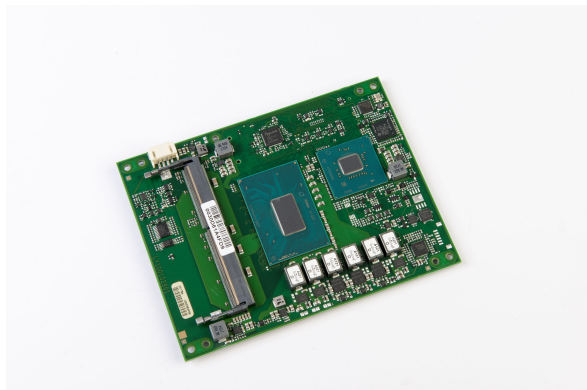


## MSC C6B-CFLR

Intel® Core™ 9th Generation



125 x 95



25 / 55 W



0 +60



IoT Solutions  
Alliance

COM Express

## Description

The MSC C6B-CFLR module is based on the 9th Generation Intel® Core™ Processor family. The Intel two-chip solution allows highest performance in graphics and computing on a COM Express module in basic form factor.

The new MSC C6B-CFLR offers triple independent display support with up to 4k x 2k resolution, highest level graphics acceleration and hardware based video en-/decoding. Fast DDR4 memory with optional error correction (ECC) and multiple USB 3.1/2.0 interfaces complete the compact and powerful module.

With choices of six and quad-core processor options the board is well positioned to address challenging performance demands. Besides an extensive set of interfaces and features, the MSC C6B-CFLR 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 1.4, DisplayPort 1.2, HDMI 1.4 and DVI as well as up to four USB 3.1 interfaces supporting the fastest peripherals currently available.

## Highlights

- Intel® Xeon®
- E-2276ME (6C, 2.8/4.5GHz, 45/35W TDP/cTDP)
- E-2276ML (6C, 2.0/4.2GHz, 25W TDP)
- E-2254ME (4C, 2.6/3.8GHz, 45/35W TDP/cTDP)
- E-2254ML (4C, 1.7/3.5GHz, 25W TDP)
- Intel® Core™
- i7-9850HE (6C, 2.7/4.4GHz, 45/35W TDP/cTDP)
- i7-9850HL (6C, 1.9/4.1GHz, 25W TDP)
- i3-9100HL (4C, 1.6/2.9GHz, 25W TDP)
- Intel® Celeron®
- G4930E (2C, 2.4GHz, 35W TDP)
- G4932E (2C, 1.9GHz, 25W TDP)
- Intel® UHD Graphics
- Intel® chipsets QM370 or CM246
- Up to 32GB DDR4-2666 SDRAM, dual channel, optional ECC
- Four SATA 6Gb/s mass storage interfaces
- Three DisplayPort/HDMI/DVI interfaces
- Embedded DisplayPort / LVDS interface
- Triple independent display support
- DirectX 12, OpenGL 4.5, OpenCL 2.x
- Resolution up to 4096 x 2304
- Eight PCI Express™ x1 lanes, configurable up to x4, Intel® Rapid Storage Technology support
- PEG configurable as 1x16 or 2x8 or 1x8 + 2x4
- Four USB 3.1/2.0 and four USB 2.0 interfaces
- Trusted Platform Module
- UEFI Firmware

