

LeddarEngine

SoC and Software for LiDAR Manufacturers,
Tier 1-2 Suppliers and System Integrators



The Engine at the Core of Automotive-Grade LiDAR Designs

LeddarEngine™ sets a new standard for the development of highly integrated, customizable solid-state LiDAR solutions that are optimized for high-volume production. LeddarEngine is also at the core of our LiDAR XLRator™ platform.

Comprised of the LeddarCore™ system on chip (SoC) and LeddarSP™ signal processing, the LeddarEngine supports multiple LiDAR architectures and will be implemented into the Zynq UltraScale platform for enhanced performance.

LeddarEngine enables LiDAR manufacturers, Tier 1-2 suppliers and system integrators to design their own differentiated LiDAR solution by providing the technology, tools and resources they need to meet the specific requirements of various advanced driver assistance systems (ADAS) and autonomous driving (AD) applications.

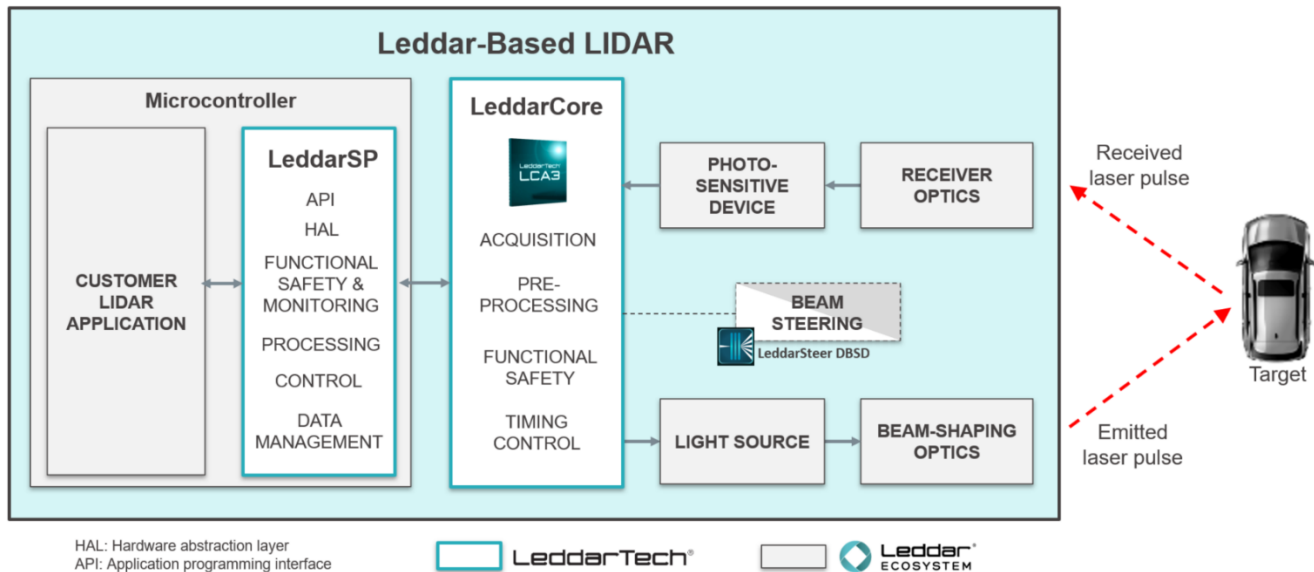
Customers developing with the LeddarEngine benefit from:

- ✓ A comprehensive set of development tools that include LiDAR architecture
- ✓ LiDAR evaluation kits and reference designs to benchmark the technology against application requirements
- ✓ Building multiple sensor systems around the same flexible, low-cost, industry-trusted and functional-safe core
- ✓ Reduced development time and complexity through multiple hardware abstraction layers (HAL)
- ✓ Technical support throughout the entire development process: access to engineering and training services as well as ongoing support from LeddarTech
- ✓ Preferred access to state-of-the-art components through LeddarTech's comprehensive ecosystem

LeddarEngine: At the Core of Your Solid-State LiDAR Design

LeddarEngine is the advanced software and hardware core that enables the development and industrialization of multiple LiDAR architectures, including solid-state flash and hybrid flash designs. Various components and software that are part of LiDAR design such as emitters, receivers, micromirrors, microprocessors and software development tools are available from the Leddar™ Ecosystem partners, who are prequalified for integration with LeddarEngine.

LeddarEngine™ = LeddarCore™ SoC + LeddarSP™ Library



Key Benefits of Developing With LeddarEngine

✓ OPTIMAL COST/PERFORMANCE

- Reduces hardware cost by up to 80% and electronics real estate by up to 90%; reduces power consumption
- Open architecture allows to select building blocks and components according to market needs
- Modular approach enables volume aggregation from multiple end customers to reduce production costs

✓ SCALABLE

- Single architecture enables solutions across the ADAS/AD performance range from L2 to L5
- Ability to meet high-volume production requirements
- Ecosystem partnerships support faster deployment and ramp-up of core technologies

✓ VERSATILE

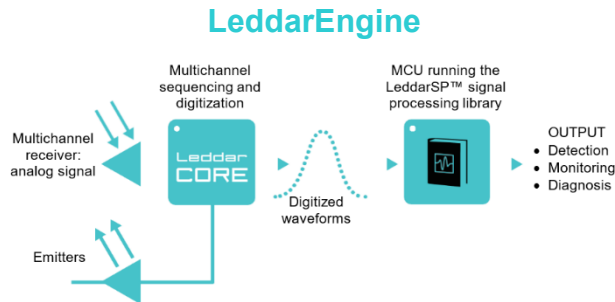
- Directly compatible with a wide variety of LiDAR architectures and technologies
- Allows to meet various use cases with single platform
- Architecture and software compatibility enable central architecture or local processing

