A SOLID STATE OF PROGRESS

A solid state of progress. It is a classic truth in biological science that the development of a single human being usually retraces the development of an entire race.

Much the same is true of the evolution of silicon technology at Fairchild Camera & Instrument Corporation, as it relates to the semiconductor industry. The history of one is the history of the other.

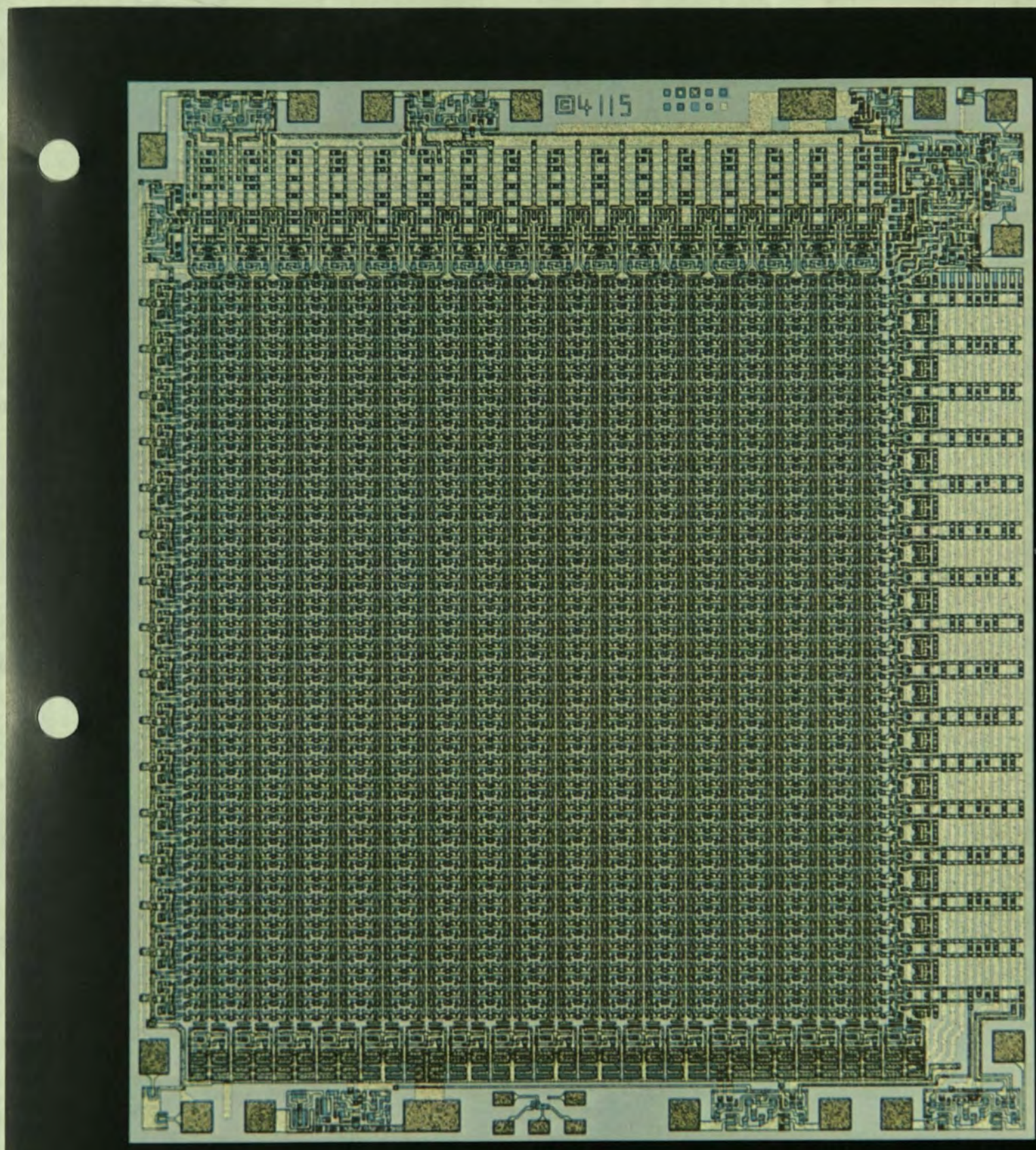
From the first Planar transistor in 1959 to present-day Isoplanar and other highly advanced integrated circuits, Fairchild has been at the forefront of solid-state electronics.

This portfolio includes some of Fairchild's most important technical milestones in this era—color photographs which portray an industry, and a company, in the making.

Compliments of Fairchild Camera and Instrument Corporation

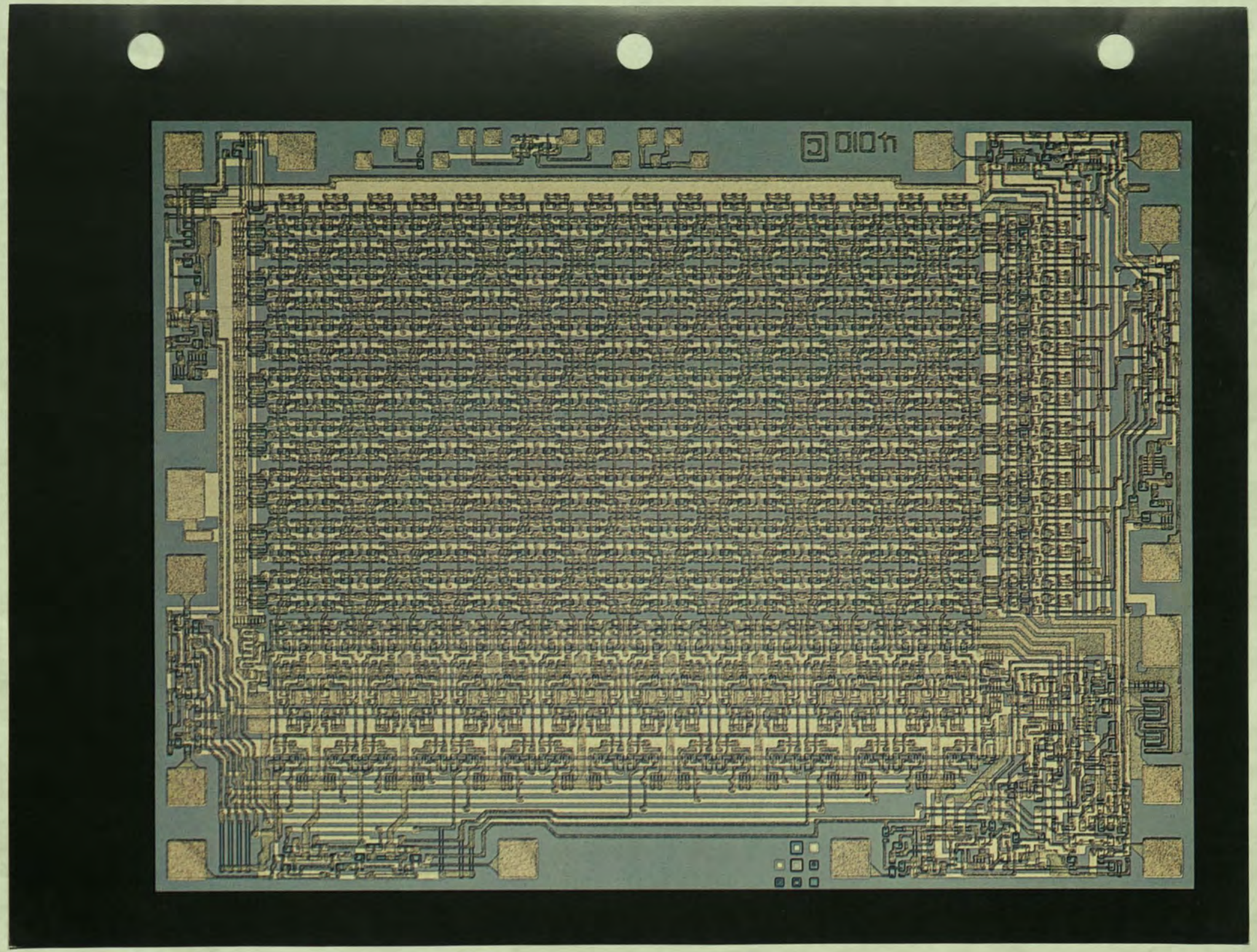
1959

The first Planar transistor—A teardrop device which marked the beginning of an industry revolution.


4115

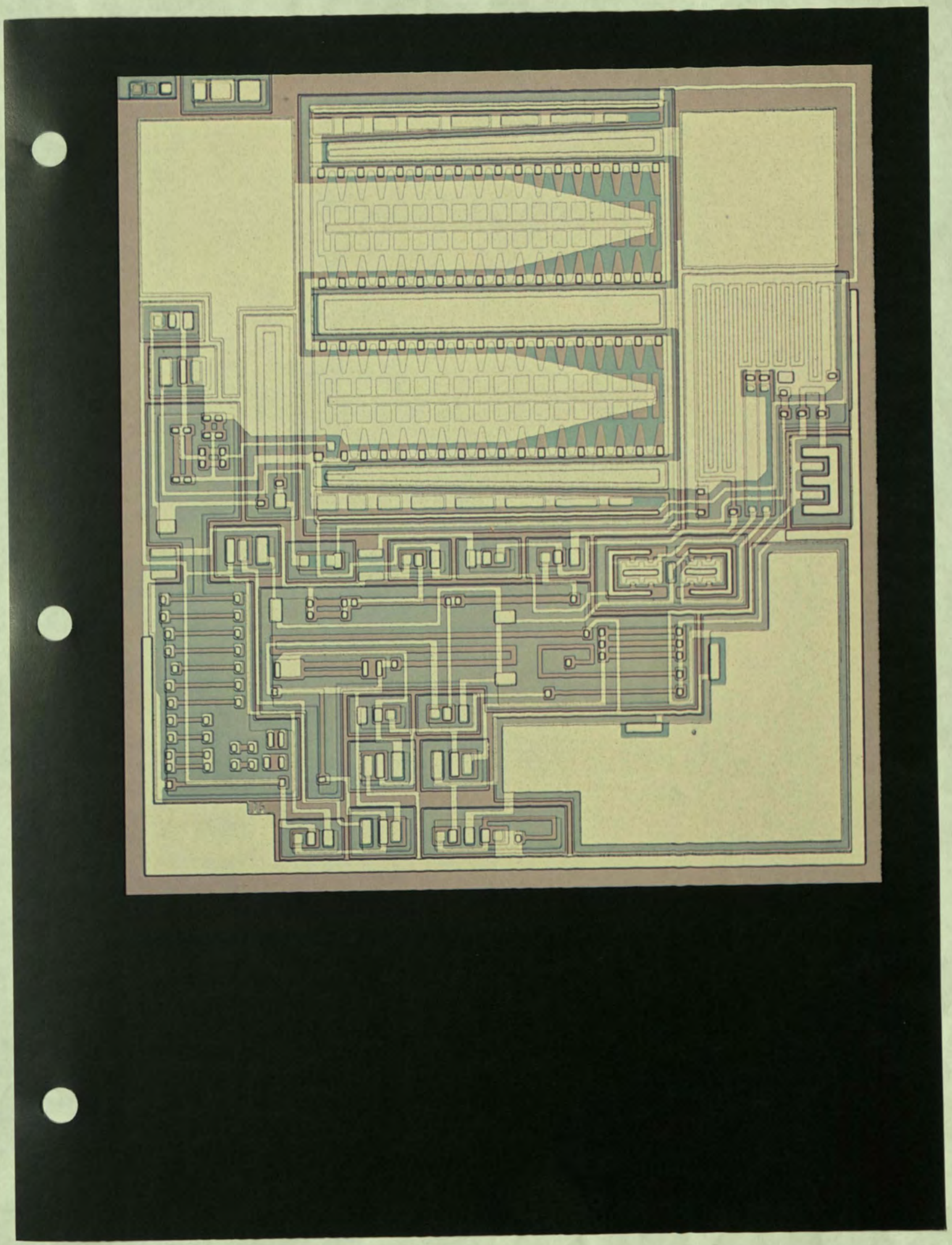
1972

Fairchild's "Superdigit" light-emitting display. This one-quarter-inch LED device reduced the amount of GaAsP material approximately one-third to one-sixth of that required in previous LED digits. It also introduced piece parts suited to mechanized assembly, eliminating hand operations for aligning light-emitting sources.



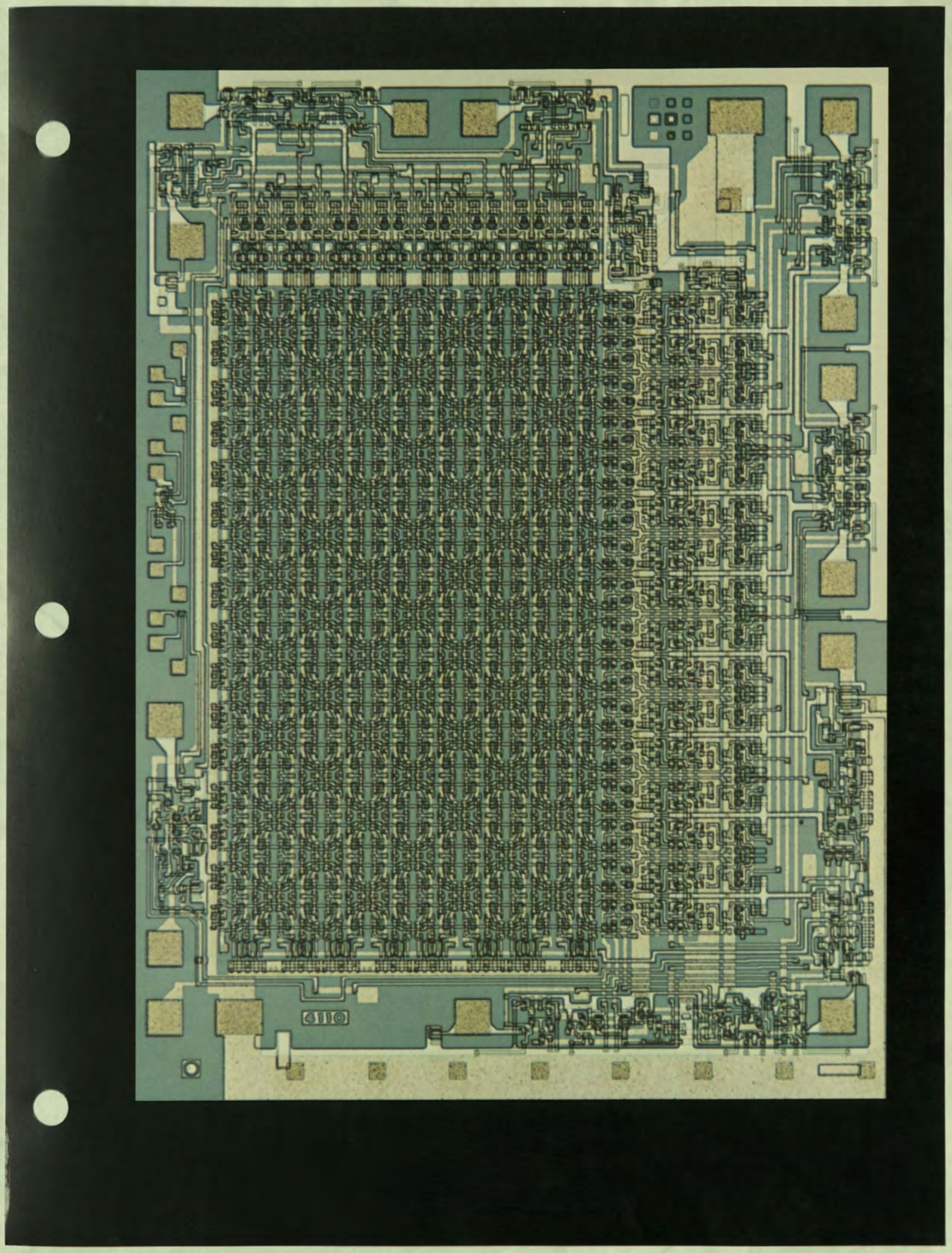
1972

Fairchild's third major Isoplanar product was the industry's first 1,024-bit TTL read-write memory, available as a production item in 1972.



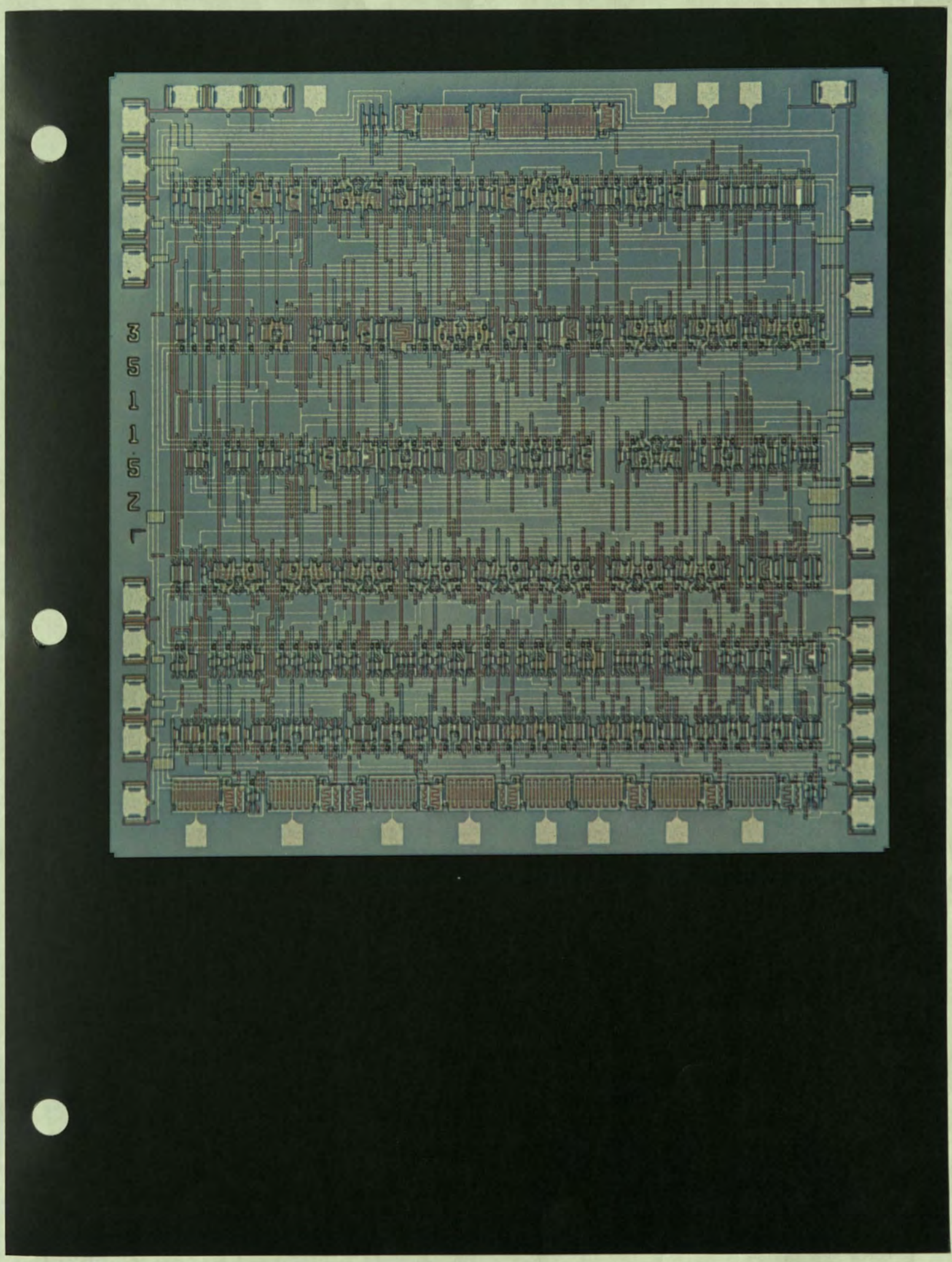
1972

This emitter-coupled logic (ECL) version of the first commercial Isoplanar memory is a 256-bit fully decoded memory with even higher speed operation than the TTL version. ECL is the main logic form being designed into computers for the 1980's.



1971

This monolithic voltage regulator was the first such product to be completely self-sufficient on a single silicon chip, with no external components needed for operation.

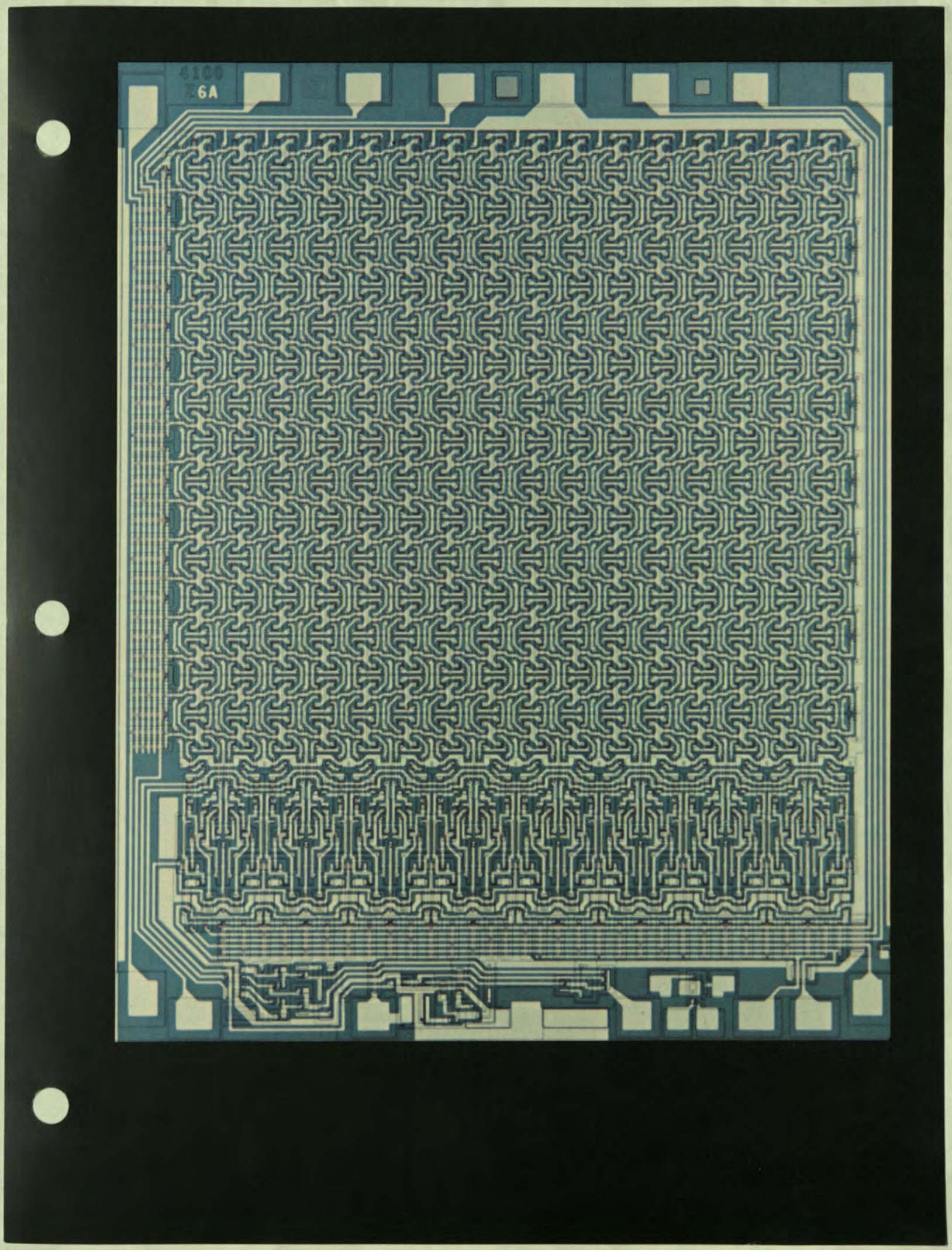

3511527

1971

The world's first commercial Isoplanar™ product. A 256-bit fully decoded bipolar random access memory chip. DTL/TTL compatible with a 50-nanosecond access time.

