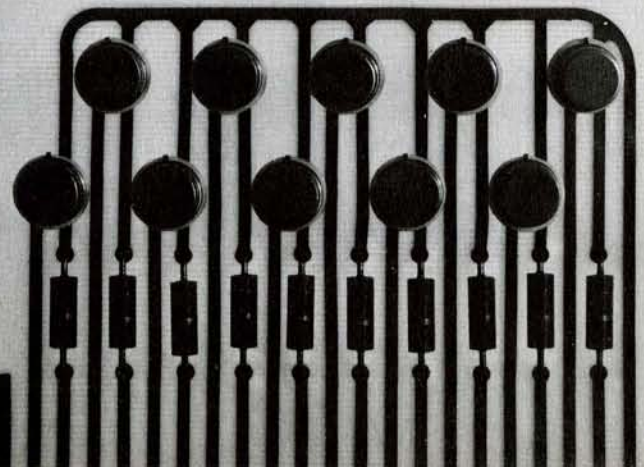
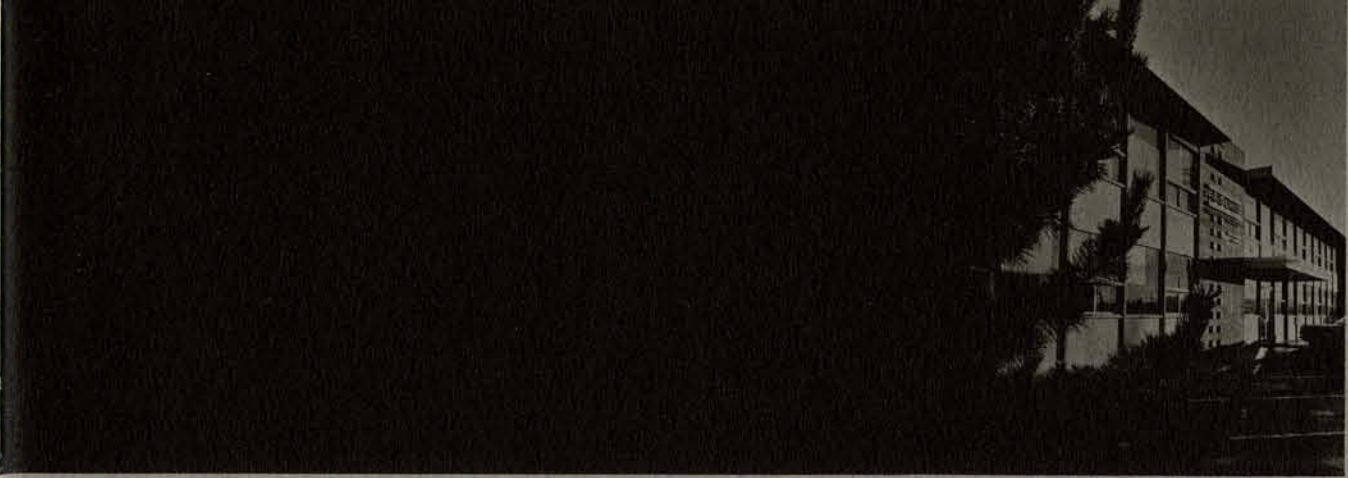


# Instrumentation Facilities and Capabilities

TYPE G

FSC 601012





Fairchild Semiconductor was organized in late 1957 by eight scientists and engineers with the financial backing of the Fairchild Camera and Instrument Corporation. The objective was to develop and produce silicon transistors and diodes to meet the stringent reliability requirements of Defense Department and NASA contractors.

