Product Catalog

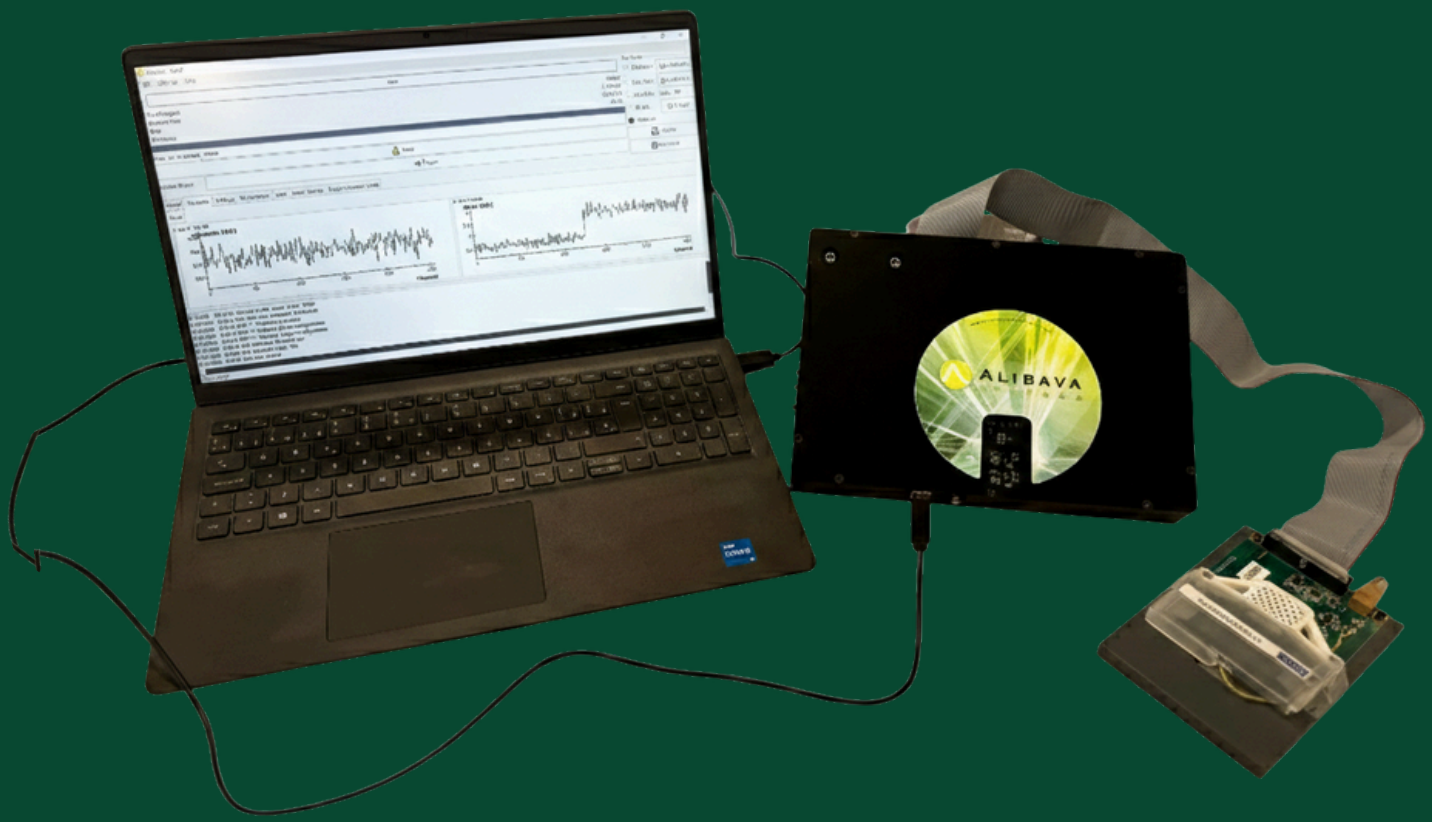
JUNE - 2026

ALIBAVA SYSTEMS

CONTENTS

Our Philosophy

Our mission is to provide technological products and services to the High Energy and Nuclear Physics research community from readout and characterization electronics, to radiation detector development and manufacuring as well as custom engineering services and full mechanical and electronic system integration.



EDUCATIONAL ALIBAVA SYSTEM (EASy)

The **Educational Alibava System (EASy)** is a fully portable, plug-and-play system engineered to bring real hands-on particle physics directly to your classroom. By performing simple experiments and analyzing the data, students will be familiarized with concepts such as:

- MIP
- Charge Collection
- Depletion region
- Charge sharing in strip detectors

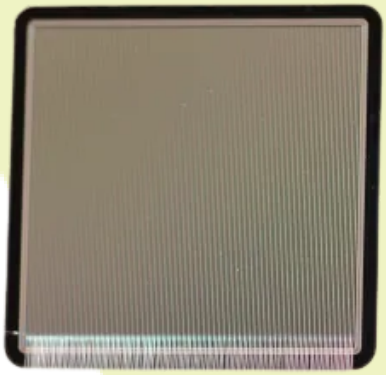
- The system can be configured to work with laser light or radioactive sources.
- Complete instrumentation system dedicated to Silicon Microstrip Radiation Detectors, representing the state-of-the-art in detector characterization.
- This easy electronic equipment establishes the basis for an affordable and complete set of student laboratory experiments.
- EASy is based on the Alibava System largely used within the CERN community to test microstrip detectors for particle and nuclear physics experiments.
- The set-up is ideal for making basic or complex experiments with silicon microstrip detectors similar to the ones performed in the actual research field, in facilities like CERN (LHC), DESY, FERMILAB, Synchrotrons, etc.

EASy Set

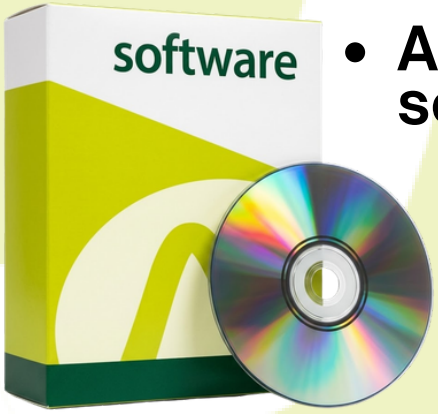
The complete system contains:

