MSC Technologies at a Glance

The Embedded Boards Solutions unit within MSC Technologies is specializing in the design and production of highly integrated standard board-level products as well as customer-specific board solutions. The standard embedded COM products (Computer-On-Module) are available in a variety of variants and versions, but also can be easily customized to satisfy the requirements of volume OEM customers.

To complement our range of COM products, MSC is offering single-board computers (SBC) from some of the world’s leading computer board manufacturers. Before becoming part of our board-level offering, these boards had to pass a meticulous selection process for their design and production quality, high level of support and long-term availability.

Synergy at Work
MSC is entering our customers’ development cycles where they want us to. We can provide just a COM module so that the target system can start with a proven, functional computing building block, or we can custom-design a complete subsystem based on the customer’s requirements.

Vertical Market Solutions
MSC’s components and board-level products and custom developments are used in Industrial and Building Automation, Medical, POS/POI and Signage, Transportation/Logistics, Energy, Automotive and Mobile Devices as well as in Gaming applications.

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MSC Technologies – The Solution Company

In the Embedded Boards Unit of MSC Technologies, we can provide a wide choice of solutions for the electronic needs of our customers. We will help our customers to find the solution to their requirements quickly, help them to bring it to their market first, and provide world-class support during and after the development phase. MSC has been in the electronic development industry for many decades, and has several design groups of experienced engineers doing hardware and software (BIOS, Firmware, Drivers) design. We are working at the forefront of technology and have a stack of proven modular building blocks for any new design at hand which will reduce development time and risk.

COM – Computer-On-Module

Our COM products are based on open standards and modular designs, and effectively simplify any system design and integration. COM products enable the system designer to focus on the end products. As a founding Member of the SGeT.org consortium, MSC is actively driving new standards enabling further advances in COM technologies. MSC is committed to open specifications such as Qseven™ and is an executive member of the PIC Industrial Computer Manufacturer Group (PICMG), an organization promoting open industry standards like COM Express™. COM products are designed for reliability, 24/7 operation, quality, longevity and for industrial OEM applications.

SBC – Industrial Single-Board-Computer

Clearly COM is the more flexible and elegant approach, but there are many applications where the solution has to be a single board, and therefore MSC provides a wide selection of high-quality embedded SBCs in the most popular formats, as well as the accessories to put them at work most efficiently. From ATX format to Pico-ITX, we can provide a suitable solution offering the right computing performance, power consumption and cost to suit the applications’ requirements.

Solution Concepts

Industry 4.0

A Subset of the Internet of Things
As the world becomes networked and things become intelligent, the production processes in the industrial environment will gain vastly from the growth of information sharing and active control cut-through. The Intelligent Factory, as depicted in the above drawing, is merely a part of the intelligent world and seamlessly blends into the networked world of the Internet of Things.

Scalability

Only Computer-On-Module solutions come with built-in scalability of performance, power and cost. COM boards will be plugged on a carrier board which adapts the I/O of the COM to the local environment. This board can remain the same even if the computer module gets swapped to a similar one with more/less computing performance and likewise more/less power consumption and related cost. In most cases, even the software of the system can remain the same giving the system designer the option to upgrade/downgrade the system in order to achieve different price/performance points.

Local Intelligence

The Internet of Things would be impossible without intelligent “things”, and that means computing devices inside the network nodes which are sensors, actors, information collectors or decision makers in control of larger machines. Depending on the task to perform, a large and powerful computer will be required or a small system consuming little power and generating little heat.

With our COM products used for either alternative, a wide choice of computing power classes exists which can reach up to high-performance multi-core engines and down to very small, power-nibbling microcomputer boards. Similarly, Single-Board Computers are available giving a wide choice of power and performance.
<table>
<thead>
<tr>
<th>Product</th>
<th>CPU</th>
<th>RAM</th>
<th>SATA</th>
<th>Expansion</th>
<th>OS Support</th>
<th>Module Size (mm)</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM-Express™ Family</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C6B-8S</td>
<td>1.5 – 3.4 GHz</td>
<td>16 GB DDR3L SO-DIMM</td>
<td>PCIe® Express™</td>
<td>TPM 1.2, 4K-resolution supported, ISF ready</td>
<td>Windows® 7, 8, Linux</td>
<td>95 x 125</td>
<td>35/55</td>
</tr>
<tr>
<td>C6B-7S</td>
<td>1.0 – 2.7 GHz</td>
<td>16 GB DDR3 SO-DIMM</td>
<td>PCIe® Express™</td>
<td>TPM 1.2</td>
<td>Windows® 7, 8, XP, Linux</td>
<td>95 x 125</td>
<td>25/65</td>
</tr>
<tr>
<td>C6B-6S</td>
<td>1.6 – 2.7 GHz</td>
<td>16 GB DDR3 SO-DIMM</td>
<td>PCIe® Express™</td>
<td>TPM 1.2</td>
<td>Windows® 7, 8, XP, Linux</td>
<td>95 x 125</td>
<td>35/65</td>
</tr>
<tr>
<td>C6C-BT</td>
<td>1.33 - 2.42 GHz</td>
<td>8 GB DDR3L SO-DIMM</td>
<td>PCIe® Express™</td>
<td>TPM 1.2 MicroSD socket</td>
<td>Windows® 7, 8, Linux</td>
<td>95 x 95</td>
<td>8/14</td>
</tr>
<tr>
<td>C6C-GX</td>
<td>1.33 - 2.42 GHz</td>
<td>8 GB DDR3L SO-DIMM</td>
<td>PCIe® Express™</td>
<td>TPM 1.2, MicroSD socket</td>
<td>Windows® 7, 8, XP, Linux</td>
<td>95 x 95</td>
<td>25/35</td>
</tr>
<tr>
<td>C6C-A7</td>
<td>1.33 - 2.42 GHz</td>
<td>8 GB DDR3L SO-DIMM</td>
<td>PCIe® Express™</td>
<td>TPM 1.2</td>
<td>Windows® 7, 8, XP, Linux</td>
<td>95 x 95</td>
<td>8/15</td>
</tr>
<tr>
<td>CXC-PV525</td>
<td>1.66 GHz</td>
<td>2GB DDR3 soldered</td>
<td>PCI Express™, PCI</td>
<td>SATA Flash</td>
<td>Windows® 7, XP, Windows® EC7, Linux</td>
<td>70 x 70</td>
<td>7</td>
</tr>
<tr>
<td>CXC-BT</td>
<td>1.33 - 2.42 GHz</td>
<td>8 GB DDR3L soldered</td>
<td>PCIe® Express™</td>
<td>eMMC</td>
<td>Windows® 7, 8, Linux</td>
<td>55 x 84</td>
<td>8/14</td>
</tr>
<tr>
<td>Qseven™ Family</td>
<td></td>
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</tr>
<tr>
<td>Q7-BT</td>
<td>1.91GHz, 1.75GHz, 1.46GHz, 1.33GHz, 1.46GHz</td>
<td>8 GB DDR3L soldered</td>
<td>PCIe® Express™</td>
<td>TPM 1.2, SATA Flash</td>
<td>Windows® 7, 8, Linux, Windows® EC7</td>
<td>70 x 70</td>
<td>6/12</td>
</tr>
<tr>
<td>Q7-IKE6</td>
<td>1.2GHz</td>
<td>4 GB DDR1 soldered</td>
<td>PCIe® Express™</td>
<td>TPM 1.2, SATA Flash</td>
<td>Linux, Windows® EC7</td>
<td>70 x 70</td>
<td>4/7</td>
</tr>
<tr>
<td>Q7-TH168</td>
<td>1 GHz</td>
<td>1GB DDR1 soldered</td>
<td>PCI Express™</td>
<td>DSS C67x compliant SATA Flash, Flash, Ext. Temp.</td>
<td>Linux, Android</td>
<td>70 x 70</td>
<td>9</td>
</tr>
<tr>
<td>Q7-ASOM</td>
<td>0.8 / 1.2GHz</td>
<td>4 GB DDR1 soldered</td>
<td>PCIe® Express™</td>
<td>TPM 1.2, SATA Flash</td>
<td>Windows® 7, 8, XP, Linux</td>
<td>70 x 70</td>
<td>8/9</td>
</tr>
<tr>
<td>Q7-TC6-PD</td>
<td>0.6 – 1.6 GHz</td>
<td>2 GB DDR2 soldered</td>
<td>PCIe® Express™</td>
<td>TPM 1.2, CAN, SATA Flash, Ext. Temp.</td>
<td>Windows® 7, XP, Linux</td>
<td>70 x 70</td>
<td>7</td>
</tr>
<tr>
<td>ETX™/ET(e) Family</td>
<td></td>
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<tr>
<td>ETE-PVS10</td>
<td>1.66 GHz</td>
<td>2GB DDR2 soldered</td>
<td>PCI, ISA</td>
<td>SATA, INTA</td>
<td>Windows® 7, XP, Windows® EC7, Linux</td>
<td>95 x 114</td>
<td>8/15</td>
</tr>
<tr>
<td>ETE-GLX3</td>
<td>0.9 W, 500 MHz</td>
<td>1GB DDR1 soldered</td>
<td>PCI, ISA (optional)</td>
<td>SATAX, INTA CF socket</td>
<td>Windows® 7, XP, Windows® EC7, Linux</td>
<td>95 x 114</td>
<td>5.5</td>
</tr>
<tr>
<td>nanoRISC® Family</td>
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</tr>
<tr>
<td>nanoRISC-IMX6</td>
<td>0.8 / 1.2GHz</td>
<td>4 GB DDR1 soldered</td>
<td>Processor Bus</td>
<td>eMMC, MicroSD socket, NAND Flash, Ext. Temp</td>
<td>Linux, Windows® EC7</td>
<td>50 x 70</td>
<td>4/7</td>
</tr>
<tr>
<td>nanoRISC-AM335x</td>
<td>0.8 / 1.2GHz</td>
<td>4 GB DDR1 soldered</td>
<td>Processor Bus</td>
<td>NAND Flash, CAN, SPI Socket, Ext. Temp</td>
<td>Linux</td>
<td>50 x 70</td>
<td>2.5</td>
</tr>
</tbody>
</table>
COM Express™

COM Express™ was defined by the PICMG® (PCI Industrial Computer Manufacturers Group) as an open specification without hidden hooks. Hence, this standard is supported by a large number of suppliers offering interchangeability of their COM Express™ products. The latest revisions introduced various changes in the COM Express standard. New module formats have been adopted and the support for USB 3.0, PCI Express™ Gen 2 and additional digital display interfaces has been included. Most of these changes require new pin-outs, like Type 6 and Type 10.

