

1954

Motorola

INCORPORATED

ANNUAL

REPORT

COLOR MAGIC

BY

Motorola

There's excitement in the air! It's color television—the newest and most amazing achievement in education and entertainment media.

With all the truly wonderful developments that have issued from American laboratories in recent years, it is understandable if we take it for granted when fantastic dreams are being realized. With cooperation of engineers from most leading electronic companies, color television emerged without much fanfare from the dream-world. And in 1954 Motorola announced the first large-screen color set with simplified circuitry and thus made color TV a practical means to see things as they really are—colorful.

This was all net gain because a Motorola color set continues to give a superior view of programs that are telecast in black and white, but—in addition—enables you to see the programs that are telecast in color.

An interesting by-product of Motorola's pioneering in color television is that engineering advances in color have contributed to improvements in engineering design of black and white sets. Thus Motorola's pioneering of color sets has given leadership in color and increased strength in the field of black and white television.



1954

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INCORPORATED

ANNUAL

REPORT

WORLD'S LARGEST EXCLUSIVE

ELECTRONICS MANUFACTURER

Motorola

4545 AUGUSTA BOULEVARD

CHICAGO 51, ILLINOIS

TELEVISION



HOME RADIOS



CAR RADIOS



**TWO WAY RADIOS AND
CONTROLS**



MILITARY ELECTRONICS



**DIRECTORS
AND OFFICERS
OF MOTOROLA**



Paul V. Galvin
Director, President



Robert W. Galvin
Director,
Executive Vice President



George R. MacDonald
Director



Edward R. Taylor
Vice President for Marketing
Consumer Products and
Assistant to the President



Daniel E. Noble
Director,
Vice President in Charge of
Communications and Electronics
Division



Charles E. Green
Secretary



Frank J. O'Brien
Director,
Vice President for Purchasing



Edwin P. Vanderwicken
Director,
Vice President for Finance and
Treasurer



Matthew J. Hickey, Jr.
Director



Walter B. Scott
Vice President for Manufacturing
Consumer Products and Military



Elmer H. Wavering
Director,
Vice President for Engineering
Consumer Products

TRANSFER AGENTS

Chemical Corn Exchange Bank
165 Broadway, New York 15, New York

Harris Trust and Savings Bank
115 West Monroe Street, Chicago 90, Illinois

REGISTRARS

Irving Trust Company
One Wall Street, New York 15, New York

**Continental Illinois National Bank
and Trust Company of Chicago**
231 South La Salle St., Chicago 90, Illinois

The annual meeting will be held on Monday, May 2, 1955. A notice of the meeting, together with a form of proxy and a proxy statement, will be mailed to shareholders on or about April 11, 1955, at which time proxies will be solicited by the management.

10

YEAR

FINANCIAL SUMMARY



| YEAR | NET SALES | EARNINGS BEFORE TAXES ON INCOME | NET EARNINGS | NET EARNINGS PER SHARE ¹ | WORKING CAPITAL | INVESTMENT IN PLANT AND EQUIPMENT ² | SHAREHOLDERS' EQUITY |
|-------------------|---------------|---------------------------------|--------------|-------------------------------------|-----------------|--|----------------------|
| 1945 | \$ 67,896,597 | \$ 3,133,647 | \$ 851,882 | \$.44 | \$ 4,671,851 | \$ 1,273,523 | \$ 6,311,719 |
| 1946 | 23,201,107 | 993,786 | 656,286 | .34 | 5,862,933 | 2,464,598 | 8,733,345 |
| 1947 | 46,679,148 | 4,179,110 | 2,510,410 | 1.30 | 7,028,844 | 2,811,211 | 10,635,345 |
| 1948 ³ | 61,981,442 | 5,755,347 | 3,550,347 | 1.83 | 11,088,342 | 3,148,206 | 13,085,196 |
| 1949 ⁴ | 81,803,358 | 8,585,696 | 5,280,196 | 2.73 | 14,558,505 | 4,071,987 | 17,165,391 |
| 1950 | 177,104,669 | 27,368,061 | 13,130,246 | 6.78 | 20,731,871 | 5,794,309 | 26,895,638 |
| 1951 | 135,285,086 | 14,020,739 | 7,240,452 | 3.74 | 29,851,003 | 9,005,880 | 31,920,882 |
| 1952 | 168,734,653 | 15,576,165 | 7,012,700 | 3.62 | 38,007,247 | 11,429,532 | 41,755,780 |
| 1953 | 217,964,074 | 15,512,489 | 7,076,335 | 3.66 | 38,222,001 | 14,301,004 | 45,929,419 |
| 1954 | 205,226,077 | 16,523,889 | 7,572,024 | 3.91 | 38,308,612 | 16,579,531 | 50,598,747 |

¹Earnings per share of common stock based upon the 1,935,131 shares outstanding at December 31, 1954.

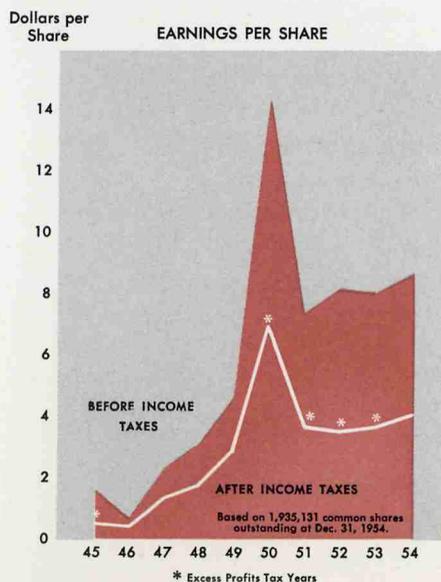
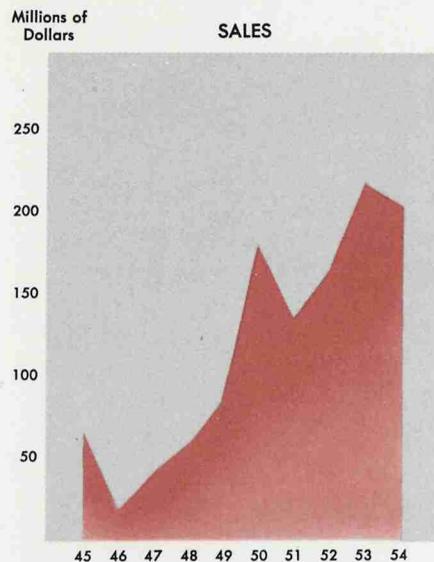
²Net investment after deduction of depreciation reserves.

