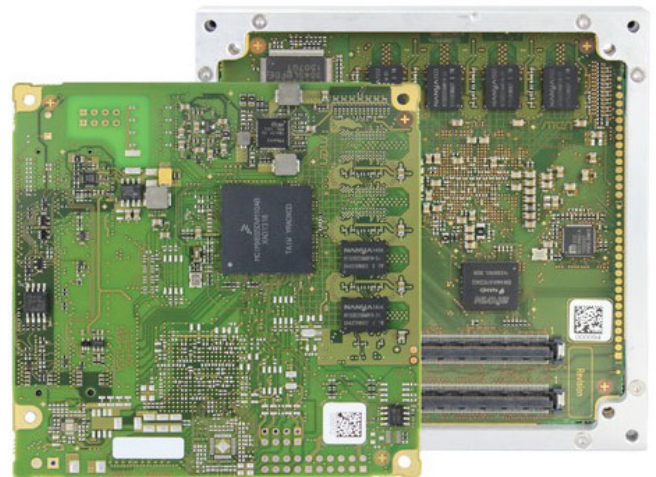


RUGGED COM EXPRESS MODULE WITH ARM I.MX6

- NXP ARM i.MX 6 Series
- Quad-core processor
- Comprehensive usage of i.MX 6 I/O
- Configurable FPGA I/O with 140 pins
- Maximum flexibility in interface configuration
- Up to 4 GB DDR3 SDRAM
- eMMC multimedia card
- U-Boot Universal Boot Loader
- -40 °C to +85 °C Tcase
- Conduction cooling
- Compliant with COM Express Compact, type 6
- PICMG COM.0 and Ultra-Rugged COM versions



SCALABLE PROCESSOR PERFORMANCE

The CC10 is an Ultra-Rugged COM Express module built around the NXP (formerly Freescale) ARM i.MX 6 series of processors with a Cortex-A9 architecture. Supporting different types of the i.MX 6Solo, 6DualLite, 6Dual and 6Quad families, the computer-on-module is widely scalable, e.g., to processing or graphics requirements. Where less performance is needed, you can optimize costs by choosing a single- or dual-core processor instead of a quad core.

PERFECT FOR HARSH ENVIRONMENTS

For applications that need reliable operation even under the harshest environmental conditions, a specially hardened version is available - the CC10C. CC10C modules are embedded in a closed aluminum frame that ensures optimum EMC protection and efficient conduction cooling and supports an extended operating temperature range of -40 °C to +85 °C. 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. With the mechanics for conduction cooling, the module's size extends to 105 x 105 mm. The CC10 is based on the "Compact", 95 x 95 mm form factor and Type 6 connector pin-out. The exclusive use of soldered components ensures that the COM withstands shock and vibration. The design is optimized for conformal coating. Adding to its rugged design, the computer-on-

module's range of supported functions leave almost nothing to wish for. With a maximum of 4 GB DDR3 RAM and an onboard eMMC device, the CC10 covers all basic memory needs. 3-Gbit SATA is provided for external mass storage.

