

- AMD Ryzen Embedded APU
- Up to 32 GB DDR4 RAM soldered, ECC
- For CompactPCI 2.0 systems or CompactPCI PlusIO 2.30 hybrid systems (2.0 and CPCI-S.0)
- Hardware memory encryption
- Board management controller with safety-related supervision
- Up to 11 Radeon Vega compute units
- Front I/O: 3x 1Gb Ethernet RJ45 or M12, 2x USB 3.2 Gen 1x1, 1x DisplayPort
- Rear I/O: 2x 1Gb Ethernet, 4x PCIe x1, 4x USB 2.0, 2x SATA
- -40 °C to +85 °C
- Conduction cooling also possible



### AMD RYZEN EMBEDDED PROCESSOR

The F27P is a CompactPCI PlusIO CPU module based on AMD's latest Ryzen Embedded APU family. AMD offers a great variety of pin-compatible CPUs and APUs, thus covering a wide range of processing and graphics power in a single FP5 package.

duagon offers both passively cooled models for the railway sector, for example, as well as high-performance models with forced air cooling. F27P is equipped with a powerful Radeon Vega 3D graphics engine and supports multiple displays via daisy-chaining with a resolution of up to 4096 × 2160 pixels without the need for additional graphics hardware.

### VARIABLE FRONT DESIGN

Unlike other CPU boards the F27P features up to three RJ45 (single-slot) or M12 (dual-slot) Ethernet front connectors making it more cost-effective by reducing the need for extra modules. Other front I/O include two USB 3.2 Gen 1x1 connectors and one DisplayPort connector.

### COMPACTPCI PLUSIO (PICMG 2.30)

The F27P supports the CompactPCI PlusIO (PICMG 2.30) specification, which makes it usable in a hybrid system for control of both CompactPCI and CompactPCI Serial peripheral boards. Compliant to the standard, four USB 2.0, four PCI Express x1 as well as two Gigabit Ethernet and two SATA interfaces are accessible on the J2 rear I/O connector.

### DESIGNED FOR EXTREME TEMPERATURES

The CompactPCI PlusIO board was designed for applications with extreme temperatures, where high reliability and long-term availability are essential requirements. The F27P is suited for applications in the rail market, industrial automation or the power and energy sector, for example. duagon offers passively cooled models for the railway sector, supporting the extended -40 °C to +85 °C operation range, as well as high-performance models with forced airflow cooling for moderate temperature requirements.

### LONG-TERM AVAILABILITY

Long-term availability minimizes life-cycle management and makes the F27P a long-lasting investment.

### THIS PRODUCT IS COMING SOON

Products with a "Coming Soon" label have not yet passed the conformity assessment procedure. Such products will be sold only when all conformity assessments were passed.

