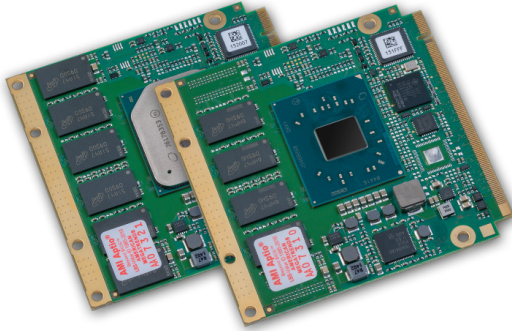



MSC Q7-AL

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



 70 x 70 mm

 7 / 12 W

 -40 +85



IoT Solutions
Alliance



Description

The new MSC Q7-AL module features Intel's next-generation low-power System-on-Chip (SOC) for the Internet of Things. The Intel Atom Processor E3900 series integrates processor core, graphics, memory, and I/O interfaces into one solution. Based on 14nm processor technology this multi-core processor provides outstanding computing and graphics performance and is more power efficient compared to its predecessors.

The new MSC Q7-AL offers triple independent display support, DirectX 12, fast DDR3L-1866 memory and USB 3.0 on a compact, power saving and cost-efficient Qseven Rev. 2.1 module.

Different SOC's with dual- and quad-core processors are supported by this design. In addition to an extensive set of interfaces and features, the MSC Q7-AL optionally offers hardware based security compliant to the requirements of TCG (Trusted Computing Group).

For evaluation and design-in of the MSC Q7-AL module, MSC provides suitable Qseven Rev. 2.1 platform board. A complete, ready-to-run Starterkit is also available.

Highlights

- Intel Atom x7-E3950 quad-core 1.6/2.0GHz, 12W
- Intel Atom x5-E3940 quad-core 1.6/1.8GHz, 9.5W
- Intel Atom x5-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, ECC support (optional)
- Up to 64GB eMMC Flash (optional)
- Two SATA-III interfaces (6Gbps)
- DisplayPort++ interface
- LVDS/Embedded DisplayPort interface
- Triple Independent Display support
- DirectX 12, OpenGL 4.3, OpenCL 2.0
- Up to 4x PCI Express x1 Gen. 2
- Up to 3x USB 3.0 Host interfaces
- Up to 8x USB 2.0 Host interfaces
- 1x USB Host/Device support
- Gigabit Ethernet
- UART, LPC, SPI, I2C, SMBus
- HD Audio, SD Card interface
- Trusted Platform Module (optional)
- Qseven Rev. 2.1 compliant
- UEFI Firmware

Technical Data - MSC Q7-AL

Technology	x86
Formfactor	Qseven
CPU	<p>Intel Atom x7-E3950 Processor, quad-core, 1.6/2.0GHz, 18 EU GFX, 12W Intel Atom x5-E3940 Processor, quad-core, 1.6/1.8GHz, 12 EU GFX, 9.5W Intel Atom x5-E3930 Processor, dual-core, 1.3/1.8GHz, 12 EU GFX, 6.5W Intel Pentium Processor N4200, quad-core, 1.1/2.5GHz, 18 EU GFX, 6W Intel Celeron Processor N3350, dual-core, 1.1/2.4GHz, 12 EU GFX, 6W</p> <p>Intel® Technologies: Enhanced Intel® SpeedStep® Technology Intel® Virtualization Technology (VT-x) Intel® Virtualization Technology for Directed I/O (VT-d) Intel® Trusted Execution Engine (TXE) 3.0 Precision Time Management</p>
Chipset	Integrated in SOC
RAM	Up to 8GB 1866 MT/s DDR3L SDRAM, dual-channel, soldered, ECC support (optional)
Flash	Up to 64GB eMMC V5.0 Flash, soldered (optional)
Storage Interfaces	2x SATA-III 6Gbps 1x SD 3.01
USB	3x USB 3.0, 3x USB 2.0, 1x USB 3.0/2.0 Host/Device* or 2x USB 3.0, 5x USB 2.0, 1x USB 2.0 Host/Device* or 1x USB 3.0, 7x USB 2.0, 1x USB 2.0 Host/Device*
	*One USB 3.0 port according to Qseven Rev. 2.1 (only SS signals)
Serial Interfaces	1x UART (no handshake)
Bus Interfaces	Up to 4x PCI-Express x1 Gen. 2 lanes 1x LPC Bus 1x I2C Bus 1x SPI Bus 1x SMBus
Display Controller	Integrated Intel HD Graphics Gen. 9 Up to 18 execution units (EU) 3D Acceleration: DirectX 12.0, OpenGL 4.3, OpenCL 2.0 Full Profile Video Decode: MPEG2, H.264 (L5.2), VC-1, WMV9, VP8, JPEG/MJPEG, H.265 (HEVC), VP9, MVC
Display Interfaces	Three independent displays supported
	1x DisplayPort++ (DisplayPort 1.2a up to 4096 x 2160 @ 60Hz, HDMI 1.4b up to 3840 x 2160 @ 30Hz)
	Dual-Channel LVDS 24/18 bit up to 2560 x 1600 @ 60Hz or 2x Embedded DisplayPort 1.3 up to 4096 x 2160 @ 60Hz (optional)

