Chip History: Intel's First Product

August 1969: Intel introduces its first product: The 3101 Static Random-Access Memory (SRAM) with the following press release. Intel had begun operations a year earlier in August 1968 and was racing to get a product to market. The company pursued Moore's "Goldilocks strategy," developing three technologies at once: a single chip bipolar memory, a single chip silicon gate metal-oxide semiconductor memory, and a multi-chip package that wired together four memory chips and today would fall into the advanced packaging category of 2.5D heterogeneous integration. The first was considered too hot a porridge, because it was too easy and would quickly draw competition. The latter too cold a porridge, because it was and would prove to be too difficult. Moore believed the middle, MOS technology, was just right competitively, but decided to hedge Intel's bet by developing all three. A good bet, because it's MOS memory was too difficult to come quickly and the company needed a win. It would be a 64-bit bipolar SRAM, the 3101, that would come to market first and bring in the company's first revenues.

Features included "fast access times of 50 nanoseconds" … and … "power dissipation of 6 milliwatts-per-bit." It was priced at $99.50 each, or a whopping $1.56 per-bit. This was cutting edge performance, circa 1969.

NEWS INFORMATION

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17 1969

For INTEL CORPORATION Mountain View, California

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INTEL ANNOUNCES FIRST PRODUCT, FIRST FULLY DECODED 64 BIT BIPOLAR LSI MEMORY

Intel Incorporated, the new Mountain View, California firm started by Robert Noyce and Gordon Moore has unveiled its first product, the Model 3101 64 bit random access memory.

The Model 3101 is designed for use as a high speed scratch pad memory or general purpose storage element. The Model 3101 is organized as a 16 word by 4 bit array. Each word is addressable through four address input leads in binary code. Features include fast access, typically 50 nanoseconds. For simple interfacing, the unit is fully decoded with on-chip address, decoding, and buffering. Separate chip select input simplified memory expansion.

Power dissipation is 6 milliwatts per bit. Inputs are 1 TTL load. Outputs sink 20 milliamperes. A low voltage diode input clamp minimizes line reflection.

Offered in a 16 lead dual in-line package, the Model 3101 is guaranteed over a 0 to 85°C range. The Model 3101 is available throughout the United States and Canada with prices ranging from $99.50 down to $38.50 each in quantity.

For complete information, please write or call Intel Corporation, 365 Middlefield Road, Mountain View, California 94040. Phone: 415-969-1670. Telex Intel 34-8366.

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Honeywell Inc. had announced a readiness to purchase 64-bit SRAMs from any company that made them, trigging a competition among memory manufacturers. As a new company, Intel started at the back of the pack. In trying to develop a product that was faster and more powerful than its competitors', Intel was placing a wager that it could conquer the standard obstacles more quickly than conventional

wisdom thought possible — and do so while facing all the additional problems that came with building a semiconductor fabrication operation from scratch.

The wager paid off. The 64-bit SRAM chip achieved twice the speed of SRAMs already on the market. Honeywell chose not to use the chip, but Intel found success with other customers. Perhaps more important, as a Silicon Valley historian noted in 2014, the technical victory sent a message: “The company was on its way — and had given notice to the rest of the industry that it would be a serious competitor, a technological innovator and manufacturer capable of achieving high enough yields to get to the market in the shortest amount of time.”

Bipolar memory used established technology. Competitors who took comfort in that fact would not have that consolation for long. Intel’s next product, the 1101 MOS SRAM, would be a far bigger milestone in the history of technology. Released later in 1969, the 1101 was the first commercial chip to use a metal-oxide semiconductor (MOS) process and rely on silicon gates rather than metal. It changed semiconductor technology forever while establishing an important revenue stream for Intel.

Between the two devices, the 3101 and the 1101, Intel had established in its first year that it could outperform competitors in improving established technologies while also beating them to the development of long-sought breakthroughs.