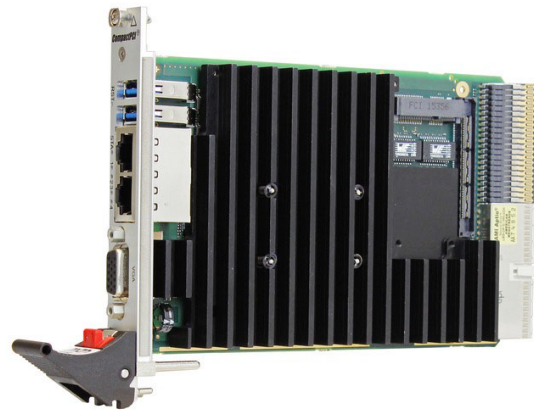


EMBEDDED SINGLE BOARD COMPUTER WITH INTEL ATOM PROCESSOR E3900 SERIES



- Intel E3900 series CPU with up to four cores
- Up to 8 GB DDR3 RAM soldered, ECC
- For CompactPCI 2.0 systems or CompactPCI PlusIO 2.30 hybrid systems (2.0 and CPCI-S.0)
- CPU TDP 6.5 W to 12 W
- Front I/O: 2 Gb Ethernet, 2 USB 3.2 Gen 1x1, 1 VGA
- Rear I/O: 2 Gb Ethernet, 4 PCIe x1, 4 USB 2.0
- microSD card and mSATA slots
- Trusted Platform Module (TPM)
- Side card connector for high flexibility and interface extensions
- Up to -40 °C to +85 °C



LOW-POWER INTEL ATOM CPU

The F26L low-power CPU board is a member of the scalable family of Intel CPU boards which ensures future-safety and long-term availability. It is equipped with an Intel Atom Processor E3900 Series dual-core or quad-core System-on-a-Chip (SoC). Due to the low power architecture on the Intel Atom processor, the CPU card has a total power consumption of max. 6.5 Watts to 12 Watts, while having a clock frequency of up to 1.6 GHz. An excellent graphics performance, thermal supervision of the processor and a watchdog for the operating system top off the functionality of the F26L. Furthermore, a Trusted Platform Module is assembled for security purposes.

DESIGNED FOR EXTREME TEMPERATURES

The CompactPCI PlusIO board has been designed for applications with extreme temperatures, where high reliability and long-term availability are essential requirements. This kind of application is common in the rail market, in industrial automation and in the power and energy sector, for example. To fulfill these extreme temperature requirements, the F26L has been equipped with a specially outlined heat sink, which efficiently takes away the heat from the board.

COMPACTPCI PLUSIO (PICMG 2.30)

The F26L supports the CompactPCI PlusIO (PICMG 2.30) specification, meaning it can be used 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 interfaces are accessible on the J2 rear I/O connector.

VERSATILE FRONT I/O

The standard I/O available at the front panel of the F26L includes VGA, two Gigabit Ethernet and two USB 3.2 Gen 1x1 ports. The F26L can be extended by different side cards. Additional functions include a variety of different UARTs or another four USBs, SATA for hard disk connection and HD audio.

LINUX AND WINDOWS SUPPORT

The F26L operates in Windows 10 and Linux environments as well as under real-time operating systems that support Intel's multi-core architecture. The AMI UEFI BIOS was specially designed for embedded system applications.

LONG-TERM AVAILABILITY

Long-term availability until 2031 minimizes life-cycle management by making the F26L available at least for this period of time.