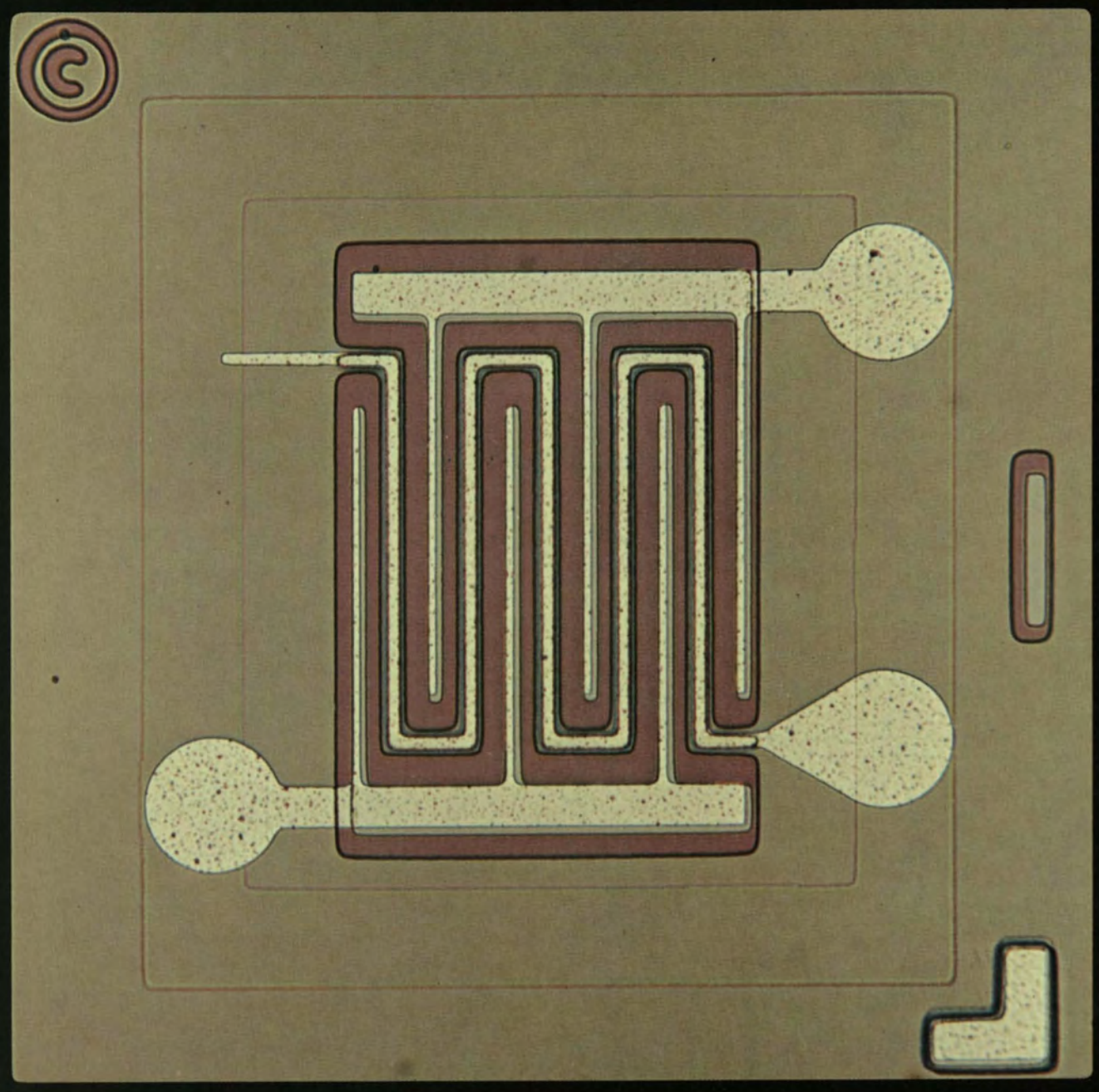
1971

This silicon-gate MOS Micromosaic circuit shows the impact of custom technology on the semiconductor environment. Developed for Philips of France, the complex 400-gate design provides the digital logic portion of a duplex data communications system.


4100
6A

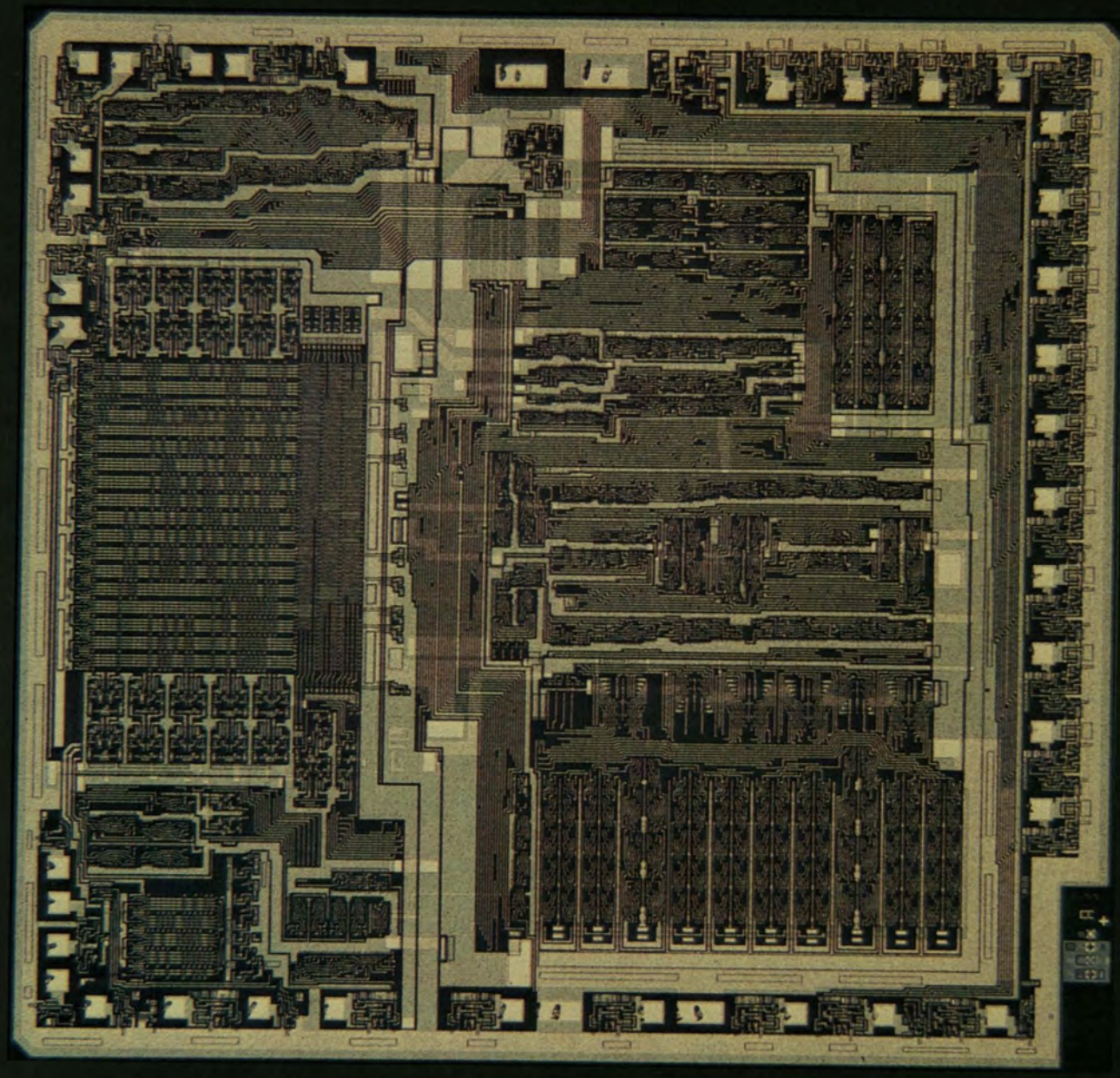
1970

A 128-element linear sensor—Fairchild's first self-scanned photo array.



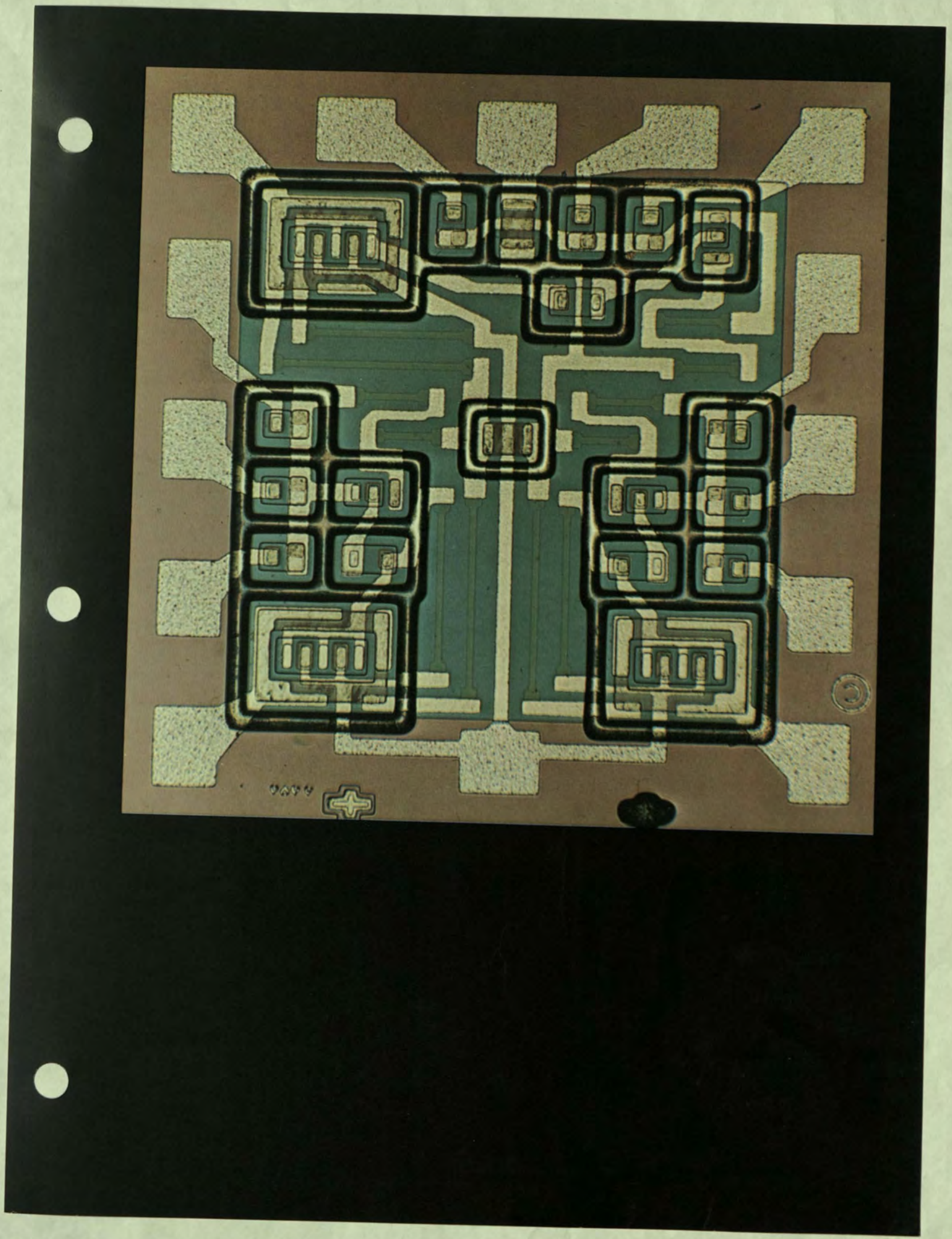
1966

Fairchild's first MOS integrated circuit product—a dual J-K flip-flop.



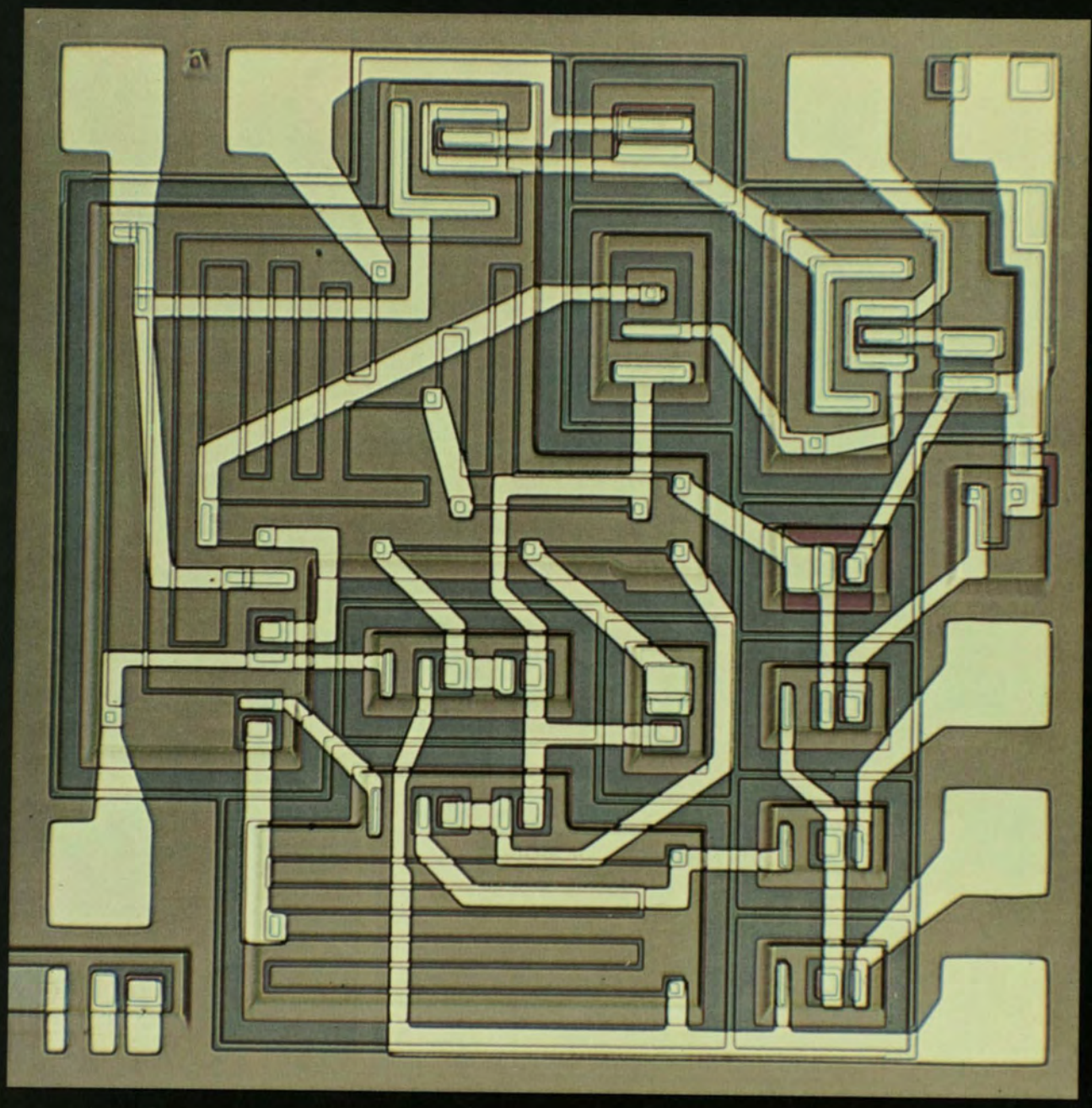
1979

This 16,384-bit Isoplanar Integrated Injection Logic (I^3L)™ dynamic RAM (Random Access Memory) further advances the performance of MOS circuitry with operating speed approaching that of bipolar devices.



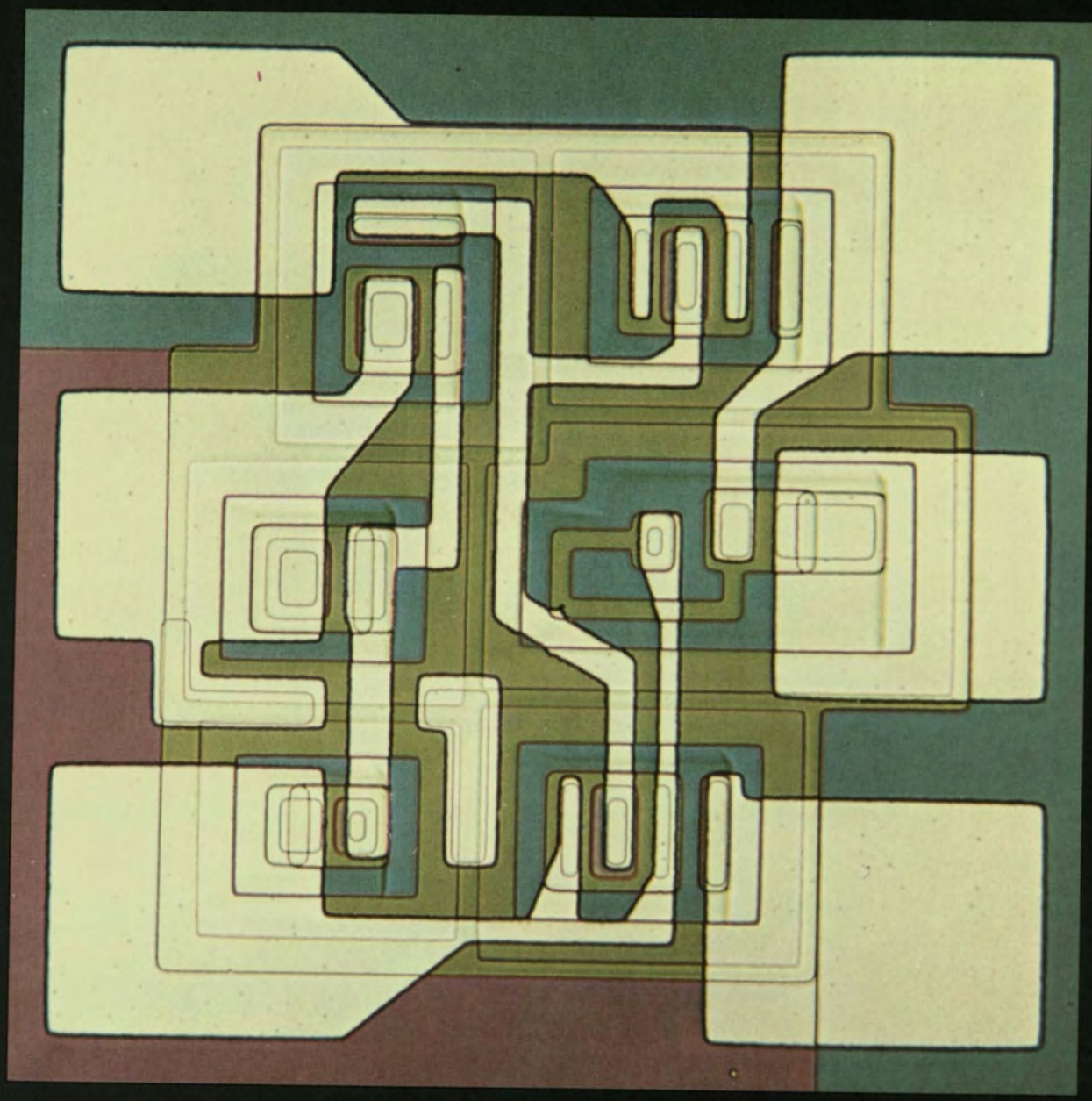
1966

The industry's first gold-doped PNP transistor, made with a stabilization technique that utilizes an equipotential ring.



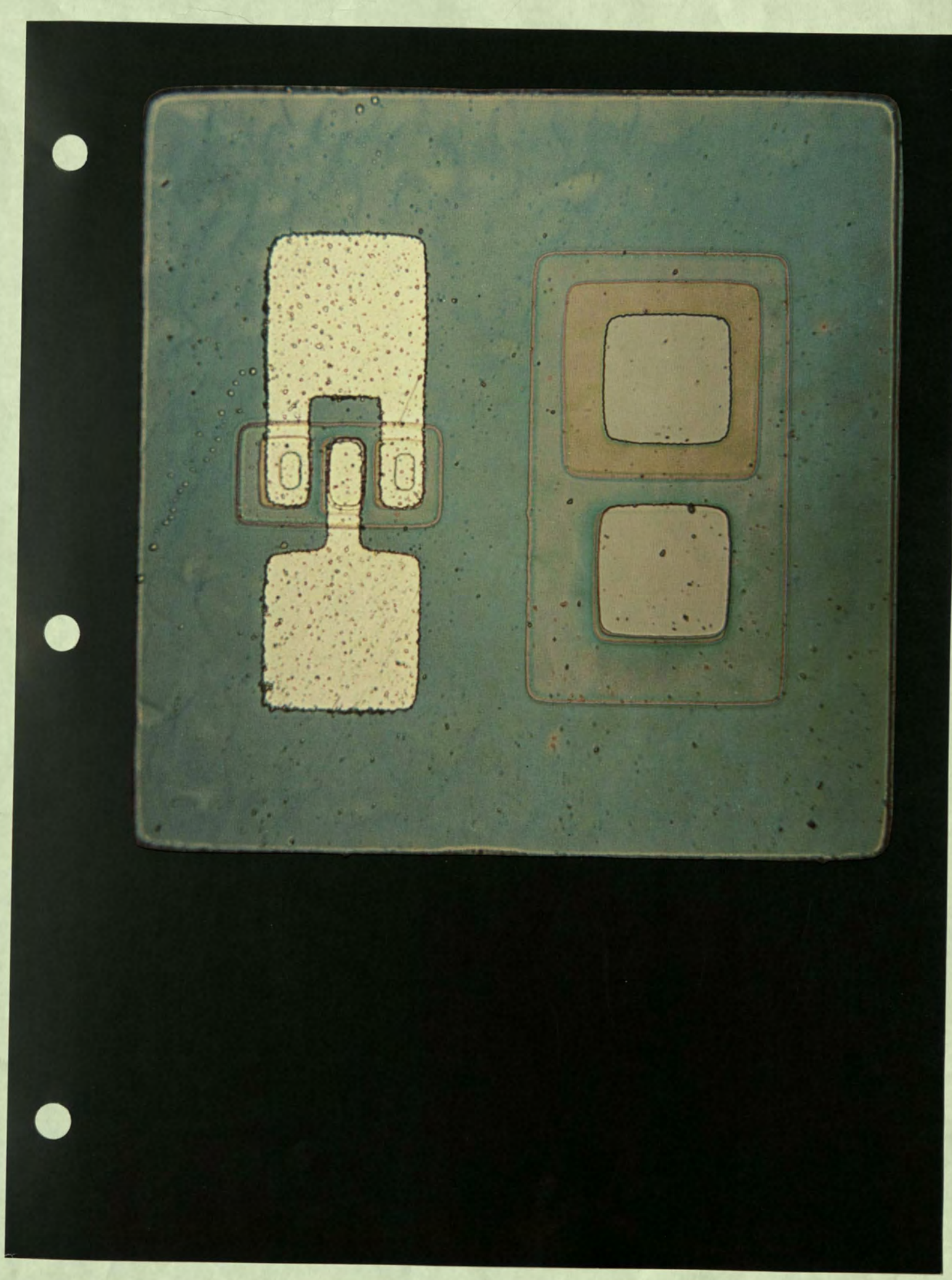
1965

This DTL triple-gate device was the first radiation hardened product made with dielectric isolation and thin-film resistors.



