



**TEKTRONIX, INC.**  
**ANNUAL REPORT**  
**26TH YEAR**  
**ENDING MAY 27, 1972**

## TO SHAREHOLDERS AND EMPLOYEES:

Introduction of a significant group of new instruments combined with an improved U.S. economic situation has produced an upturn in Tektronix business.

Orders hit record highs; sales came very close to doing so. And earnings went up faster than sales (earnings before taxes increased at twice the sales-growth rate).

Sales grew pretty much across our product line: Laboratory, portable and hand-held oscilloscopes got enthusiastic reception. Some company efforts—notably Information Display and television products—did even better.

But sales figures don't tell the whole story. There are stubborn obstacles (internal and external) to good operating results. One is higher taxes—a trend we see as continuing. Public programs already approved will demand additional revenue. Business always has been a ready target; if you happen to operate multinationally, you're in even greater jeopardy. There's a strong protectionist ground swell, which includes penalties for companies who manufacture overseas (even though multinational growth, historically, has created more U.S. jobs than would otherwise exist).

To give some idea of the threat: One pending bill not only calls for current taxation of the U.S. parent for the earnings of its foreign subsidiaries, but also

denies credit for overseas taxes paid. It's to be hoped such measures will get no farther. But it has its supporters—and the attitude behind it, we feel, will not die easily.

As a shareholder, you may wish to look into this matter, reach your own conclusions and even take steps to make your personal views known to legislators.

Another problem (one we *can* attack) is production costs. A company whose product line is as wide and complicated as ours is prey to more-than-normal problems of inventory control, parts shortages and scheduling difficulties. However, we're making headway—as witness the decrease in manufacturing cost from 54.9 per cent of sales a year ago to 51.7 per cent this past year.

Still, there's no room for smugness. Recent adversity is still fresh in our memories, providing a built-in "smug-control device." Another is profit sharing, a continuous measure of collective effort.

This year Tektronix went through a layoff (minor by industry standards but painful for all of us—those who stayed as well as the 350 who left). Because of the value we've always placed on long-term employees, we tried about everything (including unpaid time off and job transfers) before resorting to the layoff. All of those laid off have been offered re-employment; and most of them have returned.

**T**hose of you new to Tektronix' annual report will find it more than a financial

summary and recitation of "important" events. Rather, it's an attempt to be a candid narrative, describing mistakes (to the extent that they're visible to us) as well as achievements. It's also intended to be broadly educational; many of you have indicated that you expect more of an annual report than a balance sheet plus color photos.

One important company achievement is philosophical rather than directly operational: We've not only maintained but even strengthened the small-family feeling that has typified Tektronix (in a period when you might have expected such ties to be strained and pressure to develop for more structured or "efficient" ways of doing things). As a result, our people have shown growth and maturation—individually and collectively.

It's been our experience that, whatever the problem, there's someone within the Tektronix organization with the solution. This year we've found many, many such someones with creative answers.

It boils down to this: *There just isn't anyone here who doesn't want to do well.* And they will, if the organization doesn't get in the way. Part of the task, as we set directions and policies, is to help make sure it doesn't.



Chairman of the Board



President

August 3, 1972



# Display AND MEASUREMENT

Oscilloscopy, pronounced correctly, sounds more like a Kansas town than it does an advanced technical discipline. To this sophisticated field, Tektronix is the leading contributor.

Oscilloscopes, which continue to be our major product, both display and measure electrical waveforms. However, increasingly, we're developing additional products that display but do not measure, and others that enable measurement but do not display. Although they are proportionately few, they clearly indicate product-line directions; we are, in this respect, as one engineer noted, a little bit pregnant.

Because most of our products, by far, *do* rely on display, it may be useful to describe the major display element: The cathode-ray tube, or CRT.

## A WINDOW TO ELECTRONICS

The CRT has been around awhile. It was invented shortly after the turn of the century, to study the action of electrons, then barely understood. Scientists knew that something called "electrical current" existed, and that it could be manipulated in various ways inside vacuum tubes. But there was no electron theory, and certainly no electronics industry.

The CRT is like a bottle pumped free of air. At one end of it, a heated cathode gives off billions of electrons per second, which are then focused into a beam. The beam is accelerated to great speeds and fired against a sensitive phosphor screen at the other end of the tube. That portion lights up, a glowing spot.

The electrons' speed increases with the volt-

age difference between the cathode and the screen.

The beam—a "pencil" of electrons—can then be deflected by external electrical signals to move about the screen very fast—today, approaching the speed of light.

Thus, man gained a great ability: For the first time, he could, by viewing the resulting waveforms, "see" electrical phenomena, and thus understand them in a way otherwise impossible. The CRT picture is as unreal, but as useful, as the "picture" provided several centuries earlier by the development of accurate clocks. Both are invented analogs, visual equivalents of things you otherwise couldn't see—time on the one hand, electricity on the other.

The great speed of the electron beam allowed a continuous picture of a changing event—not only electrical changes, but any phenomenon convertible into electrical signals.

Other ways of picturing change are mechanical rather than electronic, and thus slow. For instance, a pen recorder can measure only changes occurring up to about 15,000 times per second. (By contrast, a computer must often deal with changes hundreds of thousands of times that fast.) The CRT, employing the nearly weightless electron (.0000000000000000000000009 gram) inside a vacuum, overcomes the mechanical limitations of weight, friction and springiness.

By now, a very wide variety of phenomena can be converted into electrical signals and displayed on a CRT: Heat, sound, pressure, strain, velocity, nuclear events, biochemical changes.

**Basic to most Tektronix products is the cathode ray tube, which displays the information.**

In an oscilloscope, the display is a graph of such changes. In our information-display products, it shows computer-stored data as words, numbers and pictures. The CRT display is integral with, or a useful adjunct to, other Tek products.

Accurately, the cathode-ray tube has been called a "window to electronics."

### Oscilloscopes

A laboratory oscilloscope is a complex, integrated system. Yet its principles are easy:

The oscilloscope draws a graph of some "event," so someone can measure the amount of that event and how long it lasts.

It has three major segments:

- *The cathode-ray tube.*
- *The time-base generator*, whose electrical signal moves the CRT spot across the screen at a uniform speed, left to right, repeatedly. The screen is ruled off like graph paper. The spot "sweeps" at almost any rate—one second per ruled division, or a hundred/millionth of a second (or less) per division.

At slow speeds you see the spot move. At very fast speeds, its "trace" appears as a solid line.

- *The vertical deflection system*, connected to a changing voltage, moves the spot up and down. You can make each vertical ruled division represent many volts, or a small fraction of one volt. The number of divisions the spot moves tells you the signal voltage—thus the amplitude of whatever that voltage represents: Heat, light, sound, gravity, pressure, acceleration.

The oscilloscope graph of an electrical event—or of any phenomenon converted to voltage—tells whether the voltage is changing positively or negatively; the amplitude and duration of the event, and the waveform's shape.

Phenomena that happen over and over produce a continuous image. But the oscilloscope can also graph events that happen randomly, or

only once: An explosion, for instance. Even if the event occurs just once and lasts only a millionth of a second, special cameras can record the graph—and some oscilloscopes can store it on the screen, for as long as needed.

**A**n oscilloscope has four basic characteristics: *Sensitivity* describes how small a signal it can measure. Some Tektronix instruments can picture signals as small as one millionth of a volt.

*Risetime* tells you how fast a change an instrument can record on its vertical axis. Our highest-frequency oscilloscopes can picture signals occurring in billionths of a second.

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*Changes occurring in tenths of billionths of seconds are what make a computer compute. Just how fast is 1/10,000,000,000/second?*

*To give you some idea, assume an electrical event, or change, that lasts one ten-billionth of a second and happens once every second. Now let's slow time down so the change lasts a full second. On that time base, the event would now occur once every 315 years!*

*If that change were to happen right now, as you read this, the last time it occurred (again, lasting one second) would have been just about the time England's Charles I was beheaded. The next time it happens, your great-great-great-grandchildren might observe it.*

*On this slow-motion time base, a bullet fired from a .45 pistol would require 15 years to cross a city street. It would take you almost 12 years to blink your eye once.)*

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An instrument's range of frequencies is called its bandwidth (expressed commonly in megahertz—MHz—or millions of cycles per second).

*Sweep range* tells you how fast and how slowly a CRT beam can cross the screen.

**The oscilloscope can draw a graph of almost any changing phenomena, whatever its speed.**

**Here's one way to visualize a ten-billionth of a second.**



**A few of many new Tektronix products are shown on the opposite page: From left, 4012 graphic terminal; 7704A general-purpose oscilloscope; 465 portable; 211 miniscope; and 7623 storage scope (on Scope-Mobile with TM500 modular instruments).**

The wider this range, the greater the variety of waveforms you can look at. On most Tektronix scopes, the fastest sweep is several hundred million times faster than the slowest.

*Intensity* refers to display brightness. Displays of one-shot events (which can't be "rewritten" as repetitive signals can) must have high intensity to be seen or recorded. One Tektronix scope lets you photograph a phenomenon occurring in the time it takes light to travel two feet.

Oscilloscopes vary also in other ways. Some are lightweight and *portable* (some can even be held in the hand while in use); some fit stationary *rackmount* installation. Some make a wide variety of *general-purpose* measurements; others are *special-purpose*, like our TV waveform monitors. Several models also provide *digital readout*—presentation of signal information in numbers and letters as well as waveforms.

Scopes vary in other features, that allow:

- Comparing simultaneous signals, by drawing two (or more) graphs at a time with a *dual-trace* or *dual-beam* instrument.
- *Storage*, or retaining the waveform display after the signal ceases.
- *Spectrum analysis*, by converting from a time to a frequency base. This allows an equally useful analysis of complex signals, separating them into their component frequencies.
- *Sampling* successive bits of a repetitive signal and assembling the samples into a graph of the waveform—measuring events far too fast for conventional oscilloscopes. The fastest sampling sweep is 3.5 times the speed of light.

**S**ome general-purpose instruments get their great versatility through interchangeable *plug-in* units, which contain some portion or other of the scope's circuitry.

Some plug-ins control *vertical* deflection, con-

verting the signal into up-and-down movement. Most are *amplifiers* (or preamplifiers).

Some are *high-gain*, amplifying very small signals so the CRT may graph them; some are *wide-band*, allowing display of very fast (high-frequency) signals.

*Dual-* or *four-trace* plug-ins enable the CRT to draw more than one graph at a time, by accepting two (or four) signals, which will share the beam's writing time.

*Differential* plug-ins compare two points in a circuit and present the voltage difference to the CRT; others (*differential comparators*) cancel out a large segment of voltage you don't want to look at, and magnify the small portion you do.

Time, like amplitude, can be magnified with plug-ins. In one method, a timing device (called a *delaying sweep*) delays the waveform until the desired segment of the signal occurs; then it triggers a second, faster sweep that fills the display area with that segment.

*Time-base plug-ins* control *horizontal* deflection, letting you vary the range of speeds with which the beam can cross the screen.

*Sampling* and *spectrum analysis*, mentioned earlier, may also be obtained through plug-ins.

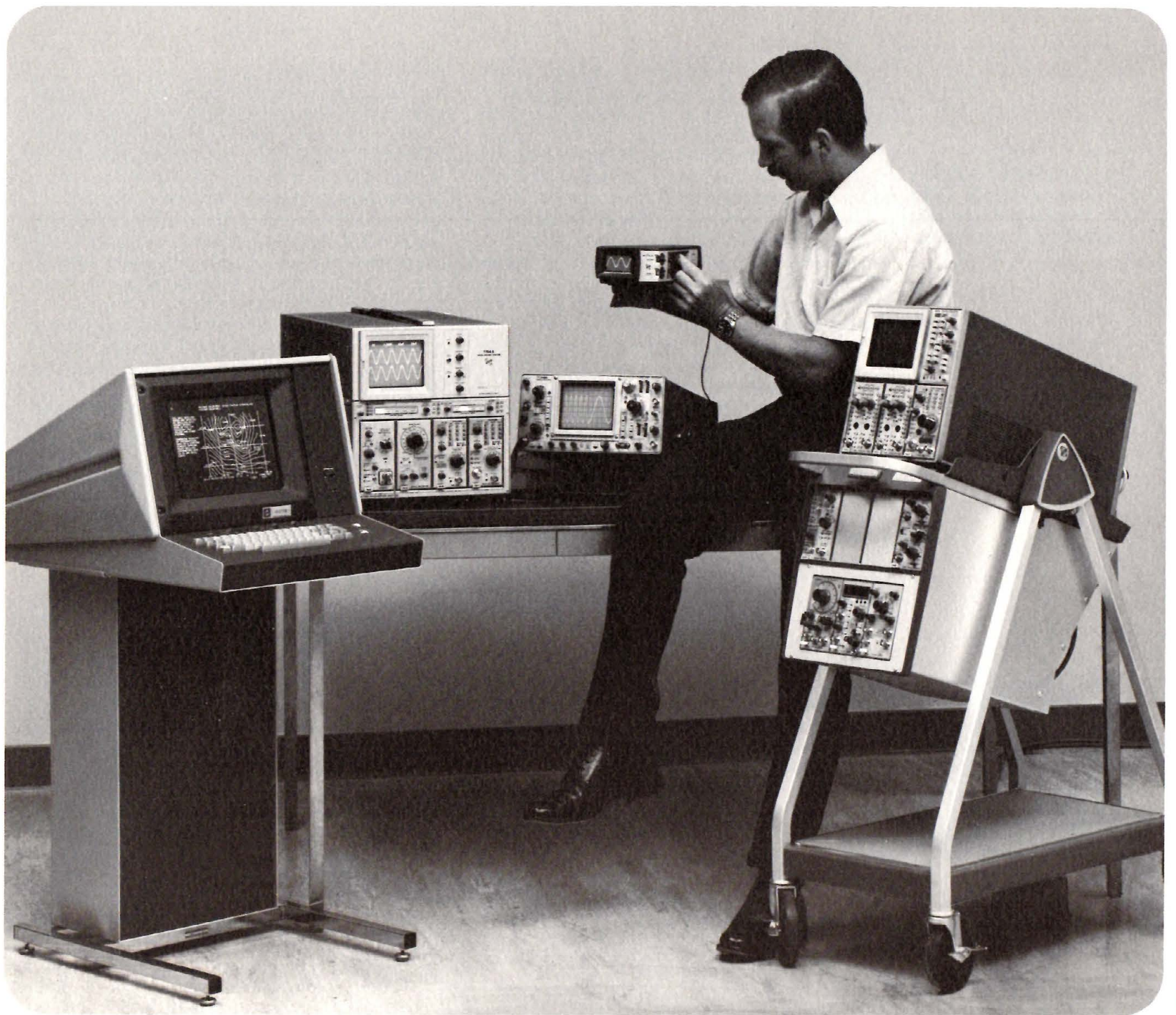
Unique *multimeter* and *counter* plug-ins let the user of a Tektronix 7000-series oscilloscope (with its CRT scale-factor readout) combine in one instrument the visual advantages of a waveform display with related digital measurements of voltage, current, resistance, temperature and frequency. Formerly, meters and counters were purchased only as stand-alone instruments.

