

# LINKTROPY® 8510

## HARDWARE GUIDE



## Linktropy® 8510 Hardware Guide

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Part No. DOC-HG-L8510-T13

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# 1 OVERVIEW

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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 revision –T1.

## 2 INCLUDED ITEMS

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The Linktropy 8510 shipping carton contains the following items:

- ▶ Linktropy 8510 hardware unit
- ▶ Slide rail kit and rack ear brackets
- ▶ Documentation CD
- ▶ Linktropy 8510 Quick Start Guide
- ▶ AC power cord (U.S.)
- ▶ RJ45 to DB9 serial cable

# 3 FRONT AND REAR PANELS

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## 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

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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.

Aggregate Throughput	Frame Size			
	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

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## 5.1 Ear Brackets (Optional)

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.



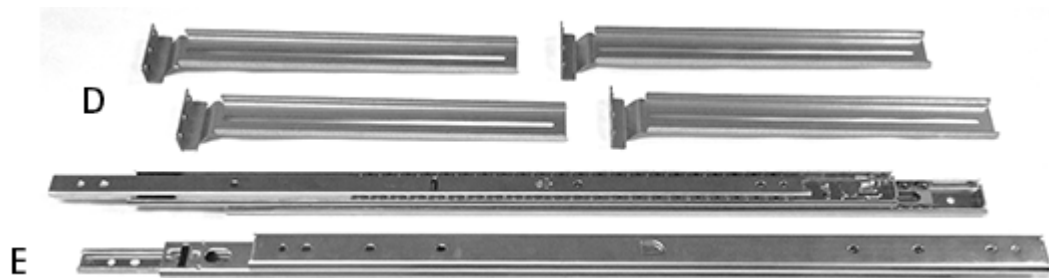
## 5.2 Slide Rail Installation

### 1. Preparation

SLIDE RAIL PARTS:



- A. M4 x 0.7 x 6mm Flat Head Screws (x8)
- B. M4 x 0.7 x 10mm Flat Head Screws and Nuts (x8)
- C. M5 x 0.8 x 10mm Flat Countersink Screws and Conical Washers (x12)



- D. L-Shaped Rail Brackets (x4)
- E. Slide Rail Assemblies (x2)

TOOLS REQUIRED:

- Phillips Screwdriver

## 2. Remove Inner Rail from Slide Rail Assembly

- A. Locate one of the slide rail assemblies (E) and extend the inner slide rail (as shown below).



- B. Press the *safety lock tab* (shown below) to release the inner rail and remove it from the slide rail assembly.



- C. Repeat on the second slide rail assembly.

## 3. Attach Inner Rails to Chassis

- A. Position one of the inner rails against one side of the chassis. Make sure that the *safety lock tab* faces out, and that the notched end of the rail is at the rear of the unit. Align the rearmost hole of the inner rail to the rearmost hole on the chassis.
- B. Secure the inner rail to the chassis using four 6mm screws (A).



- C. Attach the second inner rail to the other side of the chassis.

## 4. Attach L-Shaped Rail Brackets to Slide Rail Assembly

The L-shaped rail brackets (D) are used to secure the slide rail assemblies to the rack.

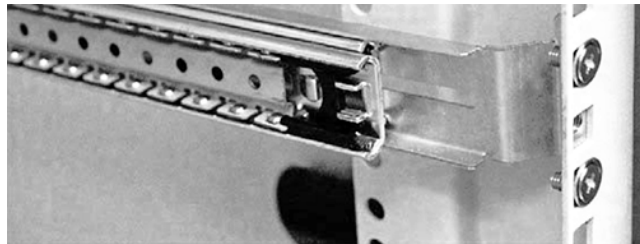
- A. Take one of the slide rail assemblies, ensure it's in the closed position, and hold it so the outer rail is facing you. Keep the open end of the center rail to the right and the closed end on the left. Place an L-shaped rail bracket on the right side of the outer rail, position a nut (B) on any of the four holes used to connect the L-shaped bracket to the outer rail, and push a screw (B) through the inside of the slide rail assembly, the center rail, the outer rail, the L-shaped bracket, and secure it with the nut (moving the tracks out of the way if necessary). Repeat the process using another screw and nut (B), and one of the three remaining holes to secure the L-shaped bracket to the slide rail assembly. *Do not tighten the screws until Step 5.*
- B. Slide the center rail to the right to expose the screw holes at the left end of the outer rail and attach a second L-shaped bracket to the left end of the slide rail assembly.



- C. Repeat steps 4A and 4B to secure the other two L-shaped brackets to the other slide rail assembly.

## 5. Attach Outer Rails to Rack

- A. Position one of the slide rail assemblies with the open end of the center rail facing the front of the rack, and attach the L-shaped bracket to the front post of the rack using two 10mm screws and conical washers (C).



- B. Extend the rear bracket until you are able to secure it to the rear rack post using two 10mm screws and conical washers (C). Tighten the screws securely.
- C. Repeat steps 5A and 5B to install the second slide rail assembly to the other side of the rack.

## 6. Mount Chassis (With Inner Rails) to Rack

- A. Pull out the center rail from each slide rail assembly until they're locked in place.
- B. Lift the chassis, with its front facing you, and carefully slide the inner rails into the center rails until they lock securely in place.

## 7. (Optional) Attach Ears to Rack

If rack ears have been attached to the 8510 and frequent movement of the unit isn't necessary, you can secure them to the front rack posts using the remaining countersink screws and washers (C).

# 6 RJ45 INTERFACES

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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)

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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.

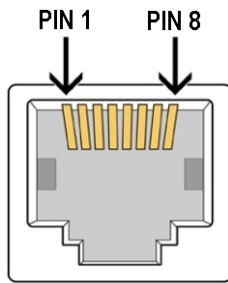
If the unit includes the optional SFP interfaces, select an appropriate transceiver type based on network and cabling requirements. Slide the transceiver into the SFP port until it clicks into place.

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

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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

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The Linktropy 8510 comes with a one year hardware warranty and one year of support and maintenance. Extended maintenance packages are available from Apposite or your local 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		120 Watts
Dimensions	Product	22" D x 17" W x 1.75" H (1 RU) 56 cm D x 43 cm W x 4.4 cm H (1 RU)
	Shipping	29" D x 23" W x 8" H 73 cm x 58 cm W x 20 cm H
Weight	Product	18 lbs. (8 kg)
	Shipping	29 lbs. (14 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		1 year
Support and Maintenance		1 year, including all firmware upgrades

# APPENDIX B: REGULATORY

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## 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).

# APPENDIX C: LINKTROPY END USER LICENSE AGREEMENT

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