COTSWORKS®

Lightning Stick

Software User's Guide

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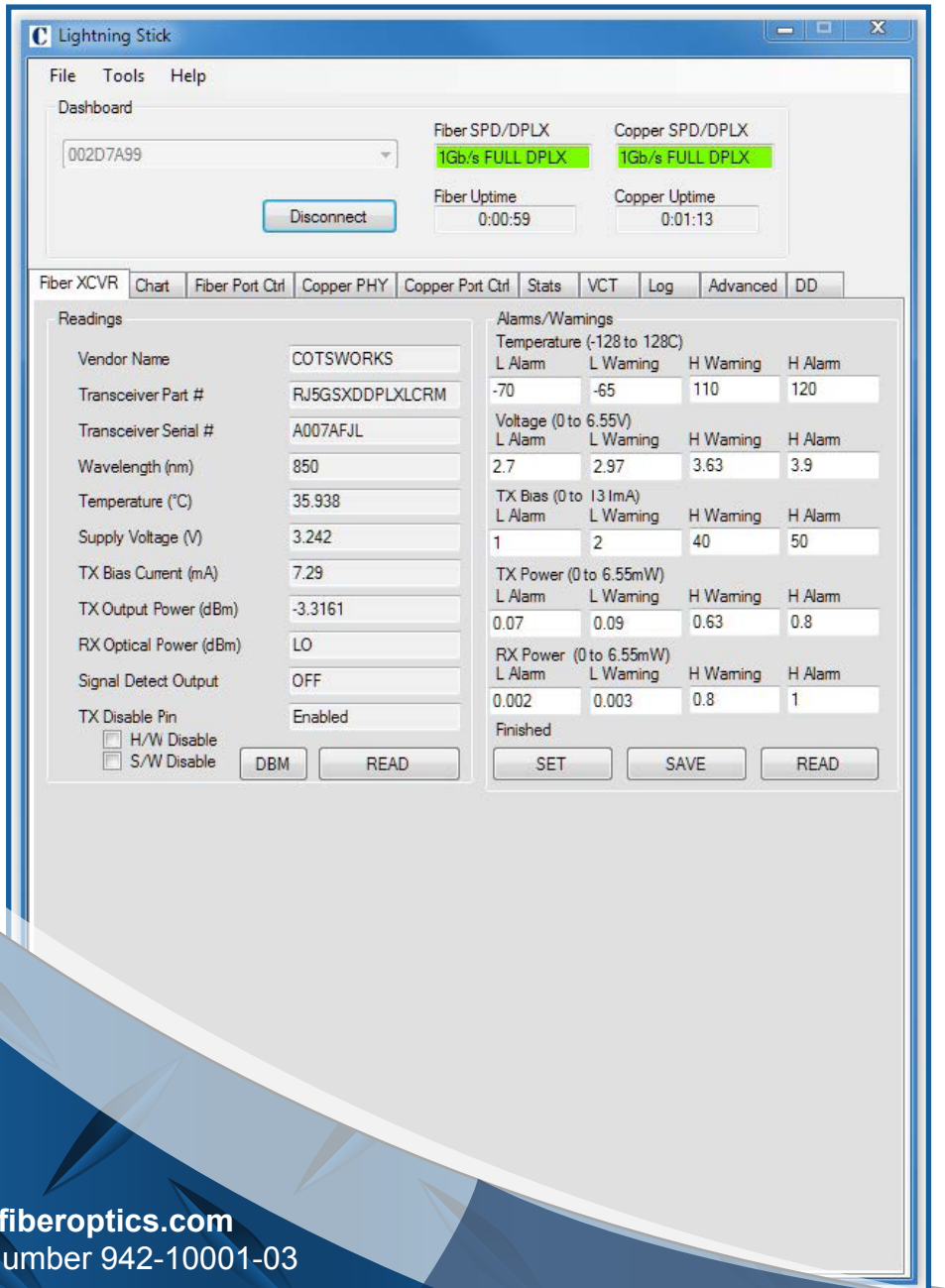
3. Introduction

Lightning Stick software greatly simplifies the media converter diagnostics capabilities and initialization in a graphical user interface. The dashboard panel allows for an easy glance at link status with categories of the data path control and diagnostics arranged in logical tabs. Fiber diagnostics can be tracked and monitored on a visual chart recorder graph. Both fiber and copper PHY and port control functions are monitored and configurable. Advanced features and monitoring include compilation of good/bad packet counts passing through the converter, a virtual cable tester that identifies possible faults and distance to fault on the copper port, a log table of user activity and converter events, and control register data dumps to/from a file.



■ Figure 1: Lightning Stick GUI

4. Relevant Documents

1. Lightning Stick Data Sheet – document number 944-00046-xx, found at: https://www.cotsworks.com/lightning-stick
2. Lightning Stick Software – document number 972-00003-xx, found at: https://www.cotsworks.com/lightning-stick

5. Lightning Stick Hardware: Connections

Lightning Stick is a media converter with one RJ-45 copper Ethernet connector, 1 LC full-duplex fiber connector and a micro-USB connector. The Ethernet port is capable of handling any duplex 10/100/1000Mbps Ethernet connection via RJ-45 connector. The Fiber port is capable of 100/1000Mbps speeds via LC fiber connection (simplex or duplex, depending on transceiver type. Multimode or single mode fiber, depending on transceiver type.)The micro-USB connector provides power to Lightning Stick as well as the interface to a PC running Lightning Stick Software. Power can also be applied to a 0.1” center 2-pin connector on the Lightning Stick board in OEM versions (without the case).

■ Figure 2: LS Optical (left) and Electrical (right) connections

- Connect the micro-USB end of the USB cord to the Lightning Stick
  - Connect the other end (standard USB) to PC USB port or a USB hub connected to the PC
- Connect the Ethernet cable to the RJ-45 (copper) port on the Lightning Stick
  - Connect the other end of the Ethernet cable to the Ethernet interface on board
- Connect the appropriate fiber (multimode or single mode, wavelength dependent) to the Lightning stick to whatever device you are connecting to – switch, converter, test equipment, other Lightning stick.

NOTE: Even without the Lightning Stick Software running, the hardware should connect at the appropriate data rate and mode for the interfaces connected.

6. Lightning Stick Hardware

LED Indicators

The Lightning Stick has indicator LEDs on both the fiber and copper interfaces, allowing the user to verify power, operation, and link activity on both media.

Interface	LED Indicator	Operation	Status Indicator	Color	ID
RJ-45	Link/Activity/Speed	OFF	No Link (copper)	Green	LED0
		ON	Link (copper)		
		BLINK	Rate indicates link speed		
RJ-45	Link/Type/Activity	OFF	No Link (copper)	Yellow	LED1
		ON	1G or 10G link (copper)		
		BLINK	Activity		
Fiber	Power	OFF	LS not powered	Yellow	LED10
		BLINK	LS Powered On		
Fiber	Link/Activity	OFF	No Link (fiber)	Yellow	LED11
		ON	1G or 10G link (fiber)		
		BLINK	Activity		

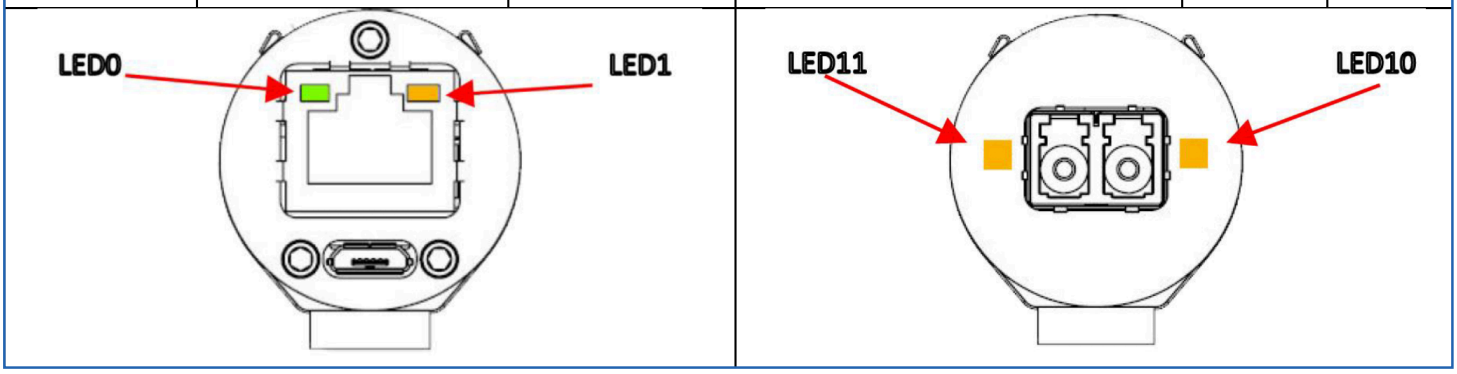
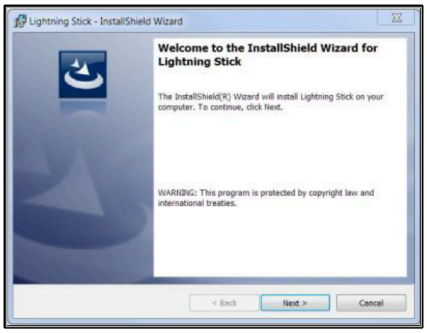


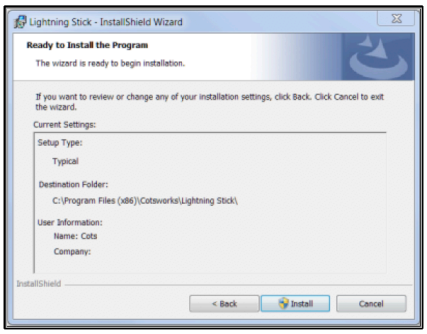
Figure 3: Lightning Stick Module LEDs

7. Lightning Stick Software
Installation

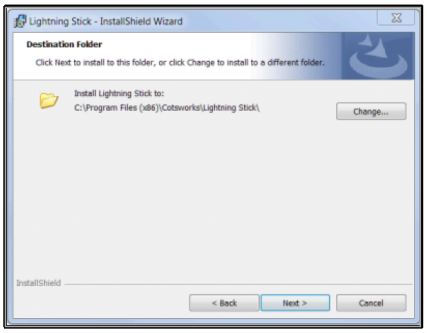
- The latest version of Lightning Stick software should be downloaded from: https://www.cotsworks.com/lightning-stick
- Verify that PC has administrative rights for software installation.
- Double click on setup.exe file to run software