### Television Products

There's many a potential slip 'twixt the studio television camera and your TV set's picture.

At each step in the process—camera, videotape recorder, control room, network transmission, phone lines (or perhaps satellite), TV-sta-







**Graphic computer terminals show that a picture can be worth any number of words.**

tion equipment—many chances occur for the video signals to become distorted, and thus for your picture at home to get fuzzy or jumpy, or act up in other irksome ways.

To help see that it doesn't, Tektronix has developed a wide variety of quality-control products custom-tailored to TV's needs. Throughout the world, no one in the television-measurement field has the reputation we do.

Tektronix makes TV products in four categories. Three of them use CRT display.

The one that doesn't is *signal generators*. We manufacture two kinds:

Synchronizing-pulse generators are the heart of the television system. Much as an orchestra leader assures that all the musicians are playing the same music at the same time, a sync generator produces timing pulses that make sure all the video signals are synchronized.

Test-signal generators, on the other hand, are diagnostic tools. They generate a wide variety of signals and patterns that enable an engineer anywhere in the broadcasting sequence to identify even minute flaws in signal transmission.

*Waveform monitors* are special oscilloscopes tailored to television. They display waveforms of the same electrical signals that create the television picture, thus allowing detailed analysis.

Similar in name but different in function, *picture monitors* are essentially very high-quality TV sets that allow quality measurements to be made while the picture is viewed. Tektronix makes black-and-white and color monitors.

Our fourth product line is *vectorscopes*, crucial to color broadcasting. Also very specialized oscilloscopes, they display circular graphs that describe the various components of the transmitted color video signal.

You'd have to look very hard in any television station to find a vectorscope that Tektronix didn't build.



### Information Display

That a picture can be worth 10,000 words is the idea behind graphic computer terminals.

We're the world's leading producer of *graphic terminals*—thanks largely to our proprietary storage CRT, which can hold the display on its screen after it has been put there only once.

Computers have a fantastic ability to accept, process and issue information. Sometimes the most useful way to present it is in numbers or words. But often it is in charts, diagrams, maps or other pictorial ways.

All terminals, of any kind, let users near or far from the computer "converse" directly with it, putting in or taking out information, asking questions and getting answers.

Most terminals insert coded information from a keyboard and get alphanumeric data from the computer, in either "hard" or "soft" copies—that is, printed on paper or shown on a CRT.

Ours do this also. But graphic terminals add the ability to display pictorial material. Thus, because of the user's well-developed sense of pattern recognition, the information becomes more meaningful than just words and numbers.

Our large, inexpensive, rugged storage CRTs hold the computerized information in place while it's being looked at. The user's input to the computer is made on a keyboard, or with various devices that act like pencils on the CRT screen. He can then move, erase or change the picture, or enlarge a portion of it.

Related Tektronix products include *hard-copy units*, which quickly make paper duplicates of the CRT screen contents; and *display monitors*, which picture computer output in a variety of ways but do not offer two-way communication.

### General-Purpose Test Instruments

Some electronic test instruments give digital—usually numeric—measurements (rather than



pictorial displays, as on an oscilloscope). Other instruments do not themselves measure, but rather provide electrical stimuli that enable measurements to be made.

Tektronix produces both kinds. Although we've never before singled them out as a product "line," we've built a variety of high-quality test instruments over the years. Often they were developed to meet our own in-house needs for reliable, precise test equipment, then later became products for the industry at large.

This year, using a unique packaging concept, we've introduced a new series of these instruments, our most extensive such venture to date.

To the layman, electricity is electricity. But not to the engineer. You can't run sophisticated instruments off power-line voltages any more than you can run your car on crude oil. *Power supplies* convert alternating "wall" current into specific voltages for laboratory applications.

A circuit, device or system under test is submitted to a known electrical stimulus and its response observed and analyzed. *Signal generators* of one kind or another provide such stimuli.

These products—pulse, ramp and function generators, and sine-wave oscillators—all produce waveforms with specific shapes and characteristics, as inputs to whatever is being tested.

Once the circuit or device under test is stimulated, its response may be read on a variety of instruments. Some of these give the resulting measurements digitally.

Tektronix *digital-measurement equipment* includes counters, which measure frequency—number of electronic "events" or time between them; and meters, which count volts, ohms and amperes—measuring current and voltage.

In addition, as has been mentioned, several of our oscilloscopes provide readout of digital information together with the CRT waveform display.

### Other Specialized Products

Other Tektronix products fall outside the above categories and require special engineering, production and marketing efforts.

Of three that deserve mention, two are relatively new ventures. One is not; we've built *automated measurement systems* for some years, and now rank among the top suppliers.

These systems, large and complex assemblies of instruments (most of them Tektronix-made) automatically put transistors and integrated circuits through rapid and intensive tests.

Our newer product efforts include *programmable calculators* and related products.

Programmability lets the user give the calculator not only a problem but also complete instructions for solving it (much like a computer), then get the solution at the touch of one key.

Our calculators may be addressed directly in the language of mathematics, rather than of computers, and are thus simple to use.

In the giant machine-tooling industry, a large and increasing number of mechanized processes are electronically controlled. Punched tapes, usually computer-generated, are translated, by *machine-control units*, into directions for making the required part, governing tool movement; speed; feed rates, and tool changes.

Tektronix produces six MC models—three contouring systems, two point-to-point systems and one lathe control—and a program verifier.

Available with some MC models, and integral with the verifier, is a Tek-made storage display unit, on whose screen the tool path is drawn while the part is built—or *before* it's built, to check for errors.

In addition, Tektronix builds a variety of products that make oscilloscopes easier to operate or more useful—Scope-Mobile oscilloscope carts; probes, which directly contact the signal being measured; and cameras to record CRT displays.

**Other Tektronix products run a varied gamut of display and measurement functions.**





# THE YEAR THAT WAS

It wasn't a bad year, ending as it did on an upbeat.

But it was a year of extremes. It encompassed not only the first layoff of employees in our history but also the highest annual order total we've ever had.

It began as the previous year had ended, with our output exceeding customer demand. But, in January, orders began a steeper upturn, which is still continuing. All the approximately 350 people laid off have been offered re-employment; selective outside hiring has been resumed.

*Net sales* grew to \$164.3 million, close to our all-time high. Last year they were \$146 million. That's an increase of 12.5 per cent.

*The U.S. portion of sales*, reflecting the long-awaited surge in the economy, was up a substantial 19 per cent from last year's \$83.7 million, moving to \$99.7 million.

*Sales outside the U.S.* made a moderate increase, from \$62.3 million to \$64.5 million, or 3.5 per cent.

*Customer orders* hit a record \$170 million, a 19 per cent gain from last year's \$142.8 million.

*Earnings* increased to \$11.2 million, compared with last year's \$9.3 million. *Earnings per share* went up by 20 per cent, from \$1.15 to \$1.38 (including five cents extraordinary currency gain).

*Employee total*, which had dropped from 8,991 at the start of the year to a low of 8,087—reflecting the layoff, normal attrition and moving our Calculator Products operation from Sunnyvale, Cal. to Beaverton—has now reversed direction, and stands at 8,234 people.

The financial totals pretty well speak for themselves—except that the earnings figure may require some elaboration.

Unlike sales, earnings did not rebound to the two-year-ago mark. Inflation kept payroll near that level, even with 1600 fewer people; it also increased other costs and expenses.

We've enlarged our provision for U.S. income taxes on future increased dividends from foreign subsidiaries. That provision has boosted our income-tax rate from 40½ per cent to about 44½ per cent, significantly cutting into earnings.

Our earnings figure also includes the effects of the U.S. dollar devaluation from August through December 1971 and the continuing instability in currency conversion rates since. The U.S. dollar value of our foreign subsidiaries' monetary assets and earnings has considerably increased.

Of this increase, 10 cents reflected gains during that 1971 revaluation period, and was thus classed as "extraordinary" earnings. About half of it was subsequently reserved to offset anticipated losses as the financial instability continues. Thus our \$1.38 earnings figure includes approximately 5 cents extraordinary gain.

We have publicly stated, and here reiterate, that—our own gain notwithstanding—there is no pride to be taken in a weakened American dollar, caused by continuing inflation and diminished productivity.

The kinds of performance we are proud of will be discussed in the following pages.

**It was a year of extremes, but it ended well, with orders hitting a new high mark.**

# TEKTRONIX 1972 FINANCIAL HIGHLIGHTS

The accounting year is the 52 or 53 weeks ending the last Saturday in May.

1971		1972		Increase (Decrease)	
\$145,999,000	100%	\$164,267,000	100%	\$18,268,000	12½ %
136,670,000	93½ %	153,049,000	93%	16,379,000	12%
52,629,000	36%	59,208,000	36%	6,579,000	12½ %
69,650,000	47½ %	75,861,000	46%	6,211,000	9%
5,813,000	4%	6,299,000	4%	486,000	8½ %
8,578,000	6%	11,681,000	7%	3,103,000	36%
9,329,000	6½ %	11,218,000	7%	1,889,000	20%
		10,813,000			
		405,000			
\$1.15		\$1.38		23c	20%
		1.33			
		.05			
142,765,000	98%	169,951,000	103½ %	27,186,000	19%

1971	1972	Increase (Decrease)
\$ 99,084,000	\$116,914,000	\$17,830,000
29,481,000	33,205,000	3,724,000
69,603,000	83,709,000	14,106,000
48,062,000	46,071,000	(1,991,000)
1,857,000	1,215,000	(642,000)
122,213,000	133,862,000	11,649,000
14,122,000	20,076,000	5,954,000
22,237,000	18,103,000	(4,134,000)
8,991	8,234	(757)

## RECEIVED BY THE COMPANY

For the sale of products, accessories, repair and replacement parts.

## RELATED COSTS AND EXPENSES

### TO OUTSIDE SOURCES

To pay for raw materials, purchased parts, rent, utilities, insurance, advertising, interest and other business expenses.

### FOR EMPLOYEES

To pay the men and women who design, make, sell and service our products—including profit share, social security and other employee benefits.

### FOR USE OF FACILITIES OWNED

To provide for depreciation in value of buildings, machinery and furniture resulting from use, wear and age, mostly computed by sum-of-years-digits method.

### FOR TAXES

To pay U.S., foreign, state and local taxes.

## RESULTING IN EARNINGS

### ORDINARY

Reinvested in expansion of our business.

### EXTRAORDINARY

## EARNINGS PER COMMON SHARE

### ORDINARY

Dilution if all outstanding share options had been exercised would not have reduced primary earnings more than two cents.

### EXTRAORDINARY

## ORDERS RECEIVED

Customers' orders measured at catalog price.

## Current Assets

## Current Liabilities

## Working Capital

## Facilities—Net

## Long-Term Indebtedness

## Shareowners' Equity

## Unfilled Customers' Orders

Measured at catalog price.

## Finished Product Inventory

Available for sale measured at catalog price.

## Number of Employees at Year End



# SMALLER, LIGHTER, FASTER, BRIGHTER...

Out in the real world, where scope sales are made, it was a good year, but a rough one. The opposition just wouldn't let up. Some Tektronix field engineers were grumbling one day about the competition.

One FE, who used to work for a competing company, listened good-naturedly to their complaints.

"Try selling *against* Tek sometime," he said.

**T**ektronix gained competitively last year. To our very large product introduction a year ago, we've added greatly improved models plus significant new ones.

It's hard to isolate the impact of new products from the effect of the rising U.S. economy. Each can be expected to boost sales. But when you couple them, the result is not additive, but multiplicative. To use a current and already over-worked fad word, the effect was *synergistic*—a fancy way of saying the whole (sales growth) is greater than the sum of its parts (stronger market plus stronger products.)