Network Interface	10/100/1000Base-T (Intel i210)
Audio Interface	High Definition Audio
Security Device	Infineon Trusted Platform Module 2.0 (optional)
Miscellaneous	Watchdog Timer: Initiates system reset, (programmable, 1s ... 255h) Fan Supply: PWM Speed Control for system fan on carrier board RTC battery: external System Monitoring: Voltage, Temperature, CPU Fan, System Fan
Feature Highlights	Qseven Rev.2.1 compliant
Firmware	AMI Aptio UEFI
OS Support	Windows 10 (embedded) BSP for Linux on request EAPI (HW Programming Interface)
Power Requirement	+5V +/-5% +5V Standby
Environment	Temperature Range: Commercial: 0° ... 60°C (operating) -20° ... 85°C (storage) Industrial: -40° ... 85°C (operating) -40° ... 85°C (storage) Humidity: 5 ... 95% (operating, non-condensing) 5 ... 95% (storage, non-condensing)
Dimensions	70 x 70 mm
Certificates	UL / CE
Cooling	Heatspreader Heatsink
Carrier	MSC Q7-MB-EP5 MSC Q7-MB-EP6

Order Reference - MSC Q7-AL

Order Number	Description	Reference	Cat
69797	Qseven Rev.2.1 module with Intel Atom E3950 processor (1.6/2.0GHz), Quad-Core, 12W, 8GB 1866MT/s DDR3L, 32GB eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics, industrial temperature -40...+85°C	MSC Q7-AL-E3950-35N0211I PCBFTX	PV
78440	Qseven Rev.2.1 module with Intel Atom E3950 processor (1.6/2.0GHz), Quad-Core, 12W, 4GB 1866MT/s DDR3L, 16GB eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics, industrial temperature -40...+85°C	MSC Q7-AL-E3950-24N0211I PCBFTX	PV
78442	Qseven Rev.2.1 module with Intel Atom E3950 processor (1.6/2.0GHz), Quad-Core, 12W, 8GB 1866MT/s DDR3L, no eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics, industrial temperature -40...+85°C	MSC Q7-AL-E3950-3NN0211I PCBFTX	PV
87746	Qseven Rev.2.1 module with Intel Atom E3950 processor (1.6/2.0GHz), Quad-Core, 12W, 8GB 1866MT/s DDR3L, no eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, eDP Graphics, industrial temperature -40...+85°C	MSC Q7-AL-E3950-3NN0111I PCBFTX	PV
69795	Qseven Rev.2.1 module with Intel Atom E3950 processor (1.6/2.0GHz), Quad-Core, 12W, 8GB 1866MT/s DDR3L, 32GB eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics	MSC Q7-AL-E3950-35N0211C PCBFTX	PV
69801	Qseven Rev.2.1 module with Intel Atom E3940 processor (1.6/1.8GHz), Quad-Core, 9.5W, 4GB 1866MT/s DDR3L, 16GB eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics, industrial temperature -40...+85°C	MSC Q7-AL-E3940-24N0211I PCBFTX	PV
78438	Qseven Rev.2.1 module with Intel Atom E3940 processor (1.6/1.8GHz), Quad-Core, 9.5W, 4GB 1866MT/s DDR3L, no eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics, industrial temperature -40...+85°C	MSC Q7-AL-E3940-2NN0211I PCBFTX	PV
69799	Qseven Rev.2.1 module with Intel Atom E3940 processor (1.6/1.8GHz), Quad-Core, 9.5W, 4GB 1866MT/s DDR3L, 16GB eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics	MSC Q7-AL-E3940-24N0211C PCBFTX	PV
69793	Qseven Rev.2.1 module with Intel Atom E3930 processor (1.3/1.8GHz), Dual-Core, 6.5W, 2GB 1866MT/s DDR3L, 16GB eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics, industrial temperature -40...+85°C	MSC Q7-AL-E3930-14N0211I PCBFTX	PV
78435	Qseven Rev.2.1 module with Intel Atom E3930 processor (1.3/1.8GHz), Dual-Core, 6.5W, 2GB 1866MT/s DDR3L, no eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics, industrial temperature -40...+85°C	MSC Q7-AL-E3930-1NN0211I PCBFTX	PV