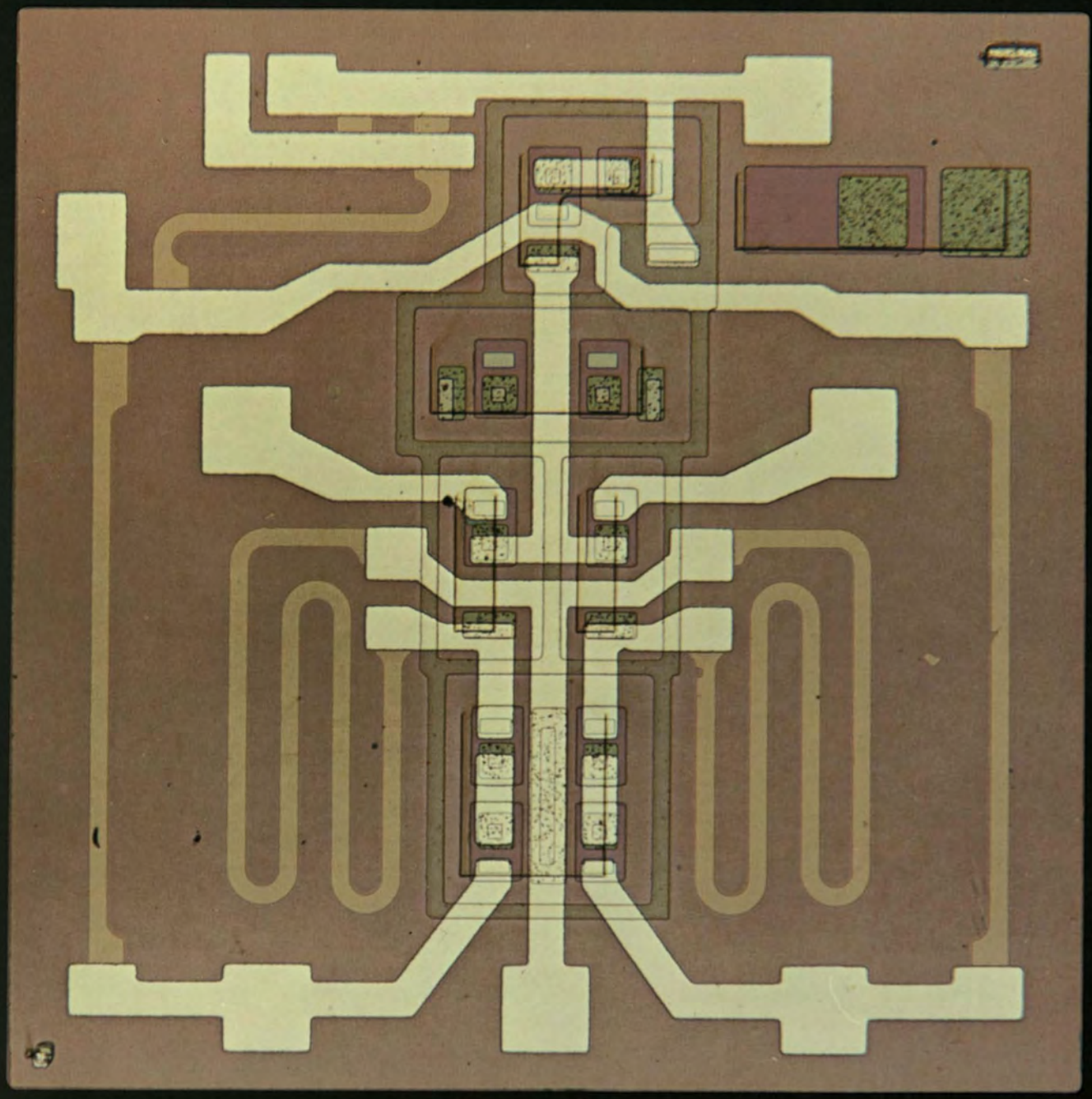
1965

A milestone in the linear integrated circuit field, this device—the μA709—was the first operational amplifier generally used throughout the industry.



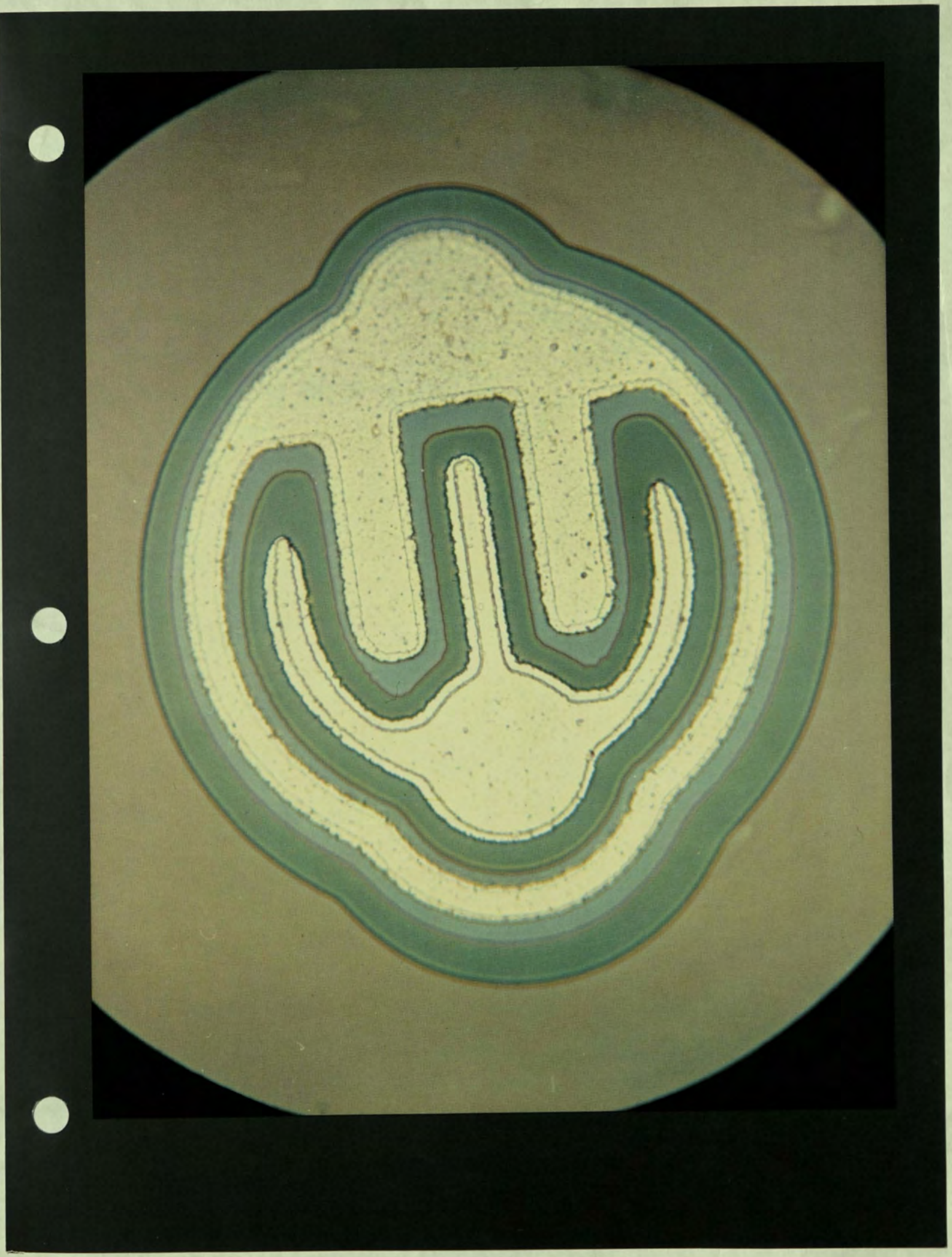
1964

The first consumer-oriented linear integrated circuit in the world. Still on the market.



1964

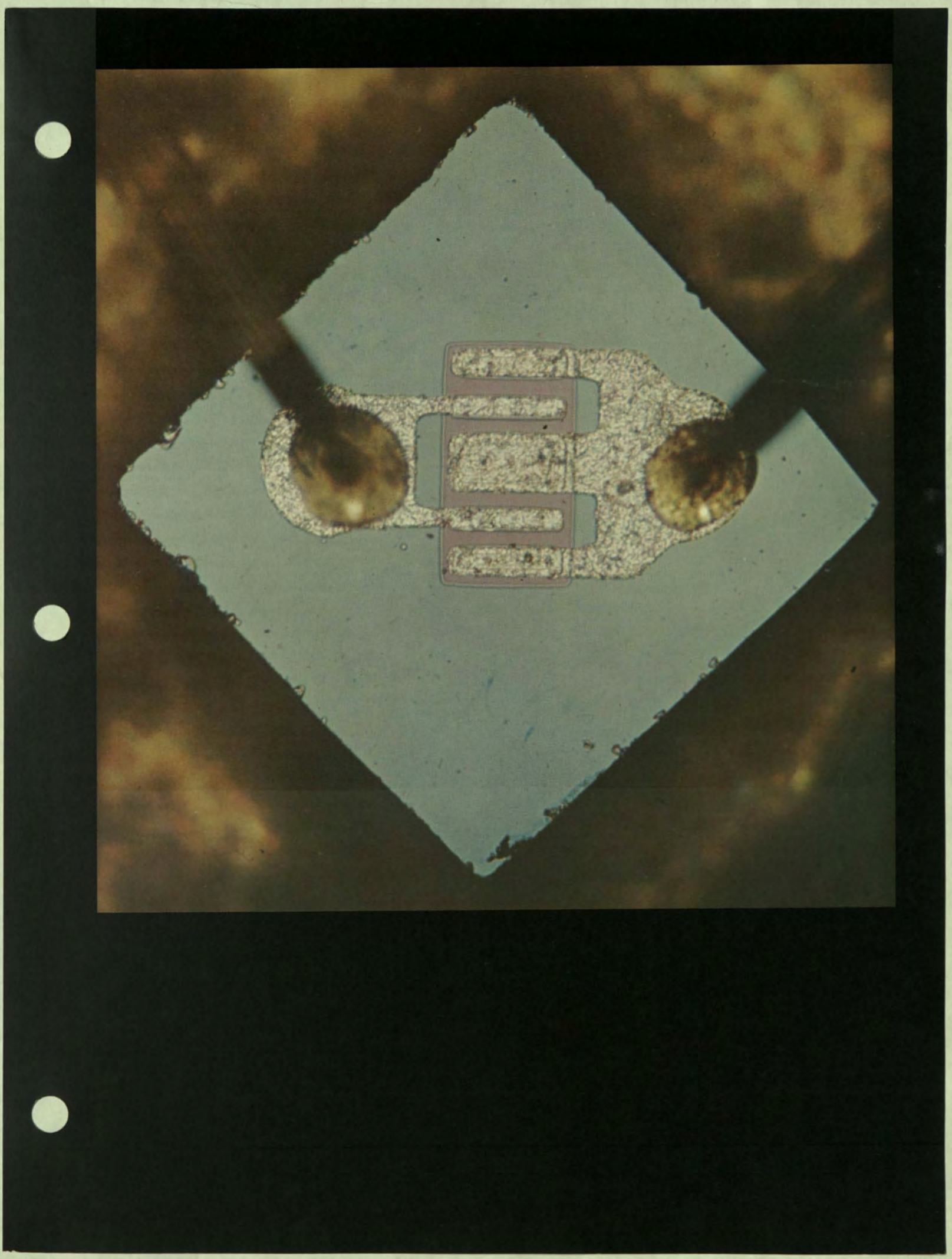
This low-power, high-frequency (700 mega-hertz) PNP transistor was among the earliest extremely fast epitaxial devices in the industry.



1964

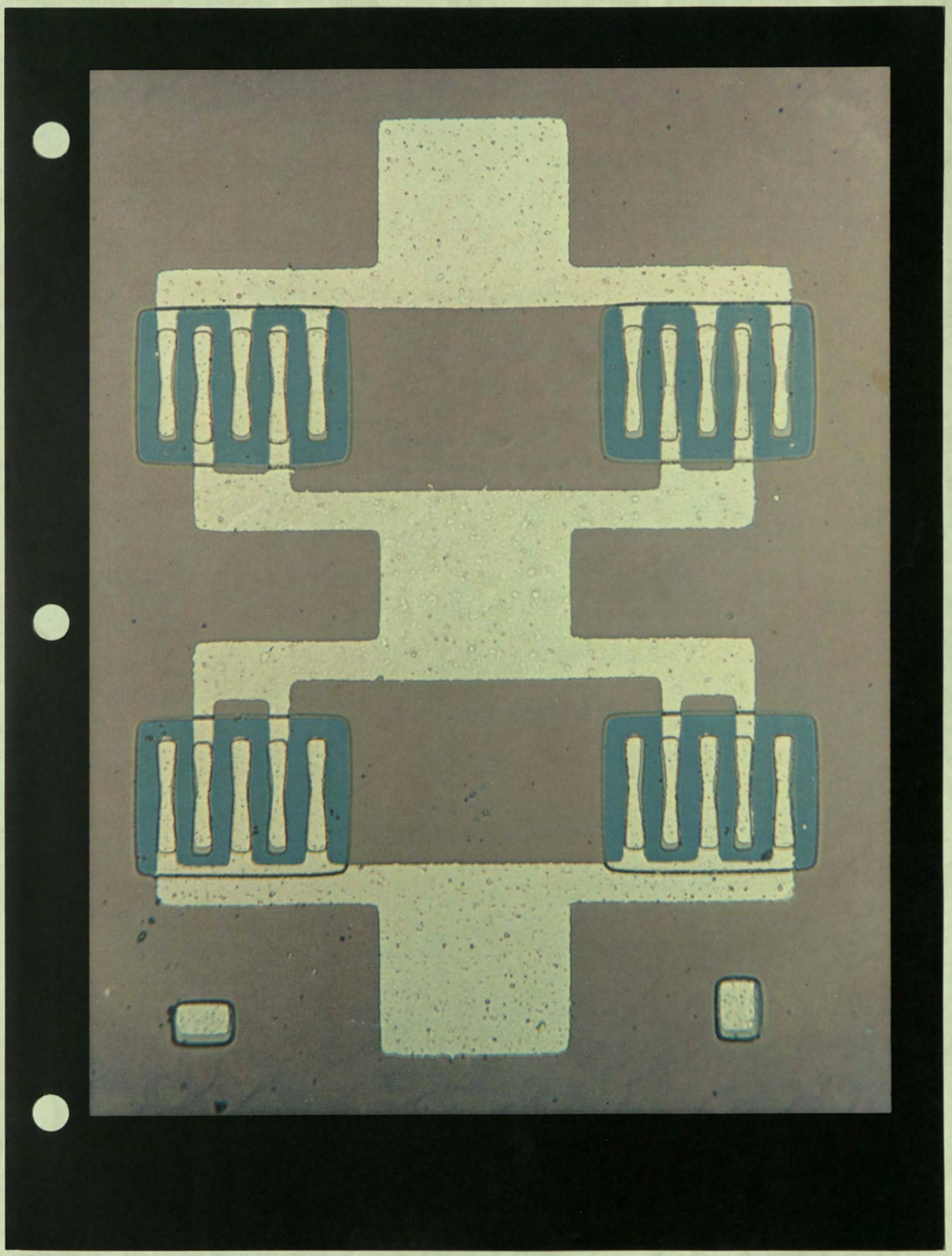
1964

The industry's first linear integrated circuit. Also the first IC whose operation was dependent upon matched active and passive components.



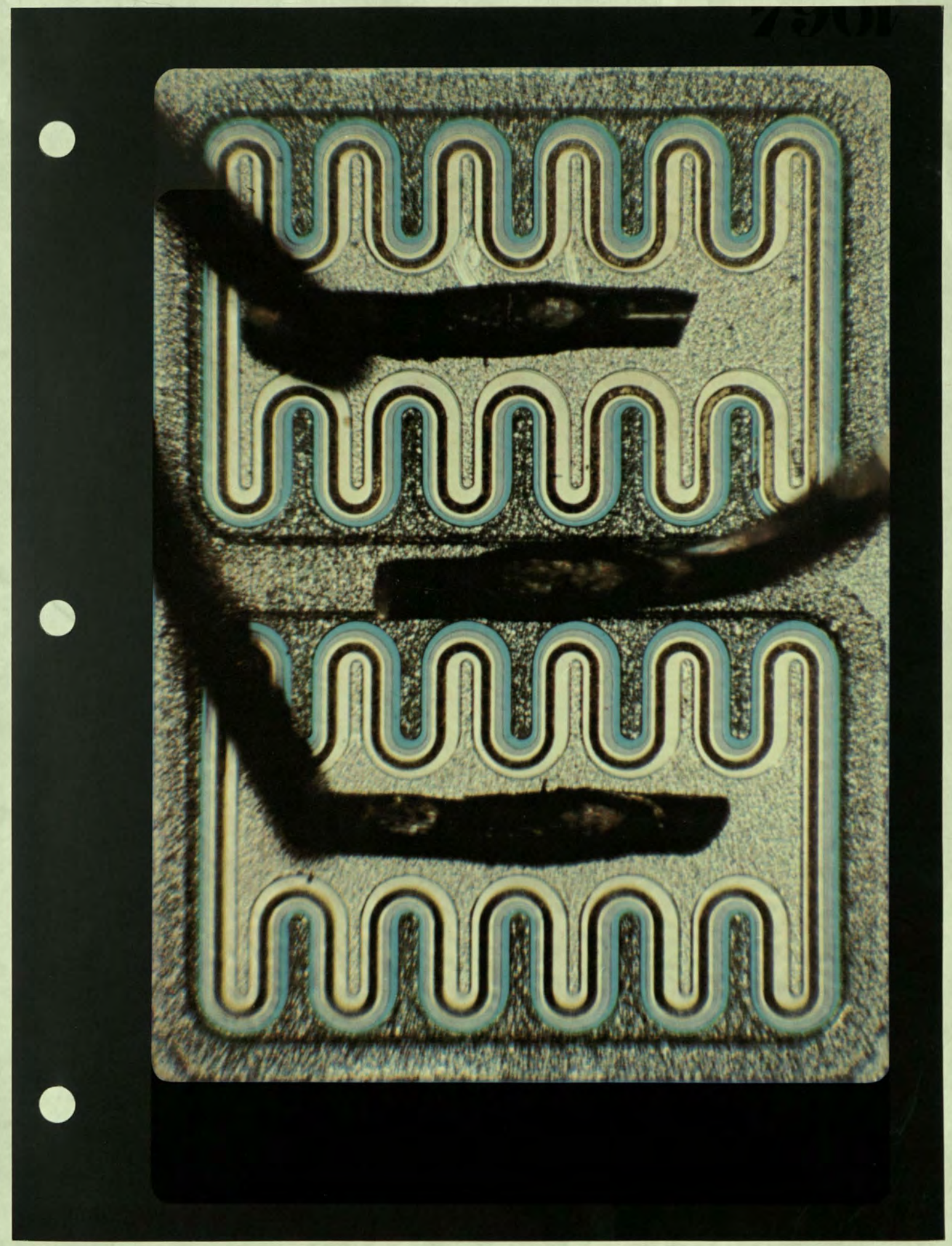
1964

Fairchild's first general purpose, 30-volt, half-amp core driver. Features medium power, medium voltage NPN.



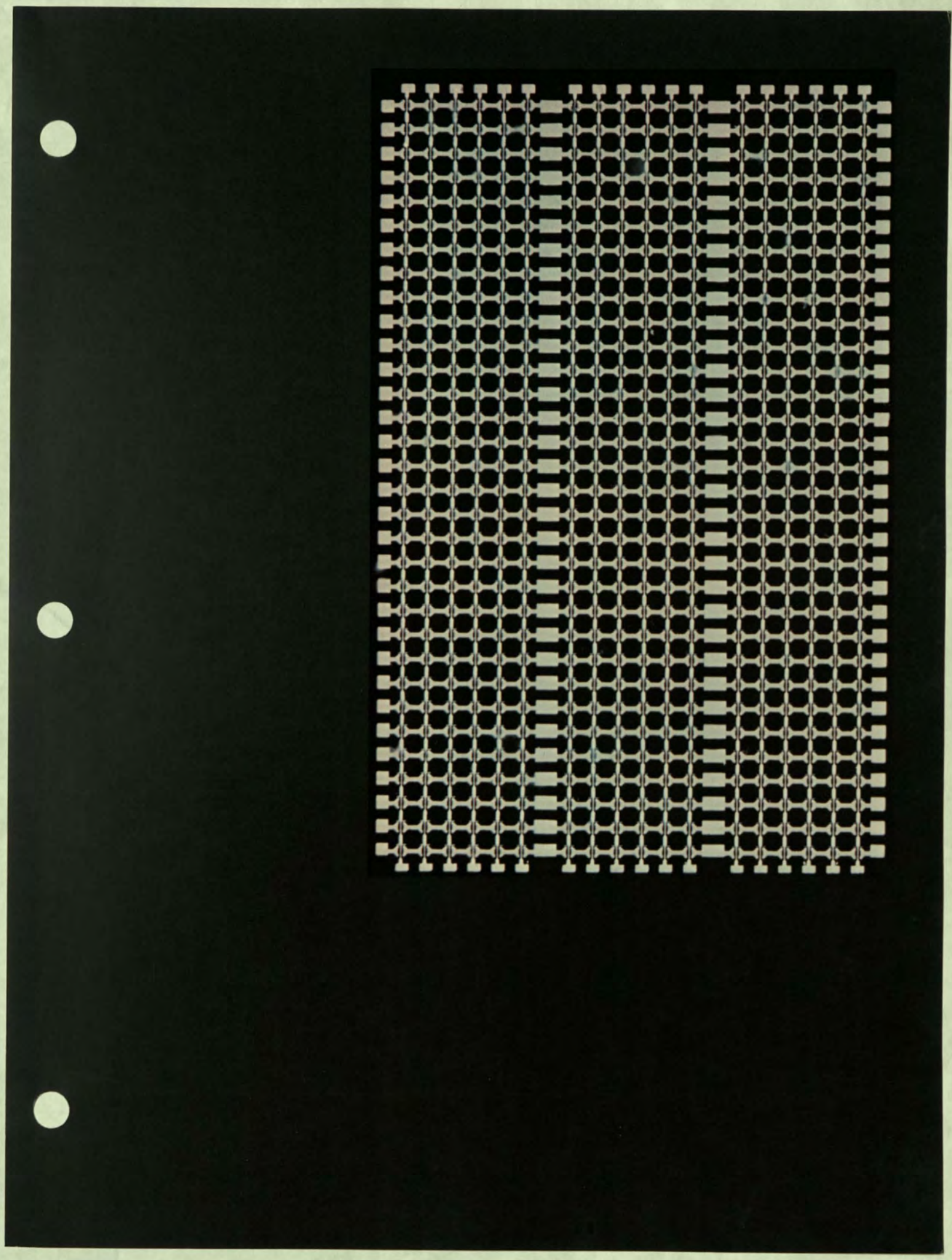
1964

The industry's fastest core driver for low-power applications.