## Technical Data - MSC C6B-CFLR

<b>Technology</b>	x86
<b>Formfactor</b>	COM Express Basic
<b>CPU</b>	<p>Intel® Xeon® E-2276ME (six-core, 2.8/4.5GHz, 12MB cache, 45/35W TDP/cTDP),  Intel® Xeon® E-2276ML (six-core, 2.0/4.2GHz, 12MB cache, 25W TDP),  Intel® Xeon® E-2254ME (quad-core, 2.6/3.8GHz, 8MB cache, 45/35W TDP/cTDP),  Intel® Xeon® E-2254ML (quad-core, 1.7/3.5GHz, 8MB cache, 25 TDP),  Intel® Core™ i7-9850HE (six-core, 2.7/4.4GHz, 9MB cache, 45/35W TDP/cTDP),  Intel® Core™ i7-9850HL (six-core, 1.9/4.1GHz, 9MB cache, 25W TDP),  Intel® Core™ i3-9100HL (quad-core, 1.6/2.9GHz, 6MB cache, 25W TDP),  Intel® Celeron® G4930E (dual-core, 2.4GHz, 2MB cache, 35W TDP),  Intel® Celeron® G4932E (dual-core, 1.9GHz, 2MB cache, 25W TDP)</p> <p>Intel® Technologies: Intel® vPro, Intel® 64, Intel® Virtualization Technology (VT-x), Intel® Virtualization Technology for Directed I/O (VT-d), Intel® Trusted Execution Technology*, Intel® Adv. Encryption Standard AES-NI, Intel® Turbo Boost Technology 2.0  * not on all models</p>
<b>Chipset</b>	Intel® Platform Controller Hubs (PCH) QM370 or CM246
<b>RAM</b>	<p>2x 260-pin SO-DIMM socket for up to 2x 16GB DDR4 SDRAM (DDR4-2666<sup>1</sup>); dual channel operation; ECC option<sup>12</sup>  <sup>1</sup> Depending on SO-DIMM type  <sup>2</sup> ECC optionally supported on models except Core i7-9850HE/HL</p>
<b>Storage Interfaces</b>	4x SATA channels (up to 6Gb/s)
<b>USB</b>	4x USB 3.1 (Gen 1 & 2)/2.0, 4x USB 2.0
<b>Serial Interfaces</b>	2x high-speed serial ports from PCH
<b>Bus Interfaces</b>	8x PCI Express x1 Gen 3, 1x PCI Express Graphics (PEG) x 16 Gen. 3 LPC bus (Low Pin Count bus; no DMA support)
<b>Display Controller</b>	<p>Integrated Intel UHD graphics Gen. 9  3D Acceleration: DirectX® 11/12, OpenGL 4.3/4.4, OpenGL ES 2.0, OpenCL 2.x;  HW accelerated Video Decode: H.264/AVC, VP8, VP9, VP9 10 Bit, H.265/HEVC 8 bit, H.265/HEVC 10 Bit, MPEG2, MJPEG, VC-1  HW accelerated Video Encode: H.264/AVC, VP8, VP9, H.265/HEVC 8 bit, H.265/HEVC 10 Bit, MPEG2, MJPEG.</p> <p>Triple independent display support</p>
<b>Display Interfaces</b>	<p>Display Port and HDMI/DVI:  3x Digital Display Interface, usable as DisplayPort 1.2 (up to 4096 x 2304 @ 60Hz), also usable as HDMI 1.4b or DVI (up to 4096 x 2160 @ 30Hz)  1x Embedded DisplayPort 1.4 (on variants without LVDS only); 4096 x 2304 @ 60Hz</p> <p>LCD:  LVDS 24bit, dual-channel (not on all variants); 1920 x 1200 @ 60Hz</p>

<b>Network Interface</b>	10/100/1000Base-TX (integrated in PCH, Intel® i219LM PHY)
<b>Audio Interface</b>	High Definition Audio
<b>Security Device</b>	TPM 2.0
<b>Miscellaneous</b>	<p>Watchdog Timer: Initiates system reset, programmable</p> <p>Fan Supply: 4-pin header for 12V CPU fan, PWM speed controlled and PWM speed control for system fan supported</p> <p>RTC battery: External</p> <p>System Monitoring: Voltage, temperature, CPU fan, system fan</p>
<b>Firmware</b>	<p>UEFI Firmware: AMI Aptio® V</p> <p>Security: TPM 2.0 support, TCG compliant</p> <p>Power Management: ACPI Active fan control</p> <p>USB: USB legacy support (keyboard, mouse, storage)</p> <p>Monitoring: System Monitoring Health Monitoring</p> <p>MSC Adv. Boot Device Selection: Boot device priority setting based on physical interfaces</p>
<b>OS Support</b>	Windows 10 IOT Enterprise BSP for Linux (Yocto) EAPI (HW Programming Interface)
<b>Power Requirement</b>	<p>Voltage: +8.5V to +20V, +5V Stby optional</p> <p>Power Consumption: 35 W to 55 W (typ.)</p>
<b>Environment</b>	<p>Ambient Temperature; 0° ... 60°C (operating), -25° ... 85°C (storage)</p> <p>Humidity: 5 ... 95% (operating, non-condensing), 5 ... 95% (storage, non-condensing)</p>