That is, a company's fortunes are not merely passive reflectors of external economic ups and downs. Take Europe as an instance. There, all the indicators were bleak. Major-industry purchasing: Down. Governments' spending: Down. National economies: Down.

Tektronix sales: Up.

Across the broad product line, our years of intensive technical and organizational development were paying off. Portable oscilloscopes

had an excellent year, in a traditionally strong Tek market. New-generation laboratory main-frames and plug-ins, already doing very well, were bolstered by better and less costly models. Television-product sales increased (even more steeply than normal); our Information Display Products division caught fire, their strong sales growth reflecting several years of patiently nurturing the computer-graphics market.

Those are merely highlights. The following pages describe recent product introductions. Our competitors, who had to walk a rough road this year, hadn't seen anything yet.

## The Hand-Held Oscilloscope

"It has sex appeal" and other less racy but equally favorable reactions greeted the three-pound Tektronix 211 miniscope, introduced this year. It wasn't just idle talk, either: The success of the 211, exceeding all but the most optimistic predictions, says clearly that it has opened the door to a distinct new oscilloscope line—the hand-held portable.

It's a laboratory oscilloscope you can hold in one hand. It compares in bandwidth and sensitivity with, say, the old Tektronix 504, which weighed 30 pounds and sat on a bench.

The battery-operated miniscope offers 500KHz bandwidth at 1 mv sensitivity. It fits into a tool kit, coat pocket or glove compartment. One of our engineers files his in a file drawer. (Yes, under M.)

Portability has long been recognized as desirable. It used to be that a scope would be

**Sales increased across the product line—riding the upswing in the US economy and bucking the odds in Europe.**

called "portable" if you could lug it around without wheezing or staggering. Tektronix pioneered the true easy-to-carry scopes, and has consistently led in this very important segment of the market. From our "standard"-size portable (under 30 pounds) and our smaller SONY/Tektronix line (under 10 pounds), we've now made a big jump to a tiny instrument (just three pounds.) It's getting easier and easier for the user to take the scope to the measurement.

The 211 has a self-contained probe and simplified controls. It's double insulated, for safety; you can connect it to high voltages with no fear of your suddenly becoming part of the circuit.

Because it's hand-held and can be turned every which way, the controls could be placed anywhere; there's no need to use up front-panel space with knobs and buttons, as is true of scopes that operate in a stationary position. The 211's controls are on the side, freeing most of the 3x5-inch front panel for the CRT display.

The miniscope is finding a surprisingly wide range of applications, from the technically simple to the sophisticated. Its size lets you use it almost any place you can climb, walk to or squinch under—and not everything that must be measured occurs in a handy place. Also, its price (\$545) and simple operation make it appealing to people who'd never thought of using a scope before. Almost all the 211 business has been "add-on," with almost no displacement of other Tek scope sales.

Thus the entire scope market has been expanded, and a new group of scope users is being created. Some of them undoubtedly will go on to more advanced scopes. And from the start, they're thinking Tektronix.

#### **Portables: 465, 475, 485**

Even if it weren't the lightest-weight high-performance portable in the world, which it is,

the 485 (bandwidth 350MHz, sensitivity 5 mv/division) would still be an exceptional laboratory oscilloscope. Weighing in at only 20 pounds, it lets the user take the lab with him.

The only thing keeping it from being the fastest (widest-band) scope anywhere is that Tektronix builds a faster one.

But the dual-trace 485 *is* the fastest portable. Introduced in March, it's done excellently.

The 485 is two inches shorter and a full one-third lighter than portables with much less performance. Its CRT is among our brightest: It can display a waveform moving across the screen at more than 30,000 miles per second

Backlighted skirt knobs automatically account for attenuation when a probe is used. The 485 also offers external trigger viewing, which allows the user, at the push of a button, to look at the signal he's triggering on; and alternate sweep switching, which lets him view, on the same screen, two waveforms plus a magnified segment of each—four waveforms in all.

**P**ortables have provided a bright spot in the year's market, thanks partly to better-than-expected growth of the computer industry and partly to our continued product introduction.

Although competitors have been busy in this important market segment also, we've counterpunched effectively. Now, following the 485 and in its same general configuration, we have just introduced the 100MHz 465 and the 200 MHz 475. They offer performance superior to that of our widely used 453A and 454A.

Compared with the scope it supersedes, each of these new instruments has a 25 per cent larger CRT, substantially increased bandwidth and twice the sweep speed; is shorter, thinner and lighter. Each adds external trigger view, knob-skirt readout and, as an option, an ex-

**When you can hold an oscilloscope in one hand and use it, you can take it to wherever the measurement needs to be made.**

**In the competitive portable market, Tektronix has delivered a one-two-three wallop.**



ternal pack enabling battery operation.

And, as if that weren't enough for competitors to fret over, these scopes *cost substantially less* than the 453A and 454A—which right now are still the industry's most popular portables.

So it is that Tek has about blanketed the portable scope market with excellent values. Also doing well are our 434, world's first storage portable, and the SONY/Tektronix dual-trace 326.

### Laboratory Oscilloscopes

Nowadays, it doesn't take much of a product change to trigger a flashy new product name. Add a different-shape grille and racing stripes, and last year's Chariot 8 becomes this year's Super-Wildcat.

In this age of the easy superlative, oscilloscope nomenclature comes across as strangely subdued. Often, major and even dramatic product advances are cloaked under the bland title, "an A model."

Take the 7704A oscilloscope system, just introduced. It replaces the 7704, already one of our most popular new-generation scopes, which has had a very good sales year.

That "A" represents a lot. In addition to the 7704's proven features (including four-plug-in capability and CRT readout), the A model offers greater bandwidth (250MHz compared with 150MHz); lighter weight (30 pounds, compared with 42—putting the "A" down with many portables); easier operation; faster CRT, with smaller spot size; modular construction . . .

And lower price.

We believe you'd have trouble finding a better oscilloscope value. Consider the A model a Super-7704.

The display unit (containing the CRT) may be easily disconnected from the acquisition unit (containing the plug-ins) by the turn of a few

screws. This modular construction not only enables easy maintenance but also provides room between the modules for future scope-system expansion.

**S**haring a strong order rate with the 7704 has been the 500MHz 7904, which moved into delivery position this year. This unequalled instrument, the highest-frequency real-time oscilloscope, has had a secondary impact also, in providing leverage for other Tek scope sales.

First off, rightly or wrongly, bandwidth leadership in the scope business has come to be equated with *company* leadership. The high-frequency race is a leapfrog contest, of course, but Tek has almost always led—not uncommonly by leapfrogging its own instruments.

Whatever advantage prestige may offer, our field engineers agree that *not* having it can make things a bit tougher.

In particular, the 7904 has directly enhanced the sales of other new-generation instruments, largely because of broad plug-in versatility. We offer 24 interchangeable plug-in units that will work in all new-generation mainframes. Thus, the buyer of a 7904 mainframe knows that, should he someday need a scope with less bandwidth, he can get it at relatively little cost, just by buying the necessary plug-ins.

A three-plug-in version with comparable performance, the R7903, will be shown in August. At 5<sup>1</sup>/<sub>4</sub> inches high, it fits into a standard rack.

The lowest-priced new-gen mainframe offering scale-factor readout is the new 7603, a 100 MHz scope with more capability than the 60MHz 7403, for less money.

### New Frontiers in Storage

The July issue of a leading electronics magazine had some nice things to say about three new Tektronix oscilloscopes:

**Modestly named, a new "A model" has moved far ahead in performance, downward in cost.**









**A top electronics magazine found Tek's new storage scopes far superior to competition—and said so in glowing terms.**

"Storage-scope writing speed soars to 200 cm/ $\mu$ sec," said the headline on the cover. Inside, the magazine went on: "The Tektronix 7623 streaks past any other storage scope . . . It beats (its nearest competitor) by a factor of two and whips any other storage scope by at least a factor of 40 . . ."

They go so far as to call the 7623 "the high-speed star of a new storage-scope family."

Colorful writing aside, their facts are correct.

Storage has been recognized as a valuable oscilloscope feature for years. Tektronix introduced its 564 in 1962, providing the first low-cost, reliable scope storage—the ability to hold a CRT display after the electrical event that causes it is over.

There are two basic kinds of storage: Bistable and halftone.

To date, our storage scopes (as well as our computer terminals) have used *bistable* storage tubes. In them, a "writing" gun traces a charged pattern on the phosphor screen; then a second gun floods the screen with weaker electrons, holding the written areas bright. A bistable screen has two states—bright and dark. There are no "gray" tones.

Bistable storage is simple and low-cost—and useful for most waveforms.

*Halftone*, or variable-persistence, storage is different. In it, the stored image begins to fade as soon as it's written and doesn't last very long—up to a few minutes, as the operator decides. Display brightness depends on the density of the CRT beam; hence the name "halftone."

Halftone tubes have been able to provide brighter displays and store faster signals than bistable tubes. Because their written displays fade slowly, they're useful for comparing successive images, such as the slow waveforms associated with heartbeats. Outside of scopes, radar is a common user of halftone storage.

Until this year, Tektronix didn't build a halftone storage scope, although competitors did. Frankly, they had us there. But, as the quotations above indicate, we've taken a giant step, and now offer excellent halftone storage, as well as bistable storage in both normal and ultra-fast modes.

Our new storage instruments offer three-plug-in capability, CRT scale-factor readout and other features associated with Tek's "new generation." Also available are 5 $\frac{1}{4}$ " rack versions.

- *The 7313* offers low-cost bistable storage, on a split screen—either half of which can be operated in either stored or conventional mode. This 25MHz scope compares in bandwidth with the older, heavier Tektronix 549, but costs less.

- *The 7613* (100 MHz) allows, through *transmission* storage of halftone images, variable viewing time, typically several minutes. In it, the phosphor screen and the storage target have been separated; thus each can be optimized—the target for sensitivity and the phosphor for brightness. The writing gun stores a trace on the halftone target; then flood-gun electrons pass through the charged areas—much like a stencil works—onto the phosphor. The result is a bright, high-contrast display, able to store changes in intensity.

- *The 100MHz 7623*, a very sophisticated scope, boasts a stored writing rate of 200cm/ $\mu$ sec in its "fast" mode. It also offers the user his choice of bistable or halftone storage.

In the fast mode, the writing gun stores a trace on a mesh target designed for maximum speed. That stored image lasts only momentarily, but it's immediately transferred onto another, longer-retention bistable mesh target—hence the term *transfer* storage. Then, as in the 7613, flood electrons pass through the charged areas onto the screen. The resulting bistable image may be viewed for hours, or even days.



When the fast mode is not employed, the high-speed target is rendered electrically transparent; the other mesh, depending on voltages applied to it, becomes either a bistable or halftone target, through which flood electrons pass to make the image on the phosphor.

Low-cost storage, ultra-fast storage, bright storage, bistable storage, variable viewing time—Tektronix has them all. That plus even portable storage, in our 434, introduced a year ago and mentioned earlier in this report.

### A Plug-In Instrument System

The market for non-display test and measurement products is a very big one. And we're no stranger to it. Over the years, we've designed and built generators and oscillators, often for in-house use first; plus digital counters and multimeters that plug into oscilloscopes.

It's true our approach to the market has been with single products, and not a systematic attack; it must also be said, however, that we've never put anything into this market that hasn't done well. So we expect a lot of the TM500 modular test and measurement system.

The compact TM500 is not an oscilloscope system (it has no CRT display), but it borrows from things we've learned building scopes. A chief adoption is the plug-in concept.

The TM500 series offers, to start with, an assortment of 14 plug-in instruments that fit into either a one-compartment (TM501) or three-compartment (TM503) mainframe. The mainframe contains the power module, a substantial part of any instrument's cost. Just as with plug-in oscilloscopes, the TM500 mainframe buyer finds that each addition to it costs him less than a self-contained instrument.

Two TM503s can be stacked in operation, or converted easily into a six-instrument-wide 5¼"-high rack installation (which wouldn't be

as wide as these two pages). Or a single TM503 can be rackmounted—or installed in a Scope-Mobile movable test station (which can also carry four other TM500 plug-ins plus an oscilloscope or other instrument). Should CRT display be desired, this system can be rack-mounted with a Tektronix 603 or 604 monitor.

Plug-ins so far include five signal sources (generators and oscillators), five power supplies, three counters and one multimeter. Most offer better performance and/or lower price than anything else on the market.

A typical engineer's bench is a maze of wires interconnecting essential test equipment. A rat's nest, is the technical term for it.

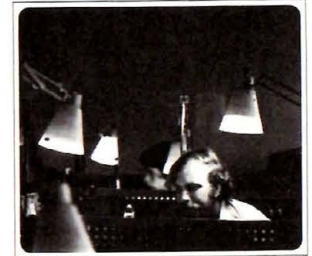
The small, neat TM500 system saves him bench space—and time, since its interface connections are largely within the power module.

The TM500 series offers users something new: A versatile, low-cost, compact, reliable, easy-to-maintain, modular test-instrument system. It offers something unique to Tek, too: A chance to gain a possibly substantial share of an enormous market—and at little risk. That is, we already *know* how to engineer, build and sell these products. And people who buy scopes are exactly the people who would be most interested in TM500s.

