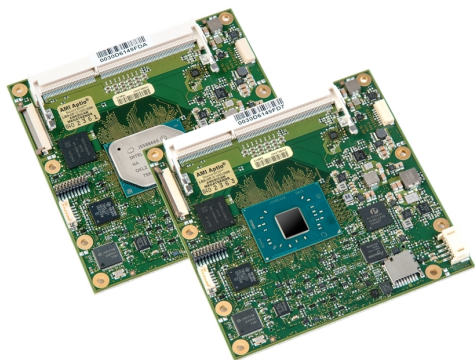


## MSC C6C-AL

Intel® Atom™ E3900 Series /  
Pentium® / Celeron® SOC



95 x 95



7 / 14W



-40 +85



IoT Solutions  
Alliance

COM  Express

## Description

The MSC C6C-AL module is based on Intel's multi-core system-on-chip (SOC) Atom generation (codenamed "Apollo Lake") that integrates next generation Intel processor core, graphics, memory, and I/O interfaces into one solution. Based on 14nm processor technology this multi-core Atom processor provides outstanding computing and graphics power and is more power efficient compared to its predecessors.

The new MSC C6C-AL brings triple independent display support, DirectX 12, fast DDR3L memory and four USB 3.0 on a compact, power saving and cost-efficient module. Different SOCs with dual- and quad-core processors are supported by this design. Besides an extensive set of interfaces and features, the MSC C6C-AL optionally offers hardware based security compliant to the requirements of TCG (Trusted Computing Group).

The Type 6 pin-out allows direct access to the latest digital display interfaces like DisplayPort, HDMI 1.4b and DVI. USB 3.0 interfaces support the fastest peripheral devices currently available.

Supporting extended temperature range and long availability the modules are perfectly suited for modern IoT applications.

## Highlights

- Intel Atom E3950 quad-core 1.6/2.0GHz, 12W
- Intel Atom E3940 quad-core 1.6/1.8GHz, 9.5W
- Intel Atom E3930 dual -core 1.3/1.8GHz, 6.5W
- Intel Pentium N4200 quad-core 1.1/2.5GHz, 6W
- Intel Celeron N3350 dual-core 1.1/2.4GHz, 6W
- Integrated Intel Gen. 9 HD graphics
- Up to 8GB DDR3L SDRAM, dual-channel
- Two SATA 6Gb/s mass storage interfaces
- MicroSD card socket
- eMMC option
- DisplayPort/HDMI/DVI interface
- LVDS/Embedded DisplayPort interface
- Three independent displays supported
- DirectX 12, OpenGL 4.3, OpenCL 2.0
- Dual MIPI-CSI (option)
- Four USB 3.0/2.0 and four USB 2.0 interfaces
- Two high-speed UARTs
- Up to five PCI Express™ x1 lanes
- UEFI Firmware
- Trusted Platform Module
- Extended temperature variants