I/O FLEXIBILITY

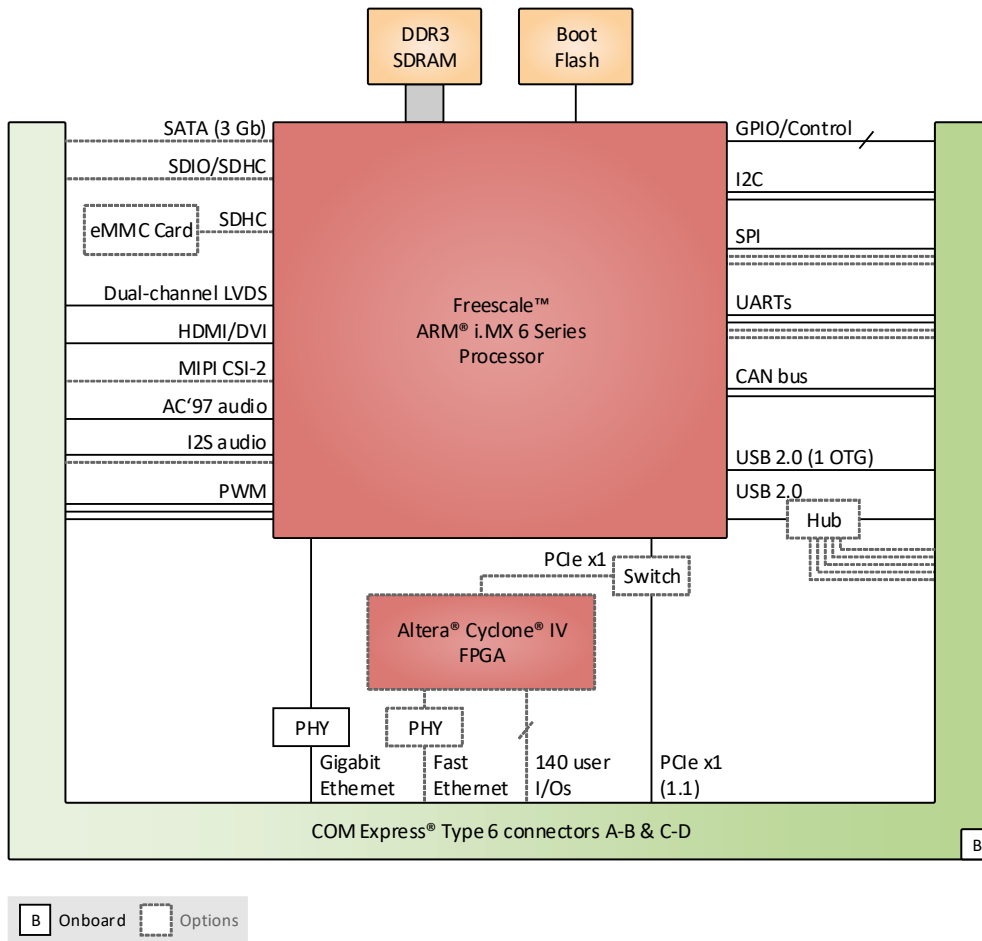
One of the biggest strengths of the CC10 lies in its I/O flexibility. The i.MX 6 provides an abundance of onchip controllers and interfaces, including Gigabit Ethernet, USB 2.0 (also with OTG/client support) and PCI Express. Different video outputs like LVDS and HDMI/DVI, audio and an optional camera interface make the card fit for multimedia applications. Other serial ports provide UARTs or CAN bus. Where the processor's standard functions are not a perfect match, an onboard FPGA opens up 140 signal pins for user I/O. As IP cores are easy to integrate, the CC10 becomes a semi-custom solution with the suitable functionality even for more specialized applications. The resulting I/O functionality in the ordered version depends on the customer's requirements and will always be a tailored combination of i.MX 6 and FPGA-based I/O, without the need for a completely new design. For evaluation and development purposes a microATX carrier board, the XC15, is available.



www.duagon.com/products/cc10/

DATA SHEET

CC10 | DIAGRAM



CC10 | TECHNICAL DATA

CPU

- NXP ARM i.MX 6 Series (ARM Cortex-A9 architecture)
- The following CPU types are supported:
 - i.MX6S (i.MX 6Solo family)
 - i.MX6DL (i.MX 6DualLite family)
 - i.MX6D (i.MX 6Dual family)
 - i.MX6Q (i.MX 6Quad family)

MEMORY

- System RAM
 - Soldered DDR3
 - 4 GB max.
- Boot Flash
 - 16 MB max.