- **Control Unit**

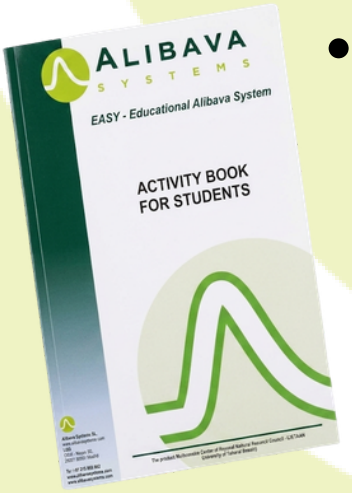
- **Sensor Unit**



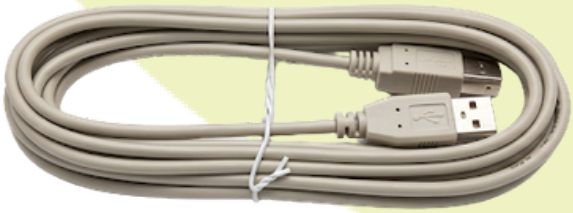
- **Microstrip Silicon Detector**



- **Acquisition software**



- **User's manual and Exercises book**

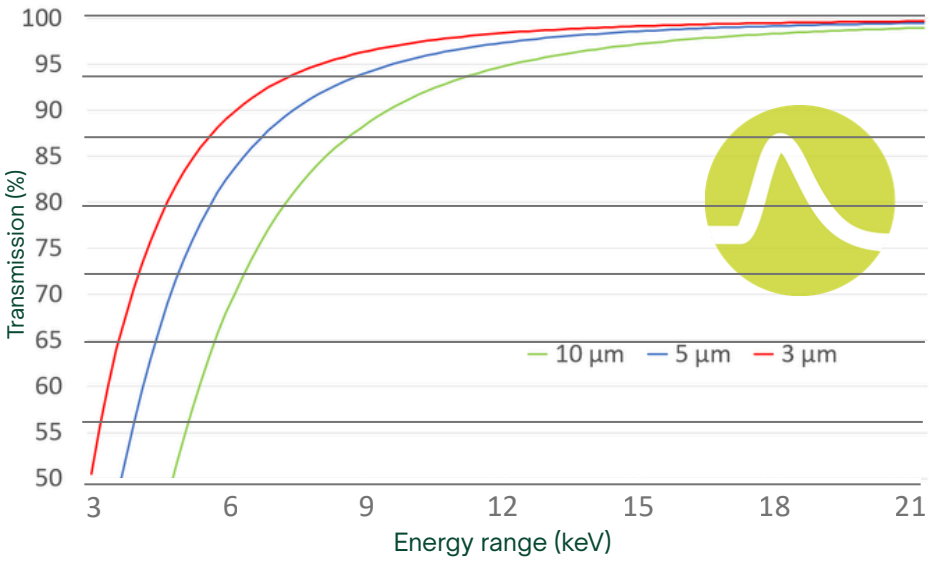


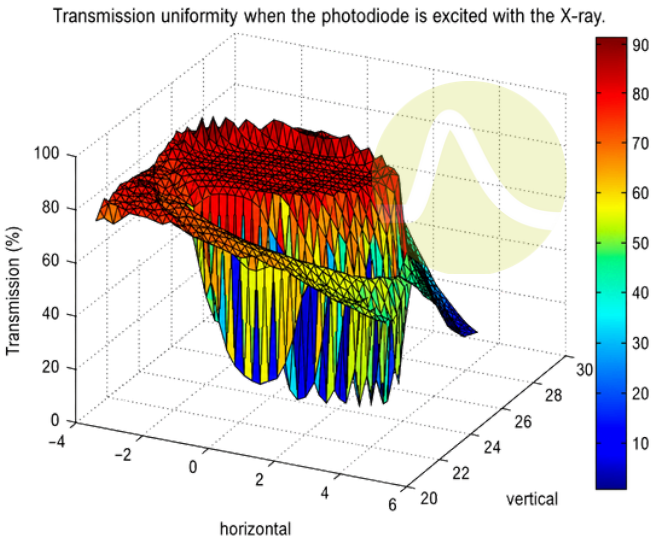
- **Laser source, 1 USB cable and 1 flat cable**

BEAM INTENSITY & POSITION MONITORS

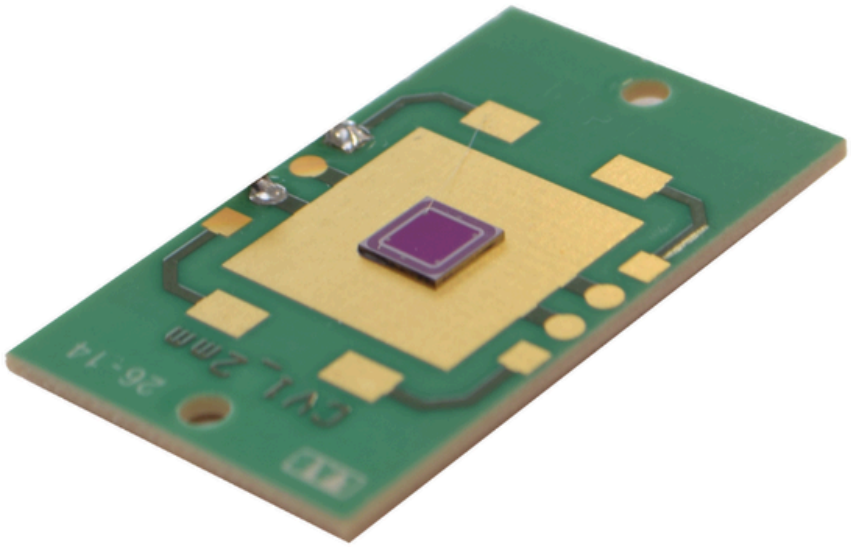
The Alibava Beam Intensity Monitor is a compact, passive photodiode circuit designed for advanced X-ray beam diagnostic applications. Developed in collaboration with **ALBA Synchrotron**, this solution delivers actual X-ray beam intensity and position data through direct measurement. Furthermore, its high transmission properties enable continuous, online monitoring of critical beam parameters simultaneously with data acquisition during an experiment. Thanks to these unique characteristics, the monitor is an invaluable tool not only for synchrotron beamline characterization but also for the rigorous quality control of monochromatic X-ray machinery.

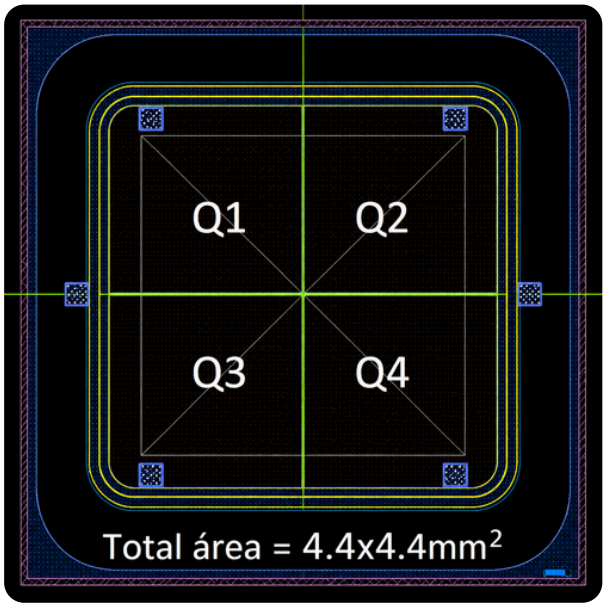
Our High-Efficiency Silicon Transmission Photodiode features an innovative ultra-thin detector design, guaranteeing high X-ray transmission and uniform radiation stability. Engineered to ensure that every absorbed photon is accurately counted, it offers an ultra-low absorption rate (under 20% at 4.5 keV) without compromising measurement efficiency. The device delivers outstanding transmission levels—exceeding 80% at 4.5 keV and 94% at 12 keV—alongside a responsivity uniformity of better than 5% within its active area, making it a highly stable and reliable solution for critical beam diagnostics.





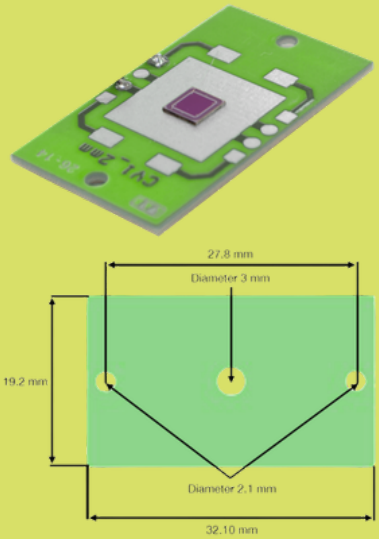
This P-on-N silicon detector is designed for easy integration into experimental setups, measuring beam intensity directly through its output current without the need for an external bias voltage. The compact 4.4 x 4.4 mm² device delivers a sensitivity of 0.035 A/W. It is available in total thicknesses of 3, 5, and 10 µm, which correspond to zero-bias depletion layer thicknesses of 2.6, 3.7, and 7 µm, respectively, providing a highly versatile and precise solution for continuous beam monitoring.





Light shielded (Standard)

The diode is integrated into a highly compact, light-shielded enclosure designed to strictly prevent ambient light interference. Engineered for seamless and secure system integration, this fully opaque housing features precision mounting holes and individual coaxial Lemo connectors. This setup ensures reliable, low-noise signal transmission while maintaining an ultra-compact footprint of just 41 x 68 x 12.5 mm.