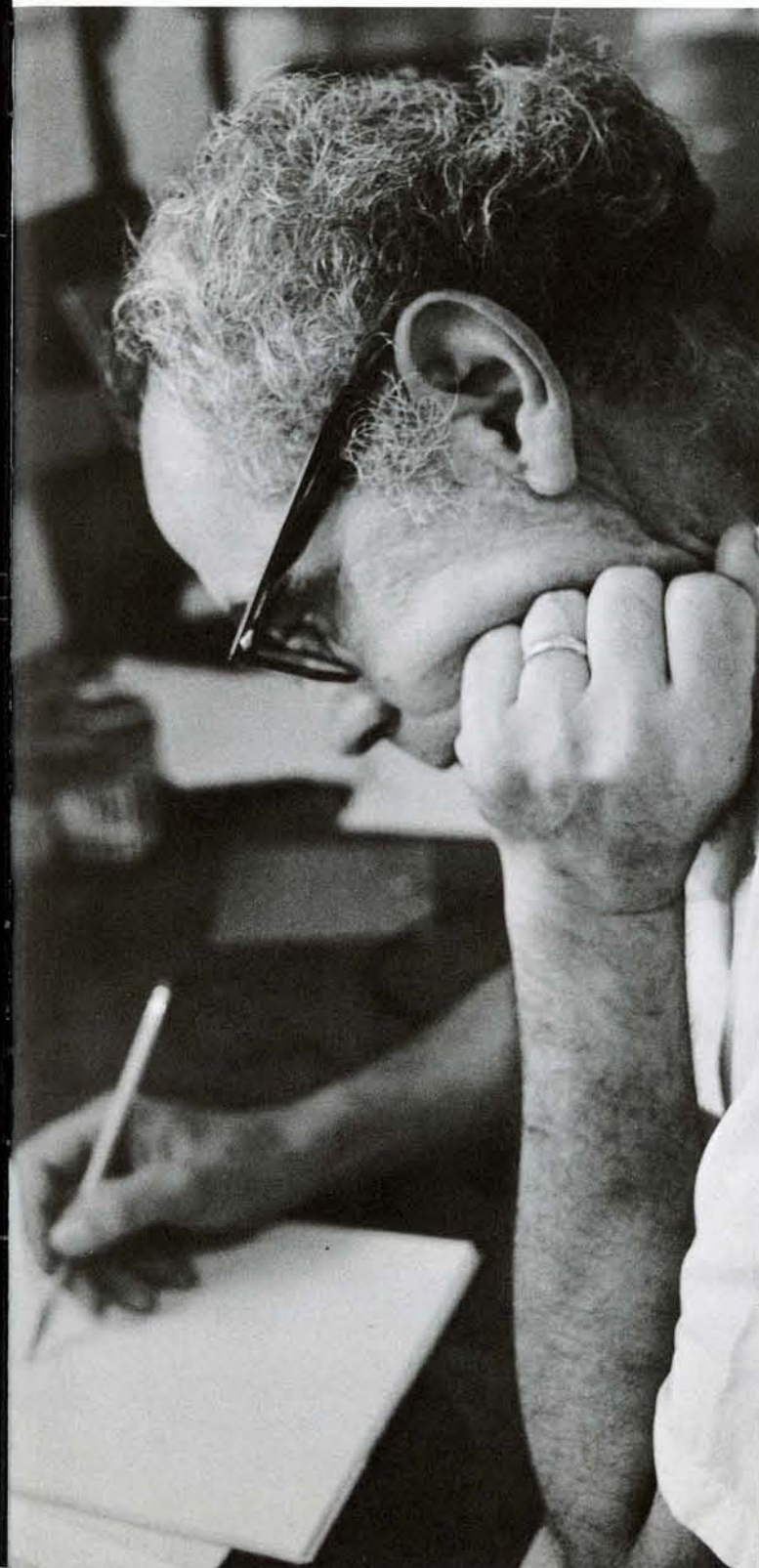
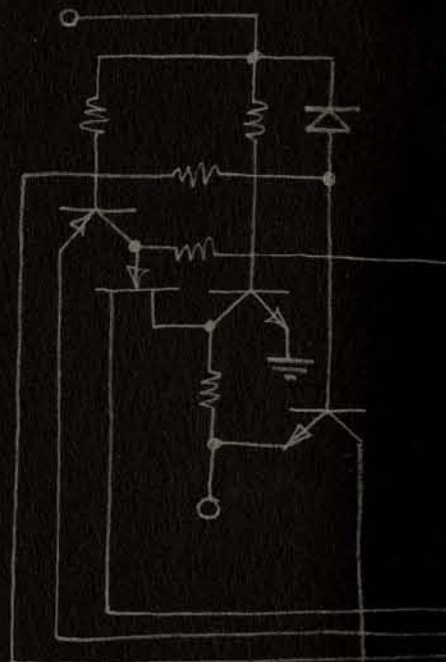
To date, Fairchild Semiconductor has supplied devices for such programs as Minuteman, Apollo, Gemini, Mariner, Lunar Excursion Module (LEM), Syncom, Surveyor, Polaris, and Titan.

