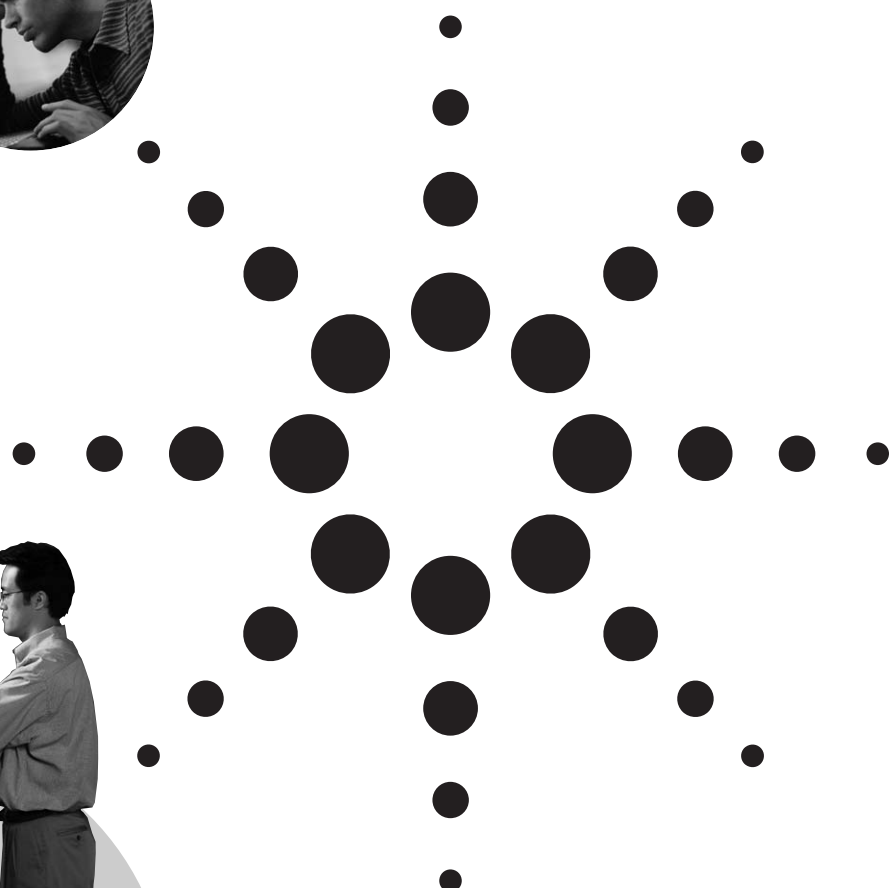# Agilent 1730 Series System Protocol Tester: 1733L 2 and 4 Gb/s SAN Director Tester

Technical Data Sheet

The most powerful, scalable, and realistic multi-port test system for verifying the performance of director-class switches

Agilent Technologies

Key Features

- Centralized control simplifies operation

- Industry's highest scalability

- Ability to generate full 4 Gb/s load on all ports

- Real time measurements and "live" monitoring

- Small foot print, low power consumption and lower total cost of ownership

- Backward compatible with existing SAN tester modules (1730B, 1733A, 1735A)

- Test customization and automation

The Agilent Technologies 1733L SAN director tester simplifies the testing of director-class switches in QA and manufacturing environments. Now you can easily generate I/O traffic to test the performance and availability of your director switches while lowering your overall cost of test.

The Challenge of Director-Class Switch Testing

Director-class switches form the backbone of enterprise storage area networks (SANs). To ensure the availability, performance and reliability of SANs, director-class switches need to be tested to ensure performance and robustness under all possible conditions.

Director-class, switches currently on the market typically have more than 128 ports, and this port count number is increasing. As port counts grow, issues with the current test methodology intensify.

Existing test methods use a large number of PC controllers, or a "wall of PCs," to generate I/O traffic to stress the director switch. This method has a number of deficiencies. There is no easy way to co-ordinate the operations of all the PCs

from a centralized view; you have to manually start the I/O traffic on each PC. There also is no easy way to collect results from the PCs. Each PC must be queried in turn to retrieve the results. Also, since typical PCs are not designed to run at wire speed due to software and driver limitations, testing under realistic conditions have become more challenging as director switches' port speed has increased to 4 Gb/s.

