

LINKTROPY 8510

HARDWARE GUIDE

HARDWARE VERSION 3



APPOSITE
— TECHNOLOGIES

Linktropy® 8510 Hardware Guide

Hardware Version: 3

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1 OVERVIEW

This *Linktropy 8510 Hardware Guide* describes the physical hardware of the Linktropy 8510 WAN Emulator. The companion *User's Guide* describes the installation, configuration, and operation of the Linktropy WAN emulation functionality. A separate *Quick Start Guide* provides a walk-through for first time configuration.



The Linktropy 8510 contains no user serviceable parts. Opening the chassis voids the warranty. If you believe your unit is not functioning properly, see Section 8 for information on obtaining support.

This guide is for the Linktropy 8510 hardware version 3.

2 INCLUDED ITEMS

The Linktropy 8510 shipping carton contains the following items:

- ▶ Linktropy 8510 hardware unit
- ▶ Rack ear brackets
- ▶ Linktropy 8510 Quick Start Guide
- ▶ AC power cord (U.S.)
- ▶ RJ45 to DB9 serial cable

3 FRONT AND REAR PANELS

3.1 Front Panel



The front panel of the Linktropy 8510 contains, from left to right:

Power LED: Lit green when the unit is powered on.

MGMT: Gigabit Ethernet interface with a standard RJ45 connector for management of the unit over the network.

CONSOLE: Console interface using RS-232 with an RJ45 connector. See Section 8 for a pin-out of the console interface.

Reset: The small hole to the right of the console port is used to reset the system to the factory default configuration. Reset capability is only active during system boot-up. To reset the system, insert a paper clip or toothpick into the hole, reboot or power cycle the device, and continue holding the reset switch for 20-30 seconds until the system reboots again.

LINK 1 – 4: Four pairs of Gigabit Ethernet ports consisting of four pairs of 10/100/1000baseT Ethernet ports with RJ45 connectors (standard), four pairs of SFP ports (optional), or two pairs each RJ45 and SFP ports (optional). Provides emulation of four separate WAN links between the network segments plugged into the LAN A and LAN B interfaces of each of the four links. Interfaces support jumbo frames up to 9 KB.

The RJ45 interfaces have two LEDs. The LED on the left indicates that link has been established and flashes to indicate activity. If the link is up, the LED on the right glows amber to indicate connectivity at 1 Gbps, green for 100 Mbps, and off for 10 Mbps.

The SFP interfaces have two LEDs. The LED on the left indicates that link has been established and flashes to indicate activity. If the link is up, the LED on the right glows green to indicate connectivity at 1 Gbps.

3.2 Rear Panel



The rear panel of the Linktropy 8510 contains:

Fan outlets: Hot air is vented through the fan outlets.

Power input: Standard IEC C14 socket for power input. U.S. and Canadian customers should use the supplied power cord to connect the Linktropy 8510 to a power outlet. International customers may need to substitute a local power cord with a standard IEC C13 plug. The Linktropy 8510 handles AC power input from 100 to 240 V.

Power switch: To turn on or off, rock the switch onto the power icon  and hold for 5 seconds until power light turns on or off.



Please ensure the space around the fan outlets on the back panel and the air intakes on the side panels remains unblocked to provide adequate airflow and prevent overheating.

4 CAPACITY LIMITATIONS

The Linktropy 8510 can forward up to 1 Gbps of packets in each direction on each of the four links at full line rate. This capacity can be reduced if any links are configured in routing mode, or if learning bridge functionality is enabled.

To avoid reaching these hardware limits, high traffic links that are not being used for emulation, and are therefore not being limited by the bandwidth, latency, and other emulation constraints, should be disconnected from the device.

The maximum one-way latency that the Linktropy 8510 supports depends on data throughput and packet size. The chart below summarizes a few typical examples for traffic in one direction on one link. To calculate the maximum latency in each direction for traffic in both directions at the listed rate, or to calculate the maximum latency when using multiple links at the same rate, divide these maximum one-way latencies by the number of ports through which traffic is entering. The listed values are based on actual data throughput, not bandwidth settings. Users who need to emulate latencies close to these limits are advised to contact Apposite to discuss their specific requirements.