Fairchild's success in missile and space programs has been due to its state-of-the-art developments, for example, Planar and Planar Epitaxial processes and products. When over-all production increased, the division moved into the industrial and commercial markets for users of transistors, diodes, and integrated circuits.

Fairchild Semiconductor, now a recognized leader in the electronics industry, owes a measure of this success to its independent Instrumentation department.

As Fairchild produced unique silicon devices, there evolved a department to design and build test instruments to measure and record electrical characteristics of these components.

New measuring equipment and capabilities called for a separate department to apply its own state-of-the-art techniques to those of the rapidly growing industry.

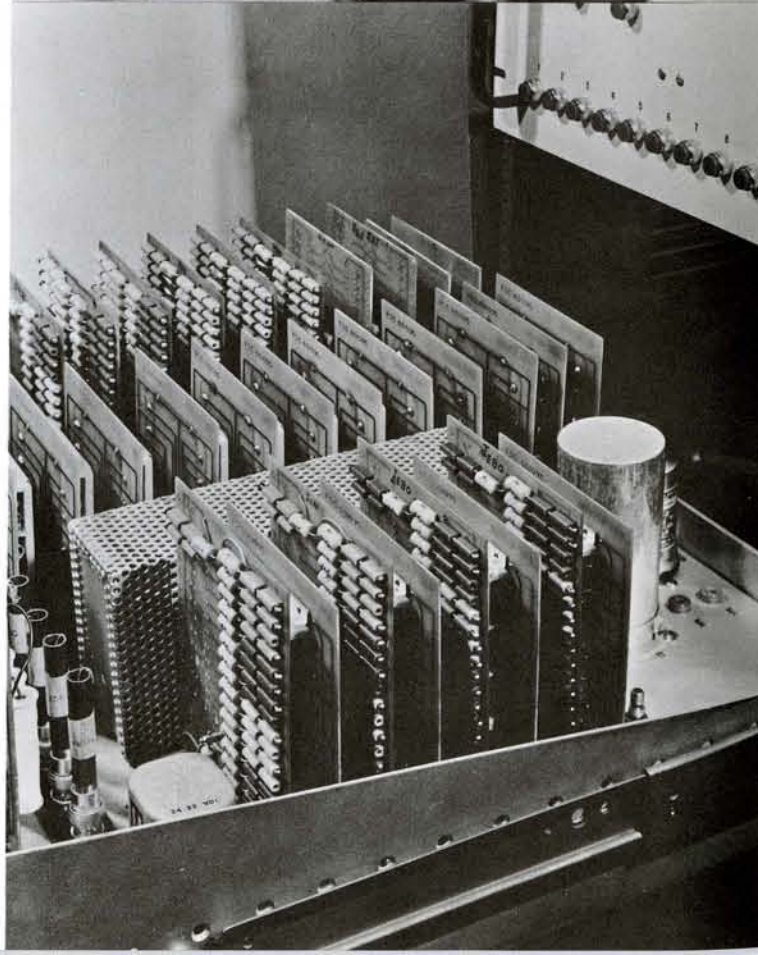
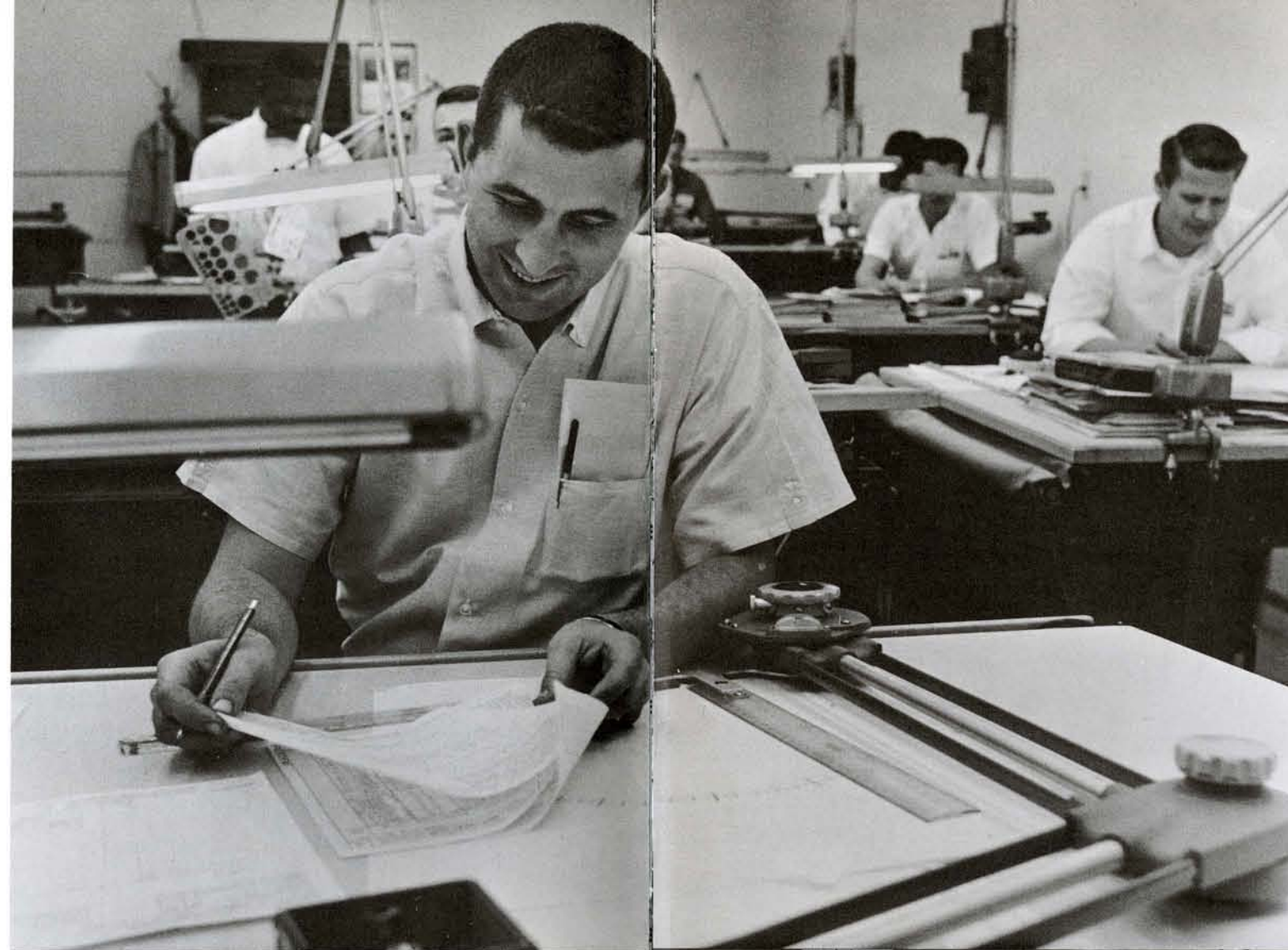