MSC has introduced products based on these new pin-outs while still offering new technologies on Type 2 products as well.

MSC C6B-8S
Intel® Core™ - 4th Generation
Type 6

Based on Intel’s 4th generation Core™ processors this Type 6 COM Express module supports the latest digital display interfaces like DisplayPort, HDMI and DVI and controls up to three independent displays. USB 3.0 interfaces connect to the fastest peripheral devices available.

- Intel® Core™ i7-4700EQ (quad-core, 2.4/3.4GHz)
- Intel® Core™ i5-4400E (dual-core, 2.7/3.3GHz)
- Intel® Core™ i5-4402E (dual-core, 1.6/2.7GHz)
- Intel® Core™ i3-4100E (dual-core, 2.4GHz)
- Intel® Core™ i3-4102E (dual-core, 1.6GHz)
- Intel® Celeron® 2000E (dual-core, 2.2GHz)
- Intel® Celeron® 2002E (dual-core, 1.5GHz)
- Intel® HD Graphics GT1/GT2
- Intel® B-Series chipset
- Up to 16GB DDR3L-1600 SDRAM, dual-channel

Highlights
- Four SATA mass storage interfaces, up to 6Gb/s
- Three DisplayPort/HDMI/DVI interfaces
- Two Embedded DisplayPort interfaces
- LVDS (24 Bit, dual channel) and CRT interface
- Triple independent display support
- DirectX 11.1, OpenGL 3.2, OpenCL 1.2
- Resolution up to 3800 x 2400
- Seven PCI Express™ x1 lanes
- Four USB 3.0 and four USB 2.0 interfaces
- Trusted Platform Module

MSC CXB-8S
Intel® Core™ - 4th Generation
Type 2

Also based on Intel’s 4th generation Core™ processors this COM Express module with Type 2 pin-out has been designed as an upgrade product for existing system designs still using legacy interfaces like PCI bus and PATA.

- Up to four SATA 6Gb/s mass storage interfaces
- One PATA/IDE mass storage interface
- LVDS (24 Bit, dual-channel) and CRT interface
- Triple independent display support (option)
- DirectX 11.1, OpenGL 3.2, OpenCL 1.2
- Resolution up to 3800 x 2400
- PCI Bus, six PCI Express x1 lanes
- Eight USB 2.0 interfaces
- Trusted Platform Module
Based on Intel’s 3rd generation Core™ processors this Type 6 COM Express module supports the latest digital display interfaces, up to three independent displays and USB 3.0. Ultra-low power variants with only 17W CPU power dissipation allow passively cooled system designs.

**COM Express™**

**MSC C6B-7S**

Intel® Core™ - 3rd Generation

Type 6

95 x 125

25 / 65 W

**Highlights**

- Intel® Core™ i7-3612QE (quad-core, 2.1GHz)
- Intel® Core™ i7-3615QE (quad-core, 2.3GHz)
- Intel® Core™ i5-3650M (quad-core, 2.5GHz)
- Intel® Core™ i3-3210ME (dual-core, 2.4GHz)
- Intel® Celeron® 1037UE (dual-core, 1.6GHz)
- Intel® Celeron® 1007UE (dual-core, 1.4GHz)
- Intel® Celeron® 927UE (single-core, 1.5GHz)
- Up to 16GB DDR3-1600 SDRAM, dual channel
- Three DisplayPort/HDMI/DVI interfaces
- Two Embedded DisplayPort interfaces
- LVDS (24 Bit, dual channel) and CRT interface
- Triple independent display support
- DirectX 11, OpenGL 3.1, OpenCL 1.1
- Resolution up to 2560 x 1600
- Seven PCI Express x1 lanes, four SATA-300
- Four USB 3.0 and four USB 2.0 interfaces
- Trusted Platform Module

Based on Intel’s multi-core system-on-chip (SOC) Atom generation this COM Express Type 6 module brings display interfaces like DisplayPort, HDMI 1.4a and DVI, supports dual independent displays, USB 3.0 and fast DDR3L memory on a compact, power saving and cost-efficient module.

**COM Express™**

**MSC C6C-BT**

Intel® Atom™ / Celeron® SOC

Type 6

95 x 125

25 / 65 W

**Highlights**

- Intel Atom E3845 quad-core 1.91GHz, 10W TDP
- Intel Atom E3827 dual-core 1.75GHz, 8W TDP
- Intel Atom E3826 dual-core 1.46GHz, 7W TDP
- Intel Atom E3825 dual-core 1.33GHz, 6W TDP
- Intel Atom E3815 single-core 1.46GHz, 5W TDP
- Intel Celeron N2920 quad-core 1.86/2.00GHz, 7.5W TDP
- Intel Celeron J1900 quad-core 2.00/2.42GHz, 10W TDP
- Integrated Intel Gen. 7 HD graphics
- Up to 8GB DDR3L SDRAM, dual-channel
- Two SATA 3Gb/s mass storage interfaces
- MicroSD card socket
- DisplayPort/HDMI/DVI interface
- LVDS/Embedded DisplayPort interface
- VGA interface
- Two independent displays supported
- DirectX 11.1, OpenGL 3.2, OpenCL 1.1
- One USB 3.0 and up to seven USB 2.0 interfaces
- Trusted Platform Module (option)

This COM Express module family with Type 2 pin-out is based on Intel’s 3rd generation Core™ processors and has been designed as an upgrade product for existing system designs still using legacy interfaces like PCI bus and PATA. Ultra-low power variants with only 17W CPU power dissipation allow passively cooled system designs.

**COM Express™**

**MSC CXB-6SI**

Intel® Core™ - 3rd Generation

Type 2

95 x 125

25 / 65 W

**Highlights**

- Intel® Core™ i7-3612QE (quad-core, 2.1GHz)
- Intel® Core™ i7-3615QE (quad-core, 2.3GHz)
- Intel® Core™ i5-3650M (quad-core, 2.5GHz)
- Intel® Core™ i3-3210ME (dual-core, 2.4GHz)
- Intel® Celeron® 1037UE (dual-core, 1.6GHz)
- Intel® Celeron® 1007UE (dual-core, 1.4GHz)
- Intel® Celeron® 927UE (single-core, 1.5GHz)
- Up to 16GB DDR3-1600 SDRAM, dual channel
- Three DisplayPort/HDMI/DVI interfaces
- Two Embedded DisplayPort interfaces
- LVDS (24 Bit, dual channel) and CRT interface
- Triple independent display support
- DirectX 11, OpenGL 3.1, OpenCL 1.1
- Resolution up to 2560 x 1600
- PCI Express x1 lanes, four SATA-300
- USB 2.0 interfaces
- Trusted Platform Module

Based on Intel’s multi-core system-on-chip (SOC) Atom generation this compact COM Express module with Type 2 pin-out has been designed as an upgrade product for existing system designs still using legacy interfaces like PCI bus and PATA.

**COM Express™**

**MSC CXC-BT**

Intel® Atom™ / Celeron® SOC

Type 2

95 x 125

25 / 65 W

**Highlights**

- Intel® Core™ i7-3612QE (quad-core, 2.1GHz)
- Intel® Core™ i7-3615QE (quad-core, 2.3GHz)
- Intel® Core™ i5-3650M (quad-core, 2.5GHz)
- Intel® Core™ i3-3210ME (dual-core, 2.4GHz)
- Intel® Celeron® 1037UE (dual-core, 1.6GHz)
- Intel® Celeron® 1007UE (dual-core, 1.4GHz)
- Intel® Celeron® 927UE (single-core, 1.5GHz)
- Up to 16GB DDR3-1600 SDRAM, dual channel
- Four SATA-300, one PATA mass storage interfaces
- LVDS (24 Bit, dual channel) and CRT interface
- Triple independent display support
- DirectX 11, OpenGL 3.1, OpenCL 1.1
- Resolution up to 2560 x 1600
- PCI Express x1 lanes, four SATA-300
- Eight USB 2.0 interfaces
- Trusted Platform Module

**COM Express™**

**MSC C6B-7S**

Intel® Core™ - 3rd Generation

Type 6

95 x 125

25 / 65 W

**Highlights**

- Intel® Core™ i7-3612QE (quad-core, 2.1GHz)
- Intel® Core™ i7-3615QE (quad-core, 2.3GHz)
- Intel® Core™ i5-3650M (quad-core, 2.5GHz)
- Intel® Core™ i3-3210ME (dual-core, 2.4GHz)
- Intel® Celeron® 1037UE (dual-core, 1.6GHz)
- Intel® Celeron® 1007UE (dual-core, 1.4GHz)
- Intel® Celeron® 927UE (single-core, 1.5GHz)
- Up to 16GB DDR3-1600 SDRAM, dual channel
- Four SATA-300, one PATA mass storage interfaces
- LVDS (24 Bit, dual channel) and CRT interface
- Triple independent display support
- DirectX 11, OpenGL 3.1, OpenCL 1.1
- Resolution up to 2560 x 1600
- PCI Express x1 lanes, four SATA-300
- Eight USB 2.0 interfaces
- Trusted Platform Module

Based on Intel’s multi-core system-on-chip (SOC) Atom generation this COM Express Type 6 module brings display interfaces like DisplayPort, HDMI 1.4a and DVI, supports dual independent displays, USB 3.0 and fast DDR3L memory on a compact, power saving and cost-efficient module.

