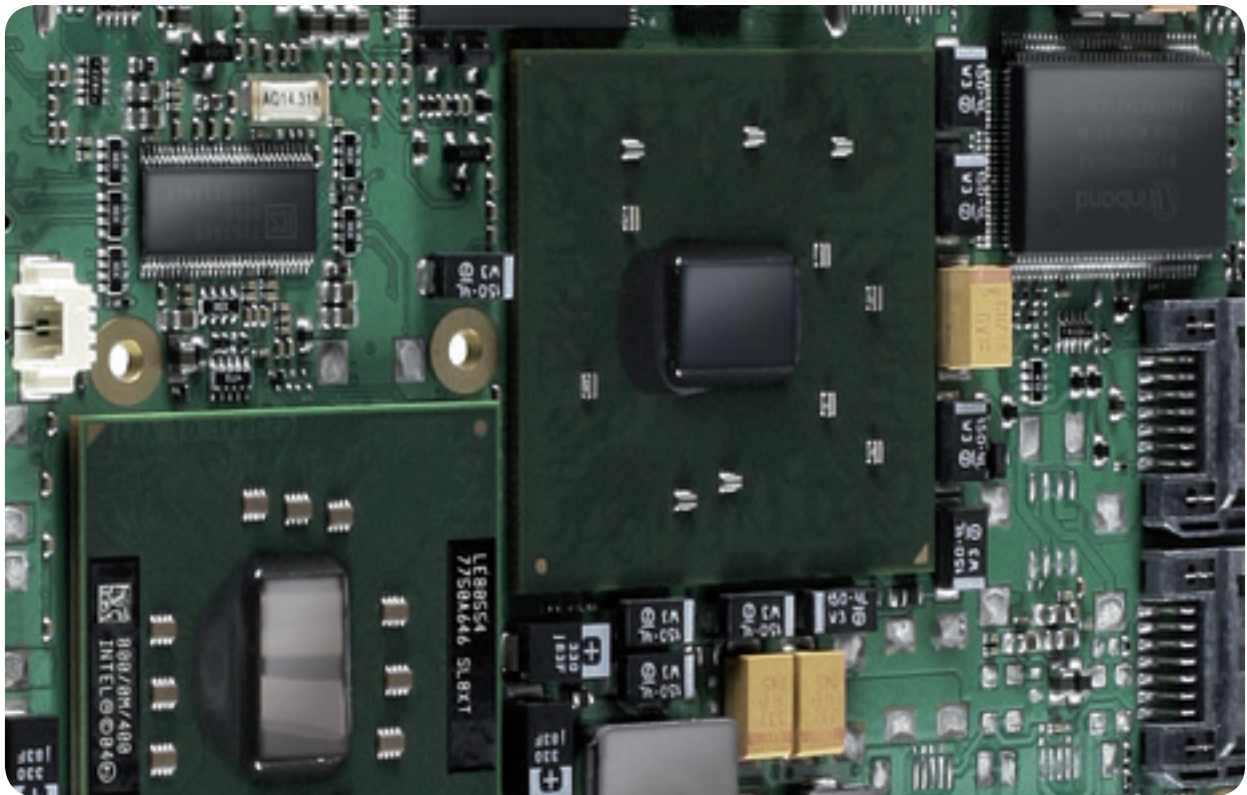


» Whitepaper «



ETX[®]-PM Migration

Three strategies for the technology change

- » Kontron Extended Life Cycle Program until 2015
- » Migration to the latest ETX[®] solutions
- » COMsistent towards COM Express[™] standard

The right decision for tomorrow

Three strategies for a change in technology

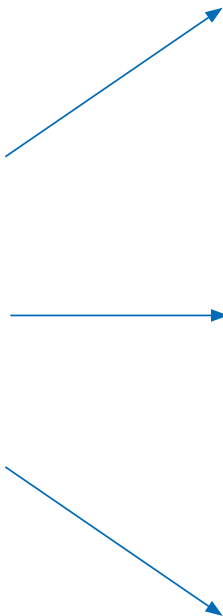
The Intel® Pentium® M processor and its little brother, the Intel® Celeron® M have a real success story behind them. They have been the most commonly used processors in embedded computer technology in recent years. On ETX® Computer-on-Modules, they have been built into various applications and are still in demand in large quantities even today. However, the Intel® 855xx and 852xx chipsets will now be discontinued. The corresponding ETX® modules will only be available for a limited period.

