

Techsol Celebrates a Decade of ARM Designs -- Techsol has been designing Computers powered by ARM processors for 10 years!

Techsol has been designing low-power computers based on a variety of ARM processors since 1999. Starting with a commercial, hard-drive-based MP3 player design (2 years before the 1st iPod). The long and expensive development of that product prompted Techsol to develop the Medallion CPU module as a tool to reduce development time, cost, and risk. "Our strict backwards compatibility is what really saves our customers money." With many tens of thousands of CPU modules shipped, and design wins ranging from Automotive to FDA-Approved medical devices, with commercial, defense, and industrial customers in the mix too, the Medallion CPU Module is probably the longest-running miniature Computer-On-Module (COM) form-factor available. And its future appears just as strong.

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[Techsol](#) has been designing low-power computers based on a variety of [ARM](#) processors since 1999. Starting with a commercial, hard-drive-based MP3 player design (2 years before the 1st iPod) and progressing through a variety of projects. "That first design used Cirrus Logic's ep7312 when the chip was brand new. We were trying to run on a single SDRAM, but the memory controller only worked on a 32-bit bus. CL's engineers only tested with 2 SD RAMs, so the HW bug wasn't found for weeks. In the end, we got it working, including an option to run the audio from the PLLs. We provided Cirrus with corrections to their datasheets, as well as an App Note on how to clock the audio internally." notes Brian Empey, founder and CEO of Techsol.



**TPC 43B and SA2410 Medallion
CPU Module with Linux on
ARM**

The long and expensive development of that product prompted Techsol to develop the [Medallion CPU module](#) as a tool to reduce development time, cost, and risk. At the time, creating a 50mm square computer with a 32-bit expansion bus, full video (LCD and VGA signals) plus Audio and USB was pretty radical. "The MP3 player ran Kadak's AMX RTOS on the 7312. It was stunningly fast, especially coming from 25 Mhz 186 designs. But the SW options in AMX are limited, especially for GUIs." So after pondering the future of both embedded HW and SW, it was decided that HW was moving to ARM processors, and SW would most likely migrate to Linux. "Packaging a [Linux](#)-powered ARM computer into a small form-factor looked like a great way to help other product developers leap-frog the huge learning-curves associated with both technologies. Plus, we continue to design products for customers, but now they're all Medallion powered, dramatically reducing development time".

Development of the 1st Medallion CPU module started in 2000. The processor chosen was unusual: an ARM 720-T based Hynix (Hyundai) chip with both LCD and VGA controllers on board. However, the chip looked perfect for wearable computers, one of the company's areas of interest. Protos were working in 2001, and the 1st dev.kits shipped in 2002. "Creating a Linux BSP for an unsupported

processor, including boot-loaders, is an onerous task. But we worked from datasheets up with the CL7312, so we had experience with MMUs and ARM's processor architecture already, making it easier. Not that we'd ever want to do that again".

The [HY7201](#) was followed by an ARM-9 using a Samsung processor and running Linux 2.6. The [SA2410](#) has been through about 10 revisions in order to keep everything current. And the pin-out of the module hasn't changed. Techsol's #1 focus is "planned non-obsolescence" which means putting out new products that plug into customer's old designs. "Our strict backwards compatibility is what really saves our customers money. That and our deep Linux experience and dedication to supporting the HW with piles of SW. Our customers typically don't even have Linux-driver-capable developers on staff -- they just concentrate on applications. We take care of the low-level details for them. We even pre-load the customer's image onto the products after testing every one running the latest Linux distribution."

Its a strategy that has worked well, as Techsol's customers are fiercely loyal to the company in exchange for that "we'll take care of it" attitude of the engineers! With many tens of thousands of CPU modules shipped (almost all newer designs having both [touch-screens](#) and Ethernet), and design wins ranging from Automotive to FDA-Approved medical devices, with commercial, defense, and industrial customers in the mix too, the Medallion CPU Module is probably the longest-running miniature Computer-On-Module (COM) form-factor available.

Going forward, there are yet more SA2410 variants in the works, an OMAP board in layout, and newer ARM-926 processors in the pipeline. The next 10 years of ARM technology look as exiting as the first 10!