**COM Express™**

**MSC C6C-BT**

Intel® Atom™ / Celeron® SOC

Type 6

95 x 125

25 / 65 W

**Highlights**

- Intel Atom E3845 quad-core 1.91GHz, 10W TDP
- Intel Atom E3827 dual-core 1.75GHz, 8W TDP
- Intel Atom E3826 dual-core 1.46GHz, 7W TDP
- Intel Atom E3825 dual-core 1.33GHz, 6W TDP
- Intel Atom E3815 single-core 1.46GHz, 5W TDP
- Intel Celeron N2920 quad-core 1.86/2.00GHz, 7.5W TDP
- Intel Celeron J1900 quad-core 2.00/2.42GHz, 10W TDP
- Integrated Intel Gen. 7 HD graphics
- Up to 8GB DDR3L SDRAM, dual-channel
- Two SATA 3Gb/s mass storage interfaces
- MicroSD card socket
- DisplayPort/HDMI/DVI interface
- LVDS/Embedded DisplayPort interface
- VGA interface
- Two independent displays supported
- DirectX 11.1, OpenGL 3.2, OpenCL 1.1
- One USB 3.0 and up to seven USB 2.0 interfaces
- Trusted Platform Module (option)
This compact COM Express Type 6 module is based on AMD’s Embedded G-Series SOC platform, a high-performance, low-power System-on-Chip solution with outstanding HD graphics and multimedia capabilities. The power saving and cost-efficient module offers dual independent display support, DirectX 11.1, fast DDR3 memory and USB 3.0.

**Highlights**
- AMD GX-420CA quad-core 2.0GHz, 25W TDP, Radeon HD 8400E
- AMD GX-415GA quad-core 1.5GHz, 15W TDP, Radeon HD 8330E
- AMD GX-217GA dual-core 1.65GHz, 15W TDP, Radeon HD 8280E
- AMD GX-210HA dual-core 1.0GHz, 9W TDP, Radeon HD 8310E
- Integrated AMD HD 8000E graphics
- Up to 16GB DDR3 SDRAM, dual-channel
- Two SATA 3Gb/s mass storage interfaces
- MicroSD card socket
- DisplayPort/HDMI/DVI interface
- LVDS/Embedded DisplayPort interface
- VGA interface
- Two independent displays supported
- DirectX 11.1, OpenGL 4.2, OpenCL 1.2
- Two USB 3.0 and six USB 2.0 interfaces

Based on AMD’s Embedded R-Series platform this compact COM Express Type 6 module offers unprecedented integrated graphics and multi-display capabilities. It brings quad independent display support, DirectX 11 and USB 3.0. Turbo overclocking and accelerated video encoding / decoding support graphics- and video-centric applications.

**Highlights**
- AMD R-460L quad-core 2.0/2.8GHz, 25W TDP, Radeon HD 7620G
- AMD R-455L quad-core 1.7/2.3GHz, 17W TDP, Radeon HD 7400G
- AMD R-452L quad-core 1.6/2.4GHz, 19W TDP, Radeon HD 7600G
- AMD R-260H dual-core 2.1/2.6GHz, 17W TDP, Radeon HD 7500G
- Integrated AMD HD 7000G graphics
- Up to 16GB DDR3-1333 SDRAM, dual-channel
- Four SATA-300 mass storage interfaces
- MicroSD card socket, bootable
- Three DisplayPort/HDMI/DVI interfaces
- LVDS/Embedded DisplayPort interface
- VGA interface
- Four independent displays supported
- DirectX 11, OpenGL 4.2, OpenCL 1.1
- Resolution up to 4000 x 2000 @ 30 Hz
- Six PCI Express x1 lanes
- Four USB 3.0 and four USB 2.0 interfaces

The COM Express Type 2 module is based on Intel’s second generation Atom™ CPU technology offering dual-core computing performance at low power consumption. The design supports legacy interfaces like PCI bus and PATA.

**Highlights**
- Intel® Atom™ D525 (1.8GHz, dual-core), resolution up to 1366 x 768
- CRT interface, resolution up to 2048 x 1536
- Five PCI Express™ x1 lanes
- Eight USB 2.0 interfaces

Based on Intel’s multi-core system-on-chip (SOC) Atom generation this COM Express Type 10 module brings dual independent display support, DirectX 11.1 and fast DDR3L memory on a very compact, power saving and cost-efficient COM Express Mini module. The rugged design with soldered memory, optional ECC support and extended temperature range opens new application areas.

**Highlights**
- Intel® Atom E3845 quad-core 1.91GHz, 10W TDP
- Intel® Atom E3827 dual-core 1.75GHz, 8W TPD
- Intel® Atom E3826 dual-core 1.46GHz, 7W TDP
- Intel® Atom E3825 dual-core 1.33GHz, 6W TDP
- Intel® Atom E3815 single-core 1.46GHz, 5W TDP
- Intel Celeron N2930 quad-core 1.83/2.66GHz, 7.5W TDP
- Intel Celeron J1900 quad-core 2.00/2.42GHz, 10W TDP
- Integrated Intel Gen. 7 HD graphics
- Up to 8GB DDR3L SDRAM (ECC option)
- Two SATA 3Gb/s mass storage interfaces
- eMMC SSD (optional)
- DisplayPort/HDMI/DVI interface
- LVDS/Embedded DisplayPort interface
- VGA interface
- Two independent displays supported
- DirectX 11.1, OpenGL 3.2, OpenCL 1.1
- One USB 3.0, up to seven USB 2.0 interfaces
- Trusted Platform Module (option)
The COM Express Starterkit for Type 6 modules is available for the whole range of MSC’s Type 6 product portfolio and contains all necessary products to quickly enable the user to run and evaluate COM Express Type 6 modules. The kit does not contain a COM Express module in order to give the user greater flexibility as to which particular module version and CPU core and speed variant is desired.

**Highlights**
- COM Express Type 6 baseboard
- 2x 4GB DDR3 SO-DIMM memory modules
- Active heatsink with fan for COM Express
- Type 6 module socket (Basic or Compact)
- 3x DisplayPort/HDMI connector
- VGA/DVI connector
- Baseboard size 184 x 140 mm
- Getting Started Manual with download links for drivers, BSP and other support tools
- Optional 15” TFT display kit with cables

COM Express™

**MSC C6-SK**

Starterkit for COM Express

Type 6

This versatile carrier board was designed for evaluation, prototyping and software development. It provides the interface infrastructure for COM Express Type 6 modules and offers various PC type connectors for external access.

**Highlights**
- Socket for COM Express Type 6 modules in Basic or Compact form factor
- One PCI Express x4 slot
- Four PCI Express x1 slots
- One PCI Express x16 PEG slot
- Four SATA connectors
- Four USB 3.0, four USB 2.0 interfaces
- Two DisplayPort/HDMI connectors
- VGA/DVI connector
- LVDS interface
- Embedded DisplayPort connector
- HD audio codec; six audio jacks and SPDIF
- LAN interface
- mSATA and Mini PCI Express sockets
- Various additional COM Express specific interfaces
- ATX-style power connector
- POST code LED display
- ATX form factor

MSC C6-AD-T6T2

Small Evaluation Board

Type 6

This compact platform for evaluating and prototyping system electronics provides the interfaces necessary for COM Express Type 6 modules and offers various I/O connectors for peripherals.

**Highlights**
- Socket for COM Express Type 6 modules in Basic or Compact form factor
- PCI Express x4 slot
- Four SATA connectors
- Four USB 3.0 interfaces
- Three DisplayPort/HDMI connectors
- VGA/DVI connector
- HD audio codec on board
- LAN interface
- Various additional COM Express specific interfaces
- ATX-style power connector

COM Express™

**MSC C6-MB-EVA**

Evaluation Motherboard

Type 6

This compact platform for evaluating and prototyping system electronics provides the interfaces necessary for COM Express Type 6 modules and offers various I/O connectors for peripherals.

**Highlights**
- Socket for COM Express Type 6 modules in Basic or Compact form factor
- One PCI Express x4 slot
- Four PCI Express x1 slots
- One PCI Express x16 PEG slot
- Four SATA connectors
- Four USB 3.0, four USB 2.0 interfaces
- Two DisplayPort/HDMI connectors
- VGA/DVI connector
- LVDS interface
- Embedded DisplayPort connector
- HD audio codec; six audio jacks and SPDIF
- LAN interface
- mSATA and Mini PCI Express sockets
- Various additional COM Express specific interfaces
- ATX-style power connector
- POST code LED display
- ATX form factor

COM Express™

**COM Express™ Cooling Solutions**

Depending on the computing performance, processor technology and system environment, COM Express modules require different cooling measures. MSC has developed various solutions that help the system designer to quickly solve the heat dissipation problems and ensure optimal environmental conditions for the module.

**Heatspreaders**

Standardized thermal interfaces for easy integration in customers’ cooling concepts and full interchangeability.

**Passive cooling**

Optimized heatsinks for best cooling performance even in industrial environments.

**Active cooling**

Heatsinks combined with a dedicated speed controlled fan. Off-the-shelf solutions for demanding ambient conditions.
Qseven™

The latest embedded Computer-On-Module standard for entry level performance and low power applications with a very attractive price performance ratio. Qseven is an open standard of the SGeT Standardization Group. Taking advantage of the ongoing development in processor technology towards smaller and more power efficient CPUs, Qseven has in recent years become the most widely adopted new standard for small form factor modules.

The Qseven™ specification has been extended to include module architectures based on the ARM processor which is renowned for its excellent performance to power ratio. Providing different processor architectures and a wide range of modules for commercial and extended temperature together with matching baseboards, the Qseven family leads the way to feature rich and small, low power modular systems.