OEMs must therefore look for new solutions. Even if an important argument for Computer-on-Modules is scalability, given the variety of potential options the right decision for the future is not well defined. OEMs should as a result weigh the available options carefully placing the planned future development of the application in the foreground. Depending on the strategy, three fundamentally different paths of migration should be taken into account.

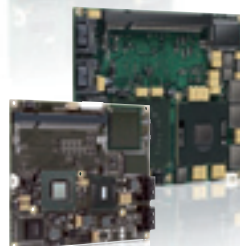
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ETX® Computer-on-Module with Intel Pentium® M and Celeron® M



1. Extended Life Cycle Program for Intel Pentium® M and Celeron® M based ETX® modules



2. Migration to current ETX® solution with Intel® Atom™ N270 processor or Intel® Celeron® M processor 440



3. Migration to multi-core and COM Express™



Strategy 1: Kontron Extended Life Cycle Program until 2015

Developers who want to work with applications without changes to their original configuration, be it because the product lifecycle ends in the near future, or because they intend to re-design at a later time and/or would like to implement future generations of processors prefer not to have to change anything. If the embedded computing manufacturer offers an extended lifecycle program, one can simply continue as before without any additional effort. Kontron has such a program, equipped with the appropriate organization and funding, on offer. The program allows OEMs to cover their needs for Intel® Pentium® M and Celeron® M processor-based Kontron ETX®-PM and ETX®-PM3 modules until the end of 2015 and then to switch to an appropriate ETX® successor. If a company can calculate its sales volume accurately, it can now sign a framework agreement. But what if one does not want to be bound by a contract or in any case a new implementation date is planned? What is the correct way to change to current modules with as little effort as possible?

Strategy 2: Migration to the latest ETX® solutions

Whoever wants to upgrade to a new ETX® module and to keep their migration simple and cost-effective should consider the following points when choosing the successor module: The ETX®-successor should provide an equivalent or better performance and power consumption, offer the same features, and guarantee high long-term availability and software compatibility. Depending on the performance of the previously used modules, there are currently two processor classes to choose from.

More performance, less power

For designs with processors up to the 1.3GHz Intel® Celeron® processor, or up to around the 1.4 GHz Intel® Pentium® M processor, the latest ETX® Computer-on-Module with Intel® Atom™ N270 processor is the ideal replacement. Depending on the processor used, these offer the same (or far greater) computing power with lower power consumption. Kontron presents, for example, an ideal solution with the Kontron ETX®-DC, which, with only 12.5 W maximum power consumption, requires one watt less power than an Intel® Celeron® 600 MHz solution. This is particularly advantageous when changing to the new module. As there is no need to thermally redesign the existing application, the migration is simplified even further.



Ideal for the migration of low-power Intel® Pentium® M and Celeron M designs: the Kontron ETX®-DC with Intel® Atom™ processor, certified Intel® 945 GSE chipset, and optional 24-bit LVDS support.

However, the processor is just one side of the coin. The chipset used for the migration solution is also important because it is crucial for features and of lasting influence on compatibility. For instance, some module manufacturers use non-specified chipsets, such as the Intel® 945GME chipset for Intel® Core™ processors for there Intel® Atom™-based modules to integrate additional features. This approach may, however, be to the detriment of long-term availability and design security and is therefore ultimately a burden to be carried by the user. Indeed, it is possible that with a small chipset revision, the compatibility with the Intel® Atom™ processor is lost and the module is therefore not available in this configuration. As a consequence, the re-design must be made not just once but twice. Kontron recommends focusing on solutions that strictly adhere to the Intel® usage and modul specifications, and that any added functions be separately implemented. One example is 24 bit LVDS support. Today, although most panels support 18- and 24-bit LVDS, some older applications use panels that only support 24-bit LVDS VESA/FPDI mapping. For these applications Kontron offers the ETX®-DC with the certified Intel® GSE945 chipset with an optional mapping converter for 24-bit LVDS support. This way, Kontron reliably ensures the customers' investments in existing applications and minimizes migration costs for low-power designs, without risk to long-term availability.

