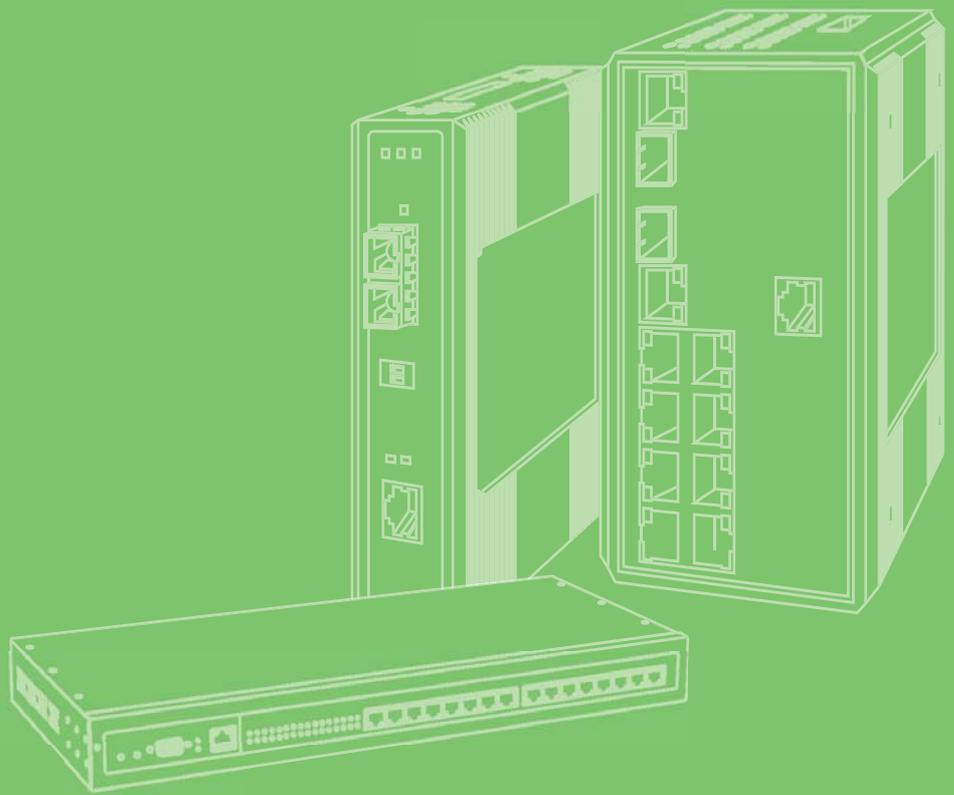


User Manual



EKI-1751-AE

Long Reach Ethernet Extender

ADVANTECH

Enabling an Intelligent Planet

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Product Warranty (5 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for five years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any on screen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

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Declaration of Conformity

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
 - Product name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Warnings, Cautions and Notes

Warning! Warnings indicate conditions, which if not observed, can cause personal injury!



Caution! Cautions are included to help you avoid damaging hardware or losing data. e.g.



There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! Notes provide optional additional information.



Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advantech.com

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

- 1 x VDSL2 LAN Extender
- 1 x DIN-Rail Mounting Bracket and Screws
- 1 x Wall-mounting Bracket

Safety Instructions

- Read these safety instructions carefully.
- Keep this User Manual for later reference.
- Disconnect this equipment from any DC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
- For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
- Keep this equipment away from humidity.
- Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
- The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
- Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
- Position the power cord so that people cannot step on it. Do not place anything over the power cord.
- All cautions and warnings on the equipment should be noted.
- If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
- Never pour any liquid into an opening. This may cause fire or electrical shock.
- Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
- If one of the following situations arises, get the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well, or you cannot get it to work according to the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.
- **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO -40°C (-40°F) ~ 75°C (165°F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.**
- The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Safety Precaution - Static Electricity

Static electricity can cause bodily harm or damage electronic devices. To avoid damage, keep static-sensitive devices in the static-protective packaging until the installation period. The following guidelines are also recommended:

- Wear a grounded wrist or ankle strap and use gloves to prevent direct contact to the device before servicing the device. Avoid nylon gloves or work clothes, which tend to build up a charge.
- Always disconnect the power from the device before servicing it.
- Before plugging a cable into any port, discharge the voltage stored on the cable by touching the electrical contacts to the ground surface.

