

### Features:

- Extremely small package maximizes portability and enhanced access to fiber or copper connections
- All metal case is rugged and secure but also lightweight, portable, easy to handle
- Comprehensive network switch support with 802.3az Energy Efficient Ethernet
- 100BASE-X and 1000BASE-X Fiber Interfaces
- Multimode or Single Mode optics
- 10/100/1000Base-T copper port speeds
- Robust networking support with the latest generation Marvell™ switch technologies.
- 1Mb packet buffer memory with true non-blocking switch performance
- Frame based flow control supports zero packet loss under temporary congestion
- 10Kb jumbo frame support
- Industry standard micro-USB plug for desktop communication, power, and firmware updates.



**COTSWORKS Lightning Stick is an ideal laboratory and field-use device for engineers looking to test and qualify fiber optic links**



### Overview

**The compact form factor Lightning Stick takes media conversion and link diagnostics to a new level.**

Lightning Stick can replace inefficient, rack based metal chassis plug-in modules. It is small enough to run in-line with copper and fiber cable. Powered by either a board connector or micro-USB connector, the conversion between light and copper is simplified and network managers can reclaim valuable rack and desktop space in media conversion applications as well as hold the most powerful ultra-portable link diagnostics tool.

#### Port Management

Lightning Stick has local management over USB to access both copper and fiber port control; provides straight-forward access to link and transceiver information. Control and Diagnostics in both directions: fiber and copper. Warnings and alarms for both can be set and managed in one interface.

#### Copper Auto-MDiX and Auto-Negotiation

Automatically detects the required cable connection type and configures the connection appropriately. Configurable auto negotiation or forced data speed, duplex and type.

#### Portable

Lightning stick can also be used as a network analyzing tool. Connections on both sides of the media converter can be tested with in-module Virtual Cable Test (VCT) tools on the copper interface and digital diagnostics on the fiber within Lightning Stick Software (LSS) accessible on the USB port.

### General Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Optical Data Rate	BR <sub>Fiber</sub>	125		1250	Mbps	(1)(2)
Electrical Data Rate	BR <sub>Copper</sub>	10		1000	Mbps	(3)
<b>Notes:</b>						
1) Default Data Rate is 1.25Gbps for LS-SX, LS-LX, LS-SFF-SX, LS-SFB-G-xx, and LS-SFP						
2) Default Data Rate is 125Mbps for LS-SFB-M-xx						
3) RJ-45 Electrical Interface Supports Auto-Negotiation of 10/100/1000 Mbps						

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Maximum Supply Voltage	V <sub>CC</sub>	-0.3		4.0	V	
Storage Temperature	T <sub>sto</sub>	-40		85	°C	
Operating Temperature	T <sub>OP</sub>	-20		70	°C	
Relative Humidity	RH	0		85	%	

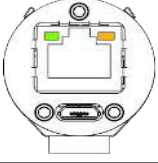
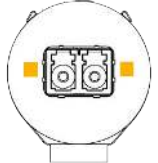
### Electrical and Communication Specifications

Input Supply Voltage	4.5 – 5.5 VDC via micro-USB
Power Consumption	<1.6 W
Power Connector	Micro-USB B connector

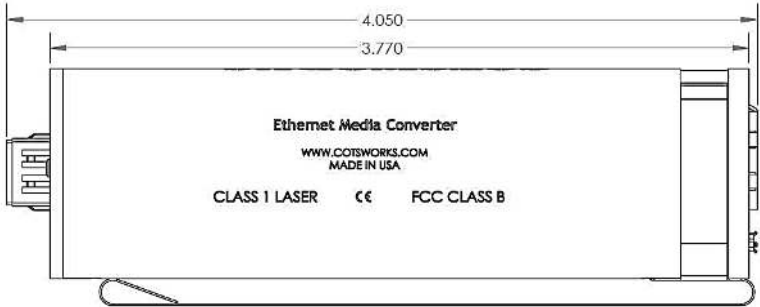
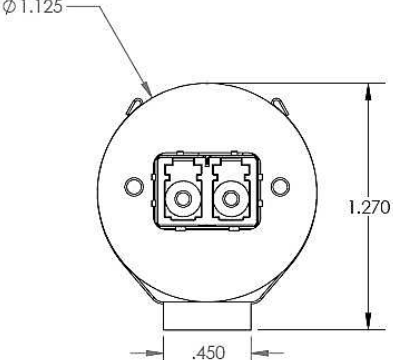
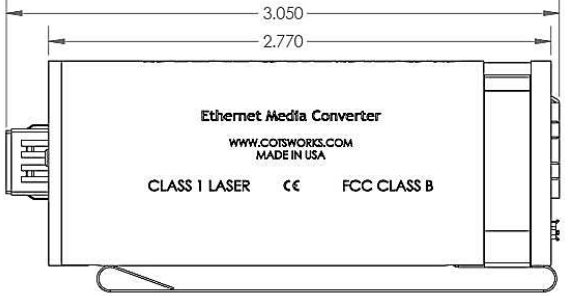
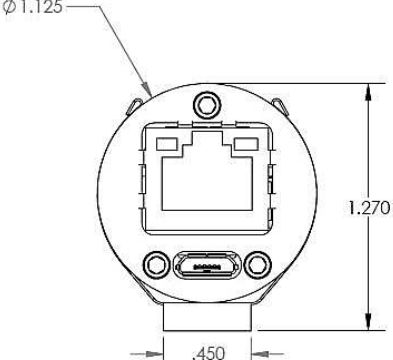
### Optical Characteristics (T<sub>OP</sub> = -20 to 70°C, V<sub>CC</sub> = 3.135 to 3.465 Volts)

