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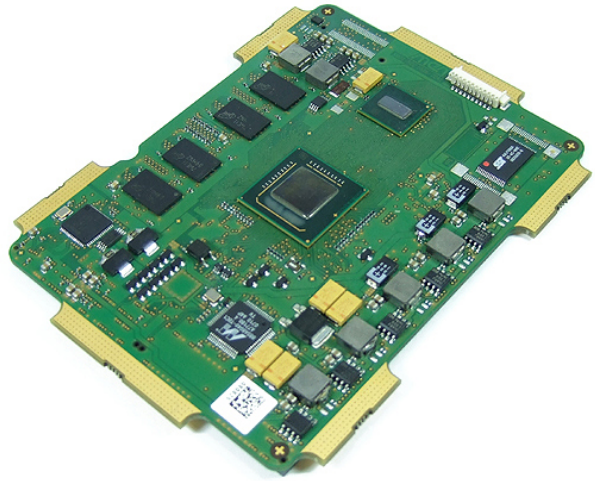
XM1 - ESMexpress® with Intel® Atom™



- **RSE, Rugged System-On-Module Express (ANSI-VITA 59 in process)**
- **Intel® Atom™ Z530 or Z510, up to 1.6 GHz**
- **Up to 1 GB DDR2 SDRAM**
- **Up to 2 PCI Express®**
- **Up to 1 Gb Ethernet**
- **1 SATA port**
- **8 USB 2.0**
- **SDVO, LVDS**
- **Intel® HD Audio**
- **-40°C to +85°C screened**
- **Conduction cooling**

The XM1 is a Computer-On-Module of the ESMexpress® family in accordance with a proposed ANSI standard currently under development (ANSI-VITA 59, RSE Rugged System-On-Module Express). Together with an application-specific carrier board it forms a semi-custom solution for industrial, harsh, mobile and mission-critical environments.
The XM1 is controlled by the Intel® Atom™ processor, a first generation IA-32 core based on 45nm process technology. Due to the new power architecture of the Intel® Atom™ processor, the XM1 has a total power consumption of max. 5 to 7 Watts, while having a clock frequency of up to 1.6 GHz.
The XM1 accommodates up to 1 GB of directly soldered main memory and supports other memory like USB Flash on the carrier board.
Interfaces from the Intel® System Controller Hub US15W are optimized using exclusively modern serial standards and are all routed from the XM1 for availability on any ESMexpress® carrier board. Depending on the version of XM1, those interfaces include a combination of PCI Express® links, LVDS, SDVO, high-definition audio, SATA, Ethernet with wake-on-LAN functionality, and USB. Additional COM interfaces can be made available on the carrier board via USB to COM conversion.
The XM1 is completed by a board management controller for temperature and power supervision. It comes with a Phoenix® Award BIOS configurable for the final application.
The XM1 is screened for operation in a -40°C to +85°C conduction or convection cooled environment. As all ESMexpress® modules it is embedded in a covered frame. This ensures EMC protection and allows efficient conductive cooling. Air cooling is also possible by applying a heat sink on top of the cover. Where operation temperatures are moderate, the module may even do without the frame and cover, with a suitable low-power processor and airflow. ESMexpress® modules are firmly screwed to a carrier board and come with rugged industry-proven connectors supporting high frequency and differential signals. Only soldered components are used to withstand shock and vibration, and the design is optimized for conformal coating.
All ESMexpress® modules support a single 95x125mm form factor.
For evaluation and development purposes an ATX carrier board is available. The ESMexpress® module can be evaluated on a COM Express™ carrier board via an adapter from ESMexpress® to COM Express™.

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Technical Data

CPU
- Intel® Atom™ Z530 or Z510
  - Up to 1.6GHz processor core frequency
  - 400MHz or 533MHz system bus frequency
- Chipset
  - Intel® system controller hub US15W

Memory
- 512KB L2 cache integrated in Atom processor
- Up to 1GB DDR2 SDRAM system memory
  - Soldered
  - 400/533MHz memory bus frequency locked to the FSB frequency

Serial ATA (SATA)
- One port via ESMexpress® connector
- Transfer rates up to 100MB/s
- Via PATA-to-SATA converter

Graphics
- Integrated in Intel® System Controller Hub US15W
- Maximum resolution: 1600x1200 pixels
- 1 SDVO port (not available on board version 15xm01-02)
- 1 LVDS port
  - 112MHz maximum pixel clock
  - 18 or 24bits pixel color depths
- Available via ESMexpress® connector

USB
- Eight USB 2.0 host ports (or 7 host ports and 1 client port, adjustable by software)
  - Via ESMexpress® connector
  - Six of these ports also support USB 1.1 (UHCI implementation)
- EHCI implementation
- Data rates up to 480Mbits/s

