LEADING THE EMBEDDED FUTURE

G029I

EMBEDDED SINGLE BOARD COMPUTER WITH 13TH GEN INTEL CORE – RJ45 CONNECTORS

- 13th Gen Intel Core Processor (Raptor Lake)
- Up to 96 GB soldered DDR5-5200 IBECC RAM
- 120 GB NVMe on-board storage
- Board Management Controller, TPM 2.0
- Front I/O: 3× 2.5G Ethernet RJ45 (AMT, TCC, TSN), 10 Gbps USB-A & USB-C with DP Alt Mode
- Rear I/O: 2× 2.5G Ethernet, PCIe, USB 10 Gbps, SATA
- -5 °C to +60 °C operating temp. (system amb.)
- Long-term availability

HIGH-PERFORMANCE EMBEDDED COMPUTING

The G029I is a 3U CompactPCI Serial CPU board featuring 13th Gen Intel Core processors with up to 14 cores (6P+8E) and up to 96 GB of soldered dual-channel DDR5-5200 IBECC RAM. Introducing Intel's new hybrid architecture with a combination of Performance and Efficiency cores, the G029I raises the bar for embedded solutions with a flat 20-25% performance-per-watt increase over the existing G28. It is perfect for wayside railway applications or industrial applications. As part of a rail wayside server system, the single board computer can be used for condition monitoring. It also offers reliable computing performance for medical applications, e.g., surgical robots as well as for factory automation, motion control and robotics in industrial automation.

SCALABLE AND RUGGED

duagon further extends CPU scalability with options ranging from 15 W to 45 W TDP and a multitude of P/E core configurations to perfectly suit operational needs even in harsh ambient temperatures of up to +60 °C. A custom solid block heat sink provides optimal heat dissipation without the use of moving parts. All components are soldered for protection against shock and vibration according to applicable DIN, EN or IEC industry standards. To make it even more enduring, coating and underfilling is available as an option. All models come with fast 120 GB NVMe storage (more as an option).

GATEWAY TO EMBEDDED AI

The integrated Intel Iris Xe GPU with up to 96 Execution Units is AI-ready for a wide range of applications like healthcare robotics and medical imaging analysis, or for manufacturing, assembly and quality control operations in industrial automation.

Intel OpenVINO toolkit, combined with the accessibility of pre-trained models such as YOLO, serves as a robust foundation for seamless deployment of AI inference applications in real-world scenarios.

COMPREHENSIVE MANAGEMENT

A versatile board management controller provides intelligent monitoring and supervision of all vital signals including supply and on-board voltages, temperatures and a watchdog for the OS. Additionally, the G029I supports Intel AMT remote out-of-band management and holds a discrete TPM module for hardware-based system security.

FUTURE-SAFE WITH CERTIFIED RELIABILITY

The G029I supports Linux and is also certified for Red Hat Enterprise Linux 9.4-9.x, adding even more benefits in terms of performance, reliability and updates.

