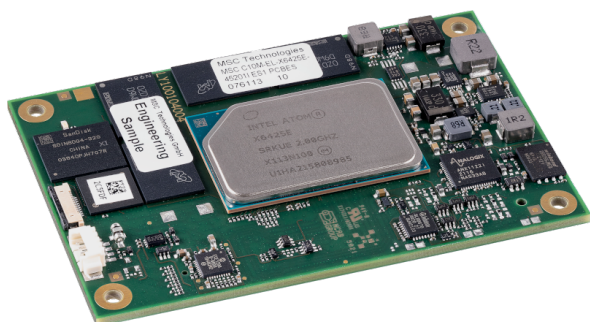


## MSC C10M-EL

Intel Atom<sup>®</sup> x6000 Series /  
Intel<sup>®</sup> Pentium<sup>®</sup> / Celeron<sup>®</sup>  
N and J Series



84 x 55

8 / 17W

-40 +85



COM  Express

## Description

The MSC C10M-EL module is based on the Intel Atom<sup>®</sup> Processor x6000 Series (codenamed "Elkhart Lake"). Built on 10nm process technology the SoC integrates the next generation Intel Atom processor with graphics accelerators, memory controller and rich I/O functionality in a single package. The module is designed for extended temperature range and 24/7 operation in mission critical tasks that require a reliable and performant computing base. The COM Express Mini Module fits into space and thermally constraint system environments, while providing outstanding performance. Typical applications include industrial IoT, communication units, mobile medical equipment, way-side controllers and outdoor POS terminals.

The MSC C6C-EL can drive up to two independent displays with a maximum of 4k resolution. The COM Express Type 10 interface allows direct access to digital display interfaces including DisplayPort, HDMI and the choice of LVDS versus eDP. With a maximum capacity of 16GB fast LPDDR4x memory the board satisfies even demanding applications. Optional in-band ECC capabilities allow for protecting code and data kept in memory. High speed I/O includes four PCIe Gen 3 lanes and two USB 3.0 interfaces. Mass storage can be supported with the optional on-board eMMC memory and via two SATA channels.

System investments are well protected through long-term availability of the module, designed and manufactured by Avnet Embedded. The COM Express standard enables performance scaling and migrating applications to future technology upgrades when they become available.

## Highlights

- Quad and dual core variants
- Power efficient processors, TDP 6 to 12W
- Extended temperature variants
- Integrated Intel UHD Graphics (Gen11), max. 32 executing units
- Up to 16GB LPDDR4x SDRAM
- In-band ECC option
- Two SATA 6Gb/s mass storage interfaces
- eMMC mass storage option
- DisplayPort/HDMI/DVI interface
- LVDS/Embedded DisplayPort interface
- Two independent displays supported
- DirectX 12, OpenGL 4.5/ES 3.x, OpenCL 1.2 driver support
- Two USB 3.0 and eight USB 2.0 interfaces
- Four PCI Express<sup>™</sup> x1 Gen 3 lanes
- One Gb Ethernet port
- TSN, TCC support
- UEFI Firmware
- Trusted Platform Module TPM 2.0