Ethernet
- One 10/100/1000Base-T Ethernet channel via ESMexpress® connector
- Ethernet controller is connected by one x1 PCIe® link
- Two LED signals for LAN link, activity status and connection speed

PCI Express®
- One x1 link to connect local 1000Base-T Ethernet controller
- One x1 link via ESMexpress® connector
- Second x1 link on ESMexpress® connector instead of Ethernet
- Data rate 250MB/s in each direction (2.5 Gbits/s per lane)

GPIO
- 1 line from PIC via ESMexpress® connector
- Usable for LED

HD audio
- Via ESMexpress® connector

Board Management Controller
- Input voltage supervision
- Power sequencing
- Board monitoring
- Watchdog
- Accessible via SMBus

Miscellaneous
- Real-time clock (with GoldCap or battery backup on the carrier board)
- Wake-on-LAN
- SMBus interface

ESMexpress® Specifications
- In accordance with proposed standard ANSI-VITA 59 RSE Rugged System on Module Express

Electrical Specifications
- Supply voltage/power consumption:
  - +12V (9..16V), power consumption 5..7W (full load)
  - +5V standby voltage

Mechanical Specifications
- Dimensions: 95mm x 125mm
- ESMexpress® PCB mounted between a frame and a cover
- Weight: 224g (incl. cover and frame)

Environmental Specifications
- Temperature range (operation):
  - -40..+85°C Tcase (screened)
- Temperature range (storage): -40..+85°C
- Relative humidity (operation): max. 95% non-condensing
- Relative humidity (storage): max. 95% non-condensing
- Altitude: -300m to + 3,000m
- Shock: 15g/11ms (EN 60068-2-27)
- Bump: 10g/16ms (EN 60068-2-29)
- Vibration (sinusoidal): 1g/10..150Hz (EN 60068-2-6)
- Conformal coating on request

MTBF
- 384,125h @ 40°C according to IEC/TR 62380 (RDF 2000)

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Technical Data

Safety
- PCB manufactured with a flammability rating of 94V-0 by UL recognized manufacturers

EMC
- Conforming to EN 55022 (radio disturbance), EN55024 EN 61000-4-2 (ESD) and EN55024; EN 61000-4-4 (burst)

BIOS
- Award BIOS

Software Support
- Windows®
  - Windows® 2000
  - Windows® XP
  - Windows® Vista™
  - Windows® XP Embedded
  - Windows® CE (on request)
- Linux (in preparation)
- VxWorks® (in preparation)
- QNX® (on request)
- For more information on supported operating system versions and drivers see Software.

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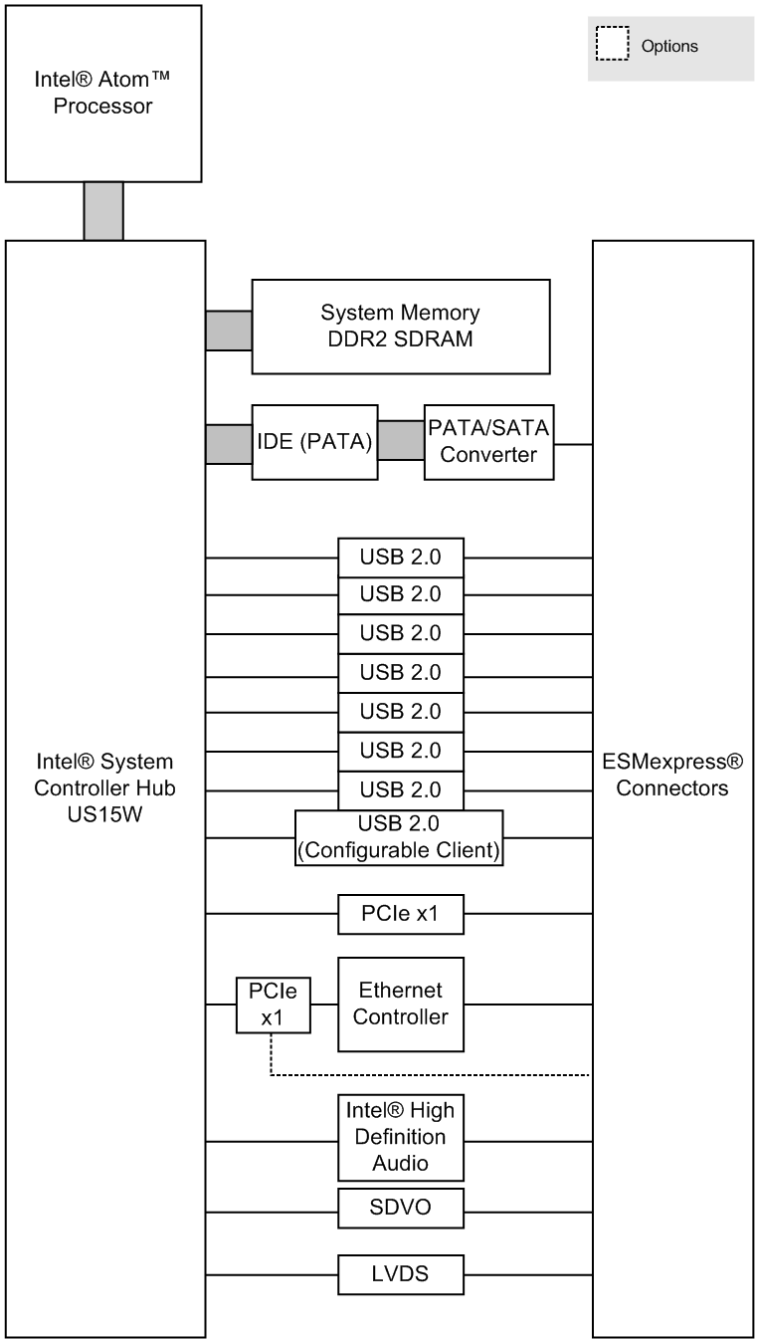
Diagram



