



The future of optical networking and communications is here.

TECHNICAL CONFERENCE: 20 – 24 March 2016 ■ EXHIBITION: 22 – 24 March 2016 ■ ANAHEIM, CALIFORNIA, US

Exhibitor Public Relations Newsletter

OFC 2016 First News #1, February

OFC 2016 Preview: 100G Deployment and Innovation Accelerates

Andrew Schmitt,  Signal AI
Active Insight

OFC is just a few short weeks away now, and some key themes are coming into focus for the conference. This is summary of what we expect to see in March – if you would like to stay informed of our opinions please sign up for our newsletter [here](#).

100G Inside the Datacenter Goes Prime Time

First and foremost of these will be the surge of demand in 2016 for the new 100G QSFP28 format. This module, in conjunction with new 100GbE switch silicon from several vendors, will trigger high volume deployment of 100GbE in hyper-scale computing environments.

This is truly an historic moment, as it represents the beginning of a transition from 10G technology, which served customers for the past decade, to faster 25G speeds. During 10G's reign, we've witnessed component vendors deliver tens of millions of modules and the price for them dropping 20% annually. 10G technology was later bootstrapped to serve the demand for 40GbE but this was really an evolutionary, not revolutionary, step.

Now the game is changing, and the **faster 25G speeds require that the industry retool fabrication, test, and assembly processes**. This process will initially narrow the field of able suppliers down to a handful of select companies that have invested in these capabilities.

Despite the reduction in suppliers for 25G, the market's needs will be met. Module supply in 2016 should be ample enough to catalyze the transition in hyperscale environments away from 40GbE

technology to 25G. Demand will ignite in 2H16 as long as the components are multi-sourced and priced according to market expectations. Under these conditions, **expect to see over \$100M in annualized revenue for QSFP28** as 2016 ends. But progress doesn't stop there, because 2017 will herald the arrival of another new technology designed to squeeze even more from the format.

PAM-4

Companies such as InPhi and MACOM are already hard at work to provide a silicon roadmap for the QSFP28 format, which will double and eventually quadruple the capacity of a single module through **pulse amplitude modulation (PAM-4)**.

This new silicon will translate 25G digital signals into analog waveforms that increase the capacity of a 25Gbaud channel through multi-level signaling. Adjacent to this new silicon, module manufacturers will need to deliver higher performance un-retimed QSFP28 modules with the bandwidth necessary to handle the PAM-4 signaling. This **requirement for additional incremental performance significantly raises the bar** for suppliers yet again and will weed out those who don't have access to this core technology.

Finally, the PAM-4 silicon and higher performance modules cannot be priced much more than existing 100G QSFPs or the cost per bit benefit of the transition to higher speeds fails. All of this spells out an exciting engineering and economic challenge, and expect to see vendors provide more detail for this product cycle at OFC.

Metro 100G+ Coherent WDM

Moving away from the data center to longer WDM links, pricing for 100G continues to drop as volume increases and more efficient technologies enter the marketplace. This dynamic spurs further and deeper deployment of 100G in the network and creates a ripe environment for continuing innovation.

Consequently, companies will announce and demonstrate a bevy of technologies optimizing the cost, performance, and power for coherent technology in shorter reach applications. Expect these companies to roll out yet more **200G to 500G coherent technology** announcements, **lower cost ROADM technology**, and perhaps even new solutions targeted at that last bastion of 10G WDM – **the 80km or less domain**.

Coherent 100G Vertical Integration

The ongoing trend of equipment vendors designing and building their own 100G optics shows no sign of stopping. This year, Ciena announced the acquisition of assets from TeraXion which will complement the company's longstanding expertise in designing coherent hardware. Likewise, Cisco announced new DSP technology as part of its NCS1000 DCI system in November.

It would be very surprising if we did not see a barrage of additional announcements at OFC amplifying this theme while the other optical vendors that account for most of the shipments—Huawei, Nokia (previously Alcatel-Lucent), Infinera—double down on their internal coherent technology investments.