The Instrumentation department of Fairchild Semiconductor has expanded into a separate facility in Palo Alto, California, employing over 200 people including approximately 40 technicians and engineers. Supplying equipment for the parent division's complex requirements, and fulfilling their high accuracy testing demands, the department developed a standard of measurement techniques that are widely accepted by circuit designers and others in the field. Fairchild test hardware, based on these unique measurement techniques, is now marketed both here and abroad.

The Instrumentation department has designed and put into operation high volume, production line test equipment used for applications such as incoming inspection, evaluation, reliability testing, process control and engineering studies. All of the testers have the emphasis on operational simplicity, so that any production girl in the plant can be readily trained to operate the equipment and extract the desired information.

Fairchild can now provide "off the shelf" test and measurement equipment for almost any semiconductor application. The product line includes both single parameter and multiparameter test units, high speed Go/No-Go testers plus optional systems such as: automatic feeders, sorting, oven testing, and data logging.

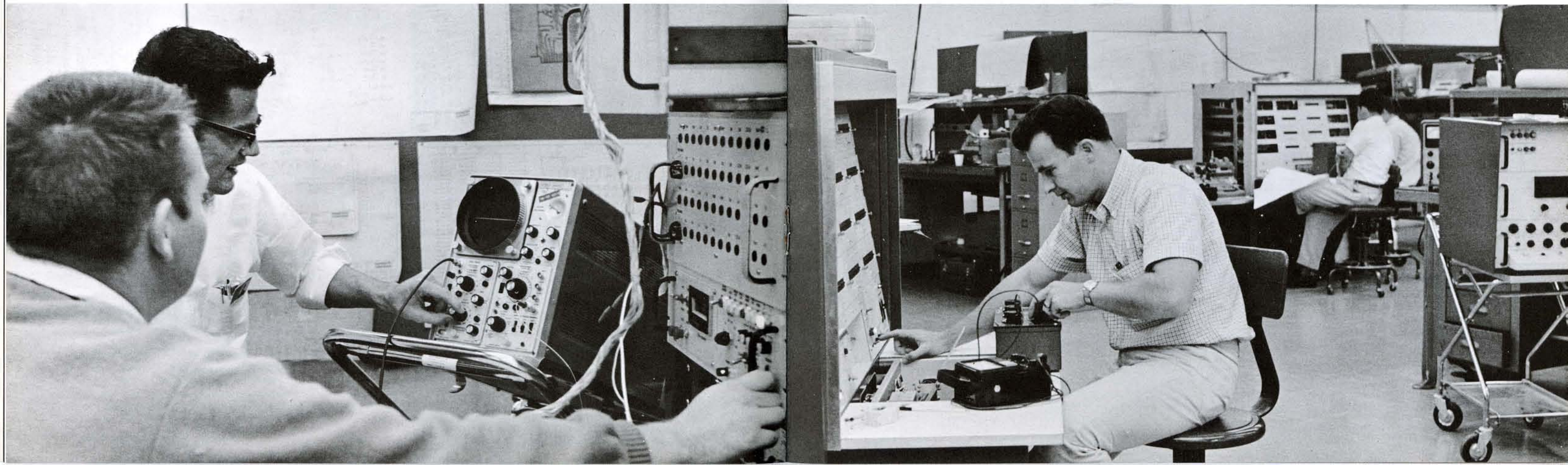
The demands of military reliability, and in some cases, commercial specifications have set stringent requirements on the Instrumentation department. The quantity, and of even greater importance, the precision accuracy of testing required for components such as those used in the Minuteman Program have required the development of test systems with high speed readout, sorting and classification. Fairchild devices (and those of other manufacturers) require a testing system which can apply various test conditions at one time and guarantee repeatability of these same conditions at a later stage of environmental testing or storage life. Analog systems, dial turning, and meter needles with their inherent parallax error have given way to direct digital readout and discrete step programming by digital switches, punched tape or punched cards. Fairchild has testers that will characterize, classify and sort over 3600 units per hour automatically. Speed, simplicity and accuracy have been basic guideposts to Instrumentation's designers.



In the process of designing semiconductor test equipment, Fairchild Instrumentation has incorporated numerous improvements in electrical measurement techniques. For example, in the single parameter Model 50 Beta Tester, the instrument measures, computes, and reads out directly the  $h_{FE}$  of the device in less than 2 seconds through a series of short pulses and null balance digital loop. This short pulse method assures accuracy of the readings and eliminates junction heating that can be detrimental to the device. All Fairchild test equipment utilizes the pulsed testing principle because of its inherent, superior accuracy as well as component safety.

The Beta Tester and other Fairchild multiparameter test systems feature the direct reading of  $h_{FE}$  from 2 to 999 digits in large, easily read figures. All testers have digital readout with the exception of Go/No-Go testers which have, instead, automatic sorting or light indication. Each piece of test equipment is equipped with output terminals for data logging.

Another feature of Fairchild testers is precise measurement of current leakages as low as one pico ampere, plus the fast, accurate measurement of LV or limiting voltage without the use of an oscilloscope.