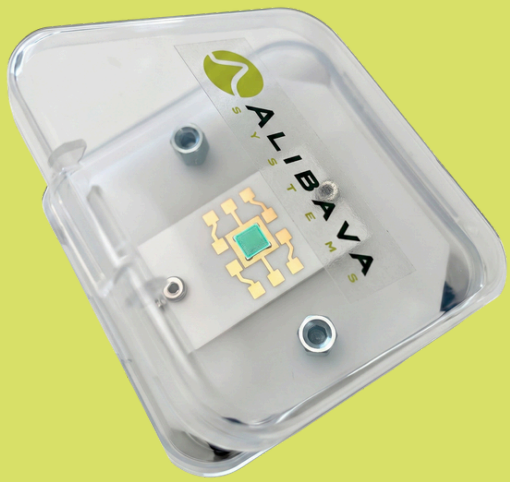


Naked

For advanced experimental setups requiring bespoke solutions, the monitor is available in a board configuration. In this version, the diode is mounted directly onto a High-Vacuum (HV) compatible PCB without the standard enclosure. This highly adaptable format provides researchers and engineers with maximum structural flexibility, making it the ideal choice for seamless integration into custom vacuum chambers or highly specialized, space-constrained beamline environments.

Vacuum

The diode is housed in an ultra-compact 36 mm chamber, specifically designed to ensure optimal performance and full compatibility with high-vacuum environments. To guarantee secure integration and stable signal transmission, the system is equipped with standard KF 40 terminations and individual coaxial Lemo connectors, effectively minimizing spatial requirements without compromising functionality.



Ultra High Vacuum (UHV)

These X-Ray Beam Intensity and Position Monitors are specifically engineered for ultra-high vacuum environments, constructed from premium UHV-compatible materials with exceptionally low outgassing rates. To guarantee optimal reliability, each device is supplied with a certified outgassing test report. These advanced features make the monitors perfectly suited for integration with beamline optical elements, such as monochromators and mirrors, as well as for use in any highly demanding experimental vacuum setup.

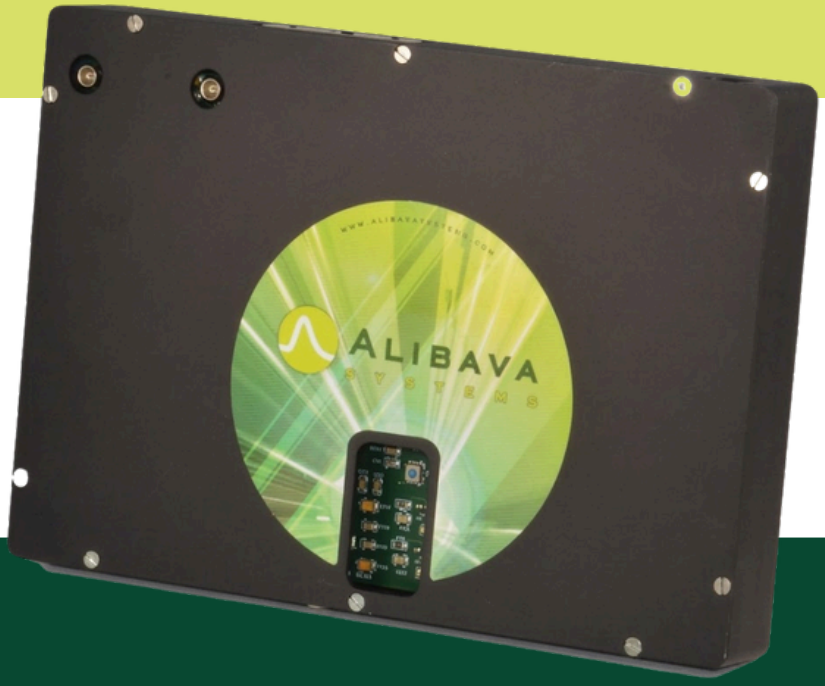
ALIBAVA SYSTEM CLASSIC

The **Alibava System Classic** is conceived to measure ionization with radiation detectors, providing:

- High sensitivity to small signals
- High position resolution and
- High speed

The Alibava System Classic is a versatile, portable particle detector readout solution tailored for scientific, academic, and industrial applications. It utilizes the Beetle chip—a sophisticated front-end readout ASIC originally developed for CERN LHC experiments—to precisely characterize both irradiated and un-irradiated microstrip detectors. To ensure optimal performance, the system's hardware architecture is structured into two primary components:

- **Mother Board:** Manages overall system control, processes analog data from the readout chips and external trigger signals, and establishes seamless USB communication with a PC.
- **Daughter Board:** Specifically designed to host the readout chips, pitch adaptors (fan-ins), and the sensor itself, all securely integrated onto a dedicated detector board.



Designed for use with radioactive sources or lasers, the system offers:

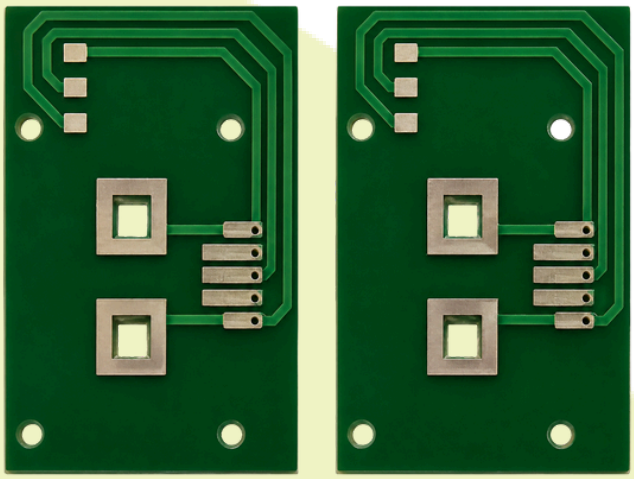
- **Broad Compatibility:** Supports various n-type and p-type microstrip detectors through interchangeable daughter and detector boards.
- **Synchronization:** Features an external trigger input and a synchronized output to pulse external excitation sources.
- **Software & Analysis:** Includes multi-platform software (Linux, Windows, macOS) and allows seamless data processing using pre-developed ROOT macros.

THE COMPLETE SYSTEM CONTAINS:

Custom detector boards are provided under demand

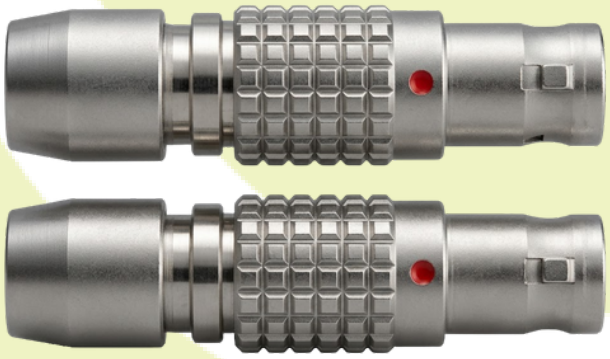
Mother Board with box

2 detector boards



1 power supply (AC/DC adaptor)

1 USB cable and 1 flat cable

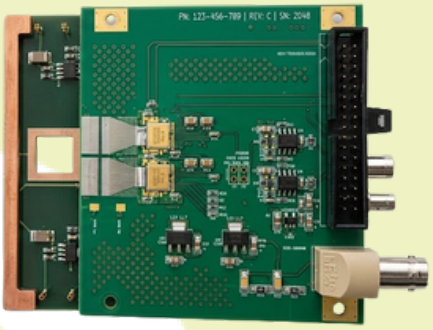


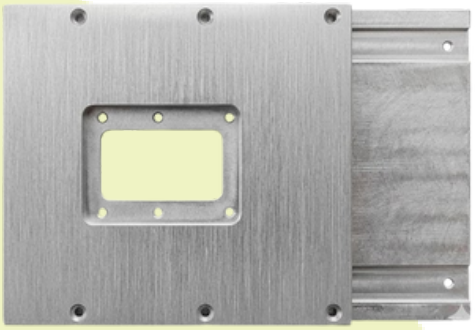
2 extra fanins (fan_det_80-80)