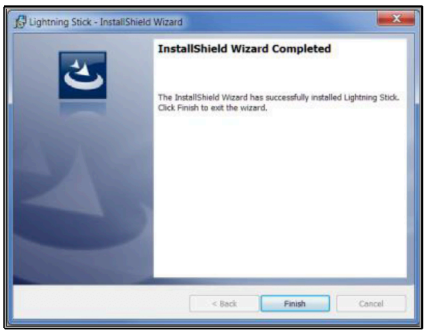
The InstallShield Wizard will install the Lightning Stick Software



Setup Parameters are verified and installation begins



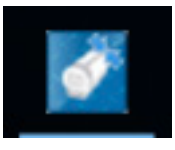
Default Directory is "C:\Program Files (x86)\Cotsworks\Lightning Stick\"
Directory can be changed from default at this point if desired



When the Wizard is completed, the software is ready for use

NOTE: Software uses native Windows drivers and requires no driver installation

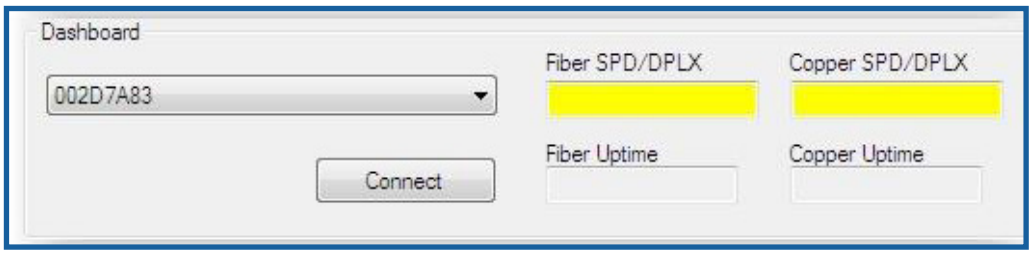
7.1 Lightning Stick Software
Running The Software



The Installation Software will create a desktop shortcut to the Lightning Stick Software. Click the icon and the software will launch. The following sections of this manual detail the features of the software, starting with the layout and how to connect to the Lightning Stick hardware via the dashboard.

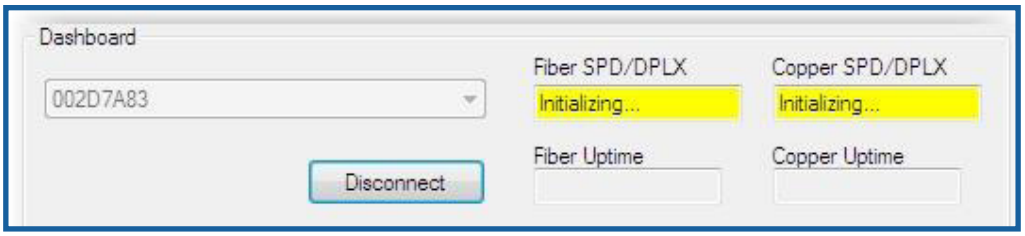
8. Lightning Stick Software
Dashboard

- The Dashboard is located in the upper section of the program window. This area is visible at all times as various tabs are viewed in the software.
- The upper left area of the dashboard is a drop-down menu which lists all Lightning Stick Modules (by serial number) that are connected to the computer or hub.



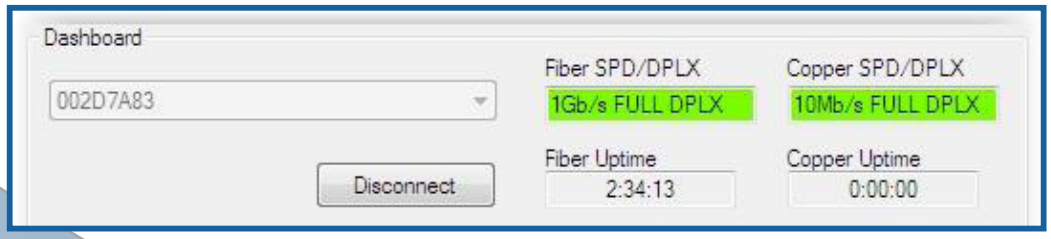
- *Figure 4: LS Dashboard Disconnected*

- When the Lightning Stick software is disconnected from the device, the Fiber and Copper port boxes will be yellow, and the action button will read **CONNECT**, indicating that the device can be connected to the software. Selecting one of the devices and clicking the **CONNECT** button will initialize the connection to the Lightning stick



- *Figure 5: LS Dashboard Intializing*

- One initialized, the dashboard will indicate connection by having the fiber and copper port boxes turn green and indicate their connection speed and type. The button will then read **DISCONNECT**



- *Figure 6: LS Dashboard Active*

9. LS Software Tabs
Overview and Features

9.1 Fiber Transceiver Tab Overview

The digital diagnostic information for the optical transceiver is displayed in this tab

- This tab lists all static data and dynamic variables available from the fiber transceiver installed in the Lightning Stick module
- The receiver status is reported
- The transmitter can be disabled via hardware or software
- High and Low warning and alarm levels for selected dynamic variables are read and can be modified in the Alarms/Warnings section.
- The dynamic variables reported in the readings tab can be plotted in the Chart Section
- Alerts can be toggled, and the handling of the alerts can be modified

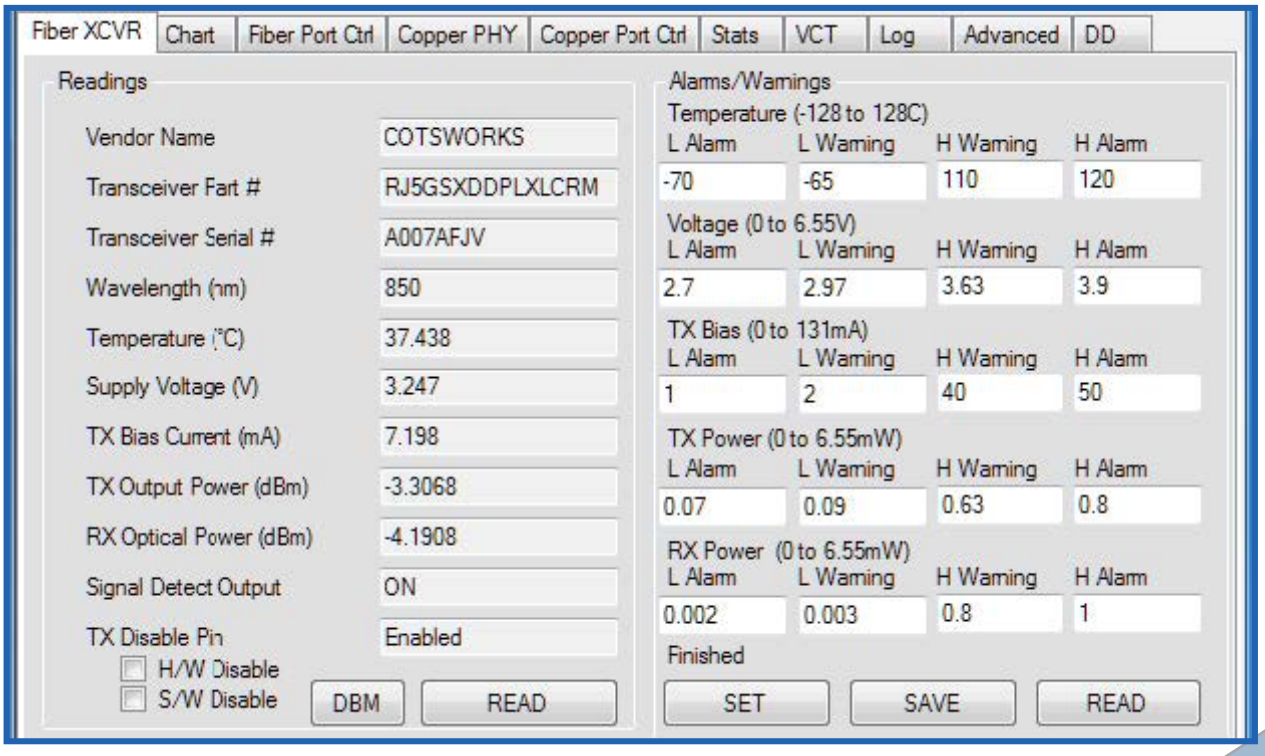
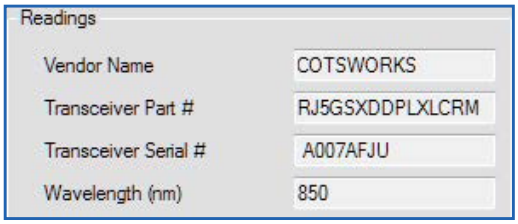


Figure 7: Fiber Transceiver Tab

9.1.1 Fiber Transcevier Tab
Readings Section

9.1.1.1 Fiber Transceiver Tab: Static Values

The following parameters are STATIC values that are read from the EEPROM. They are meant for identification and classification purposes in regards to the installed transceiver.



■ *Figure 8: Static Data*

Vendor Name
- Manufacturer Name of Transceiver Installed.

Transceiver Part #
- The permanently installed transceiver part number
- For pluggable transceivers, this allows the user to identify what transceiver is installed.

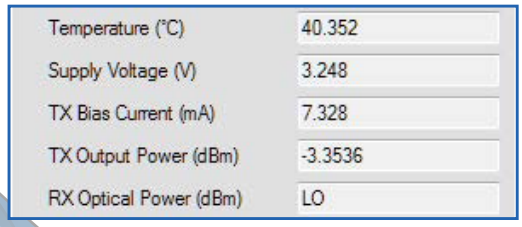
Transceiver Serial #
- The serial number of the transceiver installed in the Lightning Stick

NOTE: This is NOT the serial number of the Lightning Stick device.

Wavelength
- Transmitter wavelength (LED or laser) in nanometers (nm).