The 1733L SAN director tester is capable of 4 Gb/s traffic generation on 128 ports concurrently. By providing a centralized, multi-port control panel the 1733L SAN director tester simplifies test setup, execution and analysis, resulting in faster test completion.

Product Features

Centralized control simplifies operation

You can control all 128 ports on the 1733L from a centralized graphical user interface (GUI). The unified, multi-port control panel simplifies test setup, execution, and analysis. Without opening up multiple layers of windows, you can quickly set up and measure the device under test. You can save your specific test configuration for future reuse.
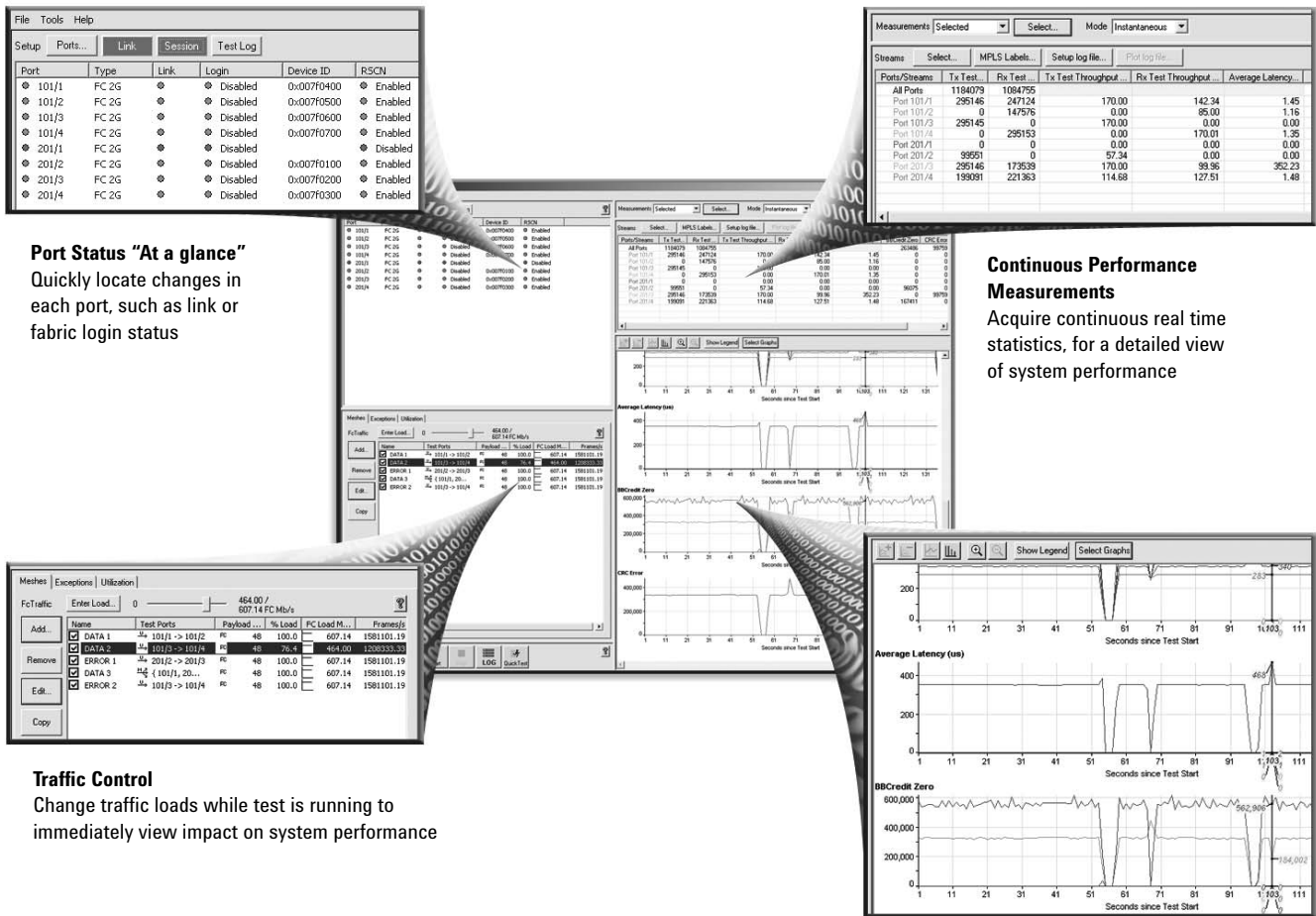
Port Status "At a glance"
Quickly locate changes in each port, such as link or fabric login status

