Computer on Module (COM) for Military Applications

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The Ever-Changing Military Systems Requirements

Ever-changing, dynamic military requirements and an ever-increasing need to analyse and share huge amounts of information and data with every node (command centres, ground stations, analysts) in real time, has resulted in an increased demand for military systems to be super-efficient and highly intelligent. The tremendous amount of available data and the need for enhanced computing power are quickly turning legacy systems obsolete.

There is a growing demand of special technology to support contemporary combat capabilities. Designers and developers are facing major challenges on performance improvements of small form factor systems with strict space and power limitations. It's extremely challenging to keep pace with the design changes related with implementation of new generation processors and complex design rules. The military today is looking for a cost effective solution with superior performance, low power consumption, increased longevity and enhanced ruggedness.

Rugged Terrain and Harsh Conditions

Rough weather, difficult terrain and harsh operating environment makes life much more difficult for military applications, these conditions may impact performance and longevity of these applications. Extreme temperatures, corrosion, fungus, moisture, vibrations and dust can lead to failures in mission critical situations.

Military cannot afford mission critical application failures. Military applications have to operate in harsh conditions. They need to work in the real battlegrounds and life like situations.
Computer-On-Module (COM) for Military Applications

Computer-On-Module, or COM, is a highly integrated board with CPU, chipset, memory, and peripherals designed into a component module. A complete computer on a plug-on module, COM requires a carrier board to power up and brings out expansion interfaces and I/O for use.

The COM architecture provides various standard specifications in different form factors and pin-out types.

The industry standard includes COM Express, ETX and Q7, providing a wide variety of interfaces like PCI Express, PCI, ISA, SATA, IDE, USB, DDI, etc. These standards cover electrical and mechanical compatibilities for easy replacement or upgrade regardless of the mechanical and thermal design giving OEM customers flexibility to choose a suitable solution for their applications and saving valuable development time.

Since the I/O is designed on individual carrier board, the developer can modify the functionality to the application, saving development costs, and reducing time-to-market, all key objectives for an embedded designer.

Different I/O interfaces, connectors, memory devices or form factors may further be added to the carrier board. FPGA-based functions can also be added to the carrier board or to the CPU module.

Computer on modules is best suitable for military usage due to its unique feature: secure knowledge. Whether how military sensitive information is, customer can use off-the-shelf computer on modules and design their application-specific carrier board for ruggedized military mobile solutions without sharing information to vendors.
Key Benefits of COM

Cost Savings:
The COM (Computer On Module) concept allows customers to customize their carrier boards with the functions they need, allowing them to build a perfect embedded carrier board to fit their chassis. Compare to creating a new SBC from scratch, it helps to reduce the assembly costs. While upgrading, the customer doesn’t need to change the carrier board or chassis design to enhance the performance; they simply need to change the COM module. This helps in reducing upgrade costs.

Reduced Time-to-Market:
A COM-based project helps shorten the project development schedule because about 70% of the design is already contained in the COM module. You can focus your attention on the 30% design effort of the carrier board. This saves a lot of development time and shortens the project’s time-to-market.

Flexibility:
The modularized design of a COM-based project allows customers to configure COM modules with several carrier boards for different applications without having to create a new board.

Secure Knowledge:
Strong engineering know-how is the key to success for most applications. Customers prefer to keep Design knowledge inside their company to the extent possible. A COM-based project helps customer proprietary information stay that way.
Longevity and Revision Control

Military applications are typically used for a very long period and may need extension or replacement during the prolonged use. Without flexibility, scalability and continued support, military applications may become obsolete very soon.

With the frequent changes to technology and new advancements every day, existing video cards, device drivers, and application software becomes incompatible with the new platform. There could be I/O register or interrupt conflicts, driver / application software incompatibilities, peripheral incompatibilities, or power supply problems.

Advantech Longevity and Revision Control Policy

Advantech platforms are designed only with industrial grade components which feature at least three to five year life cycles. Durable products reduce costly maintenance and efforts to upgrade. By partnering with the leading vendors and suppliers in the industry, Advantech provides customers with reliably long-lived products. Under strict revision control, engineering changes are kept to a minimum during a product's life cycle, reducing risks inherent with multiple product Changes.

Advantech offers comprehensive computer on modules from anti-vibration low power Intel Atom solutions SOM-7565 and graphic enhancement AMD G-series SOM-4466 to extreme performance with optimized power efficiency Intel 4th generation Core series platform SOM-5894 and SOM-6894.
“Advantech is ITAR registered and compliant. This allows Advantech Corp. USA to support military related projects.”

Advantech offers a range of services that enable solutions to operate in harsh conditions. Wide Temperature Testing services include Advantech’s Phoenix operation and wide temperature hardware Design for dynamic and static testing. A PCB and component conformal coating service provides electrical insulation and added protection from dust, moisture, fungus, corrosion and vibration. Combined with additional services such as component qualifying and manufacturing in-process testing, these services allow increased support for outdoor, transportation, remote monitoring and any mission critical application where the cost of failure is high.

RUGGEDIZED Services form Advantech
- FloTHERM 3D modeling and simulation
- Heat sink design
- Vibration testing
- Shock/drop testing
- Conformal coating

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Conclusion
Ruggedness, flexibility, ease of design, cost effectiveness, easily scalable solutions and secure knowledge; all this makes Computer on Module tailored to the military applications. Use of COM insures that you can keep on using your devices for longer and can upgrade at a fraction of cost and time.

Implementing COM is very simple and fulfils the requirements where special I/O platform is needed. The COM modules are scalable and can be used in a design application just like an integrated circuit component.

The ruggedness of COM modules offered by Advantech, the secure know-how and our design services makes Advantech COM modules an ideal fit for military applications.

Creating ruggedized solutions requires a combination of good design, good components, good engineering, and a lot of extra testing. Advantech’s approach to embedded design for extreme environment operation includes wide temperature range testing and solutions, sophisticated cooling consulting services, extensive shock and vibration proofing, and state-of-the-art conformal coating services.

About Advantech
Founded in 1983, Advantech is a leader in providing trusted innovative embedded & automation products and solutions. Advantech offers comprehensive system integration, hardware, software, customer-centric design services, and global logistics support; all backed by industry-leading front and back office e-business solutions. We cooperate closely with our partners to help provide complete solutions for a wide array of applications across a diverse range of industries.

Advantech has always been an innovator in the development and manufacturing of high-quality, high-performance computing platforms, and our mission is to empower these innovations by offering trustworthy ePlatform products and services.