9.1.1.2 Fiber Transceiver Tab: Dynamic Values

The following parameters are DYNAMIC values that are collected from the transceiver as electrical values and calculated based on EEPROM-based calibration values.



■ *Figure 9: Dynamic Variables*

Temperature
- This value is the temperature read from the fiber transceiver controller IC within the housing of the transceiver.
  - This value is given in degrees Celsius
  - The value should be within the operating range of the transceiver based on the specifications of the device.

Supply voltage
- The supply voltage (Vcc) of the fiber transceiver
  - SFP/SFF/RJ transceivers all operate using a Vcc of 3.3V.

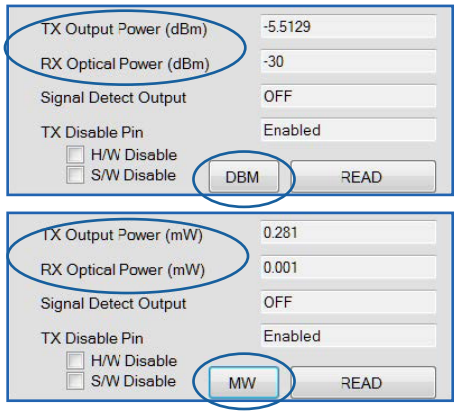
Tx Bias Current
- The current draw for the transmitter, given in mA
  - Data rate and Transmitter type dependent – see data sheet.

Tx Output power
- Optical (transmitted output) power of the transmitter.

Rx Optical power
- Optical (received input) power of the receiver.

9.1.1.3 Fiber Transceiver Tab: Optical Power Units

TX Output Power and RX Optical Power can be displayed in mW or dBm.



- *Figure 10: dBm/MW Toggle*

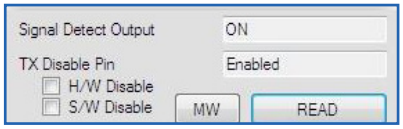
Clicking **DBM** or **MW** next to **READ** will toggle between the two representations

- This will also update the units displayed in the Readings Table
- It is not necessary to click **READ** to see the value of the TX/RX values when toggling units

NOTE:
The EEPROM of the transceiver reports optical power in mW. However, optical network designers typically work with dBm, so both units are available for use.

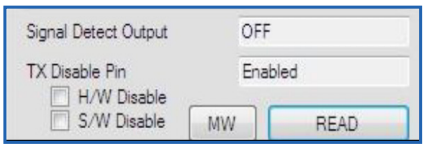
9.1.1.4 Fiber Transceiver Tab: Signal Detect/Tx Disable

In normal operation, the Signal Detect Output displays “ON” to designate that a signal is detected.

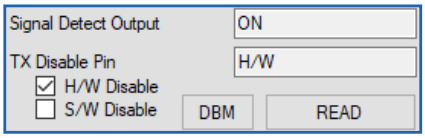


- *Figure 11: Rx/Tx Toggles*

In normal operation, the TX Disable Pin is “Enabled” when the laser is on, indicating that the transmitter is enabled and transmitting light.

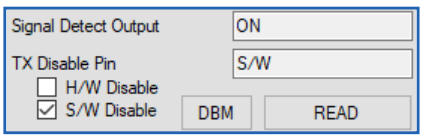


When no signal is detected (no light or low light received), the Signal Detect Output displays “OFF” to indicate that either there is an issue with the connection to the other end of the link.



The Lightning Stick software allows the user to disable the transmitter, both via hardware or software. Toggle the check box to select.

Here, H/W Disable selection is shown.
(Click **READ** after toggle)



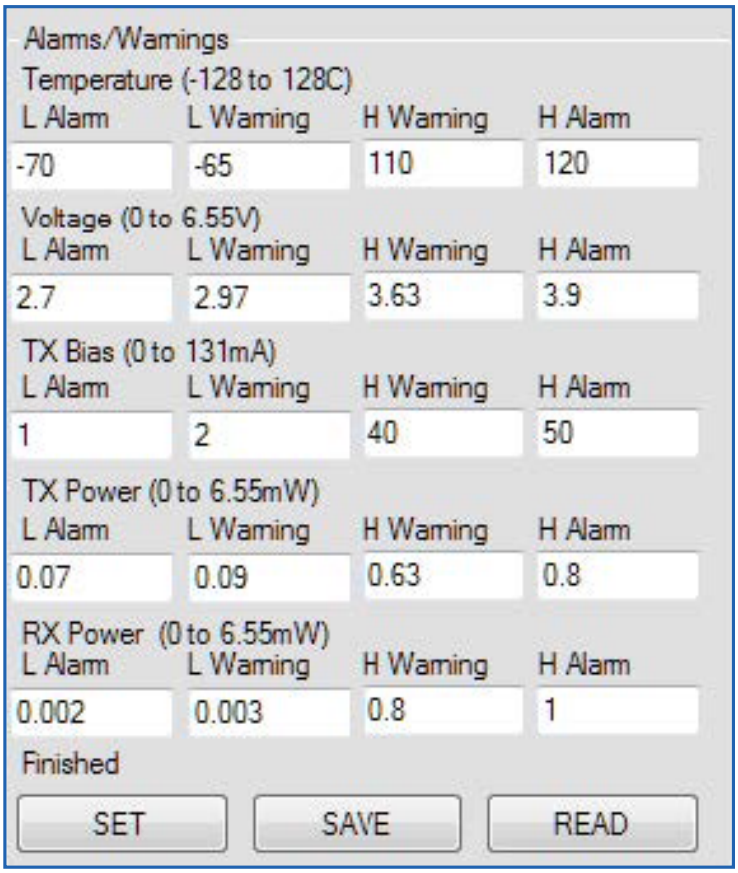
Here, S/W Disable selection is shown.
(Click **READ** after toggle)

- *Figure 12: SD Off; HW,SW, TX_DIS*

9.1.2 Fiber Transcevier Tab

Alarms/Warnings Section

The high and low warning and alarm levels are set and read in this window.



- *Figure 13: Alarms/Warnings Settings Table*

Any value typed in each field will be written to the fiber transceiver when SET button is pressed.

Verification of the values within these fields is obtained by clicking the READ button to access the memory map's stored values.

The range of values for each parameter is given in parentheses after the parameter name.

9.1.3 Chart Tab

Chart Settings

The software allows plotting of the dynamic variables behavior over time.

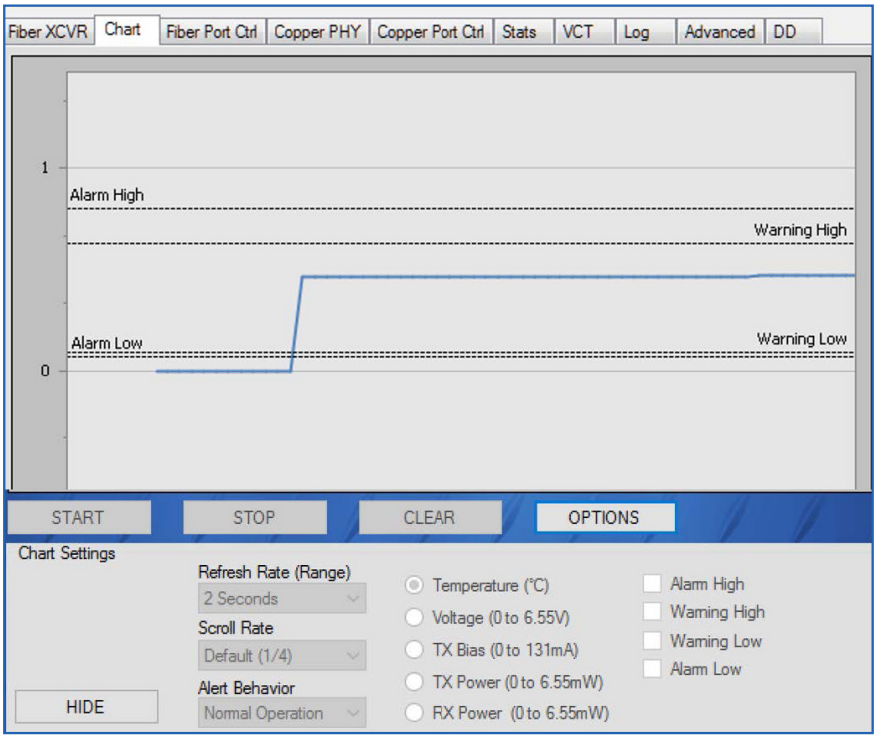


Figure 14: Chart Tab

Values that can be plotted in the chart tool are:

- Temperature (°C)
- Voltage (V)
- Tx Bias Current (mA)
- Tx Output Power (mW)
- Rx Input Power (mW)

The refresh rate can be modified

- 2 seconds
- 10 seconds
- 30 seconds
- 1 minute
- 30 minutes
- 1 hour

The scroll rate can also be modified.

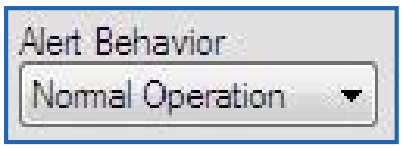
- 1/4 (default)
- 1/8
- 1/16
- 1/32

If Warning/Alarm values are set (see section Alarms/Warnings), they can be displayed in the chart by toggling the check box

- Alarm High/Low
- Warning High/Low

9.1.3 Fiber Transceiver Tab: Chart Section

Alert Behavior Settings



- If the warning/alarm values are exceeded, the user can define how to deal with the behavior.
- When warnings or alarm thresholds are crossed, a pop-up window will alert the user of condition.
- If the warning/alarm condition persists, an alert window will continue to appear warning of the condition.

This behavior can be modified in the **ALERT BEHAVIOR** drop down.

- Normal Operation will allow a pop-up window to appear persistently as long as the warning/alarm thresh old has been crossed.
- Show Once will not allow a pop-up window to repeat a warning/alarm once acknowledged.
- Disable will not allow any alert window to appear.

