

# SierraFC™ M164

## Fibre Channel 16G Protocol Analysis System

**Fast, Flexible  
And Affordable!**





## Key Features

- 16 Gbps FC protocol analysis system
- 1U rackmount form factor
- Auto speed detection on all ports
- Support for Forward Error Correction (FEC) enabled links
- Industry-leading time stamp resolution
- Sophisticated 24 state triggering & filtering
- Automatic error detection
- Comprehensive decoding
- Logical & chronological trace displays
- Traffic summaries and statistical reports
- 16 GB trace capture memory
- Cascade multiple Fibre Channel analyzers
- Sync with other Teledyne LeCroy protocol analyzers
- GbE/USB host interfaces

The SierraFC M164 system provides 16G Fibre Channel data capture and protocol verification for developers and protocol test engineers in storage networking and other Fibre Channel applications. Available with 4 recording channels, the SierraFC offers world-class protocol analysis capabilities with an easy to use, customizable hardware & software interface, large capture buffers, and standard support for Speed Negotiation and Forward Error Correction (FEC) enabled links.

## Flexibility to Meet Any Debug Challenge

The SierraFC M164's sophisticated analysis software provides unmatched flexibility with customized data displays that can easily identify and navigate to specific events of interest. Decoding provides superior visibility for troubleshooting application layer issues. In addition to the standard Spreadsheet & Frame Inspector trace views, Teledyne LeCroy's signature packet view allows users to easily track Fibre Channel exchanges from end-to-end in an intuitive logical display. Easy drill-down to frame and link layer events is always available to help uncover lower-level problems. SierraFC's

protocol-specific decoding, combined with comprehensive search, filters, and traffic metrics allows developers to quickly pinpoint root cause problems & error recovery conditions.

## Versatile, Cost-effective Platform

The SierraFC M164 is a highly cost effective 1U size test platform, easily integrated in a 19" rack or deployed as a bench top instrument, and is portable enough to carry into the field. The system is available with 16 GB of recording memory standard and comes with both USB and Ethernet interface ports for maximum connection flexibility to the PC hosting the analysis software. Convenient status LEDs provide information on negotiated link speed, link activity and errors. Multiple SierraFC M164 systems can be combined to tackle complex high-port count applications, while providing substantial cost savings and flexibility for design verification.

# SOFTWARE OVERVIEW

## Intelligent Triggering

Intelligent triggering and realtime filtering are the keys to solving complex Fibre Channel problems in live SAN environments. SierraFC M164's easy-to-use and advanced triggering features save time and improve engineers' productivity with the ability to capture precise traffic conditions such as timing between events or changes in link state.

## Graphical State Machine

The Graphical State Machine view of the advanced triggering dialog makes it easy for users to visually construct and follow even the most complex scenarios. The trigger capabilities include up to a 24-level state sequencer, 4 independent timers, multiple counters, the ability to pre-filter at each state, and the ability to assign individual triggers to each port pair.

## Flexible User Interface

When developing or debugging, one size does not fit all. The SierraFC gives you several trace display choices so that you can view the traffic in the format most meaningful for the task.

## Spreadsheet View

The familiar spreadsheet view offers users an easy-to-understand columnar format, that can be customized, adding or deleting columns, and marking frame and event types with user-defined colors to speed the eye through complex traces.

## Frame Inspector

An important adjunct to the Spreadsheet View is the Frame Inspector View, which provides a detailed window into each frame and ordered set in several helpful formats. Spec View shows frames in the same format as you'd see them in the technical specification documents.

## Field View

The Field view provides frame details of each layer of Fibre Channel traffic in an expandable tree structure.

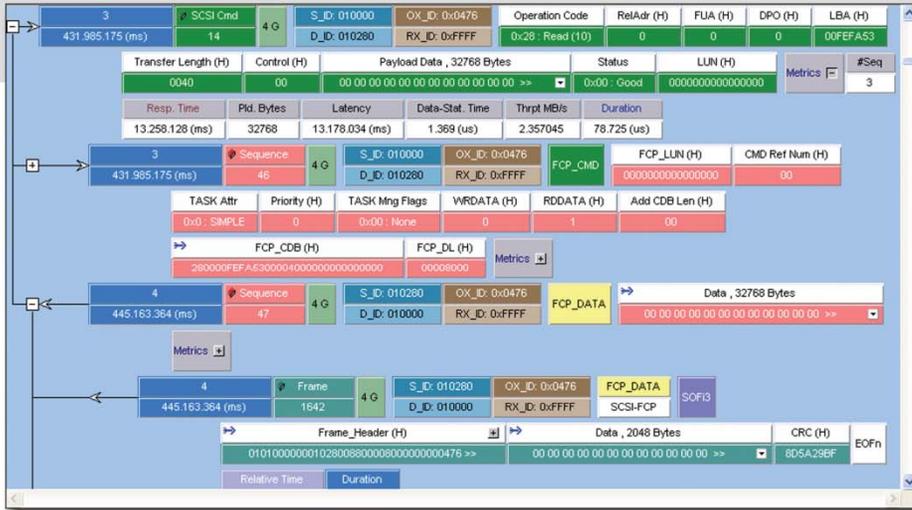
## Text View

The text view, shown below, facilitates the visualization of traffic flows between ports.