### Words and Pictures by Tektronix

Being a pioneer means frustrations as well as rewards. During its first years, Tektronix' pioneering of graphic computer terminals—a period of learning by doing—was pretty frustrating. But things are looking up. Last year, in particular, was highly rewarding. Orders for our Information Display Products division nearly doubled from the year before. (You may be thinking it's about time. Graphics have been the "coming thing" since 1961.)

Our job has been twofold: One, to establish



**A new modular-instrument system offers low cost, compactness, versatility. It uses plug-ins, an old idea at Tektronix.**



**The storage CRT, once thought to have limited use, is making us wonder now just where those limits might be. It's given us a strong lead in graphics.**

Tektronix as a major name in graphic terminals; two, and most important, to convince computer users that graphics is a tool worth considering.

We've succeeded in the first of these efforts. Tektronix is now the largest supplier of graphic CRT terminals. Lest that sound overly impressive, let it be said that the market is not yet gigantic. But it's no longer small, either, showing that our second effort is also succeeding: Developing graphics awareness *in* the market.

Pictures give you information in a way that words can't. A verbal description of the Mona Lisa can never convey the impression that viewing the painting gives. Maps, trend lines, topographical diagrams and thousands of other pictorial presentations also tell things and give subtleties of data that words cannot.

It's not an "either-or" proposition. Most terminals will always stress alphanumeric (word and number) information. Our terminals have exceptional alphanumeric capability, plus the ability to turn data into pictures.

Most terminals do graphics only at considerable cost, or awkwardly, or not at all. Ours does it easily and cheaply. The key is Tektronix' simple, rugged storage CRT. It has given us a lead in graphics that, surprisingly, is lengthening each year, as apparent technical limits on its use are being overcome.

The storage-tube phosphor screen retains information from the computer after receiving it only once, and displays it as long as you'd like. Other terminals must either keep "rewriting" the image while it's being viewed (that's how a TV tube works) or else contain a built-in memory unit; both cost money. The most common terminal is the teletypewriter. It's low-priced, but loud and slow and can do only primitive graphics, "drawing" with keyboard symbols.

The first graphic terminals were expensive—as high as \$250,000—not a price range for some-

one who just wanted one to experiment with. Then, Tektronix brought out its first storage CRT; this inexpensive tube quickly became the display unit in other companies' terminals, which were priced down in the \$16,000-\$20,000 range. Next Tek built *its* first terminal, and the price of graphics dropped again, to about \$8000. A year ago, with the introduction of the 4010, the price was cut once more, to under \$4000. (We hasten to add here that customers, viewing this price-halving history, shouldn't hold their breaths waiting for a \$2000 terminal.)

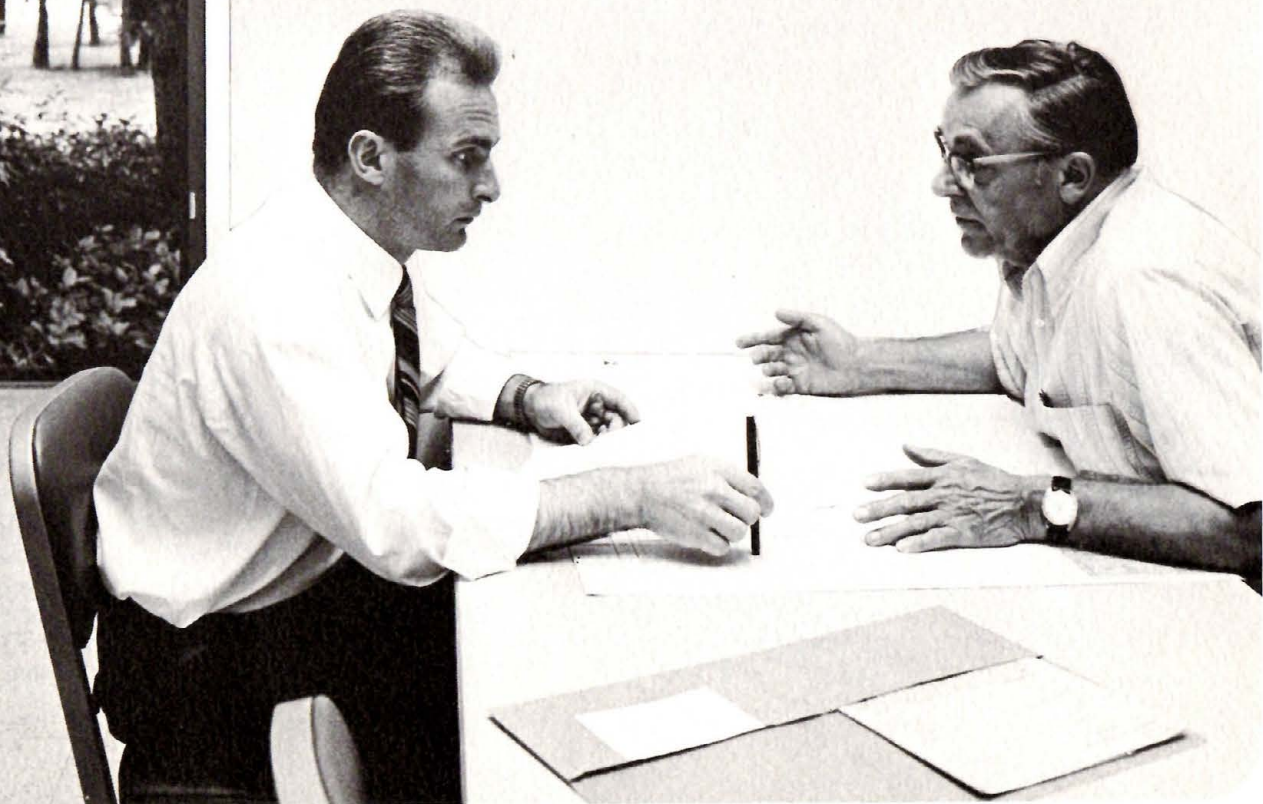
Graphic terminals have now been brought down into the alphanumeric-terminal price range, where business and scientific users can afford to buy and try them. Because the 4010 has alphanumeric capability beyond that of similarly priced competition, the user gets graphics almost as an "extra."

We're finding that graphics in terminals is much like air-conditioning in cars. Once a user has it, he'll probably never go without again.

Early graphics users were mostly experimenters and innovators, and familiar with computer operation; they were able to work out their own programs and routines. So that less-expert users could also have the advantages of graphics, we've developed extensive "software" packages. These easy-to-use programs allow computer-stored data to be converted into a variety of useful graphic formats by a person with no particular knowledge of computer programming. Almost any computer user now can use a Tektronix terminal.

And, as we learn the business environment (different in many ways from the technical market with which Tektronix is so familiar), we continue to make strides in marketing. We now have 15 U.S. applications engineers; and an overseas subsidiary, Tektronix Datatek N.V. in The Netherlands, is concerned solely with the







**Probably graphics and hard copies will be offered as standards by all terminals—some day.**

marketing of information-display products.

Among the glowing spots in a bright sales year were:

- The 4010 terminal. It offers sharp, fade-free, drift-free, flicker-free fine-line CRT images of alphanumeric and graphics. There is a substantial order backlog for it.

- The 4600-series hard-copy units. They produce dry 8½x11 permanent paper copies of CRT screen contents—refreshed or storage tube.

(These features—graphics and hard-copy—are becoming so well accepted by customers that competitors—within their ability to do so—are following suit. Most companies, for example, who use our storage tube in the terminals they build, also supply their customers with Tektronix hard copiers. It may be that before the decade is over, *all* terminals will offer graphics and hard copies as standard features.)

- The 613 display unit. This storage unit is a brighter version of the very widely used Tek 611. It can be viewed in a lighted room. And it costs only two-thirds as much as the 611.

Competition is pressing, and our development efforts can't stand still. This year we previewed our new 4013 terminal at the Conference on Undergraduate Education at Georgia Tech, where it got a warm reception. It's like a 4010, but with added language capability. For one, it can use APL, a very powerful language, especially useful in mathematics and science. (And scientists are very much at home with graphic presentations.) It happens that APL is ideally suited to a storage-tube display and not very adaptable to competing refreshed tubes.

Another new product is the 4620 hard-copier. Using 3-M dry-silver paper, it will give an 8½x11 inch copy of most refreshed (TV-type) CRT alphanumeric displays. There is no close competition for this product. Although the 4620 doesn't work with our storage-tube terminals

(for that you'd need a Tektronix 4601), it has great sales potential; most video alphanumeric hard copies are now made on a noisy, slow teletypewriter. The 4620 gives a copy in seconds, quietly—and selectively. With competing copiers, the user must decide, *before* he views the CRT image, whether he may want a copy. This results in waste paper if he guesses wrong.

Graphics uses now range from inventory control to community planning, from oil-well drilling to order forecasting. (One company recently reported having saved \$1.5 million by using a Tek terminal.)

The future, viewed from here, looks excellent.

### **Tek Brings You the Olympics**

People throughout the world will share the excitement of the summer Olympics in Munich through the still-marvelous eyes of color television. The pictures they see will have gone through hundreds of Tektronix instruments.

Tek TV products have been at the Olympics as long as television has. We had our largest number ever—400, made by SONY/Tektronix—at the winter Olympics in Sapporo, Japan. We'll exceed that number at the summer games, as color picture monitors join our products.

All this serves to underline something that's been said over and over in these annual reports: Tektronix is the leading name in television-measurement equipment; our products are the industry standards in most parts of the world.

**T**he U.S. economy—and other national economies, too—can be bumpy and erratic. But that has never bothered our TV product sales.

Last year's sales growth was about 50 per cent—and that on top of a record year just before. Nineteen new products became available during the year; that was a good part of it.





- *Picture monitors* display the actual TV picture so it can be critically assessed. Our 650 family provides the first measurement-quality color monitors available to the broadcaster—both here and abroad. It has gained widespread industry acceptance. After only one year of producing it, we fully expect it to be emulated.

The 650 uses the SONY Trinitron CRT, manufactured for Tek with phosphors that meet the most stringent specifications, including those of the European Broadcast Union. The Trinitron is uniquely suited for multiple-standards operations, such as international programs demand.

We've also broadened our line of high-quality black-and-white picture monitors, designed and manufactured by Tektronix Holland.

- *Signal generators*, which enable broadcasters to perform transmission testing, include the NTSC 147 and 149 for TV in the Western Hemisphere and Japan; and the 148, for systems in Europe, Australia and parts of Africa. These instruments allow insertion of test signals while the program is being broadcast, enabling continuous quality control.

The 149, a spinoff from the 147, meets FCC requirements for remote operation of TV transmitters, which entails insertion of specific test signals at specific times. The 149 may also be programmed to generate NTSC satellite test signals that accompany the picture signal on international transmissions (like the Olympics).

All UHF stations operating with unattended transmitters must install suitable equipment by October 1. It's expected that most TV stations will eventually go to remote operation; economics usually demand it. Anyway, some broadcasters who *aren't* going remote yet are already using these test signals from our instruments.

The 147, 148 and 149 have a unique feature: Being essentially digital, they can be reprogrammed—much like a computer—should new

or additional test signals ever be required.

The 147 and 148 contain a unique capability to accurately measure "noise"—which shows up as "snow" in your TV picture. This capability is so important that we've now developed the type 1430, a specialized noise-measuring set. It will be used to measure TV camera tubes, videotape and VT recordings, cable TV systems and satellite program relays. In many of these applications, the full capabilities of the 147 and 148 aren't needed; thus the lower-priced 1430.

- *New vectorscope*, displaying all the components of transmitted color signals, is the 520A. It offers an improved ability to work with new vertical-interval-reference signals developed by the broadcast television industry. We designed the 520A in anticipation of these signals becoming a component of the broadcast signal itself. You may have noticed that you no longer have to twiddle knobs every time you change channels. Tektronix vectorscopes deserve most of the credit.

*Value* is the reason our products become industry standards; and a great part of that value is forward-looking design, building in flexibility to meet future needs.

We intend to remain on top of the burgeoning color TV industry, which has moved in little more than a decade into CATV (cable) and closed-circuit TV, and industrial and educational uses. Also, satellite transmissions are becoming increasingly economically justifiable for national as well as international TV broadcasting.

Looking beyond the usual observation of waveforms for TV signal measurement, we've successfully demonstrated a telemetry system (we call it ANSWER) that will automate test-signal measurement. Thus a network supervisor could ascertain the quality of signals anywhere along the network by just dialing a phone.

That's tomorrow, of course. But tomorrow is

**Moving ahead of traditional TV waveform observation, we look to a day of automated test-signal measurement.**





Many kinds of other products contributed to the order total . . .

a big part in today's television-instrument planning.

As one television-products engineer succinctly put it: You don't just pop into the broadcast-engineering industry.

Other products, most of them new ones, played a part in boosting orders to new highs:

- Our Telequipment products (mostly lower priced and lower performance than Tektronix') did well, especially the dual-trace 25MHz D-67. The Tektronix 7L12 spectrum-analyzer plug-in increased our share of that see-saw market; we remain among the top suppliers there. And, as the sales of new-gen mainframes grew, so did those of the 7D13 and 7D14 digital-multimeter and digital-counter plug-ins.

- And, Tektronix systems sales were up about 20 per cent, spurred by introduction of the 3003 digitizer, designed for large computer-operated systems. It converts analog waveforms into numbers for computer processing.