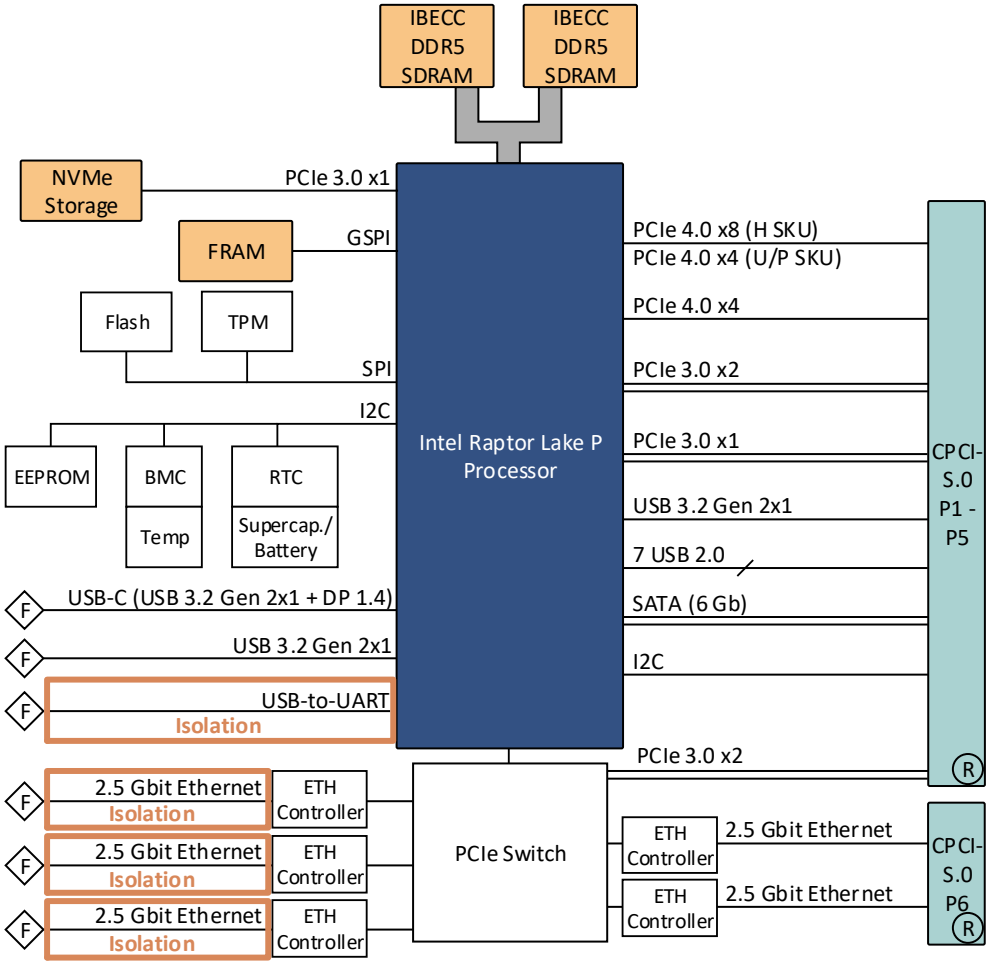
Long-term availability ensures an extended product life and future-safety, and an optional rechargeable battery contributes further to a reduction in maintenance required. The G029I is backwards compatible to duagon products G28, G25A (on request G029I with 10G Ethernet) and G23.

www.duagon.com/products/g029i/

DATA SHEET

<DIAGRAM>

G029I | DIAGRAM



F Front R Rear B Onboard O Options

G029I | TECHNICAL DATA

CPU

- The following CPU types are supported:
  - Intel Core i3-1315URE, 6 cores (2P+4E), 8 threads, 1.2 GHz, 64 EU, 15 W, -40 °C to +100 °C
  - Intel Core i3-1320PRE, 8 cores (4P+4E), 12 threads, 1.7 GHz, 48 EU, 28 W, -40 °C to +100 °C
  - Intel Core i3-13300HRE, 8 cores (4P+4E), 12 threads, 2.1 GHz, 48 EU, 45 W, -40 °C to +100 °C
  - Intel Core i5-1345URE, 10 cores (2P+8E), 12 threads, 1.4 GHz, 80 EU, 15 W, -40 °C to +100 °C
  - Intel Core i5-1350PRE, 12 cores (4P+8E), 16 threads, 1.8 GHz, 80 EU, 28 W, -40 °C to +100 °C
  - Intel Core i5-13600HRE, 12 cores (4P+8E), 16 threads, 2.7 GHz, 80 EU, 45 W, -40 °C to +100 °C
  - Intel Core i7-1365URE, 10 cores (2P+8E), 12 threads, 1.7 GHz, 96 EU, 15 W, -40 °C to +100 °C
  - Intel Core i7-1370PRE, 14 cores (6P+8E), 20 threads, 1.9 GHz, 96 EU, 28 W, -40 °C to +100 °C
  - Intel Core i7-13800HRE, 14 cores (6P+8E), 20 threads, 2.5 GHz, 96 EU, 45 W, -40 °C to +100 °C

