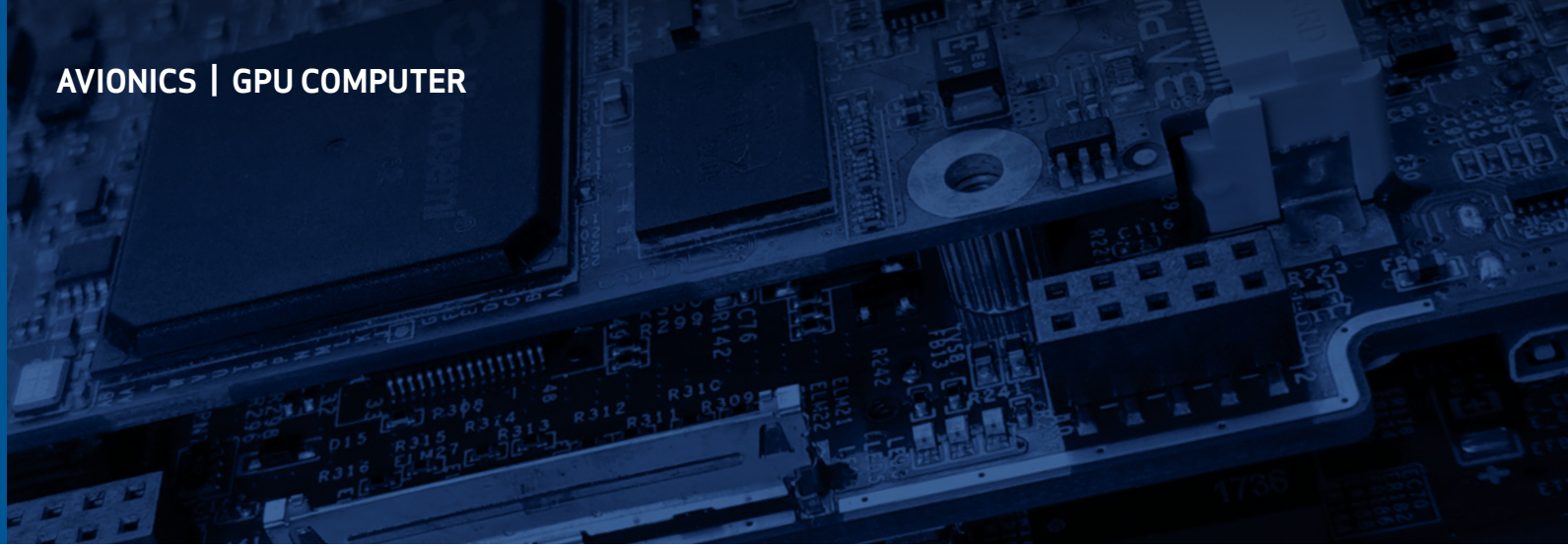

DEEP DELPHI iX5 GPU COMPUTE SOLUTION WITH INTELLIGENT DATA PROCESSING AND MACHINE LEARNING CAPABILITY

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

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

Deep Delphi iX5 (DD-iX5) is based on a space proven design that provides intelligent data processing, indexing, and storage with machine learning capability and advanced data analytics for payloads and instruments. DD-iX5 is co-developed with 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 allows 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, SQLlite, 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, where one slot is type 2242/2280 (512 GB max), and one slot is type 2242 compatible (256 GB max.). 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, PCIexpress®, LVDS, RS232/422, Isolated I2C, Isolated GPIO, USB 2.0, USB 3.0, SPI, SATA.

USE CASES EXAMPLES

- Edge Computing
- Science and Technology Demonstrations
- Software Defined Radio Data Processing
- Autonomous Vehicles Operation
- Surveillance
- Space Situational Awareness
- Synthetic Aperture Radar
- Interplanetary Exploration
- Rapid Warfighter Information Distribution

