

G029M

Embedded Single Board Computer with 13th Gen Intel Core – M12 Connectors

3U CompactPCI Serial



LEADING THE EMBEDDED FUTURE



- 13th Gen Intel Core Processor (Raptor Lake)
- Up to 96 GB soldered DDR5-5200 IBECC RAM
- 120 GB NVMe on-board storage
- Dual 10G Ethernet (optional)
- Board Management Controller, TPM 2.0
- Front I/O: 2× 2.5G Ethernet M12 (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
- -40 °C to +70 °C operating temp. (system amb.)
- Long-term availability



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

Data Sheet



Interfaces

- This product includes interface options
 - Different front connectors
 - I/O expansion via add-on board
 - Additional user-configurable LEDs
 - 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
 - 2 × 100/1000BASE-TX / 2.5GBASE-TX, M12, X-coded, receptacle
 - 2 × 100/1000BASE-TX / 2.5/5/10GBASE-TX, M12, X-coded, receptacle
 - 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 × RS232/RS422/RS485, isolated, D-Sub, 9-pin, plug
 - 1 × USB-to-UART, isolated, USB Type-A
- I2C
 - 1 × backplane
- LED
 - Status: board status (BMC)
 - Ethernet: link, activity
 - Hot-swap
 - User configurable: 4 ×

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: 57 W (02G029M00)/65 W (02G029M01) max.

Mechanical Specifications

- Dimensions: 3U, 8 HP
- Weight: 610 g (02G029M00)/570 g (02G029M01)
- Cooling: Air cooling, forced convection, airflow 2.5 m/s

Product Compliance: Rail - Rolling Stock

- Compliance level: This product is prepared for use in EN 50155 systems. Some parameters are system-dependent and are specified on system level.



- Operating temperature: -40 °C to +70 °C, +85 °C for 10 min (EN 50155:2021, class OT4, ST1)
- Equipment location
 - EN 50155:2021, location 1, closed electrical operating area
 - EN 50155:2021, location 2, cabin and interiors
- Rapid temperature variations: EN 50155:2021, class H1, no requirements
- Storage temperature: -40 °C (EN 50155:2021) to +85 °C (EN 60068-2-2, Bb)
- Altitude: +3000 m max. (EN 50125-1:2014, class AX), +4000 m max. (electrical isolation only)
- Pollution degree: EN 50124-1:2017, class PD2
- Humidity: +55 °C and +25 °C, 100 % RH max. (EN 50155:2021)
- Shock: 30 ms @ 50 m/s² (EN 61373:2010/AC:2017-09, vehicle body, cat. 1, class B)
- Vibration: 10 min @ 2.02 m/s² (functional) and 5 h @ 11.44 m/s² (long-life) (EN 61373:2010/AC:2017-09, vehicle body, cat. 1, class B, double acceleration)
- Electrical safety
 - EN 50155:2021
 - EN 50153:2014 + A1:2017 + A2:2020
 - EN 50124-1:2017
 - EN ISO 13732-1:2008
- Fire protection: EN 45545-2:2020, EL9, HL3
- EMC emission
 - EN 50121-3-2:2016 + A1:2019
 - Regelung Nr. EMV 06 :2019-05-09 (2.0), Anhang E: Messung an Geräten, Schutzklasse S1
 - Regelwerk 50.02.01 :2021-12-01, 12.3.2. EMV - Funk, prequalified according to electronic equipment tests defined by Deutsche Bahn EMV 06 standard, class S1, for risk minimization in finished vehicle test
- EMC immunity: EN 50121-3-2:2016 + A1:2019
- Protective coatings: EN 50155:2021, class PC2 (Any PCB protected on both sides)
- Useful life: 20 years (EN 50155:2021, class L4)

Product Compliance: Medical Electrical Equipment

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

Reliability

- MTBF: 206 542 h (02G029M00)/166 161 h (02G029M01) predicted @ 40 °C according to IEC/TR 62380 (RDF 2000)