MSC Q7-A50M
AMD Embedded G-Series APU

The MSC Q7-A50M module is based on AMD’s Embedded G-Series offering dual-core or single-core CPUs and a powerful GPU in a single embedded Accelerated Processing Unit (APU). The MSC Q7-A50M module features the AMD T40E dual-core or the T40R or T16R single-core APU, DDR3 SDRAM and the AMD A50M I/O Controller Hub and optionally up to 32MB of Flash Disk.

Highlights
- AMD G-Series APU
- T40E Dual-Core, 1.0 GHz, 6.4W TDP
- T40R Single-Core, 1.0 GHz, 5.5W TDP
- T16R Single-Core, 615 MHz, 4.3W TDP
- AMD A50M I/O Controller Hub
- 2GB DDR3 SDRAM
- Gigabit Ethernet
- HDMI/DVI or DisplayPort 1.1a up to 1920 x 1200 @60Hz

- Dual-Channel LVDS 24 bit or 18 bit up to 1920 x 1200
- 3x PCI Express x1 Gen. 2.0 ports, GbE LAN
- USB 3.0 Host, optional USB 3.0 Device
- Up to 6x USB 2.0 Host, optional USB 2.0 Device
- UART, LPC, i2S Audio, SPI, I2C, SMBus, SDIO, TPM
- OS support: Windows® 8, 7, XP, Linux

MSC Q7-BT
Intel® Atom™ E3800 SOC Rev. 2.0

The MSC Q7-BT module is based on the Qseven Rev. 2.0 standard and uses Intel’s multi-core System-On-Chip (SOC) Atom E3800 generation based on Intel’s 22nm processor technology. The quad-core, dual-core or single-core Atom processor provides outstanding computing and graphics power and is accompanied by a comprehensive set of peripherals.

Highlights
- Intel Atom E3845 quad-core 1.91GHz, 10W TDP
- Intel Atom E3827 dual-core 1.73GHz, 8W TDP
- Intel Atom E3826 dual-core 1.46GHz, 7W TDP
- Intel Atom E3825 dual-core 1.33GHz, 6W TDP
- Intel Atom E3815 single-core 1.46GHz, 5W TDP
- Up to 8 GB DDR3L SDRAM (opt. ECC)
- Up to 64GB SATA Flash Disk (optional)
- Up to 16GB eMMC Flash (optional)
- 2x SATA interfaces (1 used for opt. Flash Disk)
The Qseven Rev. 1.2 Reference Platform MSC Q7-MB-RP2 offers a large variety of interfaces commonly used in industrial applications such as Gigabit LAN, USB 2.0, 1x RS232, CAN and LVDS/ADD2 for display attachment. In addition PCI Express is supported with four PCIe x1 slots. This platform for rapid prototyping helps to evaluate and test Qseven modules.

**Highlights**
- Four PCI Express x1 slots
- One ADD2 slot for SDVO / DP / HDMI
- Mini PCI Express, ExpressCard socket
- MMC / SD Card socket
- Two SATA onboard connectors
- Two Super I / O (Winbond/SMSC)
- COM1 / COM2, LPT, fan control and HW monitor
- CAN transceiver
- HD audio codec, AC97 connector
- Up to eight USB interfaces
- LVDS display via Jili30

**MSC Q7-MB-RP2**
70 x 70
9 W
-40 +85 °C

**MSC Q7-TCTC-FD**
70 x 70
7 W
-40 +85 °C

The MSC Q7-TCTC-FD module is based on the Intel’s E6x0 Atom™ CPU and the EG20T Platform Controller Hub. The module provides up to 2GB DDR2 DRAM and optionally up to 8GB on-board SATA Flash Disk.

**Highlights**
- Intel® Atom™ E6x0 (up to 1.6GHz) with integrated Graphics EG20T PCH
- Up to 2GB DDR2 SDRAM, soldered
- Optional 4 / 8 GB on board Flash SSD, bootable
- Gigabit Ethernet interface
- LVDS (18 / 24 Bit) up to 1280 x 768 @ 60Hz
- SDVO up to 1920 x 1080
- Dual independent display support
- Three PCI Express x1 lanes
- Up to two SATA-300 mass storage interfaces
- Six USB 2.0 hosts, one USB2.0 client
- CAN Bus, mini SDIO socket
- Industrial temperature versions available
- OS support: Windows 7, XP, Linux

**MSC Q7-TI8168**
70 x 70
4/6 W
-40 +85 °C

The MSC Q7-TI8168 MPU module incorporates a high performance DM8168 MPU @ 1.2 GHz with DDR3 memory, Gigabit Ethernet and industrial interfaces including Flash memory. It provides a combination of an ARM® Cortex™ A8 RISC MPU with Texas Instrument’s C674x VLIW DSP core offering up to 8000 MMACS.

**Highlights**
- Texas Instruments TMS320DM8168
- ARM® Cortex™-A8 CPU up to 1.2 GHz
- DSP Subsystem C674x up to 1.0 GHz
- 1GB DDR3 SDRAM
- 2GB Flash SSD soldered on board
- Gigabit Ethernet
- One PCI Express x1 port
- HDMI/DVI up to 1920 x 1080 resolution
- Single-channel LVDS 24 bit up to 1280 x 720 resolution
- Dual independent display support
- Two SATA interfaces
- Six USB 2.0, HD audio
- OS support: Linux (Android on request)

**MSC Q7-IMX6**
70 x 70
4/6 W
-40 +85 °C

The MSC Q7-IMX6 module is based on Freescale’s i.MX6 CPU offering quad-core, dual-core and single-core ARM® Cortex™-A9 performance at very low power consumption. The MSC Q7-IMX6 CPU Module incorporates the Freescale quad-core, dual-core or single-core processor with up to 1.2 GHz, up to 4GB DDR3 DRAM and up to 32GB eMMC Flash memory as well as an extensive set of interface controllers.

**Highlights**
- Freescale™ i.MX6 ARM® Cortex™-A9 CPU
- i.MX6 Quad, Dual, DualLite, Solo up to 1.2GHz
- “Triple-Play” Graphics and Video Subsystem
- Up to 4 GB DDR3 SDRAM
- Up to 8 GB NAND Flash
- Gigabit Ethernet
- PCI Express x1 port
- HDMI/DVI up to 1920 x 1200 @30Hz
- Dual-Channel LVDS 18/24 bit up to 1920 x 1200 also usable as 2 separate channels
- Triple independent display support
- One SATA interface (3Gb/s), not for single-core CPU
- Up to 8 USB2.0 ports, AC’97 audio
- OS support: Linux, Windows EC7 (Android on request)

**MSC Q7-Q78168**
70 x 70
9 W
-40 +85 °C

The MSC Q7-Q78168 MPU module incorporates a high performance DM8168 MPU @ 1.2 GHz with DDR3 memory, Gigabit Ethernet and industrial interfaces including Flash memory. It provides a combination of an ARM® Cortex™ A8 RISC MPU with Texas Instrument’s C674x VLIW DSP core offering up to 8000 MMACS.

**Highlights**
- Texas Instruments TMS320DM8168
- ARM® Cortex™-A8 CPU up to 1.2 GHz
- DSP Subsystem C674x up to 1.0 GHz
- 1GB DDR3 SDRAM
- 2GB Flash SSD soldered on board
- Gigabit Ethernet
- One PCI Express x1 port
- HDMI/DVI up to 1920 x 1080 resolution
- Single-channel LVDS 24 bit up to 1280 x 720 resolution
- Dual independent display support
- Two SATA interfaces
- Six USB 2.0, HD audio
- OS support: Linux (Android on request)
The Qseven™ Rev. 2.0 Embedded Platform MSC Q7-MB-EP6 offers a variety of embedded interfaces such as dual Gigabit LAN, USB 3.0, USB 2.0, RS232/485 and CAN as well as HDMI, DisplayPort and LVDS display interfaces. In addition a mini PCI Express™, an mSATA and an SD Card socket are supported. Module slot on bottom side.

### Highlights
- HDMI and DisplayPort connectors for direct output of TMDS signals from Qseven module
- Dual Gigabit Ethernet
- Mini PCI Express card slot
- MMC/SD card and mSATA card sockets
- 1x SATA connector
- RS-232 on DB9 connector
- RS-485 and RS-232 on pin header
- LPC / GPIO on pin header
- USB 3.0 host connector
- 2x USB 2.0 host connector
- 1x USB 2.0 on pin header
- 1x microUSB 2.0 OTG connector
- LVDS / eDP via Jili30 connector
- Backlight interface 3.3/5/12VDC
- SPI / I2C / SMBus, CAN bus, I25 audio
- Wide input range from 10-28VDC

### Dimensions
- 148 x 102 mm

The Qseven™ Rev. 1.2 Embedded Platform MSC Q7-MB-EP3 offers a number of embedded interfaces such as Gigabit LAN, USB 2.0, RS232 and CAN as well as LVDS and VGA derived from SDVO. In addition an SD Card socket is supported. Module slot on top side.

### Highlights
- One VGA port up to 1920 x 1200
- Mini PCI Express slot
- MMC / SD Card socket
- Two SATA onboard connectors
- One RS-232 D-Sub9 connector
- Four USB 2.0 interfaces, two external
- One CAN interface
- One mini-USB 2.0 client connector
- Optional touch screen controller on board
- Optional LVDS display via Jili30
- Backlight interface 3.3 / 5 / 12VDC
- HD audio codec (6 channel), one channel to front
- Wide input range from 10 - 28VDC

### Dimensions
- 148 x 102 mm

The Qseven™ Rev. 1.2 Embedded Platform MSC Q7-MB-EP4 offers many interfaces often used in embedded applications such as dual Gigabit LAN, USB 2.0, RS232, CAN and LVDS as well as DVI/HDMI. In addition a mini PCI Express™ and an mSATA slot as well as an SD-Card socket are supported. Module slot on bottom side.

