Centre for Integrated Photonics

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Dual-channel photonic 2R regenerator/wavelength converter delivers outstanding combination of performance and economy

** integrated hybrid SOA/MZI device delivers high gain and stable performance*
** passive assembly provides low loss performance and excellent manufacturability*

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The Centre for Integrated Photonics (CIP) has released a dual-channel version of its innovative all-optical 2R (reamplification and reshaping) regenerator for 40 Gbit/sec optical networking applications.

The device is fabricated from a hybrid integrated combination of a planar silica Mach-Zehnder interferometer (MZI) and a monolithic quad semiconductor optical amplifier (SOA) array, using a novel passive assembly technique. This approach provides outstanding signal regeneration quality, combined with multi-channel capability, and an economical construction technique that is suited to volume manufacture - delivering a practical building block for advanced optical networking systems.

The new reamplification and reshaping device - 40G-2R2-ORP - may be used for inline regeneration in long-haul networks, for signal conditioning at network points such as add-drop nodes, and for mitigation of polarization-mode dispersion. The device's ability to regenerate with or without wavelength conversion - as well as perform optical logic functions - greatly extends the flexibility for network system developers.

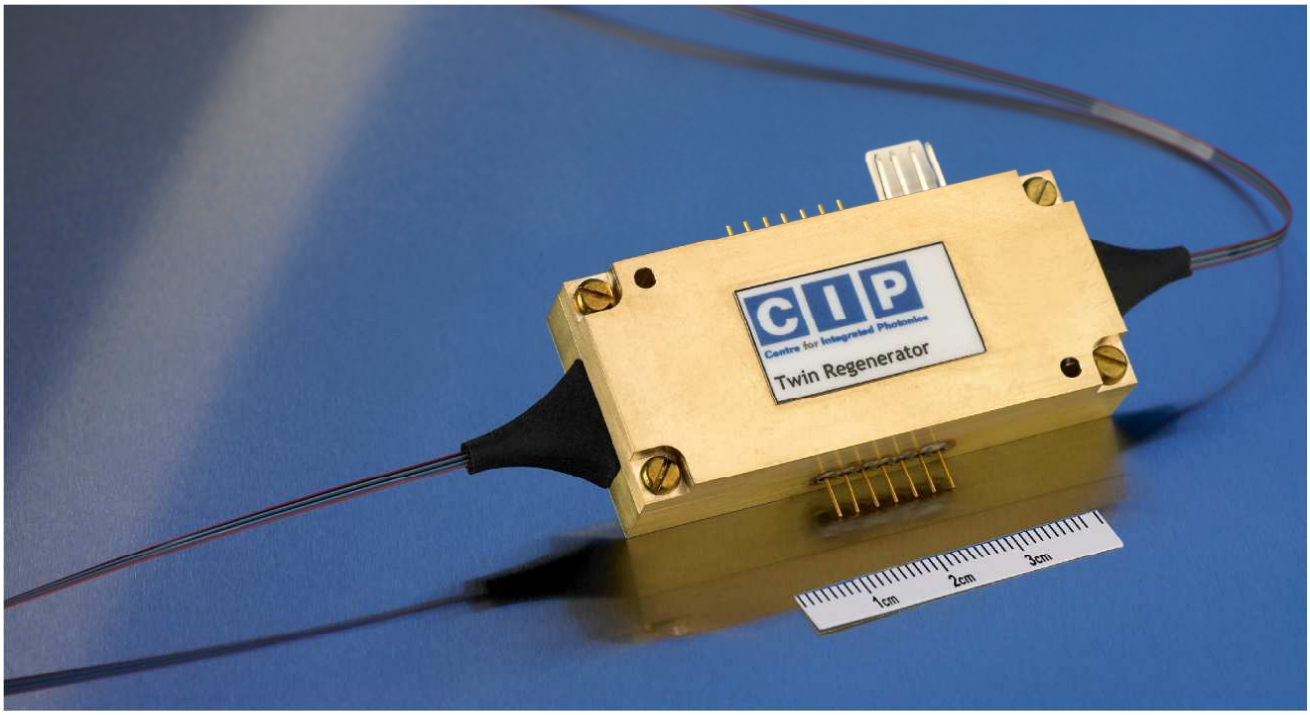
40G-2R2-ORP employs a combination of planar silica and indium phosphide (InP) component technologies to achieve optimal reamplification and reshaping quality. The two components used are a planar single-mode waveguide with splitter/combiner elements configured to create a balanced MZI, and a monolithically integrated array of four non-linear SOAs. The hybrid approach, using the best component technologies for each function, ensures extremely low intra-device excess losses and high optical gain. Special interface characteristics on both components, combined with a unique precision alignment technique, additionally allow the devices to be assembled without active alignment. This makes the finished component highly amenable to economic volume production. The packaged device measures just 6.5 x 3 x 1.4 cm (~2.6 x 1.2 x 0.55 inch).

Signals are regenerated by using non-linear cross-phase modulation in the SOAs. Two data inputs, one a time-delayed version with respect to the other, are used as switching signals for the SOAs. The temporal offset creates a gating window that switches the digital data onto a second optical input. The non-linear MZI's response, coupled with the operating characteristics of the SOAs, provides excellent control over the amplifier output pulse shape. Simple MZI phase bias is provided by thermo-optic phase shifters.

The same device can be configured for 2R regeneration - which can be applied with or without wavelength conversion - for bit-level optical switching and logic, and for 3R regeneration with the addition of an optical clock source.

Reamplification and reshaping combined with the option of wavelength conversion provides great flexibility of architecture for network operators, especially at switching nodes and interfaces between networks. The new device is also expected to be attractive for long-haul link applications, as in many instances all-optical 2R regeneration - especially with the benefit of multi-channel capability - provides an economic alternative to OEO (optical-electronic-optical) 3R nodes (or even a combination of OEO and EDFAs). Another potential mode of operation for the device is to use the twin channels in cascade, to clean pulse zeros and ones sequentially, providing optimum signal quality to support longer span lengths.

A datasheet is available from info@ciphotonics.com.
Image & text available at: *http://www.wordsun.com/cip8.htm* *or*
www.ciphotonics.com/cip_press.htm



The Centre for Integrated Photonics Ltd (CIP) is a leading supplier of advanced photonic hybrid integrated circuits and InP based optoelectronic chips, devices and modules for communications, biomedical, defence and industrial markets. CIP is also a major provider of technical services and consultancy in the photonics field. With 500 years of combined expertise in photonics, CIP refines research into viable products based on leading edge technologies, thus helping customers develop the photonic products of tomorrow. CIP's wide range of competencies are based on advanced world renowned research and are uniquely broad, incorporating III-V photonic materials, silicon micromachining, planar silica waveguides and systems measurements expertise. Together with state-of-the-art, ISO9001:2000 registered, co-located fabrication and pilot production facilities, CIP is able to help customers realise new exciting product ideas based on these technologies.

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