

Point-to-Point Optical Transceiver

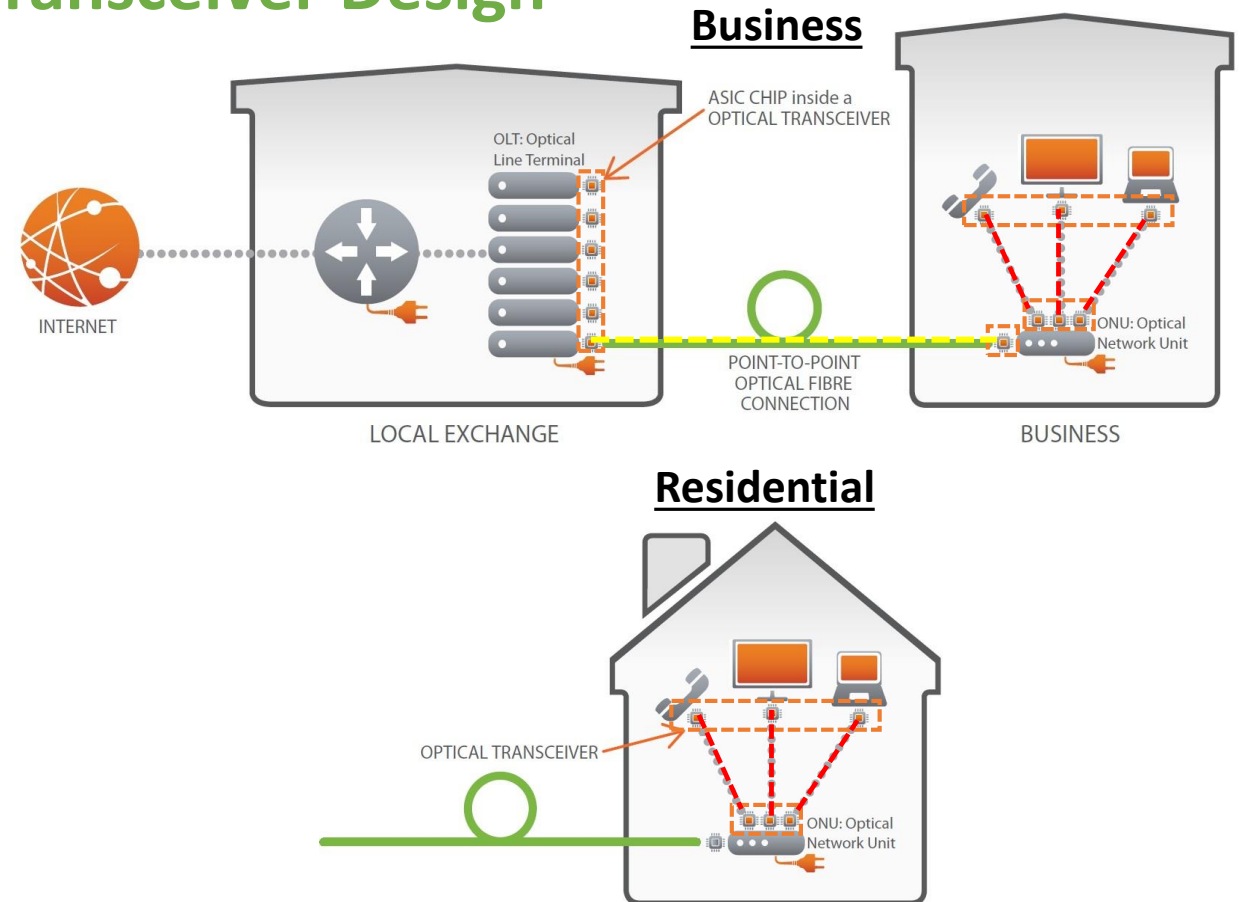




Low Power Point-to-Point Optical Transceiver Design

CHALLENGE AND BREAKTHROUGHS

- Transceiver responsible for 25% of total power in point-to-point links in a point-to-point access network
- Conventional optical transceiver is designed with limited consideration for energy-efficiency
- Operating continuously with high optical power



Energy Efficient Redesign of Optical Transceiver for Access and In-Home Applications



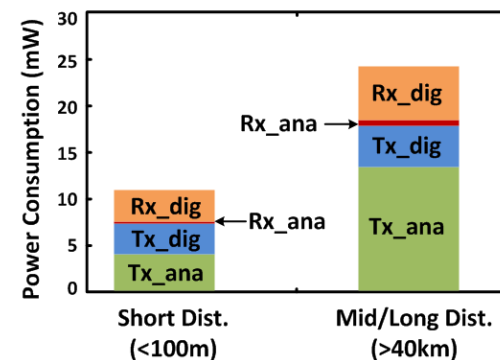
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KEY ACCOMPLISHMENT AND RESULTS

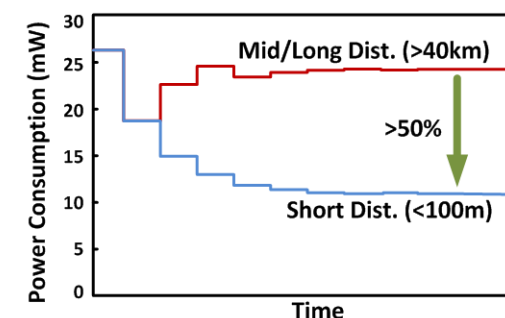
- **Innovative circuit design**
 - Increase power conversion efficiency for up to 1Gb/s
 - Implement “turn-on-as-you-go” feature of functional blocks based on link condition
 - Tight hardware integration
- **Adaptive power control algorithm**
 - Enable “power-on-demand” feature
 - Dynamic optical power according to link loss