	Frame Size			
Aggregate Throughput	64 bytes	500 bytes	1518 bytes	9220 bytes
10 Mbps	>20 sec	>20 sec	>20 sec	>20 sec
100 Mbps	>20 sec	>20 sec	>20 sec	>20 sec
1 Gbps	7.1 sec	>20 sec	>20 sec	>20 sec

Table 1: Maximum Round-Trip Latency

The maximum emulation bandwidth may be limited below the hardware capacity of 1 Gbps in each direction by the device's license key. See the *Linktropy User's Guide* for more details on the license key.

5 RACK MOUNTING

5.1 Ear Brackets

Optional ear brackets can be used to secure the 8510 to the front of the rack. Attach the ear brackets to the right and left sides of the 8510 using the three supplied screws with each bracket as shown in the diagram below.



6 RJ45 INTERFACES

The standard version of the Linktropy 8510 includes eight RJ45 10/100/1000baseT ports for emulation and a separate RJ45 10/100/1000baseT port for management.

The ports are set by default to auto-negotiate the proper speed and duplex settings, and flow control is turned off. On the emulation ports, auto-negotiation can be disabled and the ports forced to a particular speed and duplex setting from the GUI. In nearly all cases, the default settings should be used and only changed to resolve incompatibilities with directly-connected equipment. Auto-negotiation cannot be disabled on the MGMT port.

When set to auto-negotiation, the ports are auto-MDI/MDIX and can use either crossover or straight through cables. If the interface is forced to a particular speed or duplex setting, the interfaces are MDI and require a crossover cable if connected to another MDI-only device.

7 SFP INTERFACES (OPTIONAL)

The Linktropy 8510 is optionally available with eight Gigabit Ethernet small form-factor pluggable (SFP) interfaces (also known as mini-GBIC) instead of the eight standard copper RJ45 ports, or with 4 each of the SFP ports and RJ45 ports.

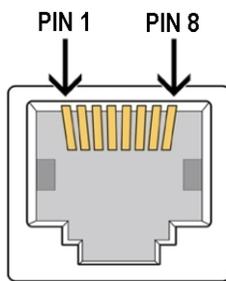
SFP interfaces are modular and support both fiber-optic and copper-based cabling depending on the installed transceiver. Standard transceivers are available from a variety of vendors or can be purchased from Apposite.

If the unit includes the optional SFP interfaces, select an appropriate transceiver type based on network and cabling requirements. Slide the transceiver into the SFP port until it clicks into place.

The SFP interfaces support 10/100/1000 Mbps auto-negotiation when using RJ45 SFP transceivers with SGMII support. Fiber SFP transceivers are only supported at 1 Gbps full duplex transfer mode.

8 CONSOLE INTERFACE

Console access to the Linktropy 8510 is through the RJ45 interface on the front panel labeled "CONSOLE." An RJ45 to DB9 cable is included with the unit to connect the device to a standard PC serial port. The pin-out for the RJ45 interface is shown below:



Pin	Definition	Pin	Definition
1	CTS/RTS	2	DTR
3	TxD	4	GND
5	GND	6	RxD
7	DSR	8	CTS/RTS

To connect to the console, use a terminal or a computer running terminal emulator software such as HyperTerminal or PuTTY, and set the following parameters:

- 9600 baud
- 8 data bits
- No parity
- 1 stop bit
- Disable flow control

9 APPOSITE SUPPORT

Linktropy units with a product license receive support and maintenance for the term of the license, including hardware warranty, firmware updates, and customer support. The license expiration date for limited term product licenses is shown on the Upgrade Tab of the Linktropy GUI.

For units with an unlimited term license (purchased prior to August 2017), one year of maintenance is included with purchase, after which a yearly maintenance renewal is required for ongoing support. License and maintenance renewals are available from Apposite or your Linktropy reseller.

If you believe your unit is not functioning properly and is under warranty, please upgrade to the latest firmware release. If the problem persists, please contact Apposite Support at:

support@apposite-tech.com
1.310.477.9955 ext. 2

When contacting Apposite Support, please include the following information:

- ▶ Linktropy model
- ▶ Serial number
- ▶ Your e-mail address and phone number
- ▶ Installed firmware version
- ▶ A detailed description of the problem



Do not attempt to fix any hardware problem yourself. The Linktropy 8510 contains no user serviceable parts. Opening the chassis voids the warranty.

