

MSC C6C-EL

Intel® Atom™ Series /
Pentium® / Celeron® SOC



✖ 95 x 95

⚡ 7 / 14W

🌡️ -40 +85



IoT Solutions
Alliance

COM  Express

Description

The MSC C6C-EL module is based on Intel's multi-core system-on-chip (SOC) Atom generation (codenamed "Elkhart Lake"). Built on 10nm process technology the SoC integrates the next generation Intel Atom processor core architecture and graphics accelerators, memory controller and rich I/O functionality into a single package. The module is designed for extended temperature range and 24/7 operation making it an ideal platform for mission critical tasks that require a reliable and performant compute base. It provides significant performance gains over previous Atom generations allowing for technology upgrades within existing power and cooling requirements defined by the system design. Typical applications are industrial IoT, mobile medical equipment, on-board units, way-side controllers and outdoor POS terminals.

The MSC C6C-EL can drive up to three independent displays with a maximum of 4k resolution. The COM Express Type 6 interface allows direct access to digital display interfaces including DisplayPort, HDMI and the choice of LVDS versus eDP. With a maximum capacity of 32GB fast DDR4 memory the board satisfies even demanding applications. Optional in-band ECC capabilities allow for protecting code and data kept in memory. High speed IO includes up to eight PCIe Gen 3 lanes and two USB 3.1 interfaces. Mass storage can be supported with the optional on-board eMMC memory and via two SATA channels.

Highlights

- Scalable CPU performance
- Quad and dual core variants
- Power efficient processors, TDP 6 to 12W
- Extended temperature variants
- Integrated Intel Gen11LP graphics, max. 32 executing units
- Up to 32GB DDR4-3200 SDRAM, dual-channel
- In-band ECC option
- Two SATA 6Gb/s mass storage interfaces
- eMMC mass storage option
- DisplayPort/HDMI interface
- LVDS/Embedded DisplayPort interface
- Three independent displays supported
- DirectX 12, OpenGL 4.5/ES 3.x, OpenCL 1.2 driver support
- Two USB 3.1 and eight USB 2.0 interfaces
- Two UARTs
- Up to eight PCI Express™ lanes
- One Gb Ethernet port
- TSN, TCC support
- UEFI Firmware
- Trusted Platform Module TPM 2.0

Technical Data - MSC C6C-EL

Technology	x86
Formfactor	COM Express Compact
CPU	<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>Intel® Technologies: Enhanced Intel® SpeedStep® Technology Intel® Virtualization Technology (VTx-2, VT-d) Intel® Trusted Execution Engine (TXE) Intel® Time Coordinated Computing (TCC) Precision Time Measurement (PTM) Precision Time Measurement (PTP)</p> <p>IUC - Intel Industrial Use Conditions EUC - Intel Embedded Use Conditions PUC - Intel PC Client Use Conditions</p>
Chipset	SOC
RAM	<p>2x 260-pin SO-DIMM socket for up to 2x 16 GB (dual channel operation) or 1x 16 GB (single channel operation)</p> <p>DDR4-3200 (max. transfer speed depending on memory type)</p> <p>In-band ECC (on selected variants)</p>
Flash	On-board eMMC mass storage option, scalable capacity up to 256GB
Storage Interfaces	Up to 2x SATA 6Gb/s
USB	<p>2x USB 3.1</p> <p>8x USB 2.0</p>
Serial Interfaces	Two UARTS
Bus Interfaces	<p>8x PCI Express Gen 3, up to 6 root ports</p> <p>LPC bus (Low Pin Count bus; no DMA support)</p>

Display Controller	Integrated Intel graphics Gen11LP Up to 32 execution units (EU) DirectX 12, OpenGL 4.5/ES 3.x, OpenCL 1.2 driver support Media codec support: MPEG2, H.264 (L5.2), VC-1, WMV9, VP8, VP9, JPEG/MPEG, H.265 (HEVC)
Display Interfaces	Three independent displays supported: 2x 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, dual-channel (not on all variants); max. 1920 x 1200 @ 60Hz
Network Interface	10/100/1000Base-T (SoC integrated controller) Supports Time-Sensitive Networking (TSN) and Time Coordinated Computing (TCC)
Audio Interface	High Definition Audio
Security Device	TPM 2.0
Miscellaneous	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
Feature Highlights	Type 6 pin-out
Firmware	AMI Aptio UEFI
OS Support	Windows 10 IoT Enterprise RS5 (64bit) Linux (Yocto Project) Kernel 5.4
Power Requirement	Wide range input +8.5 ... +20V, 5V Stby optional, 7 W to 14 W (typ.)
Environment	Ambient Temperature; 0° ... 60°C (operating), -25° ... 85°C (storage) Extended temp. variants: -40 ... +85°C (operating) Humidity: 5 ... 95% (operating, non-condensing), 5 ... 95% (storage, non-condensing)
Dimensions	95mm x 95mm
Certificates	UL
Cooling	Passive heat sink Active heat sink with fan Heat spreader with threaded or non-threaded standoffs

