SiS Defends Turf Against Intel's 810

Highly Integrated 540, 630 Core Logic Chips Run Faster, Save Money

by Peter N. Glaskowsky

Silicon Integrated Systems (SiS; *www.sis.com.tw*) has introduced single-chip PC core-logic products meant to compete more directly with Intel's 810 chip set (see MPR 5/10/99, p. 17) than previous SiS integrated-graphics products such as the 530 and 620 (see MPR 9/14/98, p. 4). These older SiS chip sets are widely used in low-end PCs today, and their successors should be even more popular.

The improved 540 and 630 chips (for Super Socket 7 and P6-bus systems, respectively) feature a 128-bit 3D accelerator and a local-area network controller compatible with the 1-Mbit/s Home Phoneline Network Alliance (HPNA; *www.homepna.org*) and 10/100-Mbit/s Ethernet standards, as Figure 1 shows. Other features match those found in Intel's 810: a flat-panel display interface, an AC-97 audio-codec port, and an ATA-66 disk-drive controller. Though the 810 supports up to six PCI slots, the 540 and 630 handle only four.

The SiS chips have a unified memory architecture (UMA) like that found on the 810 and previous SiS chip sets. Like any other UMA design, the 540 and 630 suffer from contention between the graphics controller and the CPU for access to main-memory bandwidth. SiS and Intel took different steps to reduce this contention. The 810 uses an optional 32-bit, 100-MHz display-cache memory to reduce the load on main memory, but it works only during 3D-rendering operations. SiS chose to boost main-memory bandwidth by supporting PC133 SDRAM, which is 33% faster than the PC100 SDRAM used by the 810. The 540 and 630 can also use NECs virtual-channel memory (see MPR 10/26/98, p. 4). Both approaches boost effective throughput by about 50%, but only the SiS solution helps non-3D tasks.

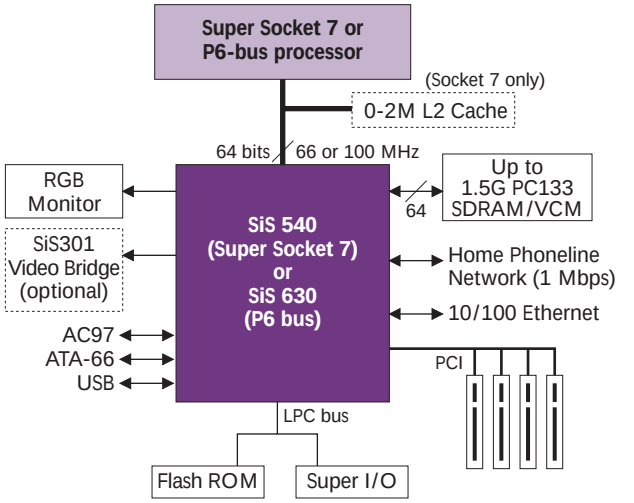

Figure 1. The SiS 540 and 630 provide almost all of the core-logic features needed for a desktop PC in a single chip.

The 540 and 630 can control a total of 1.5G of memory, three times the maximum configuration of the 810. This memory size can be achieved only with 256-Mbit DRAMs, however, since the SiS chips support just three DIMMs.

SiS promises a 3D WinMark 99 score of 800 when the 630 is used with a 450-MHz Pentium III, making the new chips about twice as fast as Intel's 810, which reaches just 384 3D WinMarks with a 466-MHz Celeron. The SiS chip set also includes a 300-MHz (vs. Intel's 230-MHz) RAMDAC, allowing the 540 and 630 to drive a 1,920 × 1,200-pixel true-color display at 80 Hz—better than the 810's top true-color resolution, 1,280 × 1,024 pixels at 85 Hz. SiS also offers the companion SiS301 video bridge, which can be used to add dual-display capabilities to the 540 and 630. The 301 can drive a second RGB monitor, a PAL or NTSC television, or a flat-panel monitor.

The SiS chip sets also boast better DVD playback support than Intel's 810. Whereas the 810 offloads about 40% of the processing needed for DVD playback by performing MPEG-2 motion compensation in hardware, the 540/630 video engine also handles variable-length decoding and inverse discrete-cosine-transform chores, leaving just 20% of the overall task for the CPU to handle. This makes the SiS products a better choice for video-capable low-end PCs.

The 810's lack of a LAN interface will impose an additional cost for business systems, where Ethernet support is de rigueur. Few home users are even aware of HPNA, but as demand grows for home networks, SiS's HPNA controller will grow in value to OEMs.

SiS's chips use a standard low-pin-count (LPC) bus interface to a commodity LPC flash BIOS chip, which is not included. Intel's 810 chip set includes a proprietary flash BIOS chip that features an integrated hardware random-number generator (RNG). Intel hopes to make end users aware of the value of the 810's hardware RNG for Internet security; if it succeeds, SiS and other core-logic vendors will have to provide similar functionality in future products.

SiS has an advantage in board space, since the 540 and 630 combine the functions of two chips from the 810 set. This advantage is minimal—about two square inches—but may be significant to some motherboard makers.

The 540 and 630 are priced at $35 in quantity and will be available this summer. Though the listed price of the SiS chips is somewhat higher than that of the 810, we expect the 540 and 630 to have lower street prices than the 810. With better performance and more useful features, SiS has everything going for it except the Intel brand. M