### Highlights
- One DVI port up to 1920 x 1080 for Qseven modules with SDVO
- Dual Gigabit Ethernet
- Mini PCI Express slot
- MMC/SD Card socket
- Two SATA onboard connectors
- One RS-232 on board pin header
- One CAN interface
- Six USB 2.0 interfaces, four external
- Touch screen controller on board
- LVDS display connection via Jili30
- Backlight interface 3.3/5/12VDC
- Size 148 x 102 mm
- Wide input range from 10-28VDC

### Dimensions
- 148 x 102 mm

The Qseven™ Rev. 2.0 Embedded Platform MSC Q7-MB-EP6 offers a variety of embedded interfaces such as dual Gigabit LAN, USB 3.0, USB 2.0, RS232/485 and CAN as well as HDMI, DisplayPort and LVDS display interfaces. In addition a mini PCI Express™, an mSATA and an SD Card socket are supported. Module slot on bottom side.

### Highlights
- HDMI and DisplayPort connectors for direct output of TMDS signals from Qseven module
- Dual Gigabit Ethernet
- Mini PCI Express card slot
- MMC/SD card and mSATA card sockets
- 1x SATA connector
- RS-232 on DB9 connector
- RS-485 and RS-232 on pin header
- LPC / GPIO on pin header
- USB 3.0 host connector
- 2x USB 2.0 host connector
- 1x USB 2.0 on pin header
- 1x microUSB 2.0 OTG connector
- LVDS / eDP via Jili30 connector
- Backlight interface 3.3/5/12VDC
- SPI / I2C / SMBus, CAN bus, I25 audio
- Wide input range from 10-28VDC

### Dimensions
- 148 x 102 mm

The Qseven™ Rev. 1.2 Embedded Platform MSC Q7-MB-EP3 offers a number of embedded interfaces such as Gigabit LAN, USB 2.0, RS232 and CAN as well as LVDS and VGA derived from SDVO. In addition an SD Card socket is supported. Module slot on top side.

### Highlights
- One VGA port up to 1920 x 1200
- Mini PCI Express slot
- MMC / SD Card socket
- Two SATA onboard connectors
- One RS-232 D-Sub9 connector
- Four USB 2.0 interfaces, two external
- One CAN interface
- One mini-USB 2.0 client connector
- Optional touch screen controller on board
- Optional LVDS display via Jili30
- Backlight interface 3.3 / 5 / 12VDC
- HD audio codec (6 channel), one channel to front
- Wide input range from 10 - 28VDC

### Dimensions
- 148 x 102 mm

The Qseven™ Rev. 1.2 Embedded Platform MSC Q7-MB-EP4 offers many interfaces often used in embedded applications such as dual Gigabit LAN, USB 2.0, RS232, CAN and LVDS as well as DVI/HDMI. In addition a mini PCI Express™ and an mSATA slot as well as an SD-Card socket are supported. Module slot on bottom side.

### Highlights
- One DVI port up to 1920 x 1080 for Qseven modules with SDVO
- Dual Gigabit Ethernet
- Mini PCI Express slot
- MMC/SD Card socket
- Two SATA onboard connectors
- One RS-232 on board pin header
- One CAN interface
- Six USB 2.0 interfaces, four external
- Touch screen controller on board
- LVDS display connection via Jili30
- Backlight interface 3.3/5/12VDC
- Size 148 x 102 mm
- Wide input range from 10-28VDC

### Dimensions
- 148 x 102 mm
Qseven™
Cooling Solutions

For all its Qseven modules, MSC is offering tailored cooling solutions which perfectly fit the geometry of the COM product.

Heatspreaders
A heatspreader offers a blank surface allowing to mount a cooling device or to contact the metal housing of a system, while the underside provides contact areas for the heat generating parts of the module’s geometry.

Heatsinks
A heatsink is shaped like the heatspreader, but shows cooling fins on the upper side so as to maximize the surface used to dissipate heat into the surrounding air.

MSC Q7-MB-EP-02 BOX
Qseven Enclosure for Q7-MB-EP2/4

The enclosure MSC Q7-MB-EP-02 BOS-001 was designed for use with the Qseven platform boards MSC Q7-MB-EP2/4. The enclosure provides suitable cut-outs for the baseboards’ connectors plus two optional cut-outs for D-Sub9 connectors for serial lines available on the baseboards.

Highlights
- Compact dimensions: 175 x 117 x 60 mm (L x W x H)
- Material 1.5 mm sheet metal, RAL7032
- Optional DIN Rail Adaptor
- Front plate with cut-outs for EP2/4 interface connectors:
  - DVI, 4x USB, 2x Ethernet
  - 2x optional D-Sub9 for serial lines or CAN
- Cooling slots on two sides improve air flow inside the housing

MSC Q7-SK-BT-EP6
Qseven 2.0 Starterkit

The Qseven Starterkit for Qseven 2.0 modules with the Intel Atom E3800 is based on the 3.5” Qseven carrier board MSC Q7-MB-EP6 and contains all necessary products to quickly enable the user to run and evaluate Qseven modules built to the Rev. 2.0 specification. The kit does not contain a Qseven module in order to give the user greater flexibility as to which particular module version and CPU core and speed variant is desired.

Highlights
- 3.5” Qseven carrier board with socket for Qseven Rev. 2.0 modules MSC Q7-BT (not included)
- Heatsink suitable for all module variants of the Q7-BT family
- 12V power supply and cable kit included for immediate operation of the Starter Kit
- Resource CD with drivers, manuals etc.
- HDMI and DisplayPort graphics output
- LVDS graphics output on standard 30-pin connector; backlight connector includes dimming output
- 2x Ethernet (10/100/1000 LAN) connectors
- SATA, USB 3.0, 3x USB 2.0, USB 2.0 OTG, 3x UARTs
- Mini PCI Express and mSATA Card slots
- SD Card socket

The Qseven Starterkits for Qseven 1.2 modules are available in versions for the Freescale i.MX6, AMD Embedded G-Series, Texas Instruments DM8168 and the Intel Atom E6x0. The kits are based on the 3.5” Qseven carrier boards MSC Q7-MB-EPx and contain all necessary products to quickly enable the user to run and evaluate Qseven modules. The kits do not contain a Qseven module allowing the user to select the most suitable one from MSC’s wide offerings.

Highlights
- 3.5” Qseven carrier board with socket for Qseven Rev. 1.2 modules (not included)
- Heatsink suitable for the chosen module family
- 12V power supply and cable kit included for immediate operation of the Starter Kit
- Resource CD with drivers, manuals etc.
- HDMI/DisplayPort or DVI graphics output
- LVDS graphics output on standard 30-pin connector; backlight connector includes dimming output
- 2x Gigabit Ethernet connectors
- SATA, 4x USB 2.0, USB 2.0 OTG
- HD audio or I2S audio
- Mini-PCI Express and mSATA Card slots
- SD Card socket

MSC Q7-SK
Qseven 1.2 Starterkits

For all its Qseven modules, MSC is offering tailored cooling solutions which perfectly fit the geometry of the COM product.

MSC is providing a heatspreader for each Qseven module, and a single-piece heatsink for the high-performance modules.

Heatspreaders
Heatsinks

The enclosure MSC Q7-MB-EP-02 BOX was designed for use with the Qseven platform boards MSC Q7-MB-EP2/4. The enclosure provides suitable cut-outs for the baseboards’ connectors plus two optional cut-outs for D-Sub9 connectors for serial lines available on the baseboards.

Highlights
- Compact dimensions: 175 x 117 x 60 mm (L x W x H)
- Material 1.5 mm sheet metal, RAL7032
- Optional DIN Rail Adaptor
- Front plate with cut-outs for EP2/4 interface connectors:
  - DVI, 4x USB, 2x Ethernet
  - 2x optional D-Sub9 for serial lines or CAN
- Cooling slots on two sides improve air flow inside the housing
The ETX® specification V3.02 allows the lifetime of existing designs to be extended by years without the need to change the familiar legacy interfaces. ETX® will continue to be the platform of choice for systems requiring CPUs with low power dissipation and support for legacy interfaces such as the ISA bus, PS/2, LPT or COM1/COM2. Processors are offered in the performance range from 500 MHz AMD Geode LX to 1.66 MHz dual-core Intel® Atom.

### MSC ETE-PV510

**Intel® Atom™ Single-/Dual-Core**

The module is based on Intel’s second generation Atom™ technology offering dual-core computing performance and low power consumption. The processor with integrated graphics offers high graphics performance and many I/O options.

**Highlights**

- Intel® Atom™ D510 (1.66GHz, dual-core),
- Intel® Atom™ N450 (1.66GHz, single-core),
- Integrated Intel® GMA 3150 graphics
- Intel® ICH8M /I/O controller hub
- Up to 2GB DDR2 SDRAM
- LVDS interface (18-bit, single-channel), resolution up to 1366 x 768
- CRT interface, resolution up to 2048 x 1536
- Dual independent display supported
- Six USB 2.0 interfaces
- OS support: Windows 7, EC7, XP, Linux

### MSC ETE-GLX3

**AMD Geode LX800**

This design is based on the AMD LX800 @ 0.9W processor and offers a rich feature set in combination with entry level computing performance and lowest power requirements. Two PATA interfaces and on-board SATA offer various storage capabilities.

**Highlights**

- AMD® LX800 @ 0.9W processor (500MHz)
- Companion chip AMD Geode™ CS5536
- Integrated VID TFT graphics (LVDS and TTL options)
- Up to 1 GB DDR SDRAM
- Compact Flash slot
- Two SATA interfaces
- Two PATA interfaces
- ISA Bus (subset)
- OS support: Windows 7, EC7, XP, Linux
The MSC NANORISC-AM335X module is based on the Texas Instruments® Cortex™-A8 processor AM335x family which ranges from 300 to 800MHz. On the module it is combined with up to 4GB DDR3 SDRAM, up to 4GB SLC NAND Flash, optionally up to 64GB eMMC Flash and Gigabit Ethernet LAN.

