

RAA2L6060

LiDAR Data Acquisition IC

Description

The RAA2L6060 LiDAR Control and Data Acquisition IC comprises a multi-channel LiDAR frontend for object detection in industrial and automotive applications. It uses the “Time-Of-Flight” (ToF) principle of light pulses reflected by one or more objects.

The timing module sends out trigger pulses to control one or more light emitters. The reflected light pulses are detected by the external PIN or SiPM photo array and applied to the RAA2L6060 automotive LiDAR data acquisition IC.

Each RAA2L6060 has 32 parallel light acquisition channels to amplify, sample and post-process the reflected light pulse into a multi-dimensional image of the surroundings. The SYNC feature allows operation in Master/Slave Mode to increase the resolution to 64 parallel light acquisition channels by using two RAA2L6060 ICs.

A 50MHz Quad-SPI interface transmits the pre-processed acquisition traces to a microcontroller for further post-processing, object detection and object classification.

Operational Overview

The RAA2L6060 architecture comprises a parallel multi-channel data acquisition system with a SPI interface for data exchange with an external microcontroller. This integrated mixed-signal system is capable to serve an array of 32 photodiodes enabling Time-of-Flight and intensity measurements. Customer can configure the device according to his use cases for analog parameters (for example, TIA gain, bandwidth) as well as for digital functionality (for example, number of data acquisitions, oversampling, accumulation, dithering).

Configuration and data acquisition are initiated through the SafeSPI interface by an external microcontroller. A frame scan is completely scheduled by the RAA2L6060 core controller running autonomously and parallel in each Light Acquisition Unit (LAU1 to LAU8). The data can be read out through Standard SPI or Quad SPI for post-processing.

Features

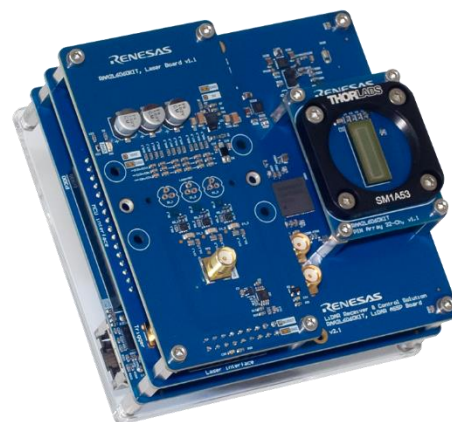
- Control and Data Acquisition IC for 2D/3D object detection and distance measurement.
- 32 light acquisition channels with integrated transimpedance amplifiers (TIA) and analog-to-digital converters (ADCs).
- Optional synchronized operation of two RAA2L6060 in Master/Slave Mode to double light acquisition channels.
- 50MHz Quad-SPI interface for data readout.
- 10.0 × 10.0 mm, 72-QFN package with a 6.5mm EPAD.

Typical Applications

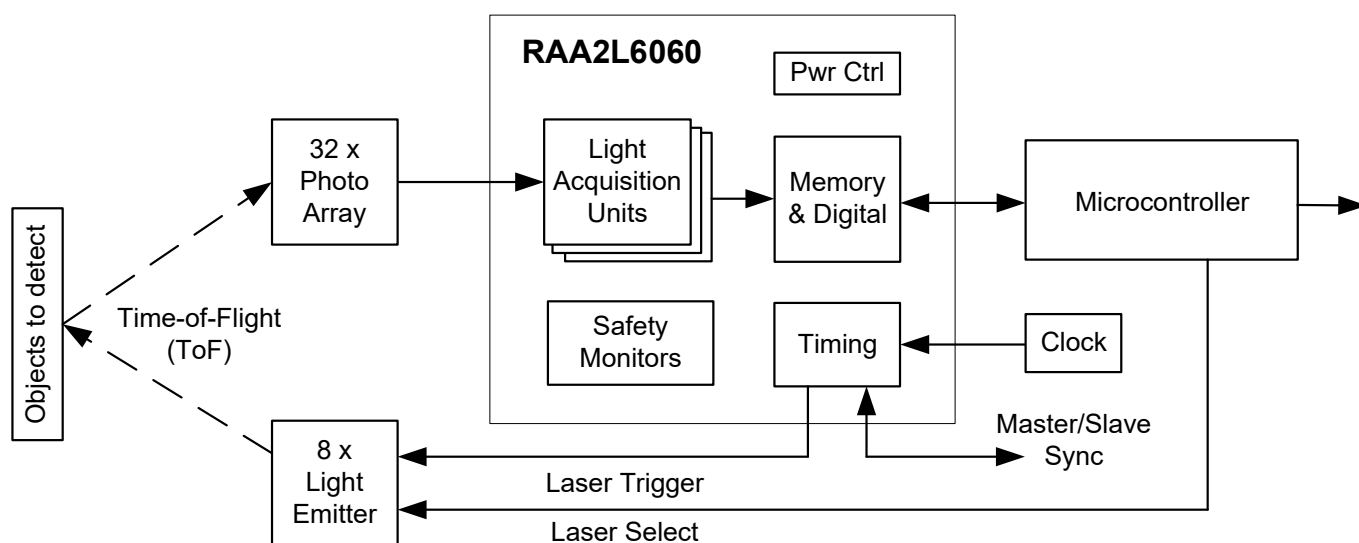
- Short-range and mid-range LiDAR systems for industrial, logistics and automotive applications.
- Autonomous shuttles and robots.
- Privacy sensitive surveillance.
- Blind Spot Coverage.
- Proximity Detection.
- Object detection.

