TELEDYNE LECROY
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SierraNet™ M648

Ethernet and Fibre Channel Protocol Test System

Key Features

- Analyze PAM4 Native Ethernet and Fibre Channel fabrics
  - 50/100/200GbE PAM4
  - 64GFC PAM4
- Fall-Back support for NRZ based links/speeds
  - 10/25/40/50/100GbE NRZ
  - 16/32GFC NRZ
- Layer 1 analysis support for link layer negotiation analysis
- Complete bi-directional capture of line rate traffic
- API for automation of test routines
  - Python scripts for popular Linux OS environments
  - Post capture, comprehensive analysis capabilities with Verification Script Engine™
- Deep memory buffers and pre-capture filtering for extended analysis needs
- 2U form-factor with optional rack mount kits
- Integrated 50GbE and 64GFC SFP-56 ports, backward compatible for SFP+ legacy applications
  - 4-Analog Pass Through
  - 4-Digital Re-Time
  - 2-QSFPCombination analog and digital
- Optical or copper cable connections supported

The Teledyne LeCroy SierraNet™ M648 is a highly advanced, fully integrated Ethernet and Fibre Channel protocol analysis and impairment system. The SierraNet M648 platform provides best in class traffic capture and manipulation for testing application or link characteristics. SierraNet M648 is the latest in the line of industry leading test and measurement tools from Teledyne LeCroy, designed for today's high-speed storage and communications fabrics. SierraNet M648 supports examination of Ethernet and Fibre Channel links utilizing both Pulse Amplitude Modulation 4 (PAM4) and legacy Non-Return to Zero (NRZ) technologies.

To achieve 50Gb Ethernet and 64G Fibre Channel data rates, the industry has adopted the use of PAM4 physical layer signaling technologies. PAM4 signaling offers advantages in doubling the effective data-rate, however, it has added more complexity to basic link connectivity. SierraNet M648 leverages Teledyne LeCroy's renowned physical layer test capabilities, applying non-intrusive, high-speed – "bump in the wire" – probing methodologies resulting in the industry's only Layer 1 protocol capture and analysis functionality.

Complete Coverage

The SierraNet M648 combines the exceptional Teledyne LeCroy expertise for physical layer testing with triggering, analysis and debug functions for a wide range of current and evolving SAN and LAN specific protocols (i.e. NVMe-oF™, NVMe/TCP, RoCE v1/v2, iSCSI, and TCP/IP). The SierraNet M648 supplies Ethernet and Fibre Channel test and validation engineers 100% complete visibility into all layers of the communication protocols.

The SierraNet M648 will support the PAM4 signaling requirements in Ethernet and Fibre Channel communications, as well as supporting the large-scale installation of legacy NRZ based 10/25GbE and 16/32GFC networks and SANs. The result is the M648 - the most versatile and capable fabric and network test and analysis platform available!

InFusion™

Teledyne LeCroy pioneered the art of "real time traffic" corruption and manipulation with the InFusion™ jamming and impairment tool software capabilities. Infusion is an integrated component of the NetProtocol Suite™ and used in conjunction with the SierraNet M648 provides users with intuitive and powerful tools for altering traffic and data patterns in the effort to determine the behavior of the test components. Extremely useful for problem recreation and remediation testing, the patented InFusion software may be used singularly or in automated test batch scenarios. For example, engineers may use InFusion for the disruption of stable links to observe recovery or fail over characteristics; test the capabilities of operating system drivers, or for introduction of corner case error conditions.

Connectivity

Networks or Fabrics under examination are connected to the M648 through either Small Form Factor Pluggable-56 (SFP-56) connectors, or Quad-Small Form Factor Pluggable Double Density-56 (QSFPDD-56) connectors.

For completely unaltered 50GbE and 64GFC traffic capture and analysis – a typical requirement when examining physical layer signaling – four (4) dedicated SFP56 analog pass through connections are provided. The SierraNet M648 has an additional 4-SFP56 digitally retimed ports dedicated for use with the InFusion impairment and jamming functions, in addition to supporting analysis. Ethernet 100GbE and 200GbE testing is accomplished via the multifunction QSFP-DD ports, supporting both analog pass through and digital retiming operational modes.

Users may daisy-chain multiple SierraNet platforms to examine higher port counts and analyze captured traffic across all systems in a single, easy to understand Net Protocol Suite™ trace view. SierraNet platforms may be connected via the CrossSync™ application to other Teledyne LeCroy protocol tools to observe traffic across multiple connections to understand how traffic, stimulus, or errors propagate across bridges or adapters.