**Highlights**
- Freescale® i.MX6 Cortex™-A9, 1/2/4 core(s) CPU clocked up to 1.2GHz
- Up to 4GByte DDR3 SDRAM soldered
- Up to 4GByte SLC NAND Flash soldered
- Up to 64GByte eMMC Flash
- Gigabit Ethernet interface
- USB 2.0 Host
- USB 2.0 OTG Host/Client High Speed
- Graphics Interfaces: HDMI/DVI, LVDS, RGB up to 1920 x 1080, dual independent display support
- Video decoder and scaler
- CAN 2.0B, 3x UART, 2x SPI, 2x PC
- I²S audio interface
- SD V3.0 / SDIO V2.0 / MMC V4.3
- Parallel bus interface
- Camera interface ITU656 / CSI

The MSC NANORISC-IMX6 module is based on the Freescale® Cortex™-A9 processor i.MX6x which is available as quad-core, dual-core and single-core CPU. On the module it is combined with up to 4GB DDR3 SDRAM, up to 4GB SLC NAND Flash, optionally up to 64GB eMMC Flash and Gigabit Ethernet LAN.

**Highlights**
- Freescale® i.MX6 Cortex™-A9, 1/2/4 core(s) CPU clocked up to 1.2GHz
- Up to 4GByte DDR3 SDRAM soldered
- Up to 4GByte SLC NAND Flash soldered
- Up to 6GByte eMMC Flash
- Gigabit Ethernet interface
- USB 2.0 Host
- USB 2.0 OTG Host/Client High Speed
- Graphics Interfaces: HDMI/DVI, LVDS, RGB up to 1920 x 1080, dual independent display support
- Video decoder and scaler
- CAN 2.0B, 3x UART, 2x SPI, 2x PC
- I²S audio interface
- SD V3.0 / SDIO V2.0 / MMC V4.3
- Parallel bus interface
- Camera interface ITU656 / CSI

The nanoRISC module standard has been created for applications requiring a small form factor and lowest power consumption.

The nanoRISC modules simplify the design of embedded systems by providing a processor core with an extensive set of interfaces on a small form factor board. Boot loader and adaptations for popular Operating Systems will be provided by MSC so that design times will be shortened dramatically.

nanoRISC modules can be used as a processing “supercomponent”, while users only need to add application-specific periphery. The 230-pin MXM connector used as interface to the baseboard is inexpensive but robust and proven. A variety of easy-to-use interfaces are available. All popular embedded interfaces are included, and additional interfaces can be provided by adding suitable controllers on the baseboard and connecting them to the processor bus available on the MXM connector.
The Evaluation Platform MSC NANORISC MB2 offers dual LAN, USB, UARTs, audio and graphics RGB 18/24 Bit and extension connectors for graphics, SATA, PCIe, CAN (CPU I/O), Local Bus, I²C and SPI. In addition touch controllers for projected capacitive touches and for resistive touches are provided. An SD Card socket is supported.

**Highlights**
- Socket for nanoRISC compatible modules
- LCD panel interfaces with RGB TTL output
- Backlight power 8..20VDC
- Graphics extension connector for optional graphics modules (LVDS, HDMI)
- 2x 10/100 Base-T Ethernet interface or GbE
- 2x USB Host, USB OTG Host/Client port
- Touch Screen support (capacitive + resistive)
- ITU656 video input interface on ext. connector
- 2x COM ports on 9pin Sub-D connector
- I2S audio codec with standard audio connectors
- SD Card socket
- PCIe, SATA, CAN, Local Bus, SPI, I2S on extension pad field
- Battery charger support (Lithium cell)
- 8..20V power supply input

The MSC NANORISC-SK is a complete, ready-to-run Starterkit for MSC’s range of nanoRISC processor modules. It consists of the nanoRISC Embedded Platform board MB2, a 7-inch WVGA display with capacitive touch and a suitable power supply.

**Highlights**
- Evaluation and Development Kit for all nanoRISC® modules
- Includes 7” LCD panel 800 x 480 pixels with all required interface cables
- Power supply included
- Integrated Debug Adapter on-board
- SD Card with pre-installed Linux or Android Operating System to be ordered with CPU module of choice
- nanoRISC CPU module not contained - please order separately
- Complete range of usable interfaces
- GbE or 2x 10/100 Base-T (dep. on module)
- 1 or 2 USB Host Port (dep. on module)
- USB OTG Port (dep. on module)
- CAN Bus, 2x COM Ports on 9-pin Sub-D
- I2S or AC97 audio codec with standard audio connectors

**Design and Production Expertise**

**Module Design**
Industrial applications require module designs to be a balance between performance, price, size, reliability and power dissipation. These factors are incorporated into our design guidelines ensuring that our designers select components appropriately for longevity, low power consumption and multiple sourcing to ensure the best availability. By adopting COM technology in the form of COM Express™, Qseven™, ETX® or nanoRISC® in your system design minimizes your efforts and engineering competencies required for high speed design and provide you a clearly defined upgrade path.

**Custom Development**
While modules require a carrier board to operate, complete custom designs may be the right solution for high volume projects. These may include single board requirements or special application demands using FPGA or DSP support. MSC offers such custom product development including the production and logistics according to your needs. This also includes mechanical design, certification support and regulatory requirements like ISO 13485.

**Firmware Expertise**
With today’s highly integrated CPUs the hardware designs from different module vendors tend to be similar. The BIOS/UEFI or microcontroller firmware not only ensures interoperability, but also makes the modules configurable for special requirements. MSC’s large BIOS/UEFI engineering team has throughout the years adopted a variety of BIOS/UEFI from various vendors for our modules and accumulated significant experience and know-how to be able to support any custom specific BIOS/UEFI. We ensure direct support, maximum expertise and rapid reaction to customer demand. All new designs are based on the latest UEFI implementations, and as a standard API they follow the common EAPI definition for COM Express and Qseven.

**Product Support**
MSC uses a tracking system for all product support issues related to our module technologies, ensuring quick and professional support. This helps customers to register their issues and the communication is maintained until the reported issues are resolved. Our support group also offers services such as compliance measurements on customers carrier boards as well as schematic and PCB layout design review consultancies for volume OEMs. With a private login to our support portal, customers are able to download restricted design support documents, BIOS updates or special drivers. Please use www.msc-technologies.eu to get your personal user account.
BIOS and Secure Boot
Built-in Security

Secure booting
– MSC’s enhanced security features
In many of our COM products we have implemented the most advanced BIOS technologies such as UEFI architecture plus MSC Secure Boot enhancements. Using encryption algorithms, digitally signed storage devices and a Trusted Platform Module (TPM) these products provide Full TCG (Trusted Computing Group) compliance and additional security against attacks, protection from software theft or misuse.

BIOS customization
Our BIOS solutions have been adapted to our customers’ special industrial requirements, such as flat panel display support, booting from various devices, extensive power and thermal management or initialization of customer specific devices.

New technologies
MSC continuously improves its BIOS solutions with new functions and technologies, such as UEFI, Intel® Virtualization Technology, VT-d Virtualized I/O Support, Intel® Advanced Management Technology and Intel® Trusted Execution Technology. Continuous improvement of security functions is also one of the most challenging tasks to meet the growing demand for safer embedded systems. MSC is maintaining user friendly interfaces, such as EPI (Extended Panel interface) and EAPI (Embedded Application Programming Interface) to allow low-level control of non-volatile memory, I2C bus, backlight, watchdog timer etc.

Operating systems
For embedded modules and boards
In addition to our BIOS competence, we are also focusing on operating system support for our customers. Starterkits and board support packages for different board and operating system platforms are available. Customized driver support for dedicated applications can be offered on request. Major operating system support is available for Microsoft Windows® 8, Windows® 7, Windows® XP (embedded), Windows® Embedded Compact 7, Linux and Android, depending on the architecture of the individual module. QNX® and VxWorks are supported on request. For more details see the table on pages 6/7 and our product pages on www.msc-technologies.eu

Product Support
The MSC Embedded Solutions group has a dedicated support team that works in close cooperation with the module hardware and software developers. This rapid access to design resources allows us to help our customers to achieve fast time to market. All technical issues from our customers are tracked in an internal system, thus ensuring timely response and enabling the support group to make use of a large technical knowledge database.

MSC web-based Support Center
Customers can contact our support group by phone or email, but we also provide an extensive website for delivering as much information as possible to help customers design-in with our products.

On our website www.msc-technologies.eu you will find detailed information on MSC’s embedded products. This includes data sheets, user’s manuals, mechanical data and other design support documentation. On the software side, BIOS updates, drivers for multiple operating systems and BSPs for typical embedded operating systems such as WES7, WEC7, and WinCE are available for download. In addition, application notes, videos, whitepapers and FAQs provide deeper technical insight on specific topics. Part of the information provided is only available for registered customers. If you are a customer using MSC products then you can register using the link in the top line of the website to gain access to this private portal.

