Transmeta Crusoe TM 5800 System Development Kit tested

Laptop contender

Transmeta starting delivering the long awaited second generation of System Development Kits for the Crusoe processor just a few weeks ago. We put the system through some initial performance tests in our hardware lab to discover whether this will take over the laptop world.
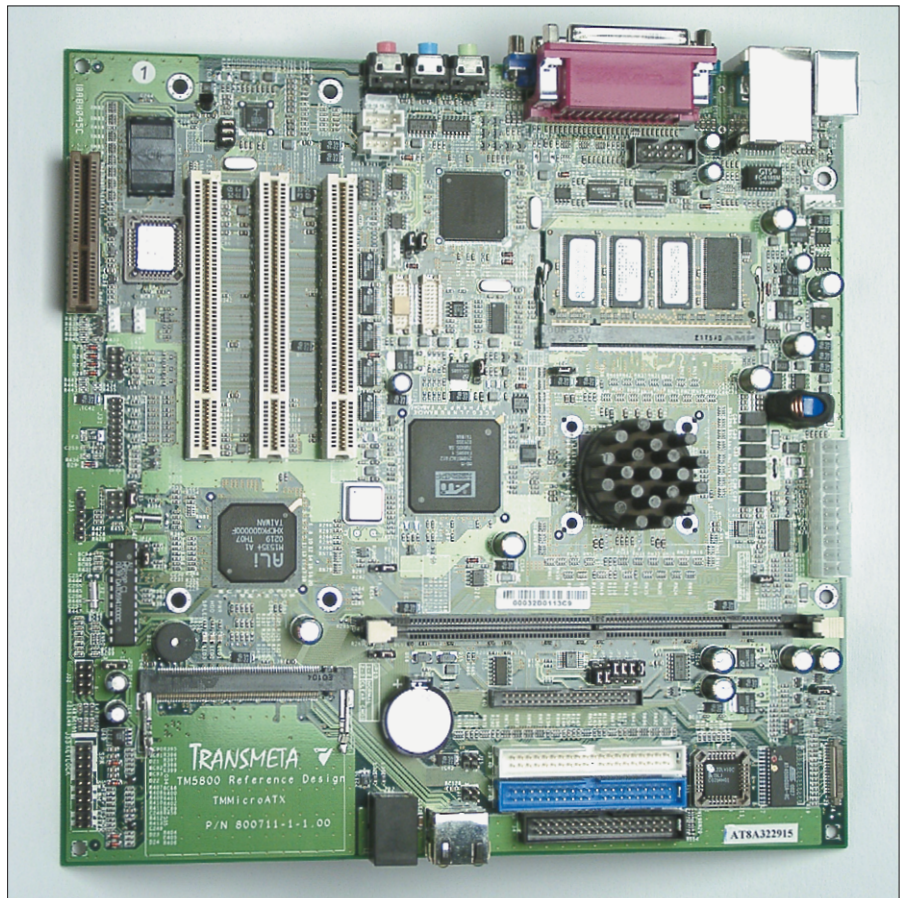
BY DANIEL COOPER

Figure 1: The Crusoe TM 5800 on a Micro ATX board requires only passive cooling; three PCI slots and one mini PCI expansion slot for notebook add-ons are provided

Transmeta still has not achieved the expected breakthrough, and currently the Crusoe is only to be found in sub-notebooks and tablet PCs. The TM 5600, a model which is over two years old, which running at a clock speed of 700 MHz, is most widely distributed. The follow-up product, the Crusoe TM 5800 runs at 733MHz to 1GHz but this did not become available in larger quantities until the fall of 2002.

The differences between the TM 5800 and its predecessor the TM 5600 are fairly minor: Transmeta now use a 0.13 micrometer process to manufacture the core, and this allows increased clock speeds, at the same time reducing the minimal kernel voltage from 1.2 to 0.8 volts and power consumption of between 0.5 to 1.5 watts according to the technical specs.

In comparison to Intel's mobile processors, one has to consider the fact that the Crusoe processor, provides both a North bridge and a memory controller on a single chip; other processors place both on separate chips.

The Crusoe offers far more flexible speed control than Intel's Speed Step for mobile processors. The Crusoe's code morphing software uses long run to automatically adjust the processor speed and kernel voltage to the current CPU load, whereas Speed Step merely provides three different clock speeds.

Transmeta released the Crusoe TM 5800 System Development Kit at the beginning of 2003 for about 1,000 Euro. The system is geared to the needs of system and notebook developers and not for end users. The set is not commercially available, but directly from Transmeta via pre-registration.