³Thirteen month period ended December 31, 1948.

⁴Consolidated information including financial data of wholly-owned subsidiaries in 1949 and subsequent years.

TO THE SHAREHOLDERS OF

Motorola



SALES AND EARNINGS

I take pleasure in reporting that earnings of the company increased in 1954 over 1953. Our sales were the second best in our history. They totalled \$205,226,000, compared to \$217,964,000 for 1953. At the same time important gains in several directions, and with long-term significance, were recorded.

Consolidated earnings, before provision for taxes, were \$16,524,000 in 1954 compared with \$15,512,000 in 1953, up 7%. Net earnings of \$7,572,000 or \$3.91 per share of common stock in 1954 compares with \$7,076,000 or \$3.66 per share in 1953.

BLACK AND WHITE TELEVISION

The year 1954 was the second best year for the industry in terms of unit production of black and white television sets which totalled 7,347,000. There was a greater proportion of lower-priced table models sold and, since the price structure was generally lower, the dollar value of production was under 1953. Industry inventories were generally maintained in balance and there were some 1,850,000 units in dealer, distributor and manufacturer inventories at the year-end, which we regard as a conservative amount.

We introduced a highly competitive television line at mid-year and thereafter achieved a higher proportion of industry sales than the year before. September sales were the largest for any month in the history of Motorola.

Replacement sales and sales of a second set to the same owner are an increasing source of business. It is estimated that 63% of sets sold in New York



in 1954 were in replacement of old, small-screen sets in which the picture gradually deteriorates as compared with modern sets. This high rate of replacement should naturally extend to other communities as they reach a comparable television age.

Although an additional 70 new telecasting stations were in operation in 1954 which brought the total up to 426 at year-end, the effect of new stations on set sales is a waning one because there are few markets not now served by at least one station.

COLOR TELEVISION

At the July convention of our distributors we introduced three models of color television with 205 square inches of picture screen and priced below \$1000. We felt our advances in simplifying the electronic circuitry, and the availability of a large screen picture tube, justified this move. However, it was apparent that the growth of color television would be much slower than black and white because of its cost and because many people could continue to enjoy their monochrome sets. But as more programs are telecast in color, more people will be exposed to its intriguing advantages. More sets purchased should induce more color programs and, as sales volume rises, costs should gradually decline and thus accelerate this reciprocal operation of more programs — more sets. However, I expect this to occur quite gradually.

Color television, in addition to the engineering involved, required the setting up of new production lines, the development of many trained service men in the field and a special merchandising program. Substantial costs were incurred for these purposes and valuable experience was gained. The first dealer showing was on September 30 and by the end of the year color television had been introduced in 65 markets.

There are now 237 television stations capable of transmitting network color programs. Fifteen stations are equipped with color film scanners and there should be at least 30 by the end of 1955.



MILITARY ELECTRONICS

Billings for military electronic equipment and laboratory services reached a peace-time high in 1954 and amounted to about 25% of total sales. This comprised many types of complex equipment principally in the fields of radar, guided missiles, weapons fusing and communications.

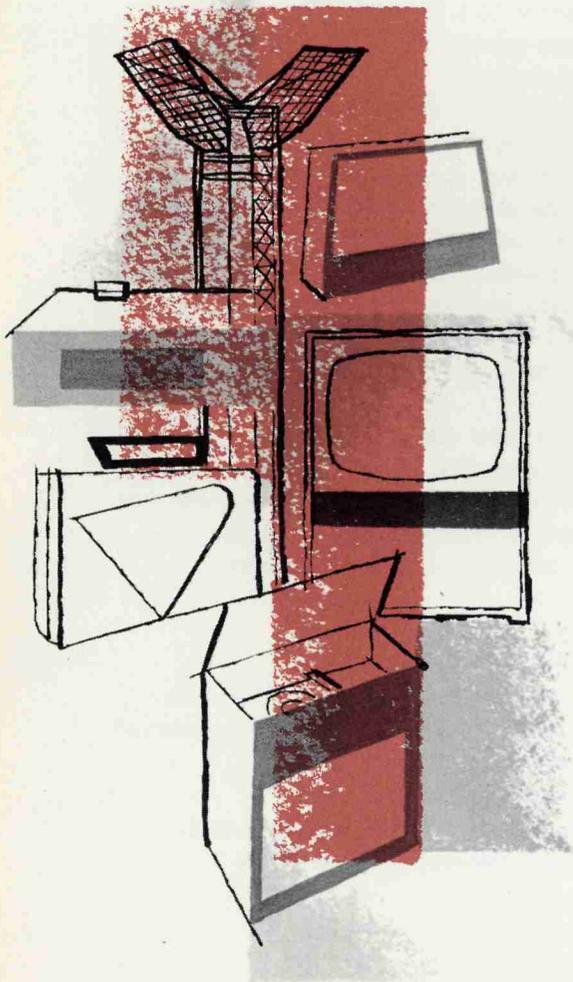
The Motorola Phoenix Research Laboratory was doubled in size late in 1953, and now employs a staff of more than eight hundred. To fulfill the requirements of electronic weapons systems design, a new laboratory has been established in Riverside, California, where an attractive building was completed and staffed with an experienced team of able scientists and engineers. The Motorola Riverside laboratory equipment includes the necessary analog computer facility required for dynamic systems analysis. Our expanding military research facilities will continue to implement Motorola's leadership in new electronic art and qualify us, by contributions to the art, for a full share of military electronics production.

In addition to the two western laboratories, two other military electronic development laboratories are located in Chicago. The choice of location and field of interest provides a wide range of opportunities for qualified scientists and engineers who become a part of the diverse Motorola creative effort.

The military electronic mass production activity continues to operate efficiently in a separate facility in Chicago.

COMMUNICATIONS & ELECTRONICS

Motorola continues to be a principal manufacturer of two-way mobile radio communications equipment. An important share of the market is also achieved in microwave relay equipment, including black-and-white and color television relay equipment, portable radio communication units and telemetering, power line carrier, supervisory control, coupling networks and remote control devices. The sales of this division continued the consistent record of annual growth through 1954.