Cascade SierraFC systems to create multiple synchronized ports

Time Stamp	Port	All Lanes	1	2	3	4	Src. ID	Dest. ID	Speed
416.302.200 (ms)	1	R_RDY	R_RDY						8 G
416.304.643 (ms)	4	FCP_DATA				FCP_DATA	010280	010000	8 G
416.305.500 (ms)	3	R_RDY			R_RDY				8 G
416.305.509 (ms)	2	FCP_DATA		FCP_DATA			010280	010000	8 G
416.307.189 (ms)	1	R_RDY	R_RDY						8 G
416.309.623 (ms)	4	FCP_RSP				FCP_RSP	010280	010000	8 G
416.309.820 (ms)	4	CLS			CLS				8 G
416.309.957 (ms)	3	CLS							8 G
416.310.472 (ms)	2	FCP_RSP		FCP_RSP			010280	010000	8 G
416.312.126 (ms)	1	R_RDY	R_RDY						8 G
416.315.992 (ms)	1	R_RDY	R_RDY						8 G
416.616.240 (ms)	1	Write (10)	Write (10)				010000	010280	8 G
416.616.900 (ms)	3	ARB_val (x21)			ARB_val (x21)				8 G
416.616.969 (ms)	4	ARB_val (x23)			ARB_val (x23)				8 G
416.617.097 (ms)	3	OPNyx			OPNyx				8 G



**Packet View** The SierraFC packet view is specifically designed to aid understanding of application layer traffic, logically assembling frames and primitives relative to exchanges in the captured data. The protocol-specific packet view allows users to easily view exchange definitions, completion and status. This capability is especially useful in environments with outstanding exchanges, and large gaps of traffic between exchange start and exchange completion. The exchanges can then be expanded to view the sequence and frame layers for a deeper view of the underlying traffic.

Port	Source ID	Destination ID	Type	Payload Size	Seq No	Status	Duration	Count	%	
P1	10000	10280	Write (10)	32768	4	Good	2.286 798 ms	29	20.14	
P3	10000	10280	Write (10)	32768	4	Good	2.286 652 ms	29	20.14	
P1	10000	10280	Read (10)	32768	3	Good	3.307 180 ms	42	29.17	
P3	10000	10280	Read (10)	32768	3	Good	3.307 197 ms	42	29.17	
P1	10000	10280	Read (10)	26624	2	Incomplete	63.888 412 us	1	0.69	
P3	10000	10280	Read (10)	26624	2	Incomplete	63.892 704 us	1	0.69	
								0.011316	144	100.00

**Statistical Reports** Statistical reports analyze and summarize the contents of a captured trace. A large number of settings are available to fit most any analysis need. This provides the ability to identify critical events and navigate directly to items of interest, such as primitive sequences, task management sequences, SCSI commands, incomplete exchanges, and CRC errors.

## Specifications

<b>Host Machine</b>	Microsoft Windows® 8, Windows Server 2012, Windows 7, Windows Server 2008R2, Windows XP; 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; and USB 2.0 port.
<b>Minimum Requirements</b>	
<b>Recording Memory Size</b>	16 GB
<b>Data Rates Supported</b>	1, 2, 4, 8 and 16 Gbps
<b>No. of Ports Supported</b>	4 ports per system
<b>Cascade Capability</b>	Up to 32 ports (8 Sierra systems)
<b>Host Interface</b>	USB 2.0 and 10/100/1000baseT Ethernet
<b>Front Panel Connectors</b>	Four SFP+ ready ports, External Trigger IN/OUT
<b>Front Panel Indicators</b>	4 LEDs (Trigger, Error, Link, Frame) for each TX & RX pair, 5 Data Rate LEDs for each pair of ports, Status LCD Panel, Power LED
<b>Front Panel Controls</b>	Power ON/OFF, Menu Navigation and Selection Wheel
<b>Rear Panel Connectors</b>	AC Power, Expansion Port (Expansion cards are optional)
<b>Dimensions (H x W x D)</b>	Chassis: 44 x 432 x 419 mm (1.75" x 17" x 16.5") With Bumpers: 54 x 457 x 425 mm (2.125" x 18" x 16.75")
<b>Weight</b>	4.2 Kg (9.3 lb)
<b>Power Requirements</b>	100-240 VAC, 50-60 Hz, 100W

## Ordering Information

Product Description	Product Code
Sierra FC M164 Protocol Analyzer Hardware Platform (16 GFC, 4 ports, 16 GB memory)	<b>FC-M016-164-X</b>
Sierra FC M164 4-Port Analyzer License	<b>FC-T016-004-A</b>
SFP+ Transceivers and Optical Cables (2 of each)	<b>FC009ACA-X</b>



1-800-909-7211  
teledynelecroy.com

Local sales offices are located throughout the world.  
Visit our website to find the most convenient location.