## Technical Data - MSC C10M-EL

<b>Technology</b>	x86
<b>Formfactor</b>	COM Express Mini
<b>CPU</b>	<p>Intel Atom® x6425RE Processor, quad-core / 4T, 1.9GHz, 32EU, IBECC, TCC, 12W, IUC</p> <p>Intel Atom® x6416RE Processor, quad-core / 4T, 1.7GHz, 16EU, IBECC, TCC, 9W, IUC</p> <p>Intel Atom® x6414RE Processor, quad-core / 4T, 1.5GHz, 16EU, IBECC, TCC, 9W, IUC</p> <p>Intel Atom® x6214RE Processor, dual-core / 2T, 1.4GHz, 16EU, IBECC, TCC, 6W, IUC</p> <p>Intel Atom® x6212RE Processor, dual-core / 2T, 1.2GHz, 16EU, IBECC, TCC, 6W, IUC</p> <p>Intel Atom® x6425E Processor, quad-core / 4T, 2.0/3.0GHz, 32EU, IBECC, 12W, EUC</p> <p>Intel Atom® x6413E Processor, quad-core / 4T, 1.5/3.0GHz, 16EU, IBECC, 9W, EUC</p> <p>Intel Atom® x6211E Processor, dual-core / 2T, 1.3/3.0GHz, 16EU, IBECC, 6W, EUC</p> <p>Intel® Pentium® J6426 Processor, quad-core / 4T, 2.0/3.0GHz, 32EUs, 10W, PUC</p> <p>Intel® Pentium® N6415 Processor, quad-core / 4T, 1.2/3.0GHz, 16EU, 6W, PUC</p> <p>Intel® Celeron® J6413 Processor, quad-core / 4T, 1.8/3.0GHz, 16EU, 10W, PUC</p> <p>Intel® Celeron® N6211 Processor, dual-core / 2T, 1.2/3.0GHz, 16EU, 6W, PUC</p> <p>IUC - Intel Industrial Use Conditions EUC - Intel Embedded Use Conditions PUC - Intel PC Client Use Conditions</p>
<b>Chipset</b>	SOC
<b>RAM</b>	Up to 16GB LPDDR4x SDRAM, up to 4267MT/s, soldered on board In-band ECC (on selected variants)
<b>Flash</b>	Up to 256GB eMMC V5.1 Flash, soldered (optional)
<b>Storage Interfaces</b>	2x SATA 6Gb/s
<b>USB</b>	2x USB 3.0, 8 x USB 2.0
<b>Serial Interfaces</b>	Two UARTS
<b>Bus Interfaces</b>	4x PCI Express x1 Gen 3, LPC bus (Low Pin Count bus; no DMA support)
<b>Display Controller</b>	<p>Integrated Intel UHD Graphics (Gen11)</p> <p>Up to 32 execution units (EU)</p> <p>DirectX 12, OpenGL 4.5/ES 3.x, OpenCL 1.2 driver support</p> <p>Media codec support: MPEG2, H.264 (L5.2), VC-1, WMV9, VP8, VP9, JPEG/MPEG, H.265 (HEVC)</p>

<b>Display Interfaces</b>	Two independent displays supported: 1x Digital Display Interface (DP 1.2/1.3/1.4 (max. 4096 x 2160 @ 60Hz), HDMI 1.4b/2.0b (max. 4K @ 60Hz) 1x Embedded DisplayPort 1.3 (on variants without LVDS only); max. 4096 x 2160 @ 60Hz, LVDS 24bit, single-channel, 1366 x 768 @ 60Hz (shared with Embedded DisplayPort)
<b>Network Interface</b>	10/100/1000Base-T (SoC integrated controller)
<b>Audio Interface</b>	High Definition Audio
<b>Security Device</b>	TPM 2.0
<b>Miscellaneous</b>	Watchdog Timer: Initiates system reset, programmable Fan Supply: 4-pin header for CPU fan, PWM speed controlled and PWM speed control for system fan supported RTC battery: external System Monitoring: voltage, temperature, CPU fan, system fan GPIO, SDIO (multiplexed with GPIO)
<b>Feature Highlights</b>	Type 10 pin-out
<b>Firmware</b>	AMI Aptio UEFI
<b>OS Support</b>	Windows 10 IoT Enterprise RS5 (64bit) Linux (Yocto Project) Kernel 5.4
<b>Power Requirement</b>	Wide range input +5 ... +20V, 5V Stby optional, 8W (typ.) up to 17W (typ.)
<b>Environment</b>	Ambient Temperature; 0° ... 60°C (operating, commercial), -40° ... 85°C (operating, industrial), -40° ... 85°C (storage) Humidity: 5 ... 95% (operating, non-condensing), 5 ... 95% (storage, non-condensing)
<b>Dimensions</b>	84mm x 55mm
<b>Certificates</b>	UL / CE
<b>Cooling</b>	Passive heat sink Heat spreader with threaded or non-threaded standoffs

