

» The core of your application! «

The continuation of established standards

Computer-on-Modules (COMs) are highly integrated single board computers which support straightforward system expansion and application-specific modification. The CPU modules provide the core functionality, while the application-specific functions are integrated into the carrier board. This results in a semi-customized embedded solution with a short development period and a high degree of flexibility.



Concentration on your core business

Thanks to Computer-on-Modules (COM), customers can concentrate on their core business and only have to design the necessary interfaces and circuits for their individual carrier boards. The standardized computer module is then simply plugged into the carrier board. Customers can focus on their everyday business without having to worry about the computer.

Automation



Industrial Control



Medical



Military/Aerospace



Infotainment



Transportation



Energy



Communications

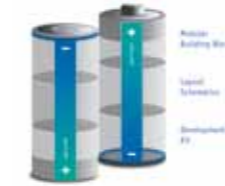


» Faster to complete solutions with... «

MARS-Reference design for battery-solutions

MARS is a universal reference platform to Design-In of smart-battery systems. The acronym stands for "Mobile Application platform for Rechargeable Systems".

MARS is an add-on system for battery-operated and mobile applications. It enables a simple and easy transfer of tested layouts and schematics in your design.



Find out more on www.kontron.com/mars

K-Station – Standardized software interface

K-Station offers a standardized API and developer library in order to access to hardware, BIOS and software interfaces. Through this standardized abstraction layer, independence from the module is also achieved on software layer.

The toolkit provides easy reuse of code on a variety of module configurations.

K-station's API is identical on all Computer-on-Modules from Kontron and was developed for:

- » Product and software development
- » Product support
- » Service for application developers and integrators of software solutions



Find out more on www.kontron.com/k-station

Boards & More – Individual Carrier Board Design

When Carrier Board design and Computer-on-Modules come from a single source, system functionality can be optimally tuned for the application. Kontrons Boards & More Team offers the correct form factor fit – in the highest quality.

With x86, ARM and PowerPC design experience, Kontron develops and delivers any kind of Carrier Board, including test, memory, heatsink, housing, assembly, individual configuration, packaging and shipment.

Even if you can't find a suitable module in Kontron's broad product range, we'll take on the design and the manufacturing of complete boards with any desired CPU in any desired form factor.



Find out more on www.kontron.com/boardsandmore

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» Kontron Embedded Modules 2010 «

Computer-on-Modules

- » Flexibility
- » Scalability
- » Long service life
- » Short time-to-market

OVER 12 YEARS' COM EXPERIENCE!



If it's embedded, it's Kontron.

