OCC - Optical Cross Connect

Single-Mode Fiber Optic Switch

Overview

Network equipment manufacturers, storage system manufacturers, carriers, and enterprise organizations encounter challenges in test lab environments. Increasing competitive pressure to bring products to market is driving the need for test lab automation. Sophisticated software products can can automate your test scripts, reservation and inventory systems, and schedule tests, but if physical cabling has to be manually configured, dynamic tests cannot be performed.

The "wire-once" technology of a physical layer switch turns the practice of manually configuring test topologies into a software process, electronically storing and recalling configurations as needed. Test time and configuration errors are reduced, repeatability of tests is improved, and lab efficiency is increased.

MRV's Optical Cross Connect

In addition to the intricacies of the testing environment, fiber rates and protocols to be tested are increasing in complexity. The necessity to test fiber rates of 40 Gbps and above while maintaining optical attributes is becoming more common.

MRV's Test Automation Product (TAP) line addresses this situation with the Optical Cross Connect (OCC), an all-optical physical layer (OSI Layer 1) switch. The OCC complements MRV's optical-electrical-optical (OEO) physical layer switch, the Media Cross Connect (MCC), which supports multi-media applications.

Physical layer switching can save time and money by using wire once technology to execute test topology configuration changes through software control that allows:

Applications

- Network or storage eqipment manufacturing
- Carrier fiber installation and maintenance
- New product development or interoperability labs
- Software regression testing
- Customer support environments

Features

- **Transparency:** 2.0 dB typical insertion loss
- **Scalability:** up to 640 fiber terminations per system
- **Modularity:** expansion in increments of 8 ports
- **High-density:** fully populated system occupies 17 rack units, 19" rack
- **Reliability:** carrier-class redundancy with proven performance
- **Simplicity:** installation, integration, and use with EMS-ready GUI
- **Flexibility:** 19-inch standard rack, 23-inch rack, and ETSI rack mounts

Benefits

- **Wire-Once Technology** - Configurations are performed using software commands. Changing topologies requires only a simple mouse click.
- **Increased Lab Efficiency and Productivity** - Topologies can be stored using a web-based GUI or industry-standard TL-1 commands. Test topologies can be scripted and automatically executed. Inventory management and tracking is simplified because equipment is not physically moved for tests.
- **Decreased Capital Expenditures** - By sharing expensive test equipment, capital equipment costs can be minimized without compromixing capabilities.

• More tests performed with less equipment and personnel
• Decreased capital expenditures by sharing expensive equipment
• Minimal test set up, retests, and testing errors
• Accelerated product time to market

The center of OCC architecture is a three dimensional Micro-Electro-Mechanical (3D-MEMS) switching matrix. This technology allows transparent switching of single-mode fiber connections in less than 20 ms with a typical insertion loss of 2.0 dB, and it makes the OCC ideal for maintaining optical attributes when testing:

• High density 10 Gbps applications
• 40 Gbps protocols
• Non-standard protocols
• WDM applications with parallel wavelength switching
• Burst mode signals as in PON applications

The OCC is scalable to 640 optical terminations or 320 bi-directional ports per system. Ports are added in increments of 8 using the 8-Port Driver card. The system includes test ports used to share test equipment within the system. Optionally, the OCC is available with a *multi-channel power monitor* (MCPM) that monitors the optical input power and adjusts for minimum optical signal loss.

Administration, configuration, and mappings are easily performed using the web-based management graphical user interface (GUI) or an industry-standard TL-1 interface that easily integrates into scripting scenarios. These interfaces are accessible either through the RS-232 serial local console port or through the RJ-45 Ethernet port using SSH or telnet protocol.

Physical Specifications	
Operating Temperature	-5°C to 50°C (23°F to 122°F)
Storage Temperature	-40°C to 70°C (-40°F to 158°F)
Operating Humidity	5% to 90%, non-condensing
Storage Humidity	5% to 95%, non-condensing
Input Voltage	-42V to -57V DC
Input Current	4A continuous, max.
In-rush Current	7A for 8 ms
Power Dissipation	470 mW per connection (fully-loaded chassis)
Physical Dimensions	752 mm high x 445 mm wide x 318 mm deep (29.6"H x 17.5"W x 12.5"D)
Weight	40 kg (88 lbs)
Shipping Weight	75 kg (165 lbs)
Regulatory Compliances	UL 60950, EN 60950-1, CSA 69950; FCC Part 15 (Class A), GR-1089-CORE, EN 55022 (Class A), EN 55024;
	GR-63-CORE, EN 300019; CFR Title 21 Part 1040 Class 1; ANSI T1.315-2001
Reliability	MTBF > 12 years
Serviceability	Hot-swappable field-replaceable units (FRU)
Indicators	Standard telco alarms

Optical Specifications (O and C bands)

Fiber type	Single-mode
Configuration time	< 20 ms
PDL	< 0.3 dB
PMD	< 10 fs
Chromatic dispersion (@1550 nm), EoL	< 0.25 ps/nm
Static crosstalk	< -65 dB
Path stability	< 0.2 dB
Repeatability	±0.25 dB
Input Dynamic range	+5 dBm to -20 dBm (customizable)
Switching cycles	10^{-9}
Insertion loss (EoL)	Minimum: 1.3 dB; Typical: 2.0 dB; Maximum: 3.0 dB
Return loss (EoL)	Typical: 40 dB; Maximum: 35 dB

Ordering Information

CHASSIS

OCC-A-320-N	OCC Chassis (ANSI) with 320x320 port matrix, LC connectors, dual DC power supplies, output power monitoring
OCC-A-320-P	OCC Chassis (ANSI) with 320x320 port matrix, LC connectors, dual DC power supplies input and output power monitoring
OCC-E-320-N	OCC Chassis (ETSI) with 320x320 port matrix, LC connectors, dual DC power supplies, output power monitoring
OCC-E-320-P	OCC Chassis (ETSI) with 320x320 port matrix, LC connectors, dual DC power supplies input and output power monitoring

ACCESSORIES (CHASSIS INDEPENDENT)

OCC-SPC8	8-port driver card
OCC-CPR	Configuration Processor

For more information on MRV's test automation products, please visit *www.mrv.com/tap* .

MRV has more than 50 offices throughout the world. Addresses, phone numbers, and fax numbers are listed at www.mrv.com.
Please e-mail us at **sales@mrv.com** or call us for assistance.

MRV (West Coast USA)
20415 Nordhoff St.
Chatsworth, CA 91311
800-338-5316
818-773-0900

MRV (East Coast USA)
295 Foster St.
Littleton, MA 01460
800-338-5316
978-952-4700

MRV (International)
Business Park Moerfelden
Waldeckerstrasse 13
64546 Moerfelden-Walldorf
Germany
Tel. (49) 6105/2070
Fax. (49) 6105/207-100