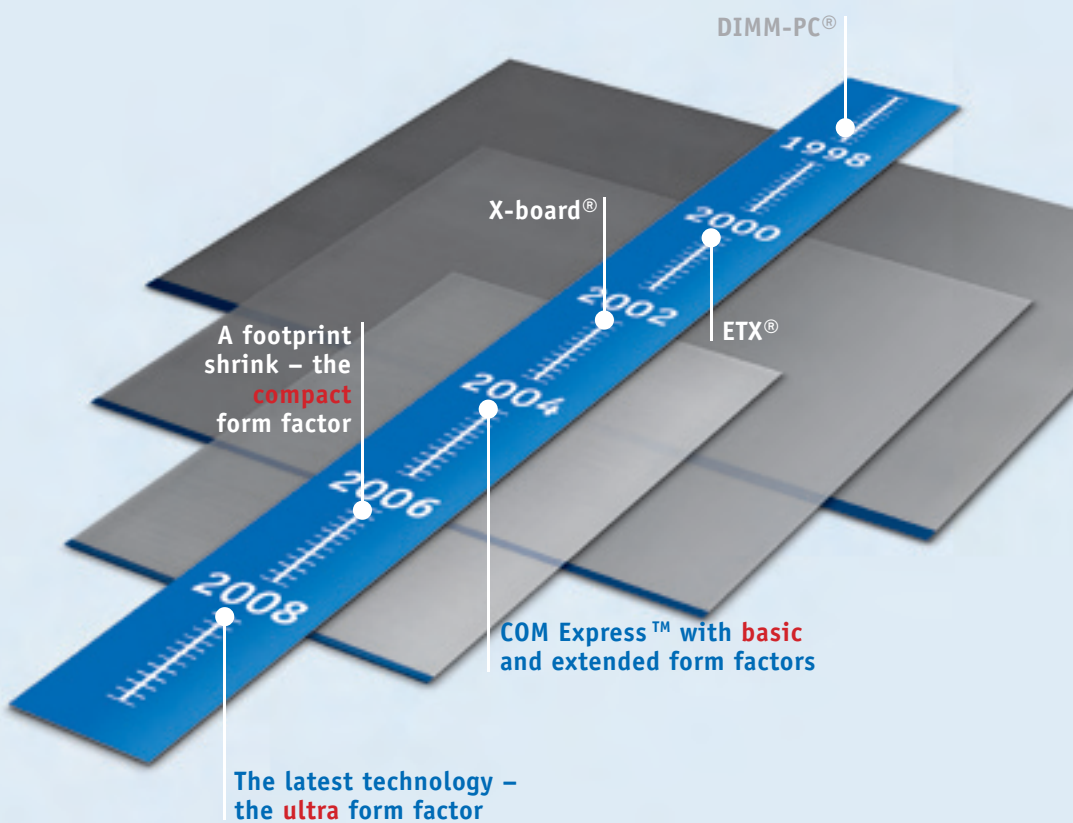


COM Express™ One Concept, Ever Smaller

10 Years Computer-on-Modules!



The long term strategy from Kontron

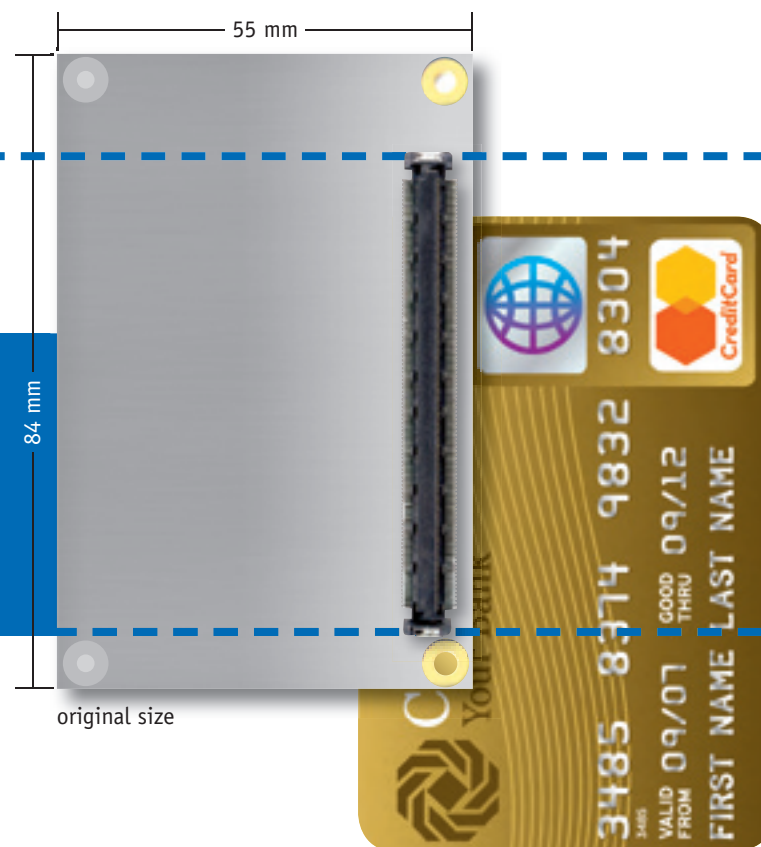


Common Connector

ultra

► Form factor

Size: 84 x 55 mm
 Type connector: AMP/TYCO
 Pin-out types: COM Express™
 COM.0 Type 1
 Power supply: 5V – 14V



The **ultra** is the latest addition to the COM Express™ pin-out compatible family. The newest developments and architectures give it a tiny footprint, just the size of a credit card. With this form factor, COM technology again reaches out to the classic small form factor world addressed by other legacy form factors. This time, however, with proven and standardized knowledge about board layout and COM Express™ connector concepts having been gained in the meantime, new markets have emerged. Extremely low power consumption and tiny dimensions make **ultra** most suitable for mobile and battery applications.

In mechanical terms, **ultra** means optimum compatibility with the **compact** and **basic** form factors, and it has the smallest footprint.

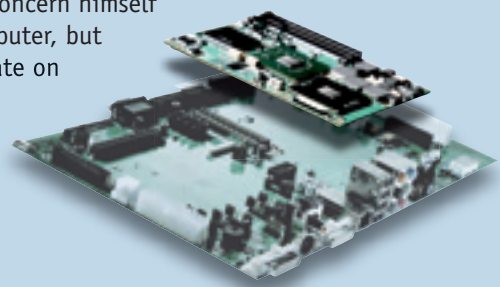
ultra – small form factor with a common standard

To permit handling of legacy small form factors, the power supply range was extended downwards to include 5V supplies. Thus the regular COM Express™ 12V standard, as well as 5V from small systems, can be used. Even the mounting holes line up for easy integration!

Kontron sells the **ultra** form factor under the trademark **nanoETXexpress**.

Concentrate on your core business

When using a Computer-on-Module (COM), customers can concentrate on their core business and need only design the necessary interfaces and circuits for their individual Carrier Boards. The standardized operations computer is simply plugged into the Carrier Board. The customer does not need to concern himself with the computer, but can concentrate on his business.