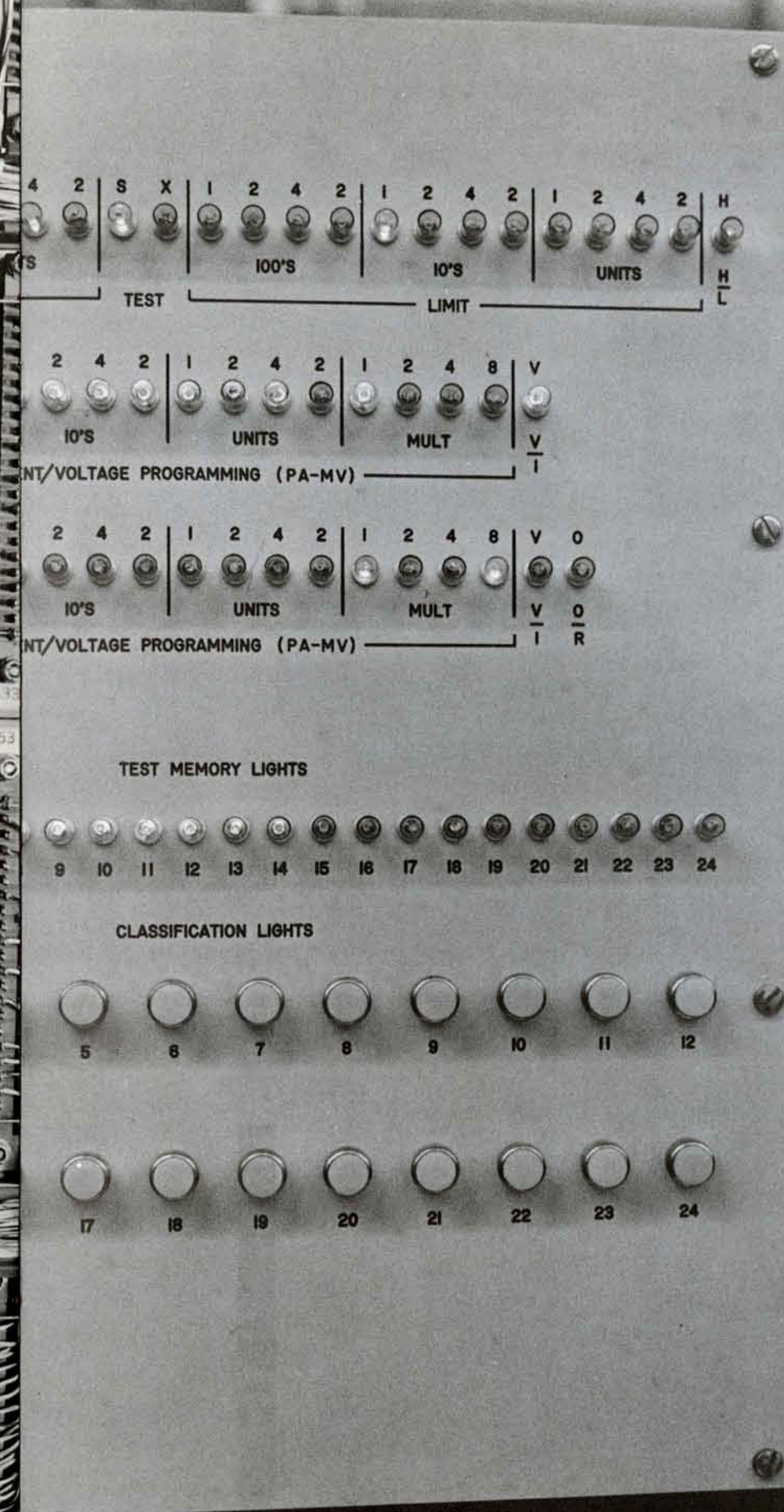
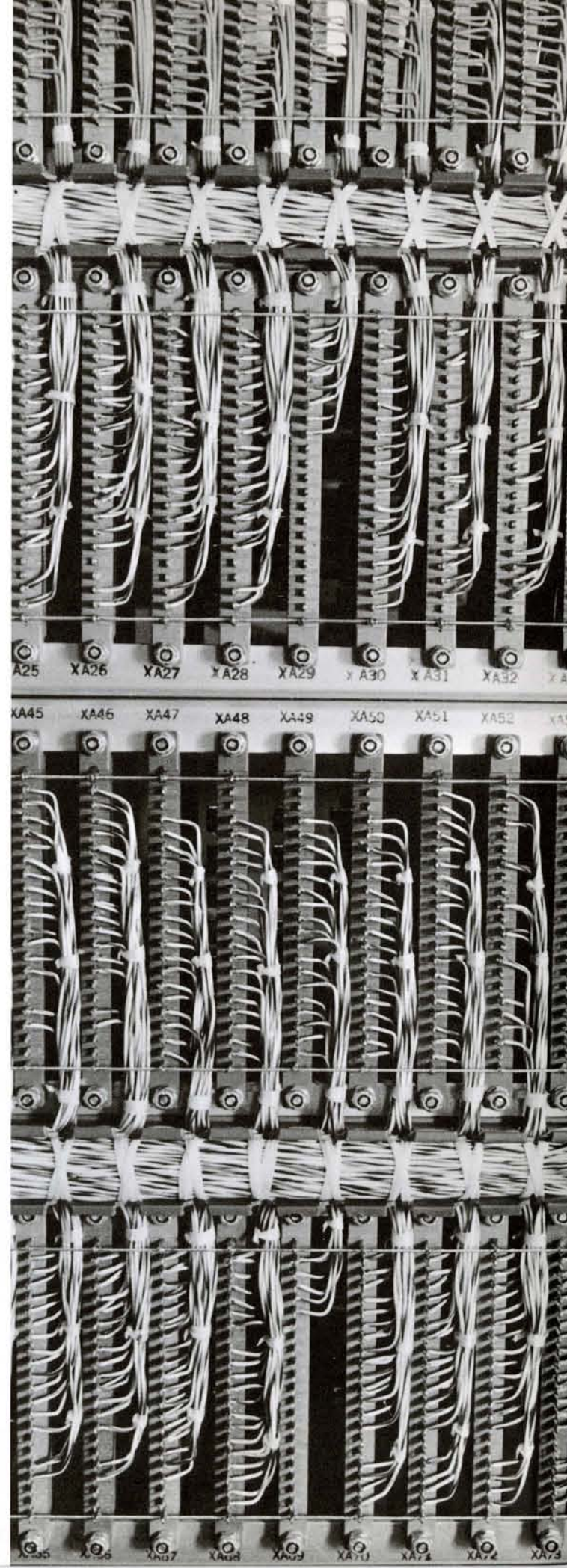