Important advances were achieved in Motorola's pilot production of audio, radio frequency and power output transistors. Specialized transistor design for high temperature operation, and new circuitry developments, have opened the way for significant applications to military and civilian electronic products. Motorola's first transistorized product to be announced is a narrow-band power line carrier system for telemetering and remote switching. The second device, a transistorized radio paging unit, is undergoing field tests.

During 1954 the division introduced a new line of marine two-way radio equipment, a mobile microwave color TV relay, an airborne radio selective calling system, a new mobile selective calling system, and completed the release of universal two-way radio mobile equipment for operation on either six or twelve volt batteries. The rearrangement of the division's physical facilities was completed during the year to satisfy the demands for expanding operations.

AUTO RADIO

This division is subdivided into radios sold to automobile manufacturers and auto radios sold to consumers through our distributor-dealer outlets.

During the year the Ford Motor Co. increased the proportion of its radio purchases from Motorola with respect to 1955 models and we now supply over half of Ford division requirements. We also supply about half of Chrysler Corporation requirements and all of American Motors Corporation and International Harvester truck division requirements. While the aggregate of these sales declined considerably in 1954 under 1953, the current rate of operations is very high.

Partially as a result of an excessive inventory position at the beginning of the year, our sales of auto radios to our distributors also declined in 1954 despite an increase in the latter part of the year.

To augment our specialized facilities for producing auto radios, we acquired in late 1954 an additional plant in Arcade, New York, for the purpose of producing tuners for auto radios. This plant was in full operation at the first of this year and will aid in maintaining our traditional leadership in this business.



New research laboratory completed during this year at Riverside, California.

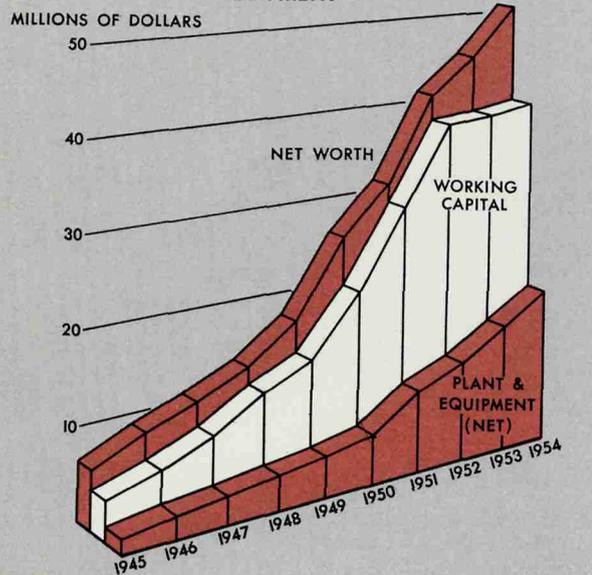


At the auto radio tuner plant recently acquired in Arcade, New York.

The military research and development laboratory at Phoenix, Arizona.



NET WORTH, WORKING CAPITAL AND INVESTMENT IN PLANT AND EQUIPMENT



HOME RADIOS AND PHONOGRAPHS

Industry sales of home radio sets declined about 27% in 1954, portable radios 10% and clock radios 1%. Motorola sales in these particular products were also disappointing.

A new group of high fidelity phonographs was introduced at midyear which makes available at modest prices high quality performance with an audio range of 30 to 18,000 cycles. These units have met with favorable market acceptance.

FINANCES

On December 31, 1954 the consolidated working capital of the company was \$38,309,000. All categories of receivables were lower than a year ago in relation to current sales rates, except receivables from the government. Inventories were generally at a lower ratio to sales than existed a year earlier. Current assets were 204% of current liabilities at the 1954 year-end compared with 216% the year before.

Shareholders' equity increased to \$50,599,000 up \$4,669,000 for the year. Long term debt was reduced \$840,000 and fixed assets (net of depreciation) increased \$2,278,000. Additions to fixed assets included the new laboratory and its equipment at Riverside, modernization of the Chicago headquarters of the Communications division, the expansion of the Phoenix laboratory, acquisition of the radio tuner plant in Arcade, equipment for production and testing of color television and a substantial amount of other laboratory and production equipment.

Dividends of \$1.50 per common share were paid in 1954. At the close of the year there were 4,381 Motorola stockholders. Directors, officers and their immediate families owned directly or beneficially 573,951 shares of Motorola stock out of the 1,935,131 shares outstanding.



THE FUTURE

We expect 1955 to be a good year although a very competitive one. Barring an international war or a major strike in any of the important industries in this country, we see the prospects for the best year in the history of our business. We are targeting for a sales volume of \$225,000,000 for the year. It is our hope to increase our earnings per share in 1955.

Our military billings for 1955 will be less than in 1954, but our billings in all remaining divisions of our business will be greater in 1955 than 1954. Our color television business will continue to be modest in volume compared to our black and white. We do not expect a measurable increase in color television until late 1956 or early 1957. It will be predicated on a much lower cost color tube and an increase in the quantity and regularity of color programming.

Being in the dynamic industry that we are and progressively planning for growth in the future, we are naturally entertaining expansion plans — some of which very likely will be put in motion during 1955.

Because of the extremely competitive conditions in our industry, it behooves us to be ever alert to all facility improvement requirements to keep ourselves in a truly competitive position. To this end, we are moving progressively into mechanization and the use of automation in many of our facilities. As of now, we are making all of our home sets with plated circuits and the use of our latest automation equipment. We contemplate the introduction of car radio production into plated circuits and automation in 1955.

Sincerely

A handwritten signature in black ink, appearing to read "P. V. Johnson", written in a cursive style.