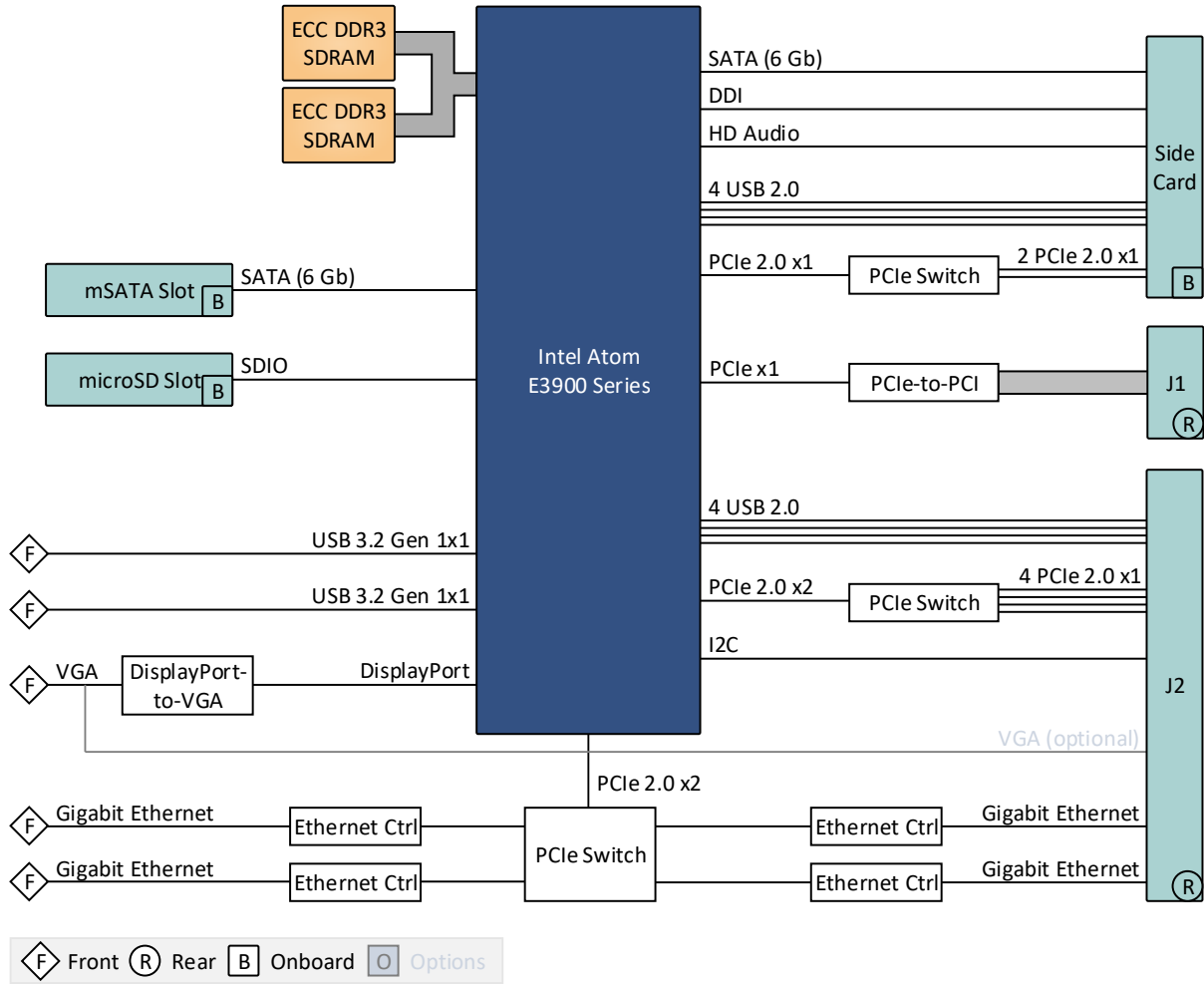


www.duagon.com/products/f26l/

DATA SHEET



F26L | DIAGRAM



F26L | TECHNICAL DATA

CPU

- The following CPU types are supported:
 - Intel Atom x5-E3930, 2 cores, 2 threads, 1.3 GHz, 1.8 GHz Turbo Boost, 6.5 W, 2 MB cache
 - Intel Atom x5-E3940, 4 cores, 4 threads, 1.6 GHz, 1.8 GHz Turbo Boost, 9.5 W, 2 MB cache
 - Intel Atom x7-E3950, 4 cores, 4 threads, 1.6 GHz, 2.0 GHz Turbo Boost, 12 W, 2 MB cache

MEMORY

- System RAM
 - Soldered DDR3, ECC
 - 8 GB max.