Acquisition software

1 USB cable and 1 flat cable

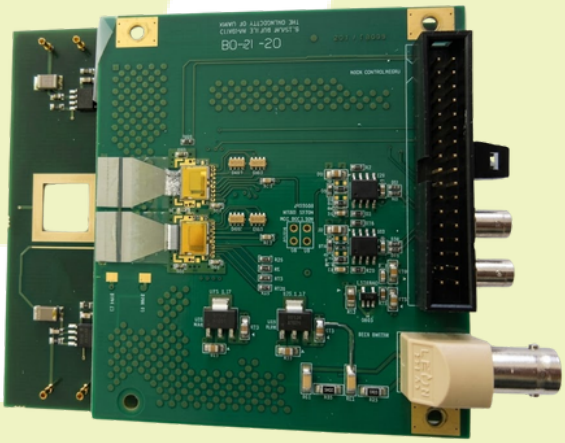
Daughter Board with fanins (2 fan chip + 2 fan det 80- 80) with box



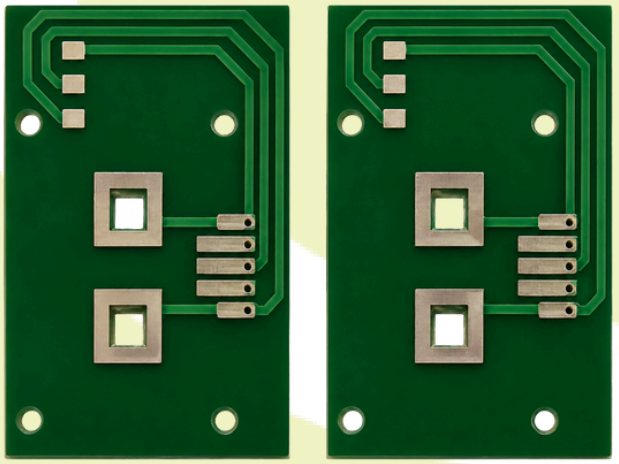


Standard Daughter Board is shipped with:

1 Populated Daughter Board with fanins (2 fan_chip + 2 fan_det_80-80)



2 detector boards



2 extra fanins (fan_det_80-80)

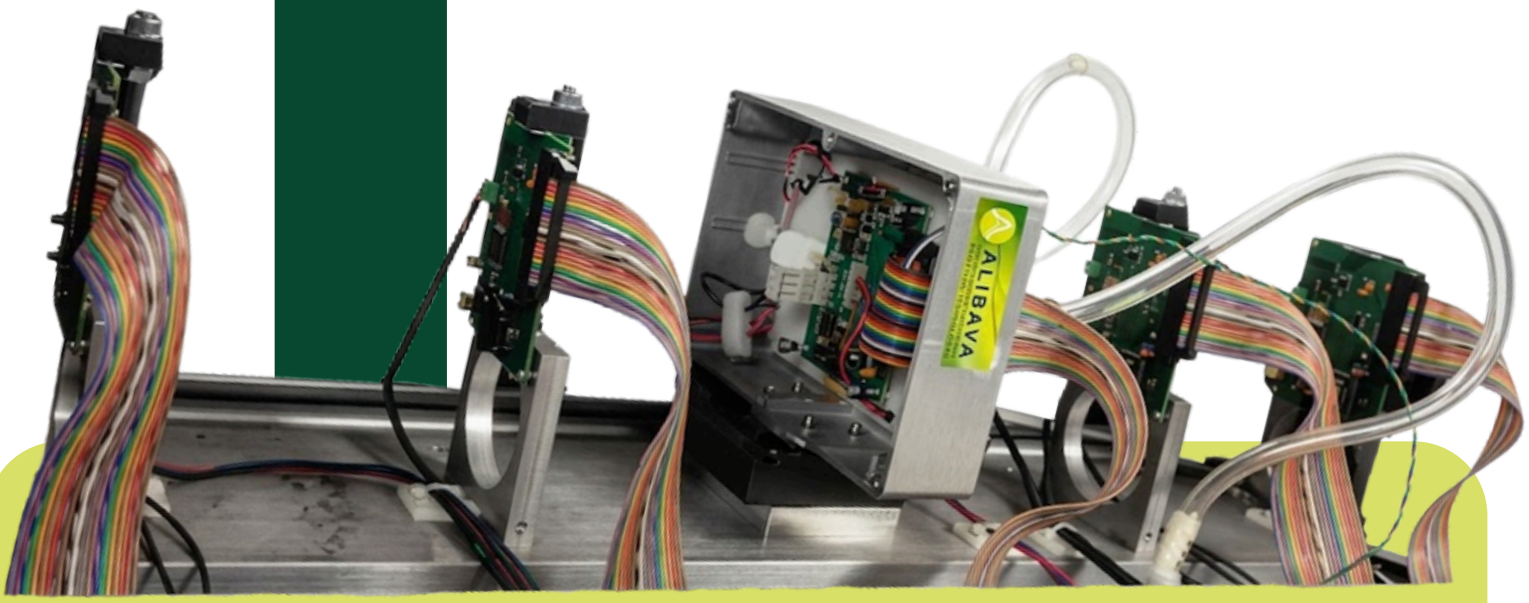
*Custom detector boards are provided under demand

LASER SYSTEM

This plug-and-play, low-power Class 1 laser source is optimized for seamless operation with silicon detectors.

- **Laser Specifications:** 0.5mW peak power, available in 980nm or 1064nm wavelengths.
- **Driver Performance:** Delivers precise 5ns pulse widths with a rapid 1ns rise time.
- **Connectivity & Power:** Features an FC/APC optical output, a Lemo input trigger, and operates on a standard 5V DC supply.

COMPACT TRACKER TELESCOPE



Designed for the high-resolution tracking of high-energy particles, this advanced system features:

- **Scalable Architecture:** Includes up to 16 planes for precise x-y positioning, equipped with standard 1x1 cm^2 silicon microstrip detectors (custom planes and sensor sizes available upon request).
- **High Performance:** Powered by Alibava boards with synchronous readout to support high trigger rate capabilities.

The system includes a comprehensive, user-friendly graphical interface for full configuration and data analysis:

- **Multi-Platform Support**: Fully compatible with Linux, Windows, and macOS.
- **Free Upgrades:** All future software versions and adaptations for other operating systems are provided entirely free of charge.

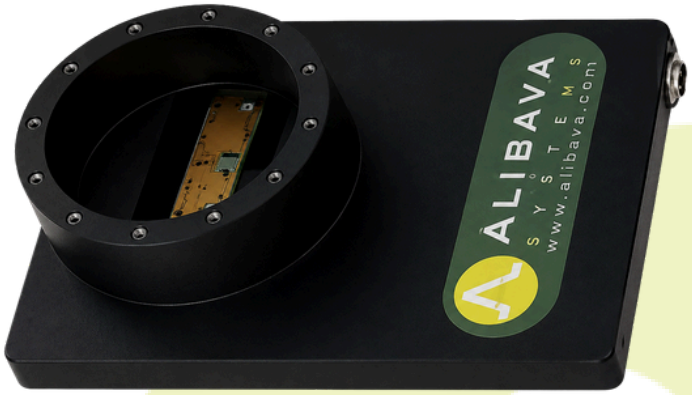
AliVata SYSTEM

The **AliVata System** is a highly compact and portable readout solution meticulously engineered for the precise characterization of silicon sensors. This versatile system is primarily deployed in advanced radiation spectroscopy and cutting-edge medical physics studies, delivering exceptional data acquisition reliability without compromising spatial efficiency.

This portable and compact system is **optimized for silicon sensor** characterization, specifically **tailored for spectroscopy and medical physics applications.** Powered by the IDEAS GPn and HDRn ASIC families, it seamlessly reads out silicon micro-dosimeters, strip or pad sensors, and SiPM-based detector systems.

