

» Benefits of Computer-on-Modules «

With Computer-on-Modules

Without Computer-on-Modules

Deadline

Advantages at a glance

- » Scalable computing power
- » Scalable dimension
- » Short time-to-market
- » Optimized for harsh environments
- » Simplified development
- » Long-term availability
- » Industry standard with strong eco system

Automation



Industrial Control



Medical



Military/Aerospace



Infotainment



Transportation



Energy



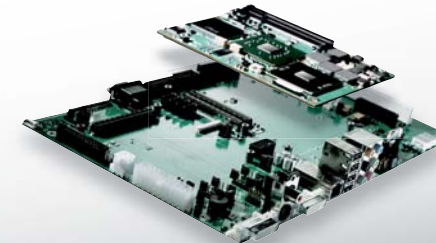
Communications



» Faster to complete solutions with... «

Concentrate 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 application-specific elements without worrying about the computing core.



Broad Knowledge Base Accelerates Time-to-Market

Kontron offers a variety of hardware and software tools to speed up and simplify your R&D processes.

With complete **starter kits** that, which include all required hard- and software for quick evaluation, engineers can start development while defining their application-specific solution. In addition to the available starter kits Kontron also provides various additional **Graphics Adapters** help developers to convert panel signals to the required specification of the target application.



Find out more on
kontron.com/mars,
kontron.com/mysafechoice

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.

More about ARM
modules on
www.kontron.com/arm



Find out more on
kontron.com/boardsandmore

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» Computer-on-Modules 2012 «

Computer-on-Modules

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



over 14 YEARS
COM Experience

If it's embedded, it's Kontron.

