

OneChip: Photonic integration technology provides some distinct advantages in the 10G PON arena

Interview with Andy Weirich, Vice President of Product Line Management at OneChip Photonics

Editor: Zhantao Yu

Editor's Note: Remember OneChip's debut at CIOE 2009? Its photonic integration technology used in FTTx caused a sensation in this industry. This year, OneChip shows up at CIOE again. Does OneChip bring any new technology and products this year? Are there any new trends emerging? Let's focus on OneChip. The Editor of China Optoelectronics interviewed Andy Weirich, Vice President of Product Line Management at OneChip Photonics to discuss the company's growth and its latest achievements.



Andy Weirich, Vice President of Product Line Management at OneChip Photonics (left) and his colleague, Doug Cheng.

1. China Optoelectronics: I remember that OneChip attracted a lot of attention when it first debuted at CIOE last year. What progress has your company made in bringing your technology to market in the past year? Are there any breakthroughs in mass production and shipment?

Andy: OneChip indeed encountered some very interesting issues in the past year, but we now have addressed all of the problems that emerged. In fact, it is very normal that a company will face a number of issues when it brings new technology to market. As for production, we haven't started mass production yet. But the live demonstration of our products at CIOE 2010 is the proof that our products are working properly. Please note that this is the first live demonstration of FTTH optical transceivers, based on Photonic Integrated Circuits, in the world.

2. China Optoelectronics: We have noticed that photonic integration technology has been rapidly developed in recent years. Both Intel and IBM have made significant progress in silicon photonic active components. And CIP is also promoting its hybrid photonic integrated circuit technology. As a PIC technology representative, what is your opinion about the proliferation of these technologies?

Andy: Silicon Photonics technology is a very promising and interesting technology, which features the interconnection of various modules by entirely silicon-based technology. But the problem remains that there is still no way to create silicon-based lasers. The laser must be developed using Gallium Arsenide or Indium Phosphide material and then placed on a silicon substrate. To produce a laser for telecommunications applications – for fiber communications wavelengths between 1200-1700 nm – the only choice of material is Indium Phosphide (InP).

As you mentioned, CIP is using a hybrid photonic integrated circuit technology. This is like making a wall from bricks. The wall can be said to be solid, but it can't be said to be a single brick. In contrast, our PIC is single (monolithic) photonic integrated circuit technology. With regard to which technology is better, I think each technology has its own advantages and disadvantages, and we very much welcome the competitive atmosphere that various technologies bring.

3. China Optoelectronics: Can the production of photonic integrated circuits be completely automated? Is this a goal?

Andy: Our technology allows us to achieve fully automated production, but we have to choose techniques and processes according to actual market requirements because the cost of automated processes is not always cheaper than the cost of manual ones.

4. China Optoelectronics: You mentioned in a speech that the next five years will represent the “Golden Age” of the PON market in China. Why are you so bullish on the Chinese market? What opportunities will it bring to your company?

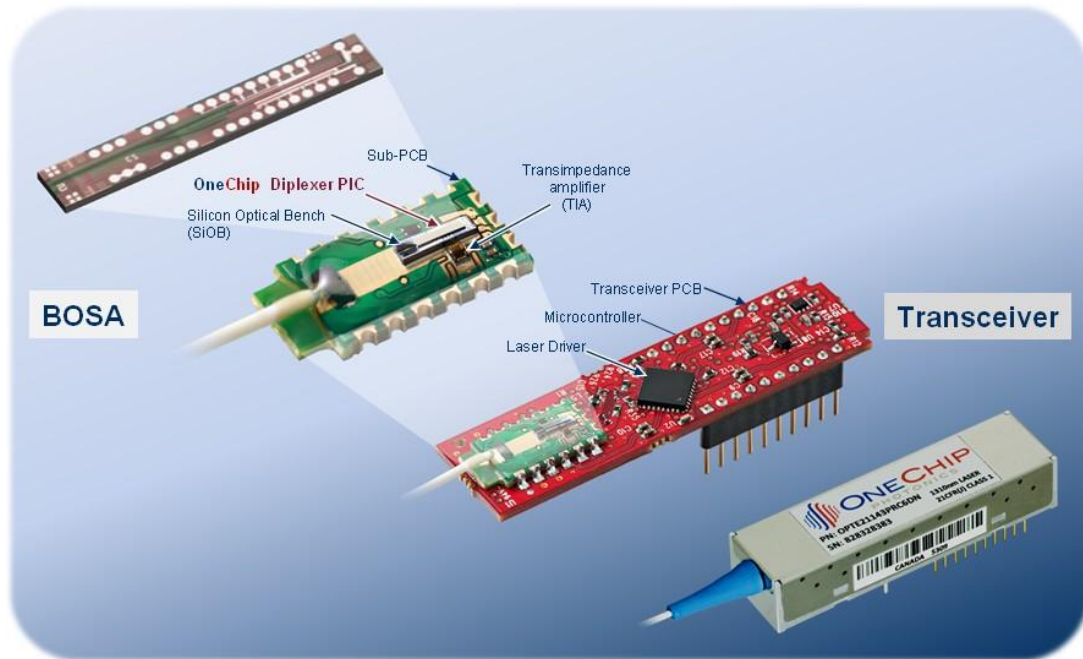
Andy: Based on the current, rapid growth of the Chinese market, it will be the world’s largest market for FTTx. Though FTTx deployment has just started in China, it is maintaining a rapid growth momentum. The Japanese and South Korean markets largely have become saturated, and U.S. and European FTTx deployments currently are not very strong. We are seeing the same rapid growth in the Chinese automobile market, as well. China now has become the world’s largest new automobile market, officially surpassing the U.S. for the first time.