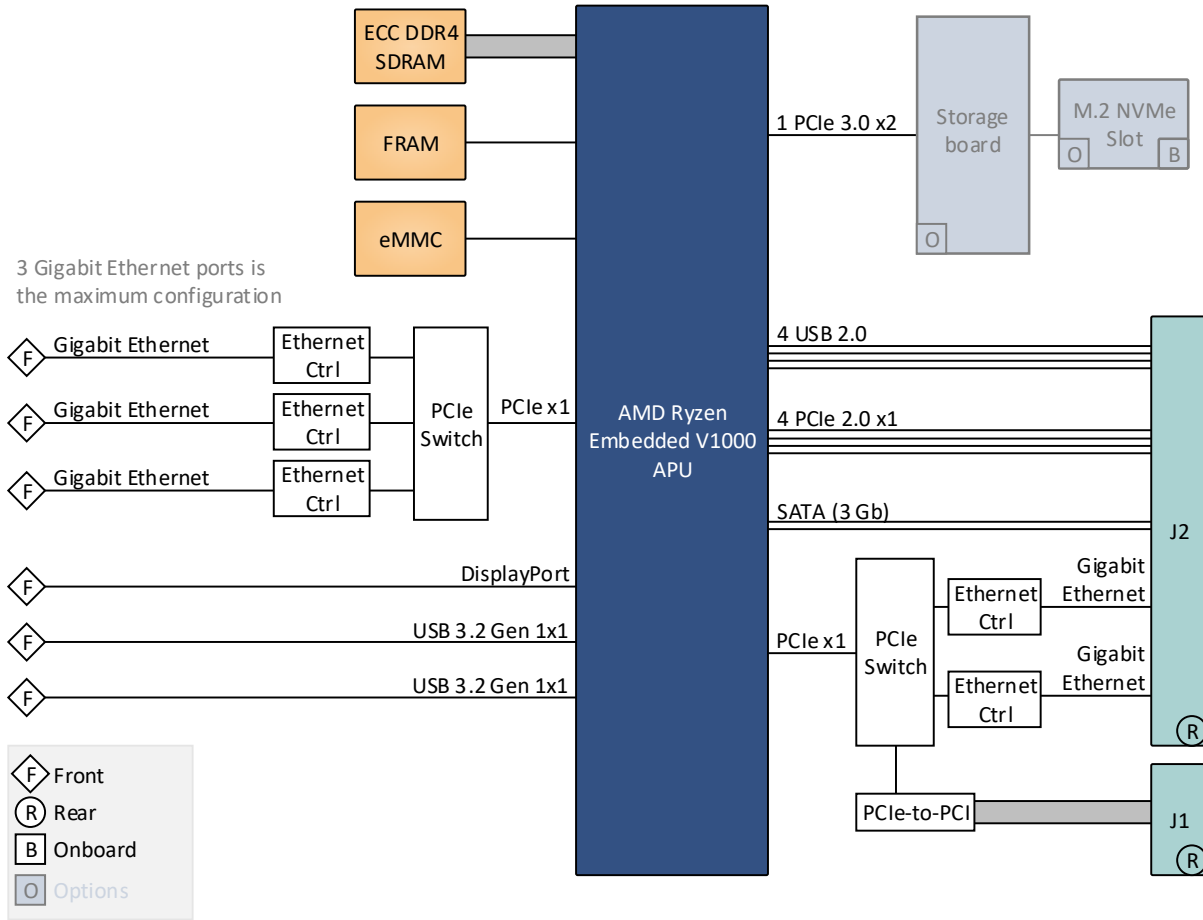


[www.duagon.com/products/f27p/](http://www.duagon.com/products/f27p/)

**DATA SHEET | PRELIMINARY**



## F27P | DIAGRAM



## F27P | TECHNICAL DATA

### CPU

- The following CPU types are supported:
  - AMD V1404I, 4 cores, 8 threads, 2.0 GHz base, 12-25 W, 2 MB cache, Vega GPU with 8 CUs, iTemp
  - AMD V1807B, 4 cores, 8 threads, 3.35 GHz, 35-54 W, 2 MB cache, Vega GPU with 11 CUs
  - AMD V1202B, 2 cores, 4 threads, 2.3 GHz base, 12-25 W, 1 MB cache, Vega GPU with 3 CUs

### MEMORY

- System RAM
  - Soldered DDR4, ECC
  - 32 GB max.

- Non-volatile RAM (NVRAM): 64 Kbit (8 K × 8) FRAM

### MASS STORAGE

- eMMC (soldered); 32 GB
- The following mass storage devices can be assembled:
  - SSD M.2 (NVMe)

### GRAPHICS

- Processor graphics
- Maximum resolution: 4096 × 2160 pixels @ 60 Hz, 24 bpp



## INTERFACES

- This product includes interface options
  - Different front connectors
- SSD/HDD slot
  - 1 × M.2 2242/2260/2280 socket 3 Key M; NVMe (PCIe x2)
- SATA
  - 2 × SATA Revision 2.x, backplane
- Video
  - 1 × DisplayPort 1.2
- USB
  - 2 × USB 3.2 Gen 1x1, Type A
  - 4 × USB 2.0, backplane
- Ethernet
  - 3 × 10/100/1000BASE-T, RJ45
  - 3 × 10/100/1000BASE-T, M12, A-coded, receptacle
  - 3 × 10/100BASE-T, M12, D-coded, receptacle
  - 3 × 10/100/1000BASE-T, M12, X-coded, receptacle
  - 2 × 10/100/1000BASE-T, M12, X-coded, receptacle
  - 2 × 10/100/1000BASE-T, backplane
  - Three front connectors (RJ45 or M12) and two backplane connectors is the maximum configuration.
- PCI Express
  - 4 × PCIe 2.0, x1, backplane
  - 1 × PCIe 3.0, x2, board to board
- Reset
  - Reset button
- LED
  - Status: board status (BMC)
  - Ethernet: activity, link

## SUPERVISION AND MANAGEMENT

- Board management controller
- Temperature measurement
- Real-time clock, buffered by supercapacitor (3 days) or battery (30 days)
- Trusted Platform Module 2.0

## PRODUCT STANDARD

- CompactPCI: CompactPCI Core Specification PICMG 2.0 R3.0

- CompactPCI PlusIO: CompactPCI PlusIO Specification PICMG 2.30
- 1PCI33/4PCIE2.0/2SATA/4USB2/2ETH1G
- System slot
- 32-bit/33-MHz CompactPCI bus
- V(I/O): +3.3 V (+5 V tolerant)

