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The Chip

Mostek engineers had to make history

By 1970 the microcomputer circuit industry was involved in a heated race to develop smaller circuits and reduce the number of circuits contained in calculators.

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Those in the industry knew that one day a single-chip calculator would be invented.

The only questions remaining were when and by whom?

The answer came in November, 1970 from a group of supercharged engineers who worked for a little-known custom circuit design company in Dallas-the Mostek Corporation.

How could this industry infant (50 employees) come up with the design of the decade, set the electronic world on its ear and beat the giants of the industry in both the United States and Japan at their own game?

According to those who did it, the answer was simple. Mostek had to do it to stay alive as a company.

"Business had just absolutely cratered," said Dave Leonard who, as part of a four-man design team designed the first single-chip calculator. "Our total billings in December, 1970, for example was \$50,000. That was engineering fees for work done on a custom circuit."

The future of the company was uncertain in May, 1970 when Berry Cash, vice-president for marketing, visited the Tokyo offices of the Nippon Calculating Machine Company.

A month before, Canon, Inc. had introduced a "pocket-sized" calculator which used three circuits and weighed 1.8 pounds.

Nippon wanted to introduce a model that was smaller, lighter and less expensive to produce.

And, Nippon wanted Mostek to put the calculator's circuit on a single-chip.

Nippon agreed to let Mostek work on the idea and signed a contract which called for Mostek to begin supplying the circuits by mid-November.

The Mostek design group set to work on the circuit and decided to do what no other company had done before-to design a calculator circuit which fit on a single-chip.

According to Leonard, the group gained their motivation from the fact that Nippon had agreed to buy 60,000 copies of their circuit for \$30 each.

"The company needed that money," said Leonard, "and it needed that product. That fact had a very positive influence on our work."

Dietrich Erdmann, now vice-president of Mostek International, had done some initial work on the logic system with Japanese engineers earlier in the year.

Gaynell Lockhart took over the logic design job from Erdmann. Both he and Leonard had experience in calculator circuits with another company.

The race began!

The group had allocated six weeks to design the layout for the circuit. But the first circuit design failed preliminary testing and instead of six weeks, the effort took three months.

By the time the second design passed the initial tests and was ready for production, October had arrived.

Time was literally running out for Mostek and the design team was working almost around the clock to finalize the design for production.

By the time the chip was ready for production, November had arrived and the design team decided to speed up the process by putting Richard Petty, the layout engineer, engineering ruby and other plans on a plane for California where he would hand carry the plans to a contractor for mask production. Petty would then fly to Mostek's production facility in Worcester, Mass. where the chip was to be made.

In mid-November it was time for Petty to come home with the final product.

"About 10 one evening, we set up for testing and waited for Petty to walk in the door," Leonard said.

About 10 to 15 people had gathered, including Le Kepley, a young test engineer who had been asked to help with the test.

Petty walked in with the finished product and the testers hooked the chip to a calculator.

"We punched the 'Clear' button and it cleared," said Kepley.

"We added and it added; we subtracted and it subtracted; and then everyone started plugging numbers into it-adding, subtracting, multiplying and dividing. The whole thing was incredible," said Kepley.

A cheer went up and then applause. For Mostek as a company, it was the Super Bowl World Series and Triple Crown rolled into one.

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