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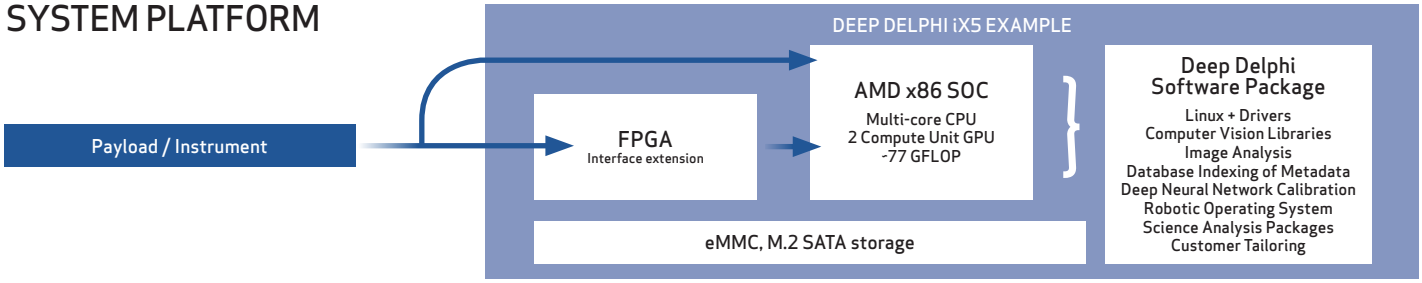
DEEP DELPHI iX5 COMPUTE SOLUTION INTELLIGENT DATA PROCESSING WITH MACHINE LEARNING CAPABILITY

DEEP DELPHI iX5 EXAMPLE

SYSTEM PLATFORM



SPECIFICATIONS

Model Name	Deep Delphi iX5 EDU (standard)	Deep Delphi iX5 FM (standard)
Processing and Memory		
Intelligent Processing Core	e20xx/e21xx compute solutions	e20xx/e21xx compute solutions
RAM (on e20xx/e21xx)	2 GB DDR3 ECC (CPU/GPU), 0.5 GB DDR3 ECC (FPGA)	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	PCIexpress® x2 lanes v2.0, 6.4 GT/s
Storage	Up to 768 GB M.2 Solid State Drive, 64 GB eMMC / Micro-SD card	Up to 768 GB M.2 Solid State Drive, 64 GB eMMC / Micro-SD card
Display output for development	HDMI output, max 4K HD	HDMI output, max 4K HD
H.264 video encoding	Yes, two full-HD video streams hardware accelerated.	Yes, two full-HD video streams hardware accelerated.
Unibap Safety Chip feature	Prepared (not included in standard version).	Prepared (not included in standard version).
I/O Interface		
General Purpose IO (GPIO)	8 (Isolated), 14 (ext. connector)	8 (Isolated), 14 (ext. connector)
LVDS	16 @ 695 Mbps (max.)	16 @ 695 Mbps (max.)
I2C	2 (Isolated), 2 (ext. connector)	2 (Isolated), 2 (ext. connector)
SPI	1 (ext. connector)	1 (ext. connector)
CAN v2.0b	1 (Isolated)	1 (Isolated)
Ethernet, GigaLAN	1 (Isolated)	1 (Isolated)
USB	2 × USB v2.0, 1 x USB v2.0 (ext. connector), 1 × USB v3.0 (ext. connector)	2 × USB v2.0, 1 x USB v2.0 (ext. connector), 1 × USB v3.0 (ext. connector)
SERDES	1 SerDes paired with 1 USB v2.0 in USB type C connector, 1 (extension connector)	1 SerDes paired with 1 USB v2.0 in USB type C connector, 1 (extension connector)
Serial Communication	5x RS232/422 (Isolated)	5x RS232/422 (Isolated)
PCI express®	x1 lanes (ext. connector), 1x4 lanes v2.0 (ext. connector)	x1 lanes (ext. connector), 1x4 lanes v2.0 (ext. connector)
Mechanical		
PCBA Dimensions	96 (W) × 90 (H) × 50 (D) mm3	96 (W) × 90 (H) × 50 (D) mm3
Development Casing	TBD (W) x TBD (H) x TBD (D) mm3	TBD (W) x TBD (H) x TBD (D) mm3
Environmental and Electrical		
Power Consumption	10-30 W (Depending on processing and storage selection and use)	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)	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	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	Deep Delphi library
BIOS	Coreboot or AMI	Coreboot or AMI

Information may change at any time

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