(An exceptional new product, which didn't contribute to last year's sales, is the S-3260, the most versatile and powerful automated integrated-circuitry test system in existence. It has more input and output pins (128) than any other system, and thus can test more-complex IC devices. It has a self-contained computer. It can log, or store, data at very high speeds on a Tektronix 4010 terminal, and, as an option, also uses a Tek hard-copy unit. It can perform up to 250 tests per second of DC, logic, timing—all the things you always wanted to know about ICs, but couldn't ask fast enough.)

- Not to mention a strong demand for our old 540-series oscilloscopes. Although they were "obsoleted" several years ago by more advanced models, buyers still recognize them as an excellent price/performance value.

On the other hand—and just so we don't duck the subject—there were some few products that appeared less and less lustrous as the year moved along. They're fine products, too—but, things happen:

*Programmable calculators* looked like a good bet. We'd just acquired a small California manufacturer with an exceptional product. Then the sky fell in: High manufacturing costs; long management-communication lines; advanced technical difficulties; the arrival on the scene of some rattling good competition; a less-than-impressive awareness of calculator markets and marketing, and—let's see, what else? Anyhow, we decided, while we worked out those difficulties, to take time to carefully reassess both our product strengths and our market strategy.

As to the first of these, we can report simply that the calculator effort is alive and well. As to the second—marketing—there are decisions yet to be made that can't, unfortunately, be timed to coincide with this report.

*Machine-control units* have borne out our predictions: They're well engineered, very competitively priced, compact and reliable, and popular with potential buyers. They have unique and desirable capabilities—notably that of the storage CRT, which can "draw" a part on its screen before or while it's being built. What's more, we've strengthened our line this year.

The problem is the market. Machine tooling is a mountainous industry, but one that has been going through some molehillish years. Among other things, we recall, it was supposed to be a bellwether, that would lead the way out of the U.S. recession.

We spoke of that industry in last year's report as a "sleeping giant." We *do* hear increasing noises from that sector now (and orders are picking up); but the loudest one still sounds suspiciously like a snore.

. . . But, as in any year, not every venture was a winner.

# BEYOND GLITCHES AND SNIVETS

“Glitches,” “snivets,” “grass” and “crud,” not textbook terms, are nevertheless part of an electronics engineer’s vocabulary. They describe various unwanted aberrations in a waveform.

They also occur elsewhere. When Robert Burns noted that man’s best-laid plans often go astray, he was saying that life is full of glitches.

It’s certainly true that they show up in product manufacturing. In the past couple of years, Tektronix has had its share of crud, snivets, etc.

The 110 new Tektronix products introduced a year or so ago were, at least in part, a response to an idling U.S. economy and a tight electronics market—an effort to pull ourselves up by our technological bootstraps. The resulting output of new products buffered the effects on us of the recession, greatly improved our competitive standing—and, in the process, threatened to strangle our manufacturing organization.

Being handed 110 new products to build is a mixed blessing. It’s like a child receiving, for his birthday, that real live elephant he’d been asking for. The problems balance the benefits.

Compounding the situation, Manufacturing was then still busy digesting the *first* round of complex “new-generation” instruments.

The new technology was very advanced. Some state-of-the-art Tek-made components occasionally acted up. The breadth of our product line multiplied normal problems with parts scheduling and shortages. New components required space and new production facilities.

The net result was a manufacturing cost higher than we could accept. It bit into earnings.

Hogan’s (or someone’s) Law states: Once you’ve done something, you can see ways to do it better.

With that in mind, we’ve focused a lot of attention on production costs. The handiest solution—automate—is of considerable help, but not the whole answer in a company with such a very broad and complex product line and so many short runs.

But we’ve attacked the problem from all sides, and are making continued headway.

The key to this concerted effort is close teamwork. We’ve never been much for protocol or going through channels, anyway. The task-force approach, freely crossing organizational lines, is increasingly typical—with engineer, builder and marketing man cooperating from the start on product ideas. That way the Manufacturing person can *tell* the engineer that the whiz-bang scope on his drawing board will be a sonovagun to build.

Many manufacturing costs are simply being designed out. Some troublesome components have been replaced. Others that caused problems in their early runs have, with time, become very reliable—and their cost is down. We’re making more use of standard parts, avoiding redesign to gain minor performance changes. There are fewer discrete components, more integrated circuitry. Process control is improving; product testing is more thorough than ever, resulting in a list of “do’s” and “don’ts” for future designs. Modularity includes plug-ins, display modules and easy bench-to-rackmount convert-

**A tremendous outpouring of new products from Engineering was both good news and bad news to Manufacturing—who had to build them all.**







ibility. (Rack versions used to be mechanically different instruments from bench models.)

It's worthy of note that customer demand on Tektronix is now at the same record level as it was two years ago. And we're absorbing it with about 1,600 fewer people—an unmistakable sign that something has gone right.

Some other problems are hard to get at.

No one wants to be the bad guy. But multinational companies (like Tektronix) are being cast in that role more and more frequently by sincere people trying to make things "better" for the United States.

When U.S. companies manufacture outside this country, these critics hold, they create jobs overseas at the expense of jobs that otherwise would exist here. With unemployment continuing relatively high—and with balance-of-trade and balance-of-payments problems growing—more and more moves are afoot to make it less profitable (or even *unprofitable*) to operate multinationally. It seems easier to find a scapegoat than to improve U.S. productivity and thus make us better global competitors.

If all U.S. overseas sales were made as exports from this country, that would please the reformers. But it doesn't work that simply.

The idea that multinational companies are "exporting jobs" has been repeatedly discredited. Independent studies show that the effect of having strong overseas bases, in the long run, *provides* U.S. jobs that otherwise wouldn't exist. But these studies don't faze the critics. These people—businessmen, labor leaders and members of Congress—include some former advocates of free trade who now seek not only protectionist legislation (which almost certainly

would bring retaliation) but also what amounts to punitive taxation of the multinationals.

The Burke-Hartke bill now in Congress, for instance, provides for current U.S. taxation of foreign earnings and removes any credit for foreign taxes paid—in effect, double taxation. It's not expected to pass, but some of the ideas it embodies will, we fear, be around a long while. A few have already been included in the Tax Reform bill now being proposed.

Another thing that's been no help at all is the Office of Foreign Direct Investment, set up in the first place to combat the U.S. balance-of-payments deficit.

The OFDI counts, as overseas investments, the earnings of subsidiaries. Besides requiring time-consuming and costly reporting, it places stringent limits on capital earned outside the U.S., thus reducing international competitiveness.

To meet OFDI requirements, Tektronix has been forced to borrow overseas at high interest rates, a move otherwise unnecessary. As the saying goes, that's a helluva way to run a railroad.

Our experience echoes that of other companies: Manufacturing within major overseas trading areas has let us provide customers there with our instruments at competitive prices, by avoiding restrictive trade barriers.

It has done another thing. Oscilloscopes are widely needed products, and many countries have companies capable of building them. Protected by trade barriers against vigorous competition in their own markets or trade areas, they could grow strong enough to invade other Tektronix world markets—not excluding the U.S.

Thanks to overseas operation, we've been able to increase our exports far more than we otherwise could have—including a continued increase into every country in which we've set

**Sincere people trying to improve things for this country have sized up multinational corporations as some sort of villains.**



**The need for specialized marketing to meet new kinds of customers means a planned increase in expenses.**

up manufacturing. Today, more than one out of every four Tektronix U.S. jobs is accounted for by export business.

Our position has always been firmly in support of free trade. Arbitrary restrictions on multinational operation must eventually diminish, rather than enhance, U.S. competitiveness. We intend to use all channels of influence open to us to firmly advocate that position.

**A**mong the things that hold earnings down a bit, one more deserves brief mention: A continued increase in Marketing expenses.

The growth results partly from expansion of existing markets, but even more from entry into new ones that require specialized training. For some years, using oscilloscope-oriented field engineers to represent our entire product line worked out all right; but, as that line has broadened, the need to specialize has grown.

Different customers speak different "languages." A businessman interested in a computer terminal may be less impressed by technical specs than an engineer looking to buy an oscilloscope; the executive who must decide whether to invest in a \$50,000 automated test system talks in different terms from the technician who's empowered to buy a \$545 miniscopes. Television engineers prefer TV-knowledgeable salesmen; machine-tool people, machine-tool experts, and so on. Like the man who wouldn't let the finance company take his car back because they didn't send his "regular repossessor," it's just natural to want to talk with someone familiar with you.

Tektronix now has nine specialists in automated systems; 15 in information display (and an overseas subsidiary dedicated to that market); 10 in machine control, and 13 in television. Each is devoting full time and attention to the special-

ized requirements of these growing markets, supplementing an enthusiastic and competent scope field-engineering force.

**S**pecific events during the year that are of particular note to shareholders include these:

- Earl Wantland, 41, was elected to the presidency at the September meeting of the board of directors. He succeeded Howard Vollum, president since the company's inception. Howard had been named chairman of the board a month earlier, filling a vacancy caused by the death the preceding spring of M. J. (Jack) Murdock.

At the August meeting, Paul L. Boley was named to the board in Jack's place. Mr. Boley is partner in a Portland law firm, director of several companies and trustee of a number of foundations and of Lewis and Clark College.

Earl joined Tektronix in 1954. In 1959 he set up the manufacturing operations of Tektronix Guernsey, Ltd. In 1962 he was manager and directed the establishment of Tektronix Holland, N.V. He became International Manufacturing manager in 1964 and executive vice-president in 1969. That year he was elected a director and assigned responsibility for all company operations.

- At the September meeting, the board selected four group vice-presidents, new positions: Those named, and their responsibilities:

Donald Alvey, 46, Marketing; Leslie F. Stevens, 45, Finance and Administration; William Walker, 41, Engineering, and William Polits, 44, Manufacturing.

Howard remains Tektronix' chief executive officer, and chairs a committee comprising the four group vice-presidents, Earl and James B. Castles, secretary, which is responsible for corporate strategies and policies. The new grouping will be particularly helpful in assessing potential





markets and possible new-product avenues.

- In March, a new vice-presidency was created with the appointment by the board of Francis Doyle, 44, European Operations manager since 1970. He remains in that responsibility, at our European Operations Center.

The appointment recognizes the large and growing role of our overseas activities. Also, relationships with foreign governments and multinational companies will be aided by the participation of a corporate officer.

- There ought to be a “Ho-hum” section in these annual reports, in which to announce “progress” in our 11-year-old suit against the U.S. government in the Court of Claims.

The favorable judgment, reported to you last year, ruled that eight contested Tektronix patents were valid and had been infringed by three other companies through government encouragement, and that we were entitled to “reasonable and entire” compensation for business lost.

The wheels of justice seem to grind even more slowly than usual when the government is a party to the dispute. But, with the court’s decision, leverage is on our side. What’s going on now is a determination of the amount.

We haven’t the slightest idea how long it will take. But we’ll keep up the pressure.

- In January, Tektronix Export Corporation was formed, a Domestic International Sales Corporation (DISC) that lets us take advantage of new government incentives to exporting industries. We’re allowed to defer tax on half the earnings of export business conducted through the DISC. It will have a positive profit effect.

### The Ledger: A Long “Plus” Side

Production costs, retreating stubbornly; arbitrary impedances to international operation; rising taxes, and some planned overhead increases all mean there’s no room for smugness.

But there is optimism, pride—and not a little muscle-flexing. It feels good after a year or so of adversity.

Briefly, here’s what we have going for us:

*A lean and hungry work force*, our most experienced ever. With laid-off employees back on the job, and little other hiring, our time and effort are being productively spent, undiluted by needs to train and be trained. Our greatest continuing asset, people strength, is now receiving the kind of challenge it has been spoiling for—partly because of the

*Brighter economic picture*. Most forecasts for the U.S. economy are bullish. Order and sales trends have continued up as the new year has begun. Internationally also, we look for growth—all of this due in large part to

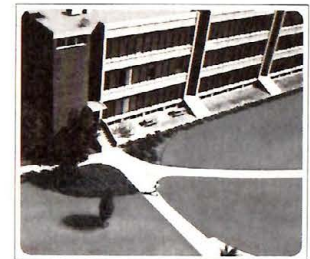
*An exceptional product line*: Innovative, high-performance, high-value, easier-to-build, more compact, better instruments. That about says it—and these characteristics are product-line-wide. We’ve never been in better shape. A lot of credit must go to our highly developed

*Component strength*. Highly vertically integrated, Tektronix can produce special product ingredients we couldn’t buy elsewhere, or get at reasonable prices. It also lets us respond quickly to specific product-design needs. In crucial areas, we’re clearly at the edge of the state of the art: CRTs, high-speed integrated circuits, storage technology . . . Components also are improved and simplified, leading to

*Greater product buildability*. Many manufacturing costs are being engineered out, and production hiccups are fewer, thanks greatly to

*Teamwork*. An old concept, and a trite phrase. But our informal task-force approach is unimpeded by arbitrary authority relationships. Its concern is getting the job done. Throughout the company, there’s unprecedented cooperative effort, but also you’ll find continuing strong

**Bullish economic forecasts, a lean work force, a better-than-ever product line—that plus close teamwork makes the year ahead look pretty good to us.**





**In a profit-sharing company like ours, we've learned to question everything, and thus to separate the nice things from the necessities.**

*Internal competitiveness.* As one Tek standard is increased, it raises *all* our sights. One manager likened it to a canopy, which lifts higher over everyone as the center pole is lengthened. With this competitive spirit goes another asset,

*Self-criticism.* As a profit-sharing company, we've learned to question *everything*. During the days of recession, we boiled out a lot of niceties from among the operating essentials, and are responding to increased order demand without a corresponding buildup of people. In such a company, management is widely shared by *each* individual; but there is also need for

*Sharpened top-management focus* on operating responsibilities, dollars and priorities, through our seven-man corporate committee. This group, men with long Tektronix experience and mutual respect, makes key decisions on

*Backlog of new-product ideas*, now in the works or contemplated; and possible inroads into intriguing

*New markets.* We expect substantial growth in all our major markets. Geographically, sales to Iron Curtain countries, for instance, may become significant as Russian-American accords are reached. (It's worth noting that the products we make available to this market—for instance, television equipment—in no way contribute to military capability.) This growth is an extension of a long-time Tektronix strength,

*Market diversification.* When one technology is faltering, or one geographic market down, chances are that others will be up and going. This has been historically true, guarding against sudden drops in our business. The European Economic Community will soon expand from six to 10 nations, letting us end our hitherto necessary duplication of product lines in Holland and on Guernsey, and more efficiently redirect our manufacturing at both locations. Also, we've just recently signed a license to build and

sell our wide line of TV products into France and Eastern Europe—a huge and populous “Third World”, which uses the French SECAM television system. Three field engineers now operate from Vienna into Communist markets, another sign of our increased

*Marketing strength.* We're growing more specialized, and more knowledgeable. Reorganization this year separated the responsibility for our sales, our service and our field business management. Tektronix salesmen have been freed to sell. Overseas, with establishment of Tektronix S.A., in Belgium, we continued broadening our direct contact with customers.