Contents

Chapter 1	Introduction	1
1.1	Description	2
1.2	Features.....	2
1.3	Specifications.....	3
1.4	Applications.....	4
1.5	Deployment Option (Point to Point)	4
Chapter 2	Hardware Installation.....	5
2.1	Front Panel	6
2.2	Rear Panel	8
2.3	Installation.....	8
Chapter 3	Appendix.....	9
3.1	Connector Architecture	10
3.2	Ethernet Port Connector (RJ-45)	10
3.3	VDSL Interface Pin Assignments (RJ-45).....	11

List of Figures

Figure 1.1	LAN Extender Application.....	4
Figure 1.2	Deployment Option (Point to Point)	4
Figure 2.1	Front Panel	6
Figure 2.2	DIP Swtiches	7
Figure 2.3	Rear Panel.....	8
Figure 2.4	Installation	8
Figure 3.1	Ethernet Port Connector (RJ-45).....	10
Figure 3.2	VDSL Interface Pin Assignments (RJ-45)	11

Chapter 1

Introduction

1.1 Description

EKI-1751-AE is a high-speed Copper Ethernet Extender designed for long reach Ethernet applications. It is equipped with one Ethernet port (RJ-45 connector) and one VDSL port (RJ-45 connector) in metal enclosure for easy installation in harden environment. It is a bridge mode modem, well accommodating VDSL2 (Very-high-data-rate Digital Subscribe Loop) technology to extend Ethernet service over single-pair phone line. It is compliant to ITU-T G.993.2 standard and supports VDSL2 30a profile that features 100Mbps of symmetric data rate over the existing copper wires. Supporting both symmetric and asymmetric transmission, it can reach up to 100/100 Mbps bandwidth (line rate) within 300M. By providing ultra-high speed, EKI-1751-AE VDSL2 Ethernet Extender makes your telephone line achieve its best performance than before. EKI-1751-AE VDSL2 Ethernet Extender also supports selectable CPE and CO mode. By selecting operation modes: one with CO mode and the other with CPE mode, users can connect two 100M VDSL2 Ethernet Extenders to establish a point-to-point connection.

With its high performance and plug-n-play design, EKI-1751-AE VDSL2 Ethernet Extender is the ideal Long Reach Ethernet solution for ISPs and carriers to quickly deploy a high-speed IP-based network for triple play (video, voice and data) services.

1.2 Features

- Metal enclosure for robust installation in Utility applications.
- High speed Ethernet extension over UTP, CAT 5e/6/7 or Coaxial cables.
- Cost effective bridge function to connect two Ethernet LAN.
- Support wide operating temperature range.
- Support flow control on Fast Ethernet port via PAUSE frame or Back Pressure.
- IEEE 802.1Q VLAN tag transparent.
- Easy installation via simple plug-and-play.
- Wall Mounting or Din Rail Mounting (Optional).

1.3 Specifications

Specifications	Description
Interface	1 x Port RJ-45 10/100BaseT 1 x Port RJ-45 VDSL2 Extender
Twisted Pair	12 to 24 AWG
Band Plan	Asymmetric (Annex A/998) or Symmetric (Annex B/997)
SNR Margin	6 dB or 9 dB (selectable by DSW)
Protocol Transparency	Auto Negotiation Auto MDI/MDI-X
Maximum Distance (Meters)	1200 UTP
DIP Switch to Select	BandPlan, SNR Margin, CO/CPE
Ethernet	IEEE 802.3 10/100 BaseT, 802.3u, 802.3x, 802.1q
VDSL2	ITU-T G.993.2
VDSL2 Profiles	17a and 30a IP30 rating, enclosure
Input Voltage	12 VDC, 1A
Power Connector	Barrel jack Surge protection
Power Consumption	4.2W (max.)
Shipping Weight	0.22Kg / 0.46lbs
Dimensions	73.4 x 96.2 x 22.8mm (2.89" x 3.78" x 0.89")
Operating Temperature	0°C to 45°C (32°F to 113°F)
Storage Temperature	0°C to 85°C (32°F to 185°F)
Operating Humidity	5% to 95% (non-condensing)
Altitude	0 ~ 10,000 ft.
Regulatory Approvals	FCC Part 15 Class A, CE, EN60950, UL60950-1
Installation	DIN-Rail and Wall mount

