



## MaxLinear's Telluride PAM4 DSPs and TIA Selected by Centera Photonics for Single Lambda PAM4 Optical Modules

- *The highly integrated Telluride PAM4 DSPs offer superior overall performance, power, and cost enabling Centera's next generation 400G-DR4 and 100G-DR1 optical modules*

CARLSBAD, Calif.--(BUSINESS WIRE)-- MaxLinear, Inc. (NYSE: MXL), a leading provider of radio frequency (RF), analog and mixed-signal integrated circuits for the connected home, wired and wireless infrastructure, and industrial and multimarket applications, today announced Centera Photonics Inc., a silicon photonics optical solution provider for high-performance interconnects, has selected MaxLinear's Telluride PAM4 DSPs (MxL93542 and MxL93512) and PAM4 transimpedance amplifier (MxL9154) for its next generation 400G-DR4 and 100G-DR1 optical modules.

This press release features multimedia. View the full release here:  
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MxL93542 and  
MxL9154

Telluride PAM4 DSPs  
Enable 400G-DR4 and  
100G-DR1 Optical Modules



Centera's proprietary silicon optical engine sets a new frontier for next-generation (400GbE and above) optical interconnects in datacenter applications. The Micro-Electro-Mechanical System (MEMS) optical engine platform features a small form factor and supreme signal integrity. It utilizes a high-precision

Telluride DSP & TIA Enable 400G and 100G Optical Modules (Graphic: Business Wire)

semiconductor process that enables superb thermal management capabilities and ensures high reliability. The optical-electrical (OE) platform is designed to support the next generation I/O requirements of super high-performance silicon photonic ICs (PICs). Centera's Telluride-

based PAM4 100G and 400G optical interconnects are expected to be commercially available in December.

MaxLinear's MxL93512 (100G) and MxL93542 (400G) Telluride DSPs and the MxL9154 transimpedance amplifier (TIA) are key components in the development of high-speed mega-scale data centers based on 100Gbps single lambda optical interconnects. The MxL93512 and MxL93542 are the world's first DSP SoCs with integrated electro-absorption modulated laser (EA-EML) drivers for 100/400Gbps optical interconnects and breakout mode clocking support for 400Gbps DR4 optical modules. MaxLinear's Telluride DSPs and TIAs allow companies like Centera to develop 100/400Gbps optical interconnect modules in compact form factors for intra-datacenter applications with transmission distances up to 2 kilometers.

"We are excited to see the adoption of our Telluride product family and TIA by Centera for their 100Gbps QSFP28 and 400Gbps QSFP-DD transceiver modules," said Will Torgerson, Vice President and General Manager of MaxLinear's High-Speed Interconnect Group. "Telluride's high level of integration and performance enable companies like Centera to develop 100/400G small form factor optical interconnects to address the massive demand to deploy higher speed networks in next-generation hyperscale data centers."

"We are excited to partner with MaxLinear, a leader in PAM4 datacenter DSPs and TIAs, to demonstrate the performance of our new 100G and 400G optical interconnects at this year's ECOC conference. Their Telluride family offered the highest level of integration compared to other DSPs on the market," said Dr. Brian Lan, Centera's R&D Director. "These DSPs combined with our cutting-edge silicon photonic technology have enabled us to deliver 100/400G optical modules for next-generation equipment and networking platforms in datacenters."

## **Technical Details**

The Telluride family of low-power, high-performance PAM4 DSP SoCs enable 400Gbps/100Gbps optical modules using a 4x100Gbps/1\*100Gbps optics interface. These SoCs are suitable for use within QSFP-DD, OSFP and COBO module form factors. The MxL93542 400G PAM4 DSP and MxL93512 100G PAM4 DSP integrate an EA-EML driver with 1.8V PP SE swing. Additional options are available that offer differential 800mV peak-to-peak swing for non EA-EML-based optics.

The integrated laser driver delivers greater than 1.8V of single-ended driver output swing necessary for EA-EML lasers. This output swing easily meets the optical modulation amplitude (OMA) specification requirements across the wide operating temperature and bias ranges of all EA-EML lasers. The chip package also includes all the high frequency components required for driver and modulator biasing.