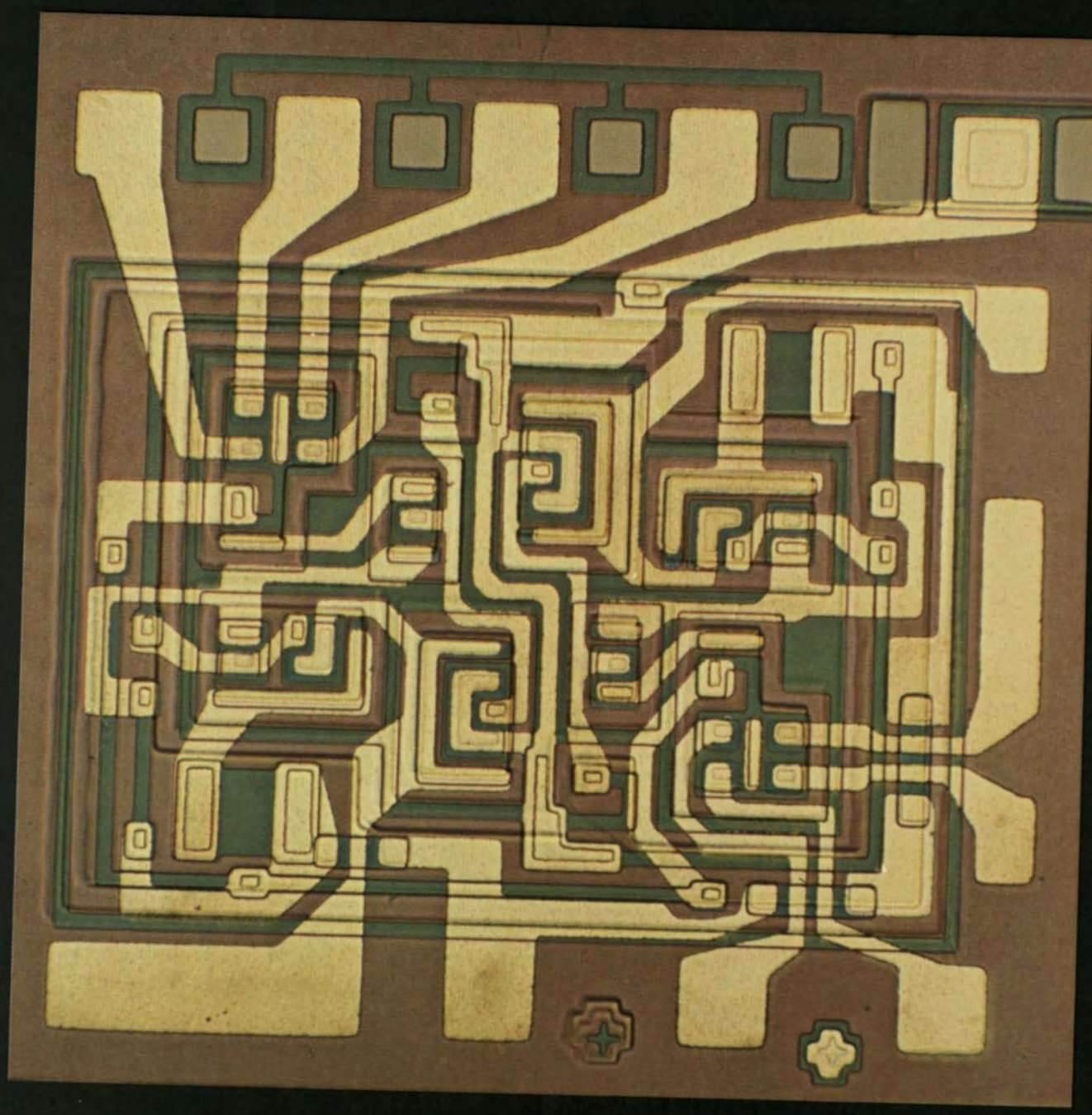
1964

Fairchild's first radio frequency power transistor—a 1-watt, 300-megahertz device.



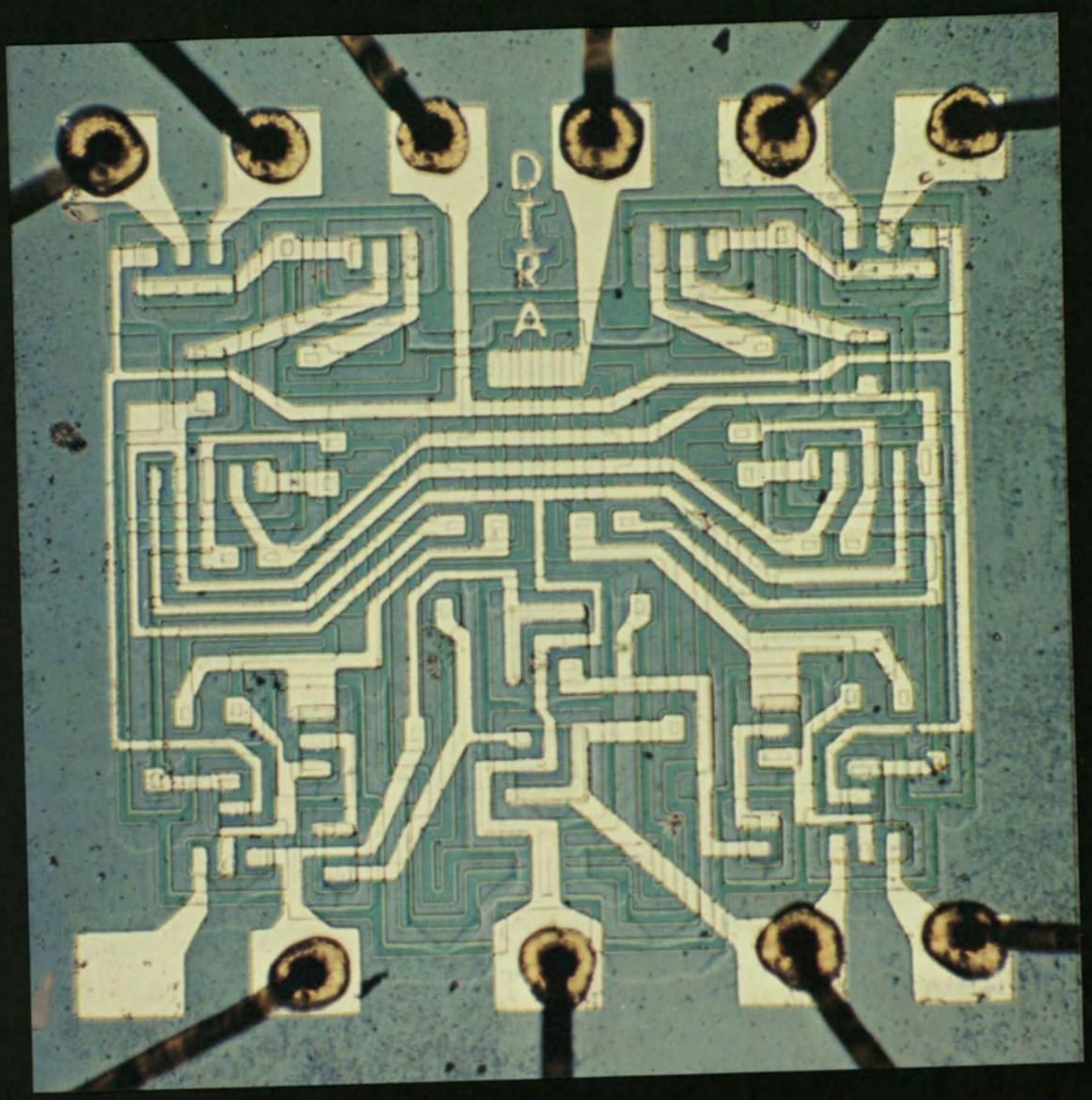
1964

This NPN Planar power transistor was the first in the industry to incorporate a thin-film emitter resistor process.



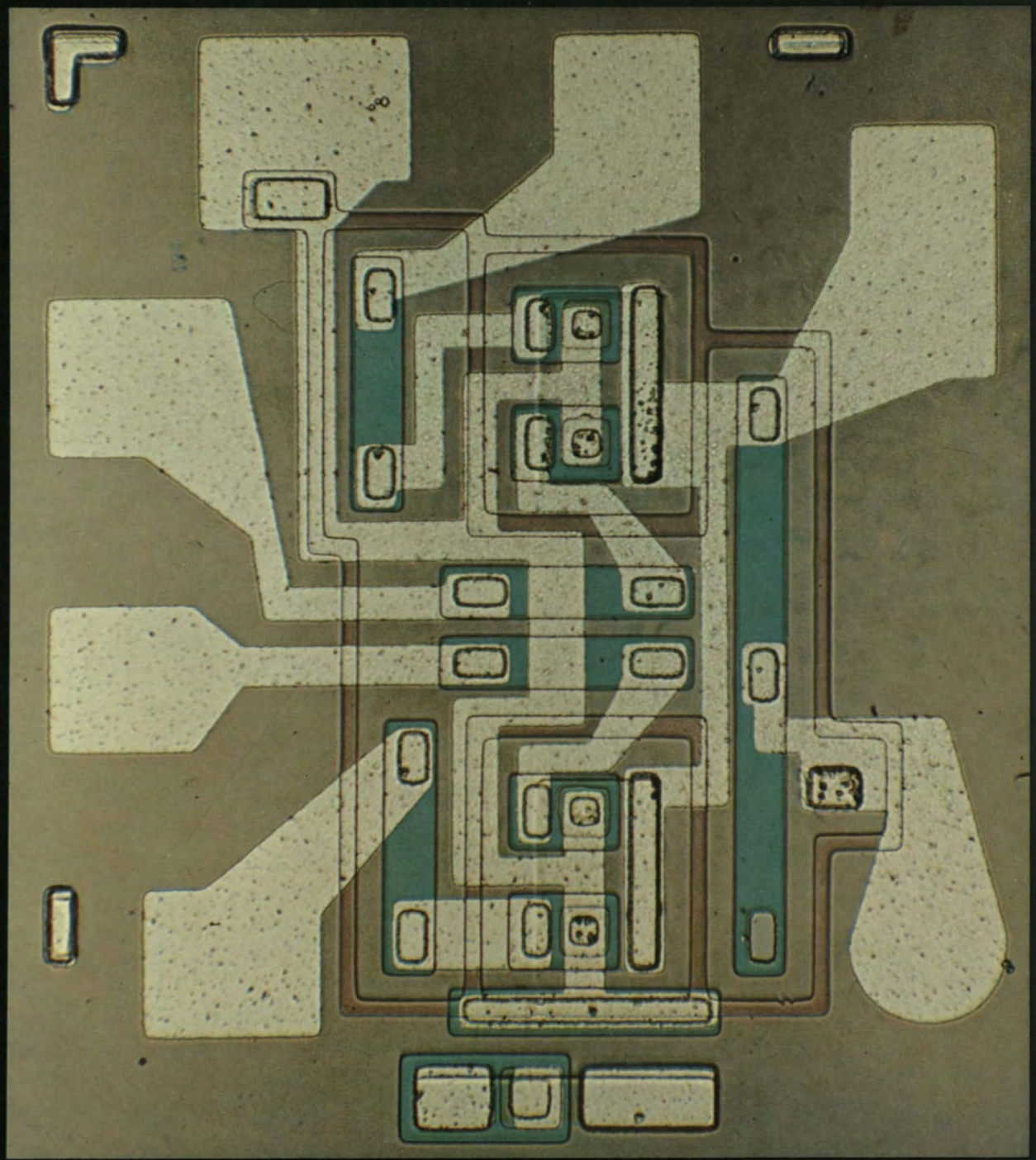
1964

The first general purpose metal-oxide-semiconductor (MOS) device—a transistor featuring P-channel enhancement.


DIRA

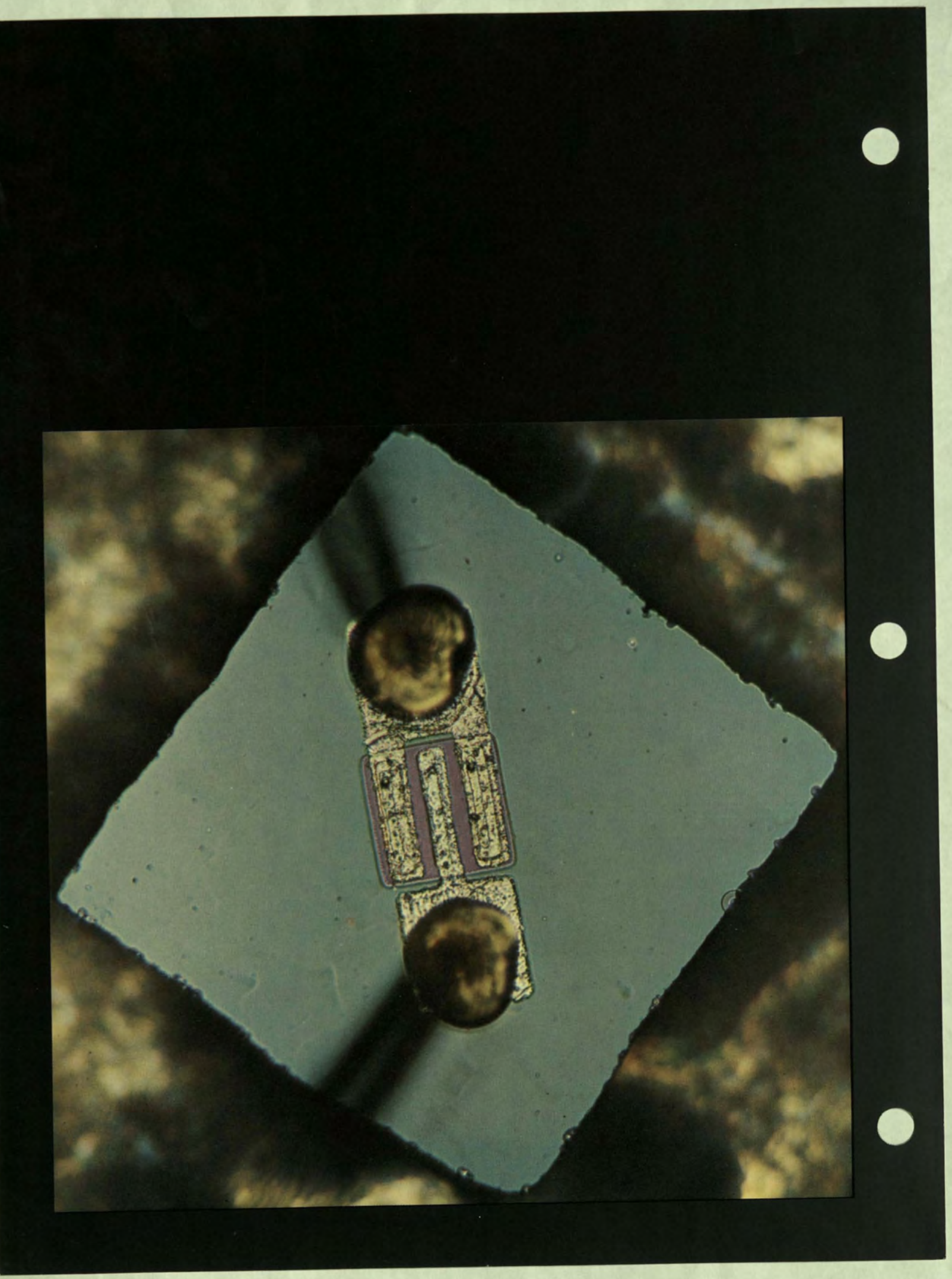
1964

This dual-gate, custom transistor-transistor logic (TTL) design was used in the first commercial application of TTL logic.



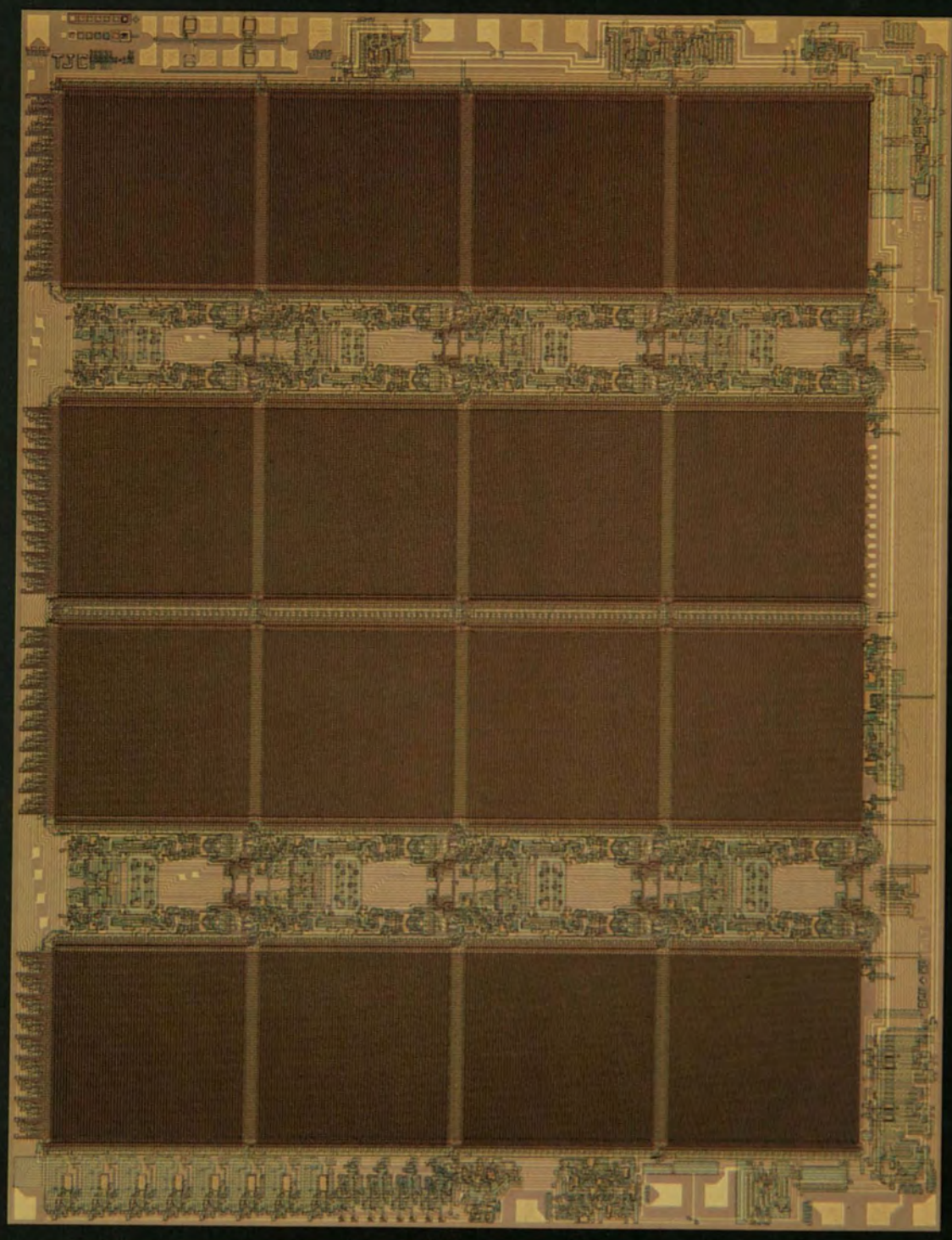
1964

The backbone of Fairchild's diode-transistor logic (DTL) family, this master-slave flip-flop was the first static flip-flop in the semiconductor industry.



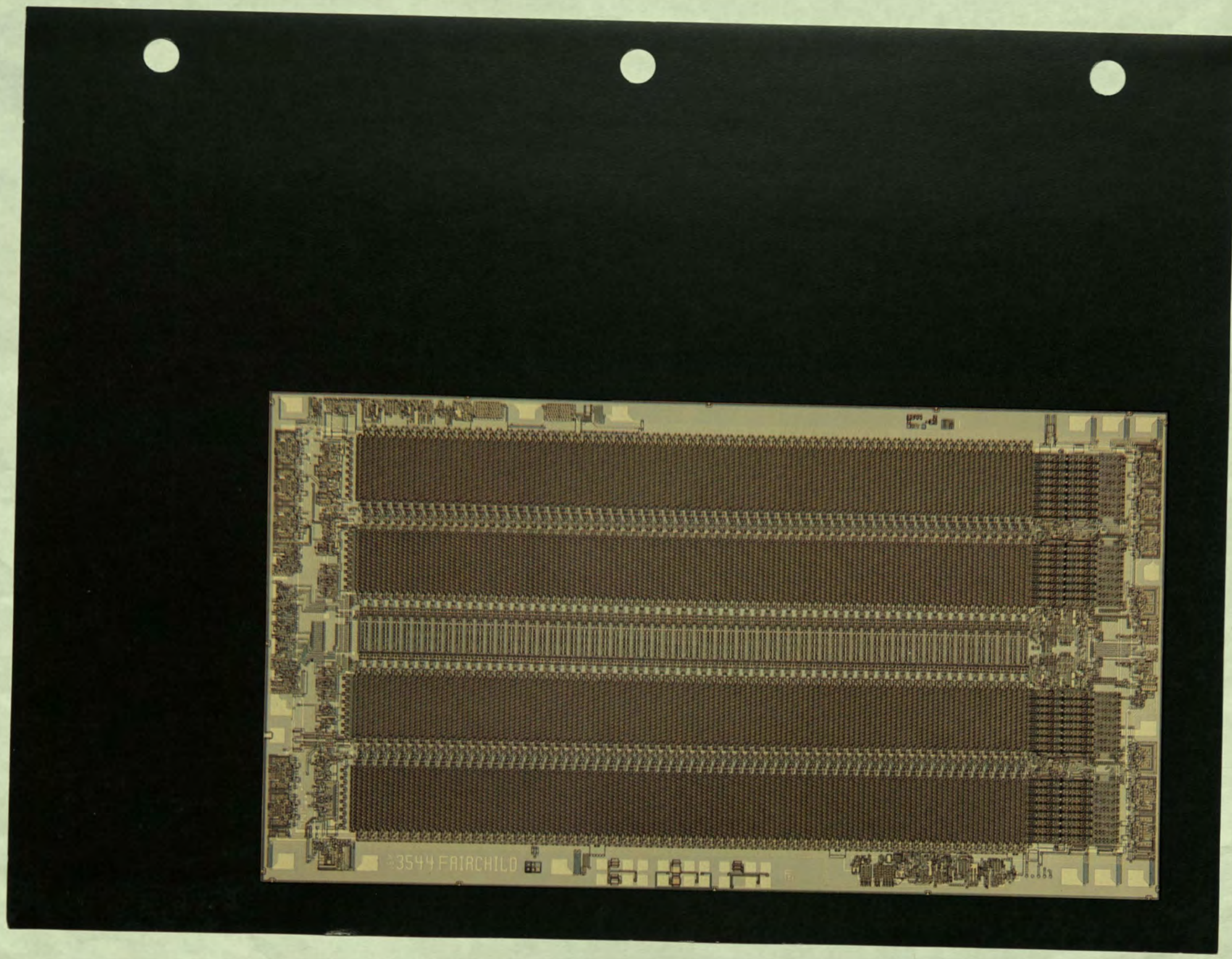
1963

A second generation RTL product, this dual-gate device was the first to incorporate buried-layer isolation technology.