CFP2-ACO Modules Reach Volume Production

Many believed that the adoption of metro 100G would be the opportunity for optical module vendors to reclaim lost market share from vertically integrated equipment companies such as Ciena, Nokia, Huawei, Infinera, and Cisco. This is indeed transpiring – though not in the way most expected – as vendors bypass the traditional digital format used to interface to optical modules. **They are embracing CFP2-ACO**, which like PAM-4, moves the interface to the module to the analog domain.

The CFP2-ACO module, which contains all of the transmit and receive coherent optics, emerged as the technology of choice for most vertically integrated vendors (as well as others like Coriant) as a way to address both data center interconnect applications and metro-optical RFP's such as Verizon's. The OIF's recent announcement of a finalized CFP2-ACO implementation agreement decreases implementation risk by standardizing the electrical, management, thermal and mechanical specifications for this format.

Buzz at OFC will center on how vendors plan to bring this format to volume production – reference Oclaro's recent announcement on reaching 1000's of units a quarter this year – and extend its capabilities. Glimpses of second generation technology from vendors such as Lumentum may be present. In turn, **the success of this CFP2-ACO ecosystem should spawn announcements from adjacent component vendors**, particularly DSPs, as vendors such as Acacia, Clariphy, and NTT Electronics are driven by their customers to rally behind this format.

OFC 2016 First News #1

Company name:	Ciena
OFC booth number:	2673
Press release date:	January 22, 2016
Product category:	Long-haul and Metro Networks
Description of news:	<p>Ciena recently introduced WaveLogic Encryption, the industry's first 100G/200G optical encryption solution. The solution delivers a simple-to-implement, always-on encryption that leverages the unmatched performance and programmability of Ciena's WaveLogic 3 Extreme chipset to efficiently meet all of your infrastructure needs, from metro to long-haul. Ciena's encryption solution is versatile and capable of encrypting any type of traffic including Ethernet, Fibre Channel, OTN, IP, SONET, and SDH. It is FIPS-certified and meets the highest security standards recognized globally in the industry. Telstra recently demonstrated the capabilities of Ciena's in-flight coherent optical encryption solution for high-capacity infrastructure environments between its Melbourne-Canberra-Sydney route while Telindus (a trusted BizConnect partner) has deployed the solution to a Dutch finance customer.</p>
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Company name: Ciena

OFC booth number: 2673

Press release date: January 19, 2016

Product category: Optical Transport, Optical chipsets, Silicon Photonics

Description of news: Ciena recently announced the acquisition of TeraXion Inc.'s high-speed photonics components (HSPC) assets. The asset purchase includes TeraXion's high-speed indium phosphide and silicon photonics technologies as well as the critical underlying intellectual property. These technologies are key enablers of Ciena's industry-leading WaveLogic coherent optical chipsets, which make the optical layer of next-generation networks more intelligent and responsive to today's web-scale demands. The TeraXion HSPC assets advance Ciena's established leadership in high-speed optics and enhance the company's ability to develop differentiated solutions that enable service providers to scale their networks with greater programmability and agility.

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Company name: Diamond USA, Inc.

OFC booth number: 2109

Press release date: March 14, 2016 **The release of the below information is under embargo until March 14, 2016**

Product category: Optical connectors

Description of news: DIAMOND offers a novel, reliable, and high-performance E-2000™ optical connector and mating adapter with an integrated electrical interface monitor. The device is ideal for telecom, medical, and industrial laser systems that require external safety/protection features to activate shutters or other shut-down procedures to prevent uncontrolled light emission and reflection. The E-2000™ Interlock is particularly suitable for environments involving high-power laser sources, Raman pumps, or other optical power amplifiers. The adapter can be easily mounted on front panels or onto PCB boards directly. The E-2000™ Interlock supports all kind of fibers and multi-Watt power levels.