1.4 Applications



Figure 1.1 LAN Extender Application

1.5 Deployment Option (Point to Point)

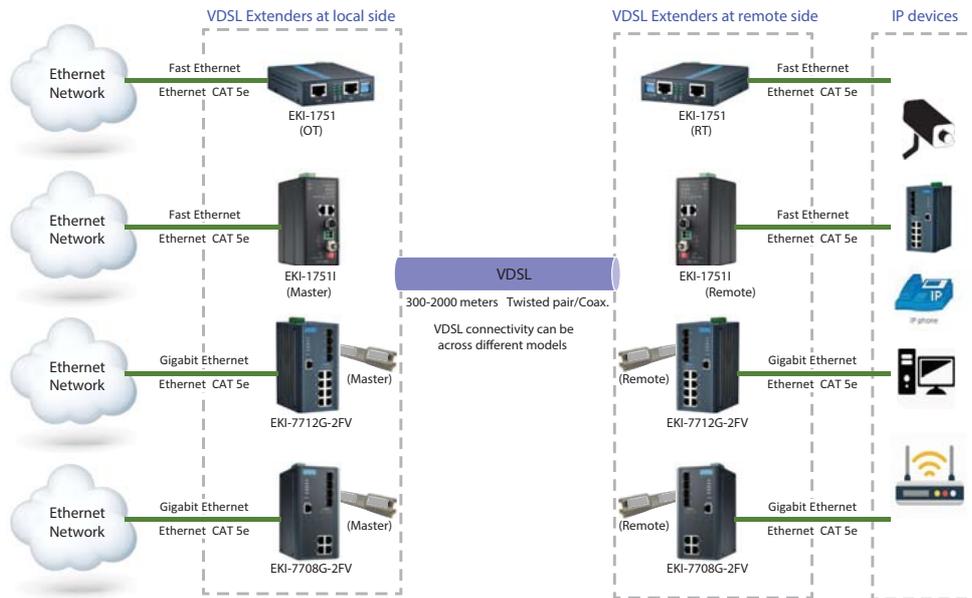


Figure 1.2 Deployment Option (Point to Point)

Chapter 2

Hardware Installation

This chapter shows the front panel and how to install the hardware.

2.1 Front Panel

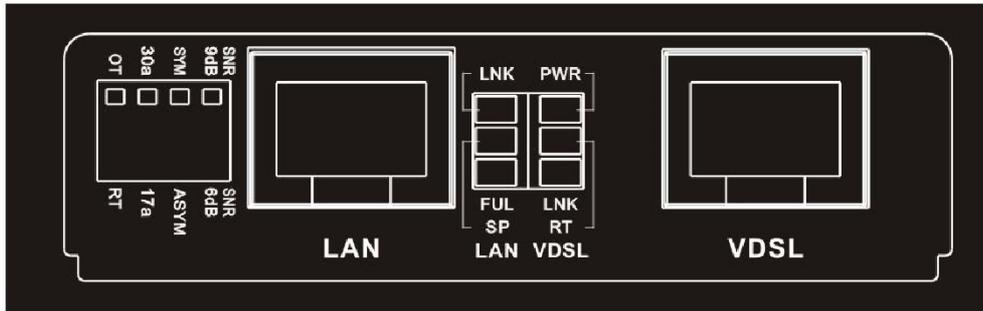


Figure 2.1 Front Panel

Front panel can be separated into five parts from left to right:

1. DIP switch
 2. RJ-45 connector for Ethernet
 3. LEDs for Ethernet
 4. LEDs for VDSL
 5. RJ-45 connector for VDSL
1. The RJ-45 is designed to connect to the Local Network with the Unshielded Twisted Pair (UTP) cable. The LEDs on top of RJ-45 connector show the status below:
 2. The following table describes the LEDs' function of the product.

LEDs for LAN	Blinking	On	Off
	Activity	Link UP	Link UP
		100Mbps	10Mbps
		Full Duplex	Half Duplex

LED	Color	Status	Descriptions
PWR (Power LED)	Green	On	Lights to indicate that the VDSL2 bridge had power
	Green	Off	The device is not ready or has malfunctioned.
LNK (Ethernet LED)	Green	On	The device has good Ethernet connection.
	Green	Blinking	The device is sending or receiving data.
	Green	Off	The LAN not connected.
LNK RT (VDSL Link)	Green	On	RT mode.
	Green	Blinking	Handshaking/Transmit & Received data
	Green	Off	The device not ready.

LED	Color	Status	Descriptions
FUL 100 (LAN Link)	Green	On	The device is link on 100M Full duplex and ready.
	Green	Blinking	The device is sending or receiving data.
	Green	Off	The device is link on 10M Full duplex and ready.

3. The following table describes the DIP Switches' setting.



Figure 2.2 DIP Switches

	Pin 1	Pin 2	Pin 3	Pin 4
	Side	Channel	Rate Limit	SNR
Off	OT	30a	Symmetric	9 dB
On	RT	17a	Asymmetric	6 dB

- Pin 1: OT, RT switch
 - OT: LAN Extender acts as Central Office (CO) side.
 - RT: LAN Extender acts as Customer Premise Equipment (CPE) side.
 - Pin 2: Impulse noise protection
 - 30a: High Speed Mode. Provides communication protection for up to 250ms impulse noise with latency less than 6 ms.
 - 17a: Long Reach Mode. Direct data transmission with latency less than 1 ms.
 - Pin 3: Band Plan
 - Symmetric: Support the band plan G.997 and provide the symmetric transmission on both downstream and upstream.
 - Asymmetric: Provides highest line rate in short range in asymmetric mode.
 - Pin 4: General protection
 - 9dB: Better channel noise protection with SNR up to 9 dB
 - 6dB: Original channel noise protection with 6 dB SNR
4. The following table describes the LEDs' function of the product.