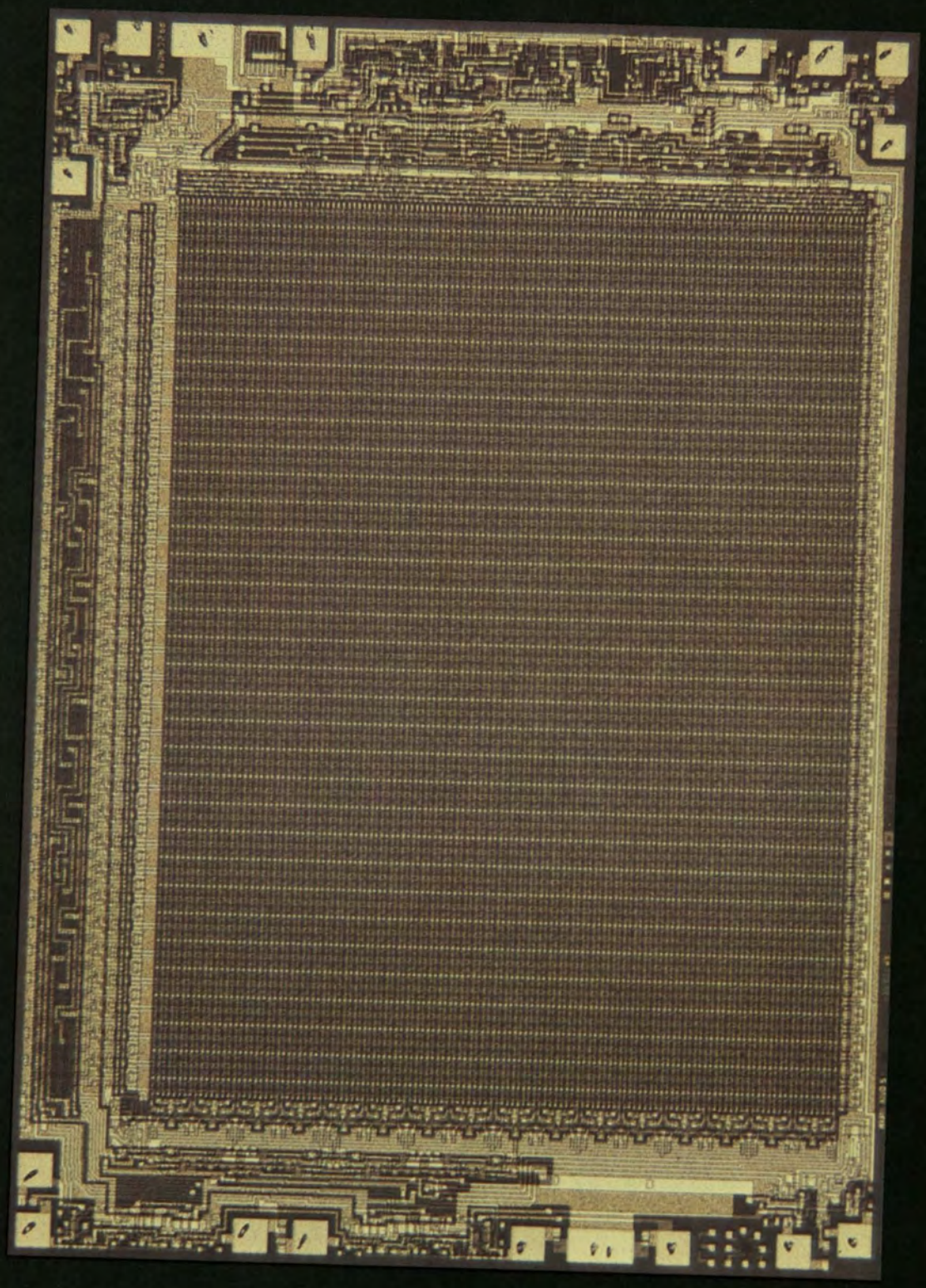
1977

This CCD (Charge-Coupled Device) area image sensor contains an array of 488 x 380 imaging elements on a single chip of silicon. Approaching 300,000 elements, this device easily represents the highest number of circuit components on a production chip. The sensor provides the highest resolution of any currently available silicon imaging device.


3544 FAIRCHILD

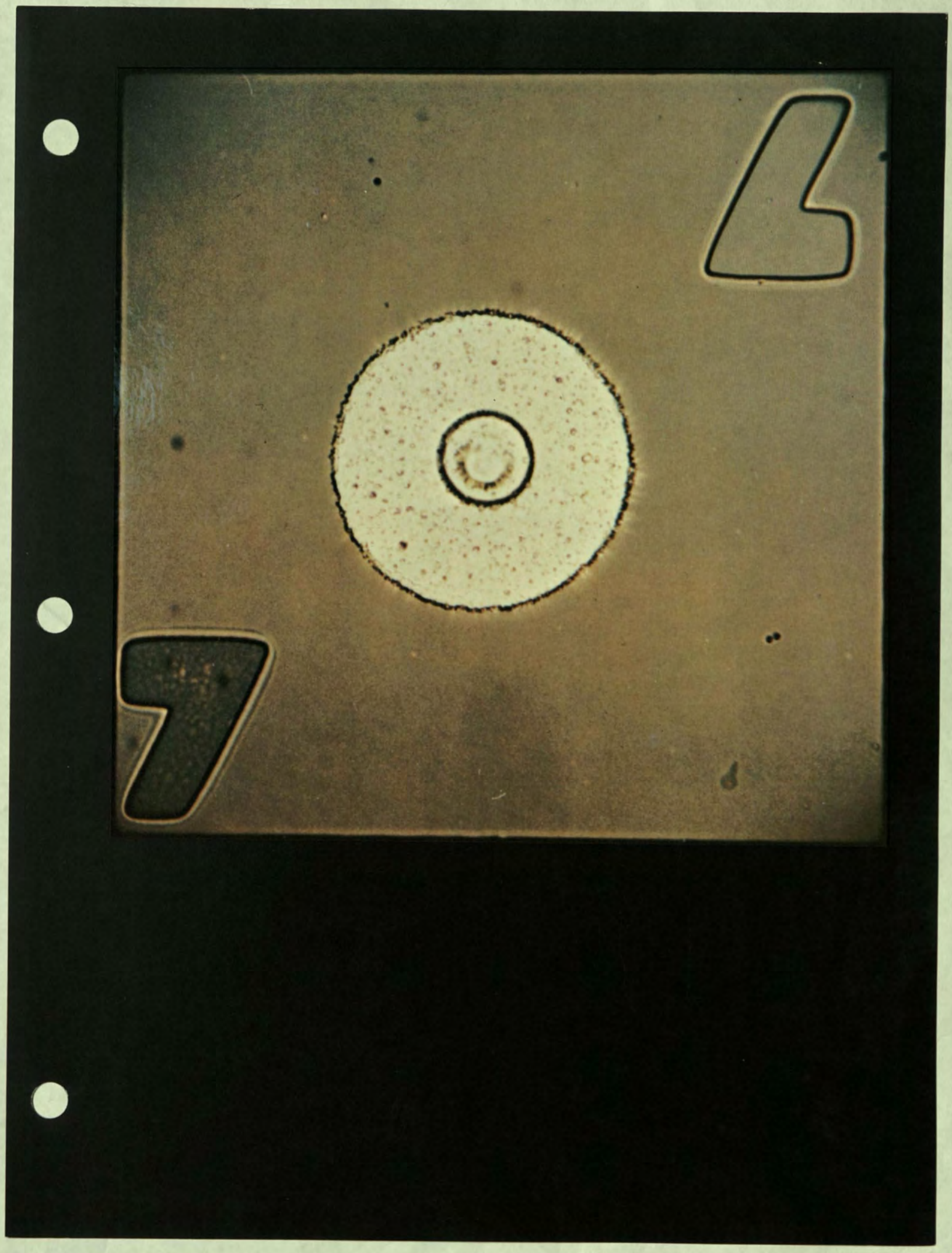
1977

The 65,536-bit CCD (Charge-Coupled Device) memory is the most complex integrated circuit memory. It combines all currently available advanced MOS circuit techniques, including double-layer polysilicon, ion implantation and Isoplanar structures. This is the first semiconductor memory capable of being cost competitive with bulk storage devices such as fixed-head disk memories.



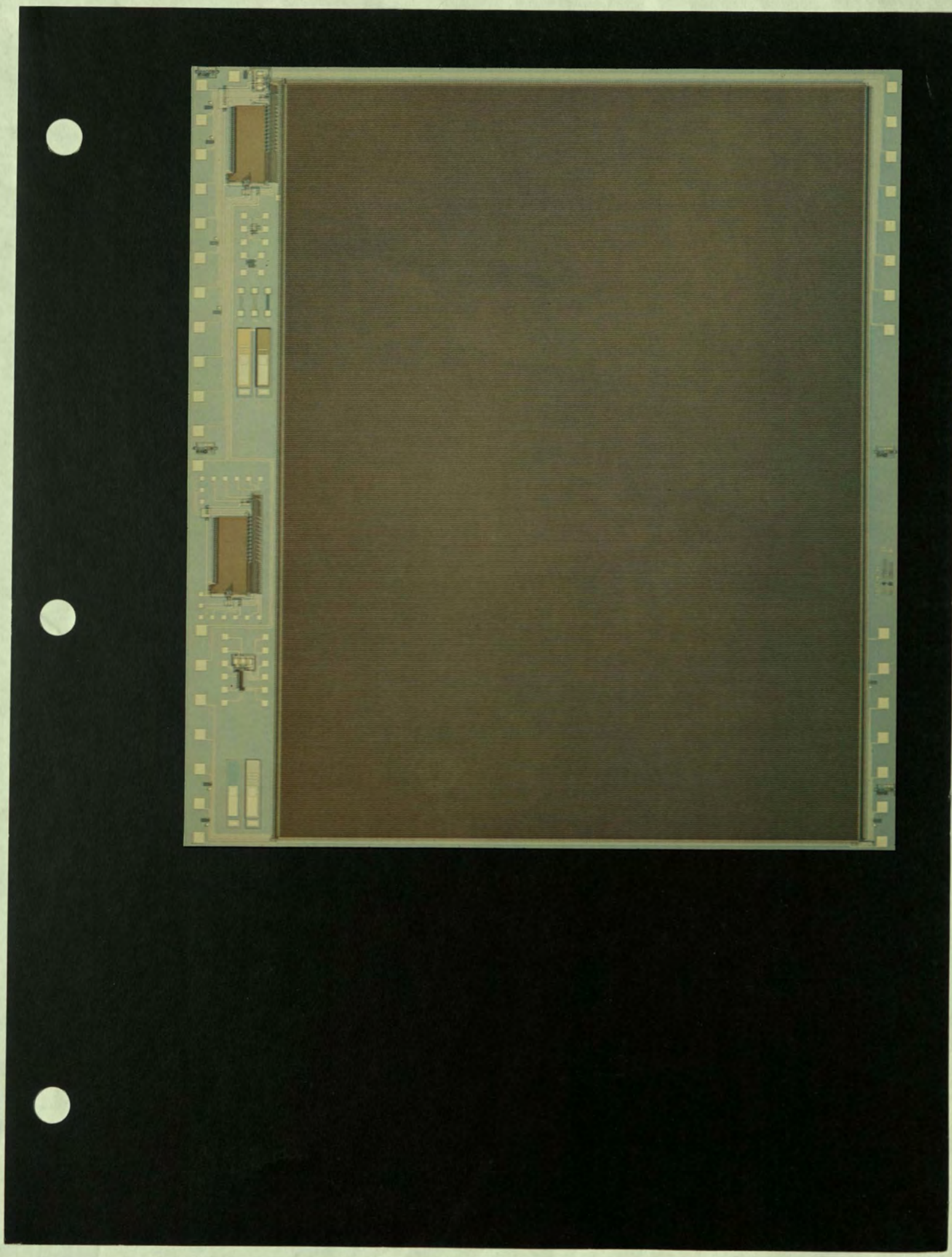
1977

Fairchild's 16,384-bit N-channel dynamic RAM (Random Access Memory) utilizes Isoplanar processing to achieve the smallest chip size and highest speed of any 16K MOS RAM. In addition to high performance, the small size of this device allowed the use of a standard 16-pin package, an important cost reducing feature.


6
7

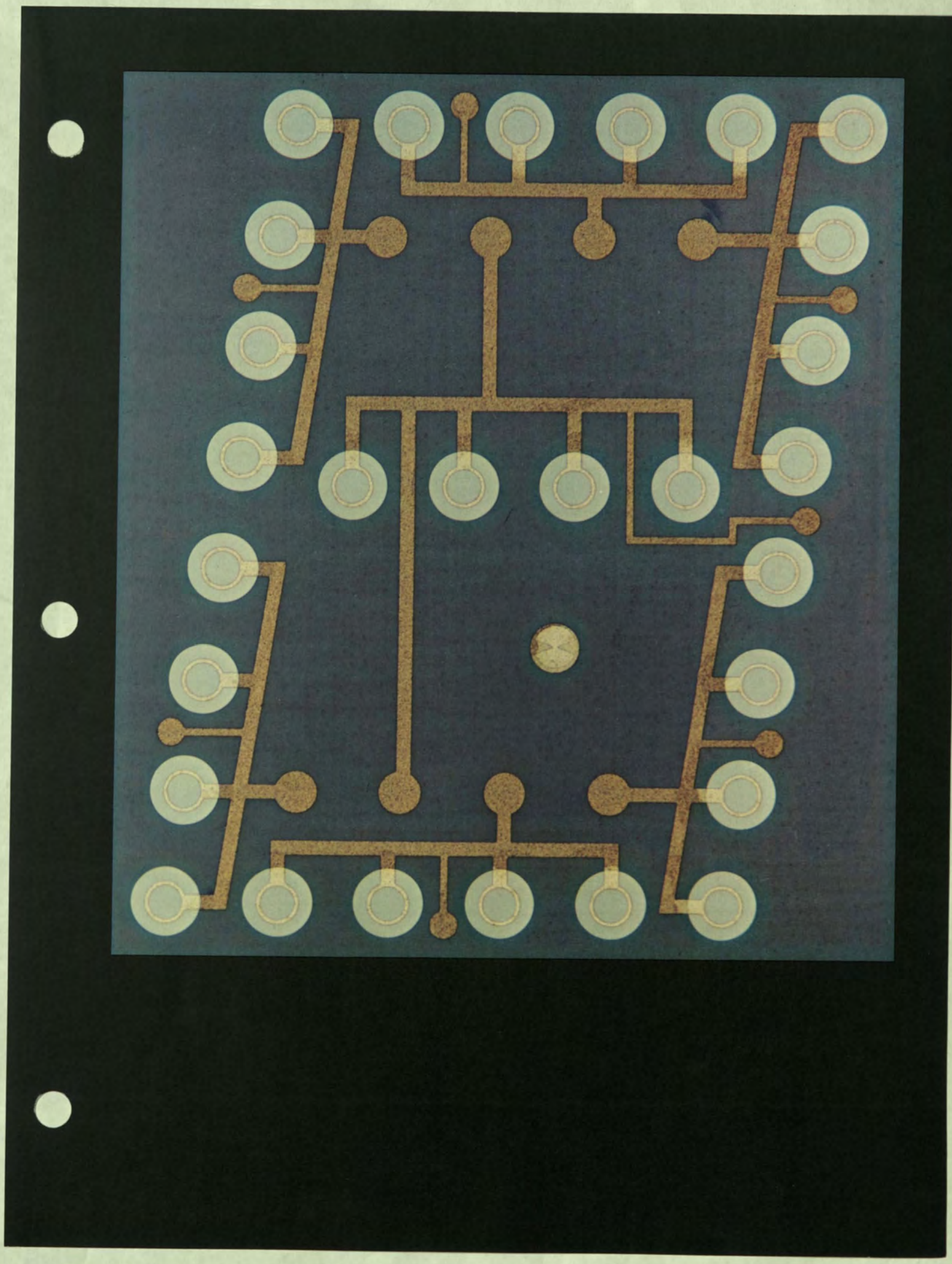
1966

Fairchild's first standard TTL product—a quad two-input NAND gate. TTL logic, still a workhorse of the industry, offers speed and power advantages over earlier types of circuitry.



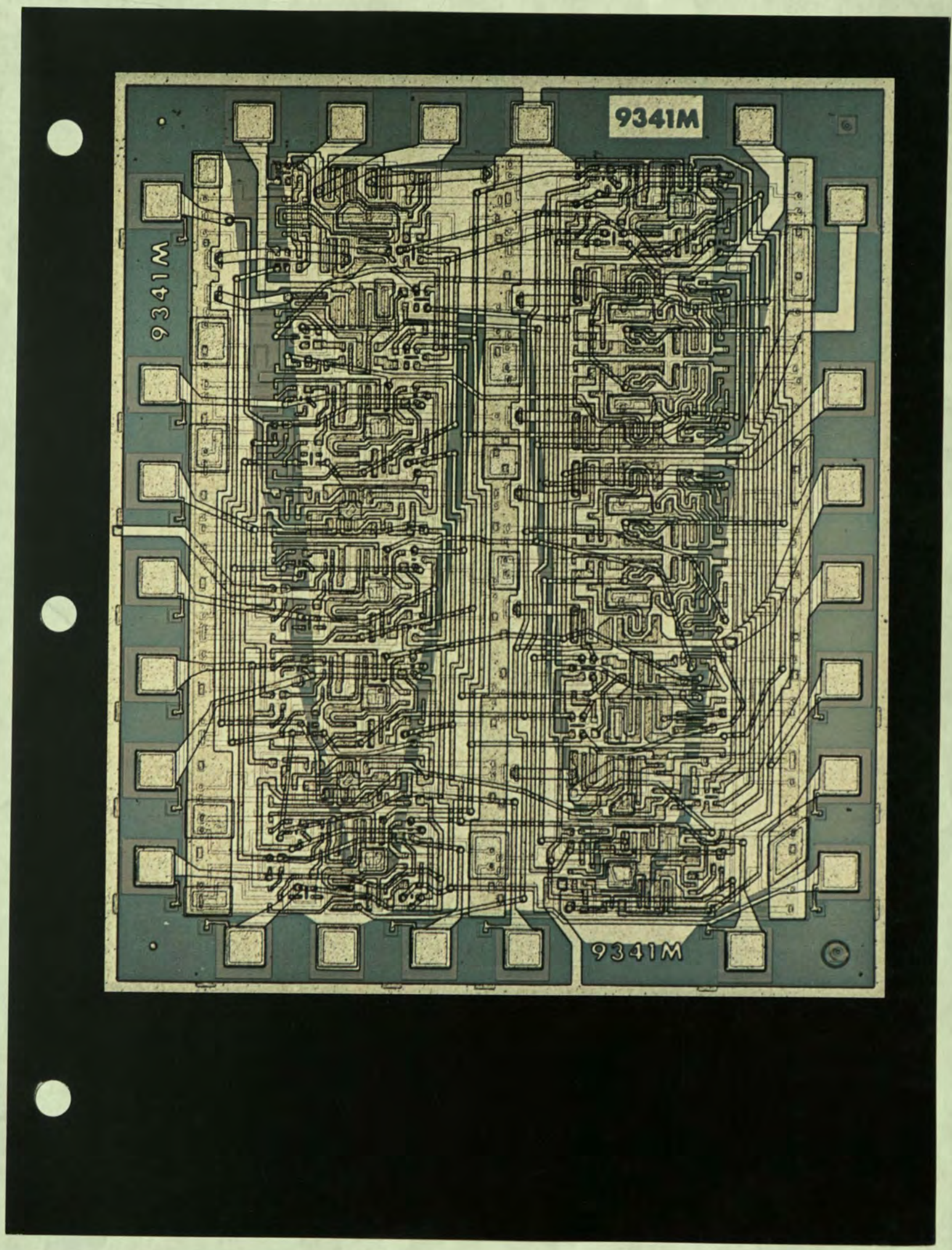
1978

The 9440 16-bit microprocessor is the first integrated circuit with the capability of a minicomputer CPU (Central Processing Unit) on a single chip. Utilizing Isoplanar Integrated Injection Logic (I^3L)™ technology, the 9440 operates at true minicomputer speeds of 10 megahertz and above.



1970

The first solid-state random access memory in production. This 256-bit partially decoded bipolar memory was used in the Illiac IV computer.

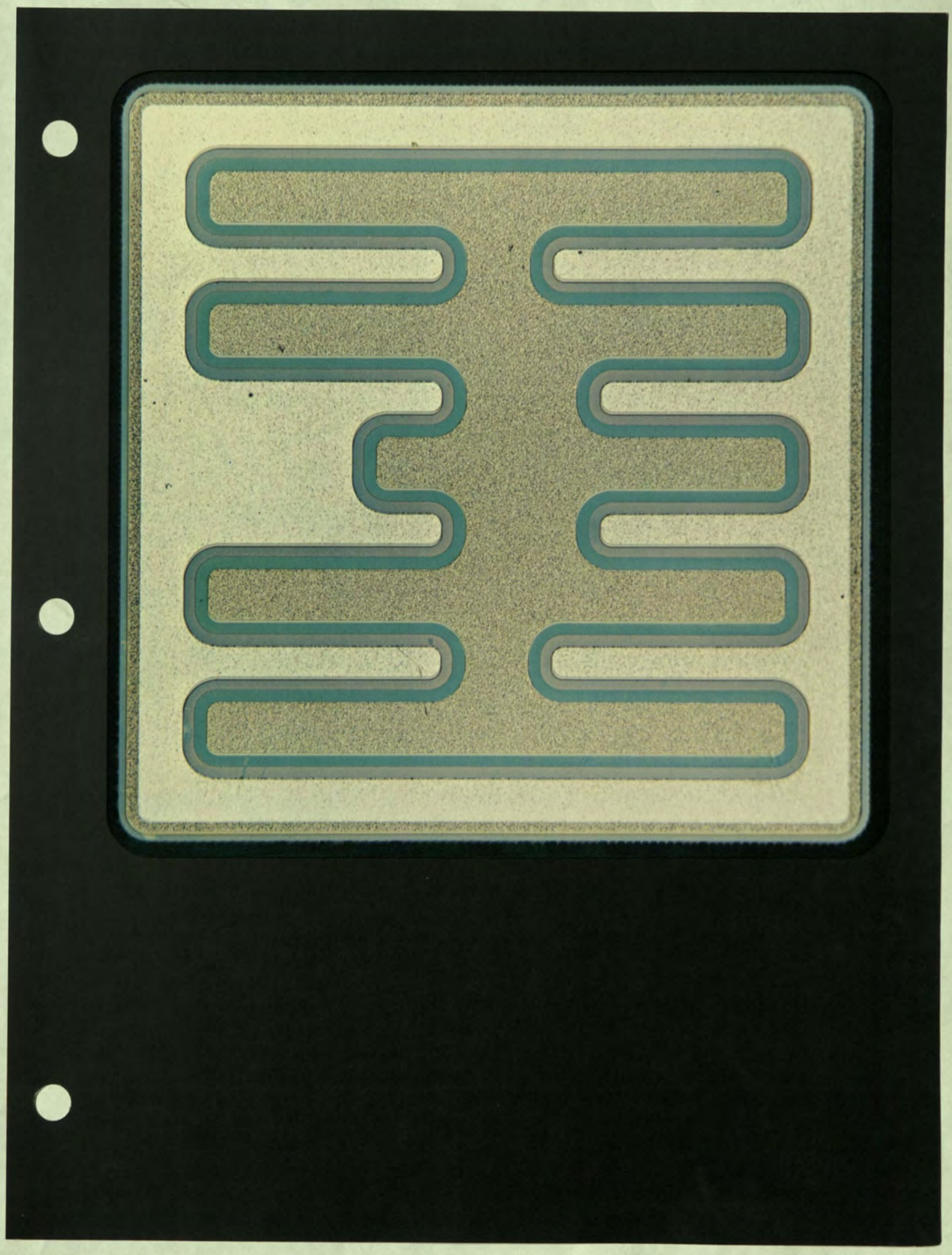

9341M
9341M
9341M

1970

The industry's first monolithic and Planar numeric display. A gallium arsenide phosphide light emitting diode array.