Continuous Performance Measurements
Acquire continuous real time statistics, for a detailed view of system performance

Traffic Control
Change traffic loads while test is running to immediately view impact on system performance

Live Monitoring
Monitor performance changes and events over time for a historic overview

Figure 1. A centralized control panel simplifies SAN director testing

Industry's highest scalability

Each 1733L system has 128 ports capable of concurrent 2 Gb/s or 4 Gb/s traffic generation. This level of scalability is required to address the testing of director-class switches with their increasing port count, and performance requirements.

Real-time measurements and "live" monitoring

All data is processed on test cards for real-time measurements. You can monitor "live" measurement results while a test is running for better insight into how your DUT is performing. Real-time statistics include throughput, latency (min/avg/max), lost frames, and error counters. These end-to-end measurements are difficult to measure with a "wall of PCs" based solution. The real-time measurements are presented in both tabular and graphical format, allowing you to identify performance issues quickly.
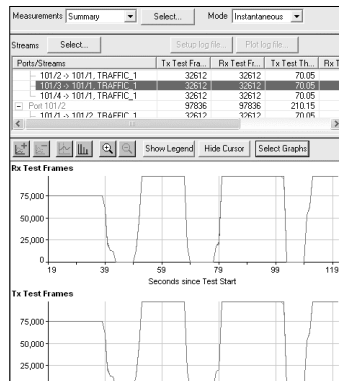
Realistic Fibre Channel traffic generation at wire speed on all 128 ports

To ensure that directors can provide full-line-rate switching, when deployed, it is important to test using realistic Fibre Channel SAN traffic conditions. Typical PCs are not designed to be able to run at wire speed due to software and driver limitations, and this has become more of a challenge as port speeds have increased to 4 Gb/s.

Hardware-based traffic generation technology enables all ports in the 1733L SAN director tester to generate full 4 Gb/s data traffic. Use this capability to generate stressful traffic loads for your director under test (DUT), to validate performance over long periods of operation.
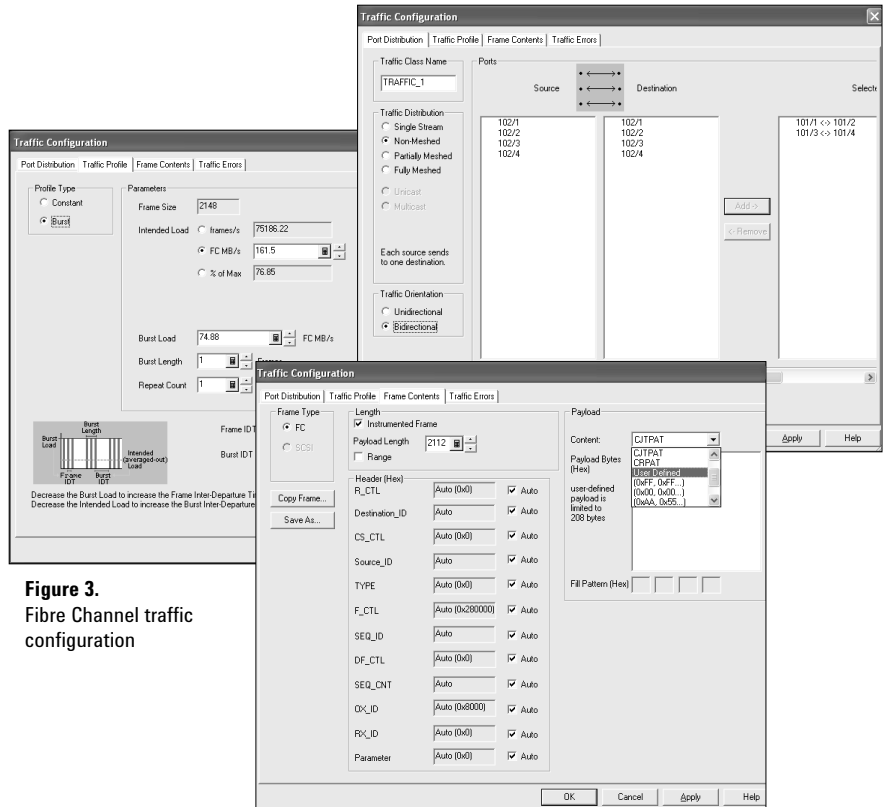

Figure 2. Real-time statistics monitoring

Figure 3.
Fibre Channel traffic configuration

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Backward compatible with existing modules

The 1733L system is completely backward compatible with existing Fibre Channel test modules (1730B, 1733A and 1735A).