9.1.3.1 Fiber Transceiver Tab: Chart Section

Chart Recorder Window

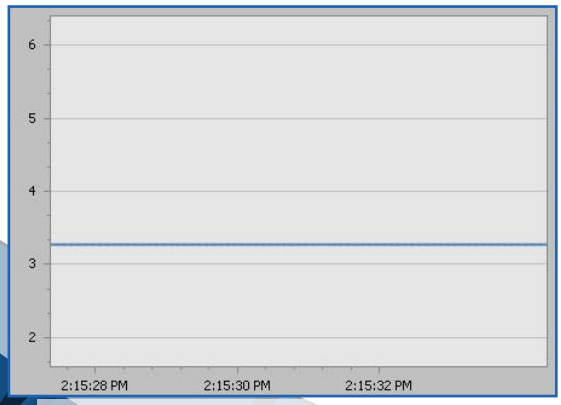
When the dynamic variable of interest is selected, the user can enable the plotting of the parameter over time, based on the selections made in the Chart Settings Section (See Section 9.1.6).

To start plotting the performance of the selected parameter, click **START.**

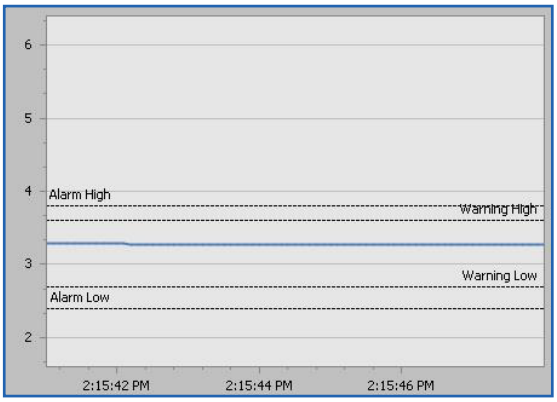
To stop the plot but keep it viewable, click **STOP.**

To clear the plot, click **CLEAR.**

The following images show the chart without alarm/warning thresholds shown, and with the thresholds displayed. This example shows the supply voltage value (Vcc) over time.



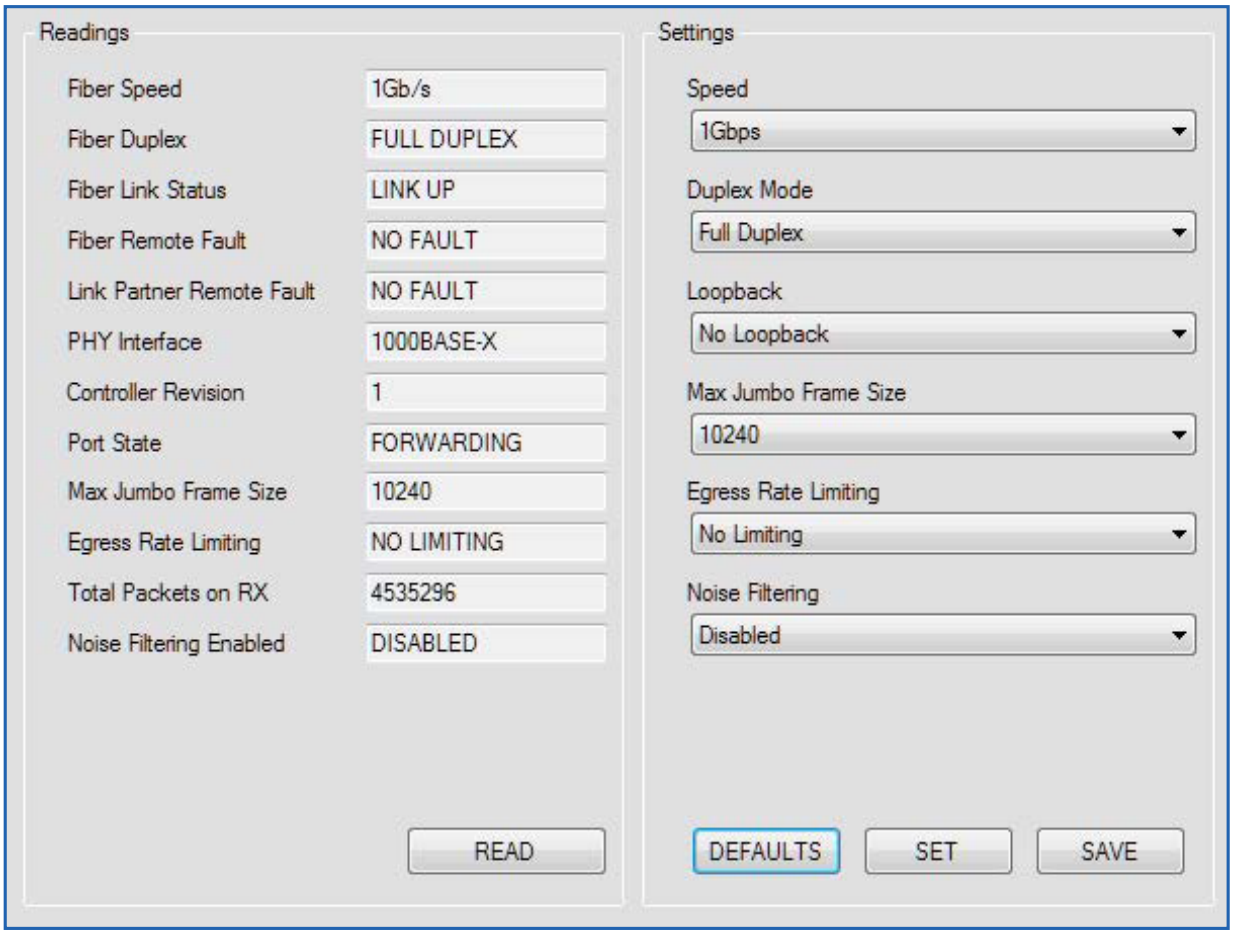
- *Figure 15: Vcc Charted No Rails*



- *Figure 16: Vcc Charted Rails*

9.2 Fiber Port Control Tab

Features of the Marvell Ethernet controller used in the Lightning Stick allow for flexible control and advanced monitoring of Ethernet traffic. The options and policy for handling traffic for the fiber port are presented on the Fiber Port Control tab.

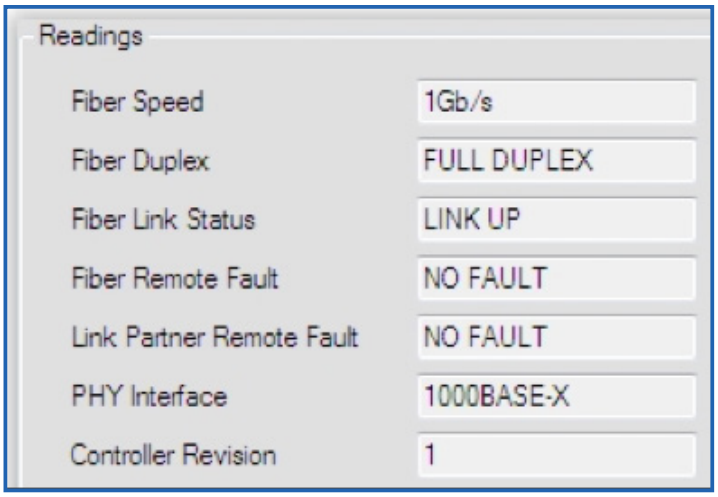


■ *Figure 17: Fiber Port Control Tab*

■ The readable parameters are listed in the left-hand column of the Fiber Port Control tab under the Readings Section, and are updated after clicking **READ**.

9.2.1 Fiber Port Control Tab
Readings Section

The following sections provide descriptions of the 'Readings' parameters in the order they are listed.



■ *Figure 18: Fiber Port Readings (A)*

Fiber Speed
- Lightning Stick is capable of supporting and will report either 100 or 1Gb/s Ethernet speed over fiber.
- The copper port is independently capable of 10/100/1Gb/s data rates.

Fiber Duplex
- Lightning Stick is capable of supporting half-duplex at 100Mbps
- Full duplex at 100/1000Mbps speeds on the fiber port.

Fiber Link Status
- Reports the link status between it and its link partner as either 'UP' and working or 'DOWN'.

Fiber Remote Fault
- If a remote fault condition is detected, Lightning Stick will report a remote fault condition.

Link Partner Remote Fault
- Will list if its link partner is reporting a remote fault status.

PHY Interface
- The PHY interface supported is reported.

Controller Revision
- The controller die revision as reported by Marvell.

9.2.1.1 Fiber Port Control Tab
Port State

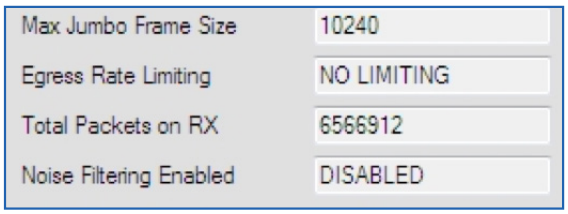
The Lightning Stick Software will report one of the fiber port states as described in Table 1.

Port State	Description
Disabled	Frames are not allowed to enter (ingress) or leave (egress) a Disabled port. Learning does not take place on Disabled ports.
Blocking/Listening	Only management frames are allowed to enter or leave a blocked port. All other frames are dropped. Learning is disabled on blocked ports.
Learning	Only management frames are allowed to enter or leave a Learning port. All other frame types are dropped but learning takes place on all good non-management frames.
Forwarding	Normal operation. All frames are allowed to enter and leave a Forwarding port. Learning takes place on all good non-management frames.

- *Table 1: Fiber Port States*

9.2.1 Fiber Port Control Tab

Port Controls



- *Figure 19: Fiber Port Readings (B)*

Max Jumbo Frame Size
Tx and Rx frames with defined maximum byte counts can be allowed to be received or transmitted.

Settings:

- 1522 bytes
- 2048 bytes
- 10240 bytes

Egress Rate Limiting
The data bit rate leaving the fiber port can be controlled or left unlimited.