APPENDIX A: SPECIFICATIONS

Capacity		
Max. Emulation Rate		Up to 1 Gbps full duplex per link (depending on license)
Max. Aggregate Throughput		8 Gbps
Max. Packet Rate		1.488 million packets per second per port (full line rate) 11.9 million packets per second aggregate
Interfaces		
Network		8 x 10/100/1000baseT copper Gigabit Ethernet (standard) or 8 x SFP Gigabit Ethernet (optional) or 4 x copper Gigabit Ethernet + 4 x SFP Gigabit Ethernet
Management		1 x 10/100/1000baseT copper Gigabit Ethernet
Console		1 x RS-232
Environmental and Physical		
AC Input Voltage		Auto ranging 100 VAC to 240 VAC
AC Input Frequency		50 to 60 Hz
AC Input Current		1.0 A
Power Draw		300 Watts
Dimensions	Product	17.2" D x 11.8" W x 1.75" H (1 RU) 44 cm D x 30 cm W x 4.4 cm H (1 RU)
	Shipping	22" W x 20" D x 8" H 54 cm W x 50 cm D x 20 cm H
Weight	Product	11.5 lbs. (5.2 kg)
	Shipping	18 lbs. (8 kg)
Temperature	Operating	32° to 104°F (0° to 40°C)
	Storage	-4° to 158°F (-20° to 70°C)
Humidity		5% to 95% (non-condensing)
Certifications		FCC Class A, CE, RoHS
Warranty and Support		
Hardware warranty		included with product license
Support and Maintenance		included with product license

APPENDIX B: REGULATORY

Federal Communications Commission Notice

This equipment has been tested and verified to comply with the limits for a Class A digital device, pursuant to Part 15 of 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 instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the user will be required to take whatever measures may be required to correct the interference at their own expense.

Canadian Notice / Avis Canadien

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

CE Certification

The product described in this manual complies with all applicable European Union (CE) directives, including EU Directive 2002/95/EC Restriction of Hazardous Substances (RoHS).

REACH Compliance Declaration

The European REACH Regulation 1907/2006 on Registration, Evaluation, Authorization, and Restriction of Chemicals (REACH), Annex XVII entered into force in June 2009, and affects all companies producing, importing, using, or placing products on the European market. The aim of the REACH regulation is to ensure a high level of protection of human health and the environment from chemical substances.

The product is considered article as defined in REACH Article 3 (3). The product/article under normal and reasonable conditions of use do not have intended release of substances. Therefore the requirement in REACH Article 7 (1) (b) for registration of substances contained in the product/article does not apply.

In addition we confirm that the product delivered by Aposite do not contain Substances of Very High Concern (SVHC) with more than 0.1% w/w as defined by REACH Article 57, Annex XIV, Directive 67/548/EEC. Hence the requirement in REACH Article 7 (2) to notify ECHA if a product /article contains more than 0.1% w/w of an SVHC and tonnage exceeding 1 tone per importer per year is not applicable.

We hereby declare, by all we know, that the information is real and integrity. We promise that the Product Name: Netropy N91 series meets the standard of REACH on SVHC and latest chemical regulation. The SVHC are still according to the publication on EU's website, please refer to the SVHC official webpage. [HTTPS://ECHA.EUROPA.EU/CANDIDATE-LIST-TABLE](https://echa.europa.eu/candidate-list-table)

RoHS Declaration of Conformity

Aposite is committed its products are in compliance with all applicable laws and regulations identified as RoHS Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and the modified EU Directive 2015/863/EU.

We hereby declare that for the products and parts supplied by our company, the hazardous substances indicated below are restricted according to the RoHS standard.

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No	Restricted Substances	Limits (wt% or ppm)	Directive
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2	Cadmium (Cd)	0.01% (<100 ppm)	
3	Mercury (Hg)	0.1% (<1000 ppm)	
4	Hexavalent Chromium (Cr6+)	0.1% (<1000 ppm)	
5	Poly Brominated Biphenyls (PBB)	0.1% (<1000 ppm)	
6	Poly Brominated Diphenyl ethers (PBDE)	0.1% (<1000 ppm)	
7	Bis (2-ethylhexyl) phthalate (DEHP)	0.1% (<1000 ppm)	2015/863/EU
8	Butyl benzyl phthalate (BBP)	0.1% (<1000 ppm)	
9	Dibutyl phthalate (DBP)	0.1% (<1000 ppm)	
10	Diisobutyl phthalate (DIBP)	0.1% (<1000 ppm)	

All product or material will also follow the expiring exemption clause detail in the Annex under RoHS Directive. Compliance is evidenced by written declaration from our suppliers, assuring that any potential trace contamination levels of the substances listed above are below the maximum level set by 2011/65/EU and 2015/863/EU directive or are exempt due to their application.

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