Test customization and automation

In addition to the test suites provided with the 1733L SAN director test system, you can develop your own test suite using the TCL/TK scripting language. The 1733L SAN director test system features and capability are accessible through the application programming interface (API). This enables you to:

- Automate tests that would be too tedious or imprecise to do manually or repeatedly through the GUI

- Repeat tests for subsequent product builds

- Automate tests to enable maximum product output in a manufacturing environment.

Small form factor and low operational cost

Compared to using a "wall of PCs" as a test tool, the 1733L has a much smaller form factor. This means savings in terms of power, space, infrastructure. Overall the SAN director tester is easier to manage, requiring less engineering resources, thus lowering the overall operational costs.
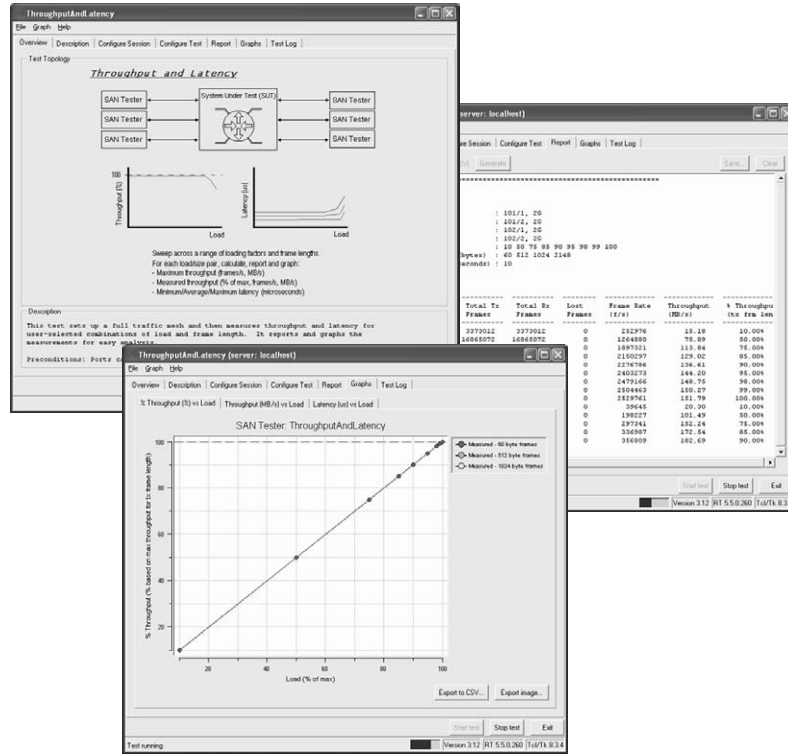

Figure 4. Packaged automation scripts to speed up test cycle

	1-U servers	1733L SAN director tester
Number of ports	128	128
Size	64 U (assuming 2 ports per server)	16 U
Weight	need to state metric units first (2496 lbs)	101.6 kg (240 lbs)
Power requirement	35.2 kW	5 kW

Note: Assuming industry average numbers for the 1-U servers

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How to configure a system
The Agilent 1733L SAN
director test system consists
of a Windows®-based system
controller and 8 chassis
containing SAN director test
cards. The system controller
contains the 1733L SAN
director test software
application that drives
the test cards.

System controller
The system controller is not
included in the 1733L product;
it can be purchased separate
from Agilent. The controller pro-
vides an easy-to-use Windows
environment for running the
test system software.

SAN director test cards
High-density, scalable Fibre
Channel SAN director test cards
are equipped with powerful
traffic-generation and measure-
ment capabilities. Each test
card houses four ports of Fibre
Channel at 2 Gb/s and 4 Gb/s.

Each 1733L SAN director
tester includes 32 SAN
director test cards.