For the Board of Directors

March 15, 1955

Motorola INC. AND SUBSIDIARIES, CONSOLIDATED BALANCE SHEET

December 31,

ASSETS

| | 1954 | 1953 |
|--|---------------------|---------------------|
| Cash..... | \$13,321,302 | \$ 9,052,298 |
| Accounts receivable: | | |
| United States Government..... | 10,489,782 | 8,942,768 |
| Other trade accounts (less reserve for bad debts— 1954, \$743,128; 1953, \$381,058)..... | 23,772,927 | 19,307,601 |
| Other current receivables..... | 720,152 | 1,769,691 |
| Costs recoverable under United States Government contracts, less progress billings..... | 7,167,003 | 9,288,036 |
| Inventories—at the lower of cost or market..... | 19,290,806 | 22,519,019 |
| Prepaid expenses..... | 461,208 | 426,581 |
| TOTAL CURRENT ASSETS..... | \$75,223,180 | \$71,305,994 |
| Other assets..... | 2,573,429 | 1,134,954 |
| Plant, equipment and leasehold improvements (less reserve for depreciation— 1954, \$3,806,341; 1953, \$2,994,834)..... | 16,579,531 | 14,301,004 |
| Patents and trademarks—less amortization..... | 154,944 | 129,261 |
| | <u>\$94,531,084</u> | <u>\$86,871,213</u> |

LIABILITIES

| |
|--|
| Current maturities of long-term debt, and short-term borrowings of subsidiaries..... |
| Accounts payable—trade..... |
| Accrued taxes..... |
| Reserves for service and product warranties..... |
| Other current liabilities..... |
| TOTAL CURRENT LIABILITIES..... |
| Long-term debt, less current maturities above: |
| 3¾% note, due November 1, 1966, with annual prepay- ment requirements of \$500,000..... |
| Real estate mortgages: |
| Parent, due March 1, 1956..... |
| Subsidiaries, principally maturing after 1965..... |
| Total liabilities..... |
| SHAREHOLDERS' EQUITY |
| Capital stock, \$3.00 par value—authorized, 3,000,000 shares; issued and outstanding, 1,935,131 shares..... |
| Capital surplus..... |
| Retained earnings..... |
| Total shareholders' equity..... |

STATEMENT OF FINANCIAL POSITION AS OF DECEMBER 31, 1954 AND 1953

December 31,

1954

1953

| | |
|---------------------|---------------------|
| \$ 1,000,040 | \$ 2,192,980 |
| 9,687,561 | 7,752,518 |
| 10,545,551 | 9,450,270 |
| 1,365,625 | 1,011,504 |
| 14,315,791 | 12,676,721 |
| <u>\$36,914,568</u> | <u>\$33,083,993</u> |
| 6,000,000 | 6,500,000 |
| 446,804 | 781,900 |
| 570,965 | 575,901 |
| <u>\$43,932,337</u> | <u>\$40,941,794</u> |
| \$ 5,805,393 | \$ 5,805,393 |
| 9,018,506 | 9,018,506 |
| 35,774,848 | 31,105,520 |
| <u>\$50,598,747</u> | <u>\$45,929,419</u> |
| <u>\$94,531,084</u> | <u>\$86,871,213</u> |

NOTES TO FINANCIAL STATEMENTS

A—All of the company's subsidiaries are wholly owned and all are included in the consolidated financial statements. The accounts of Canadian subsidiaries are included in terms of United States funds, at appropriate rates of exchange; the amounts pertaining to Canadian companies are relatively inconsequential.

B—The company's business under United States Government contracts is subject to price renegotiation, in accordance with federal statute. The company's renegotiation status has been reviewed by the Government for the years 1950, 1951 and 1952, and no refund was required. It is believed that no excessive profits were realized in 1953 and 1954 which would be required to be refunded under general price renegotiation.

C—In connection with the financing of sales of products to consumers in the ordinary course of business the companies are contingently liable on discounted, secured notes receivable and have an obligation to re-purchase products under certain circumstances. It is believed that these obligations will have no material effect on the business of the companies.

D—The Retained Earnings account at December 31, 1954 is the balance after transfer therefrom in prior years of \$2,945,385 to capital surplus and \$5,034,625 to the capital stock account, in connection with stock dividends, share distributions and increase in the par value of capital stock. Capital surplus consists of \$6,073,121 of paid-in capital and the above-mentioned transfer from the Retained Earnings account.

E—Under terms of the 3¾% note agreement, retained earnings of the parent company in the amount of approximately \$9,596,000 were available on December 31, 1954 for the payment of cash dividends or acquisitions of the company's stock.

**STATEMENT OF
CONSOLIDATED INCOME AND
RETAINED EARNINGS**

AUDITORS' REPORT

Year Ended December 31,

| | 1954 | 1953 |
|---|---------------|---------------|
| Sales..... | \$205,226,077 | \$217,964,074 |
| Other income..... | 1,595,724 | 1,125,164 |
| | \$206,821,801 | \$219,089,238 |
| Manufacturing and other costs of sales..... | \$161,730,316 | \$170,709,414 |
| Selling, service and administrative expenses..... | 23,187,253 | 28,070,626 |
| Depreciation and amortization of leasehold improvements.. | 1,405,941 | 1,125,964 |
| Contribution to employees' profit-sharing fund..... | 2,910,467 | 2,914,095 |
| Interest and other expenses..... | 1,063,935 | 756,650 |
| | \$190,297,912 | \$203,576,749 |
| Net income before provision for taxes on income..... | \$ 16,523,889 | \$ 15,512,489 |
| Provision for federal, state and Canadian income taxes... | 8,951,865 | 8,436,154 |
| | \$ 7,572,024 | \$ 7,076,335 |
| Earnings..(per common share — 1954, \$3.91; 1953, \$3.66) | \$ 7,572,024 | \$ 7,076,335 |
| Retained earnings, beginning of year..... | 31,105,520 | 26,931,881 |
| | \$ 38,677,544 | \$ 34,008,216 |
| Total..... | \$ 38,677,544 | \$ 34,008,216 |
| Deduct cash dividends declared—\$1.50 per share..... | 2,902,696 | 2,902,696 |
| Retained earnings, end of year..... | \$ 35,774,848 | \$ 31,105,520 |

BAUMANN, FINNEY & CO.

Certified Public Accountants

208 SOUTH LA SALLE STREET
CHICAGO 4, ILLINOIS

February 21, 1955.