Settings:

- No Limiting
- 1 Mbps
- 5 Mbps
- 8 Mbps
- 12 Mbps
- 15 Mbps
- 24 Mbps
- 50 Mbps
- 80 Mbps
- 150 Mbps
- 240 Mbps
- 500 Mbps

Total packets on Rx
A running total of packets received over the fiber port are counted and updated after clicking **READ.**

Settings:

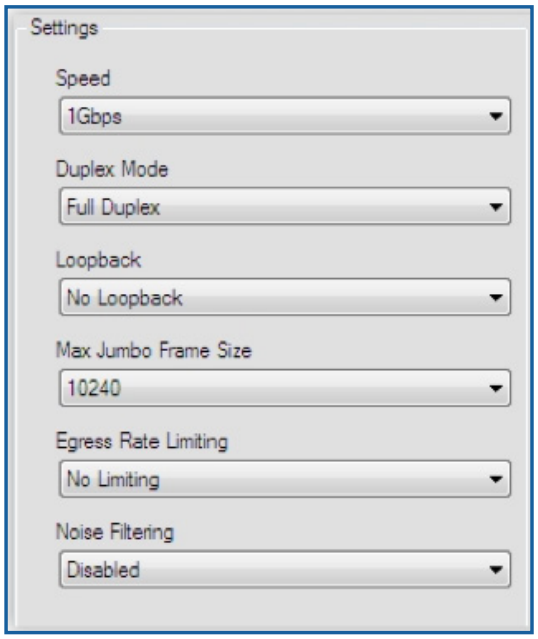
- Disabled
- 100BASE-FX
- 1000BASE-X
- Both

Noise Filtering
An unconnected optical receiver will send full swing noise into the PHY.
This random noise CAN look like a real signal.
Can falsely cause the PCS to link up.
Enable Noise Filtering to reduce the probability of false link up.
When the state machine is enabled, there will be a small delay in link up time.

9.2.2 Fiber Port Control Tab

Settings Section

Configurable options of the fiber port are listed on the right side 'Settings' column of the Fiber Port Control tab.
A number of options can be selected in each parameter's drop-down window. They can be modified and will persist until a power cycle by clicking the "SET" buton. They are written to the Lightning Stick controller and will remain as the settings for that parameter after a power cycle by clicking the 'SAVE' button. The "DEFAULT" button will return the parameters to their factory-default settings.



- *Figure 20: Fiber Port Settings*

Fiber Speed
The user can force a fiber port speed or allow for auto-negotiation
Options:

- Auto-Detect
- 100Mbps
- 1Gb/s

Duplex Mode
The fiber port is capable of supporting:

- Half-duplex at 100Mbps
- Full duplex at 100/1Gb/s

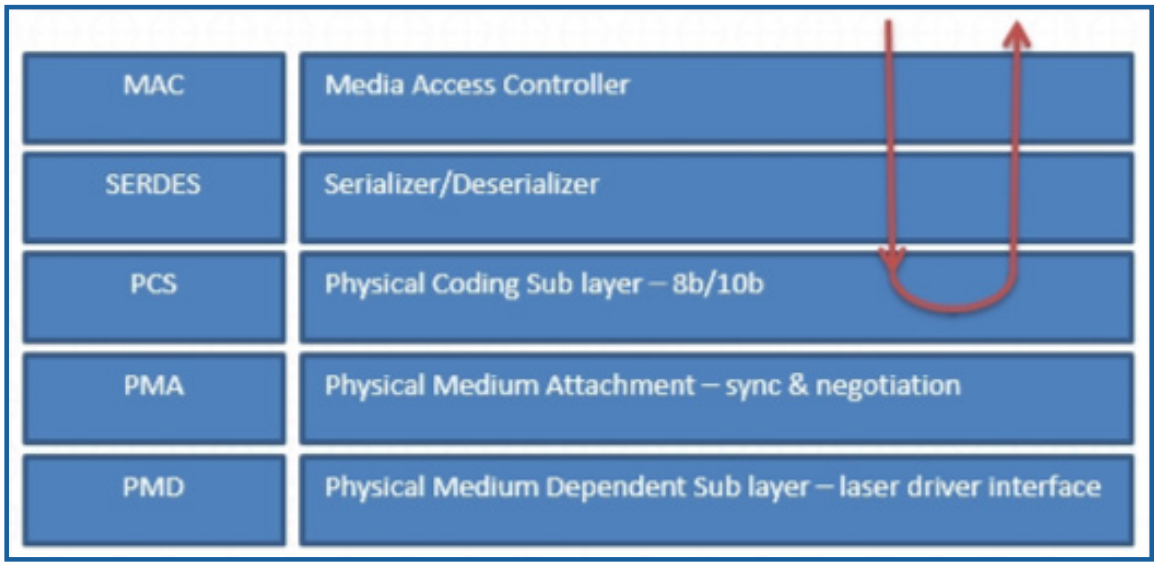
Loopback
Three levels of loopback modes are supported on the fiber port:

- Internal Bus
- SERDES
- External (physical fiber)

9.2.2 Fiber Port Control Tab
Settings Section

Internal bus loopback
- The transmitter data presented on TXD of the internal bus is looped back to RXD of the internal bus
- Note: Link is broken when loopback is enabled
- Loopback speed operates at the existing data rate

SERDES loopback
- Loops back symbols through the PCS
- Tx and Rx can be asynchronous



- *Figure 21: SERDES loopback data path*

External Loopback
- This mode allows to self-link at 1Gbps and allows the actual external loopback.
- The MAC should see the same packets it sent.

9.2.2.2 Fiber Port Control Tab

Port Controls

Max Jumbo Frame Size
Tx and Rx frames with defined maximum byte counts can be allowed to be received or transmitted.

Settings:

- 1522 bytes
- 2048 bytes
- 10240 bytes

Egress Rate Limiting
The data bit rate leaving the fiber port can be controlled or left unlimited.

Settings:

- No Limiting
- 1 Mbps
- 5 Mbps
- 8 Mbps
- 12 Mbps
- 15 Mbps
- 24 Mbps
- 50 Mbps
- 80 Mbps
- 150 Mbps
- 240 Mbps
- 500 Mbps

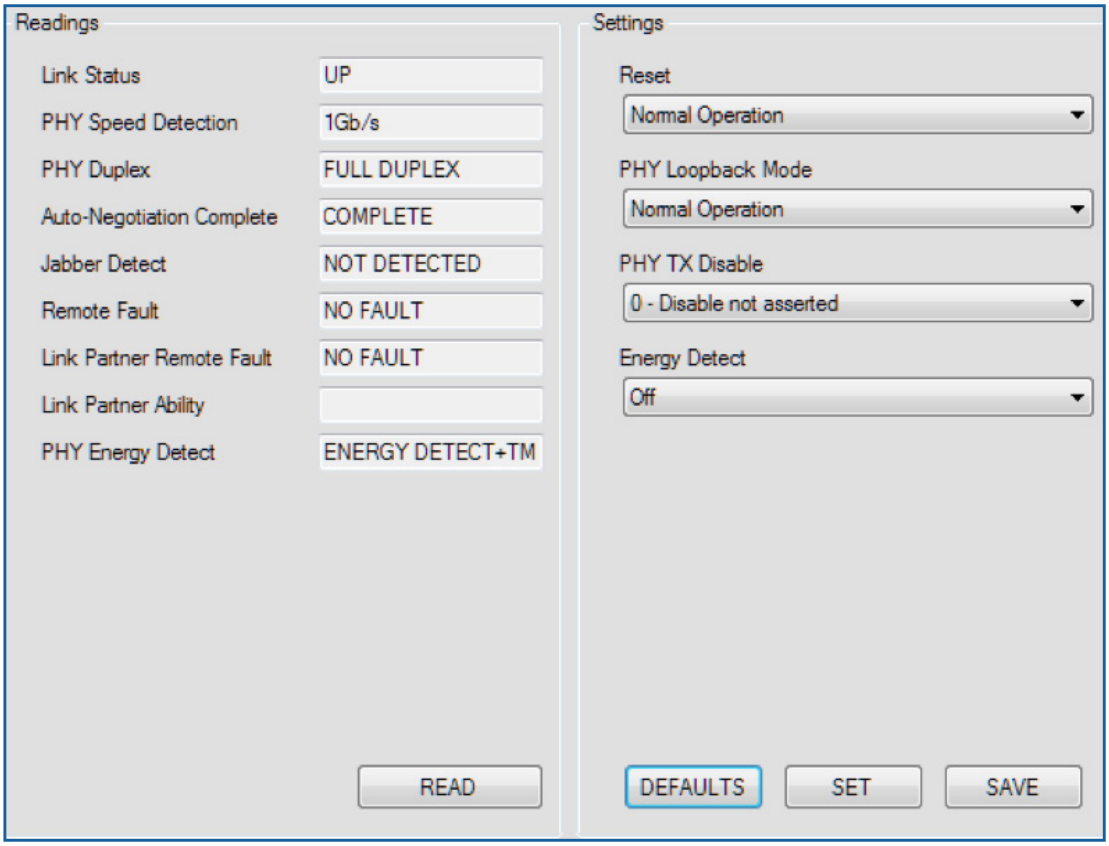
Noise Filtering
An unconnected optical receiver will send full swing noise into the PHY. This random noise can look like a real signal. Can falsely cause the PCS to link up. Enable Noise Filtering to reduce the probability of false link up. When the state machine is enabled, there will be a small delay in link up time.

Settings:

- Disabled
- 100BASE-FX
- 1000BASE-X

9.3 Copper PHY Tab

The options on the copper port PHY are presented on the Copper PHY tab.



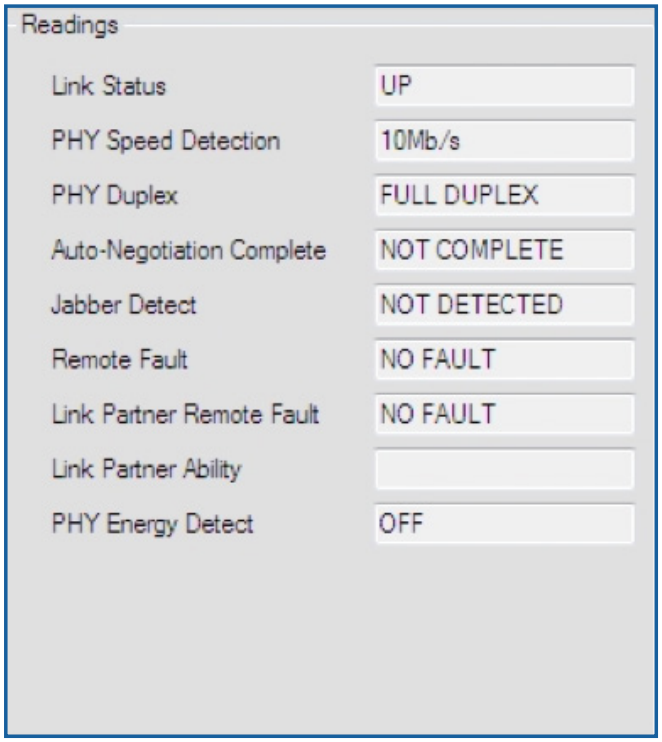
■ *Figure 22: Copper PHY Tab*

The readable parameters are listed in the left-hand column of the Copper PHY tab under the Readings Section, and are updated after clicking **READ**.