Part Number	Optical Data Rate	Ethernet Standard	Wavelength (nm)	P <sub>out</sub> Min (dBm)	P <sub>out</sub> Max (dBm)	Rx Sens. Min (dBm)	Link Budget (dB)	Digital Diagnostics
<b>RJ-Based Optical Interface Options</b>								
LS-SX-BC	1.25Gbps	1000BASE-SX	850	-5	-1	-21	16	YES
LS-LX-BC	1.25Gbps	1000BASE-LX	1310	-5	1	-18	13	YES
<b>SFF-Based Optical Interface Options</b>								
LS-SFF-SX-BC	1.25Gbps	1000BASE-SX	850	-5	-1	-20	15	YES
LS-SFB-M-35-BC	125Mbps	100BASE-BX	1310Tx 1550Rx	-9	-3	-31	22	YES
LS-SFB-M-53-BC	125Mbps	100BASE-BX	1550Tx 1310Rx	-9	-3	-31	22	YES
LS-SFB-G-35-BC	1.25Gbps	1000BASE-BX	1310Tx 1550Rx	-6	0	-22	16	YES
LS-SFB-G-53-BC	1.25Gbps	1000BASE-BX	1550Tx 1310Rx	-6	0	-22	16	YES
<b>SFP-Based Optical Interface Options</b>								
LS-SFP-BC	SFP Lightning Stick available with 100Base or 1000Base Firmware. Optical specs. based on transceiver installed							

### LED Indicators

Interface	LED Indicator	Operation	Status Indicator	Color	ID	Location
Copper	Link Activity Speed	OFF	No Link	Green	LED0	
		ON	Link			
		BLINK	Rate ~ link speed			
	Link Type Activity	OFF	No Link	Yellow	LED1	
		ON	100M or 1G link			
Fiber	Power	OFF	LS not powered	Yellow	LED10	
		BLINK	LS Powered On			
	Link Activity	OFF	No Link	Yellow	LED11	
		ON	100M or 1G link			
		BLINK	Activity			

### Mechanical Dimensions

	
Side View (SFF/SFP-based Version)	Optical Port View (RJ, SFF/SFP version)
	
Side View (RJ-based Version)	Copper Port View (RJ, SFF/SFP version)

### Environmental Specifications

Operating Temperature	-20 <sup>0</sup> C to 70 <sup>0</sup> C case version
Storage Temperature	-55 <sup>0</sup> C to 125 <sup>0</sup> C
Operating Humidity	5% to 85% non-condensing

### Product Weight and Dimensions

RJ Version	(1.15" D x 3.05" L) [29.21mm D x 77.47mm L]
SFF/SFP Versions	(1.15"D x 3.85" L) [29.21mm D x 97.79mm L]

### Part Numbering And Ordering

RJ-Based Optical Interface Options	
Part Number	Optical Operation
LS-SX-BC	850nm 1000Base-SX (1 Gbps)
LS-LX-BC	1310nm 1000Base-LX (1 Gbps)
SFF-Based Optical Interface Options	
Part Number	Optical Operation
LS-SFF-SX-BC	850nm 1000Base-SX (1 Gbps)
LS-SFB-M-35-BC	Bi-Directional 1310Tx/1550Rx (100 Mbps)
LS-SFB-M-53-BC	Bi-Directional 1550Tx/1310Rx (100 Mbps)
LS-SFB-G-35-BC	Bi-Directional 1310Tx/1550Rx (1 Gbps)
LS-SFB-G-53-BC	Bi-Directional 1550Tx/1310Rx (1 Gbps)
SFP-Based Optical Interface Options	
Part Number	Optical Operation
LS-SFP-BC	MSA compliant SFP (100 Mbps or 1 Gbps)

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