	GT TRx	TRx 2010
Transmitter	< 19.8 mW	339 mW
Receiver	< 6.6 mW	229 mW
Total	12 - 26.4 mW	460 mW
Power improvement		17-38x

Power Distribution of Each Component at Different Link Distances



Timing Diagram of “Power-on-Demand” Feature at different link distances

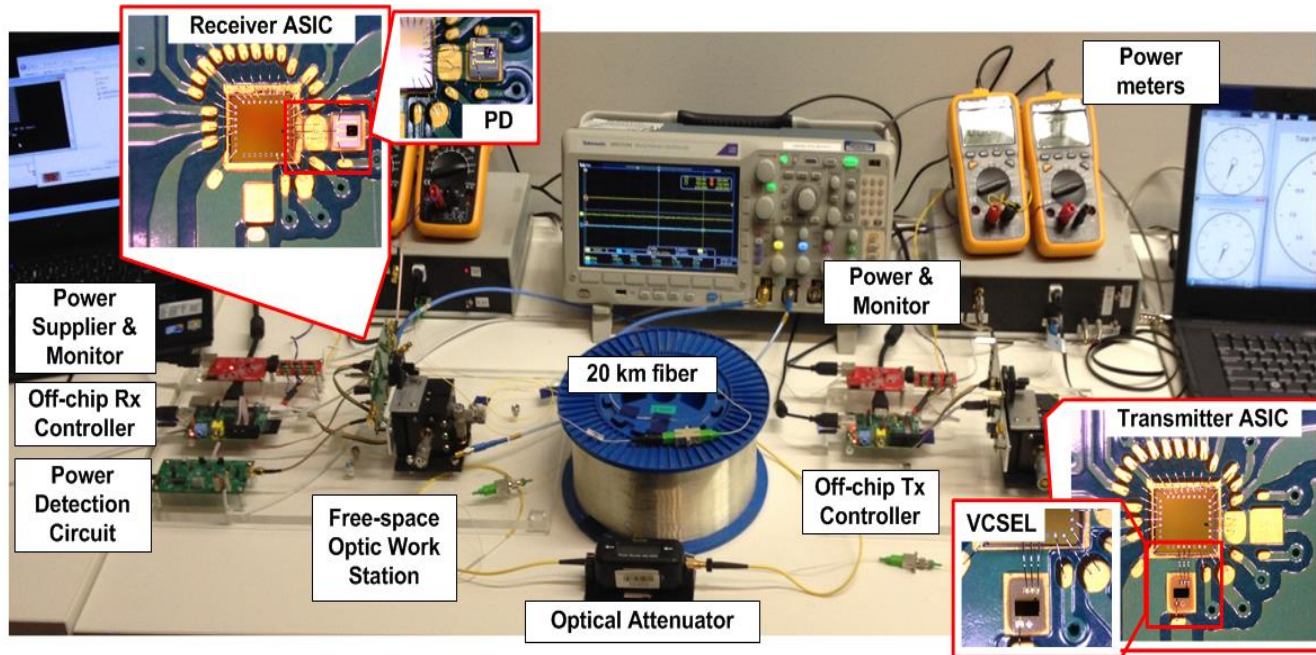


38x Power Efficiency Improvement Compared to Commercial Optical Transceiver

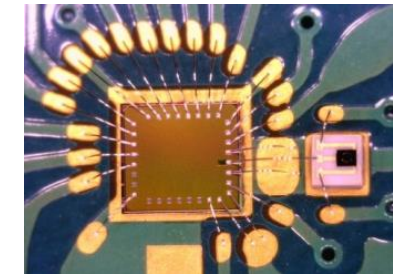
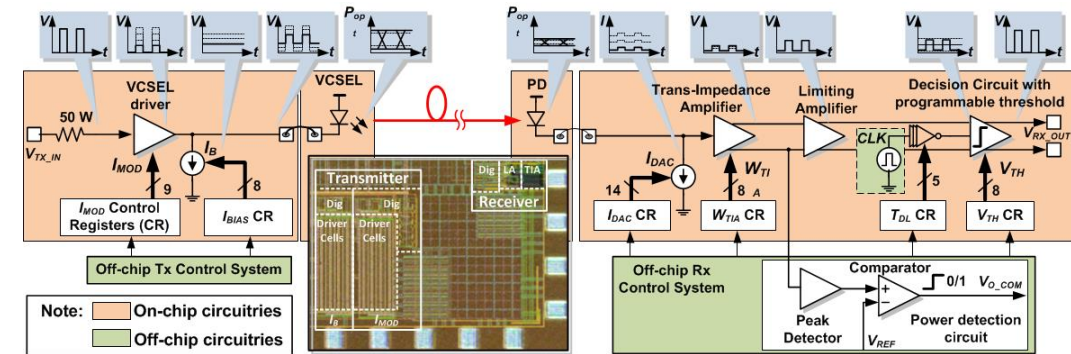


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DEMO DESCRIPTION



Integrated custom-built ASIC



End to End System Demo with Custom-Built ASIC & Adaptive Power Control Algorithm