

AIDA

ALL-IN-ONE DETECTOR SYSTEM

Conducting CT



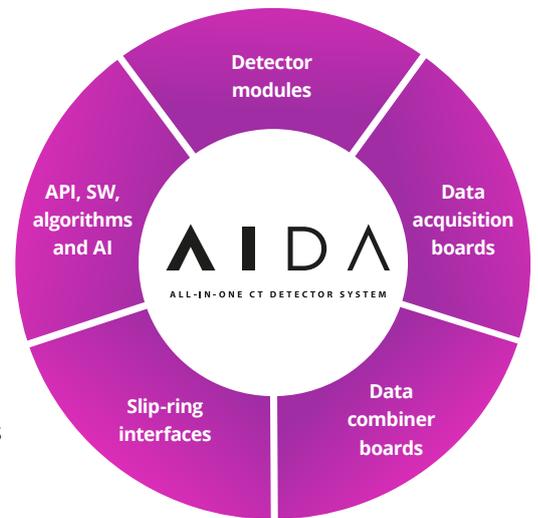
AIDA

All-in-one CT detector system

AIDA is a unified, scalable all-in-one CT detector system for all computed tomography (CT) modalities—including rotating, static, high-speed, and photon-counting CT. It combines detector boards, high-speed readout electronics, timing, communication, control, and software into one coherent system, enabling reliable and future-ready CT solutions.

Built for medical, security and industrial CT, AIDA standardizes the entire detector-to-host pipeline. It reduces system complexity, accelerates product development, and delivers consistent performance from main-stream to high-speed imaging applications.

Compatible with DT's X-ACE, X-ACE HS, and Aurora CT families, AIDA offers flexible readout options and robust communication architecture for multi-gigabit data streams. Its modular design and software stack ensure easy integration and fast time-to-market, supporting the advancement to next-generation CT systems.



Benefits

- **One platform for all CT systems**
Rotating, static, high-speed, and photon-counting CT
- **Unified architecture**
Detectors, readout, timing, communication, and software in a single coherent platform
- **Detector agnostic**
Supports X-ACE, X-ACE HS and Aurora CT families
- **Scalable performance and throughput**
From today's multi-Gbps systems to future PCCT data volumes
- **High-speed, deterministic imaging chain**
10 GbE optical image link, SPE control link, RS-422 timing, and deterministic metadata
- **Shorter time to market**
Validated HW-SW platform with DT API
- **Simplified CT system design**
Replaces multiple proprietary electronics blocks
- **Faster development cycles**
Reduced custom design effort and integration risk
- **Consistent system behavior across product lines**
Single platform from 16-slice to 64-slice and beyond
- **Lower total cost of ownership**
Fewer slip ring tracks, fewer custom electronics, reduced system complexity, streamlined supply chain

AIDA delivers a complete, scalable detector-to-host imaging chain – future-proofed for PCCT

Architecture overview

A unified CT imaging chain

AIDA turns a complex multi-board CT readout chain into a clean, deterministic, high-speed subsystem. It standardizes detector data flow, timing, control, and metadata from the X-ray detector to the host PC.

Deterministic timing architecture

AIDA maintains precise temporal alignment across the entire imaging chain using stator side encoder reception and RS 422 trigger/sync distribution. The timing links ensure consistent detector integration behavior, correct view ordering, and reliable metadata for reconstruction — enabling stable performance even in fast rotating and high speed CT.

Applications

- Rotating CT
- Static CT
- Photon counting CT (PCCT)
- For medical, security and industrial imaging

Rotor-side acquisition

- **Detectors:** X-ACE / X-ACE HS / Aurora CT detectors convert X-ray data to digital image data
- **Data combiner board:** X-DCB2x (mainstream) or HS DCB (high-speed/PCCT) aggregate image data and insert metadata functionalities:
 - High rate digital data reception
 - Metadata stamping (trigger, sync)
 - Aggregated 10 GbE image data output
 - Any Ethernet-compatible component can be connected
- **Auxiliary control:** Rotor-side X-HUB DB forwards trigger/sync signals to the DCB and provides X-ray control I/O, and diagnostic paths.