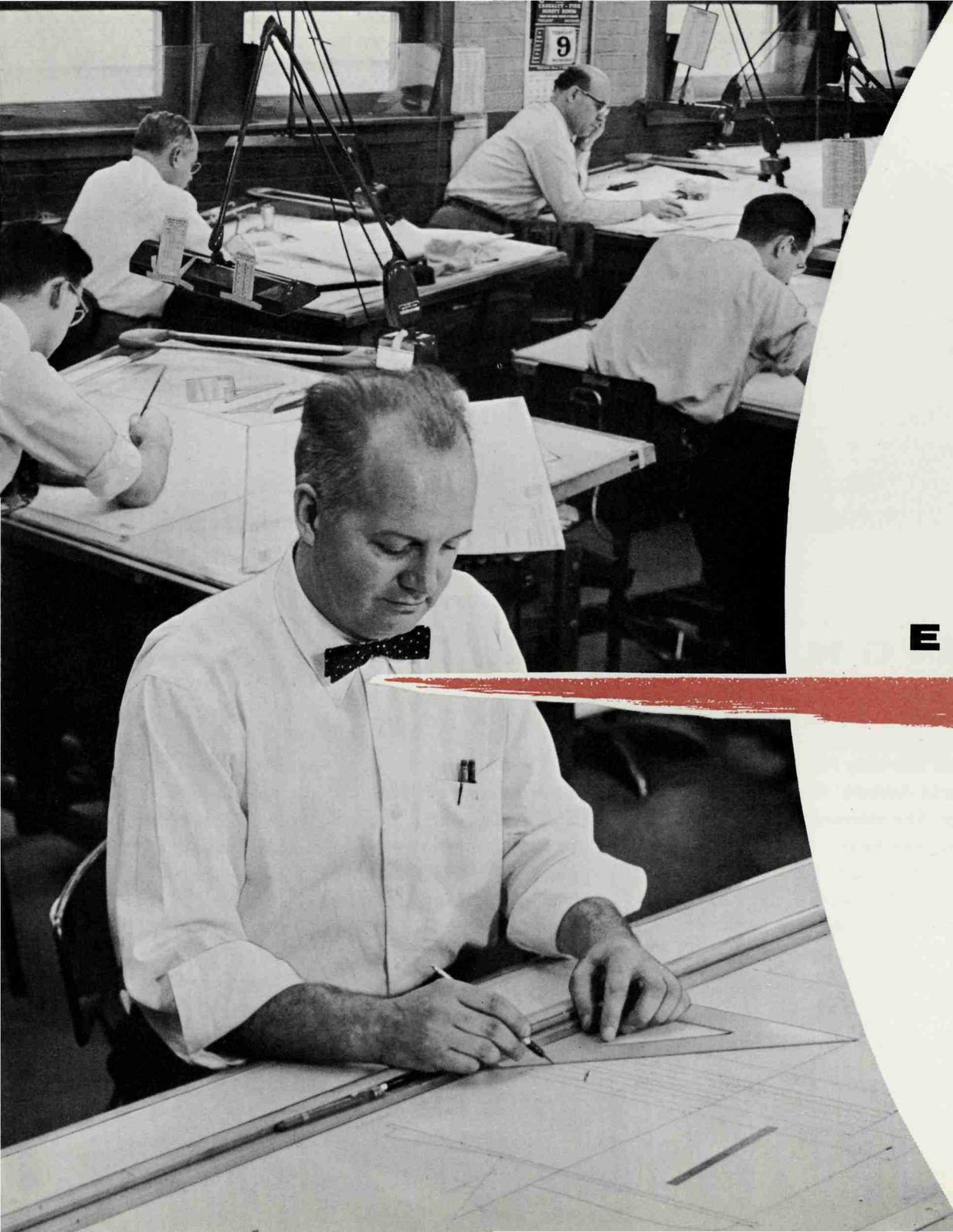
To the Board of Directors and
Stockholders of Motorola, Inc.

We have examined the consolidated balance sheet of Motorola, Inc. and its subsidiaries as of December 31, 1954, and the related statement of income and retained earnings for the year then ended.

Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests of the accounting records and such other auditing procedures as we considered necessary in the circumstances. It was not practicable to attempt to obtain confirmations of certain receivables from the United States Government, but we satisfied ourselves as to their substantial accuracy by means of other auditing procedures.

In our opinion, the accompanying balance sheet and related statement of income and retained earnings, as footnoted, present fairly the consolidated financial condition of Motorola, Inc. and its subsidiaries on December 31, 1954 and the consolidated results of their operations for the year then ended, in conformity with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Baumann, Finney & Co.



ENGINEERING

has been a dynamic, impelling force throughout Motorola's history. A combination of imaginative thinking and a practical understanding of what the customer requires . . . well trained scientists and engineers . . . hard work . . . enthusiasm—these have resulted in one solid success after another. And in this past year of 1954 Motorola laboratories moved forward to a new high.

Perhaps the most spectacular single contribution, in a year of achievement, was Motorola's pioneering in the field of . . .



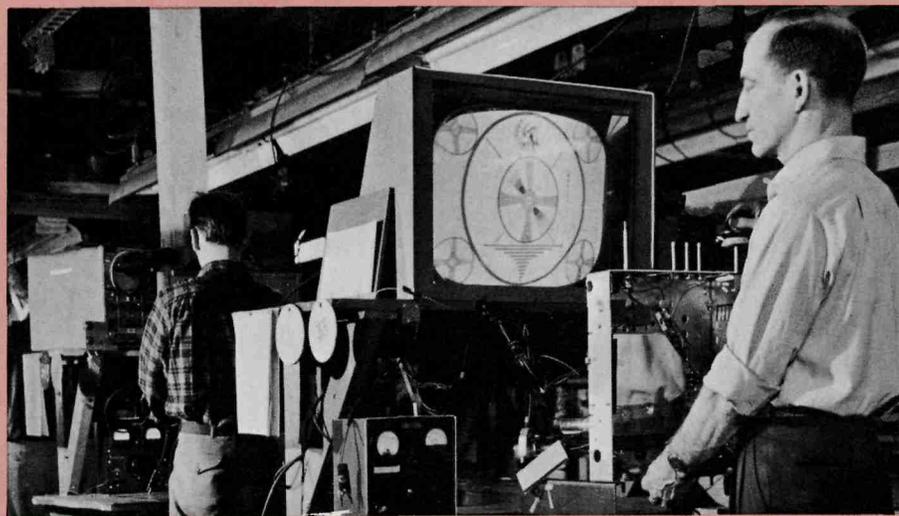
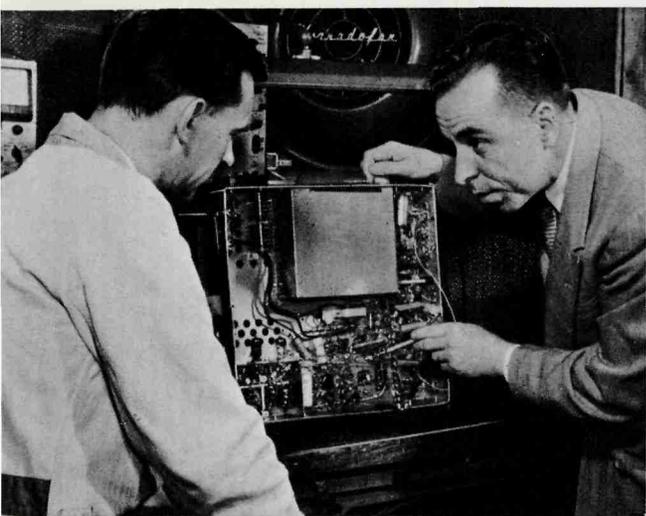
COLOR TELEVISION