## ELECTRICAL SPECIFICATIONS

- Supply voltage: +5 V (-3 % / +5 %)
- Power consumption: 52.5 W max. (02F027P00) / 45 W max. (02F027P01)

## MECHANICAL SPECIFICATIONS

- Dimensions
  - 3U, 4 HP (with 3× RJ45 or 2× M12)
  - 3U, 8 HP (with 3× M12 or 2-slot heat sink)
- Cooling
  - Air cooling
  - Conduction cooling

## 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 +85 °C (EN 50155:2017, class OT6)
- Storage temperature: -40 °C (EN 50155:2017) to +85 °C (EN 60068-2-2, Bb)
- Altitude: +3000 m max. (EN 50125-1:2014, class AX)
- Humidity: +55 °C and +25 °C, 100 % RH max. (EN 50155:2017)
- Shock: 30 ms @ 100 m/s<sup>2</sup> (EN 61373:2010/AC:2017-09, vehicle body, cat. 1, class B, double acceleration)
- Vibration: 10 min @ 2.02 m/s<sup>2</sup> (functional) and 5 h @ 11.44 m/s<sup>2</sup> (long-life) (EN 61373:2010/AC:2017-09, vehicle body, cat. 1, class B, double acceleration)
- Electrical safety
  - EN 50155:2017
  - EN 50153:2014 + A1:2017
  - EN 50124-1:2017
  - EN ISO 13732-1:2008
- Fire protection: EN 45545-2:2013 + A1:2015, HL3



- EMC emission
  - EN 50121-3-2:2016 + A1:2019
  - Regelung Nr. EMV 06 :2019-05-09 (2.0), Anhang E: Messung an Geräten
  - Regelwerk 50.02.01 :2016-12-01, 12.3.1. EMV - Funk
- EMC immunity: EN 50121-3-2:2016 + A1:2019
- Useful life: 20 years (EN 50155:2017, class L4)

## PRODUCT COMPLIANCE: RAIL - WAYSIDE SAFETY RELATED

- Operating temperature: -40 °C (EN 60068-2-1:2007, Ae) to +85 °C (EN 60068-2-2:2007, Be)
- Storage temperature: -40 °C (EN 60068-2-1:2007, Ab) to +85 °C (EN 60068-2-2:2007, Bb)
- Humidity: +55 °C and +25 °C, 90 % to 100 % RH (EN 60068-2-30:2005, Db)
- Shock: 11 ms @ 20 m/s<sup>2</sup> (EN 50125-3:2003, in a switch cabinet 1 m to 3 m from the track)
- Vibration: 2.3 m/s<sup>2</sup> (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 50121-4:2016
  - EN 61000-6-4:2007 + A1:2011
- EMC immunity: EN 50121-4:2016

## PRODUCT COMPLIANCE: INFORMATION TECHNOLOGY EQUIPMENT

- Operating temperature: -40 °C (EN 60068-2-1:2007, Ae) to +85 °C (EN 60068-2-2:2007, Be)
- Storage temperature: -40 °C (EN 60068-2-1:2007, Ab) to +85 °C (EN 60068-2-2:2007, Bb)
- Humidity: +55 °C and +25 °C, 90 % to 100 % RH (EN 60068-2-30:2005, Db)
- Humidity - Condensation: Condensation may occur
- Electrical safety: EN 62368-1:2014 + AC:2015
- EMC emission: EN 55032:2015 (multimedia equipment), class B (residential environments)

- EMC immunity
  - EN 55035:2017 (multimedia equipment)
  - EN 61000-6-2:2005 (generic standard, industrial environments)

## RELIABILITY

- MTBF: 264 000 (02F027P00) / 357 000 (02F027P01) h predicted @ 40 °C according to IEC/TR 62380 (RDF 2000)

