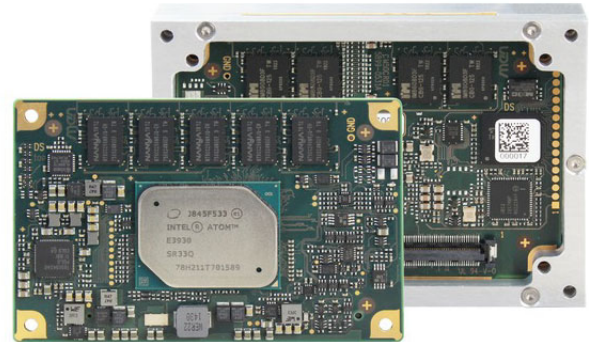


RUGGED COM EXPRESS MODULE WITH INTEL ATOM PROCESSOR E3900 SERIES

- Intel Atom E3900 series
- Up to 8 GB DDR3 RAM with ECC
- Intel VT-x virtualization support
- Very small form factor
- Trusted Platform Module
- Board management controller with safety-related supervision functions
- Conduction cooling
- -40 °C to +85 °C Tcase
- Compliant with COM Express Mini, type 10
- PICMG COM.0 and Ultra-Rugged COM versions



TRULY RUGGED COM EXPRESS MODULE

The CM50 is an ultra-rugged COM Express module with Type 10 Pin-Out for rolling stock, public transportation and industry applications. It is operable in an extended temperature range of -40 °C up to +85 °C (Tcase). The use of soldered components makes the board resistant to shock and vibration.

VERSIONS FOR EXTREMELY HARSH ENVIRONMENTS

For applications that need reliable operation even under the harshest environmental conditions, a specially hardened version is available - the CM50C. CM50C modules are embedded in a closed aluminum frame that ensures optimum EMC protection, efficient conduction cooling and extended resistance to vibration and shock. Direct air cooling is possible by placing a heat sink on the cover. The innovative mechanical design around the COM.0 electronics makes it an ultra-rugged module.

SCALABLE LOW POWER PROCESSOR

The Intel E3900 CPU series provides a scalable performance up to 4 cores and integrated quality graphics. Intel VT-x virtualization support allows to run multiple applications on a single hardware platform, saving costs. Due to the low power dissipation (depending on the CPU), no active cooling is necessary and very small designs are feasible.

SAFETY, SECURITY AND CONNECTIVITY

The board management controller has supervision functions (onboard voltages, temperature etc.) that make the board suitable for safety-related applications. The Trusted Platform Module supports features like secure/measured booting and fast cryptographic execution. The CM50 comes with a large variety of interfaces, including, e.g., Digital Display Interfaces, HD Audio, PCI Express and Gigabit Ethernet. This enables implementing many functions on a very small form factor.