SECURITY

- Trusted Platform Module 2.0



MASS STORAGE

- The following mass storage devices can be assembled:
 - mSATA
 - microSD card

GRAPHICS

- Processor graphics

INTERFACES

- This product includes interface options
 - Different front connectors
 - Front or rear connection for some interfaces (assembly option)
 - I/O expansion using a side card plugged via board-to-board connector
- SSD/HDD slot
 - 1 × mSATA; SATA Revision 3.x
- SD/microSD card slot
 - 1 × microSD card; UHS-I (104 MB/s (SDR104))
- SATA
 - 1 × SATA Revision 3.x, board to board
- Video
 - 1 × VGA
 - 1 × DDI board to board
- Audio
 - 1 × board to board
 - HD Audio
- USB
 - 2 × USB 3.2 Gen 1x1, Type A
 - 4 × USB 2.0, board to board
 - 4 × USB 2.0, backplane
- Ethernet
 - 2 × 10/100/1000BASE-T, RJ45
 - 2 × 10/100/1000BASE-T, M12, A-coded, receptacle
 - 2 × 10/100BASE-T, M12, D-coded, receptacle
 - 2 × 10/100/1000BASE-T, M12, X-coded, receptacle
 - 2 × 10/100/1000BASE-T, backplane
- PCI Express
 - 2 × PCIe 2.0, x1, board to board
 - 4 × PCIe 2.0, x1, backplane

- I2C
 - 1 × backplane
- Reset
 - Reset button
- LED
 - Status: board status (BMC)
 - Ethernet: activity, link

SUPERVISION AND CONTROL

- Board management controller
- Temperature measurement
- Watchdog timer
- Real-time clock, buffered by supercapacitor (3 days) or battery (1 year)

PRODUCT STANDARD

- CompactPCI: CompactPCI Core Specification PICMG 2.0 R3.0
- CompactPCI PlusIO: CompactPCI PlusIO Specification PICMG 2.30
- 1PCI33/4PCIE2.0/0SATA/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 %)
 - +3.3 V (-3 % / +5 %)
 - +12 V (-10 % / +10 %)
- Power consumption: 22 W max.

MECHANICAL SPECIFICATIONS

- Dimensions
 - 3U, 4 HP
 - 3U, 8 HP
 - 3U, 12 HP
 - 3U, 5 HP
 - 8 HP with M12 connectors, up to 12 HP with side card, 5 HP with conduction cooling
- Weight: 350 g (4 HP with RJ45 connectors)



- Cooling
 - Air cooling
 - Conduction cooling

PRODUCT COMPLIANCE: RAIL - ROLLING STOCK

- Operating temperature: -40 °C to +85 °C (EN 50155:2017, class OT6)
- Rapid temperature variations: EN 50155:2017, class H1, no requirements
- 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)
- Pollution degree: EN 50124-1:2017, class PD2
- Humidity: +55 °C and +25 °C, 100 % RH max. (EN 50155:2017)
- Shock: 30 ms @ 50 m/s² (EN 61373:2010/AC:2017-09, vehicle body, cat. 1, class B)
- Vibration: 10 min @ 1.01 m/s² (functional) and 5 h @ 5.72 m/s² (long-life) (EN 61373:2010/AC:2017-09, vehicle body, cat. 1, class B)
- Electrical safety
 - EN 50124-1:2017
 - EN 50153:2014 + A1:2017
 - EN 50155:2017
 - EN ISO 13732-1:2008
- Fire protection: EN 45545-2:2013 + A1:2015, HL3
- EMC emission
 - EN 50121-3-2:2016
 - Regelung Nr. EMV 06 :2019-05-09 (2.0), Anhang E: Messung an Geräten
- EMC immunity: EN 50121-3-2:2016
- Protective coatings
 - EN 50155:2017, class PC2 (Any PCB protected on both sides)
 - Third party products e.g. LTE modules are not coated, in compliance with EN 50155:2017 Class PC1
- Useful life: 20 years (EN 50155:2017, class L4)