9.3.1 Copper PHY Tab

Readings Section

The following section provide descriptions of the 'Readings' parameters in the order they are listed.



- *Figure 23: Copper PHY Readings*

Link Status (Copper)

- Reports link status between Lightning Stick and its link partner.
- **UP or DOWN**

PHY Speed Detection

- Reports the maximum speed detected for a link to occur between it and its link partner.
- An Ethernet speed of 10/100 or 1000Mbps Ethernet data rate will be reported.

PHY Duplex

- Supports half-duplex at 10 and 100Mbps and full duplex at all speeds on the copper port

Auto-negotiation Complete

- Auto-Negotiation provides a method to establish a common speed, duplex and flow control during a link session.
- Upon successful Auto-Negotiation, the
- 'COMPLETE' status is displayed.
- Can be disabled by forcing a set speed and duplex mode in the Copper Port Control window.

Jabber Detect

- In networks, a jabber is any device that is handling electrical signals improperly, usually affecting the rest of the network and in most cases can look like a device that is always sending.
- A jabber can have a longer than maximum frame length, also referred to as "long packet error."

Remote Fault

- Will report a remote fault condition if a remote fault condition is detected.

Link Partner Remote Fault

- Will display "FAULT" if link partner is reporting a remote fault status.

Link Partner Ability

- The link partner's fastest broadcasted speed and duplex is displayed.

9.3.1.1 Copper PHY Tab

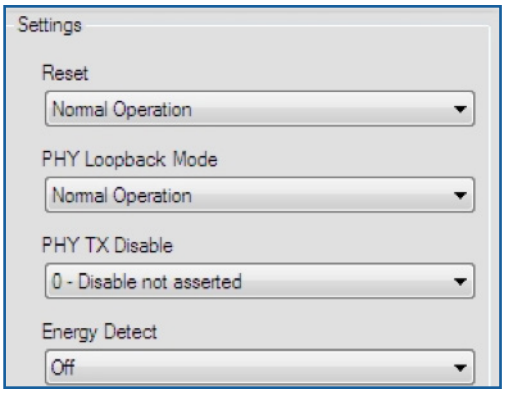
Energy Detect

Lightning stick is capable of power savings by implementing Energy Detect on its copper port. There are two modes of Energy Detect.

- In Mode 1 (**Energy Detect**):
  - If Lightning Stick detects energy on the Receive line, it will attempt Auto-Negotiation for 5 seconds.
  - If at the end of 5 seconds, the Auto-Negotiation is not completed, the PHY will stop attempting to Auto-Negotiate and go back to monitoring the Rx energy.
- In Mode 2 (**Energy Detect + TM**):
  - Lightning Stick sends out an NLP (Normal Link Pulse) once every second in an attempt to wake up the connected link partner.
- If Lightning Stick is in Mode 1, it cannot wake up a connected device.
  - Therefore, the connected device must be in Mode 2 to complete a link between two nodes.

9.3.2 Copper PHY Tab

Settings Section



- *Figure 24: Copper PHY Settings*

Reset

- Normal: Auto-Negotiation occurs on a port reset or if Auto-Negotiation is specified in the PHY speed.
- S/W Reset must occur for modified speed and duplex modes to take effect.
  - A software reset on the copper port does not affect the fiber port.

PHY Loopback mode

- When PHY loopback is activated, the data presented on the TXD is looped back to the RXD internally. Link is broken when loopback is enabled.

Copper Transmitter Disable

- A power savings feature allowing manual control of enabling or disabling copper transmitter.
- Options:
  - 0: Disable NOT Asserted
  - 1: Disable Asserted

Energy Detect

- The Power Down modes, Mode 1 and Mode 2 described in the Energy Detect section.

9.4 Copper Port Control Tab

10a. The readable parameters are listed in the left-hand column of the Copper Port Control window under ‘Readings’ and are updated after clicking on the ‘READ’ button. Below are descriptions of the ‘Readings’ parameters in the order they are listed.

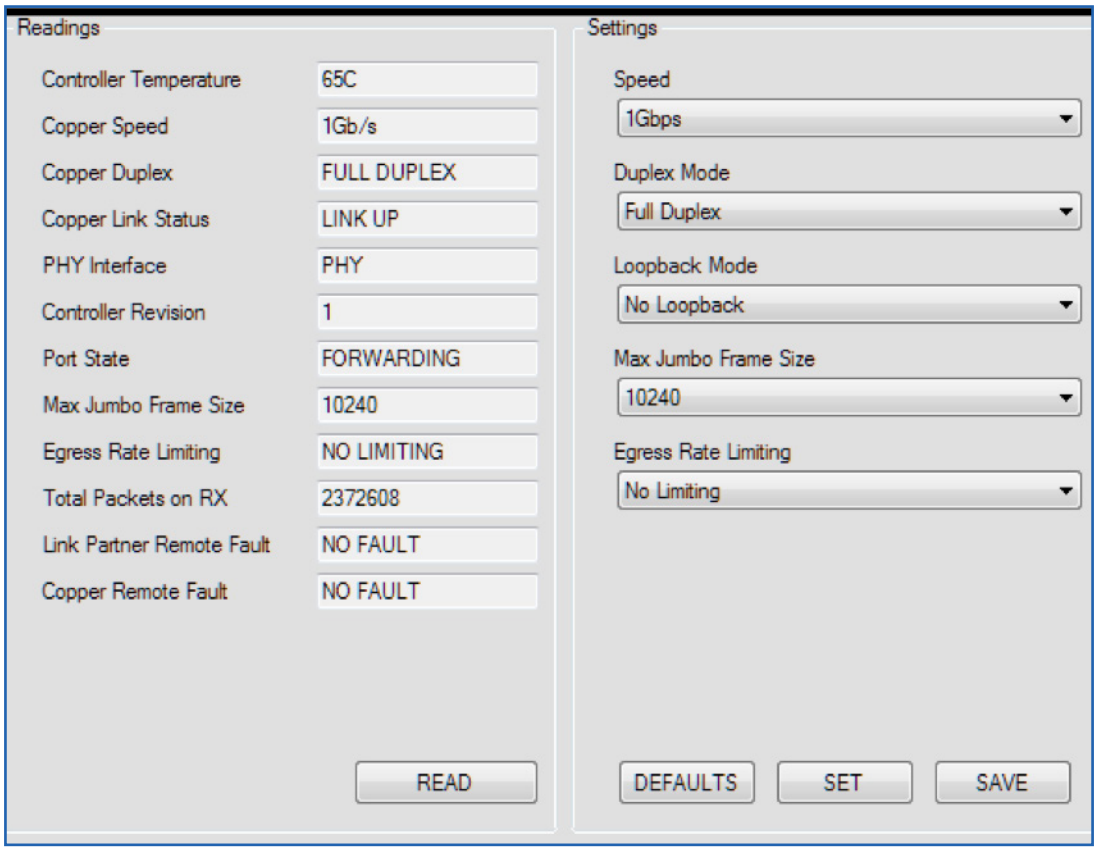
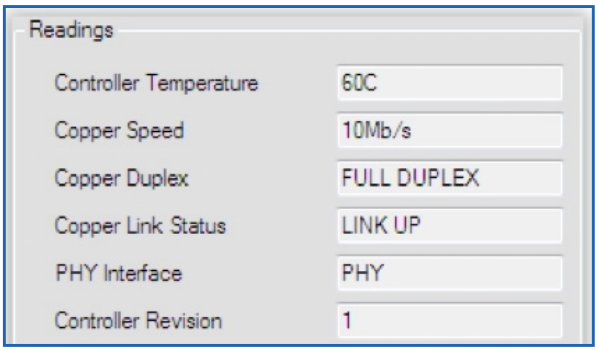


Figure 25: Copper Port Control Tab

9.4.1 Copper Port Control Tab:
Readings Section



■ *Figure 26: Copper Port Readings (A)*

Controller Temperature
■ Temperature of the Ethernet controller in °C

Copper Speed
■ Lightning Stick is capable of supporting and will report either 10, 100 or 1000Mbps Ethernet speed over copper.
■ The fiber port is independently capable of 100 or 1000Mbps data rates.

Copper Duplex
■ Lightning Stick is capable of supporting half-duplex at 10 and 100Mbps
■ Full duplex at 10, 100, or 1000Mbps speeds on the copper port.

Copper Link Status
■ Reports the link status between it and its link partner as either 'UP' and working or 'DOWN' and not working.

PHY Interface
■ The PHY interface supported is reported.

Controller Revision
■ The controller die revision as reported by Marvell.

9.4.1.1 Copper Port Control Tab:
Port State

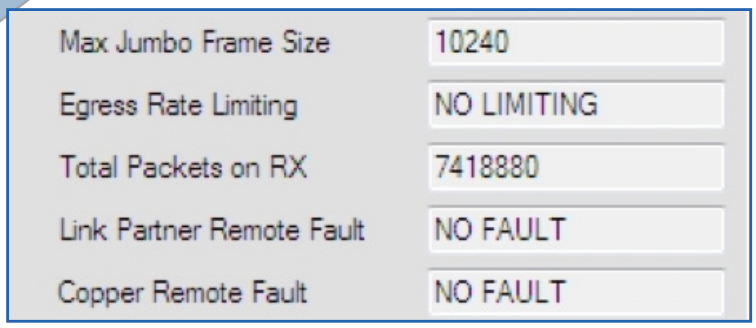
The Lightning Stick Software will report one of the copper port states as described in Table 2.