Carrier

Small carrier board (Mini-ITX) as part of a starter kit;
Evaluation board in ATX form factor

Order Reference - MSC C6C-EL

Order Number	Description	Reference	Cat*
86110	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom x6425RE, quad-core, 1.9GHz, 12W; Graphics: Intel Gen 11LP; 32 EUs; 2x DP/HDMI; LVDS; Ethernet: Intel integrated Gbit; HD audio; 2x SATA, 2x USB3/2, 6x USB2, 8x PCIe Gen 3; TPM 2.0; 2x socket for DDR4 SO-DIMM, in-band ECC; -40...+85°C (recommended for 24/7 operation)	MSC C6C-EL-X6425RE-NN221I PCBFTX	PV
86122	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom x6414RE, quad-core, 1.5GHz, 9W; Graphics: Intel Gen 11LP; 16 EUs; 2x DP/HDMI; LVDS; Ethernet: Intel integrated Gbit; HD audio; 2x SATA, 2x USB3/2, 6x USB2, 8x PCIe Gen 3; TPM 2.0; 2x socket for DDR4 SO-DIMM, in-band ECC; -40...+85°C (recommended for 24/7 operation)	MSC C6C-EL-X6414RE-NN221I PCBFTX	PV
86124	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom x6212RE, dual-core, 1.2GHz, 6W; Graphics: Intel Gen 11LP; 16 EUs; 2x DP/HDMI; LVDS; Ethernet: Intel integrated Gbit; HD audio; 2x SATA, 2x USB3/2, 6x USB2, 8x PCIe Gen 3; TPM 2.0; 2x socket for DDR4 SO-DIMM, in-band ECC; -40...+85°C (recommended for 24/7 operation)	MSC C6C-EL-X6212RE-NN221I PCBFTX	PV
86126	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom x6425E, quad-core, 2.0GHz, 12W; Graphics: Intel Gen 11LP; 32 EUs; 2x DP/HDMI; LVDS; Ethernet: Intel integrated Gbit; HD audio; eMMC 32GB 2x SATA, 2x USB3/2, 6x USB2, 8x PCIe Gen 3; TPM 2.0; 2x socket for DDR4 SO-DIMM, in-band ECC; -40...+85°C	MSC C6C-EL-X6425E-N5201I PCBFTX	OR
86128	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom x6413E, quad-core, 1.5GHz, 9W; Graphics: Intel Gen 11LP; 16 EUs; 2x DP/HDMI; LVDS; Ethernet: Intel integrated Gbit; HD audio; 2x SATA, 2x USB3/2, 6x USB2, 8x PCIe Gen 3; TPM 2.0; 2x socket for DDR4 SO-DIMM, in-band ECC; -40...+85°C	MSC C6C-EL-X6413E-NN221I PCBFTX	OR
86130	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom x6211E, dual-core, 1.3GHz, 6W; Graphics: Intel Gen 11LP; 16 EUs; 2x DP/HDMI; LVDS; Ethernet: Intel integrated Gbit; HD audio; 2x SATA, 2x USB3/2, 6x USB2, 8x PCIe Gen 3; TPM 2.0; 2x socket for DDR4 SO-DIMM, in-band ECC; -40...+85°C	MSC C6C-EL-X6211E-NN221I PCBFTX	OR

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

Order Reference - MSC C6C-EL

Order Number	Description	Reference	Cat*
86132	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Pentium J6426, quad-core, 2.0GHz, 10W; Graphics: Intel Gen 11LP; 32 EUs; 2x DP/HDMI; eDP; Ethernet: Intel integrated Gbit; HD audio; 2x SATA, 2x USB3/2, 6x USB2, 8x PCIe Gen 3; TPM 2.0; 2x socket for DDR4 SO-DIMM;	MSC C6C-EL-J6426-NN121C PCBFTX	OR
86134	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Celeron J6413, quad-core, 1.8GHz, 10W; Graphics: Intel Gen 11LP; 16 EUs; 2x DP/HDMI; eDP; Ethernet: Intel integrated Gbit; HD audio; 2x SATA, 2x USB3/2, 6x USB2, 8x PCIe Gen 3; TPM 2.0; 2x socket for DDR4 SO-DIMM;	MSC C6C-EL-J6413-NN121C PCBFTX	OR
95063	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Pentium J6426, quad-core, 2.0GHz, 10W; Graphics: Intel Gen 11LP; 32 EUs; 2x DP/HDMI; LVDS; Ethernet: Intel integrated Gbit; HD audio; 2x SATA, 2x USB3/2, 6x USB2, 8x PCIe Gen 3; TPM 2.0; 2x socket for DDR4 SO-DIMM;	MSC C6C-EL-J6426-NN221C PCBFTX	OR
95041	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Celeron J6413, quad-core, 1.8GHz, 10W; Graphics: Intel Gen 11LP; 16 EUs; 2x DP/HDMI; LVDS; Ethernet: Intel integrated Gbit; HD audio; 2x SATA, 2x USB3/2, 6x USB2, 8x PCIe Gen 3; TPM 2.0; 2x socket for DDR4 SO-DIMM;	MSC C6C-EL-J6413-NN221C PCBFTX	OR