Just a brief year ago, color television was a long way from the homes of America. At best, it was a costly experiment. The practical consumer product seemed years away.

Briefly, the problem was fourfold. The picture screen size was too small; the price much too high; service was unavailable; and there were few programs to watch. In the latter case the networks promised increasing color programming . . . but, the other obstacles seemed steep indeed.

Then with the advent of a satisfactory large screen color tube, Motorola's engineers began to turn the experimental into a salable product. First came revolutionary new circuitry that greatly reduced the number of components and permitted the number of tubes to be cut from forty-four to twenty-nine.

Next, a remarkable new design of the "yoke," which controls light deflection from the electron guns, was developed. This and new convergence circuits served to eliminate color fringing. A new corona discharge regulator and a stabilized tuner to avoid station drift were added.



BLACK AND WHITE TELEVISION

These developments helped bring the price of a high quality Motorola color set within the range of consumer buying power.

Finally, with a comprehensive Motorola color service training program, color television became a practical reality.

Thus was born a new entertainment partnership. For even as Motorola's engineers were pushing forward on color TV, they were also applying their findings toward improved . . .

In 1954 no less than thirteen major improvements were made in the field of monochrome TV by Motorola engineers. Among the most noteworthy advances was Motorola's gammatrol circuit which results in more uniform picture reproduction when selecting or switching channels, and maintains better fidelity of contrast with scene changes. Other improvements included a modified intercarrier sound system for clearer sound reception in fringe areas, a new cascode tuner with much improved interference rejection and an advanced framelock circuit for picture stabilization in noisy areas.

Keeping pace with Motorola's strides in television were several developments in . . .

RADIO

Typical of the engineering progress made in the still improving radio art, were Motorola developments in plated circuitry.

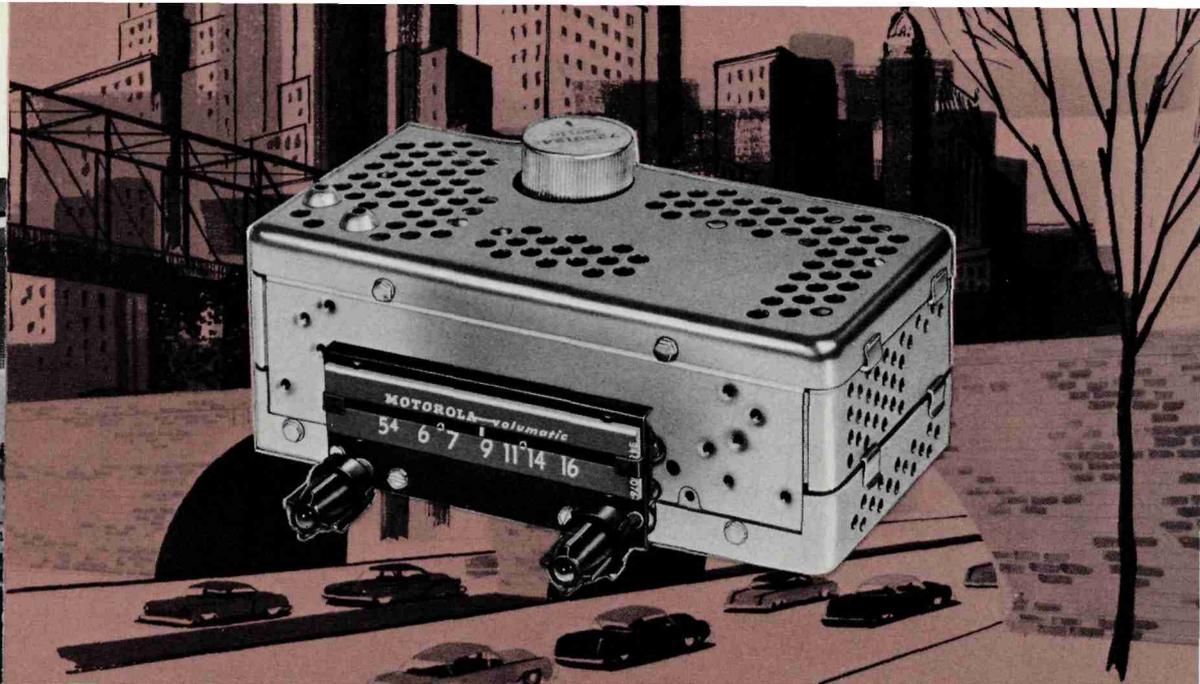
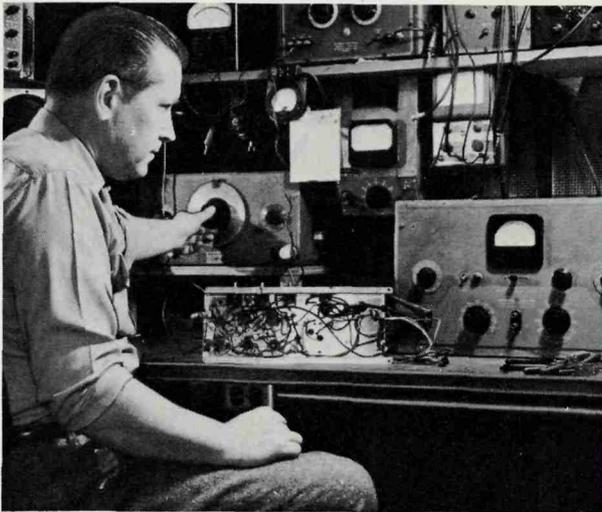
Motorola engineers created a "universal" plated circuit chassis which is interchangeable among different radio models. Its design brings new economies and longer life to the home and portable radio.