## Technical Data - MSC C6C-AL

<b>Technology</b>	x86
<b>Formfactor</b>	COM Express Compact
<b>CPU</b>	Intel Atom E3950 quad-core 1.6/2.0GHz, 18 EU GFX, 12W Intel Atom E3940 quad-core 1.6/1.8GHz, 12 EU GFX, 9.5W Intel Atom E3930 dual-core 1.3/1.8GHz, 12 EU GFX, 6.5W Intel Pentium N4200 quad-core 1.1/2.5GHz, 18 EU GFX, 6W Intel Celeron N3350 dual-core 1.1/2.4GHz, 12 EU GFX, 6W
<b>Chipset</b>	SOC
<b>RAM</b>	2x 204-pin SO-DIMM socket for up to 2x 4 GB (dual channel operation) or 1x 8 GB (single channel operation); DDR3L-1866
<b>Flash</b>	MicroSD card socket eMMC option
<b>Storage Interfaces</b>	Up to 2x SATA 6Gb/s
<b>USB</b>	4x USB 3.0/2.0, 4x USB 2.0
<b>Bus Interfaces</b>	Up to 5x PCI Express x1, LPC bus (Low Pin Count bus; no DMA support)
<b>Display Controller</b>	Integrated Intel HD graphics Gen. 9 Up to 18 execution units (EU) DirectX 12.0, OpenGL 4.3, OpenCL 2.0 Full Profile; MPEG2, H.264 (L5.2), VC-1, WMV9, VP8, JPEG/MJPEG, H.265 (HEVC), VP9, MVC
<b>Display Interfaces</b>	Three independent displays supported: 2x Digital Display Interface (DP 1.2a (4096 x 2160 @ 60Hz), HDMI 1.4b (3840 x 2160 @ 30Hz) 1x Embedded DisplayPort 1.3 (on variants without LVDS only); 4096 x 2160 @ 60Hz, LVDS 24bit, dual-channel (not on all variants); 1920 x 1200 @ 60Hz
<b>Network Interface</b>	10/100/1000Base-T (Intel i210) or 10/100/1000Base-T (Intel i225) Note: see product descriptions for supported network 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  Dual MIPI-CSI (on feature connector, optional)
<b>Feature Highlights</b>	Type 6 pin-out
<b>Firmware</b>	AMI Aptio UEFI
<b>OS Support</b>	Windows 10 (embedded) BSP for Linux on request EAPI (HW Programming Interface)
<b>Power Requirement</b>	Wide range input +5 ... +20V, 5V Stby optional, 7 W to 14 W (typ.)
<b>Environment</b>	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)
<b>Dimensions</b>	95mm x 95mm
<b>Certificates</b>	UL
<b>Cooling</b>	Passive heat sink Active heat sink with fan Heat spreader with threaded or non-threaded standoffs
<b>Carrier</b>	Small carrier board (Mini-ITX) as part of a starter kit; Evaluation board in ATX form factor

## Order Reference - MSC C6C-AL

Order Number	Description	Reference	Cat
69668	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3930 dual-core 1.3/1.8GHz, 12 EU GFX, 6W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i210 Gbit; HD audio; 2x SATA, 4x USB3, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM. -40...+85°C (recommended for 24/7 use cases)	MSC C6C-AL-E3930-NN261I PCBFTX	PV
69670	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3940 quad-core 1.6/1.8GHz, 12 EU GFX, 9W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i210 Gbit; HD audio; 2x SATA, 4x USB3, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM. -40...+85°C (recommended for 24/7 use cases)	MSC C6C-AL-E3940-NN261I PCBFTX	PV
85980	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3940 quad-core 1.6/1.8GHz, 12 EU GFX, 9W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i210 Gbit; HD audio; 2x SATA, 4x USB3/2, 4x USB2, 3x PCIe x1; TPM; no microSD, no MIPI-CSI; 2x socket for DDR3L SO-DIMM. -40...+85°C (recommended for 24/7 use cases)	MSC C6C-AL-E3940-NN201I PCBFTX	OR
69672	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3950 quad-core 1.6/2.0GHz, 18 EU GFX, 12W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i210 Gbit; HD audio; 2x SATA, 4x USB3, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM. -40...+85°C (recommended for 24/7 use cases)	MSC C6C-AL-E3950-NN261I PCBFTX	PV
86022	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3950 quad-core 1.6/2.0GHz, 18 EU GFX, 13W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i210 Gbit; HD audio; 2x SATA, 4x USB3/2, 4x USB2, 3x PCIe x1; TPM; no microSD, no MIPI-CSI; 2x socket for DDR3L SO-DIMM. -40...+85°C (recommended for 24/7 use cases)	MSC C6C-AL-E3950-NN201I PCBFTX	OR
69640	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Celeron N3350 dual-core 1.1/2.3GHz, 12 EU GFX, 6W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i210 Gbit; HD audio; 2x SATA, 4x USB3, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM.	MSC C6C-AL-N3350E-NN261C PCBFTX	OR