Rotor-stator transfer

Ensures reliable, deterministic data and timing transfer across slip ring assemblies

- **Functionalities**
 - 10 GbE optical image link
 - SPE control link
 - RS 422 timing link (trigger/sync)

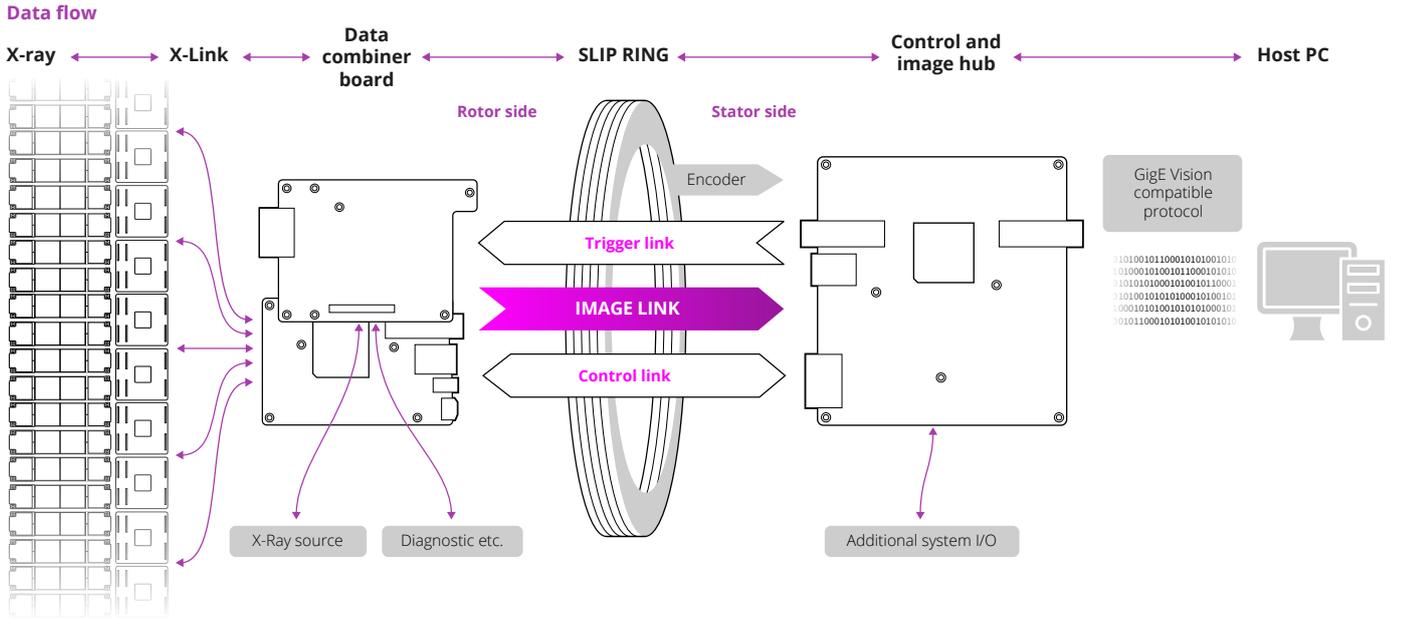
Stator-side integration

- Receives 10 GbE image data
- Handles encoder A/B/Z
- Generates trigger/sync for rotor
- Combines all control, timing, and diagnostic signals
- Presents a single 10 GbE GigE-Vision interface to host PC via DT API

