

Linear Detector Array

Solution for Large, Continuous X-ray Scans

Linear Detector Arrays (LDAs, also called Linear Diode Array Detectors) use a single-line X-ray imager (or X-ray sensitive scintillators) to capture a two-dimensional image. Adaptive Energy provides advanced, custom-built LDAs for your inspection application.

The X-ray scintillators can be set at varying length and be optimized for various X-ray energies. By either passing a part under the detector or moving the detector over a part you create a two-dimensional image. LDAs are commonly used in conveyor inspection applications.

Scan More

Adaptive Energy can customize an LDA to specific applications, enabling you to build two-dimensional images of virtually any size. The width of an array is unlimited and image length is limited only by the dedicated computer memory available. LDAs are well suited to computed tomography (CT) systems, especially for larger objects outside the standard field of view of large digital radiographic panels.

Scan Faster

LDAs allow you to scan faster than traditional arrays and offer better X-ray conversion at higher energies. Built-in LINAC accelerator control with the use of AECIS software provides synchronized image capture. Image acquisition doesn't require stitching and/or creating additional CT scans, saving you time.

Scan Better

An LDA improves imaging by minimizing X-ray scatter, which tends to be an issue with large, dense parts and materials made from metal additive manufacturing. Adaptive Energy's LDAs incorporate encoder input to automatically maintain geometric aspect ratio of the images without any distortion.

The airbag igniters are inspected with two single-line X-ray cameras set at 90 degrees to one another. The Customer is able to capture and correlate simultaneous images to inspect the sodium azide pellets and other components of the inflation system. By capturing images of the airbag igniters, the Customer can assess if the units are properly assembled and meet quality standards to ensure the airbag will deploy during an accident, protecting the driver and passengers.

How it Works

The methodology used to acquire a linear image is relatively simple and common across imagers such as photocopiers, line scan computer vision cameras, optical width gauges, or traditional X-Ray LDAs. Essentially, all these devices use a detector sensitive to a



Advantages

The key benefits of an Adaptive Energy LDA system include:

- Ability to capture a larger area in a single, continuous 16-bit image
- Set simulator sensitivity to match your X-ray energy range
- Faster than a standard area array
- Reduce X-ray scatter/image noise
- Ideal for industrial CT applications
- Better imaging for additive and metal additive manufactured parts
- Ideal for inspecting large components

Technical Specifications

- Up to 15MeV imaging
- 16-bit A/D dynamic range
- Radiation hardened casing
- Ethernet Interface
- Customized solutions
- Built-in LINAC control
- Onboard DDR3 RAM for image storage
- Top-of-the-line FPGA
- Fine pixel resolution with optimum conversion

Specifications are subject to change without notice

particular spectrum (defined by your), exposure control circuits, a conversion from analog to digital (if necessary), timing control circuit, memory, and some form of external communication. The Adaptive Energy LDA uses high-quality linear array detectors with optimized scintillator ladders.

If you need special provisions for speed, noise rejection, sampling, equalization, and image reconstruction, these features can be built in to our custom cameras.

Analog data is amplified, indexed and output to an Adaptive Energy controller PCB via a driver board. This board handles control and timing of the drivers, receives and converts the analog data, processes the digital data with appropriate software tools within a high-performance FPGA, then outputs the data as a high-speed serial link through onboard Gigabit Ethernet components. The output data is reconstructed into an image by a remote PC workstation where it may be further manipulated, as desired, by your NDT personnel.

Innovations in X-Ray Image Capture

The Adaptive Energy X-Ray LDA offers advancements in electronics design and function. For example, it includes:

- A pair of extremely sensitive analog to digital converters
- Precision FPGA timing control and top-of-the-line FPGA
- Large amounts of DDR3 RAM (4Gb) for image data storage/ buffering as well as supplying data for image processing algorithms within the FPGA

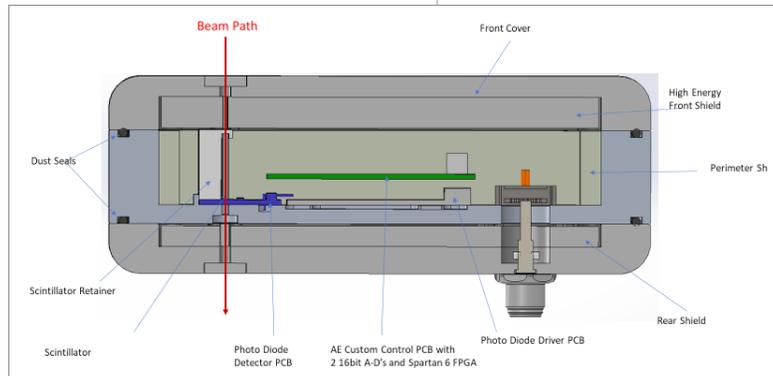
The LDA has been specially designed for radiation tolerance, redundancy, error checking, speed and robustness. It can acquire large, continuous 16-bit digital radiographic images. The LDA enclosure/housing is fabricated completely in house, with an attractive design originally developed to meet the demands of the nuclear power industry for rugged durability and reliable performance:

- Made of three billets of 6061 T6 aluminum with a hard, anodized finish
- Complete internally shielded with tungsten plate
- Light tight and IP65 environmental protected
- Three bi-color status indicators located on the rear cover along with power, trigger, and RJ45 connector
- Easy to adjust for the fine positioning of the lateral and tilt alignment, general purpose mounting and lifting hard points

About Adaptive Energy

Adaptive Energy was founded in 2001 to provide customized, non-destructive material evaluation and testing solutions to meet unique government, aerospace, transportation, energy, materials, and infrastructure industry requirements. The founders saw that off-the-shelf products were not addressing the needs of customers who had non-standard material testing demands, or who had to do testing and inspection in especially challenging environments.

With decades of experience in imaging technologies, engineering, machining, materials, and non-destructive testing (NDT), Adaptive Energy's experts work as partners with customer R&D, operations, and QC & QA teams to design and fabricate ingenious and effective solutions that perform at the highest level while delivering low total cost of ownership.



Adaptive Energy 36-inch long high energy 15MeV LDA cross-section view



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