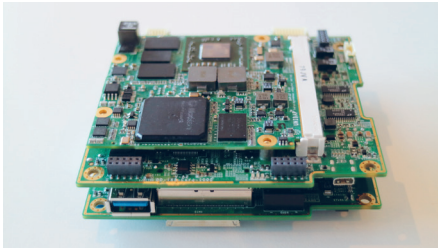


Deep Delphi iX5



Side view of DD-iX5 without casing showing standard configuration. iX5-CORE-1000 from bottom side with e2000/e2100 compute solution, and default iX5-EXT-100 extension below).



Side side view of DD-iX5 without casing showing top side iX5-EXT-100 extension interface board with M.2 SATA.

Onboard Artificial Intelligence Made Easy

Deep Delphi iX5 (DD-iX5) is based on a space proven design and provide intelligent data processing, indexing, and storage with machine learning capability and advanced data analytics for payloads and instruments. DD-iX5 is co-developed by Troxel Aerospace Industries Inc. and Unibap AB (publ) with support from the Swedish National Space Board (SNSB) for space and rugged environments. The Optimized Development Environment (ODE) kit allow easy software transition to the DD-iX5 platform.

Whether you have a Space Situational Awareness (SSA) payload, an Earth Observation (EO) payload, a synthetic aperture radar (SAR) payload, rover vehicle, or any other situation where intelligent data processing is needed, the DD-iX5 platform provides unique value through its massively parallel architecture and machine learning support. Enable and explore true autonomy and artificial intelligence on-orbit while lowering downlinking costs and time to user by increasing the information value close to the sensors.

With DD-iX5, you can rapidly develop your software application by seamless transition between the Deep Delphi software platform running on ODE, laptop, desktop, or virtual Linux environments. The iX5 solution is physically form factor compatible with PC104 and configured as two stacked PCB boards, a standard core processing module (standard version iX5-CORE-1000) and an interface and storage extension board (standard version iX5-EXT-100).

DD-iX5 support e20xx/e21xx computing modules with AMD64 architecture and full profile compute GPU acceleration. The DD-iX5 ships preloaded with a full Deep Delphi software package featuring Linux LUbuntu 16.04 LTS distribution with optimized packages for computer vision processing, robot control, point cloud handling, deep neural networks, and scientific packages. Examples include Octave, Python3, MySQL, SQLite, Postgres, etc. Machine learning tools like PlaidML, Caffe, Theano, TensorFlow are optional and offer CPU acceleration, with GPU acceleration if OpenCL is supported. Commercial tools like Matlab®/Simulink® can also be used.

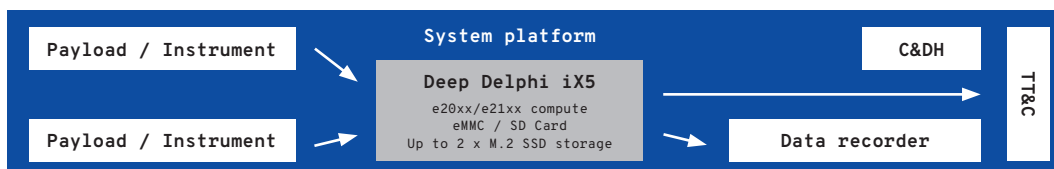
DD-iX5 with standard extension interface board provides up to two M.2 SATA Solid State Drive slots. Both slots support the M.2 types 2242/2280 with each up to 512GB SLC storage capacity. The iX5-CORE-1000 supports onboard eMMC storage and operating system boot (64 GB, default) or Micro-SD card.

Common sensor and payload interfaces are supported (some may require additional FPGA IP cores), e.g. Gigabit Ethernet, CAN, SerDes, PCIe®, LVDS, RS232/422, Isolated I2C, Isolated GPIO, USB 2.0, USB 3.0, SPI, SATA.