## Order Reference - MSC C10M-EL

Order Number	Description	Reference	Cat*
93852	COM Express Type 10 Mini module (84mm x 55mm); CPU: Intel Atom X6425RE quad-core 1.9GHz, 12W TDP; Graphics: Intel UHD; DP/HDMI and LVDS interfaces; Ethernet: 1Gbit; 16GB LPDDR4 SDRAM, in-band ECC; 32GB eMMC; HD audio; TPM 2.0; 2x SATA, 2x USB3/2, 6x USB2, 2x UART; 4x PCIe x1; -40 ... +85°C; (recommended for 24/7 operation)	MSC C10M-EL-X6425RE-452011 PCBFTX	OR
93850	COM Express Type 10 Mini module (84mm x 55mm); CPU: Intel Atom X6425RE quad-core 1.9GHz, 12W TDP; Graphics: Intel UHD; DP/HDMI and LVDS interfaces; Ethernet: 1Gbit; 8GB LPDDR4 SDRAM, in-band ECC; 16GB eMMC; HD audio; TPM 2.0; 2x SATA, 2x USB3/2, 6x USB2, 2x UART; 4x PCIe x1; -40 ... +85°C; (recommended for 24/7 operation)	MSC C10M-EL-X6425RE-342011 PCBFTX	PV
93846	COM Express Type 10 Mini module (84mm x 55mm); CPU: Intel Atom X6414RE quad-core 1.5GHz, 9W TDP; Graphics: Intel UHD; DP/HDMI and LVDS interfaces; Ethernet: 1Gbit; 8GB LPDDR4 SDRAM, in-band ECC; 16GB eMMC; HD audio; TPM 2.0; 2x SATA, 2x USB3/2, 6x USB2, 2x UART; 4x PCIe x1; -40 ... +85°C; (recommended for 24/7 operation)	MSC C10M-EL-X6414RE-342011 PCBFTX	PV
95183	COM Express Type 10 Mini module (84mm x 55mm); CPU: Intel Atom X6414RE quad-core 1.5GHz, 9W TDP; Graphics: Intel UHD; DP/HDMI and LVDS interfaces; Ethernet: 1Gbit; 8GB LPDDR4 SDRAM, in-band ECC; no eMMC; HD audio; no TPM; 2x SATA, 2x USB3/2, 6x USB2, 2x UART; 4x PCIe x1; -40 ... +85°C; (recommended for 24/7 operation)	MSC C10M-EL-X6414RE-3N2001 PCBFTX	PV
95179	COM Express Type 10 Mini module (84mm x 55mm); CPU: Intel Atom X6212RE dual-core 1.2GHz, 6W TDP; Graphics: Intel UHD; DP/HDMI and LVDS interfaces; Ethernet: 1Gbit; 8GB LPDDR4 SDRAM, in-band ECC; no eMMC; HD audio; no TPM; 2x SATA, 2x USB3/2, 6x USB2, 2x UART; 4x PCIe x1; -40 ... +85°C; (recommended for 24/7 operation)	MSC C10M-EL-X6212RE-3N2001 PCBFTX	OR
93842	COM Express Type 10 Mini module (84mm x 55mm); CPU: Intel Atom X6212RE dual-core 1.2GHz, 6W TDP; Graphics: Intel UHD; DP/HDMI and LVDS interfaces; Ethernet: 1Gbit; 4GB LPDDR4 SDRAM, in-band ECC; 16GB eMMC; HD audio; TPM 2.0; 2x SATA, 2x USB3/2, 6x USB2, 2x UART; 4x PCIe x1; -40 ... +85°C; (recommended for 24/7 operation)	MSC C10M-EL-X6212RE-242011 PCBFTX	PV
93848	COM Express Type 10 Mini module (84mm x 55mm); CPU: Intel Atom X6425E quad-core 2.0/3.0GHz, 12W TDP; Graphics: Intel UHD; DP/HDMI and LVDS interfaces; Ethernet: 1Gbit; 16GB LPDDR4 SDRAM, in-band ECC; 32GB eMMC; HD audio; TPM 2.0; 2x SATA, 2x USB3/2, 6x USB2, 2x UART; 4x PCIe x1; -40 ... +85°C;	MSC C10M-EL-X6425E-452011 PCBFTX	PV
93836	COM Express Type 10 Mini module (84mm x 55mm); CPU: Intel Celeron J6413 quad-core 1.8/3.0GHz, 10W TDP; Graphics: Intel UHD; DP/HDMI and LVDS interfaces; Ethernet: 1Gbit; 8GB LPDDR4 SDRAM; 16GB eMMC; HD audio; TPM 2.0; 2x SATA, 2x USB3/2, 6x USB2, 2x UART; 4x PCIe x1;	MSC C10M-EL-J6413-34201C PCBFTX	PV
93844	COM Express Type 10 Mini module (84mm x 55mm); CPU: Intel Atom X6413E quad-core 1.5/3.0GHz, 9W TDP; Graphics: Intel UHD; DP/HDMI and LVDS interfaces; Ethernet: 1Gbit; 4GB LPDDR4 SDRAM, in-band ECC; 16GB eMMC; HD audio; TPM 2.0; 2x SATA, 2x USB3/2, 6x USB2, 2x UART; 4x PCIe x1; -40 ... +85°C;	MSC C10M-EL-X6413E-242011 PCBFTX	OR

\*COM products are divided in two categories, „PV“ (preferred variant) and „OR“ (on request).