Port State	Description
Disabled	Frames are not allowed to enter (ingress) or leave (egress) a Disabled port. Learning does not take place on Disabled ports.
Blocking/Listening	Only management frames are allowed to enter or leave a blocked port. All other frames are dropped. Learning is disabled on blocked ports.
Learning	Only management frames are allowed to enter or leave a Learning port. All other frame types are dropped but learning takes place on all good non-management frames.
Forwarding	Normal operation. All frames are allowed to enter and leave a Forwarding port. Learning takes place on all good non-management frames.

■ *Table 2: Copper Port States*

9.4.1.2 Copper Port Control Tab:

Port Controls



- *Figure 27: Copper Port Readings (B)*

Max Jumbo Frame Size
Tx and Rx frames with defined maximum byte counts can be allowed to be received or transmitted.

Settings:

- 1522 bytes
- 2048 bytes
- 10240 bytes

Egress Rate Limiting
The data bit rate leaving the fiber port can be controlled or left unlimited.

Settings:

- No Limiting
- 1 Mbps
- 5 Mbps
- 8 Mbps
- 12 Mbps
- 15 Mbps
- 24 Mbps
- 50 Mbps
- 80 Mbps
- 150 Mbps
- 240 Mbps
- 500 Mbps

Total packets on Rx
A running total of packets received over the fiber port are counted and updated after clicking **READ**.

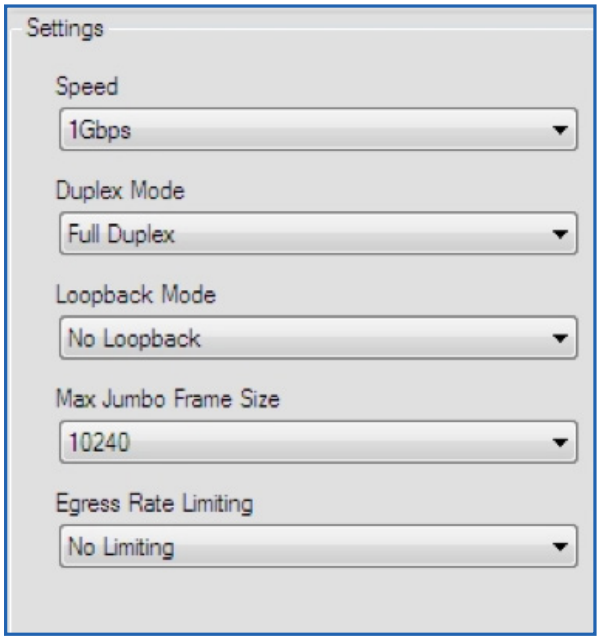
Link Partner Remote Fault
Will list if its link partner is reporting a remote fault status.

Copper Remote Fault
If a remote fault condition is detected, Lightning Stick will report a remote fault condition.

9.4.2 Copper Port Control Tab:

Settings Section

Configurable options of the copper port are listed on the right side ‘Settings’ column of the Fiber Port Control tab.
A number of options can be selected in each parameter’s drop-down window. They are written to the Lightning Stick controller after clicking the ‘SAVE’ button.



- *Figure 28: Copper Port Settings*

Copper Speed
The user can force a copper port speed or allow for auto-negotiation
Options:
- Auto-Negotiate
- 10Mbps
- 100Mbps
- 1Gb/s

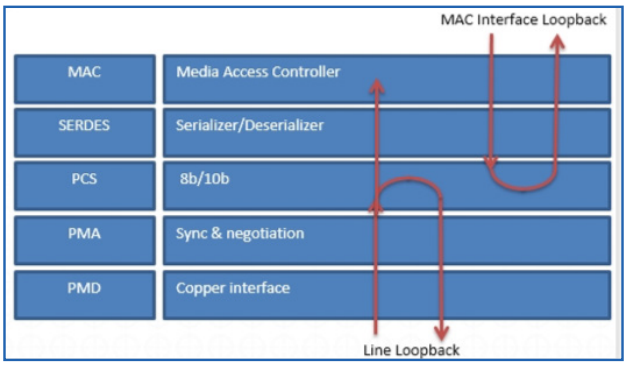
Duplex Mode
The copper port is capable of supporting:
- Half-duplex at 10 or 100Mbps
- Full duplex at 10, 100, or 1Gb/s

Loopback
Two levels of loopback modes are supported on the copper port:
- MAC Interface Loopback
- LINE Loopback

9.4.2.1 Copper Port Control Tab:
Loopback Modes

MAC Interface Loopback:
- The data received from the MAC is not transmitted out on the media interface.
- The data is looped back and sent to the MAC.
- During loopback, Link is lost and packets will not be received.

LINE Loopback:
- Allows a link partner to send frames into the device to test transmit and receive data path.
- Frames entering the PHY from a link partner, before reaching the MAC interface pins, are looped back and sent out on the line.
- They are also sent to the MAC.
  - The packets received on the MAC are ignored during line loopback.
- This allows the link partner to receive its own frames.



- *Figure 29: Copper Port Loopback*

Max Jumbo Frame Size
Tx and Rx frames with defined maximum byte counts can be allowed to be received or transmitted.

Settings:
- 1522 bytes
- 2048 bytes
- 10240 bytes

Egress Rate Limiting
The data bit rate leaving the fiber port can be controlled or left unlimited.

Settings:
- No Limiting
- 1 Mbps
- 5 Mbps
- 8 Mbps
- 12 Mbps
- 15 Mbps
- 24 Mbps
- 50 Mbps
- 80 Mbps
- 150 Mbps
- 240 Mbps
- 500 Mbps

9.5 Statistics Tab

Packet statistics are recorded in the port registers and updated in the Statistics table.
Values can be updated by clicking on ‘REFRESH’ or at a specified refresh interval.
The interval is set by entering a value (in seconds) and clicking ‘SET’.
Registers are cleared to 0 after clicking on ‘CLEAR’ button.

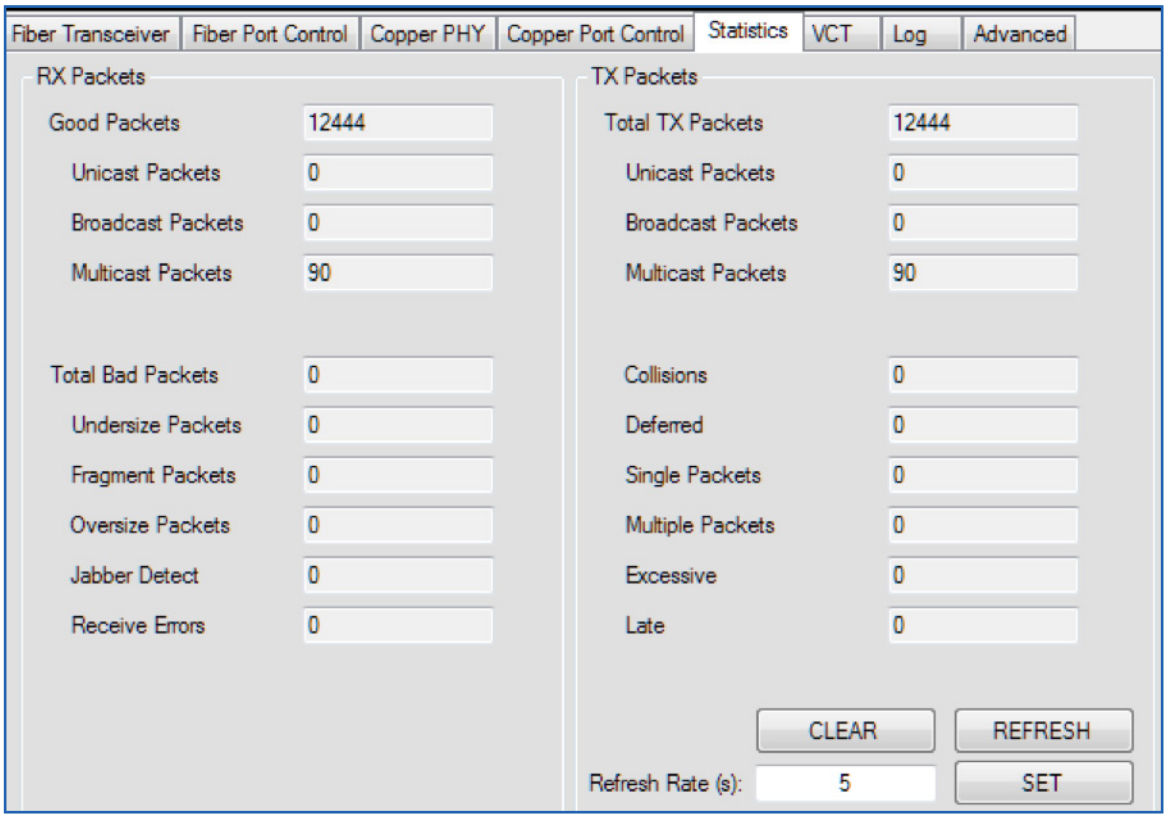


Figure 30: Statistics Tab

Good Packets	2739
Unicast Packets	0
Broadcast Packets	0
Multicast Packets	18
Total Bad Packets	0
Undersize Packets	0
Fragment Packets	0
Oversize Packets	0
Jabber Detect	0
Receive Errors	0

- *Figure 31: Rx Statistics*

otal TX Packets	16566
Unicast Packets	0
Broadcast Packets	0
Multicast Packets	121
Collisions	0
Deferred	0
Single Packets	0
Multiple Packets	0
Excessive	0
Late	0