COM Express® ETX® 3.0 Long Term Support	COM Express® mini (84x55mm)					COM Express® compact (95x95mm)							COM Express® basic (125x95mm)			ETX® (114x95mm)																					
	COMe-mSP1 (nanoETXexpress-SP)		COMe-mTT10 (nanoETXexpress-TT)		COMe-mCT10 (NEW)	COMe-cSP2 (microETXexpress-SP)		COMe-cXLi2 (microETXexpress-XL)		COMe-cPV2 (microETXexpress-PV)		COMe-cDC2 (microETXexpress-DC)		COMe-cPC2 (microETXexpress-PC)		COMe-cOH# (microETXexpress-OH)		COMe-cCT6 (Preliminary)	COMe-bCD2 (ETXexpress-CD)		COMe-bPC2 (ETXexpress-PC)		COMe-bAI# (ETXexpress-AI)	COMe-bSC# (ETXexpress-SC)		COMe-bIP# (NEW)	ETX-CD	ETX-DC	ETX-OH (NEW)								
	-40°C to +85°C		-40°C to +85°C		NEW	-40°C to +85°C		-40°C to +85°C										Preliminary					Preliminary														
CPU	Intel® Atom™ Z510, Z530		Intel® Atom™ E6xx / E6xxT		Intel® Atom™ N2600, N2800, D2700	Intel® Atom™ Z510, Z530		Intel® Atom™ Z520PT		Intel® Atom™ D510, D410, N450, D525		Intel® Atom™ N270		Intel® Core™ 2 Duo SL9400, SU9300, Intel® Celeron® M Processor 722, 723		AMD G-Series T44R, T52R, T40N, T56N		Intel® Atom™ N2600, N2800, D2700	Intel® Core™ Duo L2400, Intel® Celeron® M 440, T9400, P8400, Celeron® M575		Intel® Core™ i7-610E, i7-620LE, i7-620UE, i5-520E	Intel® Core™ i7-2715QE, i7-2655LE, i7-2610UE, i5-2515E, i3-23100E, i3-2340UE, Celeron® B810E, 847E		3rd Generation Intel® Core™ processor based platform	Intel® Core™ 2 Duo, Intel® Core™ Duo, Intel® Celeron® M		Intel® Atom™ N270	AMD G-Series, T40R, T52R, T40E, T56N									
CPU Clock	1.1 GHz up to 1.6 GHz		0.6 GHz up to 1.6 GHz		up to 2x 2.13 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 1.6 GHz		up to 2x 2.13 GHz	up to 2x 1.66 GHz		up to 2x 2.53 GHz		up to 2x 2.53 GHz	up to 2x 2.5 GHz resp. 4x 2.1 GHz		tbd	up to 2x 1.66 GHz		1.6 GHz		up to 2x 1.65 GHz						
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 Instructions cache + 24 kB L1, up to 512kB L2 Cache	32 kB Instruction Cache + 24 kB L1, up to 512kB L2 Cache		512 kB L2		up to 1 MB L2		512kB L2		up to 6 MB L2		512 kB L2		tbd	up to 4 MB L2		up to 6 MB L2		up to 4 MB L2	up to 6 MB L2 Cache		tbd	up to 4 MB L2		512 kB L2		2x 512 kB L2						
Chipset	Intel® SCH US15W		Intel® PCH EG20 / EG20T		Intel® SCH NM10 Express	Intel® SCH US15W		Intel® SCH US15WPT		Intel® 82801HM		Intel® 945GSE, ICH7M		Intel® GS45, ICH9M SFF		AMD FCH A50M		Intel® SCH NM10 Express	Intel® 945GME, ICH7M-DH		Intel® GS45, ICH9M SFF, Intel® GM45, ICH9EM, Intel® GL40, ICH9M		Intel® Mobile Platform Controller Hub QM57	Intel® Mobile Platform Controller Hub QM67 resp. HM65		tbd	Intel® 945GME, ICH7M		Intel® 945GSE, ICH7M		AMD FCH A55M						
Bus Speed	400/533 MHz FSB		n/a		n/a	400/533 MHz FSB		533 MHz FSB		667/800 MHz		400/533 MHz FSB		800/1066 MHz FSB		800/1066 MHz FSB		n/a	533/667 MHz FSB		800/1066 MHz FSB		800/1066 FSB	n/a		n/a	400/533/667 MHz		400/533 MHz		1066 MHz FSB						
Memory	onboard up to 2 GB DDR2		onboard up to 2 GB DDR2-800		onboard up to 2 GB DDR3 (800/1066 MHz)	up to 2 GB DDR2		onboard up to 2 GB DDR2 (industrial temperature range)		up to 2x 2 GB DDR2/DDR3		up to 2 GB DDR2		up to 4 GB DDR3		up to 2x 4 GB DDR3		up to 2x 2 GB DDR3	physical memory up to 4 GB DDR2, Dual Channel		up to 6 MB L2		up to 2x 4 GB DDR3, Dual Channel with ECC	up to 2x 8 DDR3, Dual Channel with ECC		up to 2x 8 GB DDR3, Dual Channel	up to 2 GB DDR2		up to 2 GB DDR2		Up to 4 GB DDR3						
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 SATA 300, 1x SATA E2 SSD up to 8 GB		2x Serial ATA external supporting 3Gb/s alternatively: 1x SATA + 1x SATA onboard SSD Flash drive up to 8GB SLC / 32GB MLC	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 2, 1x PATA		4x SerialATA 3		2x SerialATA 2		2x SerialATA (AHCI; RAID 0,1), 1x PATA		4x SerialATA 2, 1x PATA (optional Flash onboard)		4x SerialATA 2 PATA (on Type 2 only)	2x SerialATA 3, 2x SerialATA 2 PATA (on Type 2 only)		2x SerialATA 3 PATA (on Type 2 only)		2x SerialATA (AHCI), 1x PATA		2x SerialATA (AHCI), 2x PATA						
