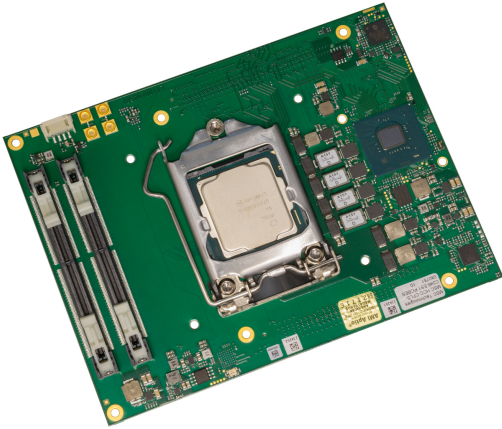





## MSC HCC-CFLS

### Intel® Core™ 9th Generation



 160 x 120

 tbd W

 0 +60



COM+HPC™

## Description

The MSC HCC-CFLS module is the first member of the new COM-HPC product family. It enables a PICMG COM-HPC Client interface and features size C module format. The Client interface offers a wide range of I/O, including multiple graphics interfaces, 1G and BASE-T Ethernet as well as PCIe and USB data paths.

Designed for the 9th Generation Intel® Core™ S-Series Processor family, the module comes with the greatest scalability, from cost efficient Pentium up to most performant Core i7 processor. Depending on selected processor variant up to eight cores can be utilized by most demanding applications. A total of 64GB of main memory provides extended and reliable space for data intensive tasks.

The graphics units on the MSC HCC-CFLS provide highest level graphics acceleration and hardware based video en-/decoding. They connect to three DDI interfaces and one eDP display port allowing for a maximum of three independent displays at up to 4k x 2k resolution.

The 16 lane width PEG port based on PCIe Gen 3 gives system designers the possibility to integrate external graphics and AI accelerators into their application. Further I/O include additional PCIe lanes, USB 3 Gen1 and 2, SATA, 1G and 2.5GBASE-T Ethernet and GPIOs. For lab evaluation, rapid prototyping and application development Avnet Integrated offers the MSC HC-MB-EV, a COM-HPC Client carrier.

## Highlights

- Intel® Core™
- i7-9700E (8C/8T, 2.6/4.4GHz, 65W TDP)
- i7-9700TE (8C/8T, 1.8/3.8GHz, 35W TDP)
- i5-9500E (6C/6T, 3.0/4.2GHz, 65W TDP)
- i5-9500TE (6C/6T, 2.2/3.6GHz, 35W TDP)
- i3-9100E (4C/4T, 3.1/3.7GHz, 65W TDP)
- i3-9100TE (4C/4T, 2.2/3.2GHz, 35W TDP)
- Intel® Pentium®
- G5400T (2C/4T, 3.1GHz, 35/25W TDP/cTDP)
- Intel® UHD Graphics
- Intel® chipsets Q370 or H310
- Up to 64GB DDR4-2666 SDRAM
- Two SATA 6Gb/s mass storage interfaces
- Up to three DisplayPort/HDMI/DVI interfaces
- One Embedded DisplayPort interface
- Up to triple independent display support
- DirectX 12, OpenGL 4.5, OpenCL 2.x
- Resolution up to 4096 x 2304
- 1x 1G and 1x 2.5GBASE-T Ethernet
- Up to sixteen 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 HCC-CFLS

<b>Technology</b>	x86
<b>Formfactor</b>	COM-HPC Client Size C
<b>CPU</b>	<p>Intel® Core™</p> <p>i7-9700E (eight-core/eight threads, 2.6/4.4GHz, 12MB cache, 65W TDP)</p> <p>i7-9700TE (eight-core/eight threads, 1.8/3.8GHz, 12MB cache, 35W TDP)</p> <p>i5-9500E (six-core/six threads, 3.0/4.2GHz, 9MB cache, 65W TDP)</p> <p>i5-9500TE (six-core/six threads, 2.2/3.6GHz, 9MB cache, 35W TDP)</p> <p>i3-9100E (four-core/four threads, 3.1/3.7GHz, 6MB cache, 65W TDP)</p> <p>i3-9100TE (four-core/four threads, 2.2/3.2GHz, 6MB cache, 35W TDP)</p> <p>Intel® Pentium®</p> <p>G5400T (two-core/four threads, 3.1GHz, 4MB cache, 35/25W TDP/cTDP)</p> <p>Intel® Technologies: Intel® vPro, Intel® 64 (1), Intel® Virtualization Technology (VT-x), Intel® Virtualization Technology for Directed I/O (VT-d), Intel® Trusted Execution Technology1, Intel® Adv. Encryption Standard AES-NI, Intel® Turbo Boost Technology 2.0 (1)</p> <p>(1) Not on all models</p>
<b>Chipset</b>	<p>Intel® Platform Controller Hubs (PCH) Q370 or H310 (reduced feature set)</p> <p>Q370:</p> <p>3x DisplayPort, 3 independent displays, PEG port bifurcation, 16x PCIe Gen 3 x1 lanes (configurable up to x4)</p> <p>H310:</p> <p>2x DisplayPort, 2 independent displays, 6x PCIe Gen 2 x1 lanes</p>
<b>RAM</b>	2x 260-pin SO-DIMM socket for up to 2x 32GB DDR4 SDRAM (DDR4-2666); dual channel operation
<b>Storage Interfaces</b>	2x SATA channels (up to 6Gb/s)
<b>USB</b>	<p>4x USB 3.1 (Gen 1 &amp; 2), paired with USB 2.0 on USB[0:3]+/-</p> <p>8x USB 2.0 on USB[0..7]+/-</p>
<b>Serial Interfaces</b>	2x high-speed serial ports from PCH
<b>Bus Interfaces</b>	<p>16x PCI Express x1 Gen 3, configurable up to x4 (Q370 only)</p> <p>6x PCIe Gen 2 x1 lanes (H310 only)</p> <p>1x PCI Express Graphics (PEG) x 16 Gen 3</p>
<b>Display Controller</b>	<p>Integrated Intel® UHD graphics Gen 9</p> <p>3D Acceleration: DirectX® 11/12, OpenGL 4.3/4.4, OpenGL ES 2.0, OpenCL 2.x;</p> <p>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</p> <p>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 (Q370 only)</p>
<b>Display Interfaces</b>	<p>Display Port and HDMI/DVI:</p> <p>Up to 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)</p> <p>1x Embedded DisplayPort 1.4; 4096 x 2304 @ 60Hz</p> <p>Note: three out of for display ports concurrently available (Q370 only)</p>

