

# LINKTROPY 5510

## HARDWARE GUIDE



Linktropy® 5510 Hardware Guide  
Hardware Revision: L1  
Documentation Version: 3  
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Part No. DOC-HG-L5510-L13

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# 1 OVERVIEW

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This *Linktropy 5510 Hardware Guide* describes the physical hardware of the Linktropy 5510 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 5510 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 5510 hardware revision –L1.

# 2 INCLUDED ITEMS

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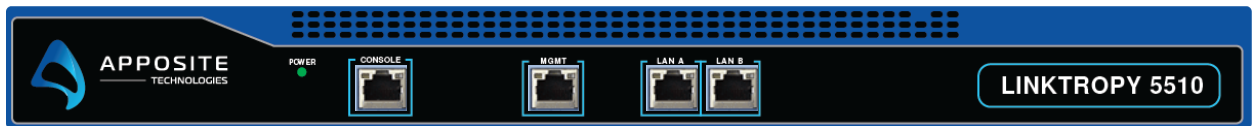
The Linktropy 5510 shipping carton contains the following items:

- ▶ Linktropy 5510 hardware unit
- ▶ Rack mount brackets (2) and screws (6)
- ▶ Linktropy Quick Start Guide
- ▶ AC power cord (U.S.)
- ▶ RJ45 to DB-9 serial cable

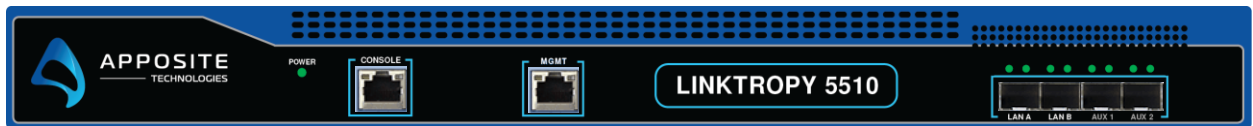
# 3 FRONT AND REAR PANELS

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## 3.1 Front Panel



Standard RJ45 Interface Version



The front panel of the Linktropy 5510 contains:

**Power LED:** Lit green when the unit is powered on. Unlit when power is off.

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

**MGMT:** 10/100/1000baseT Gigabit Ethernet interface with a standard RJ45 connector for browser-based management of the unit over the network.

**LAN A and B:** A pair of either 10/100/1000baseT Gigabit Ethernet interfaces with standard RJ45 connectors or a pair of modular SFP Gigabit Ethernet interfaces. See Section 7 for more details on the optional SFP interfaces.

Emulation interfaces support jumbo frames up to 9 KB.

**AUX 1 and 2:** The SFP version of the 5510 includes two additional ports labelled AUX 1 and AUX 2. These ports are currently reserved for future functionality.

## 3.2 Rear Panel



The rear panel of the Linktropy 5510 contains:

**Power input:** Standard IEC C14 socket for power input. U.S. and Canadian customers should use the supplied power cord to connect the Linktropy 5510 to a power outlet. International customers may need to substitute a local power cord with a standard IEC C13 plug. The Linktropy 5510 handles AC power input from 100 to 240 V.

**Power switch:** Rock the switch to the 1 position to turn on the unit. Rock the switch again to the 1 position and hold for 5 seconds to turn off.

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



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

# 4 CAPACITY LIMITATIONS

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The Linktropy 5510 can forward packets at full line rate (1.488 million packets per second) in both directions for all packet sizes. However, packet forwarding rate may be reduced depending on the classification method used.

The maximum one-way latency that the Linktropy 5510 supports depends on data throughput and packet size. The chart below summarizes a few typical examples for traffic in one direction. To calculate the maximum latency in each direction for traffic in both directions at the listed rate, divide these maximum one-way latencies values in half. The listed values are based on actual data throughput, not link 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	4.0 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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The Linktropy 5510 includes a pair of brackets for mounting the device into a standard 19" rack. Attach the brackets to both sides of the unit using three of the supplied screws with each bracket as shown in the diagram below.



# 6 RJ45 INTERFACES

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The standard version of the Linktropy 5510 includes two RJ45 10/100/1000baseT ports for emulation, labeled LAN A and LAN B, 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.

The RJ45 interfaces have two LEDs. The LED on the left glows amber to indicate that link has been established and blinks 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.

# 7 SFP INTERFACES (OPTIONAL)

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The Linktropy 5510 is optionally available with Gigabit Ethernet small form-factor pluggable (SFP) interfaces, also known as mini-GBIC, for the LAN A and LAN B interfaces. SFP interfaces are modular and support both fiber-optic and copper-based cabling depending on the installed transceiver. Standard fiber and copper transceivers are available from a variety of vendors.

Select an appropriate transceiver type based on network and cabling requirements. Slide the transceiver into the SFP port until it clicks into place.

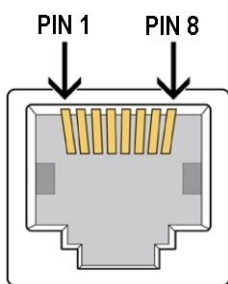
The SFP interfaces support 10/100/1000 Mbps auto-negotiation when using RJ45 SFP transceivers with SGMII support. Fiber SFP transceivers are only supported at 1 Gbps full duplex transfer mode.

The SFP interfaces have two amber LEDs. The LED on the left indicates that link has been established. The LED on the right blinks to indicate activity.

# 8 CONSOLE INTERFACE

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Console access to the Linktropy 5510 is through the RJ45 interface on the front panel labeled "CONSOLE." An RJ45 to DB-9 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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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 5510 contains no user serviceable parts. Opening the chassis voids the warranty.

# APPENDIX A: SPECIFICATIONS

Capacity		
Max. Emulation Rate		1 Gbps full duplex
Max. Packet Rate		2,976,200 packets per second (full line rate all packet sizes)
Interfaces		
Network		2 x 10/100/1000baseT Copper Gigabit Ethernet or 2 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
Power Draw		41 Watts
Dimensions	Product	17" W x 12" D x 1.75" H (1 RU) 431 mm W x 305 mm D x 43.5 mm H (1 RU)
	Shipping	21" x 19" x 7" (53 x 49 x 8 cm)
Weight	Product	10 lbs. (4.3 kg)
	Shipping	14 lbs. (6.3 kg)
Temperature	Operating	32° to 104°F (0° to 40°C)
	Storage	-4° to 158°F (-20° to 70°C)
Humidity	Operating	5% to 90% (non-condensing)
	Storage	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

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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 Directives 1999/5/EC Radio Equipment and Telecommunications Terminal Equipment and 2002/95/EC Restriction of Hazardous Substances (RoHS).

# APPENDIX C:

## APPOSITE END USER LICENSE AGREEMENT

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