- **Precision & Speed:** Delivers 1 keV energy resolution and a TDC resolution better than 100ps, with ASIC-dependent peaking times (e.g., 50ns fast / 500ns slow for the GP7).
- **Data Architecture:** Supports up to 4 data streams (managing a maximum of 16 chips per stream) and features both automatic and external trigger options.
- **Integration:** Operates on a standard +5V supply, providing UDP (Ethernet) PC connectivity and comprehensive DAQ software for Windows, Linux, and macOS.

The complete system contains:



DAUGHTER BOARD

MOTHER BOARD

FLATT CABLES

DESKOP POWER ADAPTER

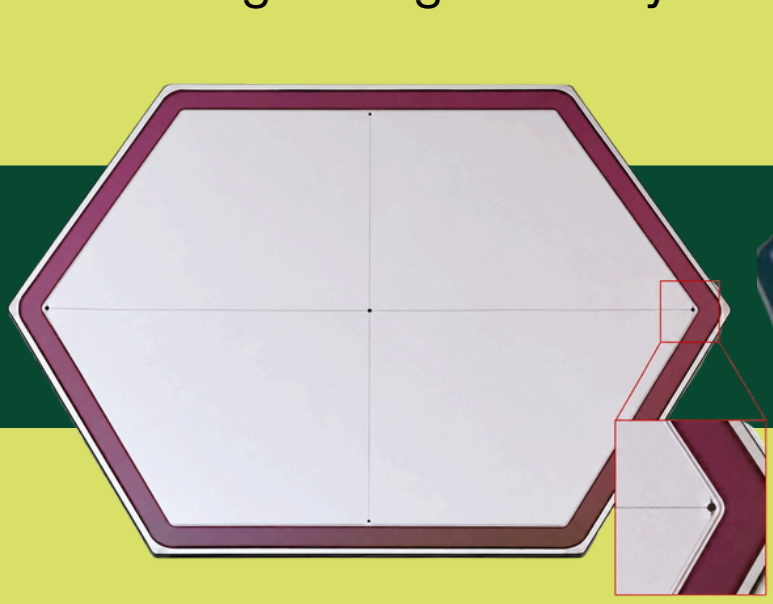
CUSTOMIZED PROJECTS

Leveraging our deep technical expertise, Alibava Systems engineers fully customized projects and complex readout systems and detectors tailored to meet highly specific experimental and industrial demands. Explore a selection of our specialized custom solutions below:

CUSTOM SILICON DETECTOR

Engineered for highly specialized applications, these custom detectors feature a unique hexagonal geometry with the active area precision-divided into four distinct trapezoidal segments.

- **Generous Coverage:** Offers an expansive 9.11 cm^2 active area for enhanced detection efficiency.
- **Optimal Profile:** Manufactured with a 200 µm thickness, ensuring robust and reliable performance.
- **Ultra-Low Noise:** Delivers exceptionally clean signals, maintaining reverse currents of just 50 nA.
- **Advanced Metallization:** Constructed with a precise 30 nm Ti and 200 nm Al/Cu layer to guarantee superior signal integrity and long-lasting durability.

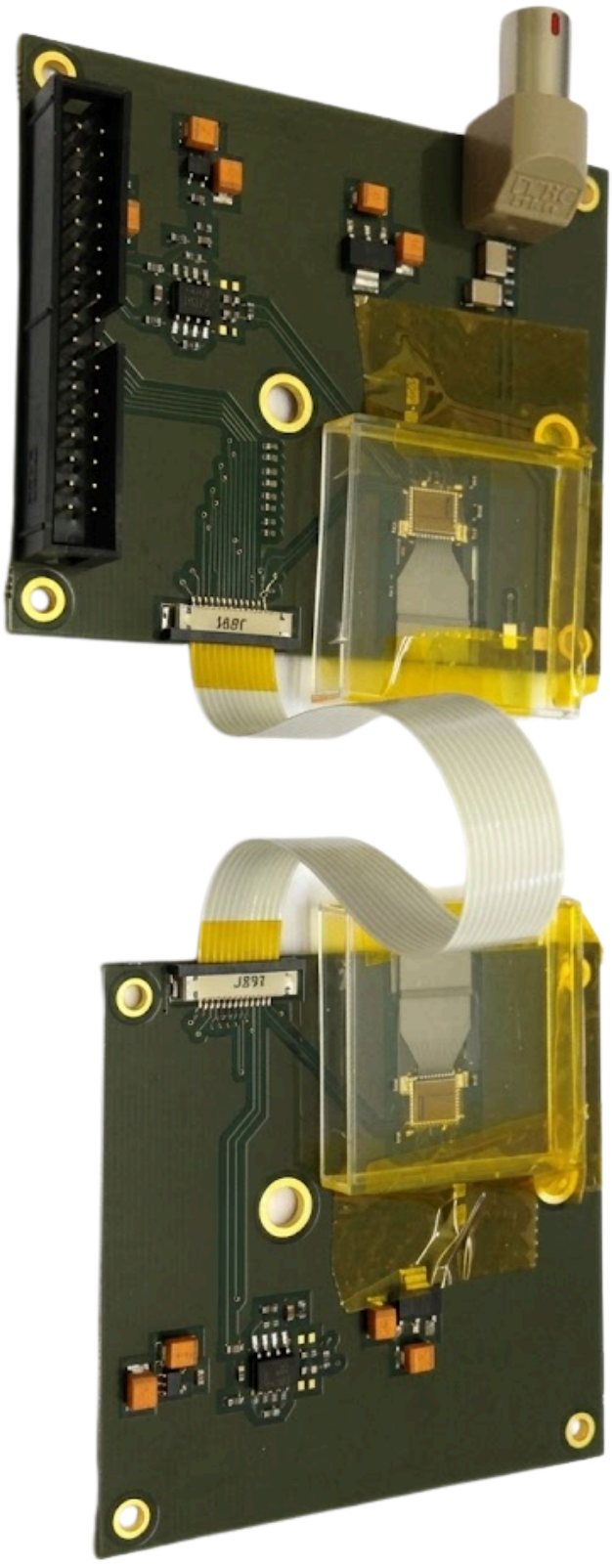


CUSTOM DAUGHTER BOARDS

Engineered to seamlessly adapt to your specific experimental requirements, our custom daughter boards offer unparalleled flexibility and advanced integration capabilities.

- **Tailored Engineering:** Fully custom board layouts designed to meet your precise operational specifications.
- **Scalable Architecture:** Multi-chip board configurations available to effectively support a significantly larger number of readout channels.
- **Versatile Sensor Integration:** Effortlessly accommodates a wide variety of sensor geometries, including advanced double-sided sensors.
- **Advanced Connectivity:** Choose between precision wire-bonding or high-density connectors, with compatible pitch adapters available upon request.

Tell us your specific needs, and our expert team will engineer a comprehensive custom solution for you.



CUSTOM PITCH ADAPTERS (PA)

We offer the fabrication of fully custom pitch adapters on demand, providing exclusive, full Engineering Runs tailored specifically to individual customer requirements.