A new approach to chassis design simplified the production of small radios.

Also a product of the design table was a new iron core directional antenna for portable radio, one of the largest and most versatile in the industry. The portable line was further improved by the inclusion of an exceptionally powerful and long-life 90 volt battery to mark the first time in the industry that small portables have been so powered.

Along with these improvements in the long-established field of radio there were others in the comparatively new medium of . . .





HIGH FIDELITY

Here, Motorola's engineers developed and designed a 20 watt amplifier with a special 5-layer output transformer. This very significant contribution enabled the production and sale of high fidelity equipment with a full audio range of 30 to 18,000 cycles at a price below \$200. Previously, such equipment would normally retail at \$500 or more.

Another development in the field of high fidelity involved the design of the speaker housing to prevent acoustical feed-back.

CAR RADIO

. . . advanced, too, under the impetus of Motorola engineering. During 1954, revolutionary "Volumatic Control" became available on all Motorola car radios. This device prevents "signal fade" and automatically holds volume at a pre-set level when passing through viaducts, over bridges or between tall buildings. In addition, each car radio model is now available for either 6 or 12 volt electrical systems.

Advances were also made in car radio design to simplify installation and maintenance, reduce size with full sensitivity, and increase shock resistance.

Not so generally known, but no less important than the strides in consumer goods, have been the successes in . . .

COMMUNICATIONS AND ELECTRONICS

The pioneering of Motorola's C & E Division has been the cornerstone for many of electronics' outstanding achievements. Research in this division has paved the way for many consumer products.

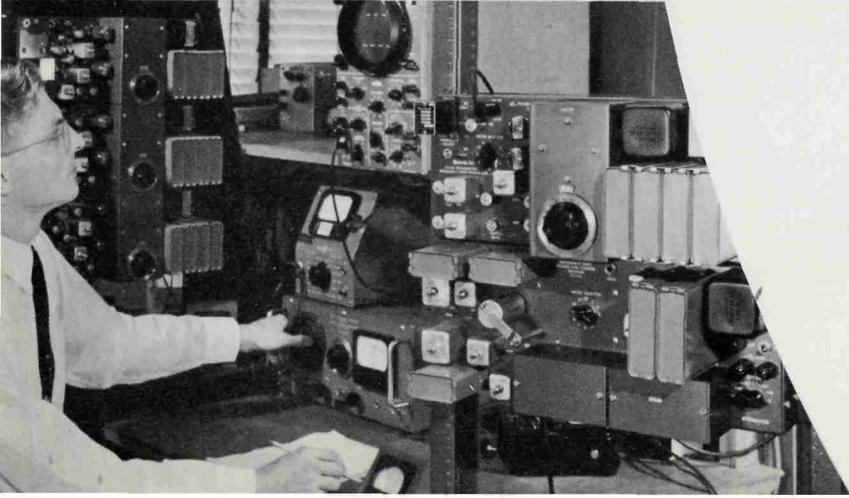
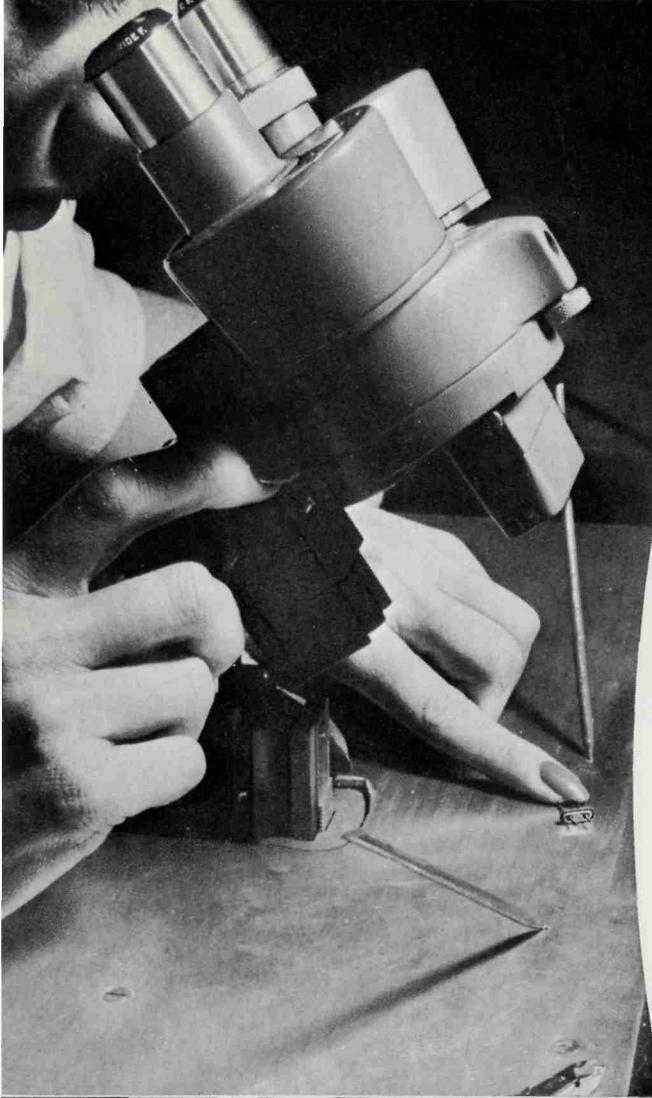
The tiniest development of '54 and yet one of the most significant was Motorola's work and research into the field of the . . .

TRANSISTOR

This tiny, extremely dependable device may replace the vacuum tube in most applications. The transistor is fashioned from a speck of germanium or silicon and a few connection wires. It provides the advantages of low power consumption, mechanical sturdiness, long life and small size. These qualities assure the use of transistors in military and civilian products once the problems of low cost mass production are overcome. An example of the transistor's advantages in use are found in Motorola's recently announced

TRANSISTORIZED NARROW BAND POWER LINE CARRIER SYSTEM

In effect, the Motorola power line carrier is "radio over wire" and is used in conjunction with electric power lines to meet the increasing communications needs of expanding utilities. With this equipment each 500 cycle channel can also be used for teleprinting, telemetering, load control, and supervisory control. This application of the transistor provides a new high standard of reliability for power line equipment.