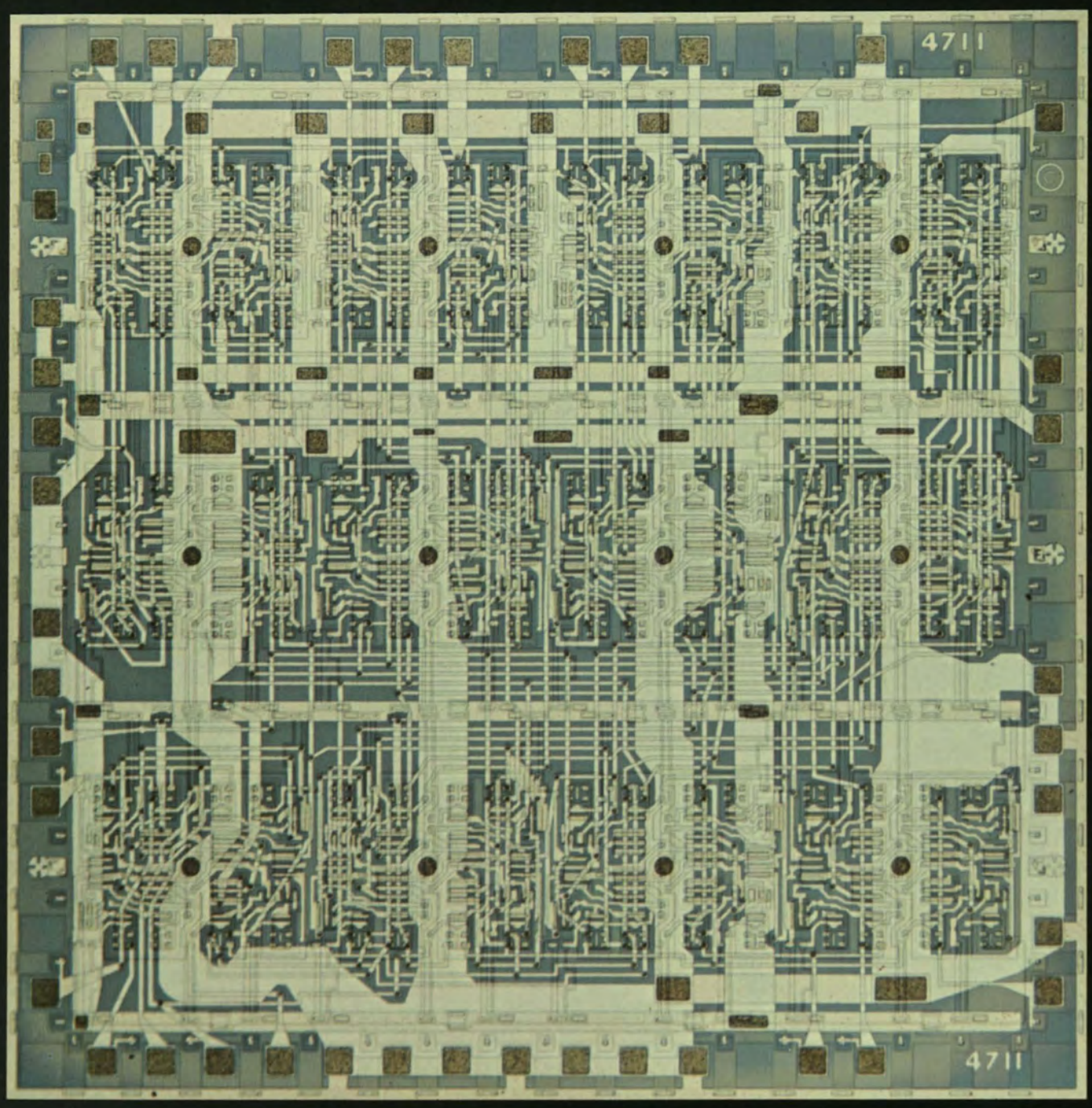
1969

The interconnection masks on this device were generated on Fairchild's computer-aided design system and implemented with the first three layer metal process. This is a 48-gate custom TTL logic array.



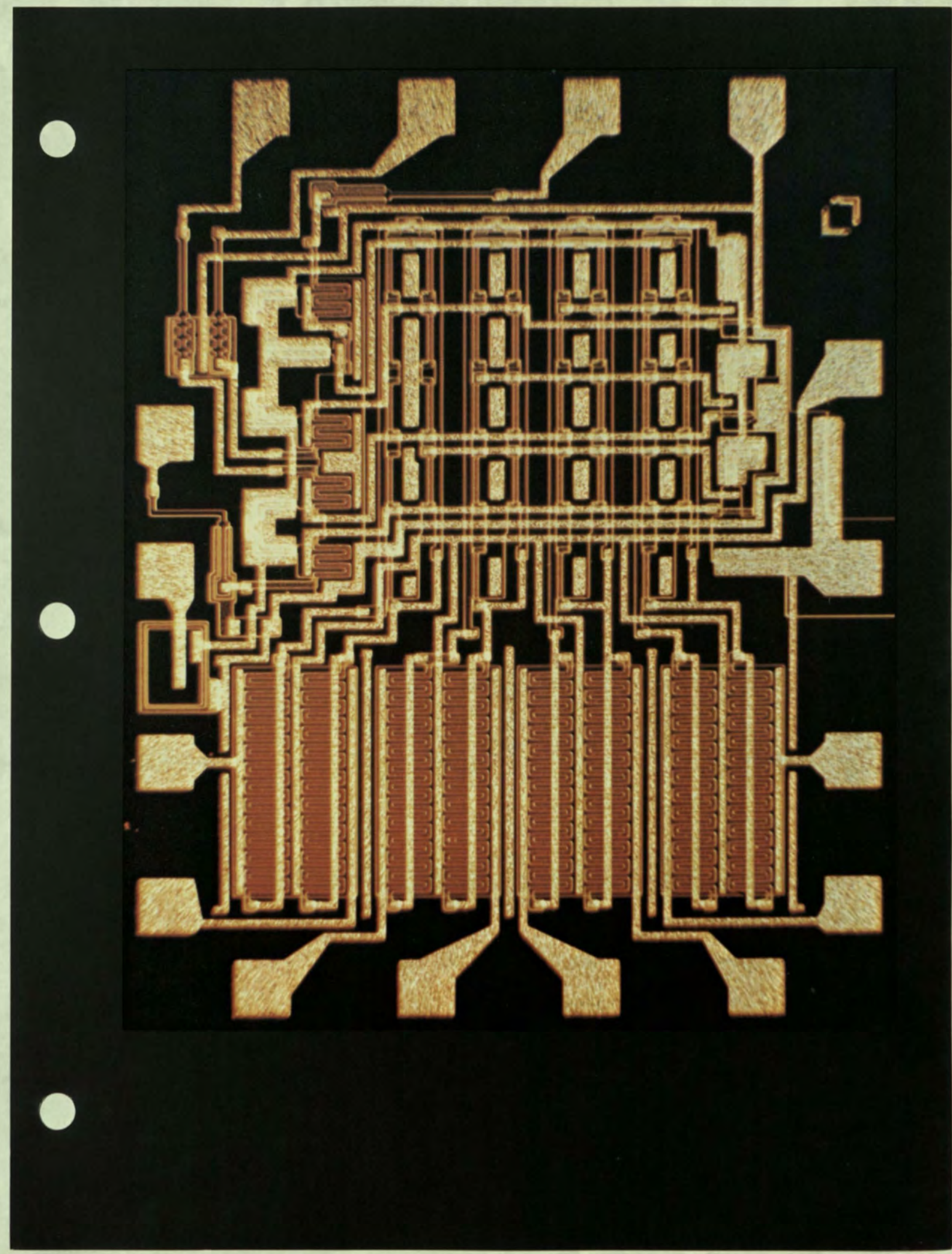
1969

The first Planar gallium arsenide product in the industry—an infrared emitting diode.


4711
4711

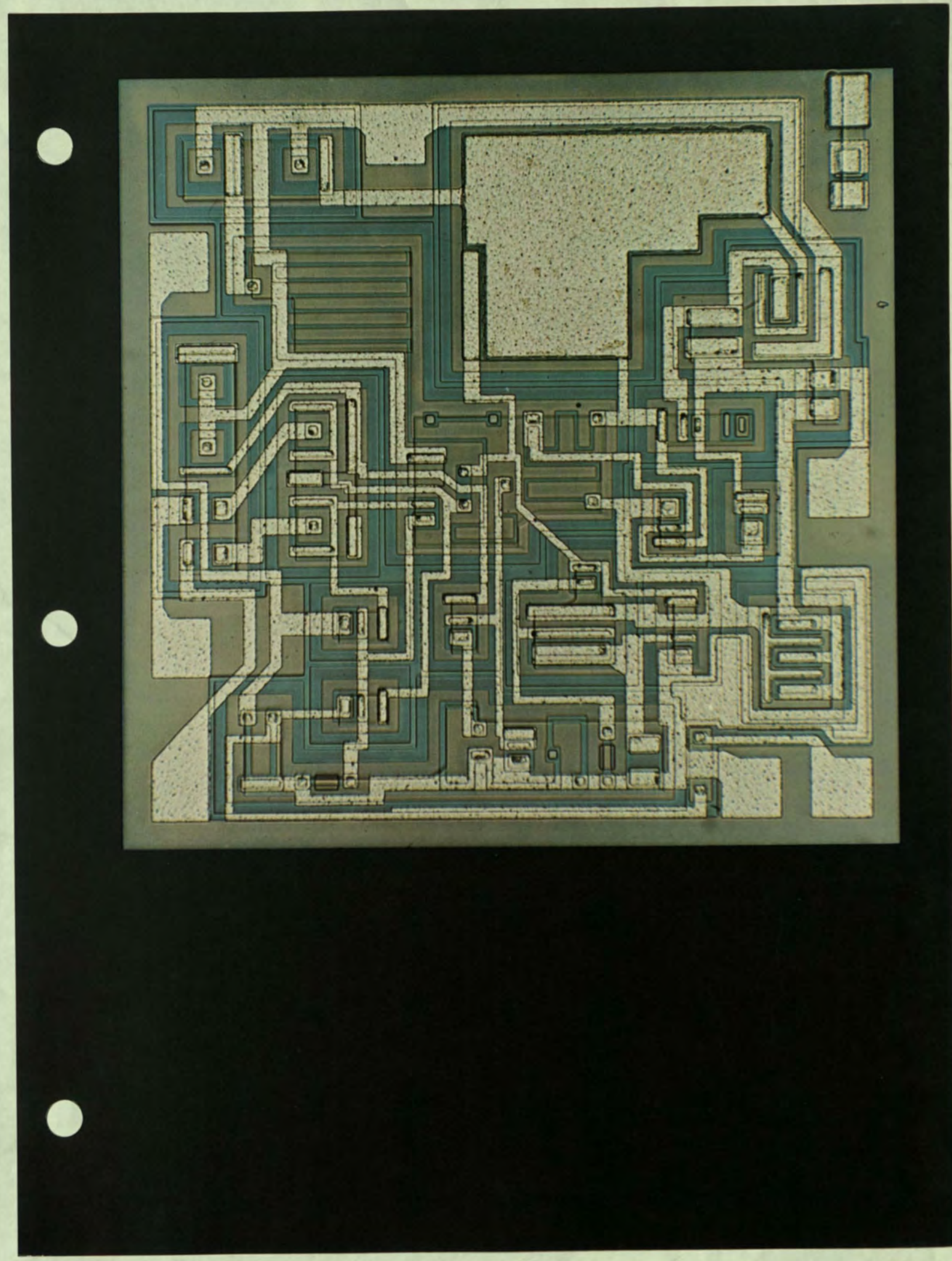
1969

The largest device on the market in Fairchild's Bimesar series, a very high power, 30-amp transistor. Size: 200 x 200 mils.



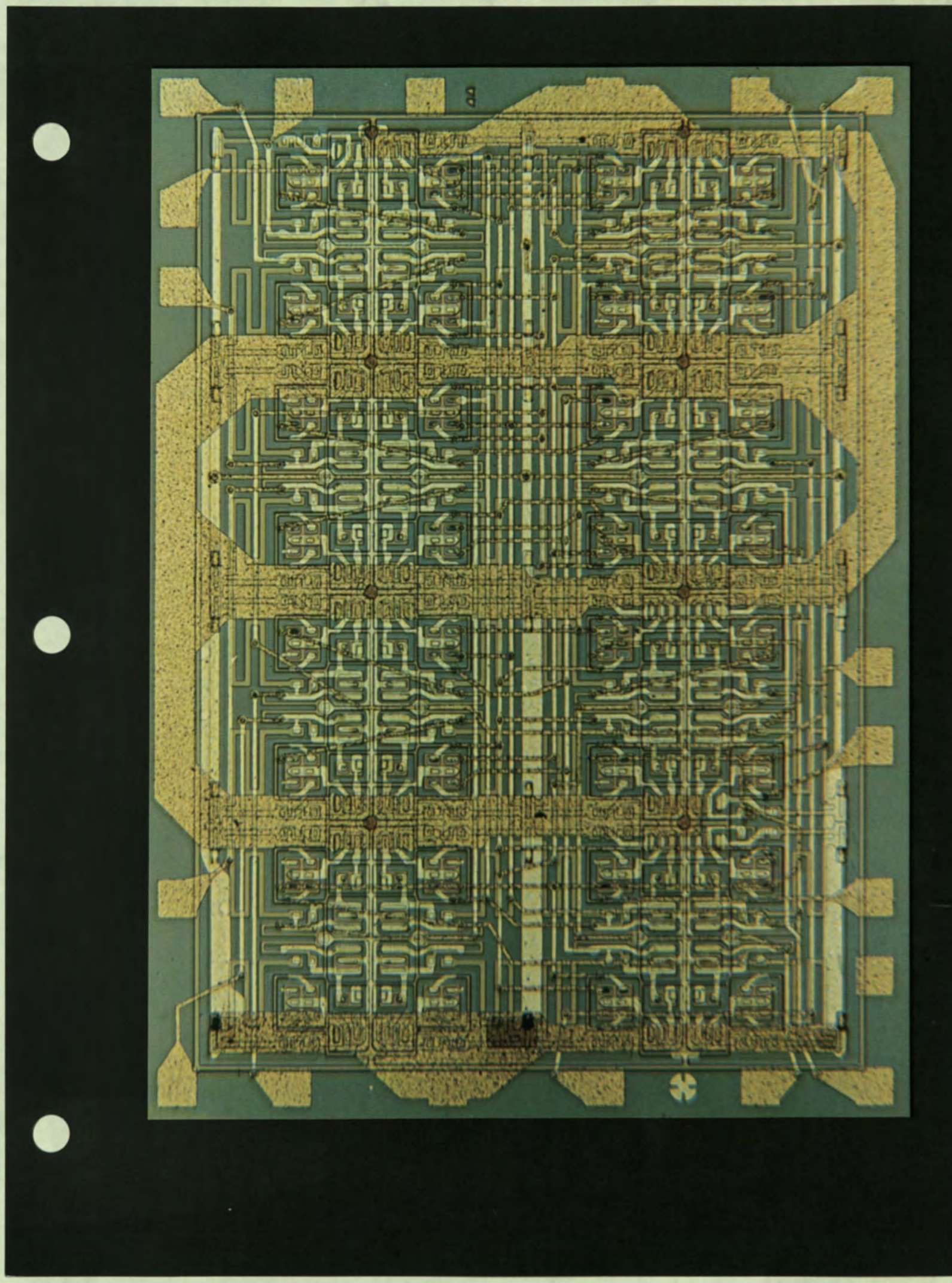
1968

The first bipolar LSI. This 96-gate TTL random logic array was another product of Fairchild's computer-aided design facility.



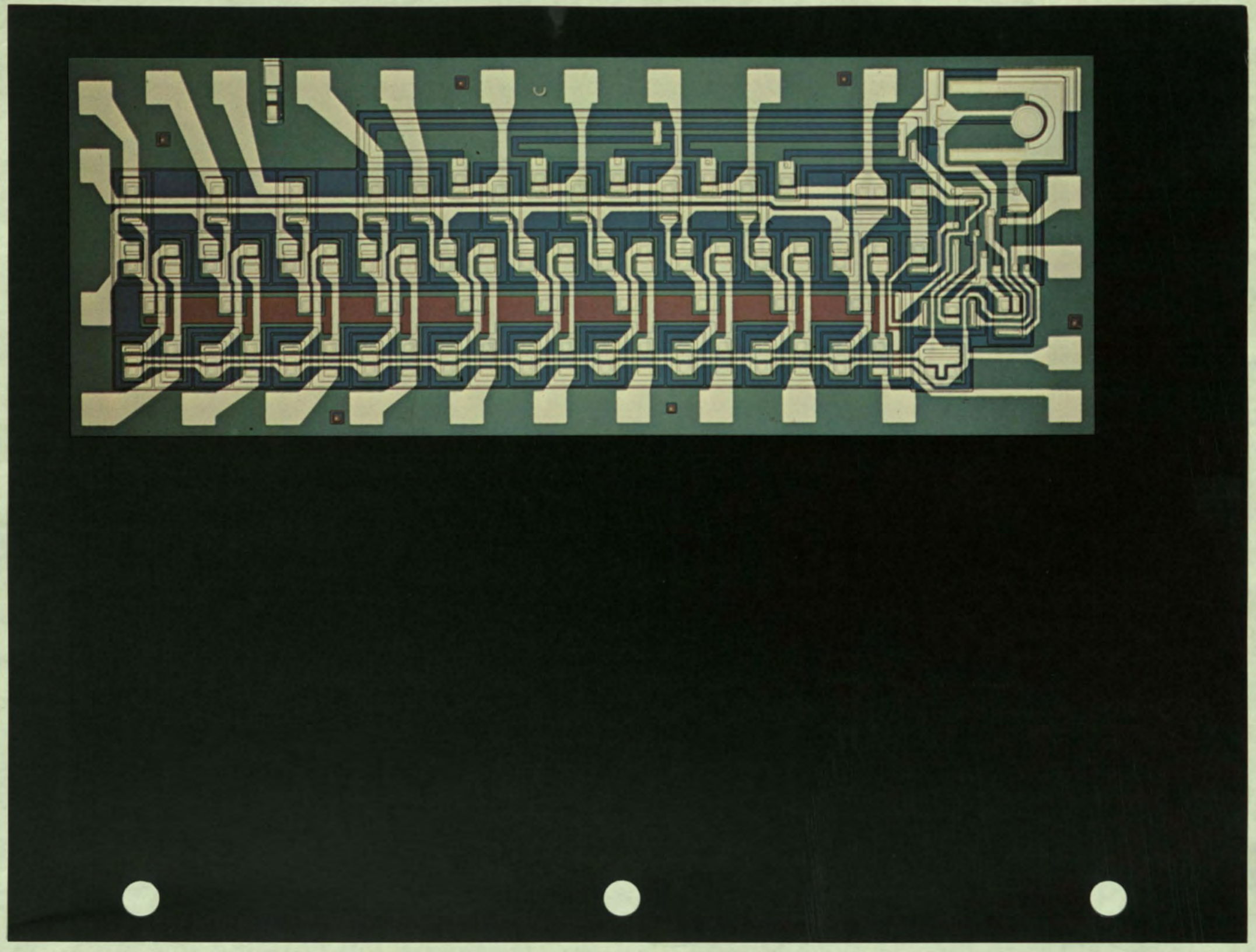
1968

The first silicon gate product with TTL compatible digital input logic. An eight-channel MOS signal multiplexer.



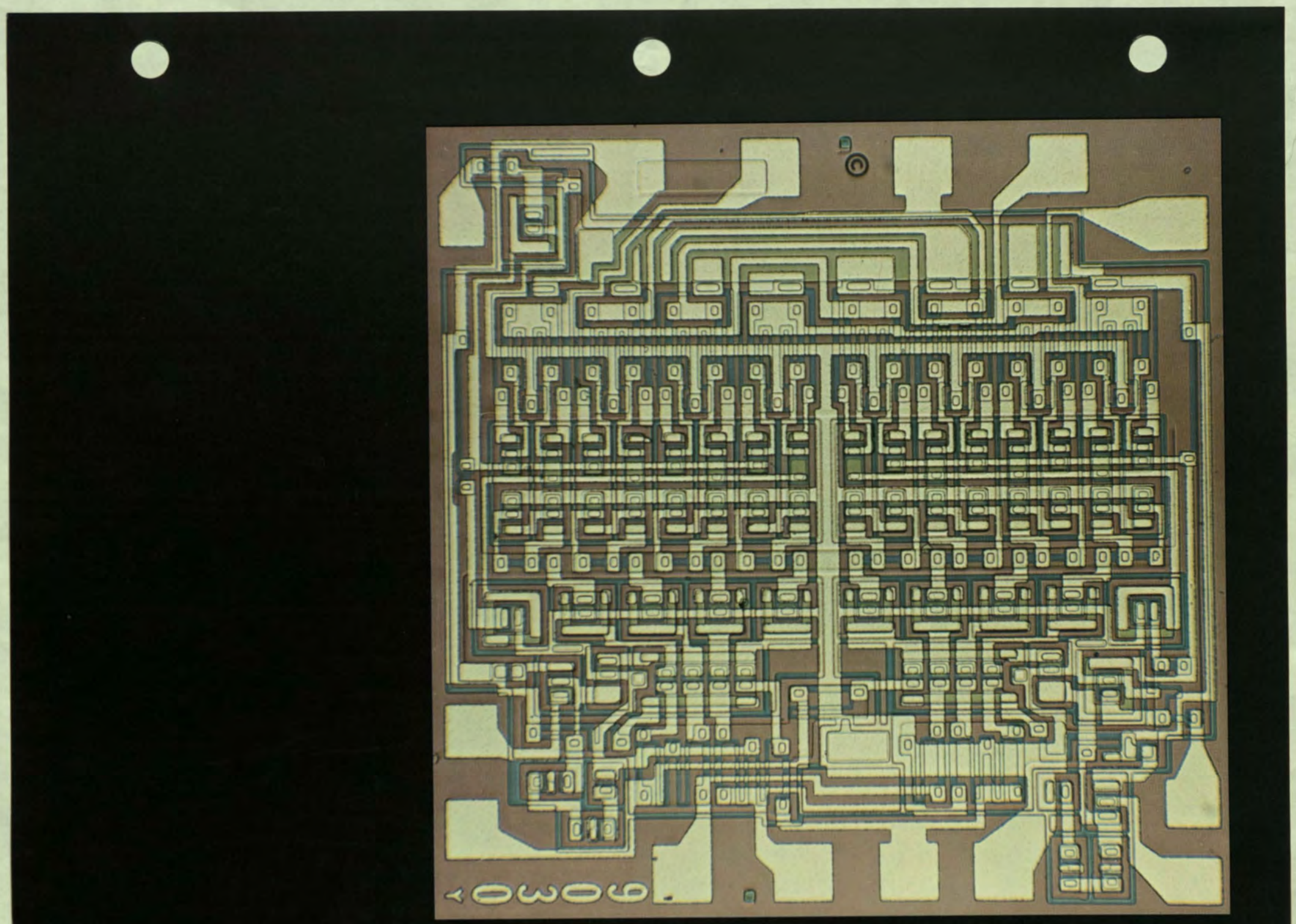
1968

This operational amplifier was one of the earliest linear integrated circuits to include temperature compensation and MOS capacitors.