Crusoe Motherboard

The central component is a Micro ATX Motherboard with a surface mounted, passively cooled Crusoe TM-5800 running at 800 MHz (see Figure 1). The South bridge is an ALI 1535 + that provides typical USB 2.0 PC interfaces. The board is expandable via three 32 bit PCI slots and a mini PCI slot for typical laptop network or modem adapters.

The board is supplied with a 128 Mbyte SODIMM DDR RAM chip that is not easily exchanged: any changes must be communicated to the Crusoe's firmware via a special Windows program. However, a standard SD RAM memory expansion slot is provided.

Notebook Accessories

The board does not provide an AGP slot; the ATI Radeon Mobility M6 chip is surface mounted and offers four connectors: analog VGA, DVI, TV, and LCD – which allows TFT displays to be attached directly. The System Development

Kit provides a Lithium-Ion battery, a charger unit with an inverter for display backlighting, a notebook keyboard, a touchpad and a notebook adapter for notebook developers. We were unable to activate ACPI power saving modes in our test, although the system did power down on closing the lid. The Transmeta board no longer provides APM support.

The documentation is supplied on a CD and is extremely exhaustive, as you would expect from a development kit. Additionally, the CD contains a few drivers, unfortunately only for Windows. There is no sign of Linux anywhere, not even in the secure developer area on Transmeta's homepage – and there is no mention of Midori.

Radeon Problems

We had no problem setting up the system with SuSE Linux 8.1; the hardware components were accurately identified and automatically set up. However, the 3D accelerator for the ATI Radeon chip refuses to cooperate – we

were unable to load the appropriate kernel modules. XFree86 (Version 4.3) which should be available in the near future, should provide a solution to this troublesome issue.

There were a few problems with the screen saver display power off; after being powered down for longer periods, the graphics adapter presented us with some serious display errors when being powered back up. Switching to text mode before powering off the display is a short term solution; refer to [2] for more details and patches.

Performance

As expected, the performance of the Crusoe motherboard was below the level of an Intel processor running at the same clock speed. We used a Dell Latitude C600 with a Pentium III (750 MHz) as a reference. Both systems were running the same SuSE installation on a Hitachi DK23CA 30 notebook hard disk. The Transmeta system's power consumption peaked at 40 watts, but this was including the hard disk.

Compiling a standard configuration of the 2.4.20 kernel took 12 minutes 31 seconds on the Crusoe, only slightly longer than on the Dell notebook (11 m. 32 s.). The difference was somewhat more noticeable for an MySQL benchtest where, in the alter table discipline, the Transmeta processor took 271 seconds, only nine seconds longer than the Dell notebook. The Crusoe took 3667 seconds to perform the insert test, whereas the Dell system's performance was just 2738 seconds.

The Bonnie++ hard disk benchmark painted a completely different picture, however, with the development board

achieving a slightly higher write performance than the notebook at 23.2 Mbps.

The Transmeta board's performance is quite sufficient for typical usage, such as word processing on KDE, although at speeds like this you really do not need to fasten your seat belt. We had to do without gaming benchmarks for this initial test as the ATI Radeon Mobility's 3D accelerator is not currently supported. We look forward to improved results followed compiler optimization.

Conclusion

The Crusoe's performance is comparable with a Pentium III processor running about 100 MHz slower. The ACPI and graphics problems indicate that Linux support will involve some non-trivial development activity. Although we find it hard to understand why Transmeta does not (at present) provide any information or drivers support for Linux developers.

The System Development Kit provides a good range of hardware, including everything a system builder needs to develop a complete notebook with the exception of a TFT display, so the price of around 1,000 Euro is warranted; unfortunately, the Crusoe motherboard is not available without the development kit, and this does cause unnecessary expenditure for notebook or desktop developers. ∎

Transmeta Crusoe TM 5800 System Development Kit	
Source:	Transmeta http://www.transmeta.com
Processor:	Crusoe TM-5800, 800 MHz
Memory:	128 MByte So-DIMM DDR-RAM
Includes:	Micro ATX board, complete set of leads, notebook add-on board with charger circuits and keyboard/touchpad interface, notebook keyboard, touchpad, notebook adapter, Lithium Ion battery, developer CD, complete documentation on CD
Price:	approx. 1,000 Euro

INFO

[1] Transmeta Crusoe TM 5800 System Development Kit: *http://www.transmeta. com/developers/devkit.html*

[2] DRI Radeon Suspend: *http://cpbotha.net/dri_resume.html*