## Order Reference - MSC C6C-AL

Order Number	Description	Reference	Cat
69662	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Pentium N4200 quad-core 1.1/2.5GHz, 18 EU GFX, 6W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i210 Gbit; HD audio; 2x SATA, 4x USB3, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM.	MSC C6C-AL-N4200E-NN261C PCBFTX	OR
69674	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3930 dual-core 1.3/1.8GHz, 12 EU GFX, 6W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; eDP; Ethernet: Intel i210 Gbit; HD audio; 2x SATA, 4x USB3, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM. -40...+85°C (recommended for 24/7 use cases)	MSC C6C-AL-E3930-NN161I PCBFTX	OR
69676	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3940 quad-core 1.6/1.8GHz, 12 EU GFX, 9W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; eDP; Ethernet: Intel i210 Gbit; HD audio; 2x SATA, 4x USB3, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM. -40...+85°C (recommended for 24/7 use cases)	MSC C6C-AL-E3940-NN161I PCBFTX	OR
69678	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3950 quad-core 1.6/2.0GHz, 18 EU GFX, 12W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; eDP; Ethernet: Intel i210 Gbit; HD audio; 2x SATA, 4x USB3, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM. -40...+85°C (recommended for 24/7 use cases)	MSC C6C-AL-E3950-NN161I PCBFTX	OR
69664	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Celeron N3350 dual-core 1.1/2.3GHz Burst, 12 EU GFX, 6W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; eDP; Ethernet: Intel i210 Gbit; HD audio; 2x SATA, 4x USB3, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM.	MSC C6C-AL-N3350E-NN161C PCBFTX	OR
69666	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Pentium N4200 quad-core 1.1/2.5GHz, 18 EU GFX, 6W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; eDP; Ethernet: Intel i210 Gbit; HD audio; 2x SATA, 4x USB3, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM.	MSC C6C-AL-N4200E-NN161C PCBFTX	OR

## Order Reference - MSC C6C-AL

Order Number	Description	Reference	Cat
91850	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3930 dual-core 1.3/1.8GHz, 12 EU GFX, 5.5W Graphics; integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i210 Gbit; no +5V STDBY; HD audio; 2x SATA, 4x USB3/2, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM. -40...+85°C	MSC C6C-AL-E3930-NN2E1I PCBFTX	OR
91862	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3940 quad-core 1.6/1.8GHz, 12 EU GFX, 9W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i210 Gbit; no +5V STDBY; HD audio; 2x SATA, 4x USB3/2, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM. -40...+85°C	MSC C6C-AL-E3940-NN2E1I PCBFTX	OR
91868	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3950 quad-core 1.6/2.0GHz, 18 EU GFX, 13W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i210 Gbit; no +5V STDBY; HD audio; 2x SATA, 4x USB3/2, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM. -40...+85°C	MSC C6C-AL-E3950-NN2E1I PCBFTX	OR
91864	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3950 quad-core 1.6/2.0GHz, 18 EU GFX, 13W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; eDP; Ethernet: Intel i210 Gbit; no +5V STDBY; HD audio; 2x SATA, 4x USB3/2, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM. -40...+85°C	MSC C6C-AL-E3950-NN1E1I PCBFTX	OR
91866	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3950 quad-core 1.6/2.0GHz, 18 EU GFX, 13W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i210 Gbit; no +5V STDBY; HD audio; 2x SATA, 4x USB3/2, 4x USB2, 3x PCIe x1; TPM; no microSD, no MIPI-CSI; 2x socket for DDR3L SO-DIMM. -40...+85°C	MSC C6C-AL-E3950-NN281I PCBFTX	OR
95841	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3930 dual-core 1.3/1.8GHz, 12 EU GFX, 5.5W Graphics; integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i225 Gbit; no +5V STDBY; HD audio; 2x SATA, 4x USB3/2, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM. -40...+85°C	MSC C6C-AL-E3930-NN2V1I PCBFTX	OR