Other Support services
Our support group also offers services such as compliance measurements for customer carrier boards as well as schematic and PCB layout design review consultancy for volume OEMs. If you cannot find the information you need or if you have additional questions please use the email or telephone contact address below:

Email: support@msc-technologies.eu
Phone: +49 (0)8165 906-200
### Industrial Mainboard Selector

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Form Factor</th>
<th>Size</th>
<th>CPU</th>
<th>max. Memory</th>
<th>Extensions</th>
<th>Specials</th>
<th>OS Support</th>
<th>Typ. Power Dissipation (W)</th>
<th>Performance</th>
<th>Page</th>
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</thead>
<tbody>
<tr>
<td>D3236-S</td>
<td>ATX</td>
<td>243.8 x 304.8 mm</td>
<td>Intel® Core™ i7 / i5 / i3 – 4xxx processor series</td>
<td>4 x DDR3-1600 DIMM slots up to 16 GByte</td>
<td>1 x PCIe x16 Gen.3, 1 x PCIe x16 (H Lane) Gen.2, 1 x PCIe x8 (1 Lane) Gen.2, 1 x PCI 32-Bit, 6 x USB2.0 external / 4 x USB2.0 internal, 2 x USB3.0 external / 2 x USB3.0 internal, 1 x COM external / 1 x COM internal, 1 x LPT port internal, 6 x SATA III</td>
<td>1 x mSATA socket, 1 x USB socket (built-in/sample) on-board BIOS-POST, Boot &amp; OS – HW Watchdog, EraseCtrl/BIOS Feature included, B-Bit CPQ, TPM 1.2, Softwarertrust (Flash, BIOS Setup, OEMIDENT, LVDS Tool etc.)</td>
<td>Windows® 7 / Windows® 8</td>
<td>High</td>
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<tr>
<td>D3231-S</td>
<td>µATX</td>
<td>243.8 x 243.8 mm</td>
<td>Intel® Core™ i7 / i5 / i3 – 4xxx processor series</td>
<td>4 x DDR3-1600 DIMM slots up to 16 GByte</td>
<td>1 x PCIe x16 Gen.3, 1 x PCIe x8 (1 Lane) Gen.2, 4 x PCI 32-Bit, 6 x USB2.0 external / 4 x USB2.0 internal, 2 x USB3.0 external / 2 x USB3.0 internal, 1 x COM external / 1 x COM internal, 1 x LPT port internal, 6 x SATA III</td>
<td>1 x mSATA socket, 1 x USB socket (built-in/sample) on-board BIOS-POST, Boot &amp; OS – HW Watchdog, EraseCtrl/BIOS Feature included, B-Bit CPQ, TPM 1.2, Softwarertrust (Flash, BIOS Setup, OEMIDENT, LVDS Tool etc.)</td>
<td>Windows® 7 / Windows® 8</td>
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<td>D3243-S</td>
<td>Mini-ITX</td>
<td>170 x 170 mm</td>
<td>Intel® Core™ i7-4700EQ, quad-core, 2.4GHz, 6M Cache</td>
<td>2 x DDR3-1600 SO-DIMM slots up to 16 GByte</td>
<td>1 x PCIe x16 Gen.3, 1 x Mini-PCIe socket, 6 x USB2.0 external / 4 x USB2.0 internal, 4 x USB3.0 external, 5 x COM1-2/3, 1 x COM2-32/33/42/485, MB85BV/BVX Series, 4x SATA III, 2x SATA II, MB889F/885F, 2x SATA III</td>
<td>Dual Power Supply (ATX compliant &amp; 12V only), 1 x mSATA socket, 1 x USB socket (built-in/sample) on-board BIOS-POST, Boot &amp; OS – HW Watchdog, EraseCtrl/BIOS Feature included, B-Bit CPQ, TPM 1.2, Softwarertrust (Flash, BIOS Setup, OEMIDENT, LVDS Tool etc.)</td>
<td>Windows® 7 / Windows® 8.x</td>
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<td>M98B</td>
<td>Mini-ITX</td>
<td>170 x 170 mm</td>
<td>Intel® Celeron® N2807 = 4.3W max. TDP</td>
<td>2 x DDR3-1600 SO-DIMM slots up to 16 GByte</td>
<td>1 x PCIe x16 Gen.3, 2 x Mini-PCIe socket, 1 x mSATA socket (shared with 1 MiniPCIe), 6 x USB2.0 external / 4 x USB2.0 internal, 4 x USB3.0 external, 5 x COM1-2/3, 1 x COM2-32/33/42/485, MB85BV/BVX Series, 4x SATA III, 2x SATA II, MB889F/885F, 2x SATA III</td>
<td>1 x mSATA socket, 6 x COM, B-Bit CPQ, ISAR (support) Watchdog timer</td>
<td>Windows® 7 / Windows® 8.x</td>
<td>Core™-i7-4700EQ = 47W max. TDP Core™-i5-4400E = 37W max. TDP Core™-i3-4100E = 33W max. TDP</td>
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<td>D3313-S</td>
<td>Mini-ITX</td>
<td>170 x 170 mm</td>
<td>Intel® Celeron® J900 = 10W max. TDP</td>
<td>2 x DDR3-1600 SO-DIMM slots up to 16 GByte</td>
<td>1 x PCIe x16 Gen.3, 2 x Mini-PCIe socket, 1 x mSATA socket (shared with 1 MiniPCIe), 6 x USB2.0 external / 4 x USB2.0 internal, 4 x USB3.0 external, 5 x COM1-2/3, 1 x COM2-32/33/42/485, MB85BV/BVX Series, 4x SATA III, 2x SATA II, MB889F/885F, 2x SATA III</td>
<td>Dual-Range DC Power Supply 12V / 19-24V, D3313-S1 – designed for fanless operation</td>
<td>Windows® 7 / Windows® 8</td>
<td>AMD® X4-2100A = 24W max. TDP AMD® X4-2130A = 25W max. TDP AMD® X4-2135A = 28W max. TDP</td>
<td>Medium</td>
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<td>BX190D</td>
<td>Mini-ITX</td>
<td>170 x 170 mm</td>
<td>Intel® Celeron® J800 = 7.5W max. TDP</td>
<td>2 x DDR3-1600 SO-DIMM slots up to 16 GByte</td>
<td>1 x PCIe x16 Gen.3, 1 x Mini-PCIe socket, 1 x mSATA socket, 4 x USB2.0 external / 2 x USB2.0 internal, 2 x USB3.0 external / 2 x USB3.0 internal, 1 x COM external / 1 x COM internal, 1 x LPT port internal, 2 x SATA III</td>
<td>1 x mSATA socket, 6 x COM, B-Bit CPQ, TFM, Softwarertrust, Flash, BIOS Setup, OEMIDENT, LVDS Tool etc.</td>
<td>Windows® 7 / Windows® 8.x</td>
<td>Intel® Celeron® J900 = 10W max. TDP</td>
<td>Entry</td>
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<tr>
<td>EC0M-QM87</td>
<td>3.5” SBC</td>
<td>145 x 101 mm</td>
<td>Intel® Core™ i7-4700EQ, quad-core, 2.4GHz, 6M Cache</td>
<td>4 x DDR3-1600 SO-DIMM slots up to 16 GByte</td>
<td>1 x Mini-PCIe with mSATA Support, 6 x USB2.0, 2 x USB2.0, 2 x COM1-2/3, 2 x COM1-2/32/33/42/485, 2 x SATA II</td>
<td>12V/ DC IN, 1 x mSATA socket, B-Bit CPQ, 2W Amplifier on-board</td>
<td>Windows® 7 / Windows® 8.x</td>
<td>Core™-i7-4700EQ = 47W max. TDP Core™-i5-4400E = 37W max. TDP Core™-i3-4100E = 33W max. TDP</td>
<td>High</td>
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<td>EC0M-QA</td>
<td>3.5” SBC</td>
<td>145 x 101 mm</td>
<td>AMD® G-Series K1415A SoC (1.6GHz), quad-core</td>
<td>4 x DDR3-1600 SO-DIMM slots up to 16 GByte</td>
<td>1 x Mini-PCIe with mSATA Support, 6 x USB2.0, 2 x USB2.0, 2 x COM1-2/3, 1 x COM2-32/33/42/485, 2 x SATA II</td>
<td>+12V ~26V wide range power supply 1x mSATA socket, 1x CompactFlash, B-Bit CPQ, Flash</td>
<td>Windows® 7 / Windows® 8.x</td>
<td>AMD® G1-145G = 15W max. TDP (AMD® X4-2130A = 25W max. TDP) AMD® G1-155A = 9W max. TDP (AMD® X4-2135A = 28W max. TDP)</td>
<td>Medium</td>
<td>37</td>
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<tr>
<td>G36E-BT05</td>
<td>3.5” SBC</td>
<td>145 x 101 mm</td>
<td>Intel® Celeron® N2930 = 7.5W max. TDP</td>
<td>4 x DDR3-1600 SO-DIMM slots up to 16 GByte</td>
<td>1 x Mini-PCIe with mSATA Support, 6 x USB2.0, 2 x USB2.0, 2 x COM1-2/3, 1 x COM2-32/33/42/485, 2 x SATA II</td>
<td>12V C(D)power supply 1x mSATA socket (optional) 1x Clamshell, B-Bit CPQ, Optional built-in Touch Screen interface</td>
<td>Windows® 7 / Windows® 8.x</td>
<td>Intel® Celeron® N2930 = 7.5W max. TDP Intel® Celeron® N2807 = 4.3W max. TDP</td>
<td>Entry</td>
<td>38</td>
</tr>
</tbody>
</table>
The Fujitsu industrial mainboard D3236-S is the best choice for industrial requirements. Produced in the German Fujitsu mainboard factory in Augsburg, the D3236-S fulfills the highest quality needs. Featured by the Intel® Q87 Express chipset, the 4th Generation of Intel® Core™ processors are supported. The Fujitsu D3236-S is designed and approved for 24/7 continuous operation also in enhanced temperature ranges up to 60°C.

**Highlights**
- Intel® HD Graphics (integrated in processor, e.g. HD4600)
- 1x PCIe x16 Gen3, 1x PCIe x16 Gen2
- 1x PCIe x8, 4x PCIe 32-Bit
- USB 2.0 / 3.0 and USB socket (stick/dongle) onboard
- 2x Intel® GbE LAN onboard (incl. teaming support)
- BIOS-POST/Boot & OS – HW Watchdog onboard
- Mainboard "Made in Germany"
- Designed & approved for 24/7 continuous operation
- Intel® vPro 2014+ Intel® iAMT 9.1 (CPU support required)

Fujitsu industrial Mini-ITX mainboard with Intel® Q87 Express chipset supporting DDR3 1600 SDRAM memory and 4th generation Intel® Core™ i3 / i5 / i7 processors (Socket LGA1150). The Fujitsu D3243-S is designed and approved for 24/7 continuous operation also in enhanced temperature ranges up to 60°C.