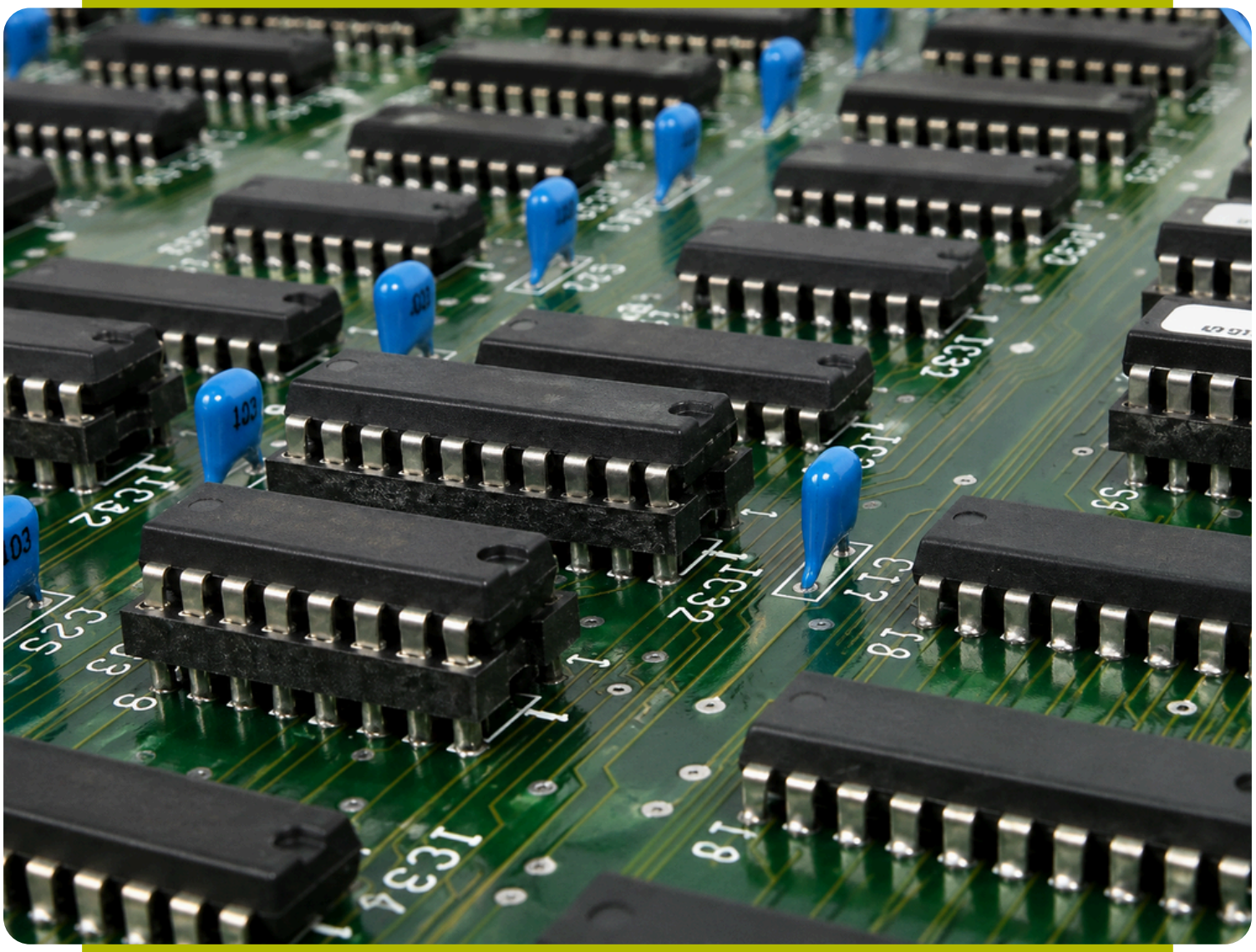
- **Exclusive Engineering Runs:** Designed specifically for a single customer, requiring a minimum order of 10 full wafers.

- **Guaranteed Yield Rates:** We ensure a reliable minimum fabrication yield based on die area: 70% for areas $\leqslant$ 200 mm^2, and 50% for areas between 200 mm^2 and 400 mm^2 (yields for areas exceeding 400 mm^2 are not guaranteed).

- **Maximum Value Delivery:** In all production runs, every fully functional pitch adapter produced is delivered to the customer, completely independent of and in addition to the guaranteed minimum yield.

ACCESSORIES

Alibava Systems also sells complementary accessories with its devices.

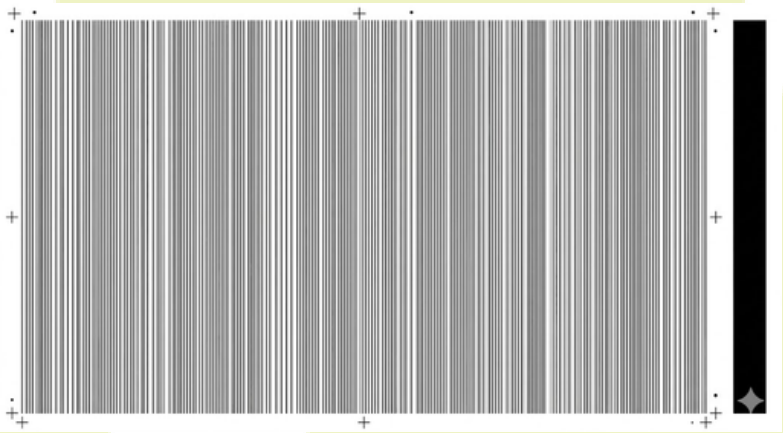


STANDARD PITCH ADAPTERS (FAN-INS)

Essential for adjusting the daughter board pitch to accommodate different sensors, these adapters facilitate the effortless wiring of multiple detectors—allowing for up to 500 connections on a single board. We currently have two unique types of detector fan-ins available in stock to fulfill your specific integration needs.

Standard Fan-In (fan_det_80-80) – 10-Pack Supplied in convenient packs of 10, these standard pitch adapters are engineered for precise and reliable sensor integration.

- **Physical Dimensions:** ~ 11800 x 5000 µm overall footprint with a 300 µm thickness.
- **Track Configuration:** 128 active tracks featuring an 80 µm pitch, 50 µm width, and 30 µm separation.
- **Bias Line:** Includes a single 250 µm thick bias line, safely isolated by a 1000 µm gap from the main tracks.



STANDARD PITCH ADAPTERS (FAN-INS)

Advanced Fan-In (fan_det_80-50) – 6-Pack Supplied in packs of 6, these specialized pitch adapters feature an asymmetric track design and staggered pad configurations to accommodate complex, multiple bonding requirements.

- Physical Dimensions: ~ 11800 x 10000 µm overall footprint with a 300 µm thickness.
- Track Configuration: 128 active tracks featuring asymmetric specifications (Left side: 80 µm pitch / 50 µm width; Right side: 50 µm pitch / 20 µm width) with a standard 30 µm separation.
- Bonding Pads (Right Side): Equipped with 2 rows of 50 µm wide pads in a staggered configuration, repeated 15 times to facilitate multiple wire bonding.
- Bias Line: Includes a single 250 µm thick bias line, safely isolated by a 1000 µm gap from the active tracks.

MULTI-PHOJECT WAFER PITCH ADAPTERS

Our MPW runs for full-custom pitch adapters provide a highly cost-effective solution for acquiring custom fan-ins in small quantities by sharing manufacturing costs across multiple users.

- **Flexible Ordering & Finishes:** Available in batches of 20, 50, or 120 units (with a 40% discount on extra orders, if available). Choose between Standard (zero-defect) or Untested (20% discount) batches, with passivated or non-passivated finishes to suit your prototyping needs.

- **Design Parameters:** Accommodates die areas from 100 mm^2 up to ~500 mm^2 (maximum side length of 50 mm). Requires a minimum feature size and separation of 10 µm, a rectangular cut, and a 200 µm clearance from the last feature to the cut line (exceptions evaluated upon request).

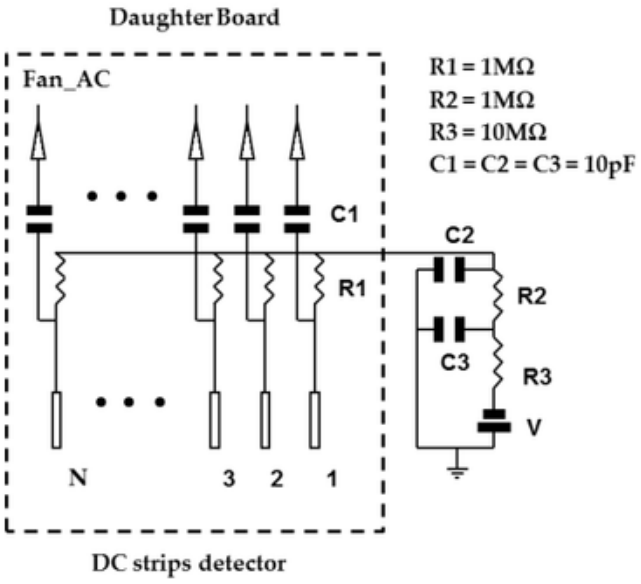
- **Design Submission:** Supply your own layout (GDS, Gerber, or other formats) or let our team create a Full-Custom design based on your specific requirements (subject to final customer approval).