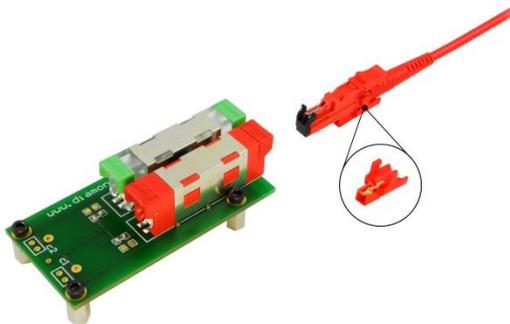
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Company name: Dongguan Mentech Optical & Magnetic Co., Ltd.

OFC booth number: 2125

Press release date: None

Product category: Optical components

Description of news: Dongguan Mentech Optical & Magnetic Co., Ltd. will showcase its main optoelectronic products, including PON components, PON modules, 1.25G SFP, LTE modules, XFP & SFP +SR/LR/ER/ZR, 10G SFP+ AOC, 40G QSFP+AOC and new products to be promoted to the market, such as 40G QSFP +, 100G QSFP28/CFP4. Please stop by the booth to learn more.

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AOC SFP+ AOC

Features & Applications

- SFP+ MSA package with 1~100m cable
- Supports 9.95 to 11.3 Gbit/s
- 2-wire interface with integrated Digital Diagnostic monitoring
- 3.3V Power Supply
- Less than 0.8W power consumption
- Operating case temperature: C-temp
- ROHS compliant
- Ethernet

AOC QSFP+ AOC

Features & Applications

- QSFP+ MSA package with 1~100m cable
- Operating 42 Gbit/s
- 2-wire interface with integrated Digital Diagnostic monitoring
- 3.3V Power Supply
- Less than 1.5W power consumption
- Operating case temperature: C-temp
- ROHS compliant
- Ethernet

Company name: Luna Innovations Incorporated

OFC booth number: 1341

Press release date: None

Product category: Test & Measurement

Description of news: Our technology allows engineers to test, modify, and fully qualify their designs before production; and enables fast, accurate, and comprehensive high resolution testing once in production.

Our solutions provide substantial cost and time savings in development, production and maintenance of optical network equipment; enabling the most comprehensive, sensitive and accurate component test available.

- High performance computing & data centers
- Defense and Aerospace fiber optic networks
- Silicon Photonics

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Company name: Methode Electronics

OFC booth number: 3567

Press release date: November 2, 2015

Product category: Optical equipment

Description of news: dataMate, a business unit of Methode Electronics, Inc., announced the release of the first 10G copper small form pluggable (SFP+) transceiver module.

dataMate's SFP+ transceiver pushes the limits of copper based technology providing 10 gigabits of data transfer over distances of 30 meters or less and replaces the need for cumbersome direct attach cable solutions that have limitations of up to ten meters. This innovative product is fully compliant to the IEEE 802.3az, SFF-8431 and SFF-8432 standards and will interoperate with other 10GBASE-T solutions. This new module will allow data center and network managers the ability to extend the life of their cabling infrastructure with a simple cost effective upgrade of their 1G SFP's with the new 10G variant.

dataMate's 10G copper SFP+ is available now through your switch provider. Ask for the new Methode 10G Copper SFP.

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Company website: www.methode.com

Company name: MicroCare Corp.

OFC booth number: 848

Press release date: None

Product category: Optical cleaning products

Description of news: STICKLERS® fiber optic cleaning products will feature a full range of products and tools that deliver perfectly clean fiber connector end faces. The STICKLERS family of fiber cleaning kits has been greatly expanded in 2016 to include a wider variety of kits custom-made for field installers and technicians.

Building on this success, the STICKLERS team is encouraging OFC attendees to visit booth #848 to share ideas on cleaning kit configurations that address their fiber cleaning challenges. The STICKLERS team will award a cleaning kit every day (a \$220 value) for the best new cleaning kit suggestion.