COM Express	COM Express™										ETX®		ETX® 3.0 Long Term Support
	nanoETXexpress (ultra: 84x55mm)		microETXexpress® (compact: 95x95mm)				ETXexpress® (basic: 125x95mm)				(basic: 114x95mm)		
	nanoETXexpress-SP	nanoETXexpress-TT	microETXexpress®-SP	microETXexpress®-XL	microETXexpress®-PV	microETXexpress®-DC	microETXexpress®-PC	ETXexpress®-CD	ETXexpress®-PC	ETXexpress®-AI	ETX®-CD	ETX®-DC	
CPU	Intel® Atom™ Z510, Z530	Intel® Atom™ E6xx	Intel® Atom™ Z510, Z530	Intel® Atom™ Z520PT	Intel® Atom™ D510, D410, N450	Intel® Atom™ N270	Intel® Core™ 2 Duo SL9400, SU9300, Intel® Celeron® M Processor 722, 723	Intel® Core™ Duo L2400, Intel® Celeron® M 440, ULV423	Intel® Core™2 Duo SP9300, SL9400, SU9300, T9400, P8400, Celeron® M575	Intel® Core™ i7-610E, i7-620UE, i7-620UE, i5-520E	Intel® Core™ 2 Duo, Intel® Core™ Duo, Intel® Celeron® M	Intel® Atom™ N270	CPU
CPU Clock	1.1 GHz up to 1.6 GHz	up to 1.6 GHz	up to 1.6 GHz	1.33 GHz	up to 2x 1.66 GHz	1.6 GHz	up to 2x 1.86 GHz	up to 2x 1.66 GHz	up to 2x 2.53 GHz	up to 2x 2.53 GHz	up to 2x 1.66 GHz	1.6 GHz	CPU Clock
Cache	32 KB Instruction Cache + 24 KB L1/512 kByte L2	32 KB Instruction Cache + 24 KB L1 Cache, 512 KB L2 Cache	32 kB Instruction Cache + 24 kB L1, up to 512kB L2	512 KB L2	up to 1 MB L2	512kB L2	up to 6 MB L2	up to 4 MB L2	up to 6 MB L2	up to 4M L2	up to 4 MB L2	512 kB L2	Cache
Chipset	Intel® System Controller Hub US15W	Intel® Platform Controller Hub EG20	Intel® System Controller Hub US15W	Intel® System Controller Hub US15WPT	Intel® 82801HM	Intel® 945GSE, ICH7M	Intel® GS45, ICH9M SFF	Intel® 945GME, ICH7M-DH	Intel® GS45, ICH9M SFF, Intel® GM45, ICH9EM, Intel® GL40, ICH9M	Intel® Mobile Platform Controller Hub QM57	Intel® 945GME, ICH7M	Intel® 945GSE, ICH7M	Chipset
Bus Speed	400/533 MHz FSB	n/a	400/533 MHz FSB	533 MHz FSB	667/800 MHz	400/533 MHz FSB	800/1066 MHz FSB	533/667 MHz FSB	800/1066 MHz FSB	800/1066 FSB	400/533/667 MHz	400/533 MHz	Bus Speed
Memory	onboard up to 2 GB (DDR2)	onboard up to 2 GB DDR2-800	up to 2 GB DDR2	up to 2 GB onboard DDR2 (industrial temperature range)	up to 2x 2 GB DDR2	up to 2 GB DDR2	up to 4 GB DDR3	physical memory up to 4 GB DDR2, Dual Channel	up to 2x 4 GB DDR3, Dual Channel	up to 2x 4 GB (DDR3-RAM), Dual Channel with ECC	up to 2 GB DDR2	up to 2 GB DDR2	Memory
Hard Disk	1x onboard SSD up to 4 GByte, 1 SDIO port (shared with GPIO)	2x SerialATA 300, 1x microSD-Card Slot on GPIO alternatively 1x SerialATA 300, 1x SerialATA E2 SSD up to 8 GB	2x SerialATA (RAID 0,1), 1x PATA	1x SerialATA, 1x PATA, Optional industrial temperature range SSD onboard	3x SerialATA	2x SerialATA (AHCI), 1x PATA, optional SSD flash onboard	3x SerialATA 300 (AHCI; RAID 0,1), 1x PATA	2x SerialATA (AHCI; RAID 0,1), 1x PATA	4x SerialATA 300 (AHCI; RAID 0, 1, 5, 10, Matrix), 1x PATA (optional Flash onboard)	4x SerialATA (300) and PATA (on type 2 only)	2x SerialATA (AHCI), 1x PATA	2x SerialATA (AHCI), 2x PATA	Hard Disk
USB	USB 2.0, 8 ports (1 USB Client)	USB 2.0, 6 ports + USB Client port	USB 2.0, 8 ports (1x USB Client)	USB 2.0, 8 ports	USB 2.0, 8 ports	USB 2.0, 8 ports	USB 2.0, 8 ports	USB 2.0, 8 ports	USB 2.0, 8 ports	USB 2.0, 8 ports	USB 2.0, 4 ports; opt. 6 ports	USB 2.0, 4 ports; opt. 6 ports	USB