LONG-TERM AVAILABLE

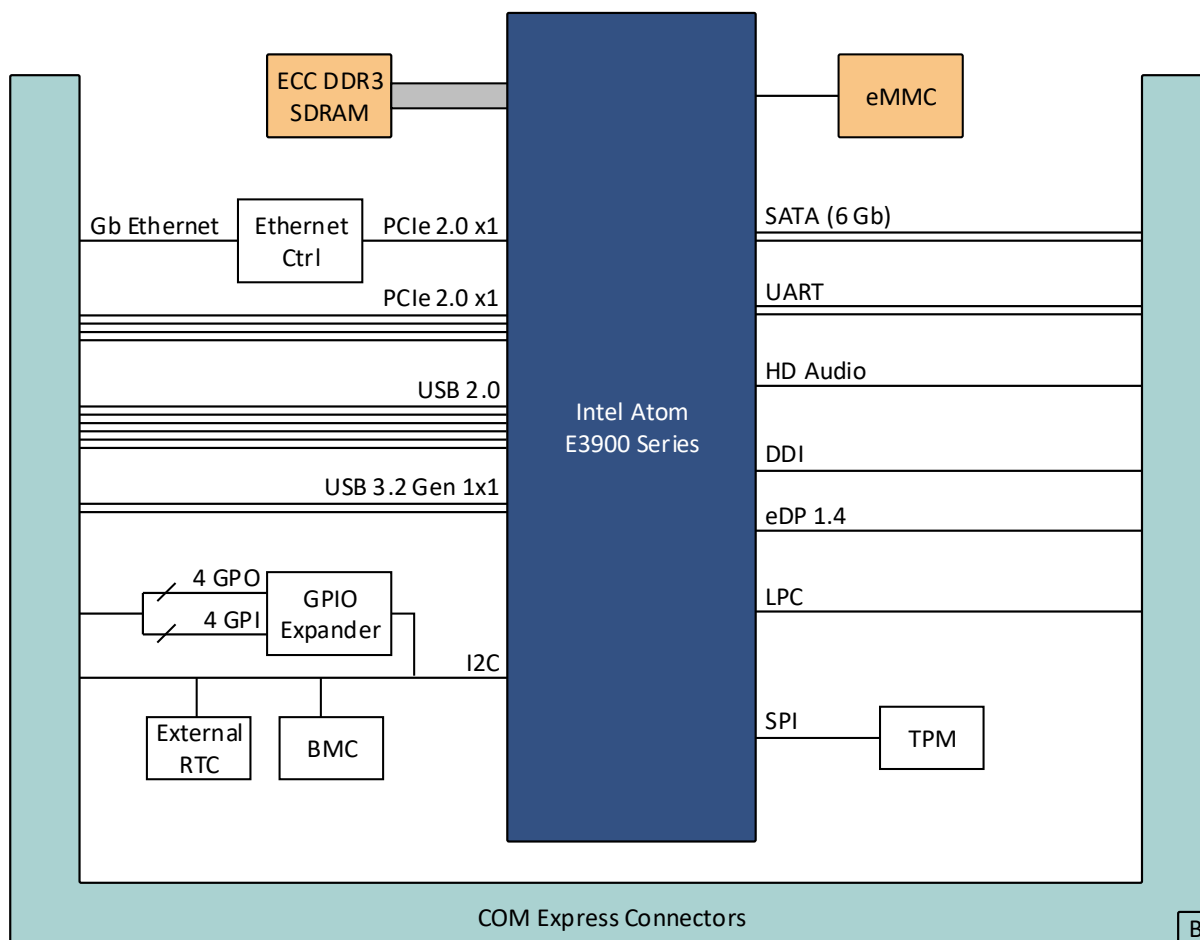
Long-term availability ensures an extended product life and future-safety.



www.duagon.com/products/cm50/

DATA SHEET

CM50 | DIAGRAM



B

 Onboard

CM50 | TECHNICAL DATA

CPU

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

MEMORY

- System RAM
 - Soldered DDR3, ECC
 - 8 GB max.
- Non-volatile RAM (NVRAM): 64 Kbit (8 K × 8) FRAM

MASS STORAGE

- eMMC (soldered); 64 GB max.



GRAPHICS

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

INTERFACES

- SATA
 - 2 × SATA Revision 3.x, board to board
- SDHC (on request)
 - 1 ×, board to board
- Video
 - 1 × DDI, board to board
 - 1 × eDP 1.4, board to board
- Audio
 - 1 × board to board
 - HD Audio
- USB
 - 2 × USB 3.2 Gen 1x1, board to board
 - 6 × USB 2.0, board to board
- Ethernet
 - 1 × 10/100/1000BASE-T, board to board
- PCI Express
 - 4 × PCIe 2.0, x1, board to board
- Serial
 - 2 × UART, board to board
- GPIO
 - 4 × GPI non-isolated, board to board
 - 4 × GPO non-isolated, board to board
- I2C
 - 1 × board to board
- LPC
 - 1 × board to board

SUPERVISION AND MANAGEMENT

- Board management controller
- Temperature measurement
- System watchdog (BMC)
- Real-time clock
- Trusted Platform Module 2.0

PRODUCT STANDARD

- Mini, Type 10, PICMG COM.0 COM Express Module Base Specification
- Mini, Type 10, Ultra-Rugged COM

ELECTRICAL SPECIFICATIONS

- Supply voltage
 - +6 V to +17 V
 - +3 V RTC (2 V to 3.3 V)
- Power consumption: 14.4 W typ. (quad core processor, full load)