USE CASES EXAMPLES

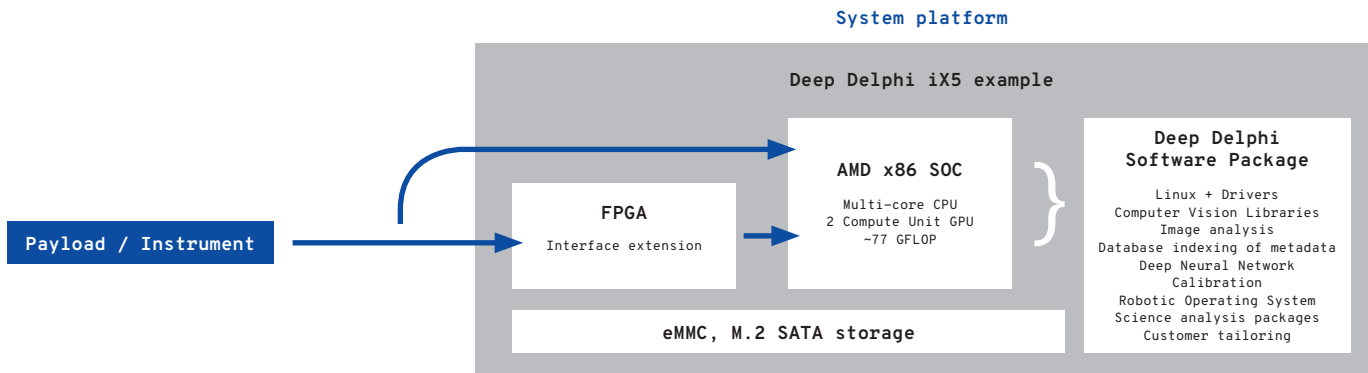
- Industrial Internet of Things
- Science & Technology demonstrations
- Human assist applications
- Autonomous vehicles operation
- Surveillance
- Space Situational Awareness
- Synthetic aperture radar
- Interplanetary exploration
- Rapid warfighter information distribution

DEEP DELPHI iX5 EXAMPLE



Solution
Efficient use of bandwidth.
High information value of most data. Advanced database indexing.

Deep Delphi iX5 compute solution - Intelligent Data Processing



Model Name Deep Delphi iX5 EDU (standard) Deep Delphi iX5 FM (standard)

Model Name	Deep Delphi iX5 EDU (standard)	Deep Delphi iX5 FM (standard)
Processing & Memory		
Intelligent Processing Core	e20xx/e21xx compute solutions	
RAM (on e20xx/e21xx)	2 GB DDR3 ECC (CPU/GPU), 0.5 GB DDR3 ECC (FPGA)	
Heterogeneous interconnect on e20xx/e21xx	PCIexpress® x2 lanes v2.0, 6.4 GT/s	
Storage	Up to 1 TB M.2 Solid State Drive 64 GB eMMC / Micro-SD card	
Display output for development	HDMI output, max 4K HD	
H.264 video encoding	Yes, two full-HD video streams hardware accelerated.	
Unibap Safety Chip feature	Prepared (not included in standard version).	
I/O Interface		
General Purpose IO (GPIO)	8 (Isolated) 14 (ext. connector)	
LVDS	16 @ 695 Mbps (max.)	
I2C	2 (Isolated) 2 (ext. connector)	
SPI	1 (ext. connector)	
CAN v2.0b	1 (Isolated)	
Ethernet, GigaLAN	1 (Isolated)	
USB	2 × USB v2.0 1 × USB v2.0 (ext. connector) 1 × USB v3.0 (ext. connector)	
SERDES	1 (extension connector) + switchable 12V power supply	
Serial Communication	5x RS232/422 (Isolated)	
PCI express®	x1 lanes (ext. connector) 1x4 lanes v2.0 (ext. connector)	
Mechanical		
PCBA Dimensions	96 (W) × 90 (H) × 50 (D) mm3	
Development Casing	TBD (W) x TBD (H) x TBD (D) mm3	
Environmental & Electrical		
Power Consumption	10-30 W (Depending on processing and storage selection and use)	
Input power voltage	12 V DC or 5 V DC (extension interface board powered separately)	
Operating temperature	0 °C to 70 °C	-40 °C to 70 °C (e2055, 15 W TDP SOC) 0 °C to 70 °C (e2160, 7 W TDP SOC)
Vibration	Operating, 5 Grms, 5-500 Hz, 3 axes	
Certification	IPC 610-E Class II	IPC 610-E Class III
Software Support		
Operating System and software	Deep Delphi library	
BIOS	Coreboot or AMI	

Doc. reference: 1004027
Information may change at any time.