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Company name: Oplink Communications, Inc., a Molex company

OFC booth number: 3411

Press release date: None

Product category: Optical communications

Description of news: Molex, LLC and Oplink will feature several new product demonstrations plus a product showcase of innovative solutions for optical communications and networking applications. Featured products include 25G Optical EMI Shielding Adapters and MXC™ Flexibend™ Boot Cable Assemblies.

In addition, Molex products are included in several demonstrations at the OIF PLL Interoperability Demo 2016, which will be held at booth 3619. The products include a zQSFP+™ 56G Connector; zQSFP+™ 56G Module Compliance Board; zQSFP+™ 56G Host Compliance Board; and Cable Assemblies operating to 50G NRZ and 50G PAM4.

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Company name: nanoPrecision Products Inc.

OFC booth number: 2467

Press release date: March 23, 2016

Product category: NA

Description of news: nanoPrecision Products Inc. has announced a poster presentation with Verizon at OFC 2016 titled “Optical and Environmental Performance of an Epoxy-less, Metallic, Single-mode SC UPC Ferrolder[®] Based Connector”. The paper reports on optical and environmental test results on SC/UPC pigtails terminated with Ferrolder[®] and zirconia ferrules. nanoPrecision Products’ Ferrolder, a ferrule and holder in one solution, is an epoxy-less replacement for ceramic ferrule and holder that will be available soon as a component of a Single Optical Connector SC-UPC Kit qualified by Verizon.
March 23 and 24, 10 am – Noon
Poster Session I, Exhibit Hall B
Presenting Author: David Chen

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Company name: Nextrom

OFC booth number: 1640

Press release date: None

Product category: Optical manufacturing technologies

Description of news: At OFC, Nextrom is featuring turnkey and high productivity VAD & OVD preform manufacturing technology for 652D fibers; high performance draw towers for large diameter mother preforms and RIC clad preforms, with helium recovery and take-ups for very large spools; as well as advanced cable manufacturing solutions for loose tube, micro-cable and ribbon in tubes.

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Company name: OptoTest Corporation
OFC booth number: 1913
Press release date: December 2015
Product category: Fiber optic test equipment

Description of news: OptoTest is proud to announce its latest innovation for measuring MPO connector polarity—The OP480MT MultiFiber Polarity Tester. Designed as a companion unit to OptoTest’s OP280MT Ribbon Visual Fault Finder, it automates testing for broken and crossed fibers with immediate and easy-to-read results. When used in conjunction with the OP280MT, the OP480MT quickly displays results for 4/8/12 fiber MPO connectors, checking polarity types A/B/C.

The OP480MT and OP280MT are available individually or as part of a kit—OP-POLARITYKIT-12—which will include the OP480MT, OP280MT, launch/receive optical cables for male/female, mating adapters, cleaning tools, software, portable power pack in a carrying case.

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Company name: OptoTest Corporation

OFC booth number: 1913

Press release date: September 2015

Product category: Fiber optic test equipment

Description of news: OptoTest proudly launches the new OP940-OP725 Bidirectional IL/RL Test System. New revisions to the IL/RL Meter OP940 allow direct control of the OP725 Optical Switch via USB link.

When connected to an OP725, the OP940 gains added functionality in most of its mode screens, including Dual IL/RL and Scan Mode. This allows operators to get real time IL/RL results or reflectance scans in either direction in less time.

In addition to adding functionality to the OP940 series of test sets, the OP725 can also be used as a 2x2 optical switch with OptoTest software making any source unit bidirectional.

