

Atari's ANTIC: My Favorite Microprocessor

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My favorite microprocessor was (perhaps unsurprisingly) a special-purpose chip. AlphaNumeric Television Interface Controller (ANTIC) drove the display of my Atari 400 (Figure 1), which debuted in 1979. I cannot find transistor counts, but ANTIC probably had a few thousand transistors like its host 6502 central processing unit (CPU). It lived on the processor daughterboard (Figure 2) along with the 6502 and a suite of other display and sound chips. ANTIC ran a single-loop program at 60 Hz, matching the refresh rate of National Television Standards Committee (NTSC) televisions. Each instruction described how to draw 1–16 scan lines on my TV, with a variety of bit-mapped and character-mapped modes (characters indirected to another set of bitmaps, allowing compact representation of 2-D game worlds). An ANTIC program was called a “Display List”; enterprising programmers could mix text and graphics vertically down the screen with the goal of conserving the machine’s precious 16–48 KB of random access memory (RAM). There were rudimentary sprites, but the coolest feature was the “Display List Interrupt,” which interrupted the main 6502 CPU. A later “ANTIC-E” chip, which debuted in 1983 is shown at Wikipedia.³ With just the right interrupt code in the CPU, I could change the color or character maps while the TV’s electron gun was resetting from



FIGURE 1. The Atari 400 computer. The membrane keyboard was hard to type on!²

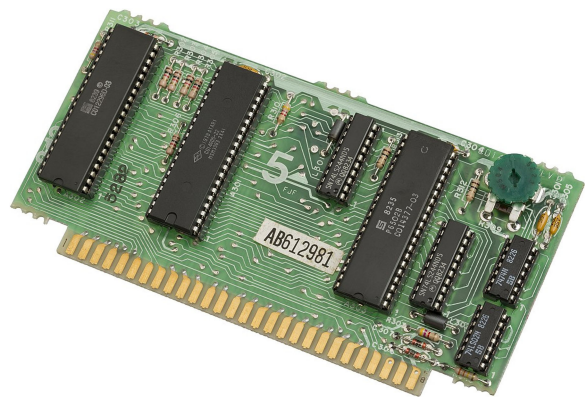
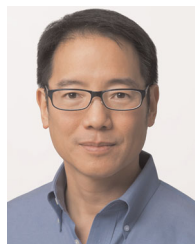


FIGURE 2. The Atari processor board. From left to right, the three large chips are ANTIC, GTIA, and 6502.¹

right to left (or bottom to top in a Vertical Blanking Interrupt). Building increasingly sophisticated graphics for games was a gateway drug for me, where each new idea for misusing my Atari’s graphics hardware pulled me deeper into the tiny world inside my computer.

REFERENCES

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