MECHANICAL SPECIFICATIONS

- Dimensions
 - COM Express Mini: (W) 84 mm, (D) 55 mm
 - Ultra-Rugged COM Mini with cover and frame: (W) 94 mm, (D) 65 mm, (H) 18 mm
- Weight:
 - 36 g (COM Express model 15CM50-10)
 - 200 g (Ultra-Rugged COM model 15CM50C00)
- 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)
- 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 @ 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 50155:2017
 - EN 50153:2014 + A1:2017
 - EN 50124-1:2017
- Fire protection: EN 45545-2:2013 + A1:2015, HL3
- EMC emission: EN 50121-3-2:2016 + A1:2019
- EMC immunity: EN 50121-3-2:2016 + A1:2019
- Protective coatings: EN 50155:2017, class PCX (As agreed between user and supplier)
- Useful life: 20 years (EN 50155:2017, class L4)

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)
- EMC emission: EN 55032:2015 (multimedia equipment), class A (industrial environments)
- EMC immunity: EN 55024:2010 + A1:2015 (information technology equipment)

RELIABILITY

- MTBF: 822 869 h predicted @ 40 °C according to IEC/TR 62380 (RDF 2000)

BIOS/BOOT LOADER

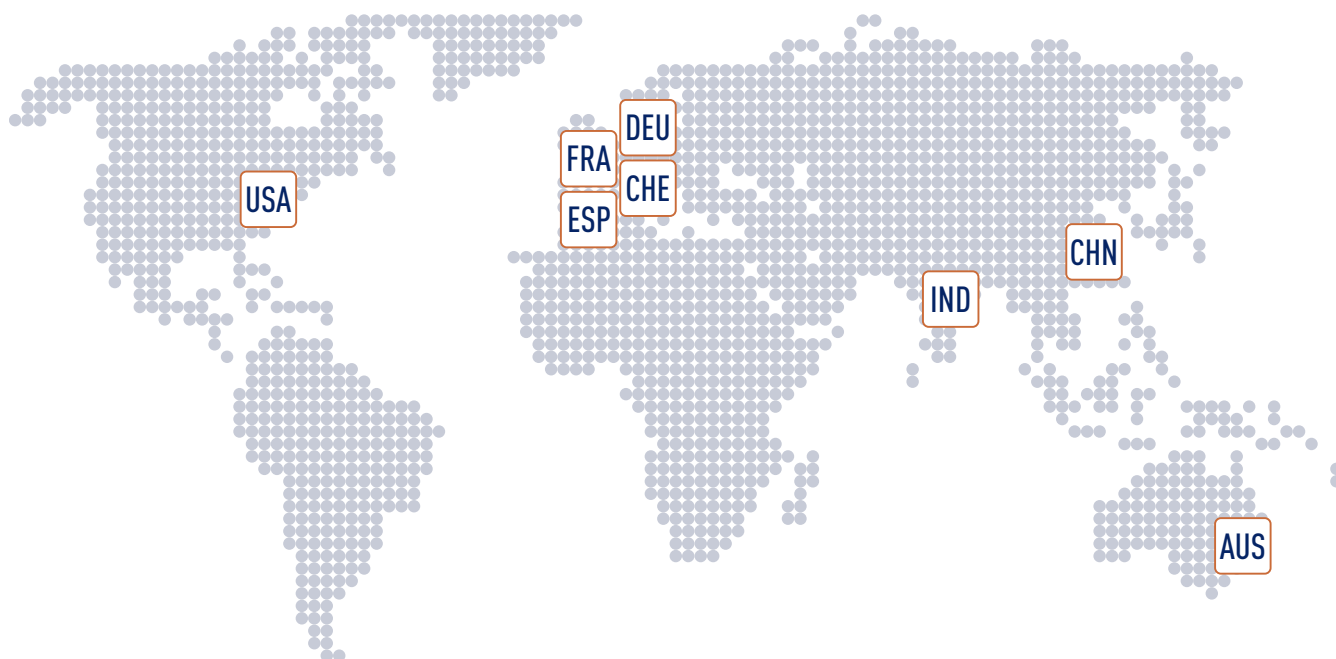
- AMI Aptio UEFI Firmware

SOFTWARE SUPPORT

- Linux
 - duagon Yocto BSP
 - Tested with: duagon Yocto BSP (Sumo 2.5, Linux kernel 4.15)
- Windows
 - Windows 10 IoT Enterprise 64-bit
 - Not all functions are supported
- Further Resources
 - See the product User Manual for details on software support: www.duagon.com/products/cm50/#doc
 - See section Software on the product web page for available packages: www.duagon.com/products/cm50/#downl
 - See also Application Note *Recommendations for a Robust Software Setup*



LEADING THE EMBEDDED FUTURE



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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