Configuration & Options

Standard Configurations

Article No.	CPU Type	Clock	System RAM	PCIe®	Ethernet	Cover
15XM01-00	Z530	1.6 GHz	1 GB	1	1	yes
15XM01-02	Z510	1.1 GHz	512 MB	1	1	no

Options

CPU

- Intel® Atom™ Z530, 1.6GHz
- Intel® Atom™ Z510, 1.1GHz

Memory

- System RAM
  - 256 MB, 512 MB or 1 GB

PCI Express®

- Second PCI Express® lane on ESMexpress® connector
  - Instead of the lane to the Ethernet controller

Please note that some of these options may only be available for large volumes. Please ask our sales staff for more information.

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Ordering Information

Standard Hardware

15XM01-00	Intel Atom Z530, 1.6 GHz, 1 GB DDR2 RAM, 1 Gb Ethernet, 1x PCIe, with cover, -40..+85°C screened
15XM01-02	Intel Atom Z510, 1.1 GHz, 512 MB DDR2 RAM, 1 Gb Ethernet, 1x PCIe, no cover, no J2, -40..+85°C screened

Related Hardware

08AE12-00	ESMexpress module to COM Express carrier adapter, 0..+60°C
08XC01-00	Evaluation and development board for all ESMexpress modules (coming with top cover and frame), 0..+60°C, incl. faceplate, 4GB USB Flash Disk and USB cable type A to A
15XM01L00	ESMexpress, Intel Atom Z530P, 1.6 GHz, 1 GB DDR2 RAM, 1 Gb Ethernet, 1x PCIe, with cover, -40..+85°C screened
15XM01L02	ESMexpress, Intel Atom Z510P, 1.1 GHz, 512 MB DDR2 RAM, 1 Gb Ethernet, 1x PCIe, no J2, no cover, -40..+85°C screened

Miscellaneous

0712-0019	Standard ATX PSU, 350W, 0..+40°C
08AE12-00	ESMexpress module to COM Express carrier adapter, 0..+60°C
08XC01-00	Evaluation and development board for all ESMexpress modules (coming with top cover and frame), 0..+60°C, incl. faceplate, 4GB USB Flash Disk and USB cable type A to A

Software: OS independent

13XM01-06	MDIS5 low-level driver sources (MEN) for XM1, XM1L, MM1, XM2, F11S and F19P board controller

Software: Windows

10F014-78	Windows Embedded Standard BSP (MEN) for F14, F15, F17, F18, F19P, G20, XM1, XM1L, XM2, MM1, SC21, DC1 and RC1
13T009-70	Windows HD audio driver (Realtek) for XM1, XM1L, MM1
13T010-70	Windows network driver (Intel) for XM1, XM1L, XM2, F11S and F19P
13T011-70	Windows graphics driver (Intel) for XM1, XM1L, MM1 and F11S
13T012-70	Windows XP/Vista chipset driver (Intel) for XM1, XM1L, MM1 and F11S
13T013-70	Windows USB client driver installation package (Intel) for XM1, XM1L and MM1
13T014-70	Windows Vista HD audio driver (Realtek) for XM1, XM1L and MM1
13T015-70	Windows Vista network driver (Intel) for XM1, XM1L and F11S
13T016-70	Windows Vista chipset graphics driver (Intel) for XM1, XM1L, MM1 and F11S
13XM01-77	Windows Installset (MEN) for XM1, XM1L and F11S

Software: Firmware/BIOS

14XM01-01	System BIOS for XM1

Documentation

20APPN004	Application Note: How to make a USB stick bootable
20XM01-00	XM1 User Manual
20XM01L00	XM1L User Manual

For the most up-to-date ordering information and direct links to other data sheets and downloads, see the XM1 online data sheet under » www.men.de.

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