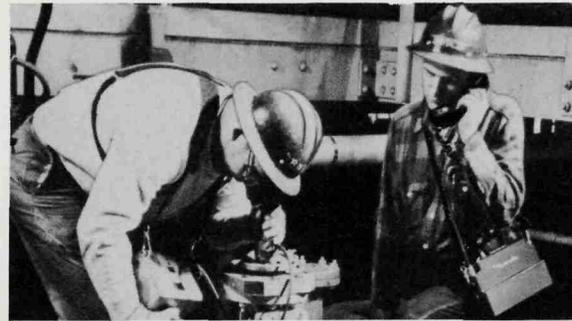


Other recent industrial developments, already in use, include . . .

TWO-WAY RADIO

improvements such as new marine ship-to-ship and ship-to-shore communications. Also in this field Motorola pioneered new universal 2-way auto equipment which may be used interchangeably with 6 or 12 volt electrical systems.

Perhaps the most significant two-way contribution was the development of equipment for the UHF 450-470 megacycle frequency range, which includes the "citizens" band. This equipment expands the usable spectrum for mobile radio applications and widens the potential equipment market.



SELCAL

is the name for still another C & E product. With it a commercial pilot need no longer listen to all the messages being transmitted to catch those intended for him. Selcal automatically selects the proper message for the right aircraft, a significant safety device to reduce pilot fatigue.

Less friendly to aircraft are some of the developments for the . . .

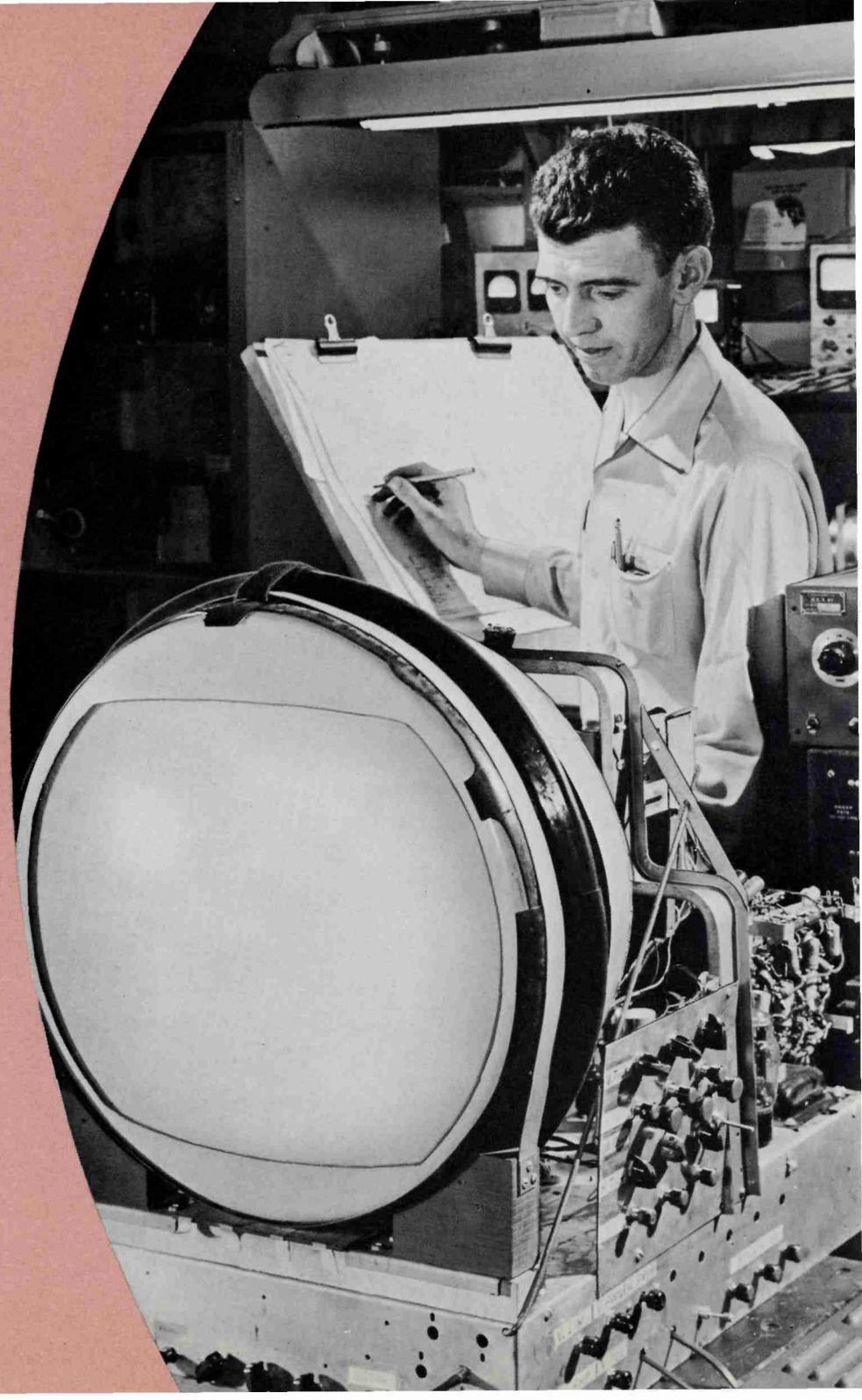
MILITARY

These devices include new aids in radar . . . guided missiles that seek and destroy enemy planes with an almost unerring precision . . . electronic plotting devices for spotting a plane's course . . . and over 16 other major contributions to the armed forces.

Still more and more advances are coming from the laboratories of Motorola. These products, now in the research stage, will be the standard items of . . .

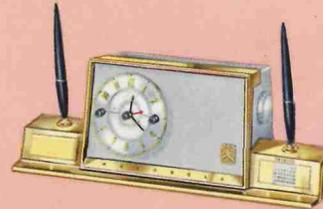
T O M O R R O W !

The ceaseless pioneering and studies of Motorola engineers are insuring a position of leadership tomorrow. The research of today pays off in next year's achievements. In every branch of research, Motorola engineers are profiting from each other's efforts. Progress in one area helps in another. The whole is building a progressive force that will maintain a strong growth trend for Motorola.



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