## Order Reference - MSC C6C-AL

Order Number	Description	Reference	Cat
96003	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3940 quad-core 1.6/1.8GHz, 12 EU GFX, 9W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i225 Gbit; no +5V STDBY; HD audio; 2x SATA, 4x USB3/2, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM. -40...+85°C	MSC C6C-AL-E3940-NN2V1I PCBFTX	OR
96007	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3950 quad-core 1.6/2.0GHz, 18 EU GFX, 13W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i225 Gbit; no +5V STDBY; HD audio; 2x SATA, 4x USB3/2, 4x USB2, 5x PCIe x1; TPM; 2x socket for DDR3L SO-DIMM. -40...+85°C	MSC C6C-AL-E3950-NN2V1I PCBFTX	OR
96005	COM Express Type 6 Compact module (95mm x 95mm); CPU: Intel Atom E3950 quad-core 1.6/2.0GHz, 18 EU GFX, 13W Graphics: integrated Intel HD Gen 9; 2x DP/HDMI; LVDS; Ethernet: Intel i225 Gbit; no +5V STDBY; HD audio; 2x SATA, 4x USB3/2, 4x USB2, 3x PCIe x1; TPM; no microSD, no MIPI-CSI; 2x socket for DDR3L SO-DIMM. -40...+85°C	MSC C6C-AL-E3950-NN2P1I PCBFTX	OR

## Accessories

Order Number	Description	Reference
<b>Carrier Options</b>		
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
<b>Cooling Options</b>		
1135097	Active Heatsink for C6C-AL (Atom variants only), consisting of a single-piece aluminum profile with fins, standoffs without thread (2.7mm inner diameter), screws and thermopads for the thermal contact to SOC. PWM fan 80x80x15mm.	MSC C6C-AL-01 HSF-001
1135098	Passive Heatsink for C6C-AL (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-AL-01 HSI-001
1135099	Heatspreader for C6C-AL (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-AL-01 HSP-001
1135205	Active Heatsink for C6C-AL (Pentium/Celeron variants only), consisting of a single-piece aluminum profile with fins, standoffs without thread (2.7mm inner diameter), screws and thermopads for the thermal contact to SOC. PWM fan 80x80x15mm.	MSC C6C-AL-02 HSF-001
1135206	Passive Heatsink for C6C-AL (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-AL-02 HSI-001
1135100	Heatspreader for C6C-AL (Atom versions only). Single-piece aluminum profile with threaded standoffs (M2.5), screws and thermopad for the thermal contact to SOC.	MSC C6C-AL-02 HSP-001
1135207	Heatspreader for C6C-AL (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-AL-03 HSP-001



## Accessories

Order Number	Description	Reference
1135208	Heatspreader for C6C-AL (Pentium/Celeron versions only). Single-piece aluminum profile with threaded standoffs (M2.5), screws and thermopad for the thermal contact to SOC.	MSC C6C-AL-04 HSP-001
<b>Memory Options</b>		
79966	2GB SoDimm, DDR3L-1866, 256x8 based, sorting wide Temp	MOD SODIMM DDR3 2GB PC3-14900 CL13 1B
73461	2GB SoDimm, DDR3L-1866, 256Mx8 based	MOD SODIMM DDR3 2GB PC3-14900 CL13 1B
79964	4GB SoDimm, DDR3L-1866, 512Mx8 based, wide Temp.	MOD SODIMM DDR3 4GB PC3-14900 CL13 1B
79967	4GB SoDimm, DDR3L-1866, 512x8 based, sorting wide Temp	MOD SODIMM DDR3 4GB PC3-14900 CL13 1B
72004	4GB SoDimm, DDR3L-1866, 512Mx8 based	MOD SODIMM DDR3 4GB PC3-14900 CL13 1B
79965	8GB SoDimm, DDR3L-1866, 512Mx8 based, wide Temp.	MOD SODIMM DDR3 8GB PC3-14900 CL13 2B
79963	8GB SoDimm, DDR3L-1866, 512Mx8 based	MOD SODIMM DDR3 8GB PC3-14900 CL13 2B
<b>Starter Kits</b>		
70503	COM Express Type 6 Starterkit for all C6C-AL modules; uses the C6-MB-EV platform for Type 6 modules in Mini-ITX format; includes 2x DDR3L memory modules, suitable Heatsinks for C6C-AL modules and 12V Power Supply with power cable. Please order separately the COM Express C6C-AL module of your choice.	MSC C6-SK-AL-EV-KIT001

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