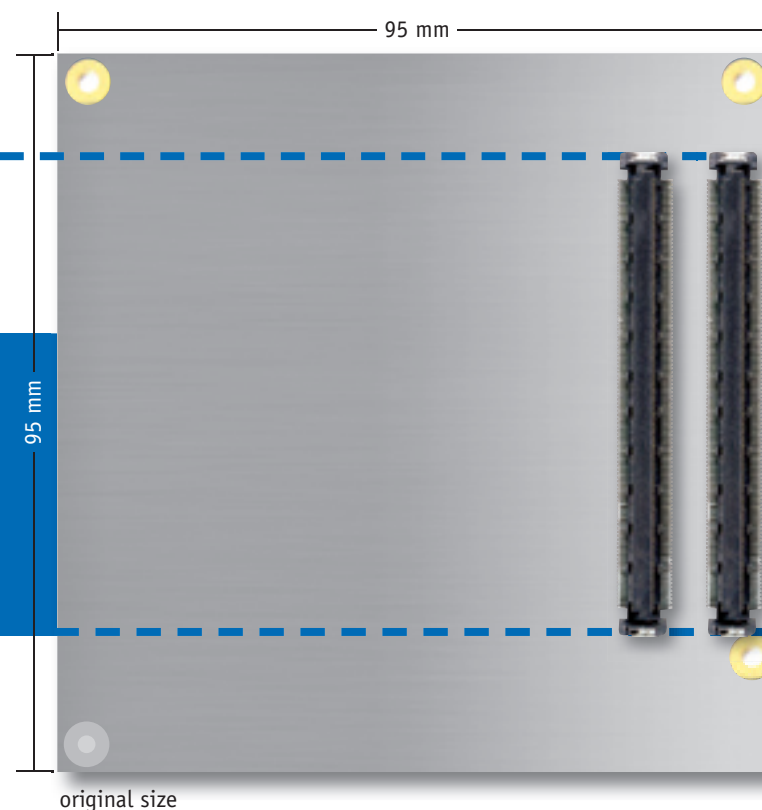


Same Placement

► Form factor

compact

Size: 95 x 95 mm
 Type connector: AMP/TYCO
 Pin-out types: COM Express™
 COM.0 Type 2
 Power supply: 8.5V – 18V



Upcoming new chip technology and smaller chip architectures led to lower space requirements and enabled the providers of such modules to shrink the footprint, resulting in the **compact**, with a quadratic format of 95 x 95 mm, being introduced. At the same time, reduced power consumption lowered cooling needs and simplified the footprint shrink. The primary difference between the **compact** and **basic** form factor is the overall physical footprint. In terms of interfaces and pin-out, the **compact** form factor is totally compatible with the **basic** form factor.

The mounting holes on the smaller module line up with the holes of the **basic** form factor – as long as the module size covers their position. This, together with the same placement of the connectors, guarantees interchangeability between **basic** and **compact** on Carrier Boards.

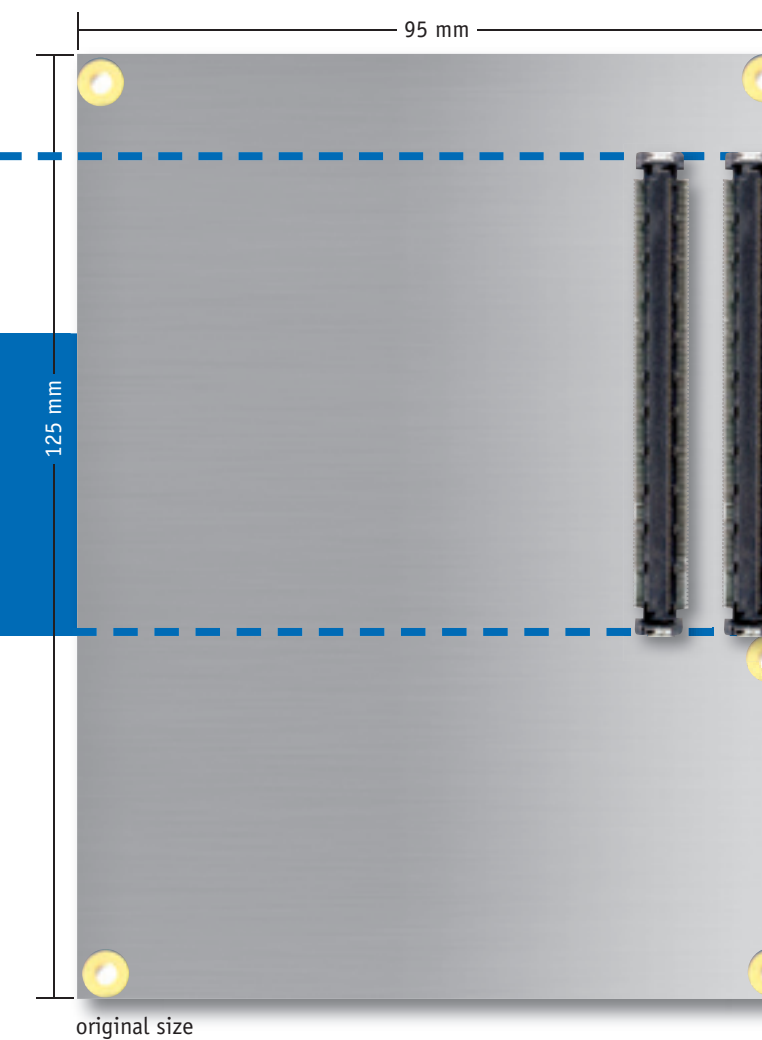
Kontron sells the **compact** form factor under the trademark **microETXexpress**.