Single core, even if it's faster

The processor offerings diverge for the migration of faster Intel® Pentium® M processors (1.4 GHz to 1.8 GHz) or the Intel® Celeron® M processor at 1.5 GHz. There are currently two processor architectures propagated: Multi-core and single-core. Several vendors advocate modules based on the Intel® Atom™ D510 dual-core processors, as these are computationally on a par with regard to CPU performance. Kontron primarily advises that migrations stick with single-core solutions. The reason for this is that many previously Pentium M-based ETX® applications cannot use the processing

power of multi-core processors because they are not designed for symmetrical multiprocessing or multithreading. Therefore the development effort for this would today rise. This only makes sense in very limited cases, when the OS and/or the application need to be reprogrammed:

Firstly, many applications are based on operating systems that do not support multi-core architectures. This applies, for example, to DOS, VxWorks 5.5 or earlier (multi-core support of Release 6.6) and Windows CE (until the pending multi-core CPU support in Version 7). For Linux it must be individually assessed whether the implemented kernel supports multi-core. If this is not the case, a core will remain unused as for the other above named operating systems.

Secondly, the developed software is not optimized for symmetric multiprocessing, as the Intel® Pentium® M and Celeron® M processors do not support hyper-threading. Applications that are based on operating systems that can make use of multi-core processors such as Windows XP, XP Embedded and QNX may therefore also in principle not take advantage of multi-core performance. The software would then only run on a single-processor core and the computing power of the other cores would actually remain unused.



More performance for fast ETX® applications: The Kontron ETX®-CD with Intel® Celeron CM440 single-core processor up to the Intel Core™ 2 Duo dual-core processor.

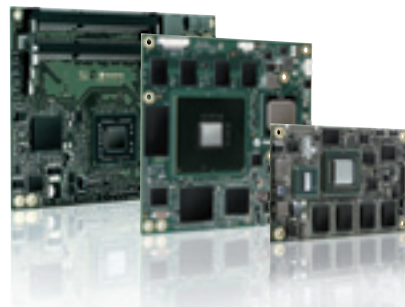
Customers who wish to continue to operate their ETX® applications without operating system changes and complex porting of the application software should stay with a single-core solution. This is recommended, for example, with the optimized version of the Kontron ETX®-CD Computer-on-Module with 1.86 GHz Intel® Celeron® M processor 440. This makes the Kontron ETX®-CD also ideal for ETX® applications that are already multithreaded. This migration path to new ETX® modules supplies a large part of the market demand for ETX®-based Intel® Pentium® M designs. There is not much more that can be said on this subject. And yet, there are those who still want to switch their application to multiprocessing and multi-core.



All Kontron ETX® and COM Express™ modules support the standard interface for JIDA32 abstracted hardware requests (including the MARS battery system) for simplified migration.

Strategy 3: COMsistent towards COM Express™ standard

Kontron recommends that these customers use the re-design of the software as a catalyst and hardware-wise take the COM's migration path towards the PICMG COM Express™ standard. COM Express™ provides fast PCI Express expansion options for faster and more flexible peripheral connectivity, offering richer and more up-to-date graphics features and an even more comprehensive interface including Gigabit Ethernet. COM Express™ thus gives developers enhanced capability to better exploit the multi-core technology. COMsistent is also the express route for ETX® to new multi-core applications.



Kontron's extensive COM Express™ portfolio offers a solution for every need: From credit card-sized modules up to Intel® Core™ i7 solutions.