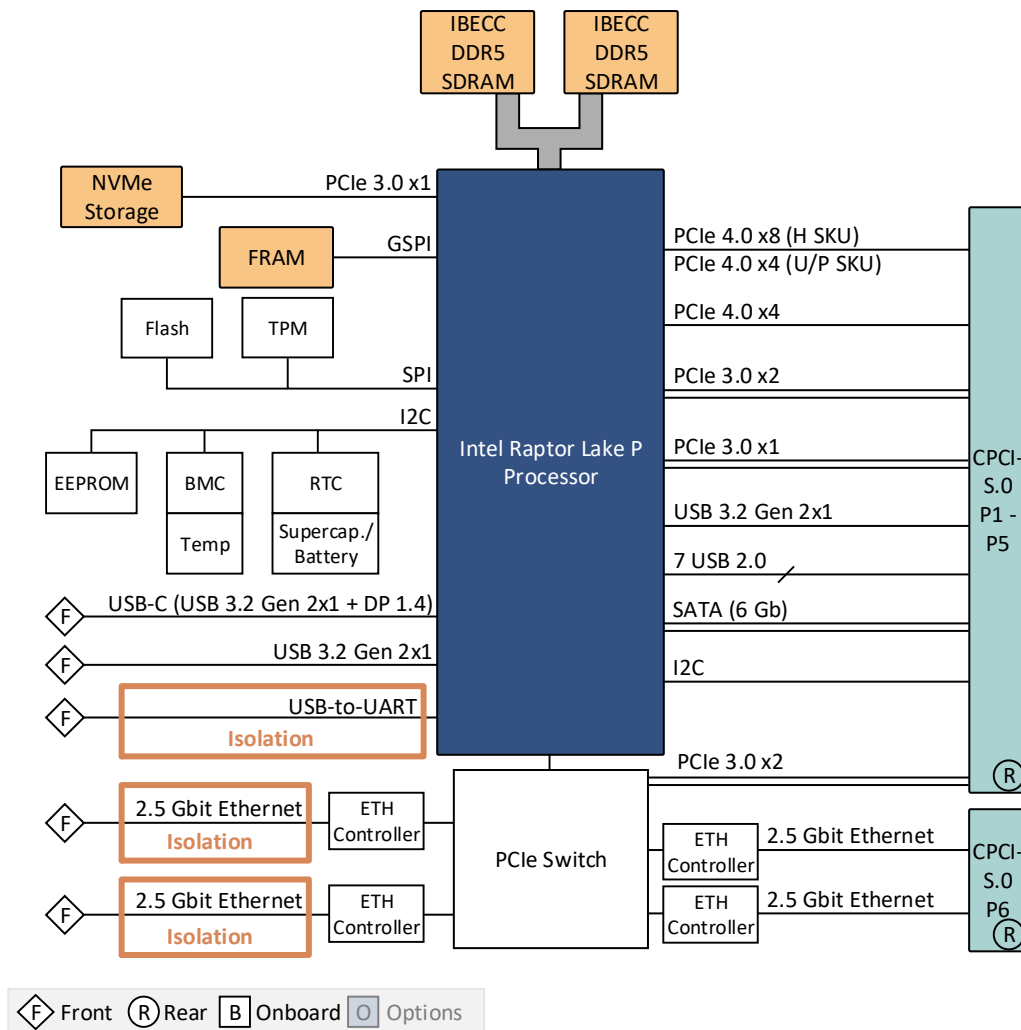
BIOS/Boot Loader

- AMI Aptio UEFI Firmware

Software Support

- Linux
 - Certified for Red Hat Enterprise Linux 9.4 - 9.x (02G029M00)
 - Tested with: Ubuntu 24.04 LTS
- See the product User Manual for details on software support:
www.duagon.com/products/g029m/#doc
- See section Software on the product web page for available packages:
www.duagon.com/products/g029m/#downl
- See also Application Note *Recommendations for a Robust Software Setup*

Diagram



Ordering Information

Standard Models

- 02G029M00** 3U CPCI Serial, 8HP, Intel Core i7-13800HRE, 14 cores (6P + 8E), 2.5 GHz, 35 W TDP, 64 GB DDR5 (IBECC) RAM, 120 GB NVMe, 2x 2.5G Ethernet M12, 1x USB 3.2 Gen 2x1, 1x USB 3.2 Gen 2x1 and DisplayPort over USB-C, 1x console redirection via USB, -40 °C to +70 °C, conformal coating
- 02G029M01** 3U CPCI Serial, 8HP, Intel Core i7-1370PRE, 14 cores (6P + 8E), 1.9 GHz, 28 W TDP, 64 GB DDR5 (IBECC) RAM, 120 GB NVMe, 2x 2.5G Ethernet M12, 2x 10G Ethernet M12, 1x USB 3.2 Gen 2x1, 1x USB 3.2 Gen 2x1 and DisplayPort over USB-C, 1x console redirection via USB, 1x RS422/485 isolated on shared 9-pin D-Sub, -40 °C to +70 °C, conformal coating

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