	Left bit	3-5
	Right bit	3-6
K12	Left bit	3-7
	Right bit	3-8

When AER800-C1P is used, make sure the correspond switch bit is set to ON. Not use the extender card, make sure switch bit is set to OFF. Each card corresponds to each power switch bit.

DO NOT care about switch bits when AER800-C1PL/C1PHL cards are used.

4. 2 Extender card AER800- C1P/ C1PL/C1PHL

The LED indicates power status.

4. 3 Power card AER800-PWR

AER800-PWR is power card, which receives remote power from the AEC, after conversion, powers cards AER800-C1P. The LED indicates that power input from AEC is OK.

5. Installation Procedure

5.1 Unpack

Unpack equipment carefully, and 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.

5.2 Install ADSL loop extender

➤ Fix the AER800-24P box near the junction cabinet, on the ground, against the wall, or on the supplied mounted brackets.

Ground the box through the grounding screw in the bottom outside the box.

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

➤ Insert extender card into AER800-24P box.

➤ Connect the cable.

Slot 1-1, 2-1 are connected to 8-core terminal, the other slots are connected to 50-core terminal.

As showed in table 4.

The cable from DSLAM are connected to CO direction, the cable from users are connected to CPE direction.

When the card is inserted on the base-board, the ADSL loop extender will work in 10 seconds.

6. Troubleshooting

Table 6 AER800-24P Troubleshooting

Problem Description		Possible Reason	Suggested Resolution
Extender does not work after power-on. Power supply card status LED is OFF.		Power supply cable is not connected properly.	Check power supply and power cable.
No Synchronization	Extender card status LED is always on.	Cables at DSLAM side or Modem side are not connected properly.	Correct the cable connection.
		Line quality is worse between CO and CPE side.	Change good quality cable.
		There is telephone before the splitter on CPE side.	Remove telephone before the splitter on CPE side.
		Cable lengths are not proper.	Check whether the lengths between DSLAM, extender, Modem are proper or not.
There is noise on the user's telephone line.		CO/CPE cable is connected to ground or the wire insulation is faulty.	Check the cables.
		Possible electromagnetic interference.	Check to ensure the extender is not located near any high voltage equipment.
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.
		SNR Margin too low.	Increase the SNR margin setting in the DSLAM to 6dB or more.
		Bit Error Rate too High.	Increase SNR Margin setting in the DSLAM.
		Data profile is too high for this circuit.	Lower the minimum data rate in the DSLAM.

Table 7 AER800-27PL 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-C1PL 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.
		ADSL 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 < 10dB. Testing with SNR margin = 1 dB can provide useful hints during troubleshooting.
There is noise on the user's telephone line.		CO/CPE cable is connected to ground or the wire insulation is faulty.	Check the cables.
		Possible electromagnetic interference.	Check to ensure the extender is not located near any high voltage equipment.
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.
		SNR Margin too low.	Increase the SNR margin setting in the DSLAM to 6 dB or more.
		Bit Error Rate too High.	Increase SNR Margin setting in the DSLAM.
		Data profile is too high for this circuit.	Lower the minimum data rate in the DSLAM.

Table 8 AER800-27PHL 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-C1PHL 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.
		ADSL 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 < 10dB. Testing with SNR margin = 1 dB 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.
		SNR Margin too low.	Increase the SNR margin setting in the DSLAM to 6 dB or more.
		Bit Error Rate too High.	Increase SNR Margin setting in the DSLAM.
		Data profile is too high for this circuit.	Lower the minimum data rate in the DSLAM.