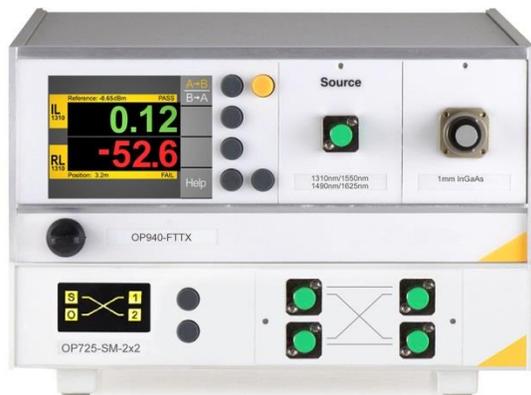
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Company name: Phoenix Photonics

OFC booth number: 2563

Press release date: None

Product category: Optical fiber components

Description of news: Phoenix Photonics will be exhibiting its enhanced range of products for polarization and mode control in optical fibers. The in-fiber mode control range is targeted at SDM applications and includes the world's first commercial Few Mode EDFA. This compact all-fiber amplifier gives high performance across C-band ideal for SDM system trials. Together with Photonic Lantern mode mux/demuxs and other supporting Few Mode Fiber components, the amplifier will be on display at the Phoenix booth.

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Company name: VLC Photonics

OFC booth number: 3661

Press release date: None

Product category: Photonic chips

Description of news: VLC Photonics will be introducing its recent “Standard chip design services” for several foundries offering multi-project wafer runs. These guarantee a minimum fixed price for any photonic circuit design composed exclusively by standard building blocks offered at each foundry PDK. Additionally, VLC will present its new building block libraries for the Silicon Photonics platforms of EURO PRACTICE (IMEC and CEA LETI), including several new passive devices ready to plug and play into any circuit design from external users, through a pay-per-use licensing model.

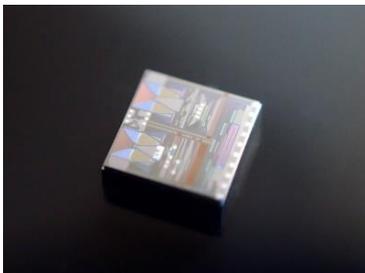
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Company name: VPIphotonics

OFC booth number: 2913

Press release date: None

Product category: Optical Equipment Configuration

Description of news: VPIphotonics offers free trials of VPImodeDesigner, a new versatile simulation framework for the analysis of guided and leaky modes in straight and bent waveguides and fibers.

This powerful design tool offers full-vectorial finite-difference mode solvers with support of widely customizable non-uniform meshing and several symmetry and absorbing boundary conditions. It provides an intuitive Python-based interface and object-oriented programming environment enabling easy implementation of arbitrary design optimization tasks.

With VPImodeDesigner waveguide cross-sections can be translated into parameters of passive and active devices, enabling seamless integration with VPIcomponentMaker Photonic Circuits, the industry-leading design tool for photonic integrated circuits and optoelectronics applications.

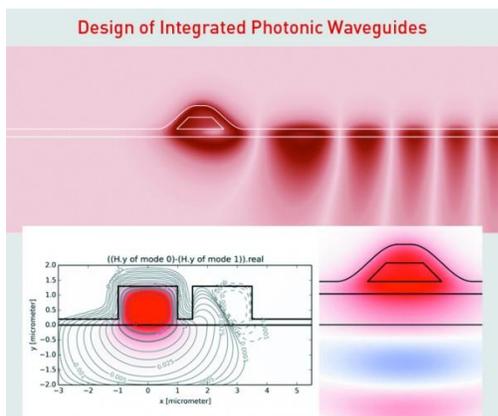
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Company name: Yelo Ltd

OFC booth number: 3762

Press release date: None

Product category: Laser test equipment

Description of news: Yelo, a world leader in laser diode test and burn in systems will be exhibiting at OFC at booth 3762.

Yelo will be demonstrating its new LIV Test System which allows high volume 100G transceiver manufacturers to test and burn in their COC and PIC devices with zero human handling. This removes the opportunity for accidental device damage which can reduce production yield.

If you would like any more information on Yelo exhibiting at OFC or the products and services we offer, follow us on Twitter @Yelotestsystems, connect with us on LinkedIn 'Yelo Test Systems Ltd' or visit our website for more information:
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