What's a SOM?

For those that aren't familiar with a System-on-module (SOM) or in other words, a computer-on-module (COM), these are sophisticated and complete microprocessor-based embedded computers in tiny form-factors. These highly integrated SOMs provide an amazing amount of compute density in a miniature space to fit into applications that have size, weight, and (low) power (SWaP) constraints. Typically, SOMs such as the off-the-shelf (OTS) Inforce 6501™ Micro SOM contain the most critical compute parts of an embedded system, including a high-performance and low-power (Snapdragon™ 805) multi-core applications processor (CPU + GPU + DSP + ISP), other chipsets such as the RAM (DDR) and flash memory (eMMC), PMIC, Audio codec, GPS, Wi-Fi + Bluetooth module, and multi-pin I/Os. Designing the compute portions is one of the most complex and time consuming steps of an embedded design, not to mention the associated design risks and cost escalations.

Benefits of designing embedded systems with SOMs

While SOMs lack the I/O connectors single-board-computers (SBCs) offer to interface with peripheral devices directly, they offer cost and time-to-market advantages over the long lifecycles of embedded systems. SOMs mount on top of a “carrier board” or a baseboard that provides physical connectivity to the external world and expands the functionality of the compute module by adding additional customized I/O interfaces, connectors, and form factors to fit a given application. Inforce’s reference carrier board designs have board-to-board (B2B) connectors that are cross compatible across multiple SOMs powered by several Snapdragon families of processors.

By separating the SOM from the carrier board, modular embedded systems can be designed. SOMs offer a convenient and cost-effective trade-off in the build vs. buy argument, affording embedded designers the flexibility to design a custom carrier board while simultaneously improving the time-to-market and optimizing the cost of their end products.
Interoperability of carrier boards with Inforce SOMs

Inforce's Snapdragon processor-based Micro SOMs are all cross-compatible (pin, connector, and form factor) with a single reference carrier board design. This accelerates product development, especially when upgrading to new generations of Inforce SOMs and high-performance Snapdragon processors. Development times and corresponding costs over the lifecycle of embedded designs can be significantly reduced, ensuring a competitive edge in the marketplace. This makes migration to next generation Qualcomm processors seamless and without the need for redesigning custom carrier boards.

Free technical support

Inforce offers free technical assistance to buyers of the Inforce 6501 micro SOM via our Techweb online resources and email-based support. Interact with Inforce's dedicated and knowledgeable technical support engineers until your case has come to a resolution. You may also post your technical questions on Inforce's forums at http://forums.inforcecomputing.com to get quick answers from expert engineers from Qualcomm, Inforce and other developers. In addition, Inforce delivers design assistance support packages for those that require help for designing a custom carrier board. As part of the support plan Inforce provides comprehensive assistance.

Inforce's expert engineers ensure that a small investment in support plans can go a long way in successfully bringing a product to market on time and offers an excellent return-on-investment. Inforce's expertise can catch many carrier board design issues upfront and save customers hundreds of thousands of dollars in design re-spins and missed time-to-market windows. As part of the support plan (contact sales@inforcecomputing.com for more details), Inforce provides comprehensive assistance that includes among other things:

- Dedicated and direct support from an assigned CSE (phone/email)
- Help with feasibility, architecture analysis, and requirements assessment
- Use-case simulation
- Benchmarking and profiling
- Reference carrier board schematics and 3D mechanical drawings provided
- Power supply and clocking reviews
- Design reviews: schematic, BoM, and layout reviews of carrier card and hardware
- Device driver tuning; BSP level support
- Manufacturability and testing
Thermal modeling, EMI shielding, heat dissipation, and 3D mechanical drawings for enclosure design

Inforce has performed extensive thermal modeling, EMI shielding, and heat dissipation analysis as part of its engineering effort to pack a high compute density Inforce 6501 micro SOM into a tiny form factor. Snapdragon processors are low-power consuming SoCs with built-in thermal throttling and safety features. Inforce strictly adheres to thermal design considerations to improve airflow and better conductivity through multiple layers of routing to avoid hot spots where there are higher thermal loads, ensuring better heat distribution in the PCBs. Inforce shares its expertise with our customers to extract the absolute maximum performance from the Snapdragon processors and the SOM, while improving heat dissipation, reliability, and improving battery life for portable embedded systems. A comprehensive application note on the thermal characterization and recommendations is available for registered users. Inforce can also source parts to meet extended industrial temperature specifications (-40 to +85 degree centigrade). Optional fully tested EMI shields are also available for customers to add to their BOM where required. Rounding it out, Inforce also provides 3D mechanical CAD drawings for its customers to help design optimal enclosures.
Summary

Designing the compute module is the most complex, time consuming, and riskiest part of an embedded design. Inforce has solved the complexity of designing and manufacturing a sophisticated and powerful Micro SOM. All electrical, thermal, mechanical, standards compliance and interoperability with future technologies have been fully taken into consideration. The product-ready Inforce 6501 Micro SOM can mitigate design risks involved in implementing an entire embedded system. Designing with the Inforce 6501 Micro SOM will reduce well over 6 months of design time, accelerate your time-to-market, and save on overall design costs over the life of a product. Best of all, Inforce ensures that embedded designers don’t have to worry about licensing state-of-the-art processors such as the Qualcomm Snapdragon 805. A strong roadmap with early access to upcoming bleeding edge 64-bit Snapdragon processors paves the path for upward compatibility and access to exciting new technologies such as hardware assisted 4K Ultra HD video HEVC encode and decode. With the most difficult part of an embedded design taken out of the equation, designers now can focus on their core-competencies, rapidly prototype, get their product to market, and ramp to mass manufacturing faster.

Avoiding parts obsolescence

Inforce understands the long product lifecycles of industrial embedded designs very well. With Inforce’s hybrid manufacturing model, a tight control of its supply chain is maintained with direct relationships with parts suppliers. If necessary, Inforce can also offer last-time-buys for customers’ future use or obtain appropriate replacement parts to maintain supplies for extended periods of time. This will ensure a smoother upgrade path and transition to newer compute technologies and Qualcomm Snapdragon processors as they become available. This enables maintenance of the SOMs form/fit/function and any potential changes won’t obsolete customer designs.

Additional information

To learn more about the processing power, performance, and connectivity options provided by the Inforce 6501 Micro SOM and to download the product datasheet, please visit: http://www.inforcecomputing.com

Standards compliance and FCC approvals

Inforce's SOMs and SBCs are fully RoHS and WEEE compliant. All WiFi and Bluetooth modules used in Inforce's SOMs are FCC pre-certified, saving embedded designers significant time and costs. Inforce will also guarantee passing UL® and FCC tests/requirements for your embedded SOM + carrier board designs.