MASS STORAGE

- The following mass storage devices can be assembled:
 - eMMC device, soldered; different sizes available



GRAPHICS

- Integrated in i.MX 6 processor
- Multi-stream-capable HD video engine delivering up to 1080p60 decode, 1080p30 encode and 3D video playback in HD
- Maximum resolution: 1920 x 1200 pixels (WUXGA)
- Superior 3D graphics performance with up to four shaders performing 200 Mt/s and OpenCL support
- Separate 2D and/or OpenVG Vertex acceleration engines for optimal user interface experience
- Stereoscopic image sensor support for 3D imaging

INTERFACES

- Video
 - 1x HDMI/DVI, board to board
 - 1x LVDS, dual-channel, board to board
 - 1x MIPI CSI-2 camera serial host interface, board to board; optional
- Audio
 - 1x AC'97 audio, board to board
 - 1x I2S audio, board to board
- SATA
 - 1x SATA Revision 2.x, board to board; only with i.MX6D or i.MX6Q
- SDIO/SDHC
 - 1x, board to board, for MMC/SD/SDIO cards
- USB
 - 2x USB 2.0, board to board, or
 - 7x USB 2.0, board to board
 - One channel always implemented as OTG (On-The-Go) host/client channel
- Ethernet
 - 1x 1000BASE-T, board to board
 - 1x 100BASE-T, board to board; optional
 - Link and activity LED signals
- PCI Express
 - 1x PCIe 1.1 x1, board to board
- ExpressCard
 - 1x, board to board

- Serial
 - 6x UART, board to board, max., 4 Mbit/s max.
 - Physical interfaces RS232 or RS422/RS485 depending on interface controller and implementation on carrier board
- CAN bus
 - 2x, board to board, 2.0A/B CAN protocol, 1 Mbit/s
 - 2x additional, board to board, 2.0A/B CAN protocol, 1 Mbit/s; with FPGA; optional
 - External transceivers to be implemented on carrier board
- PWM
 - 3x PWM, board to board
- I2C
 - 4x I2C, board to board, max.
- SPI
 - 3x SPI, board to board, max.
- Power and system management control signals
- GPIO
 - 9x GPIO, 4x GPO, 3x GPI, board to board
 - 64x GPIO, board to board, with FPGA; optional

FPGA

- No FPGA assembled, with custom configuration of i.MX 6 I/O interfaces, or
- FPGA Altera Cyclone IV, with custom IP core and i.MX 6 I/O configuration
 - Total available pin count: 140 pins on COM Express connectors
- The IP cores that make sense and/or can be implemented depend on the board model, available pin counts and number of logic elements. Please contact diagon for information on feasibility.

SUPERVISION AND CONTROL

- Power supervision and watchdog
- Temperature measurement
 - i.MX 6 temperature measurement
 - Additional onboard temperature sensor; optional
- Real-time clock, buffered by supercapacitor or battery on the carrier board



PRODUCT STANDARD

- Compact, Type 6, PICMG COM.0 COM Express Module Base Specification
- Compact, Type 6, Ultra-Rugged COM

ELECTRICAL SPECIFICATIONS

- Supply voltage
 - +12 V (9 to 16 V)
- Power consumption
 - 12 W, measured in stress test using 15CC10C00, i.MX6Q quad-core @ 1.0 GHz
 - 7.4 W, measured in test (activity on Gb Ethernet and 1 USB interface) using 15CC10C00, i.MX6Q quad-core @ 1.0 GHz
 - 5 W, measured in test (activity on Gb Ethernet and 1 USB interface) using 15CC10-00, i.MX6S single-core @ 800 MHz

MECHANICAL SPECIFICATIONS

- Dimensions
 - COM Express Compact: (W) 95 mm, (D) 95 mm
 - Ultra-Rugged COM Compact: (W) 105 mm, (D) 105 mm, (H) 18 mm
- Weight
 - 356 g (model 15CC10C00)
 - 40 g (model 15CC10-00)
- Cooling
 - Conduction cooling
 - Air cooling

ENVIRONMENTAL SPECIFICATIONS

- Temperature range (operation)
 - -40 °C to +85 °C Tcase (conduction-cooling cover/frame) (model 15CC10C00)
 - -40 °C to +85 °C (model 15CC10-00)
- Temperature range (storage): -40 °C to +85 °C
- Relative humidity (operation): max. 95% non-condensing
- Relative humidity (storage): max. 95% non-condensing
- Altitude: -300 m to +3000 m
- Shock: 50 m/s², 30 ms (EN 61373)
- Vibration (function): 1 m/s², 5 Hz to 150 Hz (EN 61373)
- Vibration (lifetime): 7.9 m/s², 5 Hz to 150 Hz (EN 61373)