Technical Support

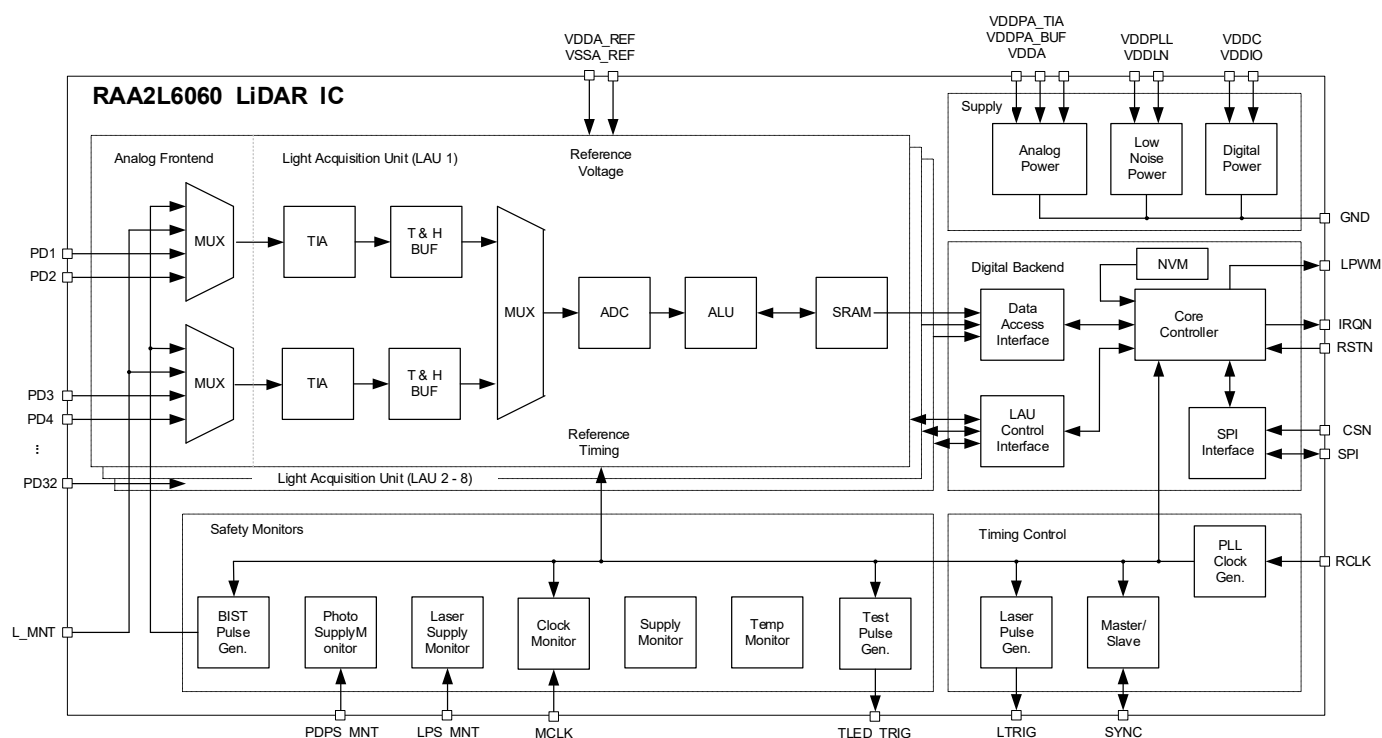
Programming Manual and technical support available on request. The Starter Kit RAA2L6060KIT provides a smooth start for evaluation and application specific LiDAR development.



Solid State LiDAR System Example



RAA2L6060 Block Diagram



Package Information

The RAA2L6060 package uses Ultra-Low Alpha mold compound Sumitomo G700SLA. The package outline drawings are accessible from the [Package Outline Drawing Package Code: NLG72S1 72-VFQFNP 10.0 x 10.0 x 1.0 mm Body, 0.50 mm Pitch \(renesas.com\)](https://www.renesas.com/en/packages/outline-drawing-package-code-nlg72s1-72-vfqfnp-10.0-x-10.0-x-1.0-mm-body-0.50-mm-pitch) site.

Ordering Information

Orderable Part Number	Description and Package	MSL Rating	Carrier Type	Temperature
RAA2L6060A3HNP#JA0	10.0 mm × 10.0mm × 1.0mm 72-QFN	3	Reel	-40°C to +105°C