



Do You Remember When ...

You never know what is going to show up in your inbox. A recent note from Matt Miller, Tooling Engineering Manager for Commercial Forged Products, spurred a look back.

"I have been marveling at the proliferation of incredibly powerful and precise modules of incredible varieties that are available these days. The price is comparatively cheap and whoa, the bang for the buck is big. I'd be very interested to see someone do an objective comparison of some or even one piece of equipment that is available for the hack like me (mechanical engineer who dabbles with electronics) at a reasonable price versus what was available 10 years ago. Every time I thumb through the Electronic Design Magazine I'm amazed at the range of products that are available now that are almost commodities (maybe they are for all I know) today that were seriously cutting edge just years ago."

We exchanged a few emails and I took a look to see what was sitting around the lab. I decided to go a bit farther back to 1976 to see what developers and hobbyists had available then.

A LOOK THEN ...

One of the oldest single chip microcontrollers is the Intel 8748 (Fig. 1). It is a EEPROM version in the MCS-48 line that eventually led to the 8051 whose architecture is still found in mainstream micros. I happen to still have couple of 8748s in a drawer. These go back to my times at the RCA Sarnoff Research Center in Princeton, NJ when Intel was also rolling out the 8088 that started the PC revolution.

I don't remember what the quantity price was but they were not cheap compared to today's small micros that cost less than two bits (\$0.50). Still, we marvelled at the designs we could come up with and how small they were then.

There were choices back then but not the plethora of options available today. Then, the massive choices were in discretely and DIPs from adders to multiplexers. Clock rates were above a megahertz but most instructions required multiple clocks.

AND A LOOK NOW ...

Spin ahead to 2006 and we have the Parallax Propeller (Fig. 2). This 8 core, 32-bit chip consumes the same 100mW assuming all cogs (cores) are in play. Comparisons are hard between such disparate architectures but it is safe to say that it Propeller is faster by well over a factor of 100.

In one way, the Propeller is similar to the MCS-48 family. Both provided basic parallel interfaces. Serial

ports were implemented in software. Of course, the Propeller can run a serial line quite a bit faster including the ability to drive a VGA display.

Each core has significantly more power and resources than an MCS-48 chip plus the Propeller is easier to program.

These days the choices vary widely making a designer's choice more interesting. At another end of the spectrum are the host of tiny 6-pin micros that are priced at less than fifty cents and sip nanowatts in sleep mode. Skip again to the 32-bit end with a single core, Stellaris 32-bit ARM Cortex-M3 from Texas Instruments for under a dollar (see "32-Bit ARM MCU Hits One-Dollar Mark," ED Online ID #12358).

The venerable Intel 8748H is still available for \$12.95 at Jameco Electronics or you can check EBay. By the way, the Propeller is also available in a 40-pin DIP and is priced around \$5. ■

Intel

www.intel.com

Jameco Electronics

www.jameco.com

Parallax

www.parallax.com

Texas Instruments

www.parallax.com

1. The 8-bit Intel 8748, circa 1976, came in a 40-pin DIP package, had 64 bytes of RAM, 1 Kbytes of EEPROM, hence the quartz cover, ran at 11Mhz, and used 100mW.

2. Parallax P8X32 Propeller, circa 2006, has eight 32-bit 80MHz cores, 2 Kbytes of RAM/core, 64 Kbytes of global RAM, 64 Kbytes of ROM, and uses up to 100mW.