✓ AUTOMOTIVE-GRADE

- SoC architecture and software library designed to meet ISO 20262 functional safety standard
- Ecosystem partners developing core components to meet automotive-grade requirements
- Roadmap to support multiple generations of automotive integration—meeting AEC-Q100

A Common Core Foundation to Centralize LiDAR Development

LeddarCore SoCs can be incorporated at any stage of development with different levels of integration (as standalone SoC or with LeddarSP signal processing in LeddarEngine). They are ideally suited to design multiple LiDAR products and to serve as a common core foundation to centralize the development of all LiDAR systems.



LeddarCore SoC

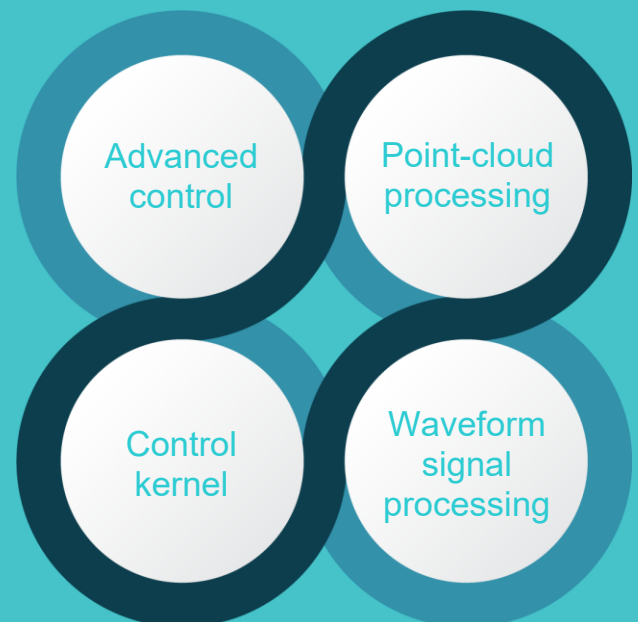


- ✓ Full acquisition system coordinating emitters, receivers, steering and advanced waveform processing. Provides point clouds.
- ✓ Built-in functional safety, comes with the entire acquisition and real-time processing program, operating on dedicated hardware: QNX, Zynq UltraScale and Artix-7, Renesas V3H. Calibrated to optimize the components (e.g., APD, laser, beam steering).
- ✓ Highly integrated, reducing cost, effort and time-to-market.
- ✓ Drastically lowers power consumption, electronics costs by up to 80% and electronics real estate by up to 90%
- ✓ High on-chip enabled SNR, enhancing it up to 2.8 x more
- ✓ Functional-safe component. Can manage the full acquisition or be controlled (upcoming hardware trigger)
- ✓ Customer's FPGA, microcontroller and operating system can manage the LeddarCore and other components
- ✓ Extremely flexible, integrates well to any system, hardware agnostic, requires more development for integration and control of the chip

Flexible, Modular Software Offering

LeddarEngine software is designed to be modular to adapt to a variety of applications, including new designs, or retrofit into existing LiDARs. It can consist of a simple control block for the LeddarCore up to a complete acquisition system, including signal processing and advanced features.

- **Control kernel**
Acquisition controller for LeddarCore. Allows for simplified control interface to the hardware, FoV segmentation, advanced laser schemes, fast acquisition triggers, acquisition tile sorting and health monitoring.
- **Advanced control**
Enables complex use cases like adaptive ROI, dynamic configurations, platform API or full system synchronization.
- **Waveform signal processing**
Provides high-speed processing of the raw waveforms. Includes filters and peak detector. Supports multiple detections per channel. Can provide short waveforms around the peak for further processing.
- **Point-cloud processing**
Enables further processing at the point-cloud level. Includes artefact compensation like crosstalk and saturation as well as compensation control loops for temperature and calibration.



LeddarEngine Configurations

Complete product data sheet available



LeddarEngine Specifications	LeddarCore LCA2 SoC	LeddarCore LCA3 SoC
Target applications	Short- to medium-range LiDARs	Medium- to long-range LiDARs
Number of input channels	32	64
Waveforms per second	Up to 48 k	Up to 935 k
Data interface	200 MBps Quad SPI	10 GBps MIPI CSI-2
Instrumented range (typical)	200 m	Up to 470 m ¹
Distance accuracy	As low as 5 cm	
Distance precision	As low as 1 cm	
Reliability and safety	AEC-Q100, ISO 26262 ASIL-B	
Package type	QFN-72	225-FCCSP
Package dimensions	10 mm x 10 mm	12 mm x 12 mm

¹ Can go up to 700 m using the High Dynamic Range mode. Contact LeddarTech for more details.



Development with the LeddarEngine is supported by the Leddar™ Ecosystem, a select group of world-class suppliers that accelerate customers' development by providing components, such as emitters, receivers, micromirrors, microprocessors and software development tools. These suppliers are prequalified for integration with LeddarCore SoCs to ensure maximum design agility and reduce technical risks. The ecosystem provides customers with a faster, safer path to high-volume commercial deployments.

For more information, visit leddartech.com/leddar-ecosystem.

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