

New AMD embedded processors attract COM module manufacturers

This article is contributed by AMD

At the time of the official launch of the new AMD Ryzen Embedded and AMD EPYC Embedded processor families, the company had already garnered support from more than 20 partners. This article explains why these processors are attractive for embedded COM manufacturers.



Figure 1. The AMD EPYC Embedded processor offers native 10GbE interfaces. It is therefore ideal for connecting manufacturing cells as part of the Industry 4.0. Even redundant system configurations are possible.

■ Leveraging its multi-functional design with a highly scalable thermal design power (TDP) of 12W to 54W, support for the AMD Ryzen Embedded V1000 Series is extremely broad. What attracts embedded board manufacturers most is the significantly greater performance driven by central processing unit (CPU) + graphics processing unit (GPU) integration, along with better pricing than competitive solutions. This processor offers up to 2x more performance than its predecessor and 46% more multi-thread performance than the competition. This is extremely important in today's multicore era with virtualization and parallel virus scanners, firewalls and intrusion detection solutions. What is more, the new AMD Ryzen Embedded processors have also made significant gains in graphics – which has been a core strength of AMD processor technology from the beginning. They now offer twice as much graphics performance as the AMD Embedded R-Series accelerated processing unit (APUs) (codenamed “Merlin Falcon”) and up to 3x more graphics performance than the competition. All in all, the new AMD Ryzen Embedded V1000 APUs with Zen CPUs and Vega GPUs achieve a performance throughput of up to 3.6 TFLOPS. Thanks to these impressive performance figures, there is also a large portfolio of products to support the launch of these new processors. With AEWIN, Axiontek, DFI, iBASE, Kon-

tron, and Sapphire Technology, AMD has found six launch partners to support AMD Ryzen Embedded V1000 processors on the Mini-ITX motherboard standard. The advantage of this ATX compatible board standard is its comprehensive ecosystem. Manufacturers can rely on a variety of components, enclosures, and power supplies that are also used in the commercial sector, making their system designs comparatively fast, cost-effective, and future-proof.

The manufacturers of COM Express modules also provide comprehensive support for the AMD Ryzen processor, which covers the entire range of possible COM Express form factors. The COM Express Basic form factor (125 x 95mm) with Type 6 pinout is supported, for example, by Advantech, congatec, MEN, SECO and Portwell; while Kontron has managed to fit the AMD Ryzen Embedded on the slightly smaller COM Express Compact form factor (95 x 95mm). GE even goes one step further by squeezing the low-power processor variants on the COM Express Mini (85 x 55mm), which means the new AMD Ryzen Embedded processor is available in any size of the PICMG specification. A special variant is offered by MEN Mikro. The CB71C is an extremely rugged COM Express module that is both 100% compatible with the COM Express Type 6 pinout and also compliant

with the VITA 59 standard. The latter specifies more robust mechanics to ensure reliable operation even under harsher environmental conditions than the COM Express specification allows. This means the module can operate completely fanlessly at significantly higher TDP. For this reason, the module is encased in a closed aluminum frame, which ensures optimum EMC protection and efficient conduction cooling while supporting a temperature range of -40°C to +85°C. The module is also pre-qualified for the specifications and certifications in critical applications such as rail transport or medical technology, and it is ‘Made in Germany’, which has its price, but pays off when there are high documentation and certification requirements.

Besides these universal board level platforms for a wide range of industrial applications, there are also a large number of providers who position their products for use in specific applications, such as iBASE and Arrow Electronics Intelligent Systems (Seneca) and AOPEN in the area of media players and digital signage systems, or Advantech Innocore and Quixant in the field of gaming platforms.

With its ABOX-5100 series, in-vehicle computing system provider Sintrones also offers a system designed for artificial intelligence (AI) applications that can accommodate up to four



Figure 2. COM Express module with AMD Ryzen Embedded processor conga-TR4 available from congatec.



Figure 3. The VITA 59 compliant COM Express Rugged standard allows fanless operation of AMD Ryzen Embedded processors even at TDPs over 35W e.g. on MEN Micro CB71C board.

perfect for the many decentralized fog data centers that are currently being installed on the edge of the IoT. The advanced AMD EPYC Embedded processor is ready to support network function virtualization (NFV), software defined network (SDN) plus – with ECC support – real-time industrial system requirements, and more. A total of eight 10GbE channels are available for setting up micro server connectivity on the factory floor. iBASE, for example, plans to use this comprehensive offering in its new FWA8800 network appliance for security, firewall and UTM tasks. Equipped with a large number of network interface modules, it also supports 25G/10G/1G optical and copper ports and impresses with a long service life of up to 10 years.

Interestingly, none of the classic embedded board level manufacturers is currently supporting the AMD EPYC Embedded 3000 processor. This is because there is no classic embedded form factor for this new performance class at the edge/fog server level. However, a design analogous to the VITA 59 would enable fanless cooling up to the eight core version with 50W TDP. At the Server-on-Module level, the fact that COM Express Type 7 can only provide up to 4x 10GbE lanes is an ongoing obstacle.

The new AMD EPYC processor, on the other hand, already executes eight of these interfaces and can therefore connect up to six local instances over 10GbE if Industry 4.0 server nodes are connected in line over 10GbE loopback. It therefore presents a perfect performance class for extremely powerful edge servers, which so far have been lacking an embedded form factor that would enable them to find immediate support upon the launch of the processors. So, we're curious to see which manufacturers will present some kind of cube design for Industry 4.0 edge servers based on the AMD EPYC Embedded processor in the next few months. IoT connected high-performance applications would definitely benefit from it. ■