PCI Express	1 PCIe x1 lane (opt. 2 PCIe x1 if no onboard LAN)	3x PCIe x1 lanes	2 PCIe x1, optional up to 5 PCIe x1	2 PCIe x1 lanes	5 PCIe x1 lanes	3 PCIe x1	5 PCIe x1 or 1 PCIe x1 and 1 PEG x16	5 PCIe x1 or 1 PCIe x4, 1 PEG x16	5 PCIe x1 or 1 PCIe x1 and 1 PCIe x4, 1 PEG x16	PCIe 7(x1) lanes on Type 6, 6 (x1) lanes on Type 2, 1 PEG x16	-	-	PCI Express
PCI	-	-	PCI 2.3, 32 bit / 33 MHz	PCI 2.3, 32 bit / 33 MHz	PCI 2.3, 32 bit / 33 MHz	PCI 2.3, 32 bit / 33 MHz	PCI 2.3, 32 bit / 33 MHz	PCI 2.3, 32 bit / 33 MHz	PCI 2.3, 32 bit / 33 MHz	PCI 2.3, 32 bit / 33 MHz (Type 2 only)	-	-	PCI
ISA	-	-	-	-	-	-	-	-	-	-	ISA Bus (ETX(R) 3.0 compliant)	ISA Bus (ETX(R) 3.0 compliant)	ISA
Serial Ports	-	2x 2-wire TTL	-	-	-	-	-	-	-	-	2x full COM ports TTL	2x full COM ports TTL	Serial Ports
Ethernet	Intel® 82574L Hartwell, 10/100/1000 MBit	MAC in Chipset integrated, Phy: Broadcom BCM54610, 10/100/1000 MBit	Intel® 82574L, 10/100/1000 MBit	Intel® 82574 (Industrial Temperature Range), 10/100/1000 MBit	Intel® 82567, 10/100/1000 MBit	Intel® 82574L, 10/100/1000 MBit	Intel® 82567, 10/100/1000 MBit	Realtek RTL 8111C, 10/100/1000 MBit	Intel® 82567, 10/100/1000 MBit	Intel® 82557, 10/100/1000 MBit	Intel® 82562EZ, 10/100 MBit	Intel® 82562V, 10/100 MBit	Ethernet
Sound	Intel® High Definition Audio	Intel® High Definition Audio	Intel® High Definition Audio	Intel® High Definition Audio	Intel® High Definition Audio	Intel® High Definition Audio, AC97	Intel® High Definition Audio, AC97	Intel® High Definition Audio, AC97	Intel® High Definition Audio, AC97	Intel® High Definition Audio	AC97, Codec Crystal CS4299	AC97, HDA Codec Realtek ALC888	Sound
Graphics Controller	Integrated Intel® Graphics HDTV/HD capable, Decoder for MPEG2(HD)/H.264	Integrated 2D/3D Graphics Engine, Gfx Core 333/400 Mhz, shared VRAM	Intel® GMA 500, DirectX® 9, PS 3.0	Intel® GMA 500, DirectX® 9, PS 3.0	Integrated in Atom™ CPU, GMA950 (200 MHz) with DirectX® 9, PS 2.0	Intel® GMA950, DirectX® 9, PS 2.0	Intel® GMA X4500, DirectX® 10, PS 4.0	Intel® GMA 950 DirectX® 9, PS 3.0	Intel® GMA X4500 DirectX® 10, PS 4.0	Intel® iGFX GMA HD/5700MHD, DirectX® 10, PS 4.0	Intel® GMA 950	Intel® GMA 950	Graphics Controller
Graphics Memory	up to 256 MB, DVMT	tbd	up to 256 MB DVMT	up to 1024 MB DVMT	up to 384 MB DVMT	up to 256 MB DVMT	up to 1024 MB DVMT	up to 256 MB DVMT	up to 1024 MB DVMT	tbd	up to 224 MB DVMT 3.0	up to 224 MB DVMT 3.0	Graphics Memory
Display Interfaces	Single Chanel LVDS 18/24 Bit; WXGA 1366x768; SDVO (optional) up to 1920x1080	LVDS 18/24bit 1280x768@60Hz SDVO 1920x1080@50Hz	SDVO 1920x1080, Single-Channel LVDS 18/24 Bit, JILI support	Single channel 24 bit LVDS, Single SDVO channel	LVDS, VGA	Single/Dual Channel LVDS up to UXGA (1600 x 1200), CRT up to QXGA (2048x1536), SDVO, TVout, JILI support	Dual SDVO multiplexed with PEG, DisplayPort and HDMI, Single/Dual Channel, LVDS 18/24 Bit up to UXGA (1600x1200), TVout, CRT up to QXGA (2048x1536)	Dual SDVO multiplexed with PEG, Single/Dual Channel LVDS 18/24 Bit, TVout, CRT, JILI support	Dual SDVO multiplexed with PEG, DisplayPort and HDMI, Single/Dual Channel LVDS 18/24 Bit up to UXGA (1600x1200), TVout, CRT up to QXGA (2048x1536)	Type 2: CRT, LVDS, PEG multiplexed with embedded DisplayPort Type 6: CRT, LVDS, 3x DDI (SDVO/ DisplayPort/HDMI/ DVI)	Single/Dual Channel LVDS 18/24 bit up to 1600x1200, SDVO, CRT up to 2048x1536, JILI support	Single/Dual Channel LVDS 18/24 bit up to 1600x1200, SDVO, CRT up to 2048x1536, JILI support	Display Interfaces