- *Figure 32: Tx Statistics*

Rx Packets Section

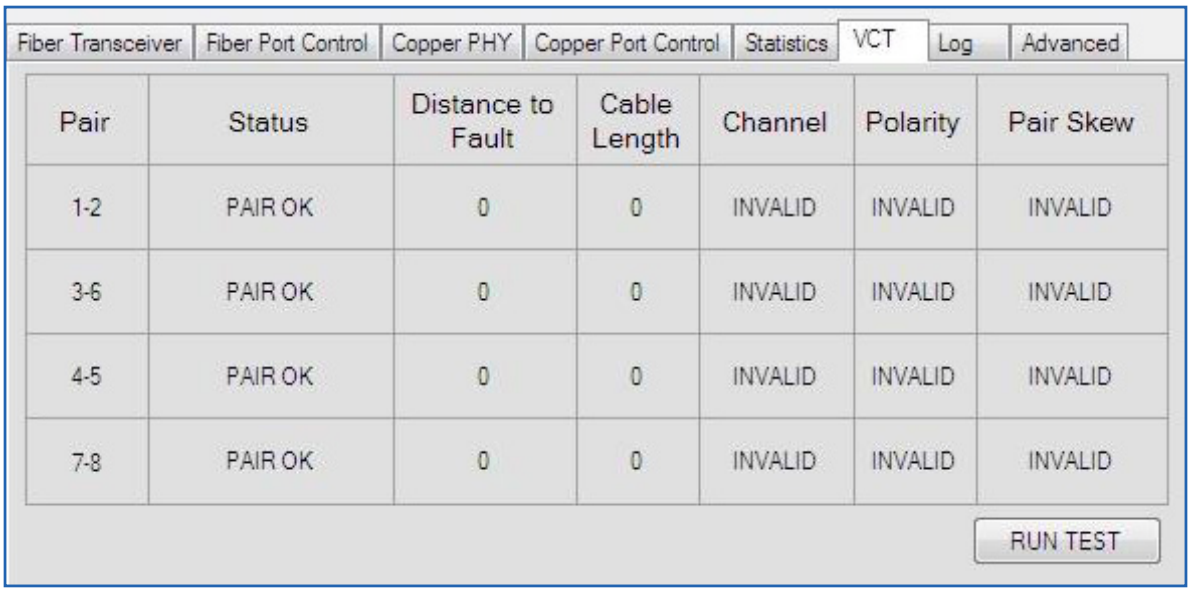
Reports the following:
- Good Packets Count
  - Unicast Packets
  - Broadcast Packets
  - Multicast Packets
- Total Bad Packets Count
  - Undersize Packets
  - Fragment Packets
  - Oversize Packets
  - Jabber Detect
  - Receiver Errors

Tx Packets Section

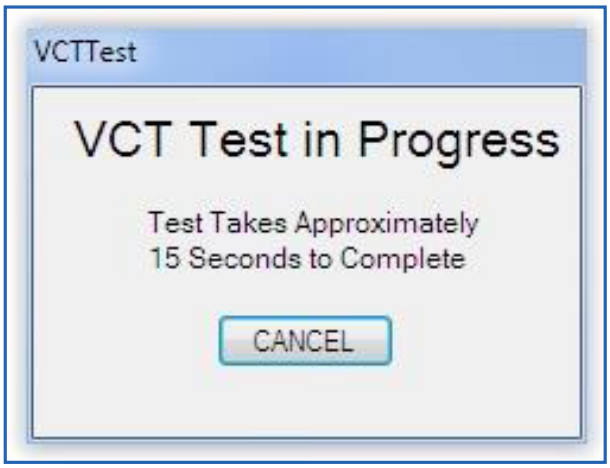
Reports the Following:
- Total Packets Transmitted
  - Unicast Packets
  - Broadcast Packets
  - Multicast Packets
- Collisions
- Deferred
- Single Packets
- Multiple Packets
- Excessive
- Late

9.6 Virtual Cable Test Tab

Lightning Stick's Virtual Cable Tester (VCTTM) feature consists of two separate diagnostic tools to evaluate cable signal integrity. The first diagnostic is based on TDR (Time Domain Reflectometry) where a pulse is sent out on each pair and reflections are observed on all pairs. The other VCT diagnostic feature is based on Digital Signal Processing (DSP). This feature is available when there is a Gigabit link established. It can determine cable length, pair skew, polarity reversal and channel swap. 'INVALID' is displayed in these fields when VCT is attempted and no Gigabit link is established. TDR can be used for two functions. The first function is to detect cable faults. These faults include opens, shorts, cable impedance mismatch, bad connectors and termination mismatch. The second function of TDR is to determine the cable length to a fault when there is a link partner physically connected, but no link established.



■ *Figure 33: VCT Chart*



■ *Figure 34: VCT In Progress Window*

9.7 Log Tab

The log page tab shows all system reporting and user actions taken in the Lightning Stick software. A log of all activities that occur in software and hardware when the Lightning stick software is running. The log is in a tabular format, and lists the following information:

- Time and Date of each event
- Type of event
  - INFO
  - DEBUG
- Event 'location'
  - Tab name
  - Section of a tab, such as "chart"
  - The application
- The device
- Message
  - A verbose message detailing information about that event
- The columns of the log file can be sorted by clicking on the header value of each column
- The log file can be saved to a text file if desired.
- It is space delimited.

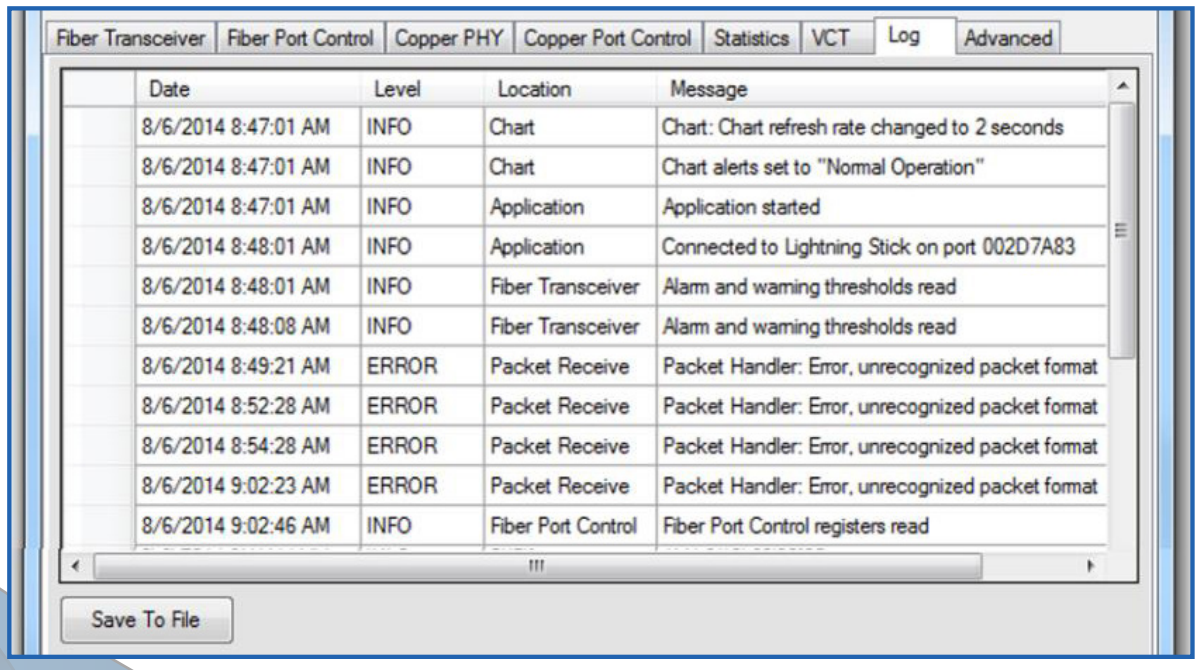


Figure 35: Log Tab

9.8 Advanced Control Register Dump

This tab is for an advanced function of providing a register dump of all control registers in Lightning Stick. They are partitioned into the register dump of the digital diagnostics on the fiber transceiver; PHY and SERDES Control Registers of Page 01h and Page 0Fh; Switch Control Registers of Page 11h and 15h; and Global Registers of Pages 1Bh and 1Ch of the Marvell Controller chip.

USERS SHOULD NOT ATTEMPT TO WRITE TO THESE REGISTERS ('Load From File' or 'Load Into Flash' BUTTONS) UNLESS INTIMATELY FAMILIAR WITH MARVELL's SWITCH ARCHITECTURE.

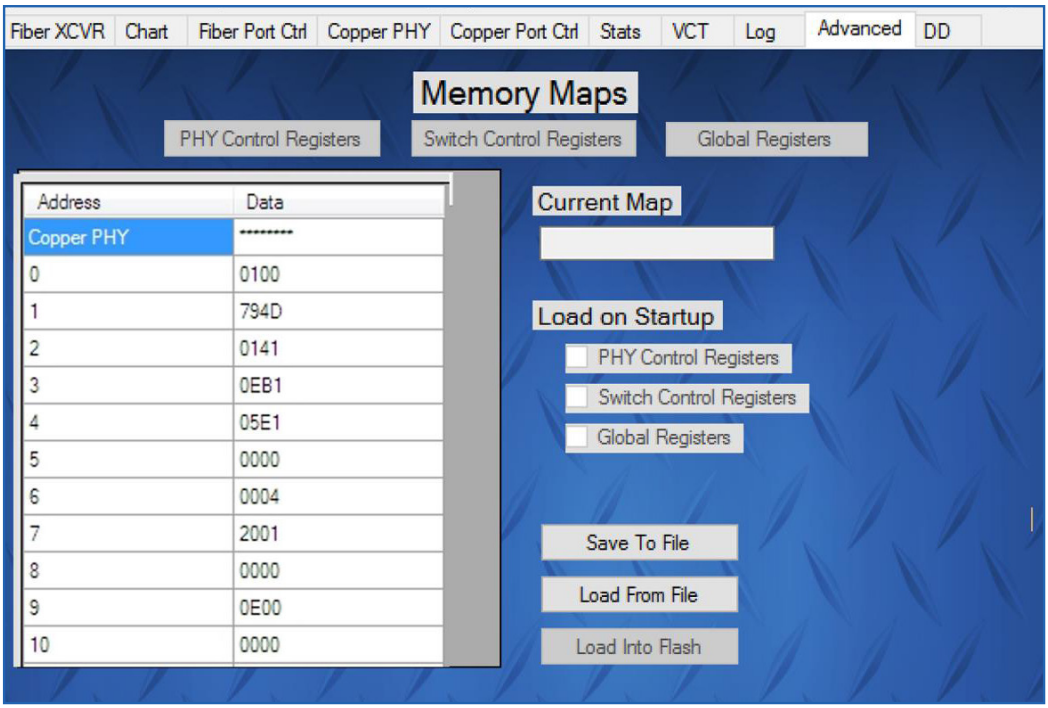


Figure 36: Advanced Tab

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