## BIOS/BOOT LOADER

- AMI Aptio UEFI Firmware

## SOFTWARE SUPPORT

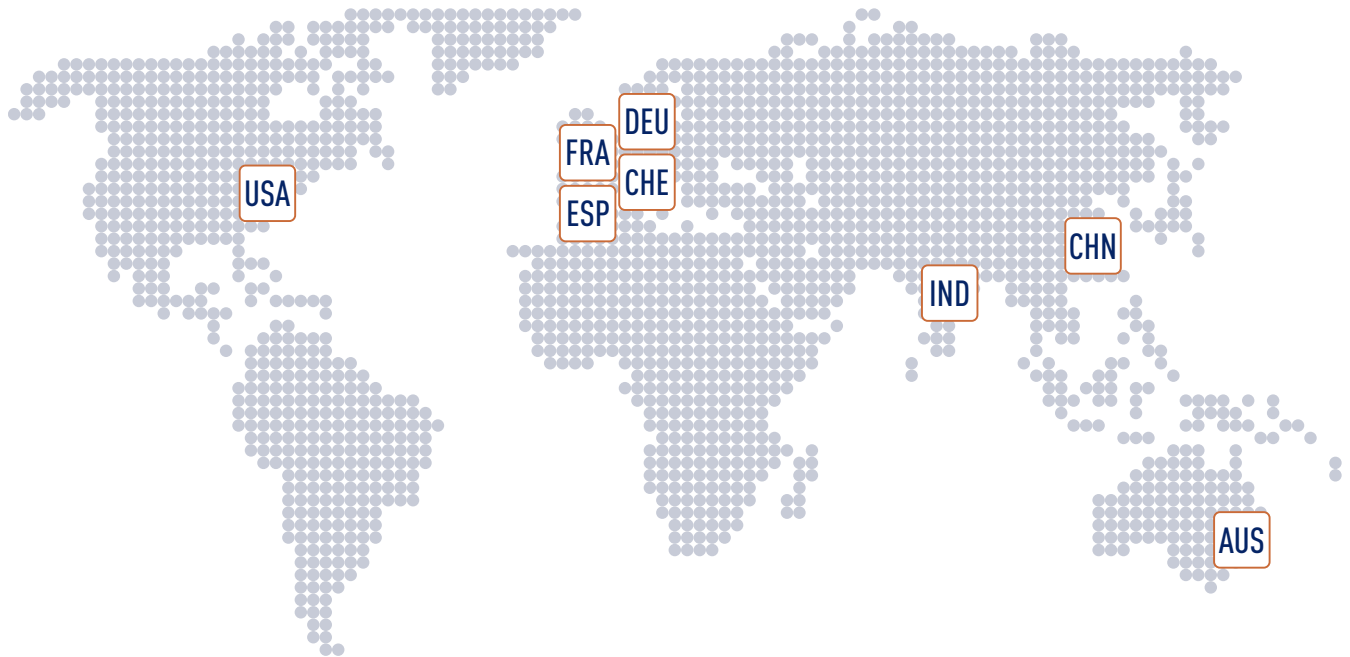
- Linux
  - Supported kernel: 5.4
  - Driver support
  - Tool support
  - Tested with: Yocto BSP (Dunfell 3.1, Linux kernel 5.4), Ubuntu 20.04.2 LTS
    - See [Chapter Using the F27P under Linux](#)
- Windows
  - Windows 10 IoT Enterprise 64-bit
  - Driver support
  - Tool support
    - See [Chapter Using the F27P under Windows](#)
- See also Application Note [Recommendations for a Robust Software Setup](#)
- See section Software on the product web page for available packages: [www.duagon.com/products/f27p/#downl](http://www.duagon.com/products/f27p/#downl)
- See the product User Manual for details on software support: [www.duagon.com/products/f27p/#doc](http://www.duagon.com/products/f27p/#doc)



## F27P | ORDERING INFORMATION

### STANDARD MODELS

- |                  |  |
|------------------|--|
| <b>02F027P00</b> | 3U CPCI PlusIO, 4 HP, AMD V1807B APU, quad core, 3.35 GHz, 32 GB DDR4 (ECC) RAM, 32 GB eMMC, 3x 1Gb Ethernet RJ45, 0 °C to +40 °C (required air flow: 1.5 m/s)               |
| <b>02F027P01</b> | 3U CPCI PlusIO, 8 HP, AMD V1404I APU, quad core, 2.0 GHz, 8 GB DDR4 (ECC) RAM, 32 GB eMMC, 3x 1Gb Ethernet M12 X-coded, -40 °C to +70 °C (10 min. +85 °C), conformal coating |



## duagon | WORLDWIDE

duagon has a global presence with support and sales representatives across 8 countries. With three decentralized engineering and production sites, our customers take advantage of the added competence and flexibility.

[www.duagon.com](http://www.duagon.com)

### SWITZERLAND (HQ)

Dietikon  
Phone +41 44 743 73 00  
sales@duagon.com

### AUSTRALIA

Artarmon  
Phone +61 2 9966 9424  
sales-aus@duagon.com

### CHINA

Shanghai  
Phone +86 159 0077 2985  
sales-chn@duagon.com

### FRANCE

Gaillard  
Phone +33 450 955 312  
sales-fra@duagon.com

### GERMANY

Nuremberg  
Phone +49 911 99 335 0  
sales-deu@duagon.com

### INDIA

New Delhi  
Phone +91 11 41 61 12 48  
sales-ind@duagon.com

### SPAIN

Madrid  
Phone +34 917 880 610  
sales-esp@duagon.com

### USA

Blue Bell  
Phone +1 215 542 9575  
sales-usa@duagon.com