Power Management	ACPI 3.0	ACPI 3.0	ACPI 3.0	ACPI 3.0	ACPI 3.0	ACPI 3.0	ACPI 3.0	ACPI 2.0	ACPI 3.0	ACPI 3.0	ACPI, APM 1.2, S3 support	ACPI, APM 1.2, S3 support	Power Management
Power Support	4.75 V - 14.7 V	4.75V - 14V	8.5 V - 18 V	4.75 V - 18 V	4.75 V - 18 V	8.5 V - 18 V	8.5 V - 18 V	8.5 V - 18 V	8.5 V - 18 V	8 V - 18 V	5 V	5 V	Power Support
Form Factor	COM Express™ compatible size ultra: 84 x 55 mm Pin-out Type 1	COM Express™ compatible size ultra: 84 x 55 mm Pin-out Type 10	COM Express™ compact: 95 x 95 mm Pin-out Type 2	COM Express™ compact: 95 x 95 mm Pin-out Type 2	COM Express™ compact: 95 x 95 mm Pin-out Type 2	COM Express™ compact: 95 x 95 mm Pin-out Type 2	COM Express™ compact: 95 x 95 mm Pin-out Type 2	COM Express™ basic: 125 x 95 mm Pin-out Type 2	COM Express™ basic: 125 x 95 mm Pin-out Type 2	COM Express™ basic: 95 x 95 mm Pin-out Type 2 or 6	ETX 3.0: 95 x 114 mm	ETX 3.0: 95 x 114 mm	Form Factor
Temperature	Operation: 0°C to +60°C Storage: -30°C to +85°C	Operation: 0°C to +60°C Storage: -30°C to +85°C Industrial Temperature Range: -40°C to +85°C	Operation: 0°C to +60°C Storage: -40°C to +85°C	Operation: -40°C to +85°C Storage: -40°C to +85°C	Operation: 0°C to +60°C, Storage: -30°C to +85°C, Extended Temperature: -25°C to +75°C on request	Operation: 0°C to +60°C, Storage: -30°C to +85°C, Extended Temperature: -25°C to +75°C on request	Operation: 0°C to +60°C, Storage: -30°C to +85°C, Extended Temperature: -25°C to +75°C on request	Operation: 0°C to +60°C, Storage: -30°C to +85°C, Extended Temperature: -25°C to +75°C on request	Operation: 0°C to +60°C, Storage: -30°C to +85°C, Extended Temperature: -25°C to +75°C on request	Operation: 0°C to +70°C, Storage: -30°C to +85°C, Extended Temperature: -25°C to +75°C on request	Operation: 0°C to +60°C, Storage: -30°C to +85°C, Extended Temperature: -25°C to +75°C on request	Operation: 0°C to +60°C, Storage: -30°C to +85°C, Extended Temperature: -25°C to +75°C on request	Temperature

THE THERMAL CONCEPT

Computer-on-Modules Heatspreader provides:

- » Identical mechanical size: modules of the same form factor fit into the same system
- » The only surface that needs cooling is the top of the heatspreader
- » Complete Cooling Solutions available



Starterkits for Computer-on-Modules

- » Complete Starterkits for immediate evaluation purposes
- » Includes all required hard- and software components for a quick start.
- » Choose your Module for the Starterkit.



COM Express™ for Extreme Temperatures

Mission-critical applications in the industrial automation, military, aerospace, transportation and energy markets offer the biggest challenges for extended temperature designs. To achieve functionality in extended temperature ranges, customers have two recommended ways to ensure that COM solutions perform within extended temperature environments – by design (solutions built with all industrial grade components) and by 100 % extended temperature testing of the solution.

The Kontron microETXexpress®-XL and nanoETXexpress-TT offers a "by design" modular solution fully approved for use under E2 industrial temperature range (-40°C to +85°C) conditions. Kontron also offers other high-performance COMs re-engineered to be reliable under such extreme temperature conditions. A whitepaper detailing the Kontron approach to serving extreme applications is downloadable from the Kontron website.