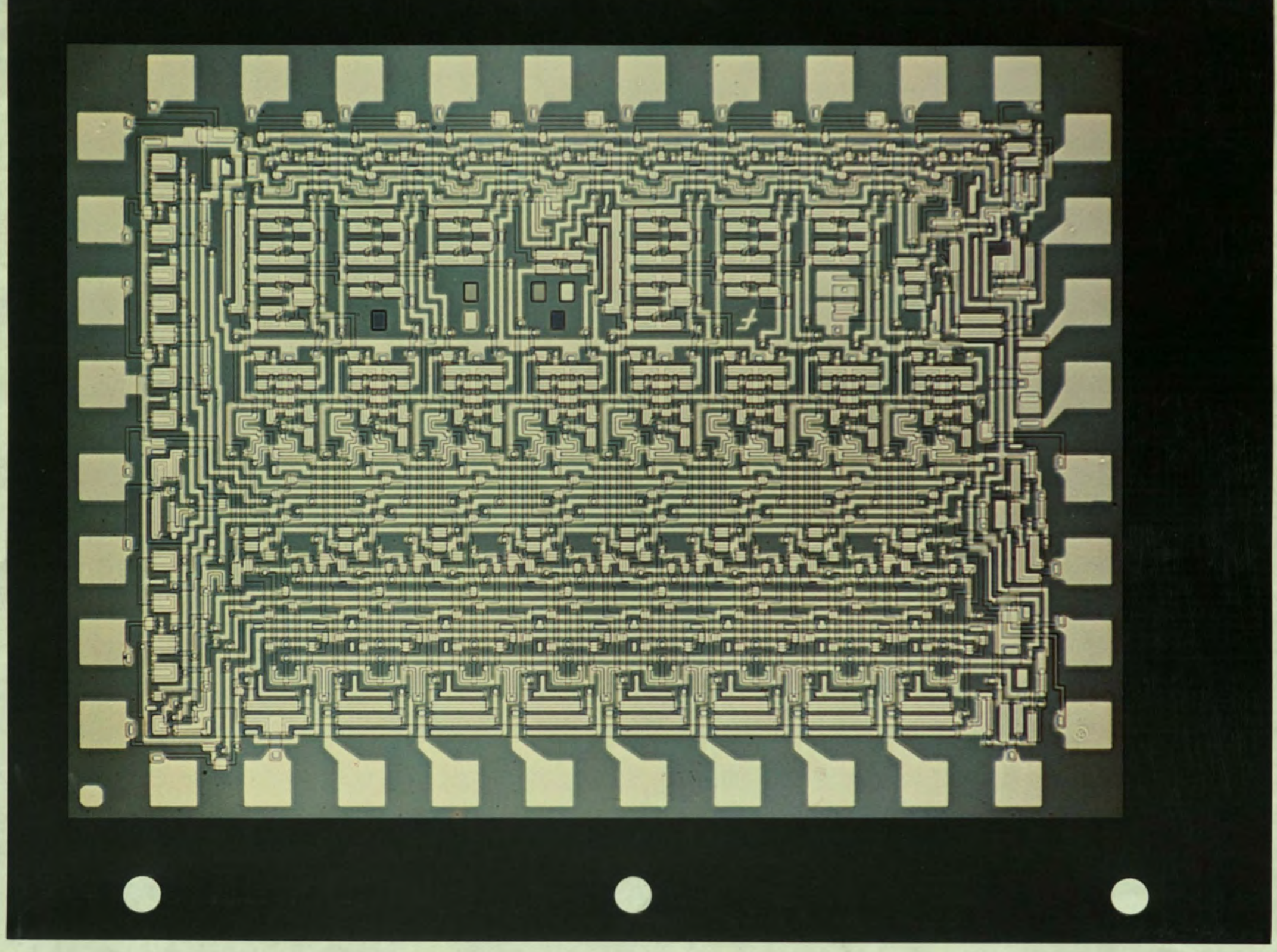
1967

The industry's first two-layer metal process put into production. A 32-gate custom DTL logic array.



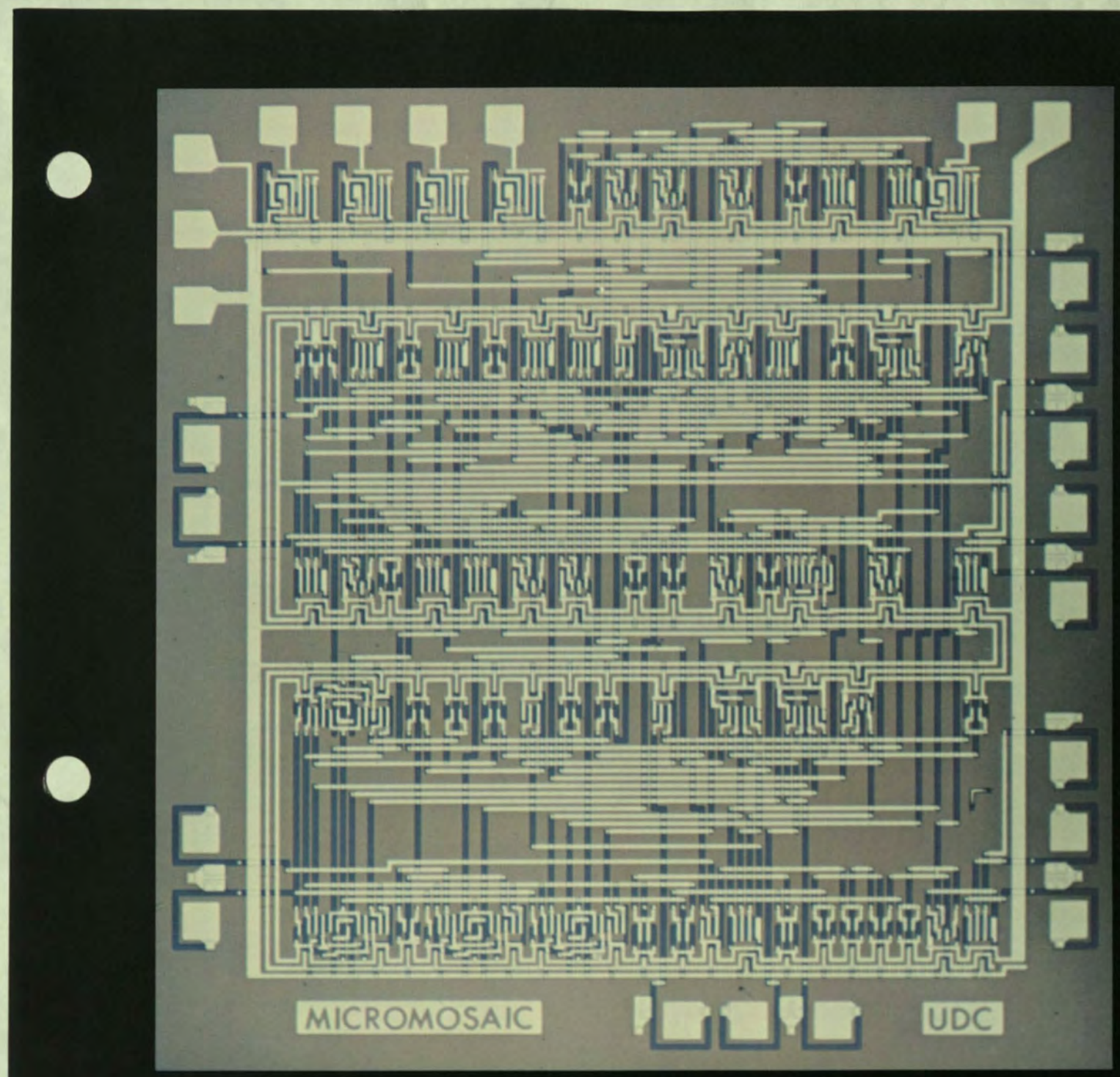
1967

The first monolithic 10-bit current source for digital-to-analog converters. A unique 157 x 60 mil size.



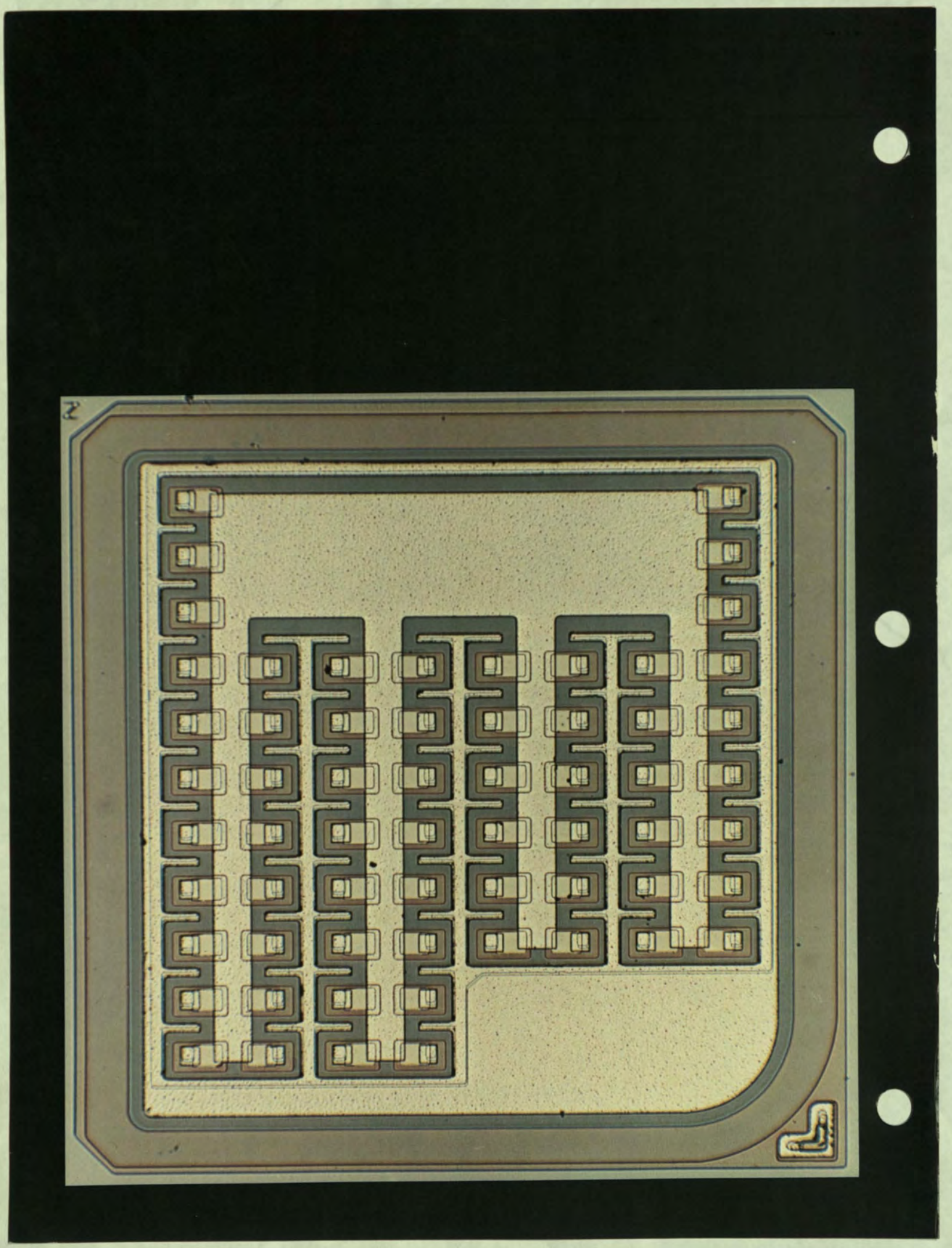
1967

The first complementary-transistor logic (CTL) medium-scale-integration design—an eight-bit latch for high-speed register applications.


MICROMOSAIC
UDC

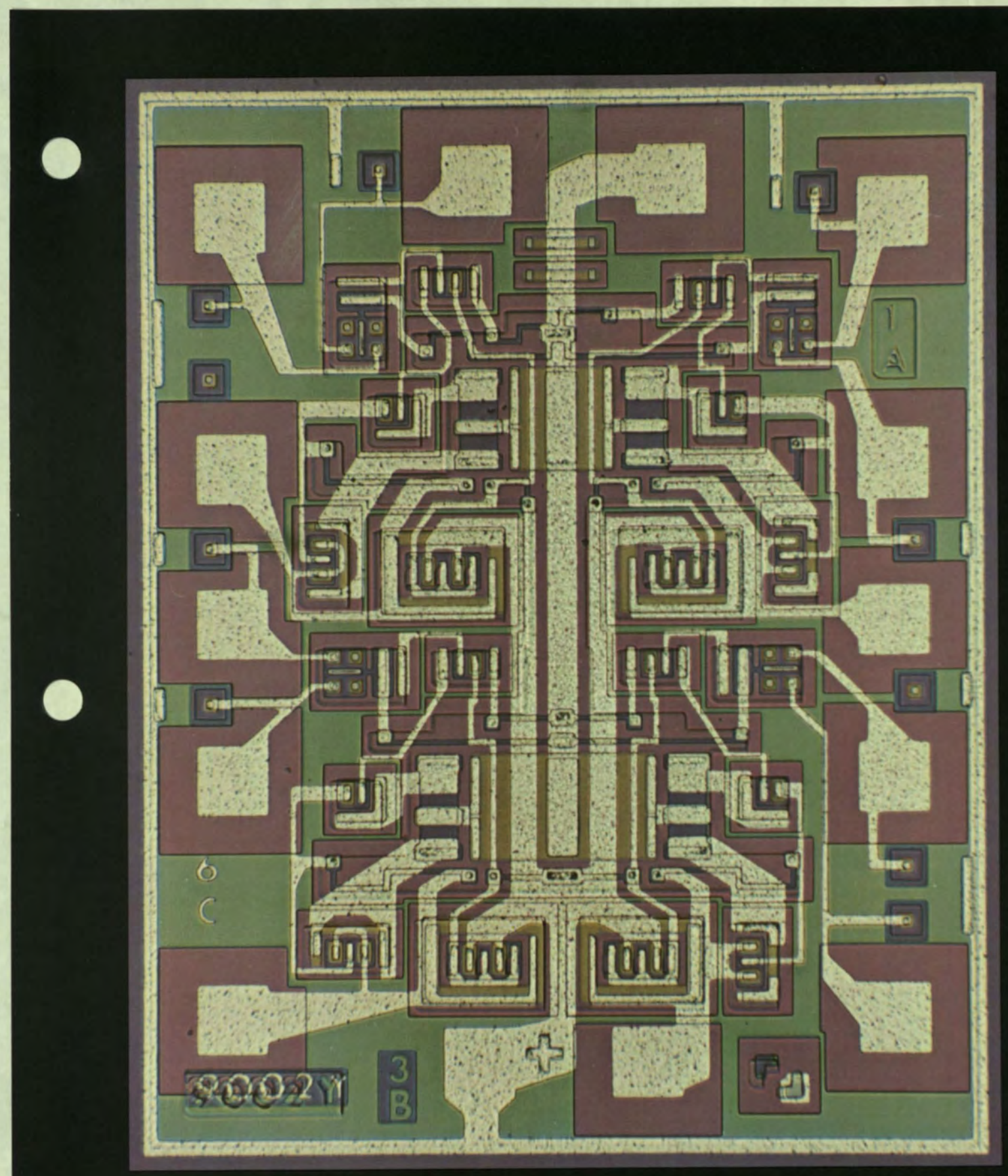
1967

The first standard MOS product for data processing applications—an eight-bit arithmetic unit and accumulator.



1967

The first custom large-scale-integration (LSI) device evolving from Micromosaic techniques in a computer-aided design system. This is a 150-gate MOS random logic device.

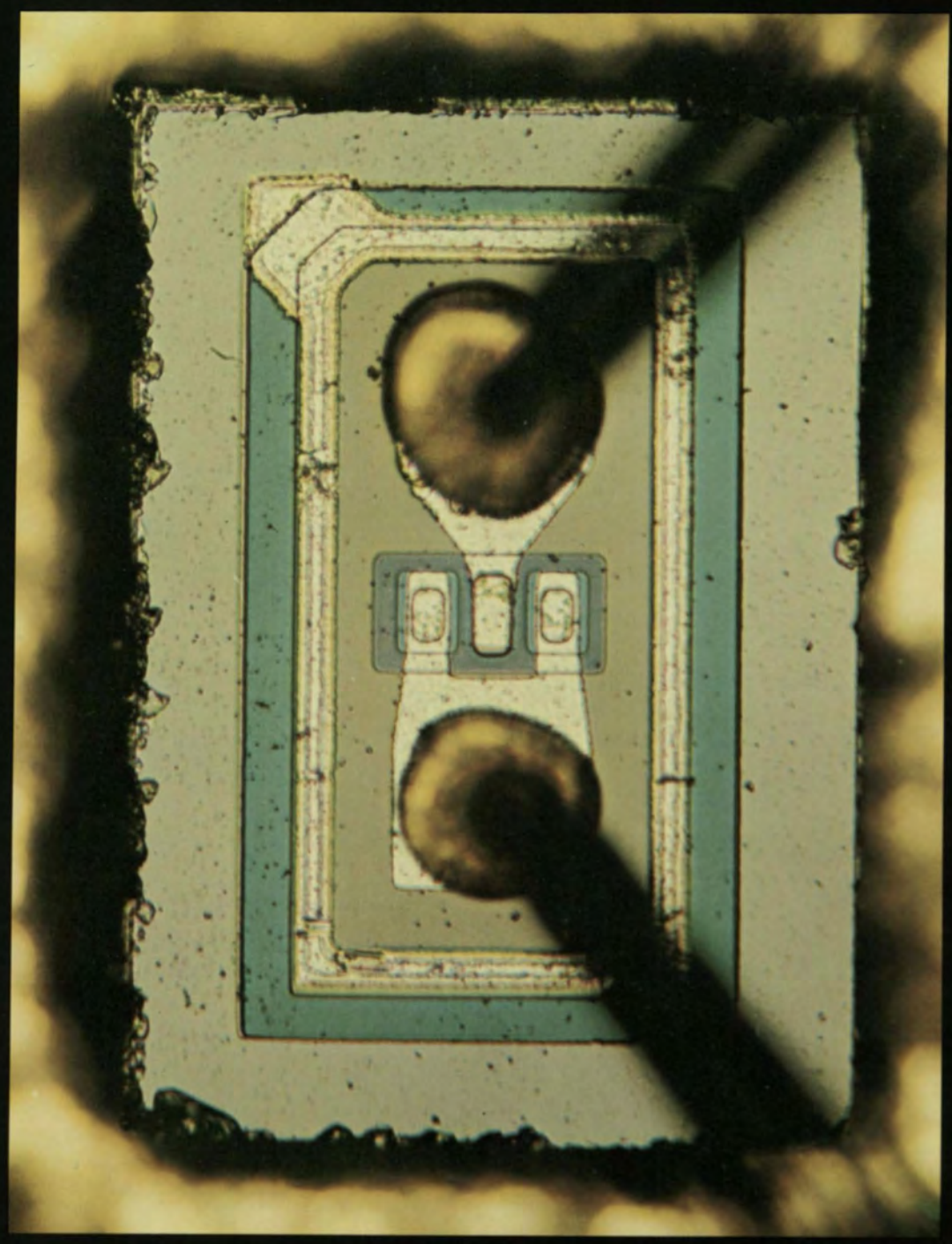

3B

1966

The first N-channel (depletion mode) MOS device.

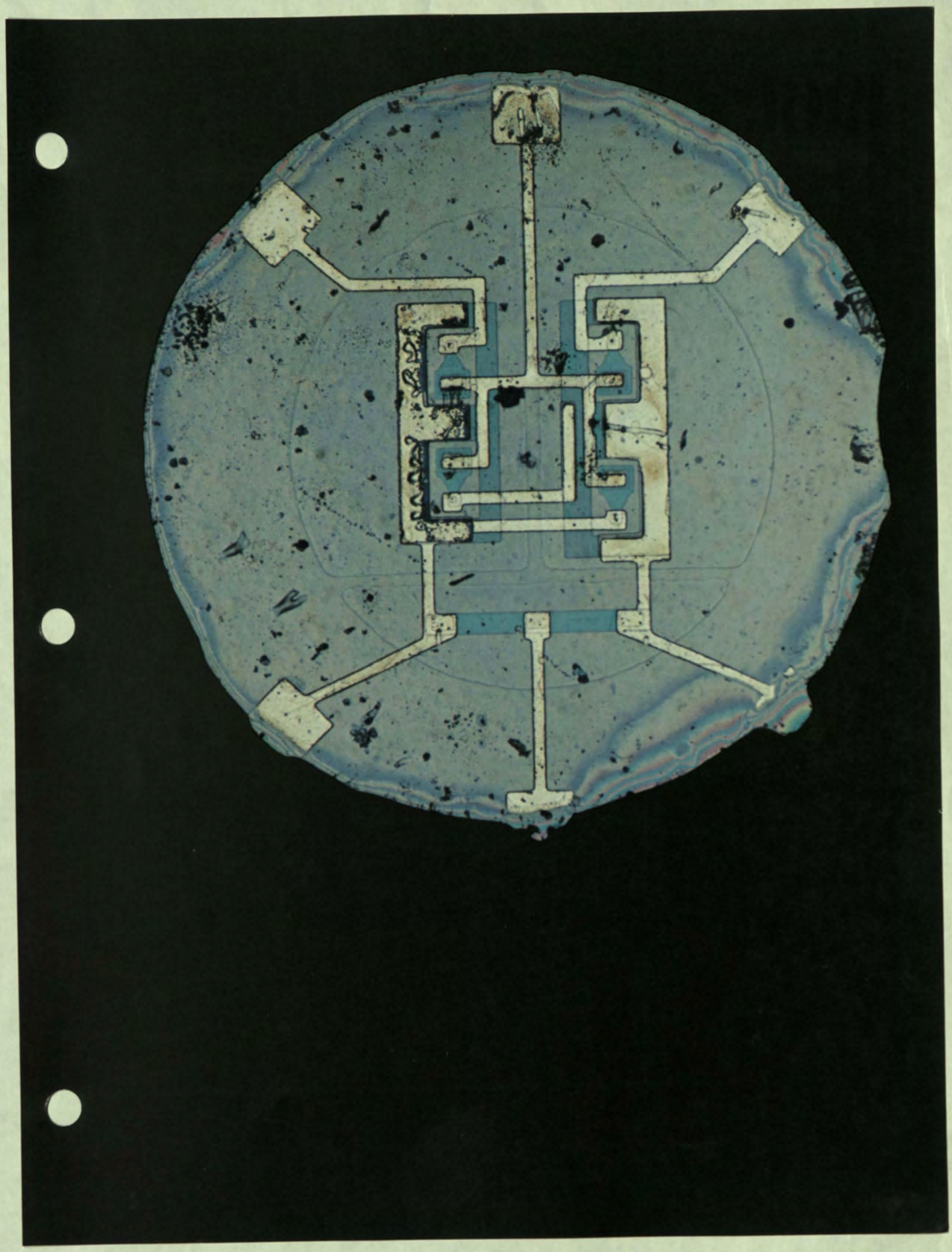
1973

The industry's first functional device with dielectric isolation of both emitter-base and base-collector junctions. Incorporates Isoplanar II,™ a process which permits reduction in the size of integrated circuit transistors by 70 percent over conventional technology, and by 40 percent over Fairchild's original Isoplanar technique. The performance of Isoplanar II devices is improved by a factor of two over the performance of comparable devices made with conventional processes.



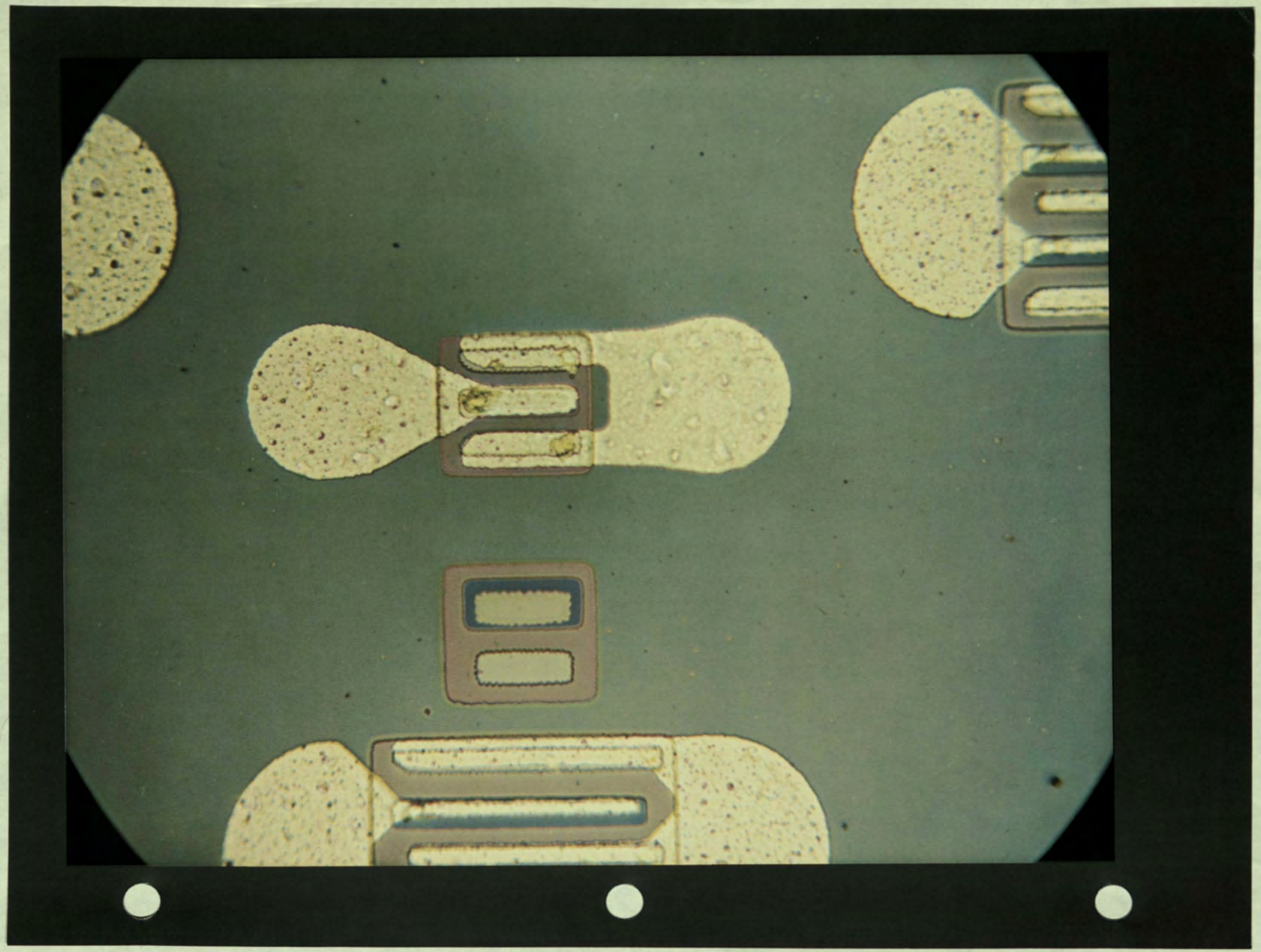
1966

Fairchild's fastest gold-doped diode, featuring a switching time of 700 picoseconds (1,000 picoseconds = one billionth of a second).



