

1958

Invention of the semiconductor integrated circuit **(Jack Kilby, Texas Instruments Incorporated, U.S.A.)**

~ Integrated circuit ~

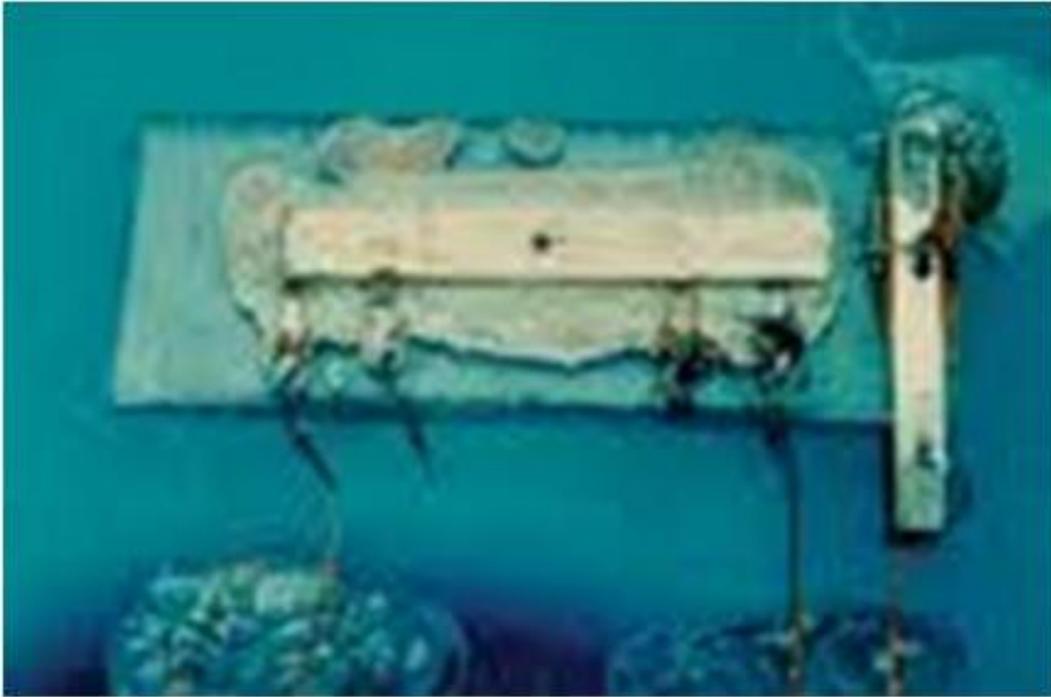
TI's Jack St. Clair Kilby reached the idea of monolithic IC on July 24, 1958. That day was the height of summer as you can see from this date, and most of his colleagues were taking summer vacations. He was 34 years old at that time, and because he was new to the company, he could not get a vacation, and he was the only one remaining in the laboratory. The great invention of the century was born at this time.

At that time, 10 years had passed since the invention of transistors, and semiconductors were beginning to spread to various fields such as military application, computer, consumer equipment. As the system became larger and more complicated, an increase in the number of interconnections between the parts was becoming a problem. Due to the increase in the number of interconnections, performance, cost, reliability and size of the system were all subject to great restrictions. This problem is called "Tyranny of Numbers", and as a common problem of the industry, countermeasures were being advanced from various angles.

TI was also promoting a development of micro-module technology jointly with the military. This method was based on mounting active devices such as transistors and passive elements such as capacitors and resistors in high density on a substrate. Kilby questioned this method and repeatedly thought about proprietary methods beyond this, and as a result he reached the idea of "monolithic integration".

"Mono" means single and "lithic" means a stone, and "monolithic integration" was an epoch-making idea of integrating all the elements on a single semiconductor substrate. A transmitter which was made based on this idea worked nicely while TI executives were watching it on September 12 of this year. In response to this, TI decided to promote the monolithic scheme which Kilby invented as the main scheme, instead of the micro-module method.

In 1959, the following year, Fairchild's Robert Noyce developed a planar type IC. This is the foundation of today's IC structure, and practical value was much higher than the one Kilby invented. As a result, the debate continued for a long time on "Is the invention of IC by Kilby or by Noyce?" It was finally settled in a way that they both shared that honor.



The world first IC which Kilby invented
(By the courtesy of TI Japan)

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