This growth scenario is the same for China in the broadband arena. We noticed that not only has the national broadband network construction plan been launched, but also that FTTx networks are going to be built by major carriers, including the cable television companies. With a large population, China is potentially a huge FTTx market (only India can be a rival), while the triple play is also a very large driving force. All in all, we are very optimistic about China’s FTTx market development prospects in the next 5 years.

Doug: In the near future, we think, the gradual transformation to FTTH single family unit (SFU) deployments will be the main tendency for the PON market in China. It is predicted that the SFU model will be adopted by one million FTTH users in 2010. From 2011, the ratio of SFU over multi-dwelling unit (MDU) will be increasing year by year. So, the conclusion is that the “Golden Age” of China’s PON market will be from 2010 to 2015.

The large-scale deployment of FTTx networks will bring tremendous cost-down pressures on ONU optical module suppliers. The opportunities for labor cost reduction already have been realized. Meanwhile, system providers and carriers are increasingly requiring high performance. Traditional, discrete-based optical module techniques and technologies will face more and more challenges. But for OneChip, there will be great opportunities for us. Our photonic integrated circuit technology will be the low-cost, high-performance solution for which system providers are looking.

SFF Transceiver Anatomy



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11



5. China Optoelectronics: I noticed that you are particularly optimistic about the opportunities of 10G PON, which will reflect the cost and performance advantages of PICs to the utmost. Why do you have such a view?

Andy: Currently, PON is experiencing an evolution from 1 Gbps to 10 Gbps. But optical modules based on traditional discrete optics will face numerous problems in terms of 10 Gbps, for example, the coupling at the receiving end. Although higher data rates also pose some challenges for PIC technology, the inherent advantages of integrated PIC technology will successfully overcome these challenges. And what's more, there is no distinct technique difference in alignment methods between 1G and 10G optical modules with OneChip PIC-based technology. Therefore no extra complexity will be added to the assembly process from coupling to the fiber.

10G EPON already has and will continue to gain market acceptance and growth momentum. Field trials already are taking place, and volume deployment is expected to start in 2011-2012. 10G EPON will require DFB lasers with low power consumption and better performance. A Semiconductor Optical Amplifier (SOA) also probably will be needed for extending the transmission distance in the future. All of those will be big problems to be solved for traditional discrete 10G optics, whereas these are not issues for PIC-based transceivers.

6. China Optoelectronics: What new products does OneChip bring for CIOE 2010?

Andy: We bring PIC-based ONU transceivers, such as EPON PX20 and PX20+SFF ONU transceivers. In addition, OneChip Photonics is demonstrating a simultaneous downstream broadcast video and an upstream personal video, with a PON ONU and OLT supplier, at CIOE 2010. This live demonstration highlights the inherent advantages associated with our company's PIC-based transceivers, which enable system providers and carriers to deploy FTTx more cost-effectively than ever before and meet consumer and business demand for high-bandwidth voice, data and video services.

OneChip integrates all the active and passive optical functions required for an optical transceiver onto a single, Indium Phosphide (InP)-based chip. This enables significant improvements over current transceiver designs in cost, quality, reliability and performance. OneChip's PIC-based transceivers can be assembled, tested and manufactured using industry-standard, automated processes, which enable the company to rapidly respond to customers' needs.

In addition to the live demonstrations, there are still many other potential products which are not displayed here, such as PIC-based single fiber bi-directional modules, and dual-fiber bi-directional modules. Besides the FTTx field, we are also developing other new products for SONET/SDH, Gigabit Ethernet, and other areas.



OneChip Photonics showcased a downstream broadcast video and upstream personal video simultaneously, with a PON ONU and OLT supplier, at CIOE 2010.

7. China Optoelectronics: We know OneChip just opened a new regional office in Shenzhen? What is the significance for the Chinese market?

Andy: Yes, we just opened a new regional office located in the Nanshan District in Shenzhen to support the critical business operations of local customers. Featuring an on-site lab, the new facility will enable OneChip to offer testing, debugging, and demonstrations for addressing the immediate technical needs of regional customers.

At present, our regional office in Shenzhen is the first and the only office in China for OneChip Photonics. Through contract manufacturing, our PON transceiver modules will be manufactured by Sanmina-SCI in its Shenzhen factory. OneChip's regional office in Shenzhen will provide comprehensive technical support for this manufacturing operation.

OneChip also announced the establishment of its relationship with ACE Broadband Technology Chengdu Co. Ltd. and Shenzhen Milli-tech Electronics Ltd. The agreement with ACE and Milli-tech, as distributor and manufacturer's representative, respectively, illustrates OneChip's understanding of the efficiencies of a local network and the benefits of working in unison with partners that know their customers.

OneChip already has its own mature supply chain in Canada. But China is an entirely new market to OneChip. In addition to our partnerships with the companies, mentioned earlier, for production and sales of our PON modules, OneChip Photonics also cooperates closely with equipment giant Huawei. All of these factors clearly indicate that OneChip Photonics will progressively develop its presence in the Chinese market and further contribute its strengths to the triple-play and FTTx optical access network markets.