Net Protocol Suite™

The Net Protocol Suite™ is a completely integrated software utility for use with the SierraNet products. It provides users with the ability to capture traffic, review, examine and annotate the resulting traces, create conditional triggering, filtering, or jamming profiles, and with its API functions supports powerful Python based automation capabilities.

Net Protocol Suite provides the most advanced triggering and filtering state machines available. Up to 24 states, with four transitions per state, and multiple trigger, filter, and timer conditions per capture project are standard features. Advanced triggering enables state-specific filtering to eliminate the capture of unwanted traffic, providing users intuitive and easy navigation to the information and events of importance.

Post capture analysis is augmented with the Verification Script Engine (VSE), providing users with advanced data processing tools for extensive investigation of the fabric or network, and the components under observation.

Specifications

Host Machine Minimum Requirements	Microsoft® Windows® 10, Windows 8.1, Windows 7, Windows Server 2012, Windows Server 2008R2; 2 GB of RAM; Storage with at least 200 MB of free space for the installation of the software and additional space for recorded data; display with resolution of at least 1024x768 with at least 16-bit color depth; USB 3.0 port and/ or 100/1000 Mbps Ethernet network interface. For optimal performance, please refer to our recommended configuration in the product documentation
Data Rates Supported	16, 32, 64G Fibre Channel; and 10, 25, 40, 50, 100, and 200* Gbps Ethernet (* via the QSFP-DD connections)
Recording Memory Size	64 GB in a single M648 platform
Host System Interface	USB 3.0 and 1Gb Ethernet
Front Panel Indicators	Three LEDs (Link, Speed, Status/ Errors) for each TX & RX pair, Status LCD Panel, Power LED
Front Panel Controls	Power ON/OFF, Menu Navigation and Selection Wheel
Front Panel Connections	Four (4) Analog Pass Through SFP-56 cages; four (4) Digitally Retimed SFP-56 cages; two (2) Analog Pass Through/Digitally Retimed QSFPDD-56 cages; two (2) SMA Trigger IN/OUT connectors; one (1) USB 3.0 compliant connector; one (1) 1GBASET connector
Rear Panel Connectors	AC Power, Expansion Port
Cascade and Expansion Capability	Up to 8 SierraNet Systems; 10/25/50GbE and/or 16/32/64GFC: Up to 32 Links; 40/100/200GbE: Up to 8 Links (Configuration and rates under test will affect these)
Dimensions (H x W x D)	Chassis: 88x432x356mm (3.5”x17”x14.1”) With Bumpers: 104x455x367mm (3.75”x17.9”x14.5”)
Weight	6.82Kg (15lbs)
Power Requirements	100-240VAC, 50-60Hz, 500W
Environmental Requirements	Operating: 0 to 55C (32 to 131F); Non-operating: -20 to 80C (-4 to 176F); Humidity: 10 to 90% RH (non-condensing)

Ordering Information

Base Hardware Platform	Product Code
SierraNet M648 Platform (Base HW platform with 64GB Memory)	HSF-M648-064-X

M648 Analysis License Option Examples

SierraNet 50G PAM4 Ethernet Analysis - Supports fall back rates to 10/25GbE NRZ, License for 4 ports	NET-T050-P04-A
SierraNet 100G PAM4 Ethernet Analysis - Supports fall back rates to 50GbE NRZ, License for 4 ports	NET-T100-P04-A
SierraNet 200G PAM4 Ethernet Analysis - Supports fall back rates to 40/100GbE NRZ, License for 4 ports	NET-T200-P08-A
SierraNet 64G Fibre Channel Analysis - Supports fall back rates to 16/32GFC, License for 2 ports	FC-T064-P02-A

M648 InFusion™ License Option Examples

SierraNet 50Gb PAM4 Ethernet InFusion - Supports fall back rates to 10/25GbE NRZ, License for 2 ports	NET-J050-P02-A
SierraNet 100Gb PAM4 Ethernet InFusion - Supports fall back rates to 50GbE NRZ, License for 4 ports	NET-J100-P04-A
SierraNet 64G Fibre Channel InFusion - Supports fall back rates to 16/32GFC, License for 2 ports	FC-J064-P02-A

Local sales offices are located throughout the world.
Visit our website to find the most convenient location.
1-800-5-LeCroy • teledynelecroy.com

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