Interchangeability

► Form factor

basic

Size: 95 x 125 mm
 Type connector: AMP/TYCO
 Pin-out types: COM Express™
 COM.0 Type 2
 Power supply: 8.5V – 18V



Today, **basic** is the most commonly known form factor, the reason being that older computer technology needed more space on the module. With newer technology providing more space, **basic** today fulfils nearly all imaginable needs. Enormously powerful modules, equipped with an abundance of features, can be easily implemented. This has led to the latest **basic** COMs leading the way in performance and features comparisons.

Standardized heatspreader dimensions ensure easy control of heat dissipation and are an important consideration for true interchangeability.

COM Express™ **basic** has dimensions that are the most similar to the ETX® modules. The COM Express™ **basic**, even in its physical respects, therefore continues the triumphant progress of ETX®.

Kontron sells the **basic** form factor under the registered trademark **ETXexpress®**.



COM Express™ Extension

Enhanced interoperability

Experience in the field has shown that additional specifications and rules can ease design considerably without constraining the opportunities and possibilities available.

As a result, consistent with the objective of the PICMG® COM Express™ specification, the COM Express™ Extension specification defines COM Express™ compliant modules at a level that permits and ensures interoperability between

independent vendor modules and Carrier Boards. It is of interest that the COM Express™ Extension also specifies additional hardware and software features. The reason for this is that COM Express™ focuses on hardware specification in terms of physical dimensions, while omitting software specifications. The extension also supports interchangeability at the software level. For more information please read either the hardware and software paragraphs on the right, or visit <http://www.comexpress-extension.com>

COM Express™ Extension: Hardware

Wide range of input power

Given that there is a broad variety of different computer modules with different power supply concepts, the wide range power input of 8.5V to 18V is designed to cover all popular concepts. Compared to the 12V specified for PICMG COM Express™, this is an uncompromising advantage. Since lower power supplies of 5V are generally used for small form factors such as **ultra**, wide-range support is here specified as being from 5V to 14V to allow compatibility with both worlds.

GPIO/SDIO

In general, GPIOs for custom use are specifically defined. The Extension defines a generic usage pattern that standardizes this but does not restrict the customer's use of GPIO. In addition, GPIO can be used for SDIO interfacing.

Thermal control

Intelligent fan control is ensured by a three-pin fan header onboard the module. To control this efficiently, an ACPI-compliant OS can access this interface.

COM Express™ Extension: Software

TPM support

Recently, trusted computing has been driving most applications in the financial and gaming sectors. In the financial industry, fraud is prevalent. Trusted computing, with state-of-the-art encryption technologies such as sealed storage or digital signature for active or passive authentication, is increasingly becoming mandatory. COM Express™ Extension COMs are TCG 1.2-compliant and meet current security and safety requirements.

Smart Battery support

For the increasingly important mobile and battery-packed applications, the BIOS must be able to monitor the actual battery state of your system. This is known as Smart Battery support.