Fairchild utilizes an all-digital approach to eliminate the oscillatory tendencies common in analog feedback systems, and overcome the need for constant adjustment. Digital systems ensure consistently repeatable test results no matter how many times the device is subject to the testing sequence.

Programming of test conditions have been drastically simplified by the use of tape programming, punched cards, and digital techniques. The subsequent testing time is reduced to a point where volume characterization of semiconductors including integrated circuit devices has become practical and economical. In designing each tester, Fairchild Instrumentation has given great consideration to the fact that the unit will be operated by nontechnical personnel.

In Go/No-Go test systems, new high speed methods of mechanical sorting and classification have been developed by Fairchild. Silicon Planar transistors and diodes are used throughout Instrumentation's product line to assure reliable performance. Modular construction permits economical adaption of system requirements to suit a particular need or for the addition of a new test measurement. Fairchild also utilizes plug-in circuitry to aid in maintenance and expandability.

The main plant and headquarters of Fairchild Instrumentation are located off the Bayshore Freeway south of San Francisco in Palo Alto, California. Complete operating sections at the plant include marketing, engineering, manufacturing, quality assurance and testing. The working area is composed of three buildings with a total of 56,000 square feet of floor space.





**FAIRCHILD**  
SEMICONDUCTOR  
(INSTRUMENTATION)

Fairchild Instrumentation has kept abreast of the technological revolution within the electronics industry. With the widest selection of semiconductor test equipment available today, the department has delivered factory-proven testers to many of the volume producers and users of transistors, diodes and integrated circuits.

The aims of this increasingly independent and self-supporting group are not limited to the development of semiconductor test equipment. A recent corollary addition is a product line of various types of solid-state amplifiers. Still other instrumentation products will be available from this department of Fairchild Semiconductor as it takes its place in one of the fastest growing industries in the world.



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