## Order Reference - MSC C10M-EL

Order Number	Description	Reference	Cat*
95181	COM Express Type 10 Mini module (84mm x 55mm); CPU: Intel Atom X6413E quad-core 1.5/3.0GHz, 9W TDP; Graphics: Intel UHD; DP/HDMI and eDP interfaces; Ethernet: 1Gbit; 4GB LPDDR4 SDRAM, in-band ECC; no eMMC; HD audio; TPM 2.0; 2x SATA, 2x USB3/2, 6x USB2, 2x UART; 4x PCIe x1; -40 ... +85°C;	MSC C10M-EL-X6413E-2N1011 PCBFTX	OR
93840	COM Express Type 10 Mini module (84mm x 55mm); CPU: Intel Atom X6211E dual-core 1.3/3.0GHz, 6W TDP; Graphics: Intel UHD; DP/HDMI and eDP interfaces; Ethernet: 1Gbit; 2GB LPDDR4 SDRAM, in-band ECC; no eMMC; HD audio; TPM 2.0; 2x SATA, 2x USB3/2, 6x USB2, 2x UART; 4x PCIe x1; -40 ... +85°C;	MSC C10M-EL-X6211E-1N1011 PCBFTX	PV
93838	COM Express Type 10 Mini module (84mm x 55mm); CPU: Intel Celeron N6211 dual-core 1.2/3.0GHz, 6.5W TDP; Graphics: Intel UHD; DP/HDMI and eDP interfaces; Ethernet: 1Gbit; 2GB LPDDR4 SDRAM; no eMMC; HD audio; TPM 2.0; 2x SATA, 2x USB3/2, 6x USB2, 2x UART; 4x PCIe x1;	MSC C10M-EL-N6211-1N101C PCBFTX	OR
110428	COM Express Type 10 Mini module (84mm x 55mm); CPU: Intel Atom X6212RE dual-core 1.2GHz, 6W TDP; Graphics: Intel UHD; DP/HDMI and LVDS interfaces; Ethernet: 1Gbit; 4GB LPDDR4 SDRAM, in-band ECC; 32GB eMMC; HD audio; TPM 2.0; 2x SATA; 2x USB3/2; 6x USB2; 1x UART; 1xCAN; 4x PCIe x1; -40... +85°C; (recommended for 24/7 operation)	MSC C10M-EL-X6212RE-252011 PCBFTX	PV
110430	COM Express Type 10 Mini module (84mm x 55mm); CPU: Intel Atom X6425RE quad-core 1.9GHz, 12W TDP; Graphics: Intel UHD; DP/HDMI and LVDS interfaces; Ethernet: 1Gbit; 16GB LPDDR4 SDRAM, in-band ECC; 64GB eMMC; HD audio; TPM 2.0; 2x SATA; 2x USB3/2; 6x USB2; 1x UART; 1x CAN 4x PCIe x1; CAN; -40... +85°C; (recommended for 24/7 operation)	MSC C10M-EL-X6425RE-462011 PCBFTX	PV

\*COM products are divided in two categories, „PV“ (preferred variant) and „OR“ (on request).

## Accessories

Order Number	Description	Reference
<b>Carrier Options</b>		
67293	COM Express Type 10 Evaluation Carrier Board with PCI Express x4 slot, USB 3.0/2.0, GbE, SATA, DisplayPort, eDP/LVDS and HD audio interfaces; Mini PCI Express socket, SD card slot, ATX power connector and single 12V power jack. Dimensions: 170mm x 170mm (Mini-ITX form factor)	MSC C10-MB-EV-001 PCBFTX
<b>Cooling Options</b>		
91456	Passive Heatsink for C10M-EL (Atom versions only), consisting of a single-piece aluminum pin cooler, standoffs without thread (2.7mm inner diameter) and thermopad for the thermal contact to SOC. With threaded mounting holes for an optional fan.	MSC C10M-EL-01 HSI-001
95968	Heatspreader for C10M-EL (Atom versions only). Single-piece aluminum profile, standoffs without thread (2.7mm inner diameter) and thermopad for the thermal contact to SOC.	MSC C10M-EL-01 HSP-002
91458	Passive Heatsink for C10M-EL (Pentium/Celeron versions only), consisting of a single-piece aluminum pin cooler, standoffs without thread (2.7mm inner diameter) and thermopad for the thermal contact to SOC. With threaded mounting holes for an optional fan.	MSC C10M-EL-02 HSI-001
95969	Heatspreader for C10M-EL (Atom versions only). Single-piece aluminum profile, standoffs with M2.5 thread and thermopad for the thermal contact to SOC.	MSC C10M-EL-02 HSP-002
95970	Heatspreader for C10M-EL (Pentium/Celeron versions only). Single-piece aluminum profile, standoffs without thread (2.7mm inner diameter) and thermopad for the thermal contact to SOC.	MSC C10M-EL-03 HSP-002

Avnet Embedded GmbH  
 Industriestr. 16  
 76297 Stutensee

AvnetEmbedded@avnet.com  
[avnet.com/embedded](https://www.avnet.com/embedded)

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