Legacy Super I/O support

Although COM Express™ is a legacy-free concept, field applications often require simple interfaces such as serial or parallel ports or a floppy drive port. The Extension has therefore made integration of LPC SUPER I/O chip support mandatory for the BIOS.

► Success factor

Benefit from the mighty COM Express™

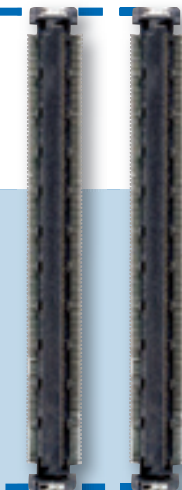
Connectors and pin-out types

PICMG® defined, within the COM Express™ standard, different pin-out schemes based on up to two AMP/TYCO connectors positioned side-by-side. These connectors are of proven design and are widely used in the telecommunications sector. Shock and vibration resistance, as well as an extraordinarily high data bandwidth, are further guarantees they offer for future security, while the upcoming PCI Express 2.0 is absolutely feasible for this connector.

The right connector (rows A and B) has been designed and pinned out to support today's state-of-the-art interfaces. The left connector's pin-out is different, since the applications field can be varied, while at the same time it can support many legacy interfaces or add more lanes to extend interfaces from the first connector. However, for a state-of-the-art application, the right connector (which is exactly COM Express™ Pin-out Type 1) is sufficient – and also used by the **ultra** form factor.

Pin-out Type 2 is based on the dual connector with 440 pins. It is depicted in the figure on the right and is the most common pin-out type.

D1 C1 B1 A1



D110 A110

D1	C1	B1	A1
IDE	IDE	LPC	Gigabit Ethernet
PCI	PCI	SMB	
PCI	PCI	I ² C	
PCI	PCI	SATA	SATA
PCI	PCI	SATA	SATA
PCI	PCI	AC97/HD Audio	AC97/HD Audio
PEG	PEG	USB	USB
PEG	PEG	USB	USB
PEG	PEG	USB	USB
PEG	PEG	USB	USB
PEG	PEG	USB	USB
PEG	PEG	PCIe	PCIe
PEG	PEG	PCIe	PCIe
PEG	PEG	PCIe	PCIe
PEG	PEG	GPIO/SDIO	GPIO/SDIO
		LVDS	LVDS
		5V stby	LVDS
		VGA/TVout	
Power	Power	Power	Power
D110			A110

COM 
Express

COM Express™ standard

Thoroughly thought-out:

The COM Express™ standard describes Computer-on-Modules and is intended to be the technological successor to ETX®. It defines mechanical dimensions such as maximum height, a standardized heat spreader for interchangeable cooling solutions, placement of mounting holes, a detailed description of connector placements and their electrical properties such as impedance or electromagnetic shielding.

Both mechanically and electrically, you benefit from:

- Scalability
- Shortest time-to-market
- Independency
- Leverage of knowledge
- Simplified development
- Long-term availability
- Numerous product and services vendors

COM Express™, PICMG® and the embedded computing world



In 1994, PICMG® (PCI Industrial Computer Manufacturers Group) was founded as a non-profit, tax-exempt organization of more than 400 member companies who collaboratively develop open specifications. Its scope of activities is in telecommunications and industrial computing applications. The companies involved have a long history of developing leading edge products for these industries. One of the supporting members of the PICMG® committee is Kontron AG.



COM Express™ is the name of the latest PICMG® standard – officially adopted in 2005 – for Computer-on-Modules (COM). COM Express™ modules are often sold as brands such as ETXexpress® from Kontron. You can learn more about different form factors and footprint sizes in the following. They are all based on COM Express™ concepts, in which the elements playing a decisive role are mounting dimensions and electrical connectors.



The Computer On Module – Industrial Group (COM-IG) is an independent association of companies and was build up to keep next generation Computer-on-Modules closer to the market needs. In particular, the COM-IG specified further hardware and software extensions to enhance the COM Express™ standard (see inside) but also pushes COM Express™ compatible form factors such as compact and ultra. To learn more about COM-IG, please visit <http://www.com-ig.com>.

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