

CM50

Rugged COM Express Module with Intel Atom Processor E3900 Series COM Express Mini, Type 10

- » 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 (SIL 2 certifiable)
- » 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

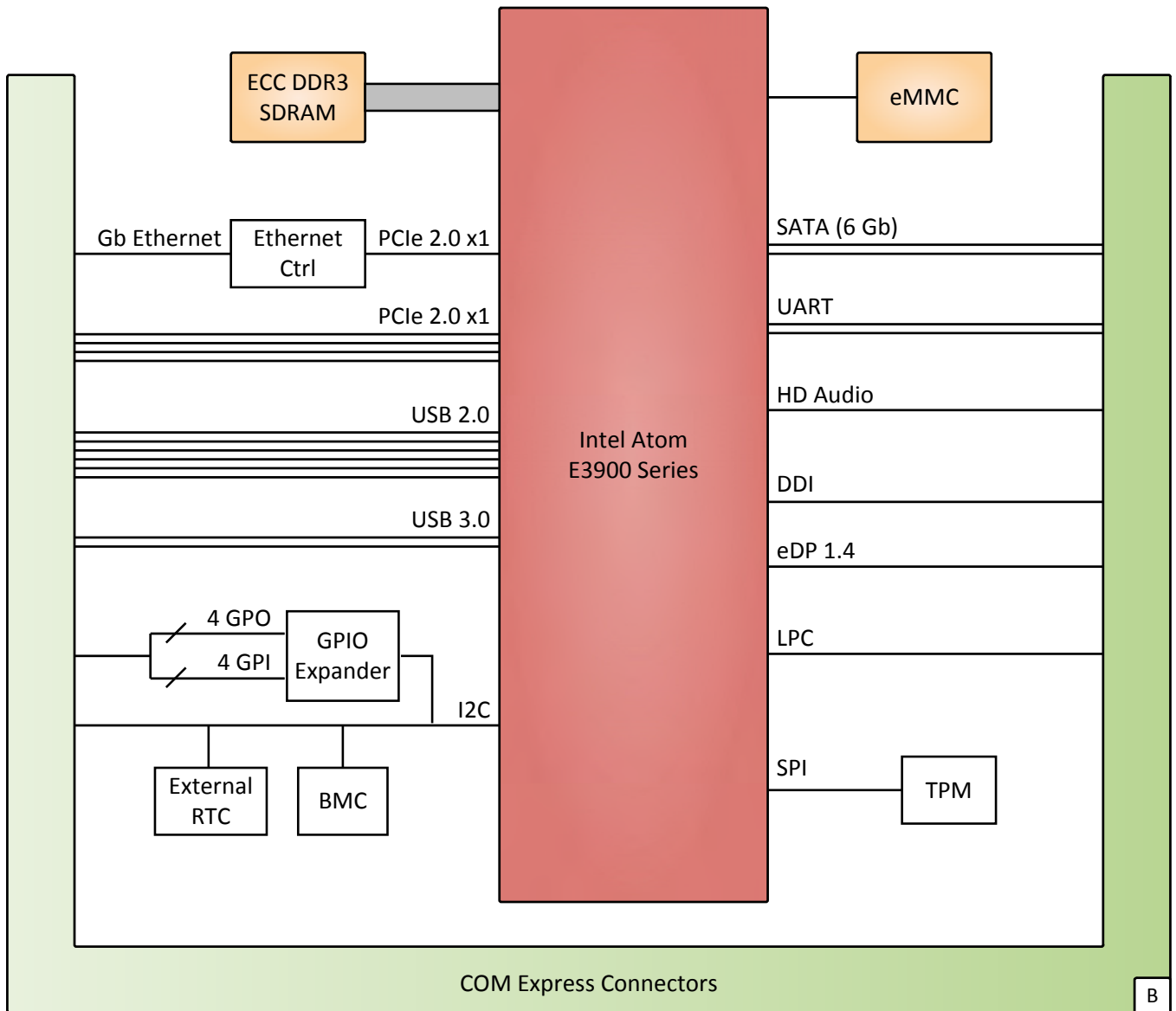
The Intel E3900 CPU series provides a scalable performance up to 4 cores and integrated quality graphics. Intel VT-x virtualization support allows to run multiple applications on a single hardware platform, saving costs. Due to the low power dissipation (depending on the CPU), no active cooling is necessary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

Safety, Security and Connectivity

The board management controller provides enhanced reliability, reduced downtime and is prepared for SIL certification. The Trusted Platform Module supports features like secure/measured booting and fast cryptographic execution. The CM50C 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 until 2031 ensures an extended product life and future-safety for a wide range of applications.



B Onboard

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.

Security

- TPM (Trusted Platform Module 2.0)

Mass Storage

- The following mass storage devices are assembled:
 - eMMC (soldered); 64 GB max.

Graphics

- Processor graphics
- Maximum resolution: 4096x2160 pixels @ 60 Hz, 24 bpp

Interfaces

- SATA
 - 2x SATA Revision 3.x, board to board
- SDHC (on request)
 - 1x, board to board
- Video
 - 1x DDI, board to board
 - 1x eDP 1.4, board to board
- Audio
 - 1x, HD Audio, board to board
- USB
 - 6x USB 2.0, board to board
 - 2x USB 3.0, board to board
- PCI Express
 - 4x PCIe 2.0, x1, board to board
- Ethernet
 - 1x 10/100/1000BASE-T, board to board
- Serial
 - 2x UART, board to board
- GPIO
 - 4x GPI, board to board
 - 4x GPO, board to board
- I2C
 - 1x, board to board
- LPC
 - 1x, board to board

Supervision and Control

- Board management controller
- Watchdog timer
- Temperature measurement
- Real-time clock

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: (W) 94 mm, (D) 65 mm, (H) 18 mm
- Cooling
 - Conduction cooling

Product Compliance: Rail - Rolling Stock

- 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)
- Humidity: +55 °C and +25 °C, 100 % 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 and 5 h @ 11.44 m/s² (EN 61373:2010/AC:2017-09, vehicle body, cat. 1, class B x 2)
- Fire protection: EN 45545-2:2013 + A1:2015, HL3
- EMC emission: EN 50121-3-2:2016
- EMC immunity: EN 50121-3-2:2016

Product Compliance: Information Technology Equipment

- Operating temperature: -40 °C to +85 °C (EN 60068-2-1:2007, Ae; 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 % (EN 60068-2-30:2005, Db)
- Electrical safety
 - EN 62368-1:2014 + AC:2015
- EMC
 - Radiated emission: EN 55032:2015 (multimedia equipment), class A (industrial environments)
 - Immunity: EN 55024:2010 (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
 - 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
 - Tested with: Yocto BSP (Sumo 2.5, Linux kernel 4.15)
- Windows
 - Windows 10 IoT Enterprise 64-bit
- See also [Application Note Recommendations for a Robust Software Setup](#)
- For more information and available packages see [Software](#).

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