All the above leads to

*Optimism*, unmeasurable but important. Increased profits cause more adrenalin to flow, which converts to greater output, which in turn boosts profits . . . (To be candid, probably the same phenomenon was working in reverse during the darker days of the past year or so.)

Things today are “on the up.” What does that mean for us?

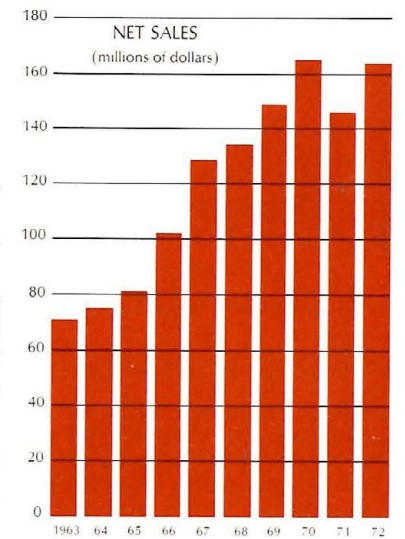
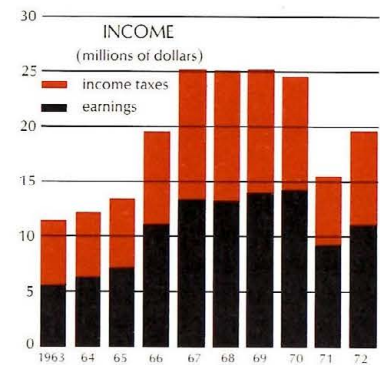
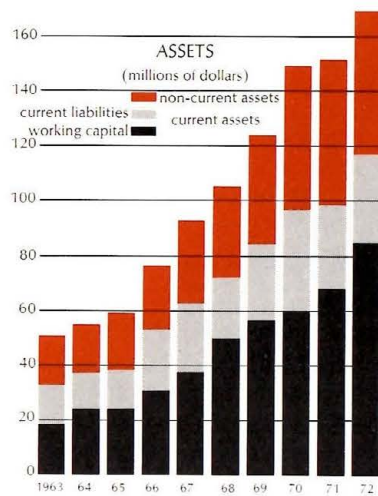
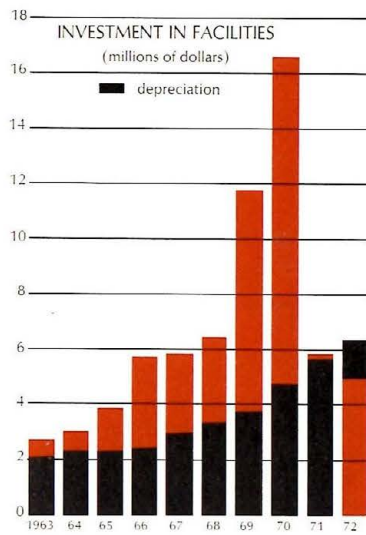
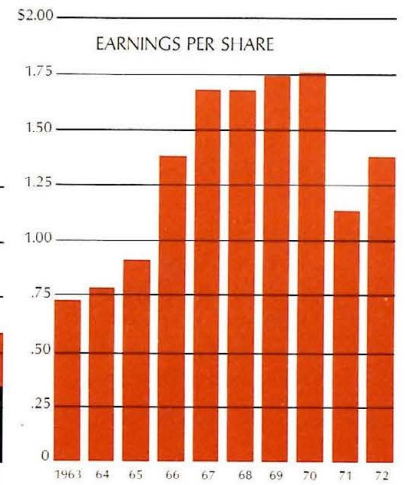
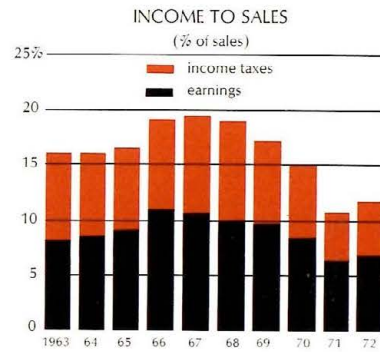
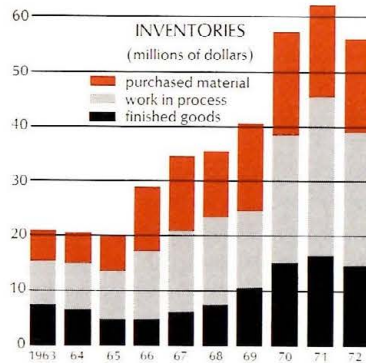
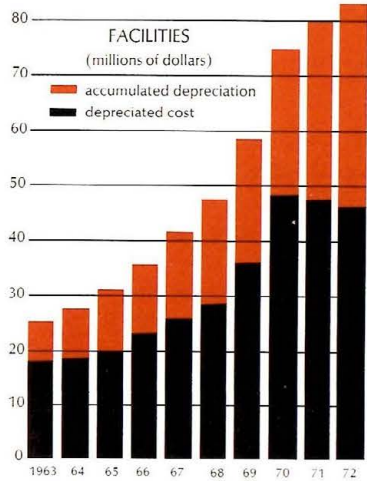
One executive has the answer: “A hell of a lot of hard work.”

### **To Continue . . .**

An annual report is like a single frame in a movie sequence, “freezing” things for a moment in time. The resulting image is accurate; but the moment is often not representative.

Nothing really “ended” as the year came to a close. Tektronix—*any* company—can be fully understood only as a continuum. This report has thus tried to relate the year's events to what had gone before and, as far as possible, to what's to come. (A continuity that's weakened by your having to wait a year for the next installment.)

Future interim messages to you will try to maintain that sense of continuum. So, the semi-colon with which this report ends is intentional;





## SHAREOWNERS' MEETING

The annual meeting of shareowners of Tektronix, Inc. will be held on Saturday, September 16, 1972, at 9 a.m. Pacific Daylight Time, in the Cafeteria Building, S.W. Karl Braun Drive, Tektronix Industrial Park, near Beaverton, Oregon.

### *Transfer Agents*

United States National Bank of Oregon  
Portland, Oregon  
Morgan Guaranty Trust Company  
New York, New York

### *Registrars*

First National Bank of Oregon  
Portland, Oregon  
First National City Bank  
New York, New York

### *Mailing Address*

TEKTRONIX, INC.  
P.O. Box 500  
Beaverton, Oregon 97005  
*Telephone*  
503/644-0161

## ACCOUNTANTS' OPINION

### TEKTRONIX, INC.:

We have examined the statements of consolidated financial position of Tektronix, Inc. and subsidiaries as of May 27, 1972, May 29, 1971, and May 30, 1970 and the related statements of consolidated income and reinvested earnings and of consolidated changes in financial position for the years 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.

In our opinion, the accompanying statements present fairly the financial position of the companies as of May 27, 1972, May 29, 1971, and May 30, 1970 and the results of their operations and the changes in their financial position for the years then ended, in conformity with generally accepted accounting principles applied on a consistent basis.



Portland, Oregon  
July 13, 1972

## EXPLANATION OF FINANCIAL STATEMENTS

Corporate performance and strength are usually measured by financial figures, although they only tell part of the story. It is hoped the explanation included as part of the financial statements will assist shareowners unfamiliar with financial analyses to a better understanding of Tektronix.

*Performance* is usually presented on the income statement, which shows how much of the revenue, mostly from sales, can be kept by the company after paying the costs of goods sold and the expenses of running the business.

*Strength* is pictured by the financial position statement, which shows the cost of the assets or resources used in the business and tells what part of them is owned by the shareowners and what part owed to creditors.

Another statement called changes in financial position shows the connec-

tion between the other two statements. Note that the first item on this statement is the earnings shown on the income statement. The last item is the working capital shown on the financial position statement.

To best adapt to conditions outside the United States, Tektronix operates in Japan through a non-consolidated 50% owned company, and elsewhere through wholly-owned subsidiary corporations. However, a meaningful financial picture of Tektronix is gained only by consolidated figures.

The figures on the financial statements are rounded to the nearest thousand dollars.

We hope these explanations will contribute to better understanding, and lead to further clarification.

# TEKTRONIX CONSOLIDATED CHANGES IN FINANCIAL POSITION

The accounting year is the 52 or 53 weeks ending the last Saturday in May.

(THOUSANDS)

This statement summarizes how working capital was provided and used.

1970	1971	1972
<b>\$19,101</b>	<b>\$15,103</b>	<b>\$17,067</b>
14,254	9,329	10,813
4,823	5,813	6,299
418	438	557
(394)	(477)	(602)
—	—	<b>920</b>
—	—	405
—	—	515
<b>1,107</b>	<b>2,838</b>	<b>1,997</b>
187	277	161
515	579	466
205	330	549
—	1,452	—
200	200	225
—	—	596
<b>17,992</b>	<b>8,195</b>	<b>5,878</b>
16,770	5,956	4,858
47	26	660
75	1,854	120
901	112	44
199	247	196
<b>2,216</b>	<b>9,746</b>	<b>14,106</b>
<b>14,117</b>	<b>654</b>	<b>17,830</b>
(4,241)	(204)	19,025
1,446	(2,186)	5,730
17,024	4,107	(6,940)
(112)	(1,063)	15
<b>11,901</b>	<b>(9,092)</b>	<b>3,724</b>
10,549	(3,601)	(1,181)
787	(968)	921
37	(2,663)	2,347
528	(1,860)	1,637
57,641	59,857	69,603
<b>59,857</b>	<b>69,603</b>	<b>83,709</b>

## WORKING CAPITAL PROVIDED FROM OPERATIONS exclusive of extraordinary items:

**INCOME BEFORE EXTRAORDINARY ITEM** as shown on INCOME STATEMENT.

**DEPRECIATION OF FACILITIES** The amounts deducted from net sales representing the decrease in value of buildings, machinery and furniture resulting from use, wear and age. These did not involve outlays of working capital, and most were computed by the sum-of-years-digits method.

**AMORTIZATION OF INTANGIBLE ASSETS** The amounts deducted from net sales representing the write-off of costs of intangible assets, which also did not involve outlays of working capital.

**EQUITY IN EARNINGS OF 50% OWNED SONY/Tektronix Corporation** including equity in net gain on translation of its monetary items. These amounts added to investment.

## WORKING CAPITAL PROVIDED FROM EXTRAORDINARY ITEMS:

**NET GAIN ON TRANSLATION OF FOREIGN CURRENCIES** during revaluation periods minus amount reserved to offset anticipated losses, net of employee profit share thereon offset by income taxes on that profit share.

**RESERVE FOR CURRENCY VALUATION** Amount reserved to offset anticipated losses in translation of foreign currencies, which did not involve an outlay of working capital.

## WORKING CAPITAL PROVIDED FROM:

**DISPOSITION OF TREASURY SHARES** Net proceeds from sale of Tektronix, Inc. treasury shares to employees as part of our employee share purchase plan.

**ISSUANCE OF COMMON SHARES** Net proceeds from sales of Tektronix, Inc. unissued shares to employees exercising stock options.

**RECOVERY OF COST ON SALES OF FACILITIES** That part of the proceeds from sales of machinery and equipment no longer needed by the company, equivalent to the depreciated cost.

**LONG-TERM INDEBTEDNESS INCURRED** The portion of the estimated purchase price of the businesses acquired to be paid in instalments as earned.

**REDUCTION OF LONG-TERM ADVANCES** Amounts becoming current assets due within one year.

**REDUCTION OF INTANGIBLE ASSETS** Reduction in estimate of purchase price of business acquired.

## WORKING CAPITAL USED FOR:

**ADDITIONS TO FACILITIES** Cost of land, buildings, machinery and furniture purchased or constructed.

**REDUCTION OF LONG-TERM INDEBTEDNESS** Amounts becoming current liabilities due within one year, and reduction in estimate of purchase price of business acquired.