MEMORY

- System RAM: 96 GB max., soldered DDR5-5200, IBECC
- Non-volatile RAM (NVRAM): 64 kB FRAM

MASS STORAGE

- NVMe (soldered); 120 GB (standard)

GRAPHICS

- Processor graphics

INTERFACES

- This product includes interface options
  - Available interfaces depend on the processor type
- SATA
  - 2 × SATA Revision 3.x, backplane
- Video
  - 1 × DisplayPort 1.4a, USB Type-C, for service
- USB
  - 1 × USB 3.2 Gen 2x1, Type-A, for service
  - 1 × USB 3.2 Gen 2x1, Type-C, for service
  - 1 × USB 3.2 Gen 2x1, backplane
  - 7 × USB 2.0, backplane
- Ethernet
  - 3 × 100/1000BASE-TX / 2.5GBASE-TX, RJ45
  - 2 × 100/1000BASE-TX / 2.5GBASE-TX, backplane
- PCI Express
  - 1 × PCIe 4.0, x8 (H SKU)/x4 (P/U SKU), backplane
  - 1 × PCIe 4.0, x4, backplane
  - 4 × PCIe 3.0, x2, backplane
  - 2 × PCIe 3.0, x1, backplane
- Serial
  - 1 × USB-to-UART, isolated, USB Type-A
- I2C
  - 1 × backplane
- LED
  - Status: board status (BMC)
  - Ethernet: link, activity
  - Hot-swap

SUPERVISION AND MANAGEMENT

- Board management controller
- Temperature measurement
- System watchdog (BMC)
- Real-time clock, buffered by supercapacitor or battery or rechargeable battery
- Trusted Platform Module 2.0

PRODUCT STANDARD

- CompactPCI Serial: CompactPCI Serial PICMG CPCI-S.0 Specification R3.0

ELECTRICAL SPECIFICATIONS

- Supply voltage: +12 V (9.5 V to 15.5 V)
- Power consumption: 68 W max.

MECHANICAL SPECIFICATIONS

- Dimensions: 3U, 8 HP
- Weight: 550 g
- Cooling: Air cooling, forced convection, airflow 2.5 m/s

PRODUCT COMPLIANCE: RAIL - WAYSIDE NON-SAFETY RELATED

- Operating temperature: -5 °C to +55 °C (EN 50125-3:2003, class T1, container N.T.C.)
- Storage temperature: -40 °C (EN 60068-2-1:2007, Ab) to +85 °C (EN 60068-2-2:2007, Bb)
- Altitude: +3000 m max. (EN 50125-3:2003, class AX)
- Pollution degree: EN 50124-1:2017, class PD2
- Shock: 11 ms @ 20 m/s² (EN 50125-3:2003, in a switch cabinet 1 m to 3 m from the track)
- Vibration: 2.3 m/s² (EN 50125-3:2003, in a switch cabinet 1 m to 3 m from the track)
- Electrical safety
  - EN 50124-1:2017
  - EN 62368-1:2014 + AC:2015
- EMC emission: EN 61000-6-4:2007 + A1:2011
- EMC immunity: EN 61000-6-2:2005

PRODUCT COMPLIANCE: INFORMATION TECHNOLOGY EQUIPMENT

- Electrical safety: EN 62368-1:2014 + AC:2015
- EMC emission
  - EN 55032:2015 (multimedia equipment), class A (industrial environments)
  - EN IEC 61000-6-4:2019 (generic standard, industrial environments)
- EMC immunity
  - EN 55035:2017 (multimedia equipment)
  - EN 61000-6-2:2005 (generic standard, industrial environments)

PRODUCT COMPLIANCE: MEDICAL ELECTRICAL EQUIPMENT

- EMC: EN 60601-1-2:2015 + A1:2021

RELIABILITY

- MTBF: 202 804 h predicted @ 40 °C according to IEC/TR 62380 (RDF 2000)

