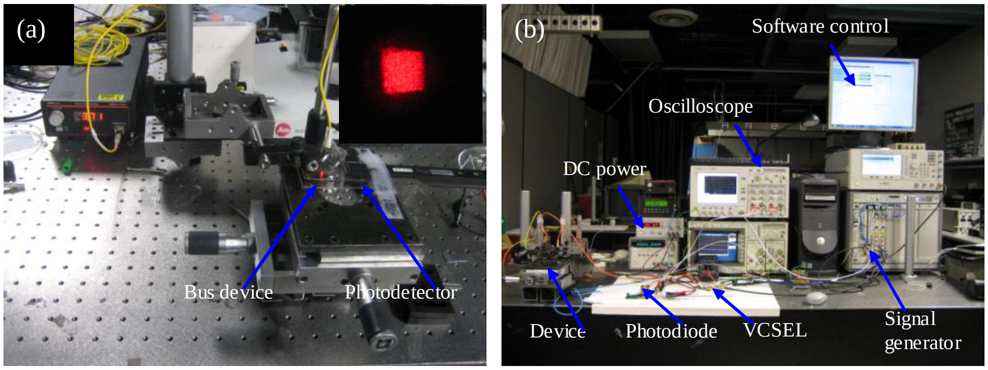

Fig. 9. (a) Insertion loss measurement and (b) High speed measurement setup for the bus waveguide.

We successfully obtained the eye-diagrams for the optical bus waveguide from 1Gbps to 10Gbps, shown in Fig. 10. The Q-factors of the eye-diagrams are measured with values from 6.23 to 4.67, respectively. The corresponding Bit-Error-Rates(BER) were calculated to be 2.3×10^{-10} and 1.5×10^{-6} for 1Gbps and 10Gbps, respectively if assuming the Gaussian distributed noises [12]. Further research work is on-going to reduce the insertion loss and increase the Q-factors for the optical bus waveguide device.

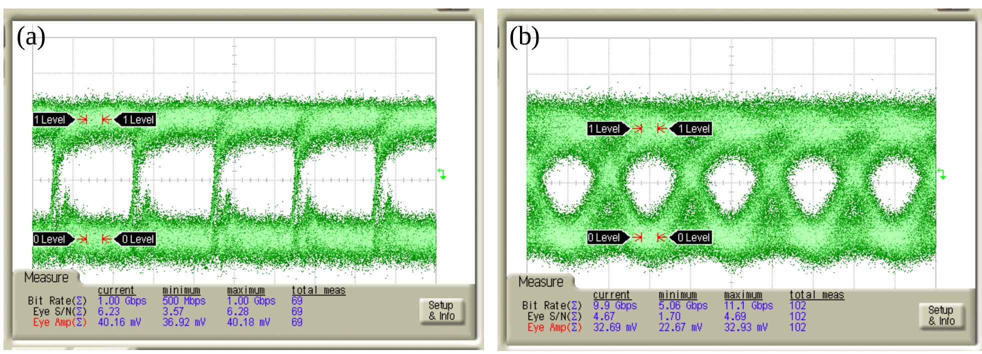

Fig. 10. Eye-diagrams of the optical bus waveguide measured at (a) 1Gbps and (b) 10Gbps.

6. Summary

In summary, we have designed and fabricated 3 × 3 bi-directional optical bus waveguides with embedded 45° micro-mirrors for broadcasting optical signals using metallic UV imprinting method. The high quality nickel mold used in the imprinting processes is fabricated by electroplating metal into pre-defined SU-8 patterns. The optical insertion loss of the bus waveguide is around −15dB due to the complicate structures including bending and splitting waveguides. With the unique broadcasting capability, the implemented optical bus structure successfully demonstrated high speed communication at 10Gbit/sec among multiple points as a high performance optical backplane.

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