**INTANGIBLE ASSETS** Amounts accrued in excess of values ascribed to the net tangible assets of the businesses acquired (goodwill).

**INVESTMENTS** Long-term receivables and advances to 50% owned SONY/Tektronix Corporation.

**PURCHASE OF TREASURY SHARES** Cost of Tektronix, Inc. common shares acquired by company.

## RESULTING INCREASE IN WORKING CAPITAL Made up of

**INCREASE (DECREASE) IN CURRENT ASSETS** Minus

**CASH AND CASH EARNING INTEREST**

**ACCOUNTS RECEIVABLE—NET**

**INVENTORIES**

**SUPPLIES, PREPAID EXPENSES AND DEPOSITS**

**INCREASE (DECREASE) IN CURRENT LIABILITIES**

**NOTES PAYABLE AND CURRENT PORTION OF LONG-TERM DEBT**

**ACCOUNTS PAYABLE AND OTHER CURRENT LIABILITIES**

**EMPLOYEE PROFIT SHARING**

**U.S., STATE AND FOREIGN INCOME TAXES**

**WORKING CAPITAL AT BEGINNING OF PERIOD** Plus increase in working capital equals

**WORKING CAPITAL AT END OF PERIOD** As shown on FINANCIAL POSITION STATEMENT.



# TEKTRONIX CONSOLIDATED INCOME AND REINVESTED EARNINGS

The accounting year is the 52 or 53 weeks ending the last Saturday in May.

(THOUSANDS)

1970	1971	1972
\$165,205	\$145,999	\$164,267
83,827	80,085	84,974
81,378	65,914	79,293
56,293	49,869	60,679
14,555	15,718	18,863
15,384	14,509	17,942
13,210	11,367	13,584
13,144	8,275	10,290
25,085	16,045	18,614
341	366	(979)
(202)	(207)	(438)
680	1,154	693
(409)	(325)	(597)
272	(256)	(637)
24,744	15,679	19,593
10,490	6,350	8,780
7,451	3,771	6,035
825	575	620
2,214	2,004	2,125
14,254	9,329	10,813
		405
14,254	9,329	11,218
91,346	105,581	114,941
(19)	31	2
105,581	114,941	126,161
8,108	8,124	8,136
\$1.76	\$1.15	\$1.38
		1.33
		.05

**NET SALES** Amounts receivable for products sold or rented. Tektronix sold directly to customers at retail in the U.S., and countries in which it has marketing subsidiaries, and to distributors (including 50% owned SONY/Tektronix Corporation in Japan) at a discount, for resale in most of the rest of the world. From NET SALES are deducted

**MANUFACTURING COST OF SALES** The cost of materials used in the products sold. Also, the payroll costs of the employees who fabricated and assembled them, their supervisors, those who assisted them, those who devise improved manufacturing methods and those who design and make tools and equipment. Also, the expense of running the manufacturing operations, leaving

**GROSS PROFIT** From which must be deducted

**OPERATING EXPENSE AND PROFIT SHARING**

**SELLING** Comprising payroll of sales engineers and employees who assist them, commissions to some marketing representatives, advertising, travel, rent of offices, and the other expenses of marketing.

**ENGINEERING** Payroll of engineers, creators and those who help them design and develop new products and the components to be assembled into them; improve existing products; and assure that new product designs provide "buildability" by the improved methods. The expenditure includes cost of materials, supplies, space and related expense.

**ADMINISTRATIVE** Including payroll of executives and personnel working on accounting, employment, data processing, facilities and communications functions, and the many expenses related to them.

**PROFIT SHARING** (Note 4) Which acts as an incentive for employees' performance by rewarding them with 35% of the profits they are responsible for generating, leaving

**OPERATING INCOME** Which is (increased) or decreased by non-operating items.

**NON-OPERATING EXPENSE (INCOME)**

**GAIN ON DISPOSITION OF FACILITIES** Amount in excess of depreciated cost recovered from sale of machinery and equipment no longer needed.

**INTEREST EXPENSE** Cost of borrowed money.

**INTEREST INCOME** Earnings of cash earning interest.

**OTHER** Including royalties, amortization of intangibles, normal net translation gains, and one half the earnings of 50% owned SONY/Tektronix Corporation, leaving

**INCOME BEFORE INCOME TAXES** From which is deducted

**PROVISION FOR INCOME TAXES** (Note 3) Estimated income taxes of Tektronix, Inc. to be paid to the United States and state and local governments, plus estimated income taxes to be paid other countries, related to the taxable income of each subsidiary. The provision for U. S. income taxes is sufficient to cover any U. S. income taxes on dividends that we may be required to repatriate from subsidiaries by the Direct Foreign Investment Regulations. Deduction of income taxes resulted in

**INCOME BEFORE EXTRAORDINARY ITEM**

**EXTRAORDINARY ITEM** (Note 1) Net gain during revaluation periods on translation of foreign currencies less amount reserved to offset anticipated losses, net of employee profit share thereon offset by income taxes on that profit share.

**EARNINGS** The measure of company performance—the amount reinvested in expansion of business.

**REINVESTED EARNINGS AT BEGINNING OF YEAR** From which is deducted

**PROCEEDS FROM SALE OF TREASURY SHARES IN EXCESS OF (LESS THAN) COST**

**REINVESTED EARNINGS AT END OF YEAR**

**COMMON SHARES OUTSTANDING AT END OF YEAR**

**EARNINGS PER COMMON SHARE** Earnings for the year divided by the average number of common shares outstanding during the year. Dilution if all outstanding share options were exercised would not have reduced primary earnings more than two cents.

The accompanying notes are an integral part of these financial statements.



# TEKTRONIX CONSOLIDATED FINANCIAL POSITION

(THOUSANDS)

May 30, 1970	May 29, 1971	May 27, 1972
<b>\$98,430</b>	<b>\$99,084</b>	<b>\$116,914</b>
3,661	1,069	1,862
4,318	6,706	24,938
28,668	26,538	32,351
(149)	(205)	(288)
3,673	2,667	2,685
1,208	1,151	1,148
57,051	61,158	54,218
11,270	16,360	14,622
27,583	29,127	26,543
18,198	15,671	13,053
<b>38,573</b>	<b>29,481</b>	<b>33,205</b>
13,500	9,800	8,600
26	125	144
5,676	6,028	6,148
6,299	4,439	6,076
6,415	3,752	6,099
3,643	2,903	3,100
1,926	1,400	1,929
1,088	1,034	1,109
<b>59,857</b>	<b>69,603</b>	<b>83,709</b>
<b>48,185</b>	<b>48,062</b>	<b>46,071</b>
42,962	45,150	45,294
24,644	31,789	35,338
186	254	261
(26,565)	(31,843)	(37,349)
1,870	1,927	1,927
5,088	785	600
<b>2,426</b>	<b>3,842</b>	<b>2,808</b>
<b>2,114</b>	<b>2,438</b>	<b>2,860</b>
<b>306</b>	<b>1,732</b>	<b>1,071</b>
		<b>515</b>
<b>112,276</b>	<b>122,213</b>	<b>133,862</b>
6,711	7,290	7,756
(16)	(18)	(55)
105,581	114,941	126,161

**CURRENT ASSETS** Those assets likely to be converted to cash or used in the ordinary operation of the business, made up of:

**CASH** Mostly in checking accounts or deposits in transit.

**CASH EARNING INTEREST** Invested in savings accounts, certificates of deposit, U. S. treasury bills, prime commercial paper or short term tax exempt securities.

**ACCOUNTS RECEIVABLE** Amounts due from customers for sales on credit.

**ALLOWANCE FOR DOUBTFUL ACCOUNTS** Estimate of erosion in value of accounts receivable because a few customers may not pay us.

**PREPAID EXPENSES AND DEPOSITS** Amounts paid for things that will not be used and deducted until the following year, and deposits that will be refunded.

**SUPPLIES** Items that will be consumed in operating offices, maintaining facilities and running manufacturing plants.

**INVENTORIES, AT LOWER OF COST (FIRST-IN, FIRST-OUT) OR MARKET** The cost of products finished but not yet sold; purchased materials and parts to be fabricated and assembled into products; and the materials, payroll costs and other costs accumulated in the process of manufacturing products not yet completed.

**CURRENT LIABILITIES** Obligations due to be paid within one year, including

**NOTES PAYABLE** Amounts borrowed for less than one year.

**CURRENT PORTION OF LONG-TERM INDEBTEDNESS** (Note 2) Installment payments due within one year.

**ACCOUNTS PAYABLE** Amounts due suppliers for materials and services bought on credit.

**U.S., STATE AND FOREIGN INCOME TAXES** (Note 3) Taxes not yet paid.

**EMPLOYEE PROFIT SHARING** (Note 4) Due employees and their retirement funds.

**PAYROLL AND PAYROLL TAXES** Amounts due employees next payday, and taxes due on or withheld from pay.

**VACATIONS** Amounts earned by employees for their vacations, but not yet used or paid.

**INTEREST AND MISCELLANEOUS TAXES** Interest, property tax, and sales taxes collected, not yet paid.

**WORKING CAPITAL** Current Assets minus Current Liabilities.

**FACILITIES AT DEPRECIATED COST** (Note 2) The cost of buildings and equipment used in the business, reduced by depreciation.

**BUILDINGS AND GROUNDS** Cost of buildings, including parking lots and landscaping.

**MACHINERY AND FURNITURE** Cost of furnishings.

**LEASEHOLD IMPROVEMENTS** Cost of remodeling rented space.

**ACCUMULATED DEPRECIATION** (Note 5) Reduction of value for use, wear and age which has been claimed as an expense of doing business, mostly computed by accelerated depreciation methods.

**LAND** Cost of land used in business.

**CONSTRUCTION IN PROGRESS** Costs accrued on equipment and buildings not yet put into operation.

**INTANGIBLE ASSETS** Amounts not yet deducted (amortized) as a cost of doing business for the excess paid over the values ascribed to the net tangible assets of the companies acquired. These amounts are frequently called goodwill.

**INVESTMENTS AND LONG-TERM RECEIVABLES** The investment in and advances to 50% owned SONY/Tektronix Corporation and one half its reinvested earnings. Also included are installments of sale and lease contracts receivable due after one year.

**LONG-TERM INDEBTEDNESS LESS CURRENT PORTION** (Note 2) The unpaid portion minus payments due within one year of amounts borrowed for more than one year.

**RESERVE FOR CURRENCY VALUATION** (Note 1) Amount reserved to offset anticipated losses on translation of foreign currencies.

**SHAREOWNERS' EQUITY** (Notes 6 and 7) The net assets or book value owned by shareowners. This is equal to the total assets (above) minus the current liabilities, long-term indebtedness and reserves. Shareowners' equity is made up of:

**COMMON SHARES** The amount the company received for issuance of common shares.

**TREASURY SHARES** The cost of Tektronix, Inc. common shares repurchased by the company and held in the company treasury.

**REINVESTED EARNINGS** The accumulation of earnings that has been reinvested in the business.



## NOTES TO FINANCIAL STATEMENTS:

### 1. PRINCIPLES OF CONSOLIDATION AND INVESTMENT IN SUBSIDIARIES:

The consolidated financial statements include all of the Company's subsidiaries (all wholly-owned) operating in the United States, Canada, United Kingdom, Channel Island of Guernsey, The Netherlands, Switzerland, Australia, France, Denmark, Belgium and Sweden.

All significant intercompany transactions have been eliminated in the consolidated financial statements.

Translation of foreign currency financial statements to United States dollars has been made at appropriate rates of exchange. Such translation resulted in no material unrealized gains or losses in the years ended May 29, 1971 and May 30, 1970. During a widespread currency revaluation period which ended in December 1971, accumulated net gains relating to the translation of monetary assets and liabilities at current rates of exchange amounted to \$1,005,900. A reserve for currency valuation in the amount of \$515,000 has been provided for anticipated losses which may result from abnormal fluctuations in certain foreign currencies subsequent to May 27, 1972. The difference between the foregoing figures (\$490,900) reduced by the after-tax effect of profit sharing thereon (\$85,900) amounting to \$405,000 is shown as an extraordinary item of income for the year ended May 27, 1972.