LEDs for VDSL	Blinking	On	Off
		Device Power ON	Device Power OFF
		CPE-mode	CO-mode
	Slow: Idle Fast: Training	Linked	Off line

2.2 Rear Panel



Figure 2.3 Rear Panel

The DC Jack on the rear panel can be connected to power supply adaptor with the DC input.

2.3 Installation

Please see the illustration below

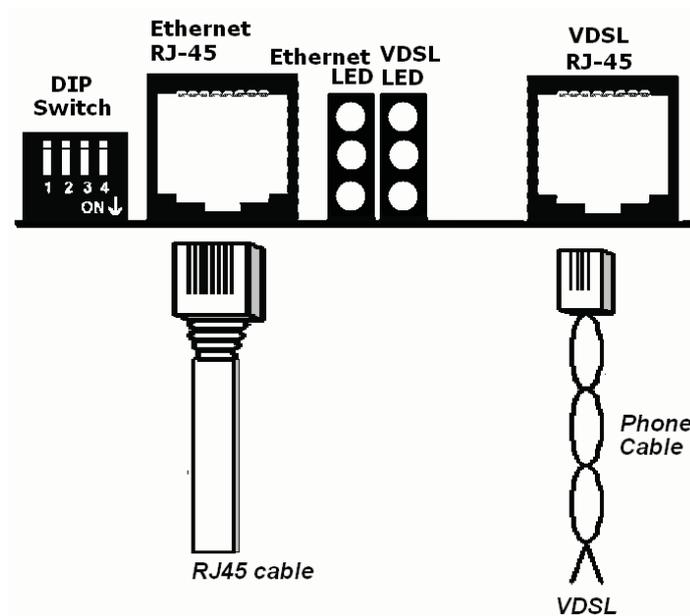


Figure 2.4 Installation

Chapter 3

Appendix

3.1 Connector Architecture

3.2 Ethernet Port Connector (RJ-45)

The Ethernet Port interface is an 8 position Modular Jack. The table below displays the pin out assignments.

Pin Number	Description
1	RX+; Receive data +
2	RX-; Receive data -
3	TX+; Transmit data +
4	Not used
5	Not used
6	TX-; Transmit Data -
7	Not used
8	Not used

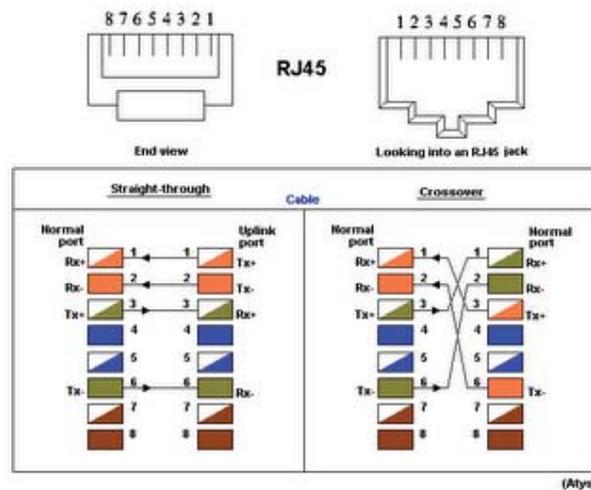


Figure 3.1 Ethernet Port Connector (RJ-45)

3.3 VDSL Interface Pin Assignments (RJ-45)

The VDSL interface is standard eight-pin modular jack. The table below displays the pin out assignments.

Pin Number	Description
1	Not used
2	Not used
3	Not used
4	Analog Input/Output
5	Analog Input/Output
6	Not used
7	Not used
8	Not used

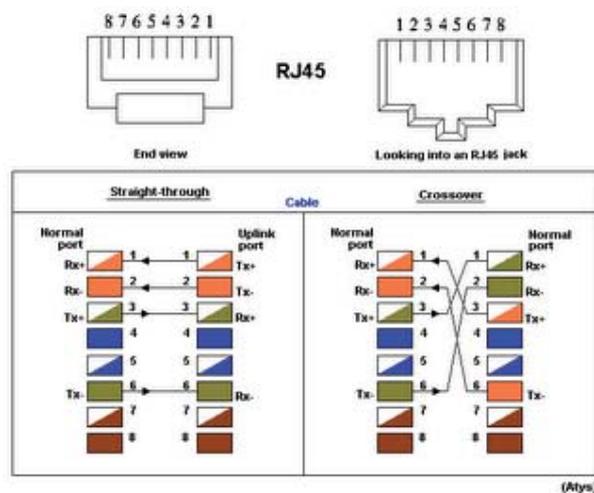


Figure 3.2 VDSL Interface Pin Assignments (RJ-45)

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