USB	USB 2.0, 8 ports (1 USB Client)		USB 2.0, 6 ports + USB Client port		USB 2.0, 8 ports	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 3.0 (type 6 only), 2 ports and USB 2.0, 6 ports		USB 2.0, 8 ports	USB 2.0, 8 ports		USB 2.0, 8 ports		USB 2.0, 8 ports	Type 2: USB 2.0, up to 8 ports Type 6: USB 3.0, 2 ports and USB 2.0, 6 ports		Type 2: USB 2.0, 8 ports Type 6: USB3.0, 4 ports and USB 2.0, 4 ports		USB 2.0, 4 ports; opt. 6 ports		USB 2.0, 4 ports; opt. 6 ports		USB 2.0, 4 ports; opt. 2x miniUSB 2.0					
PCI Express	1 PCIe x1 lane (opt. 2 PCIe x1 if no onboard LAN)		3x PCIe x1 lanes		4x PCI Express x1 Lanes, one for LAN onboard	2 PCIe x1, optional up to 5 PCIe x1		2 PCIe x1 lanes		5 PCIe x1 lanes		3 PCIe x1		5 PCIe x1 1 PEG x16		6 PCIe x1		4 PCIe x1 lanes		5 PCIe x1 1 PEG x16		5 PCIe x1 1 PEG x16		Type 2: 6 PCIe x1, 1 PEG x16 Type 6: 7 PCIe x1, 1 PEG x16		Type 2: 5 PCIe Gen 2.0 x1, 1 PEG x16 Type 6: 7 PCIe Gen 2.0 x1, 1 PEG x16 (Gen 2.0)		up to 7 PCIe x1		-		-					
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 (type 2 only)		-		PCI 2.3, 32 bit / 33 MHz		PCI 2.3, 32 bit / 33 MHz		Type 2: 6 PCIe x1, 1 PEG x16 Type 6: 7 PCIe x1, 1 PEG x16 (Type 2 only)		PCI 2.3, 32 bit / 33 MHz (Type 2 only)		PCI 2.3, 32 bit / 33 MHz (Type 2 only)		PCI 2.3, 32 bit / 33 MHz (Type 2 only)		PCI 2.3, 32 bit / 33 MHz					
ISA	-		-		-	-		-		-		-		-		-		-		-		-		-		-		-		-		-		-			
Serial Ports	-		2x 2-wire TTL		2x 2-wire TTL	-		-		-		-		-		1x 2-wire TTL		2x 2-wire TTL		-		-		-		-		-		-		-		-			
Ethernet	Intel® 82574L Hartwell, 10/100/1000 Mbit		MAC in Chipset integrated, Phy: Broadcom BCM54610, 10/100/1000 Mbit		Intel® 82574L (Hartwell) 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		Intel® 82574L, 10/100/1000 Mbit		Intel® Pearsonville, 10/100/1000 Mbit		Realtek RTL 8111C, 10/100/1000 Mbit		Intel® 82567, 10/100/1000 Mbit		Intel® 82557, 10/100/1000 Mbit		Intel® 82579, 10/100/1000 Mbit		Intel® 82579, 10/100/1000 Mbit		Intel® 82562EZ, 10/100 Mbit		Intel® 82562V, 10/100 Mbit		Broadcom BCM54610 10/100 Mbit			
Sound	Intel® High Definition Audio		Intel® High Definition Audio		Intel® High Definition Audio w/ HDMI 1.3a support	Intel® High Definition Audio		Intel® High Definition Audio		Intel® High Definition Audio		Intel® High Definition Audio, AC97		Intel® High Definition Audio		Intel® High Definition Audio		Intel® High Definition Audio w/ HDMI 1.3a support		Intel® High Definition Audio, AC97		Intel® High Definition Audio		Intel® High Definition Audio		Intel® High Definition Audio		AC97, Codec Crystal CS4299		Realtek ALC886GR HDA		Realtek ALC886GR HDA					
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 Video Encode: MPEG4, H.263, H.264 Video Decode: MPEG2, WMV9, H.264		Integrated 2D/3D Graphics Engine, GMA 3650/3600, Gfx clock 640/400MHz Video Decode: MPEG2, Blu-Ray Disk 2.0, VC-1, H.264, WMV9 up to 1080p	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		AMD Mobility Radeon HD6250/HD6310 DirectX® 11, OpenCL 1.0, PS 5.0, H.264, VC-1 (ATI Avivo HD)		Intel® GMA 5650/5600 DirectX® 9.1, OpenGL 3.0, BluRay 2.0		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® iGFX HD3000/HD2000 integrated, DirectX® 10.1, PS 4.0, OpenGL 3.0		tbd		Intel® GMA 950		Intel® GMA 950		Integrated Radeon HD6310 / HD6250 DirectX® 11, PS 5.0, OpenGL 3.2 ATI Avivo HD with H.264, VC-1, Blu-ray support			
Graphics Memory	up to 256 MB, DVMT		up to 352 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		tbd		up to 256 MB DVMT		up to 1700 MB DVMT		up to 1700 MB DVMT		up to 1700 MB DVMT		up to 1700 MB DVMT		up to 224 MB DVMT 3.0		up to 224 MB DVMT 3.0		tbd					