Asynchronous breakout mode clocking is an essential feature for hyperscale data center customers initiating 400G DR4 deployments. MaxLinear's 400G Telluride DSPs (MxL9354x) are currently the only PAM4 DSP SoCs that successfully integrate this clocking requirement.

MaxLinear has engineered a very high-performance DSP engine in both the transmit and receive data paths. The resulting superior link-margin enables single-lane 100Gbps optical wavelength technology by mitigating many of the limitations of mass production optical

components.

The devices feature a comprehensive digital pre-distortion (DPD) engine in the transmit direction to compensate for laser non-linearity and to cancel packaging limitations that cause reflections and bandwidth degradation at these extremely high signal frequencies. On the receive path, the DSP includes an auto-adaptive signal enhancement engine, which integrates a continuous time linear equalizer (CTLE), automatic gain control (AGC), a feed forward equalizer (FFE), and a decision feedback equalizer (DFE).

For additional information visit [www.maxlinear.com/MxL93542](http://www.maxlinear.com/MxL93542), [www.maxlinear.com/MxL93512](http://www.maxlinear.com/MxL93512), and [www.maxlinear.com/MxL9154](http://www.maxlinear.com/MxL9154).

MaxLinear's Telluride family and Centera's new optical interconnect modules will be on display at MaxLinear's booth (609) at the ECOC Conference in Dublin, Ireland on September 23-25, 2019. For an appointment, please contact MaxLinear sales at [sales@maxlinear.com](mailto:sales@maxlinear.com).

### **About Centera Photonics**

Centera Photonics is an optoelectronic design house specialized in silicon photonic device designs, development and integrations. Centera dedicates on developing integrated solutions for Optical Interconnect via semiconductor MEMS technologies. Centera designs, manufactures optical interconnect modules for high performance communication. Applications include data-communication, HPC (high performance computing), storage, consumer electronics and specialty market. The company was established in 2010; main office is located in Hsinchu Science Park, Taiwan, R.O.C. For more company information, please visit [www.centera-photonics.com](http://www.centera-photonics.com).

### **About MaxLinear, Inc.**

MaxLinear, Inc. (NYSE: MXL) is a leading provider of radio frequency (RF), analog and mixed-signal integrated circuits for the connected home, wired and wireless infrastructure, and industrial and multimarket applications. MaxLinear is headquartered in Carlsbad, California. For more information, please visit [www.maxlinear.com](http://www.maxlinear.com).

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### **Cautionary Note About Forward-Looking Statements**

This press release contains "forward-looking" statements within the meaning of federal securities laws. Forward-looking statements include, among others, statements concerning or implying future financial performance, anticipated product performance and functionality, and industry trends and growth opportunities affecting MaxLinear, in particular statements relating to MaxLinear's Telluride family of products, including but not limited to potential market opportunities, functionality, and the benefits of use of such products. These forward-looking statements involve known and unknown risks, uncertainties, and other factors that may cause actual results to differ materially from any future results expressed or implied by these forward-looking statements. We cannot predict whether or to what extent the availability of our Telluride family of products will affect our future revenues or financial

performance. Forward-looking statements are based on management's current, preliminary expectations and are subject to various risks and uncertainties that could cause actual results to differ materially from those described in the forward-looking statements. Forward-looking statements may contain words such as "will be," "will," "expected," "anticipate," "continue," or similar expressions and include the assumptions that underlie such statements. The following factors, among others, could cause actual results to differ materially from those described in the forward-looking statements: intense competition in our industry and product markets; risks relating to the development, testing, and commercial introduction of new products and product functionalities; the ability of our customers to cancel or reduce orders; uncertainties concerning how end user markets for our products will develop; our lack of long-term supply contracts and dependence on limited sources of supply; potential decreases in average selling prices for our products; and the potential for intellectual property litigation, which is prevalent in our industry. In addition to these risks and uncertainties, investors should review the risks and uncertainties contained in MaxLinear's filings with the United States Securities and Exchange Commission, including risks and uncertainties identified in our Quarterly Report on Form 10-Q for the quarter ended June 30, 2019. All forward-looking statements are qualified in their entirety by this cautionary statement. MaxLinear is providing this information as of the date of this release and does not undertake any obligation to update any forward-looking statements contained in this release as a result of new information, future events, or otherwise.

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