RELIABILITY

- MTBF
 - 652 986 h predicted @ 40 °C according to IEC/TR 62380 (RDF 2000) (model 15CC10C00)
 - 1 233 470 h predicted @ 40 °C according to IEC/TR 62380 (RDF 2000) (model 15CC10-00)

SAFETY

- Flammability (PCBs): UL 94 V-0

EMC

- EMC behavior generally depends on the system and housing surrounding the COM module.
- The Rugged COM Express module in its cover and frame supports the system to meet the requirements of
 - EN 55022 (radio disturbance)
 - IEC 61000-4-2 (ESD)
 - IEC 61000-4-3 (electromagnetic field immunity)
 - IEC 61000-4-4 (burst)
 - IEC 61000-4-5 (surge)
 - IEC 61000-4-6 (conducted disturbances)

BIOS/BOOT LOADER

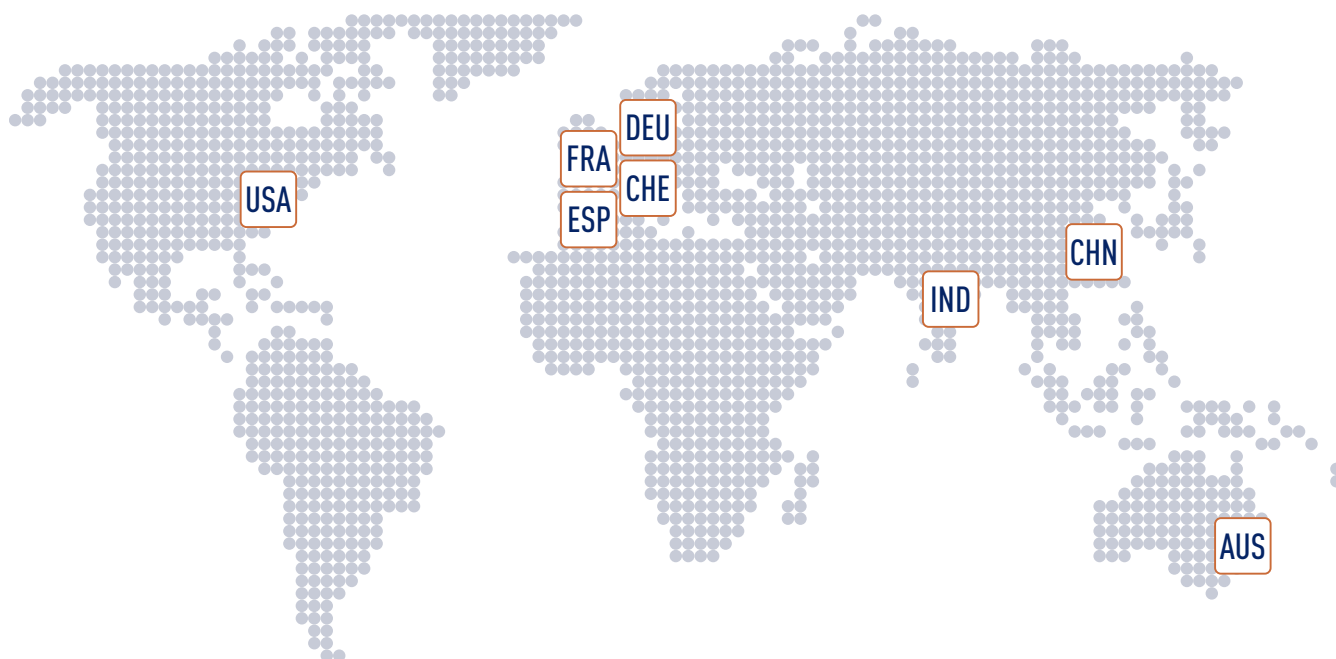
- U-Boot Universal Boot Loader

SOFTWARE SUPPORT

- Linux
 - BSP
 - Driver support
 - Tool support
- VxWorks
 - BSP
 - Driver support
 - Tool support
- ▶ 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/cc10/#downl



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.

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