RELIABILITY

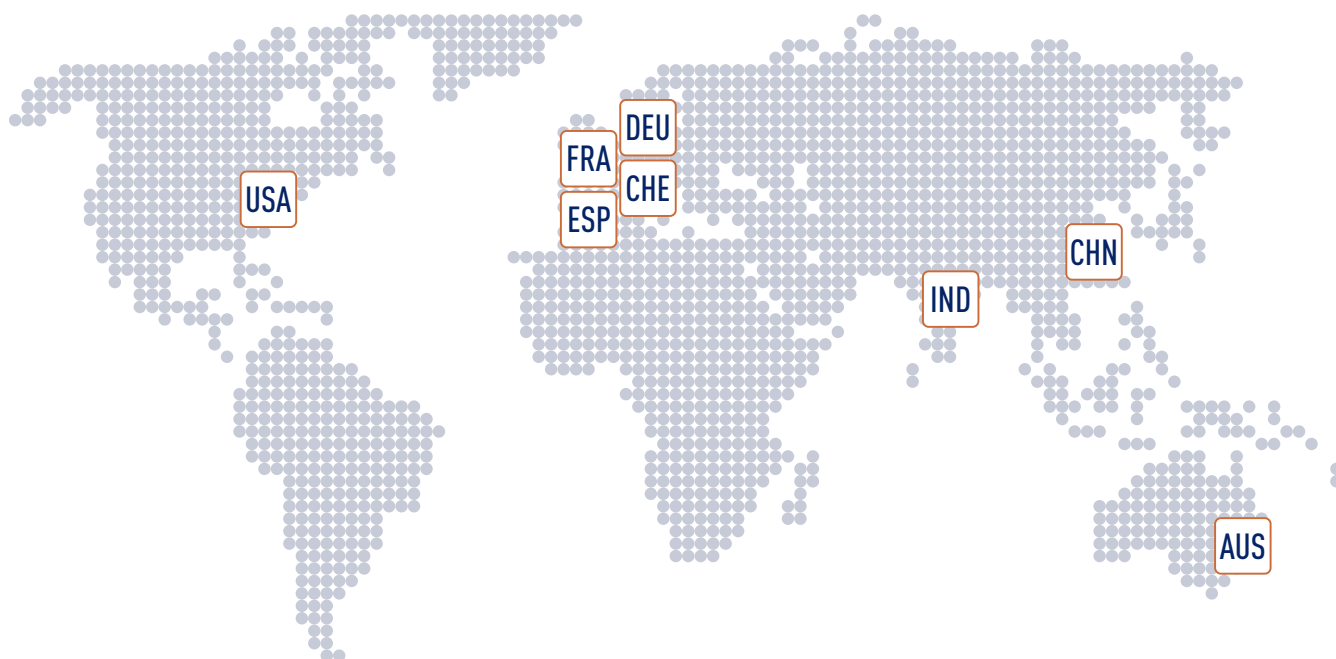
- MTBF: 365 000 h predicted @ 40 °C according to IEC/TR 62380 (RDF 2000)

BIOS/BOOT LOADER

- AMI Aptio UEFI Firmware

SOFTWARE SUPPORT

- Linux
 - Supported kernel: 4.8 or higher. For older kernels (e.g., 4.4.x), patches for the Apollo Lake platform are also available.
 - Yocto BSP
 - Driver support
 - Tool support
 - Tested with: Yocto BSP (Sumo 2.5, Linux kernel 4.15)
- Windows
 - Windows 10 IoT Enterprise 64-bit
 - Driver support
 - Tool support
 - Not all functions are supported
- VxWorks
 - BSP on request
- QNX
 - BSP on request
- ▶ See the product User Manual for details on software support: www.duagon.com/products/f26l/#doc
- ▶ 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/f26l/#downl



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.

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