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

Accessories

Order Number	Description	Reference
Carrier Options		
67295	COM Express Type 6 Evaluation Carrier Board with PCI Express x4/x16 slot, USB 3.0/2.0, GbE, SATA, DisplayPort, eDP/LVDS, VGA 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 C6-MB-EV-001 PCBFTX
41857	COM Express Type 6 Evaluation Carrier Board with various PCI Express x1, x4 and x16 slots, USB 3.0/2.0, GbE, SATA, DisplayPort, HDMI, LVDS, eDP, VGA, HD audio interfaces; mSATA and Mini PCI Express sockets, POST code display, ATX power connector. Dimensions: 305 x 244 mm (ATX form factor)	MSC C6-MB-EVA PCBFTX
Cooling Options		
82415	Passive Heatsink for C6C-EL (Atom versions only), consisting of a single-piece aluminum profile with fins, standoffs without thread (2.7mm inner diameter), screws and thermopad for the thermal contact to SOC.	MSC C6C-EL-01 HSI-001
85123	Heatspreader for C6C-EL (Atom versions only). Single-piece aluminum profile with standoffs without thread (2.7mm inner diameter), screws and thermopad for the thermal contact to SOC.	MSC C6C-EL-01 HSP-001
85930	Passive Heatsink for C6C-EL (Pentium/Celeron versions only), consisting of a single-piece aluminum profile with fins, standoffs without thread (2.7mm inner diameter), screws and thermopad for the thermal contact to SOC.	MSC C6C-EL-02 HSI-001
85124	Heatspreader for C6C-EL (Atom versions only). Single-piece aluminum profile with threaded standoffs (M2.5), screws and thermopad for the thermal contact to SOC.	MSC C6C-EL-02 HSP-001
85941	Heatspreader for C6C-EL (Pentium/Celeron versions only). Single-piece aluminum profile with standoffs without thread (2.7mm inner diameter), screws and thermopad for the thermal contact to SOC.	MSC C6C-EL-03 HSP-001
85942	Heatspreader for C6C-EL (Pentium/Celeron versions only). Single-piece aluminum profile with threaded standoffs (M2.5), screws and thermopad for the thermal contact to SOC.	MSC C6C-EL-04 HSP-001
79809	Fan kit for Heatsink MSC HCA-ALP/RLP-0x HSI-xxx, MSC C6B-ALP/RLP-0x HSI-xxx, MSC C6B-TLH-0x HSI-xxx, MSC C6C-ALP/RLP-0x HSI-xxx, MSC C6C-TLU-0x HSI-xxx, MSC C6C-WLU-0x HSI-xxx, MSC C6C-ALN-0x HSI-xxx, MSC C6C-EL-0x HSI-xxx, MSC C6C-RYZx-0x HSI-xxx, PWM fan 80x80x15mm.	MSC C6C-FANKIT-01-HSF-001

Accessories

Order Number	Description	Reference
Memory Options		
93721	4GB DDR4-3200 SO-DIMM, Commercial Temp.	MOD SODIMM DDR4 4GB PC4-25600 CL22 1B
93748	4GB DDR4-3200, Sorting Wide Temp.	MOD SODIMM DDR4 4GB PC4-25600 CL22 1B
93750	4GB DDR4-3200 SO-DIMM, Commercial Temp.	MOD SODIMM DDR4 4GB PC4-25600 CL22 1B
89531	8GB DDR4-3200 SO-DIMM, Sorting Wide Temp.	MOD SODIMM DDR4 8GB PC4-25600 CL22 1B
93718	8GB DDR4-3200 SO-DIMM, Wide Temp.	MOD SODIMM DDR4 8GB PC4-25600 CL22 1B
93720	8GB DDR4-3200 SO-DIMM, Industrial Temp.	MOD SODIMM DDR4 8GB PC4-25600 CL22 1B

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