Order Reference - MSC Q7-AL

Order Number	Description	Reference	Cat
69791	Qseven Rev.2.1 module with Intel Atom E3930 processor (1.3/1.8GHz), Dual-Core, 6.5W, 2GB 1866MT/s DDR3L, 16GB eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics	MSC Q7-AL-E3930-14N0211C PCBFTX	PV
78172	Qseven Rev.2.1 module with Intel Atom E3930 processor (1.3/1.8GHz), Dual-Core, 6.5W, 4GB 1866MT/s DDR3L, 32GB eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics, industrial temperature -40...+85°C	MSC Q7-AL-E3930-25N0211I PCBFTX	PV
78883	Qseven Rev.2.1 module with Intel Atom E3950 processor (1.6/2.0GHz), Quad-Core, 12W, 4GB 1866MT/s DDR3L, ECC, no eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics, industrial temperature -40...+85°C	MSC Q7-AL-E3950-2NN1211I PCBFTX	OR
78885	Qseven Rev.2.1 module with Intel Atom E3950 processor (1.6/2.0GHz), Quad-Core, 12W, 8GB 1866MT/s DDR3L, ECC, no eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics, industrial temperature -40...+85°C	MSC Q7-AL-E3950-3NN1211I PCBFTX	OR
78881	Qseven Rev.2.1 module with Intel Atom E3940 processor (1.6/1.8GHz), Quad-Core, 9.5W, 4GB 1866MT/s DDR3L ECC, no eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics, industrial temperature -40...+85°C	MSC Q7-AL-E3940-2NN1211I PCBFTX	OR
69777	Qseven Rev.2.1 module with Intel Pentium N4200 processor (1.1/2.5GHz), Quad-Core, 6W, 8GB 1866MT/s DDR3L, 32GB eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics	MSC Q7-AL-N4200-35N0211C PCBFTX	OR
69779	Qseven Rev.2.1 module with Intel Celeron N3350 processor (1.1/2.4GHz), Dual-Core, 6W, 4GB 1866MT/s DDR3L, 16GB eMMC, GbE LAN, 2x USB 3.0 Host, 5x USB 2.0 Host, 1x USB2.0 Host/Device, TPM, DP, LVDS Graphics	MSC Q7-AL-N3350-24N0211C PCBFTX	OR