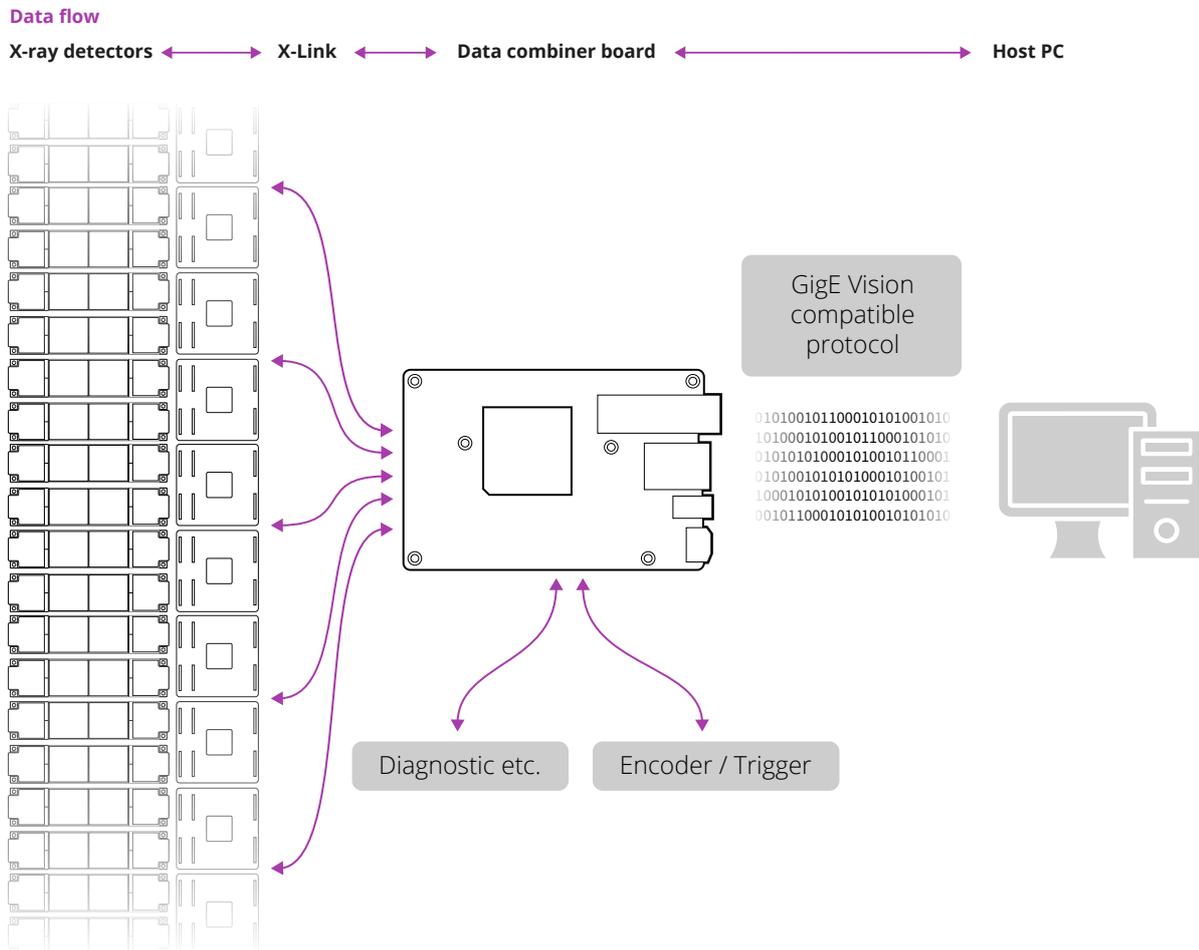
Data throughput

- Up to 3.7 Gbps (X-DCB2x)
- Up to 10 Gbps today / 40 Gbps+ future (HS DCB)

Rotating CT system architecture



Static CT system architecture



AIDA system components



Detector modules

- X-ACE 16/32: Medical CT energy-integrating detectors for value and mainstream
- X-ACE 32 and X-ACE 64 HS: Medical CT low noise, low power consumption, high-speed detectors with optimized mechanical footprint and thermal stability
- Aurora CT: Security and industrial CT detectors



X-DCB2x: Data combiner board (Value and mainstream CT)

- Supports X-ACE16/32 and Aurora CT
- Aggregates up to 3.7 Gbps image data
- Up to 16 detector-interface channels
- 10 GbE optical image link
- Full metadata stamping (trigger/sync)



X-HUB: Stator-side control & communication hub

- Central timing, control, and communication unit
- Unified 10 GbE (40 GbE-ready) interface to host PC
- Receives image data from slip ring
- Handles encoder input, generates trigger/sync
- SPE control path with rotor-side electronics



HS DCB: High-speed data combiner board

- Supports X-ACE 32 HS and X-ACE 64 HS, future scalability to PCCT
- Aggregates up to 8 Gbps image data, 40 Gbps+ future scalability
- 4 high speed detector channels
- 10 GbE optical image link
- Full metadata stamping (trigger/sync)



HS DAS: High-speed data acquisition system

- Provides a stable, optimized operating environment for X-ACE 32 HS and X-ACE 64 HS detectors
- Serves as the detector-side high-speed data acquisition interface
- Maintains tightly synchronized high-speed imaging



X-HUB DB: Rotor-side control module

- Forwards trigger/sync to DCB
- Interfaces with X-ray generator & diagnostics
- RS-422, Isolated RS-232, OC I/O
- Compact module stacked directly on DCB



DT API

- Unified software interface for all AIDA compatible detectors
- GigE Vision compatible
- Works on Windows, Linux & ARM
- Provides image data, control, metadata, and diagnostics