Display Interfaces	Single Chanel LVDS 18/24 Bit 1366x768; SDVO (optional) up to 1920x1080		LVDS 18/24bit 1280x768@60Hz SDVO 1920x1080@50Hz		LVDS 18bit 1366x768@112MHz (N2600/2800) LVDS 24bit 1440x900@112MHz (D2700 DisplayPort)	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 1600 x 1200, CRT up to 2048x1536, SDVO, TVout, JILI support		Dual SDVO multiplexed with PEG, DisplayPort and HDMI, Single/Dual Channel, LVDS 18/24 Bit up to 1600x1200, TVout, CRT up to 2048x1536		Dual SDVO multiplexed with PEG, DisplayPort and HDMI, Single/Dual Channel, LVDS 18/24 Bit up to 1600x1200, TVout, CRT up to 2048x1536		Single Channel LVDS 18 bit, (type 6) 24 bit (Type 2), 2x DDI (DisplayPort/HDMI/DVI) CRT up to 2560x1600 (Type 6)		tbd		Dual SDVO multiplexed with PEG, Single/Dual Channel LVDS 18/24 Bit up to 1600x1200, TVout, CRT, JILI support		Dual SDVO multiplexed with PEG, DisplayPort and HDMI, Single/Dual Channel LVDS 18/24 Bit up to 1600x1200, TVout, CRT up to 2048x1536		Type 2: VGA, LVDS, PEG (Multiplexed) Type 6: VGA, LVDS, 1x DDI (SDVO/DVI/DP/HDMI), 2x DDI (DVI/DP/HDMI), PEG (Multiplexed)		3x DP++ (incl. 1x SDVO, 1x eDP) 1x CRT, 1x Dual Channel LVDS 18/24 bit (DP++ and PEG multiplexed on Type 2)		3x DP++ (Type 2: PEG multiplexed), 1x CRT, 1x SDVO		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 1920 x 1200, CRT up to (2560 x 1600)		DP++ (DisplayPort/HDMI/DVI), Dual Channel LVDS 18/24 bit up to 1920 x 1200, CRT up to (2560 x 1600)	
Power Support	4.75 V - 14.7 V; ACPI 3.0		4.75 V - 14.7 V; ACPI 3.0		4.75 V - 20 V, ACPI 3.0	8.5 V - 18 V; ACPI 3.0		4.75 V - 18 V; ACPI 3.0		4.75 V - 18 V; ACPI 3.0		8.5 V - 18 V; ACPI 3.0		8.5 V - 18 V; ACPI 3.0		4.75 V - 18V; ACPI 3.0		4.75 V - 20 V, ACPI 3.0		8.5 V - 18 V; ACPI 2.0		8.5 V - 18 V; ACPI 3.0		8 V - 18 V; ACPI 3.0		8.5 V - 18 V; ACPI 3.0		8.5 V - 20 V; ACPI 3.0		5 V; ACPI 2.0, APM 1.2		5 V; ACPI 2.0		5 V; ACPI 3.0			
Form Factor	COM Express® mini: 84 x 55 mm Pin-out Type 1		COM Express® mini: 84 x 55 mm Pin-out Type 10		COM Express® mini: 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 or 6		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: 125 x 95 mm Pin-out Type 2 or 6		COM Express® basic: 125 x 95 mm Pin-out Type 2 or 6		COM Express® basic: 125 x 95 mm Pin-out Type 2 or 6		ETX 3.0: 95 x 114 mm		ETX 3.0: 95 x 114 mm		ETX 3.0: 95 x 114 mm							
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		Operation: 0°C to +60°C, Storage: -30° to +85°C,	Operation: 0°C to +60°C Storage: -40°C to +85°C		Operation: 0°C to +60°C Storage: -40°C to +85°C		Operation: 0°C to +60°C, Storage: -30°C to +85°C,		Operation: 0°C to +60°C, Storage: -30° to +85°C,		Operation: 0°C to +60°C, Storage: -30°C to +85°C,		Operation: 0°C to +60°C, Storage: -30°C to +85°C,		Operation: 0°C to +60°C, Storage: -30°C to +85°C,		Operation: 0°C to +60°C, Storage: -30°C to +85°C,		Operation: 0°C to +60°C, Storage: -30°C to +85°C		Operation: 0°C to +60°C, Storage: -30°C to +85°C,		Operation: 0°C to +60°C, Storage: -30°C to +85°C,		Operation: 0°C to +60°C, Storage: -30°C to +85°C,		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		Extended Temperature: -25°C to +75°C on request	Industrial Temperature Range: -40°C to +85°C		Extended Temperature: -25°C to +75°C on request		Extended Temperature: -25°C to +75°C or -40°C to +85°C (only D525) on request		Extended Temperature: -25°C to +75°C on request		Extended Temperature: -25°C to +75°C on request		Extended Temperature: -25°C to +75°C on request		Extended Temperature: -25°C to +75°C on request		Extended Temperature: -25°C to +75°C on request		Extended Temperature: -25°C to +75°C on request		Extended Temperature: -25°C to +75°C on request		Extended Temperature: -25°C to +75°C on request		Extended Temperature: -25°C to +75°C on request		Extended Temperature: -25°C to +75°C on request		Extended Temperature: -25°C to +75°C on request					