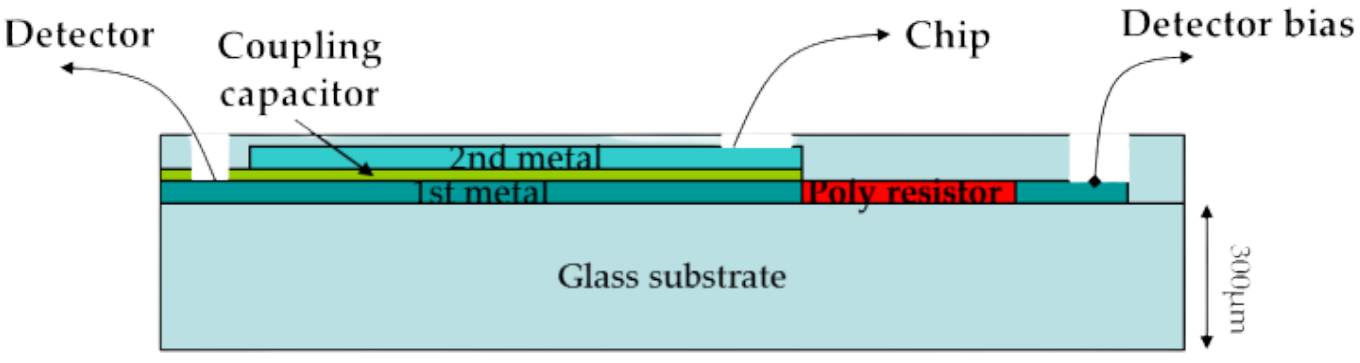
- **Fabrication Schedule:** Runs are scheduled once sufficient participation is reached, with a total turnaround time—including masking, cleanroom fabrication, testing, and cutting—of just 3 months.

AC COUPLED PITCH ADAPTERS

AC-Coupled Pitch Adapters (AC Fan-Ins) Designed to facilitate the measurement of various DC-coupled detectors using the standard ALIBAVA Daughter Board, these adapters feature integrated AC coupling capacitors and bias polysilicon resistors for every channel.

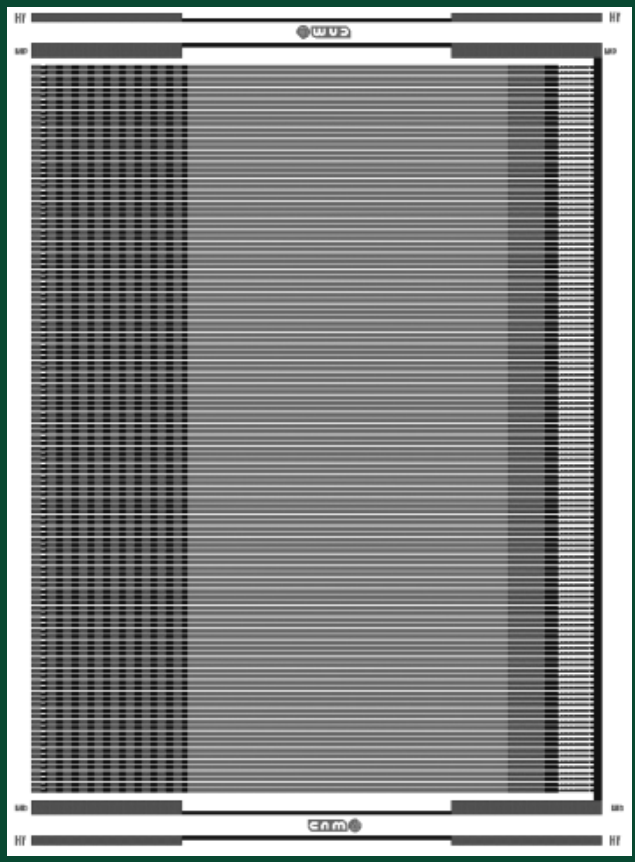
- **Integrated Capacitors:** 40 pF capacitance, 200 nm thickness, and a 4500 x 50 μm^2 active area.
- **Integrated Resistors:** 1 MΩ bias resistance per channel.

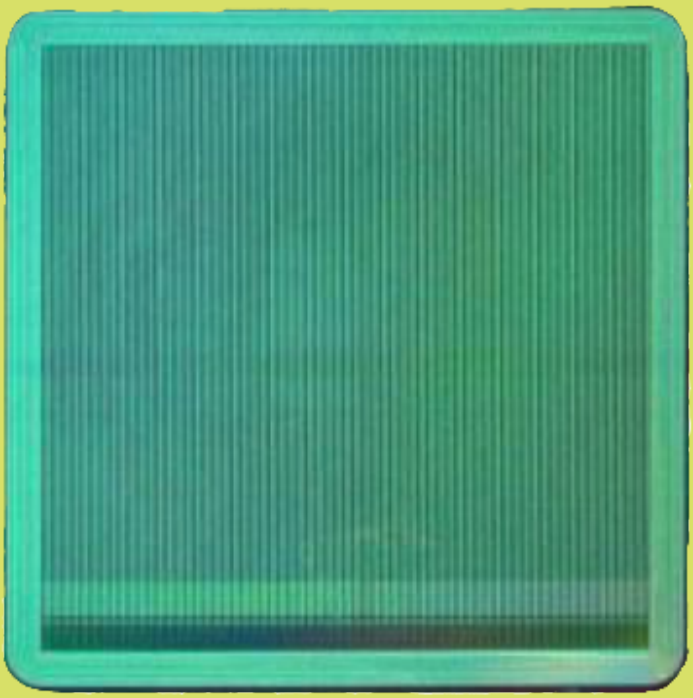




AC Fan-In (fan_AC) – 6-Pack Supplied in packs of 6, these specialized adapters are engineered for reliable AC-coupled integration.

- **Physical Dimensions:** ~ 11900 x 8900 µm overall footprint with a 300 µm thickness.
- **Track Configuration:** 128 active tracks featuring an 80 µm pitch on both sides, a 54 µm width, and a 26 µm separation.
- **Bias Lines:** Includes two 50 µm thick bias lines. The first line (GND) is isolated by a 260 µm gap from the active tracks, while the second line (HV) is spaced 300 µm from the GND line.

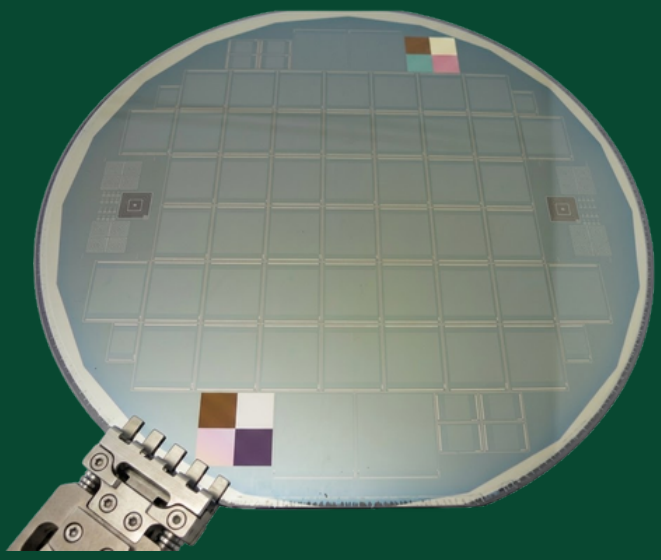




Detector Delivery & Mounting Options While the readout system is standardly delivered without a detector, we offer comprehensive integration solutions upon request:

- **Standard Detector Set:** Includes two "Baby" P-on-N microstrip particle detectors (128 channels, 1x1 cm^2) and one dedicated detector board.
- **Customization Services:** Optional professional mounting and wire bonding for detectors and fan-ins. Alternative detector types and custom sizes are also available to meet specific experimental needs.