**Highlights**
- Mini-ITX (17 cm x 17 cm)
- Intel® HD Graphics (integrated in processor, e.g. HD4600)
- 1x PCIe x16 Gen3, 1x Mini PCIe
- 1x mSATA (SATA III)
- Dual Power Supply (ATX compliant & 12V only)
- USB 2.0 / 3.0 and USB socket (stick/dongle) onboard
- 2x Intel GbE LAN onboard (incl. teaming support)
- BIOS-POST/Boot & OS – HW Watchdog onboard
- Mainboard "Made in Germany"
- Designed & approved for 24/7 continuous operation
- Intel® vPro 2014+ Intel® iAMT 9.1 (CPU support required)

The MI980 Mini-ITX supports the 4th generation Intel® Core™ i3 / i5 / i7 processors. This motherboard is based on the mobile Intel® QM87 and HM86 Express chipsets which offer an increase in graphics and CPU performance over previous generations. The new board design was developed primarily for the industrial and embedded markets that require high processing capability, but at the same time are constrained by power limits.

**Highlights**
- Intel® HD Graphics
- 1x PCIe x16 Gen3, 1x Mini PCIe
- 1x mSATA (SATA III)
- Dual Power Supply (ATX compliant & 12V only)
- USB 2.0 / 3.0 and USB socket (stick/dongle) onboard
- 2x Intel GbE LAN onboard (incl. teaming support)
- BIOS-POST/Boot & OS – HW Watchdog onboard
- Mainboard "Made in Germany"
- Designed & approved for 24/7 continuous operation
- Intel® vPro 2014+ Intel® iAMT 9.1 (CPU support required)

The M980 Mini-ITX supports the 4th generation Intel® Core™ i3 / i5 / i7 processors. This motherboard is based on the mobile Intel® QM87 and HM86 Express chipsets which offer an increase in graphics and CPU performance over previous generations. The new board design was developed primarily for the industrial and embedded markets that require high processing capability, but at the same time are constrained by power limits.

**Highlights**
- 2x DDR3/DDR3L, SD-DIMM, Max. 16GB
- Integrated VGA, supports DVI-D, DVI-D, LVDS or eDP/DisplayPort
- 2x Intel® PCIe Gigabit LAN
- Watchdog timer, Digital I/O
- iAMT (9.0), vPro, iSMART
- 6x USB 2.0, 4x USB 3.0,
- 6x COM, 4x SATA III, 2x SATA II
- 1x PCIe x16
- 2x Mini PCIe x1
The Fujitsu industrial Mini-ITX mainboard D3313-S is a very interesting platform for industrial applications with different needs. Due to the AMD embedded G-Series SoC processor platform, the D3313-S is able to fulfill needs from low power consumption with the AMD embedded GX210HA SoC up to high graphic performance with the AMD embedded GX-420CA quad-core processor. The Fujitsu D3313-S is designed for 24/7 continuous operation and equipped with 24-bit dual channel LVDS, Display-Port and DVI Interfaces.

D3313-S

Mini-ITX

The ECM-QM87 3.5” SBC (Single Board Computer) designed based on the 4th generation Intel® Core™ processors and the mobile Intel® QM87 Express chipset architecture featuring high performance, power efficiency, security, reliability and remote management capabilities. It is a compact, complete computer built on a single circuit board with rich I/O connectors and expansion sockets. The ECM-QM87 is an ideal solution for thin and light weight Intelligent systems, Digital Signage systems, Point-Of-Sale systems, compact Medical Imaging Processing machines and industrial HMI where space saving, performance, reliability and longevity are top priority.

ECM-QM87

3.5”

The MX1900J is a quad-core Bay Trail 4th generation Atom™ thin Mini-ITX motherboard for thin clients, entry level digital signage and retail POS systems. It is a single stack, low-profile and fanless Mini-ITX motherboard. The rear I/O interface includes four USB 3.0, one Display-Port, one VGA, one Gigabit LAN, optional secondary Gigabit LAN, mic-in, line-out and runs on DC power. The MX1900J’s low profile has a board height of approximately 20mm.

MX1900J

Mini-ITX

The ECM-KA is a 3.5" SBC (Single Board Computer) powered by the AMD Embedded G-Series 1st generation SoC APU based on 28nm design technology. It provides extremely low power consumption, high graphic performance, multimedia and industrial HMI where space saving, performance, reliability and longevity are top priority.

ECM-KA

3.5”

The Fujitsu industrial Mini-ITX mainboard D3313-S is a very interesting platform for industrial applications with different needs. Due to the AMD embedded G-Series SoC processor platform, the D3313-S is able to fulfill needs from low power consumption with the AMD embedded GX210HA SoC up to high graphic performance with the AMD embedded GX-420CA quad-core processor. The Fujitsu D3313-S is designed for 24/7 continuous operation and equipped with 24-bit dual channel LVDS, Display-Port and DVI Interfaces.

D3313-S

Mini-ITX

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MX1900J

Mini-ITX

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ECM-KA

3.5”

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D3313-S

Mini-ITX

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ECM-QM87

3.5”

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MX1900J

Mini-ITX

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ECM-KA

3.5”

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D3313-S

Mini-ITX

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ECM-QM87

3.5”

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MX1900J

Mini-ITX

The ECM-KA is a 3.5" SBC (Single Board Computer) powered by the AMD Embedded G-Series 1st generation SoC APU based on 28nm design technology. It provides extremely low power consumption, high graphic performance, multimedia and industrial HMI where space saving, performance, reliability and longevity are top priority.

ECM-KA

3.5”
The GENE-BT05 is equipped with an Intel® Celeron® N2930/N2807 processor. The graphics engine of GENE-BT05 supports CRT/LCD, HDMI/ LCD simultaneous and dual view displays. This model applies two Mini-Card and LPC bus for flexible expansions. Moreover, one SATA 3.0Gb/s, one CFast™, and optional half-size mSATA provide ample storage. This brand new sub-compact board is developed to cater to the requirements of Automation, Medical, Ticket Machine, Transportation, Gaming, KIOSK, and POS/POI applications.

Highlights
- Onboard Intel® Celeron® N2930/N2807 Processor
- 1x DDR3L 1066/1333MHz SODIMM
- 2x Gigabit Ethernet
- CRT, 18/24-bit dual-channel LVDS LCD, HDMI
- Dual-channel HD audio
- 1x SATA 3.0Gb/s, 1x CFast™
- 1x USB3.0, 3x USB2.0, 4x COM, 8-bit Digital I/O
- 2x MiniPCIe (1x full-size, 1x half-size)
- +12V-only operation
- Onboard 4/5/8-wire resistive touch screen controller (optional)
- AAEON Hi-Safe/SDK/Utility supported
- 1x mSATA (optional)
- Onboard Trusted Platform Module (optional)

In case you are still looking for the right product, MSC offers a lot of other popular formfactor boards on request.
<table>
<thead>
<tr>
<th>Germany</th>
<th>Aachen</th>
<th>Pascalstr. 16 • 52076 Aachen</th>
<th>t +49 2408 709 0</th>
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<tr>
<td></td>
<td>Berlin</td>
<td>Tempelhofer Ufer 37 • 10963 Berlin</td>
<td>t +49 30 720089 0</td>
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<td>Düsseldorf</td>
<td>Max-Planck-Str.15a-c • 40699 Erkrath</td>
<td>t +49 211 92593 0</td>
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<td></td>
<td>Hannover</td>
<td>Gaußstraße 10 • 31275 Lehrte</td>
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<td></td>
<td>Jena</td>
<td>Göschwitzer Straße 25 • 07745 Jena</td>
<td>t +49 3641 6825 0</td>
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<tr>
<td></td>
<td>Koblenz</td>
<td>Auf dem Hahnenberg 19 • 55218 Mülheim</td>
<td>t +49 2630 96239 11</td>
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<tr>
<td></td>
<td>Maudach</td>
<td>Torfstecherring 4 • 67067 Ludwigshafen</td>
<td>t +49 621 58649 113</td>
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<td></td>
<td>Neufahrn</td>
<td>Zeppelinstr. 1a • 85375 Neufahrn</td>
<td>t +49 8165 906 100</td>
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<tr>
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<td>Nürnberg</td>
<td>Vogelweiherstr. 20 • 90441 Nürnberg</td>
<td>t +49 911 43970 0</td>
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<td></td>
<td>Stuttgart</td>
<td>Gutenbergstraße 15 • 70771 Leinfelden-Echterdingen</td>
<td>t +49 711 78260 380</td>
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<tr>
<td></td>
<td>Wiesbaden</td>
<td>Borsigstraße 36 • 65205 Wiesbaden</td>
<td>t +49 6122 5871 422</td>
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<th>(also responsible for Slovenia )</th>
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<td></td>
<td>Aredstrasse 13 • A - 2544 Leobersdorf</td>
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<td>Romania</td>
<td>Pipera-Tunari 4c Voluntari • 077190 Iffov (Bucharest)</td>
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<td>Budafoki út 91-93 West Iroház • 1117 Budapest</td>
<td>t +36 1 436 72 29</td>
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<td>Switzerland</td>
<td>Industriestr. 25 • CH - 8604 Volketswil</td>
<td>t +41 43 355 33 66</td>
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<td>Benelux countries</td>
<td>Stadionstraat 2, 6th fl. • NL - 4815 NG BREDA</td>
<td>t +31 76 5722400</td>
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<tr>
<td></td>
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<td>Nádražní 2369/10 • CZ - 678 01 Blansko</td>
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