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<b>Dimensions</b>	125mm x 95mm x 13mm* (*Measured from module PCB bottom side to heat spreader top side. Different heights apply, when using other cooling solutions.)
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<b>Certificates</b>	UL / CE
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## Order Reference - MSC C6B-CFLR

Order Number	Description	Reference	Cat
80306	COM Express Type 6 Basic module (125mm x 95mm); CPU: Intel Xeon E-2276ME, six-core, 2.8/4.5GHz, 45W TDP; Chipset:CM246; Graphics: integrated Intel HD Gen 9 (GT2); LVDS (24 Bit, dual channel); 3x DP/HDMI/DVI; Ethernet: Intel i219 Gbit; HD audio; 4x SATA; 4x USB3.1/2, 4x USB2; 8x PCIe x1 Gen 3; PEG x16 Gen3; 2x socket for DDR4 or DDR4ECC SO-DIMM; TPM 2.0;	MSC C6B-CFLR-2276ME-NN1201C PCBFTX	OR
80308	COM Express Type 6 Basic module (125mm x 95mm); CPU: Intel Xeon E-2276ML, six-core, 2.0/4.2GHz, 25W TDP; Chipset:CM246; Graphics: integrated Intel HD Gen 9 (GT2); LVDS (24 Bit, dual channel); 3x DP/HDMI/DVI; Ethernet: Intel i219 Gbit; HD audio; 4x SATA; 4x USB3.1/2, 4x USB2; 8x PCIe x1 Gen 3; PEG x16 Gen3; 2x socket for DDR4 or DDR4ECC SO-DIMM; TPM 2.0;	MSC C6B-CFLR-2276ML-NN1201C PCBFTX	OR
96506	COM Express Type 6 Basic module (125mm x 95mm); CPU: Intel Xeon E-2276ML, six-core, 2.0/4.2GHz, 25W TDP; Chipset:CM246; Graphics: integrated Intel HD Gen 9 (GT2); Embedded DisplayPort (eDP); 3x DP/HDMI/DVI; Ethernet: Intel i219 Gbit; HD audio; 4x SATA; 4x USB3.1/2, 4x USB2; 8x PCIe x1 Gen 3; PEG x16 Gen3; 2x socket for DDR4 or DDR4ECC SO-DIMM; TPM 2.0;	MSC C6B-CFLR-2276ML-NN1101C PCBFTX	OR
80302	COM Express Type 6 Basic module (125mm x 95mm); CPU: Intel Xeon E-2254ME, four-core, 2.6/3.8GHz, 45W TDP; Chipset:CM246; Graphics: integrated Intel HD Gen 9 (GT2); LVDS (24 Bit, dual channel); 3x DP/HDMI/DVI; Ethernet: Intel i219 Gbit; HD audio; 4x SATA; 4x USB3.1/2, 4x USB2; 8x PCIe x1 Gen 3; PEG x16 Gen3; 2x socket for DDR4 or DDR4ECC SO-DIMM; TPM 2.0;	MSC C6B-CFLR-2254ME-NN1201C PCBFTX	OR
81116	COM Express Type 6 Basic module (125mm x 95mm); CPU: Intel Xeon E-2254ML, four-core, 1.7/3.5GHz, 25W TDP; Chipset:CM246; Graphics: integrated Intel HD Gen 9 (GT2); Embedded DisplayPort (eDP); 3x DP/HDMI/DVI; Ethernet: Intel i219 Gbit; HD audio; 4x SATA; 4x USB3.1/2, 4x USB2; 8x PCIe x1 Gen 3; PEG x16 Gen3; 2x socket for DDR4 or DDR4ECC SO-DIMM; TPM 2.0;	MSC C6B-CFLR-2254ML-NN1101C PCBFTX	PV