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<b>Network Interface</b>	1x 10/100/1000BASE-TX (integrated in PCH, Intel® i219LM PHY) 1x 2.5GBASE-T (Intel® i225-LM, optional)
<b>Audio Interface</b>	Total of up to 4x MIPI SoundWire audio interface: Up to 2x DMIC (multiplexed with COM-HPC SNDW0/1)  Note: COM-HPC SNDW2/3 are multiplexed with I2S
<b>Security Device</b>	TPM 2.0
<b>Miscellaneous</b>	Watchdog Timer: Initiates system reset, programmable  Fan Supply: 4-pin header for 12V CPU fan, PWM speed controlled and PWM speed control for system fan supported  RTC battery: External  System Monitoring: Voltage, temperature, CPU fan, system fan
<b>Firmware</b>	UEFI Firmware: AMI Aptio® V  Security: TPM 2.0 support, TCG compliant  Power Management: ACPI Active fan control  USB: USB legacy support (keyboard, mouse, storage)  Monitoring: System Monitoring Health Monitoring  MSC Adv. Boot Device Selection: Boot device priority setting based on physical interfaces
<b>OS Support</b>	Windows 10 IOT Enterprise BSP for Linux (Yocto) EAPI (HW Programming Interface)
<b>Power Requirement</b>	Voltage: +8.0V to +16V, Stby optional  Power Consumption: tbd

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**Environment**

Ambient Temperature;  
0° ... 60°C (operating),  
-25° ... 85°C (storage)

Humidity:  
5 ... 95% (operating, non-condensing),  
5 ... 95% (storage, non-condensing)

**Dimensions**

160mm x 120mm (Height depending on cooling solution)

**Certificates**

UL / CE

## Order Reference - MSC HCC-CFLS

Order Number	Description	Reference	Cat
tbd	COM-HPC Client C module (160mm x 120mm); CPU Intel Core i7-9700E, eight-core, 2.6/4.4GHz, 65W TDP; Chipset:Q370; Graphics: integrated Intel HD Gen 9 (GT2); Embedded DisplayPort (eDP); 3x DP/HDMI/DVI; Ethernet: 1x 1Gbit, 1x 2.5Gbit; Audio; 2x SATA; 4x USB3.1 Gen 2, 4x USB2; PCIe Gen 3 4x4 + 3x1; PEG x16 Gen3 w/ bifurc.; 2x socket for DDR4 SO-DIMM; TPM 2.0;	MSC HCC-CFLS-9700E-NN131C PCBFTX	OR
tbd	COM-HPC Client C module (160mm x 120mm); CPU Intel Core i5-9500E, six-core, 3.0/4.2GHz, 65W TDP; Chipset:Q370; Graphics: integrated Intel HD Gen 9 (GT2); Embedded DisplayPort (eDP); 3x DP/HDMI/DVI; Ethernet: 1x 1Gbit, 1x 2.5Gbit; Audio; 2x SATA; 4x USB3.1 Gen 2, 4x USB2; PCIe Gen 3 4x4 + 3x1; PEG x16 Gen3 w/ bifurc.; 2x socket for DDR4 SO-DIMM; TPM 2.0;	MSC HCC-CFLS-9500E-NN131C PCBFTX	OR
tbd	COM-HPC Client C module (160mm x 120mm); CPU Intel Core i3-9100E, four-core, 3.1/3.7GHz, 65W TDP; Chipset:Q370; Graphics: integrated Intel HD Gen 9 (GT2); Embedded DisplayPort (eDP); 3x DP/HDMI/DVI; Ethernet: 1x 1Gbit, 1x 2.5Gbit; Audio; 2x SATA; 4x USB3.1 Gen 2, 4x USB2; PCIe Gen 3 4x4 + 3x1; PEG x16 Gen3 w/ bifurc.; 2x socket for DDR4 SO-DIMM; TPM 2.0;	MSC HCC-CFLS-9100E-NN131C PCBFTX	OR

## Accessories

Order Number	Description	Reference
<b>Carrier Options</b>		
tbd	COM-HPC Client Carrier Board with 1x PEG x16, 1x PCIe x16, 3x PCIe x4 slots; USB 3.1 Gen 1/2, 2x 1G/2.5G/10GBASE-T, 2x SATA; 2x DisplayPort, 1x eDP, HD audio; 2x M.2 socket; ATX power connector and single 12V power jack; Dimensions: 244mm x 244mm (microATX form factor);	MSC HC-MB-EV
<b>Cooling Options</b>		
82758	Active heatsink with integrated heat pipe for HCC-CFLS, PWM fan, 95x95x65mm.	MEC Heatsink LGA 95x95x65

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