Chassis
The compact, 4-slot, 2U-high
N2X chassis houses up to four
SAN director test cards. The
1733L SAN director test system
includes eight N2X chassis.
You can easily daisy-chain all
eight chassis together to ensure
time synchronization of all the
test ports in the SAN director
test system.

Software
The 1733L includes one
software license for one
system controller.
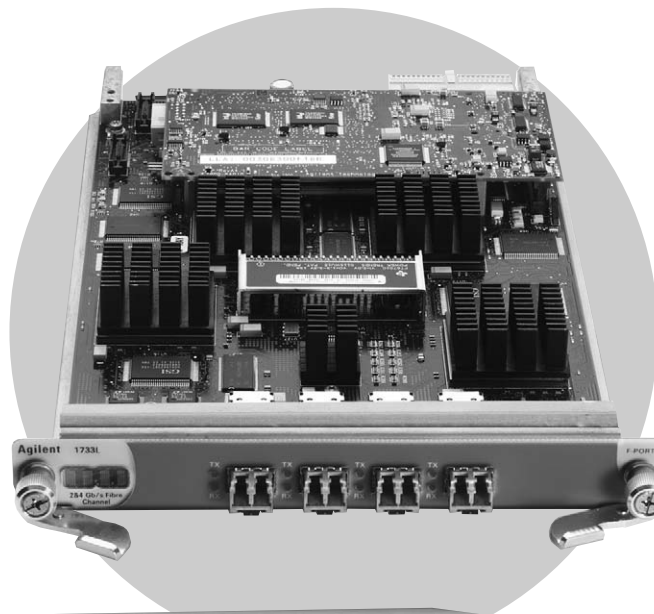
Technical specifications

Physical interface

Number of ports	128 ports per SAN director test system. The 128 ports can be used as two separate 64-port test systems.
Line rate	2.125 or 4.25 Gigabits/second (Gb/s). Industry-standard SFP interface. Shipped with 850 nm SFP.

Traffic generation

Rate	Full line speed rate
Port type	Nµ Port emulation
Port behavior	FC support includes full parameter control of Flogi. Ability to enable or disable; NS registration, Discovery of devices, and PLOGI
Classes of service	Class 3 traffic
Traffic profiles	15
Traffic streams	256 streams per port
Interframe gap	Adjustable from 3 to 1000
Minimum frame length	Transmitted: 24 bytes Received: 24 bytes
Buffer-to-buffer credit	Adjustable from 1 to 256
Error generation	Aborted frame, CRC error, oversized frame, invalid SOF, invalid EOF

Measurements

Measurements	Real-time measurements including throughput, latency, dropped frames, disparity errors, BBC=0, failover recovery time
Result types	Cumulative: measurements are reported from the start of the measurement interval. Instantaneous: measurements are reported from the most recently completed sampling interval.
Measurement clock resolution	10 ns resolution; ± 0.5 ppm/year clock drift; 3 ppm maximum difference between cards
Measurement interval	Range: 1 second to 7 days
Display sampling interval	Range: 1 second to 1 hour
Test card synchronization	All measurements are synchronized across all test cards within the 1733L SAN director test system.

Programming languages

Languages supported	Tcl/Tk

Mechanical and electrical specifications

Physical

Width	45.4 cm (17.87") (mounts in EIA-standard 19" rack)
Depth	49.0 cm (19.29")
Height (per chassis)	8.89 cm (3.50" = 2U)
Height (total system)	71.12 cm (28" = 16U)
Weight (fully loaded chassis)	12.7 kg (28 lbs)
Weight (total system)	101.6 kg (224 lbs)

Electrical

AC voltage	100 to 120 $V_{nominal}$ 200 to 240 $V_{nominal}$
Frequency	47 to 63 Hz
Power consumption (per chassis)	630 W max
Power consumption (total system)	5040 W max

Environmental

Location	Indoor use only· Altitude up to 2000 m
Operating temperature	5°C to 40°C
Storage temperature	-40°C to 70°C
Cooling requirements	Air vents must remain unobstructed. Minimum clearance 7.62 cm (3 in). Inlet air temperature must not exceed the operating temperature limits.
Humidity	Maximum relative humidity 80% for temperatures up to 31°C decreasing linearly to 50% relative humidity at 40°C - non-condensing
Safety	Installation category: II·Pollution degree: 2

For additional information please visit:

www.agilent.com/find/directortester
www.agilent.com/find/santester

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