## Order Reference - MSC C6B-CFLR

Order Number	Description	Reference	Cat
80304	COM Express Type 6 Basic module (125mm x 95mm); CPU: Intel Xeon E-2254ML, four-core, 1.7/3.5GHz, 25W TDP; Chipset:CM246; Graphics: integrated Intel HD Gen 9 (GT2); LVDS (24 Bit, dual channel); 3x DP/HDMI/DVI; Ethernet: Intel i219 Gbit; HD audio; 4x SATA; 4x USB3.1/2, 4x USB2; 8x PCIe x1 Gen 3; PEG x16 Gen3; 2x socket for DDR4 or DDR4ECC SO-DIMM; TPM 2.0;	MSC C6B-CFLR-2254ML-NN1201C PCBFTX	PV
80312	COM Express Type 6 Basic module (125mm x 95mm); CPU: Intel Core i7-9850HE, six-core, 2.7/4.4GHz, 45W TDP; Chipset:QM370; Graphics: integrated Intel HD Gen 9 (GT2); LVDS (24 Bit, dual channel); 3x DP/HDMI/DVI; Ethernet: Intel i219 Gbit; HD audio; 4x SATA; 4x USB3.1/2, 4x USB2; 8x PCIe x1 Gen 3; PEG x16 Gen3; 2x socket for DDR4 SO-DIMM; TPM 2.0;	MSC C6B-CFLR-9850HE-NN0201C PCBFTX	PV
80314	COM Express Type 6 Basic module (125mm x 95mm); CPU: Intel Core i7-9850HL, six-core, 1.9/4.1GHz, 25W TDP; Chipset:QM370; Graphics: integrated Intel HD Gen 9 (GT2); Embedded DisplayPort (eDP); 3x DP/HDMI/DVI; Ethernet: Intel i219 Gbit; HD audio; 4x SATA; 4x USB3.1/2, 4x USB2; 8x PCIe x1 Gen 3; PEG x16 Gen3; 2x socket for DDR4 SO-DIMM; TPM 2.0;	MSC C6B-CFLR-9850HL-NN0101C PCBFTX	PV
80310	COM Express Type 6 Basic module (125mm x 95mm); CPU: Intel Core i3-9100HL, four-core, 1.6/2.9GHz, 25W TDP; Chipset:QM370; Graphics: integrated Intel HD Gen 9 (GT2); Embedded DisplayPort (eDP); 3x DP/HDMI/DVI; Ethernet: Intel i219 Gbit; HD audio; 4x SATA; 4x USB3.1/2, 4x USB2; 8x PCIe x1 Gen 3; PEG x16 Gen3; 2x socket for DDR4 SO-DIMM; TPM 2.0;	MSC C6B-CFLR-9100HL-NN0101C PCBFTX	PV
80316	COM Express Type 6 Basic module (125mm x 95mm); CPU: Intel Celeron G4930E, two-core, 2.4GHz, 35W TDP; Chipset:QM370; Graphics: integrated Intel HD Gen 9 (GT2); Embedded DisplayPort (eDP); 3x DP/HDMI/DVI; Ethernet: Intel i219 Gbit; HD audio; 4x SATA; 4x USB3.1/2, 4x USB2; 8x PCIe x1 Gen 3; PEG x16 Gen3; 2x socket for DDR4 SO-DIMM; TPM 2.0;	MSC C6B-CFLR-G4930E-NN0101C PCBFTX	PV