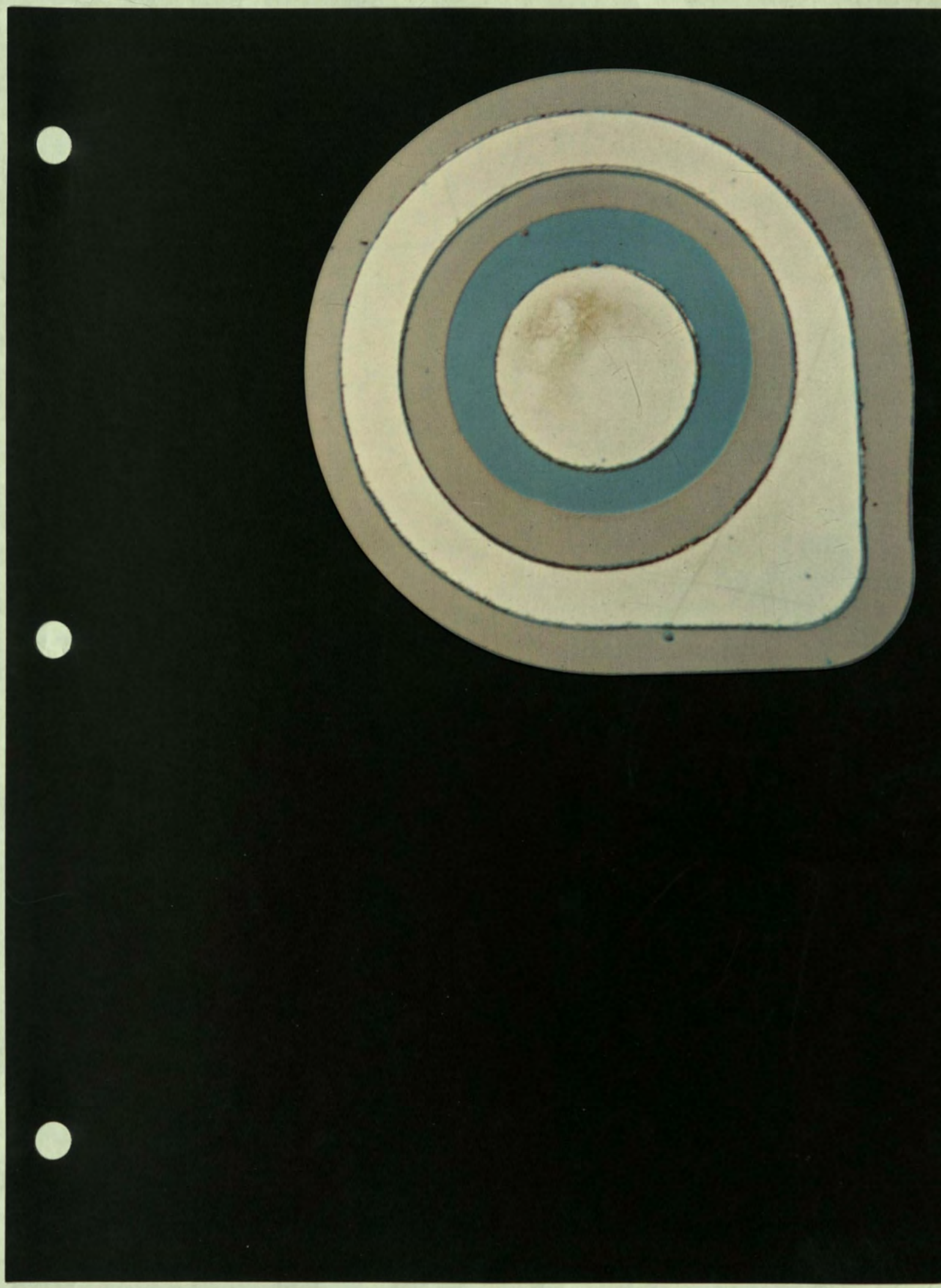
1962

A standard product that served as the industry's workhorse for discrete logic—the first widely accepted epitaxial gold-doped NPN transistor.



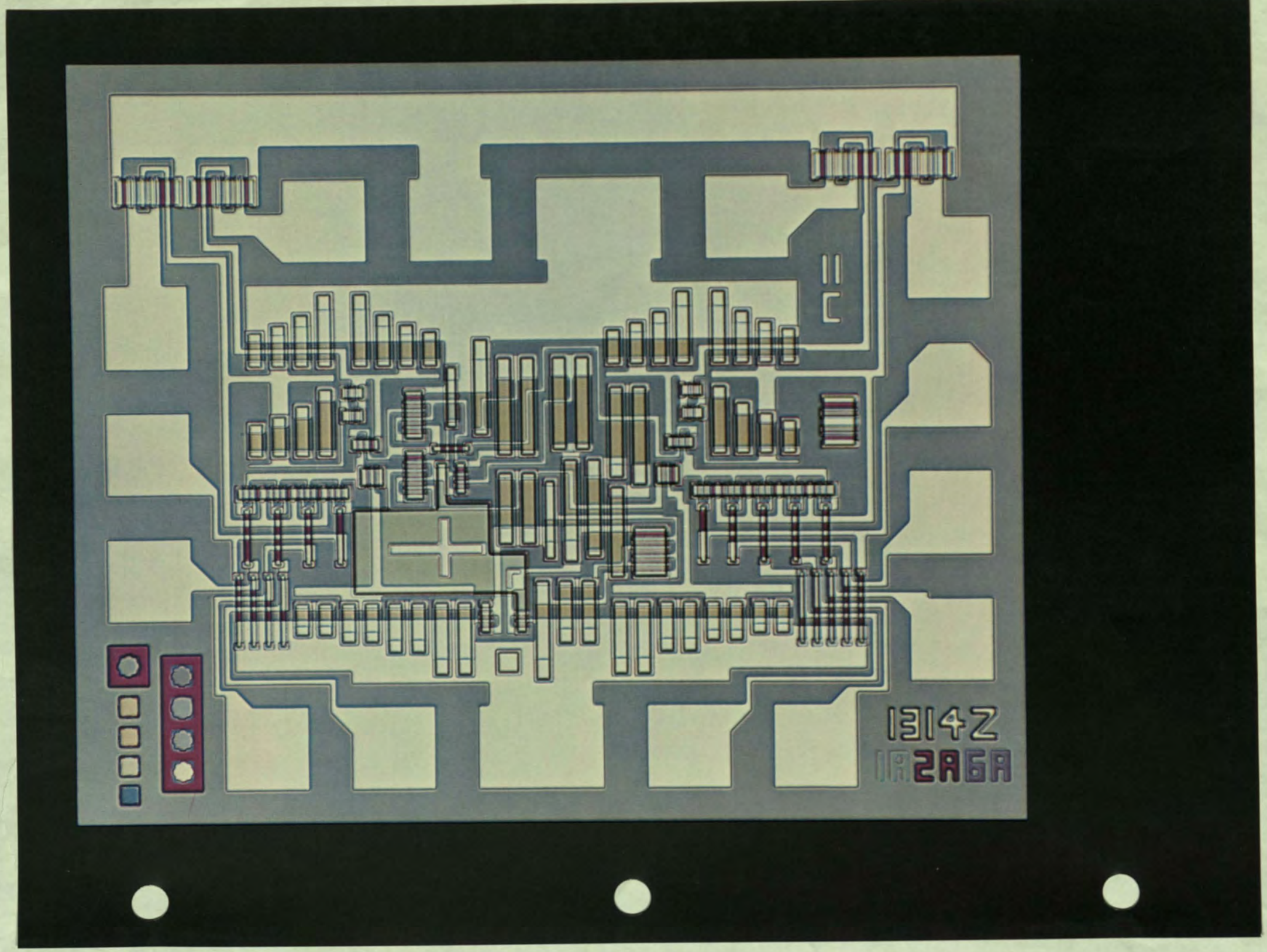
1961

The dawn of the integrated circuit era. This resistor-transistor logic (RTL) product—a set/reset flip-flop—was the industry's first integrated circuit available as a monolithic chip.



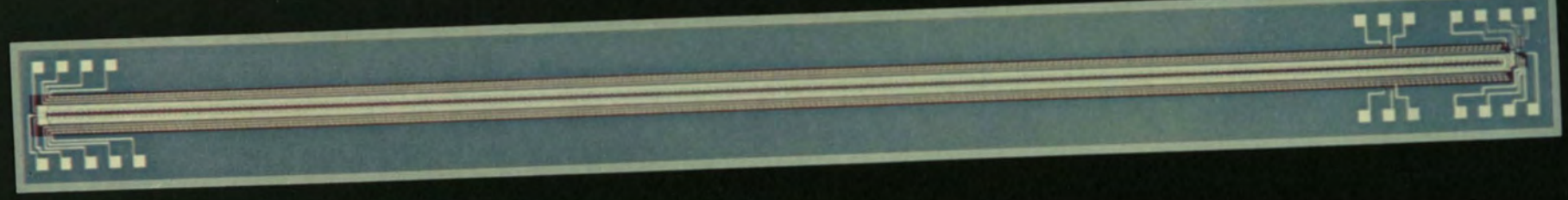
1961

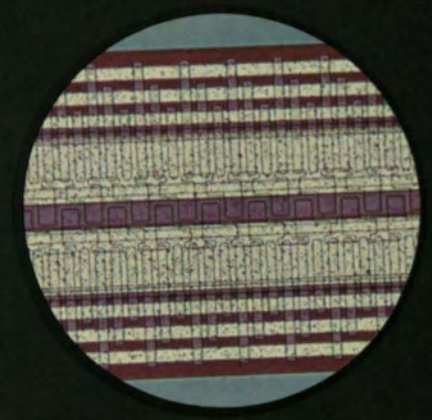
A pioneer device in the television field, this NPN radio frequency amplifier, used for TV tuners, featured metal-over-oxide technology for the first time. It displaced many germanium transistors.


13142
IR2A6A

1973

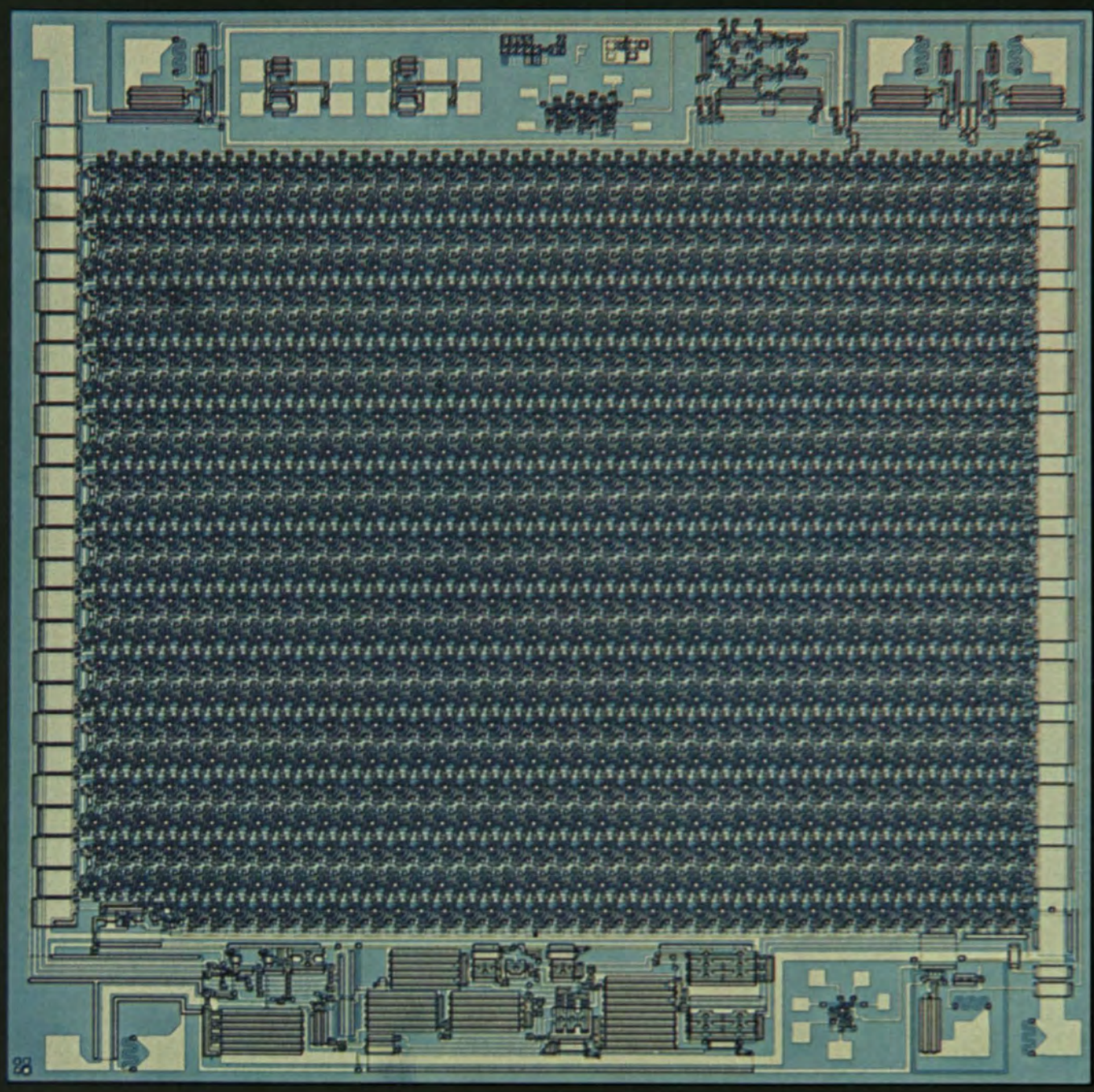
The world's first commercially available charge-coupled device (CCD)—a 1 x 500-element linear image sensor, 636 mils long. The individual elements, which are just 1.2 mils from one another, are also shown in a closeup view. This monolithic N-channel device, under a sealed glass window, includes a 500-element photosensing strip bounded by two 250-element CCD analog shift registers and a two-element CCD output register which transfers charge to an on-chip NMOS buffer device.





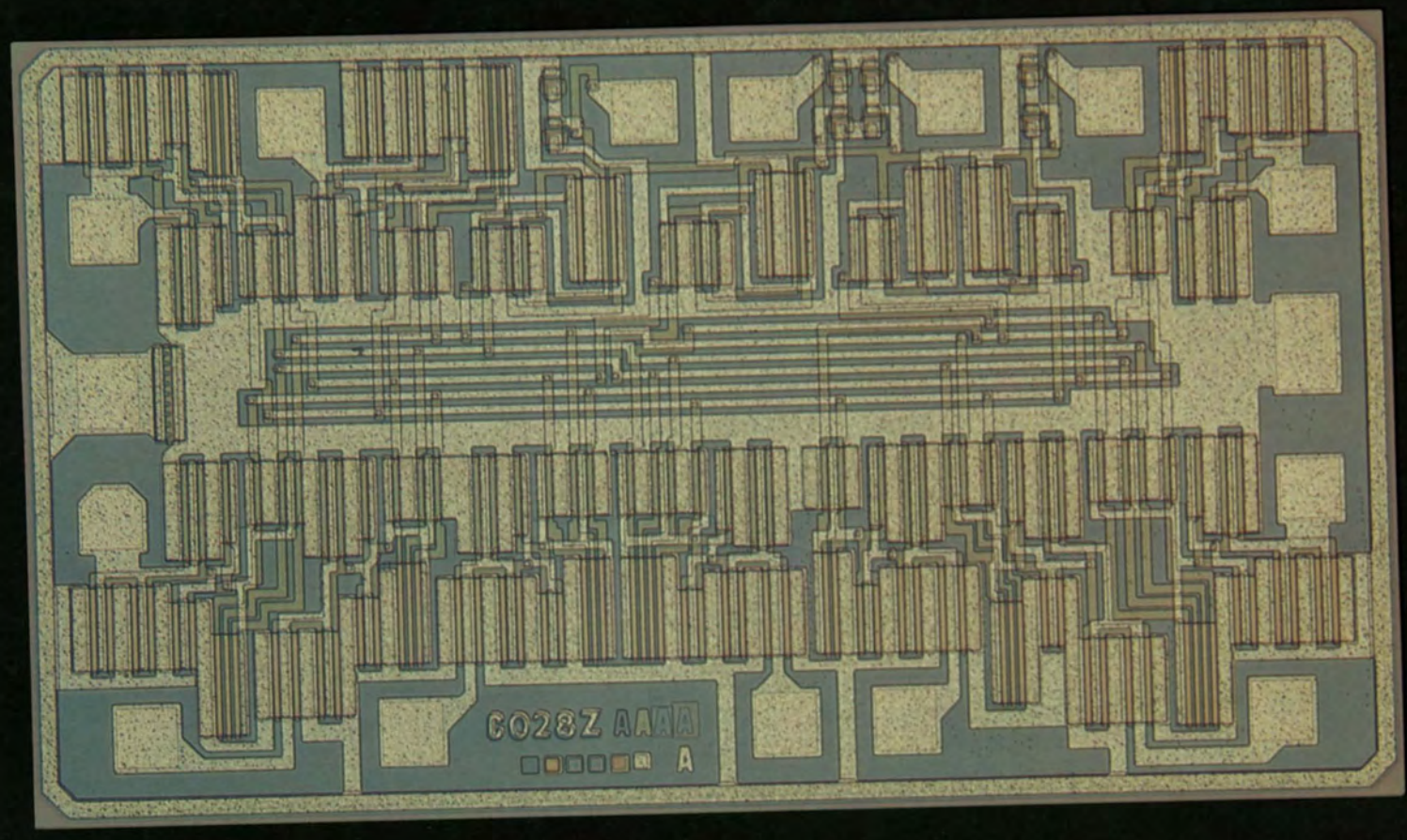
1973

Fairchild's first Isoplanar MOS product. This P-channel device is a 1,024-bit static register. It represents a 30 percent reduction in chip size from previous MOS devices with comparable capability.



1974

Fairchild combined Isoplanar technology with CMOS (Complementary MOS) structures to provide a widely accepted family of CMOS logic devices with the smallest chip sizes and highest speeds in the industry.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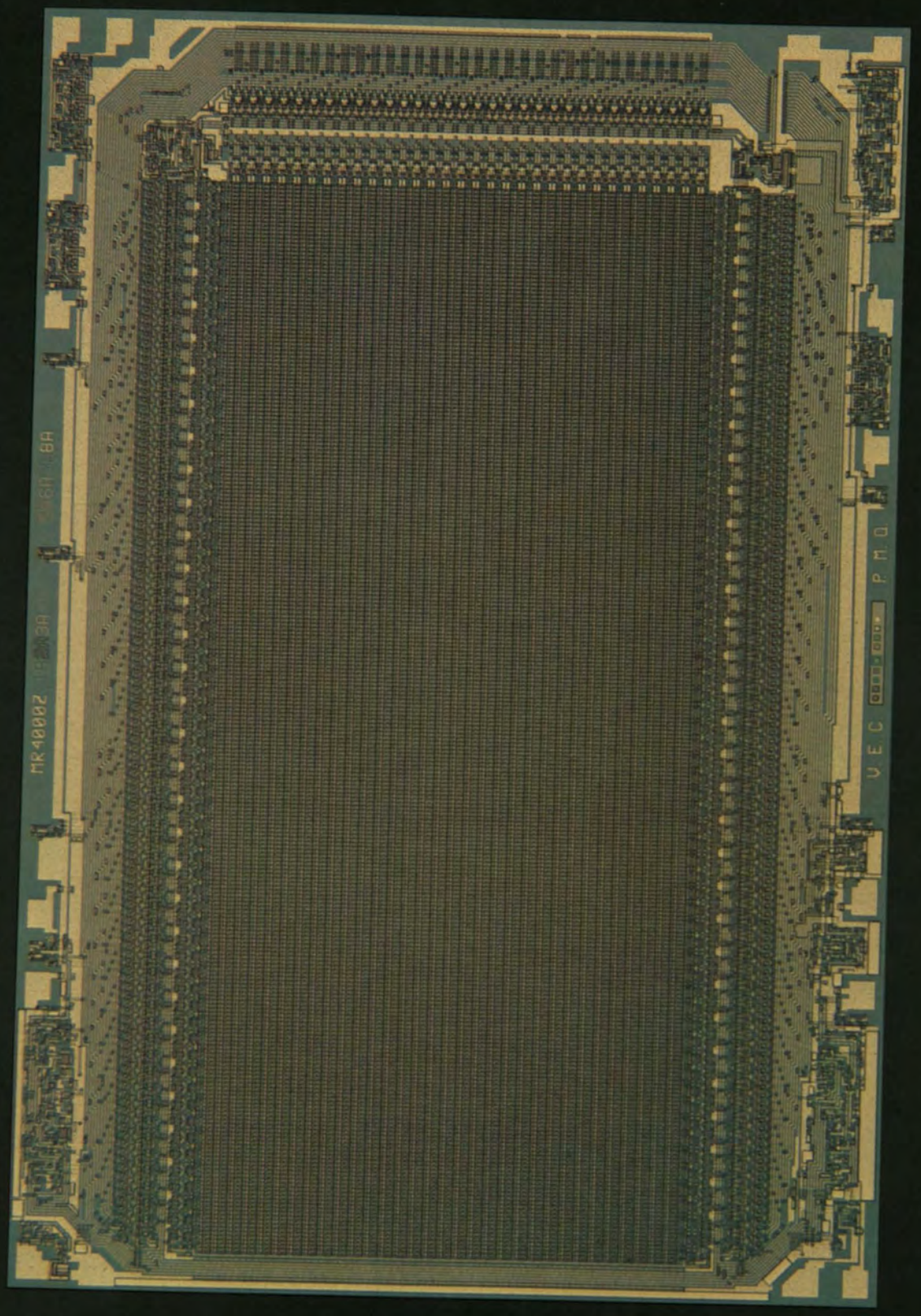
1975

The F8™ microprocessor, Fairchild's first proprietary Isoplanar N-channel product, was the industry's first 8-bit microprocessor aimed specifically at the high-volume, low-cost control market.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