BIOS/BOOT LOADER

- AMI Aptio UEFI Firmware

SOFTWARE SUPPORT

- Linux
  - Certified for Red Hat Enterprise Linux 9.4 - 9.x
  - Tested with: Ubuntu 24.04 LTS
- Further Resources
  - See the product User Manual for details on software support: **www.duagon.com/products/g029i/#doc**
  - See section Software on the product web page for available packages: **www.duagon.com/products/g029i/#downl**
  - See also Application Note ***Recommendations for a Robust Software Setup***

G029I | ORDERING INFORMATION

STANDARD MODELS

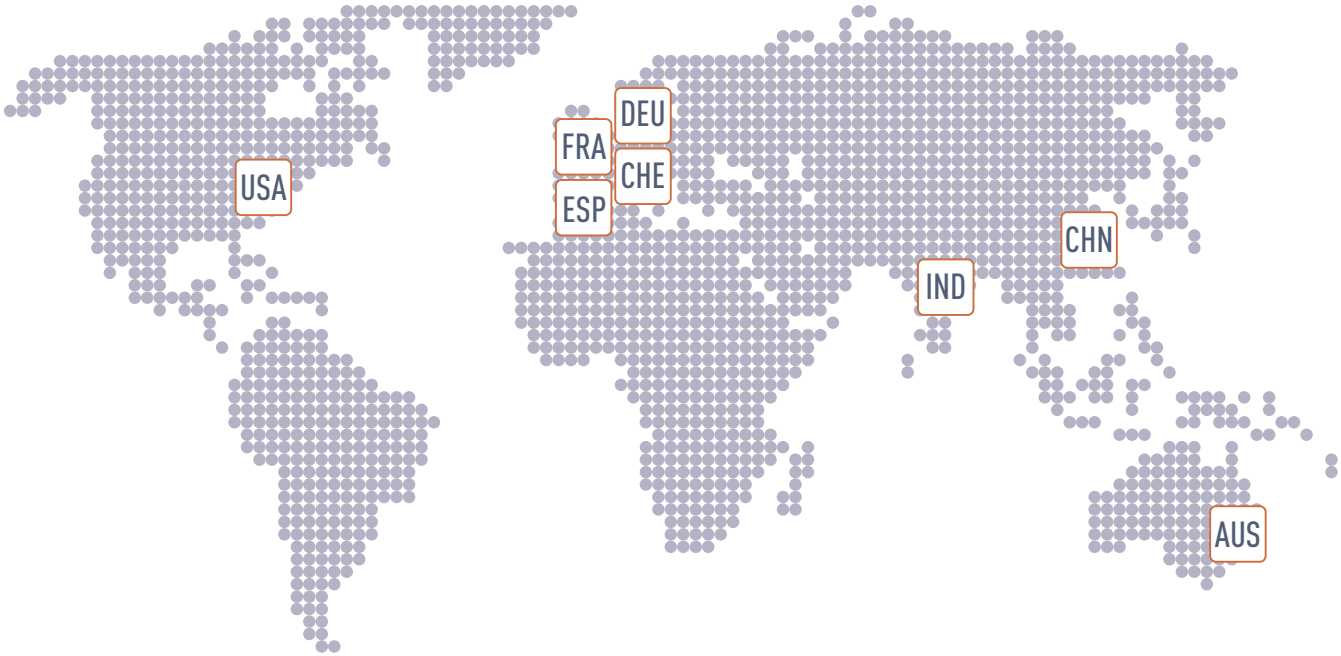
02G029I00 3U CPCI Serial, 8HP, Intel Core i7-13800HRE, 14 cores (6P + 8E), 2.5 GHz, 45 W TDP, 64 GB DDR5 (IBECC) RAM, 120 GB NVMe, 3x 2.5G Ethernet RJ45, 1x USB 3.2 Gen 2x1, 1x USB 3.2 Gen 2x1 and DisplayPort over USB-C, 1x console redirection via USB,-5 °C to +60 °C

▶ **Contact duagon** for availability and lead times for product models not listed above.

LEADING THE EMBEDDED FUTURE

duagon WORLDWIDE

duagon has a global presence with support and sales representatives across eight countries. With three decentralized engineering and production sites, our customers take advantage of the added competence and flexibility.



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