NEUTRON DETECTORS



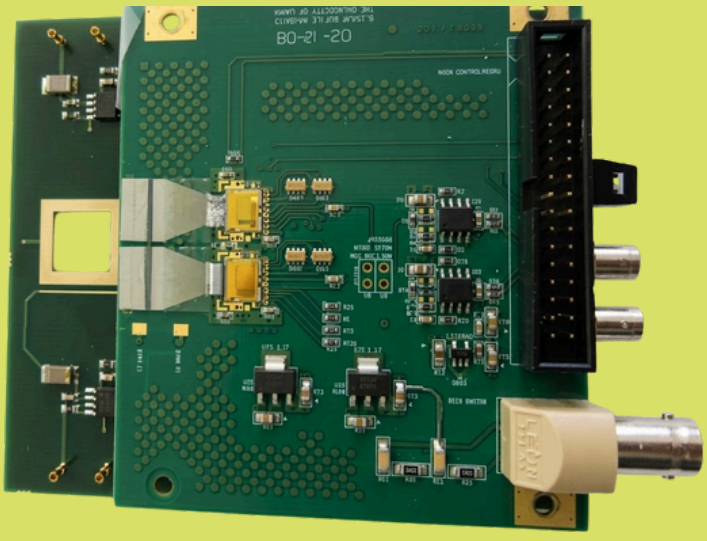
As an optional enhancement for the Alibava system, we provide specialized detectors engineered for high sensitivity to thermal neutrons.

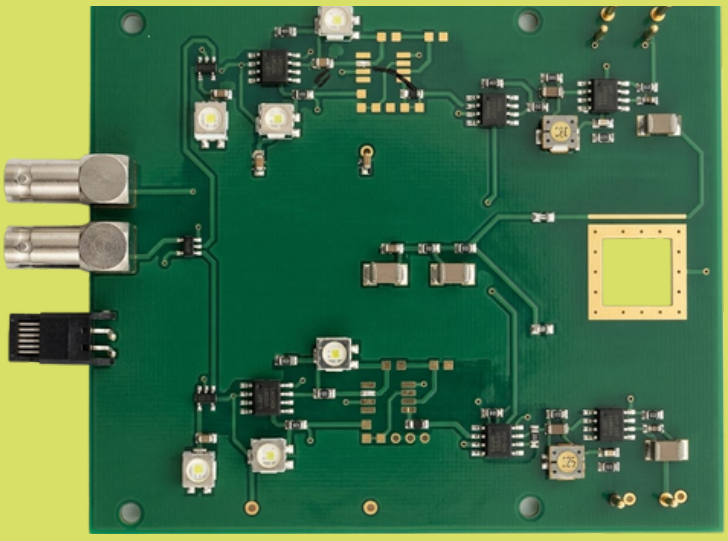
- **Advanced Conversion Technology:** Built on high-performance silicon detectors integrating thick deposited layers of pure Boron-10.
- **Precision Deposition:** Boron-10 can be precisely deposited at either the device or wafer level utilizing hard mask or photolithography techniques.
- **Versatile Sensor Configurations**: Available in a wide range of geometries and technologies, including pad, strip, pixel, planar, and micromachined designs.
- **Custom Solutions:** Fully customizable detector designs tailored specifically to meet your unique experimental and operational needs.

TRIGGER CARD

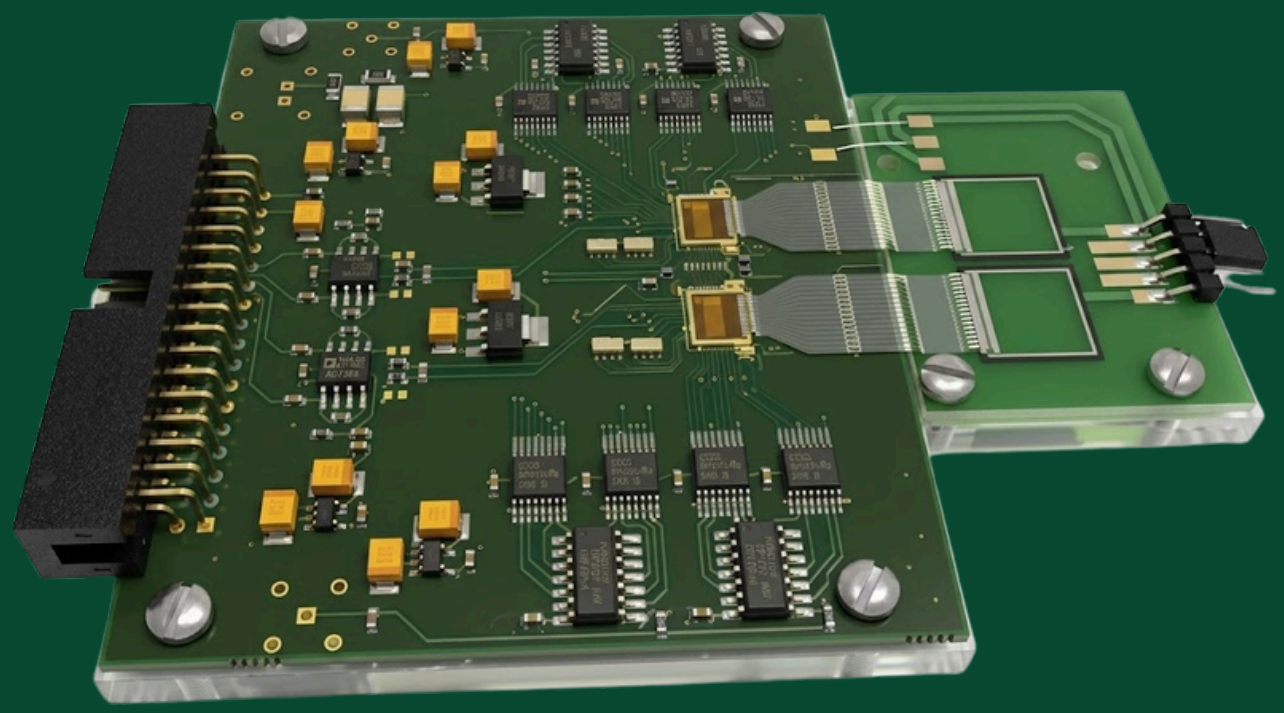
Engineered with high-performance silicon diode sensors, this versatile trigger card is designed to seamlessly initiate data acquisition within the Alibava ecosystem.

- **Advanced Triggering:** Features one or two diode coincidence triggers, complete with integrated coincidence logic and precise threshold adjustment capabilities.
- **High-Speed Performance:** Capable of sustaining high trigger rates of up to 20 kHz, reliably delivering a standard TTL trigger pulse output.
- **Seamless Integration:** Fully compatible with the Alibava Mother Board (MB) input to initiate data acquisition, featuring a physical assembly specifically designed to match the Alibava Daughter Board (DB).
- **Power Requirements:** Operates efficiently with a standard 5V input and a 20-30V sensor bias.
- **Customization:** Custom designs and specialized configurations are readily available upon request to accommodate unique experimental setups.





AUTOTRIGGER DAUGHTER BOARDS



Designed for advanced autonomous operation, these specialized daughter boards feature a reliable self-triggering mechanism generated directly by the integrated Beetle chip.

- **Versatile Sensor Integration:** Easily accommodates a wide variety of sensor geometries, including advanced double-sided sensors.

- **Tailored Engineering:** Delivered as fully custom designs, with compatible pitch adapters available upon request to ensure seamless integration into your specific setup.

- **Broad Applications:** Highly effective for demanding scientific fields, including photon detection, nuclear physics research, and neutron detection (when paired with a suitable convers

CONTACT US

Technical information available at alibavasystems.com

Mail info@alibavasystems.com

Location Carrer de Ca n´Alzina 118A, Nave 5 08202 Sabadell Barcelona, Spain

ALIBAVA
SYSTEMS

Our Contact

Office: Carrer de Ca n´Alzina 118A, Nave 5 08202
Sabadell, Barcelona, España
Werbsite: alibavasystems.com
Mail: info@alibavasystems.com