## Order Reference - MSC C6B-CFLR

Order Number	Description	Reference	Cat
76023	COM Express Type 6 Basic module (125mm x 95mm); CPU: Intel Celeron G4930E, two-core, 2.4GHz, 35W TDP; Chipset:QM370; Graphics: integrated Intel HD Gen 9 (GT2); LVDS (24 Bit, dual channel); 3x DP/HDMI/DVI; Ethernet: Intel i219 Gbit; HD audio; 4x SATA; 4x USB3.1/2, 4x USB2; 8x PCIe x1 Gen 3; PEG x16 Gen3; 2x socket for DDR4 SO-DIMM; TPM 2.0;	MSC C6B-CFLR-G4930E-NN0201C PCBFTX	OR
80318	COM Express Type 6 Basic module (125mm x 95mm); CPU: Intel Celeron G4932E, two-core, 1.9GHz, 25W TDP; Chipset:QM370; Graphics: integrated Intel HD Gen 9 (GT2); Embedded DisplayPort (eDP); 3x DP/HDMI/DVI; Ethernet: Intel i219 Gbit; HD audio; 4x SATA; 4x USB3.1/2, 4x USB2; 8x PCIe x1 Gen 3; PEG x16 Gen3; 2x socket for DDR4 SO-DIMM; TPM 2.0;	MSC C6B-CFLR-G4932E-NN0101C 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>		
1131080	Active Heatsink for C6B-SLH, C6B-KLH, C6B-CFLH and C6B-CFLR, consisting of a single-piece aluminum profile with fins, pressed in standoffs without thread (2.7mm inner diameter), screws and thermopads for the thermal contact to CPU and chipset. PWM fan 80x80x15mm.	MSC C6B-SLH-01 HSF-001
1131081	Passive Heatsink for C6B-SLH, C6B-KLH, C6B-CFLH and C6B-CFLR, consisting of a single-piece aluminum profile with fins, pressed in standoffs without thread (2.7mm inner diameter), screws and thermopads for the thermal contact to CPU and chipset.	MSC C6B-SLH-01 HSI-001
1131082	Heatspreader for C6B-SLH, C6B-KLH, C6B-CFLH and C6B-CFLR. Single-piece aluminum profile, pressed in standoffs without thread (2.7mm inner diameter), screws and thermopads for the thermal contact to CPU and chipset. No fan, no SO-DIMM cutout.	MSC C6B-SLH-01 HSP-001
1131083	Heatspreader for C6B-SLH, C6B-KLH, C6B-CFLH and C6B-CFLR. Single-piece aluminum profile, pressed in standoffs with M2.5 thread, screws and thermopads for the thermal contact to CPU and chipset. No fan, no SO-DIMM cutout.	MSC C6B-SLH-02 HSP-001
<b>Memory Options</b>		
95549	16GB DDR4-2666 SO-DIMM, ECC	MOD SODIMM DDR4 16GB PC4-21300 CL19 2B
84495	16GB DDR4-2666 SO-DIMM	MOD SODIMM DDR4 16GB PC4-21300 CL19 2B
82970	32GB DDR4 2666 SO-DIMM	MOD SODIMM DDR4 32GB PC4-21300 CL19 2B
83004	4GB DDR4-2666 SO-DIMM, ECC	MOD SODIMM DDR4 4GB PC4-21300 CL19 1B



## Accessories

Order Number	Description	Reference
78199	4GB DDR4 2666 SO-DIMM	MOD SODIMM DDR4 4GB PC4-21300 CL19 1B
80263	8GB DDR4 2666 SO-DIMM	MOD SODIMM DDR4 8GB PC4-21300 CL19 1B
95546	8GB DDR4-2666 SO-DIMM, ECC	MOD SODIMM DDR4 8GB PC4-21300 CL19 1B
<b>Starter Kits</b>		
78252	Starterkit for COM Express Type 6 modules with Intel 8th or 9th generation Core processors (Coffee Lake H, Coffee Lake Refresh). Consists of the MSC C6-MB-EV Mini-ITX platform board, suitable Heatsink with fan, two memory modules and a suitable power supply with cable kit. Please order separately the COM Express C6B-CFLH or C6B-CFLR module of your choice.	MSC C6-SK-CFLH-EV-KIT001

Avnet Embedded GmbH  
Industriestr. 16  
76297 Stutensee

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

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