Accessories

Order Number	Description	Reference
Carrier Options		
67690	Qseven Rev. 2.0 compatible embedded platform (148 x 102mm), 10-28V input voltage, 1x RS232 on DB9 connector, 1x RS485 on pin header, 1x RS232 no handshake on pin header, dual RJ45 LAN connector with LED, 1x SATA, 1x mSATA slot, SD card holder, 1x USB 3.0 connector, 2x USB 2.0 connector, 1x USB 2.0 on pin row, 1x microUSB 2.0 OTG, CAN, I2C, LPC/GPIO on pin header, I2C/SMBus, SPI, DisplayPort connector, LVDS/eDP on JILI30 connector, regulated backlight supply, mini PCI Express slot, HD Audio, CMOS battery. Commercial temperature range 0..+70°C	MSC Q7-MB-EP6-601 PCBFTX
Cooling Options		
1136438	Passive Heatsink for Q7-AL (only variants with Atom processor) with through-hole distance bolts, consisting of a single-piece aluminium profile with fins and thermo pad for the thermal contact to the CPU, M3 mounting holes for an optional fan	MSC Q7-AL-01 HSI-001
1136437	Heatspreader for Q7-AL (only variants with Atom processor) with through-hole distance bolts, only offers a 70x65mm aluminium plane to mount a heatsink or thermally connect to a cooler	MSC Q7-AL-01 HSP-001
1114190	Passive Heatsink for Q7-BT, consisting of a single-piece aluminum profile with fins, through-hole distance bolts and through-holes in the heatrail part, with thermo pad for the thermal contact to the CPU. M3 mounting holes for an optional fan. Heatsink is also suitable for Q7-BW (all modules) and Q7-AL (only modules with Celeron/Pentium processor)	MSC Q7-BT-01 HSI-001
1114178	Heatspreader for Q7-BT with through-hole distance bolts, only offers a 70x65mm aluminium plane to mount a heatsink or thermally connect to a cooler. Heatspreader is also suitable for Q7-BW (all modules) and Q7-AL (only modules with Celeron/Pentium processor)	MSC Q7-BT-01 HSP-001
1137658	Passive Heatsink for Q7-BT, consisting of a single-piece aluminum profile with fins, threaded distance bolts and threaded holes in the heatrail part, and thermo pad for the thermal contact to the CPU. M3 mounting holes for an optional fan. Heatsink is also suitable for Q7-BW (all modules) and Q7-AL (only modules with Celeron/Pentium processor)	MSC Q7-BT-02 HSI-001
1129447	Heatspreader for Q7-BT with through-hole distance bolts and threaded holes in the heatrail part, offers a 70x65mm aluminium plane to mount a heatsink or thermally connect to a cooler. Heatspreader is also suitable for Q7-BW (all modules) and Q7-AL (only modules with Celeron/Pentium processor)	MSC Q7-BT-02 HSP-001
1137181	Heatspreader for Q7-BT with threaded distance bolts and through-holes in the heatrail part, offers a 70x65mm aluminium plane to mount a heatsink or thermally connect to a cooler. Heatspreader is also suitable for Q7-BW (all modules) and Q7-AL (only modules with Celeron/Pentium processor)	MSC Q7-BT-04 HSP-001

Accessories

Order Number	Description	Reference
82584	Heatspreader for Q7-BT/BW with through-hole distance bolts and 4 through-holes in the heatrail part, all holes for countersunk screws, offers a 70x65mm aluminium plane to mount a heatsink or thermally connect to a cooler. Heatspreader is also suitable for Q7-AL (only modules with Celeron/Pentium processor).	MSC Q7-BT-07 HSP-001
1053769	Heat rail for Q7 baseboards. Recommended for conductive heat transfer from the Q7 module to the Q7 baseboard. Already assembled on all MSC baseboards.	MSC Q7-XXX-01 HTR-001
Starter Kits		
70252	Qseven Starterkit for Qseven modules with Intel Atom E39xx (Apollo Lake) processor. Consists of a Qseven baseboard MSC Q7-MB-EP6-601, Heatsinks, 12V power supply and cable kit. Does not contain Qseven module Q7-AL-xyz, please order separately!	MSC Q7-SK-AL-EP6-KIT001 BRDFTX

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