The Company's equity in the net assets of consolidated subsidiaries exceeded the cost of investment by the amounts set forth below which are included in the statements of consolidated financial position as follows:

	<u>May 27, 1972</u>	<u>May 29, 1971</u>	<u>May 30, 1970</u>
Consolidated reinvested earnings	\$32,857,461	\$27,344,858	\$23,036,228
Intercompany profit eliminated in consolidation	1,859,926	2,258,324	1,731,965
Excess of cost of investment in subsidiaries over equity in net assets at dates of acquisition (being amortized over periods ranging from approximately 7 to 10 years)	<u>(1,545,404)</u>	<u>(1,935,804)</u>	<u>(2,325,981)</u>
Excess of equity over cost	<u>\$33,171,983</u>	<u>\$27,667,378</u>	<u>\$22,442,212</u>

Assets, liabilities and equity in earnings of the subsidiaries in the following amounts (translated at appropriate rates of exchange) are included in the consolidated financial statements:

	<u>May 27, 1972</u>	<u>May 29, 1971</u>	<u>May 30, 1970</u>
Current assets	\$38,817,843	\$33,657,228	\$30,040,661
Property—net	8,670,581	8,662,829	7,801,869
Intangible assets and investments	1,531,677	1,836,380	1,996,467
Current liabilities	5,601,833	5,317,057	5,646,287
Long-term indebtedness	250,409	279,630	306,040
Equity in earnings	7,377,046	4,465,619	6,061,554

The Company and SONY Corporation each own fifty percent of SONY/Tektronix Corporation. This investment is stated at cost plus equity in undistributed earnings since date of organization. The Company's share of the net assets consists of the following:

	<u>May 27, 1972</u>	<u>May 29, 1971</u>	<u>May 30, 1970</u>
Capital	\$ 139,334	\$ 139,334	\$ 139,334
Current year's earnings	602,351	477,113	394,326
Prior years' earnings	1,181,748	704,635	310,309
TOTAL	<u>\$ 1,923,433</u>	<u>\$ 1,321,082</u>	<u>\$ 843,969</u>

### 2. LONG-TERM INDEBTEDNESS:

Long-term indebtedness consists of the following:

	<u>May 27, 1972</u>	<u>May 29, 1971</u>	<u>May 30, 1970</u>
Note payable to the City of Heerenveen, The Netherlands (original amount, \$528,200)	\$ 250,409	\$ 279,630	\$ 306,040
Contract payable	821,128	1,452,205	—
TOTAL	<u>\$ 1,071,537</u>	<u>\$ 1,731,835</u>	<u>\$ 306,040</u>

The indebtedness to the City of Heerenveen is payable in annual installments of \$29,517 plus interest at 4½%. Facilities which cost \$1,300,000 are pledged as collateral.

The contract payable represents the discounted estimated contingent portion (which estimate was revised downward during the year ended May 27, 1972) of the purchase price of the assets of an electronic calculator business acquired in May 1971. Contingent payments are based on sales of calculator products to May 1976. The Company is amortizing the contingent portion of the purchase price as the payments accrue.



# TEKTRONIX, INC. AND SUBSIDIARIES

## 3. INCOME TAXES:

The liability for U.S., state and foreign income taxes includes approximately \$2,000,000 of U.S. income taxes which will accrue upon transfer of a portion of foreign subsidiary earnings to Tektronix, Inc. Of this amount, \$1,300,000 was provided in the year ended May 27, 1972, and \$700,000 was provided in prior years. The Company anticipates that the balance of foreign subsidiary reinvested earnings, upon which U.S. income taxes have not been provided, will be employed in their operations.

## 4. EMPLOYEE PROFIT-SHARING:

Under the terms of the Company's profit-sharing plan, 35% of income before income taxes, profit-sharing, and charitable contributions is provided for employee profit-sharing.

## 5. PROPERTY AND EQUIPMENT:

Depreciation has been provided on buildings and grounds and machinery and equipment generally on the sum-of-the-years-digits and declining balance methods based on estimated useful lives of the properties. Estimated useful lives of buildings and grounds vary from ten to forty years and estimated useful lives of machinery and equipment vary from three to fifteen years.

Leasehold improvements have been amortized on the straight-line basis over the periods of the leases.

## 6. SHAREOWNERS' EQUITY:

Authorized capital consists of 20,000,000 shares without par value. Issued and outstanding shares are as follows:

	<u>May 27, 1972</u>	<u>May 29, 1971</u>	<u>May 30, 1970</u>
Issued	8,137,372	8,124,522	8,108,285
Held in treasury	1,445	731	320
Outstanding	<u>8,135,927</u>	<u>8,123,791</u>	<u>8,107,965</u>

## 7. EMPLOYEE STOCK OPTION AND SHARE PURCHASE PLANS:

Under stock option plans for employees, in which the options are "qualified stock options" as defined by the Internal Revenue Code, 401,030 common shares of the Company are reserved. The plans provide that the option price

shall be not less than 100% of the fair market value of the shares on the date of grant and that the options are exercisable in four (or fewer, where the option period is less than five years) cumulative annual installments beginning one year after the date of grant.

At May 27, 1972, options to purchase 353,695 shares were outstanding for which the option price, ranging from \$24.45 to \$58.20 per share, amounted to \$14,146,396, and options to purchase 137,595 shares were exercisable for which the option price amounted to \$6,498,059. During the year then ended, options which became exercisable and options exercised were as follows:

	<u>Options</u>	
	<u>Which Became Exercisable</u>	<u>Which were Exercised</u>
Number of shares	51,280	12,850
Option price:		
Range per share	\$24.45 to \$58.20	\$24.45 to \$41.50
Total	\$2,388,433	\$465,520
Market value at date exercisable or exercised:		
Range per share	\$33.75 to \$48.75	\$34.45 to \$55.00
Total	\$2,025,083	\$577,024

Option and market prices, respectively, for options which became exercisable and for options which were exercised in 1971 and 1970 were as follows: 1971—options exercisable \$2,702,120 and \$2,007,047, options exercised \$579,102 and \$673,254; 1970—options exercisable \$1,870,796 and \$2,561,238, options exercised \$514,847 and \$870,382.

Under an "Employee Share Purchase Plan", 171,529 common shares of the Company are reserved. The share purchase discount provided in the plan (which may not exceed 15% of market value on the date of purchase), has been charged to income as follows: \$9,219 in 1972, \$17,674 in 1971, and \$6,261 in 1970.

## 8. COMMITMENTS AND CONTINGENT LIABILITIES:

The companies are committed to pay aggregate rentals of approximately \$4,438,000 on building and equipment leases expiring from June 1972 to June 1990. Rentals under these leases for the year ending May 26, 1973 will be approximately \$939,000.



# TEKTRONIX CONSOLIDATED FINANCIAL STATISTICS

(DOLLARS, SHARES AND SQUARE FEET IN THOUSANDS)

1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	Fiscal year ending in May
70,451	75,503	81,099	101,759	129,031	133,656	148,857	165,205	145,999	164,267	<b>NET SALES</b>
5,771	6,308	7,319	11,052	13,389	13,429	14,089	14,254	9,329	11,218	<b>EARNINGS</b>
72c	78c	91c	\$1.38	\$1.68	\$1.68	\$1.75	\$1.76	\$1.15	\$1.38	Per Share (1972 includes 5c extraordinary)
8.2%	8.4%	9.0%	10.9%	10.4%	10.0%	9.5%	8.6%	6.4%	6.8%	% of Sales
23.3%	20.7%	19.1%	25.0%	24.4%	19.9%	17.3%	14.6%	8.3%	9.2%	% of Beginning of Year Shareowners' Equity
7,981	8,636	9,718	13,589	16,577	17,335	18,359	19,495	15,580	18,074	<b>CASH FLOW</b>
11,433	12,200	13,566	19,602	25,179	25,102	25,327	24,744	15,679	19,593	<b>INCOME BEFORE INCOME TAXES</b>
16.2%	16.2%	16.7%	19.3%	19.5%	18.8%	17.0%	15.0%	10.7%	11.9%	% of Sales
49.5%	48.3%	46.0%	43.6%	46.6%	46.0%	44.2%	42.4%	40.5%	44.8%	Income Tax Rate
26,143	26,146	26,018	32,489	38,192	41,356	48,686	59,515	55,426	57,512	<b>PAYROLL BEFORE PROFIT SHARE</b>
6,488	6,509	7,553	10,810	13,744	13,542	13,360	13,144	8,275	10,290	<b>EMPLOYEE PROFIT SHARE</b>
496	485	289	61	192	29	194	680	1,154	693	<b>INTEREST EXPENSE</b>
1,144	1,185	1,198	1,436	1,588	1,698	1,800	2,081	2,299	2,399	Facilities in Use at Year End in Square Feet
24,623	27,123	30,712	35,781	41,157	47,168	58,378	74,750	79,905	83,420	<b>COST OF FACILITIES</b>
2,749	3,043	3,910	5,705	5,803	6,464	11,861	16,770	5,956	4,858	<b>INVESTED IN FACILITIES</b> (during year)
2,194	2,301	2,342	2,456	2,991	3,436	3,823	4,823	5,813	6,299	<b>FACILITIES DEPRECIATION</b> (mostly accelerated)
7,009	9,031	11,196	13,061	15,724	18,836	22,183	26,565	31,843	37,349	<b>ACCUMULATED DEPRECIATION</b>
51,329	55,322	59,147	76,116	92,720	104,962	124,544	151,155	153,426	168,653	<b>TOTAL ASSETS</b>
8,958	10,801	12,679	17,053	21,557	22,612	27,073	28,519	26,333	32,063	<b>ACCOUNTS RECEIVABLE NET</b>
21,033	20,430	19,678	28,473	34,150	34,982	41,031	58,259	62,309	55,366	<b>INVENTORY</b> (including supplies)
33,318	36,857	39,064	52,781	62,952	72,626	84,313	98,430	99,084	116,914	<b>CURRENT ASSETS</b>
14,138	12,762	14,397	20,864	23,258	21,839	26,672	38,573	29,481	33,205	<b>CURRENT LIABILITIES</b>
19,180	24,095	24,667	31,917	39,694	50,787	57,641	59,857	69,603	83,709	<b>WORKING CAPITAL</b>
7,128	4,728	501	458	2,077	988	379	332	1,857	1,215	<b>LONG-TERM INDEBTEDNESS</b> (including current portion)
7,980	8,073	8,008	7,984	7,970	7,998	8,094	8,108	8,124	8,136	Common Shares Outstanding
30,463	38,258	44,275	54,819	67,548	81,597	97,519	112,276	122,213	133,862	<b>SHAREOWNERS' EQUITY</b>
3,990	5,844	5,997	5,997	5,997	5,997	6,196	6,711	7,290	7,756	<b>COMMON SHARE CAPITAL</b>
26,473	32,414	39,733	50,785	64,174	77,603	91,346	105,581	114,941	126,161	<b>REINVESTED EARNINGS</b>
5,430	4,910	4,982	6,482	7,270	7,852	8,752	9,857	8,991	8,234	Number of Employees at Year End

# DIRECTORS, OFFICERS AND MANAGEMENT

## BOARD OF DIRECTORS

HOWARD VOLLUM, *Chairman*  
PAUL L. BOLEY, *Partner, Davies, Biggs, Strayer, Stoel and Boley*  
JAMES B. CASTLES, *Secretary and General Counsel*  
WALTER P. DYKE, *President, Field Emission Corporation*  
ROBERT G. FITZGERALD, *Investments*  
EARL WANTLAND, *President*  
FRANK M. WARREN, *President, Portland General Electric Company*

## OFFICERS

HOWARD VOLLUM, *Chairman and Chief Executive Officer*  
EARL WANTLAND, *President*  
LESLIE F. STEVENS, *Group Vice President—Finance*  
DONALD ALVEY, *Group Vice President*  
WILLIAM J. POLITZ, *Group Vice President*  
WILLIAM D. WALKER, *Group Vice President*  
CHARLES L. BOUFFIOU, *Vice President*  
FRANK CONSALVO, *Vice President*  
FRANCIS DOYLE, *Vice President*  
MICHAEL J. PARK, *Vice President*  
WILLIAM B. WEBBER, *Vice President*  
JAMES B. CASTLES, *Secretary and General Counsel*  
DON A. ELLIS, *Treasurer*  
ELWELL E. SWANSON, *Controller and Assistant Secretary*  
F. H. NEISSER, *Assistant Secretary*  
KENNETH H. KNOX, *Assistant Treasurer*

## FINANCE & ADMINISTRATION

LESLIE F. STEVENS, *Group Vice President—Finance*  
DON A. ELLIS, *Treasurer*  
ELWELL E. SWANSON, *Controller*  
KENNETH H. KNOX, *Assistant Treasurer*  
LARRY N. CHORUBY, *Budget Director*  
GALE KINGSBURY, *European Finance*  
RICHARD J. REISINGER, *Corporate Planning*  
BILL J. ROBINSON, *Manufacturing Accounting*  
WILLIAM B. WEBBER, *Vice President and Community Relations*  
FRANK CONSALVO, *Vice President and Administrative Services*  
GUYOT FRAZIER, *Personnel*  
LARRY D. FROST, *Facilities*  
HUGO PANKOW, *Data Services*

## ENGINEERING

WILLIAM D. WALKER, *Group Vice President*  
J. LARRY BOWMAN, *Integrated Circuits Design*  
JOHN BOWNE, *Information Display Products Engineering*  
MICHAEL BRAND, *Engineering Operations*  
JOHN GATES, *Portable Oscilloscope Design*  
TOM LONG, *General Instrument Design*  
HIRO MORIYASU, *Calculator Products Design*  
JON REED, *CRT Engineering*  
JEROME L. SHANNON, *Low Frequency Oscilloscope Design*  
WILLEM B. VELSINK, *Laboratory Oscilloscope Design*

FRANK P. ELARDO, JR., *Calculator Products*  
LANGDON C. HEDRICK, *Machine Control*

## INFORMATION DISPLAY PRODUCTS

LAWRENCE L. MAYHEW, *Manager*  
JOHN BOWNE, *Engineering*  
PETER G. COOK, *Software*  
MORGAN E. HOWELLS, *Marketing*

## MANUFACTURING

WILLIAM J. POLITZ, *Group Vice President*  
MICHAEL J. PARK, *Vice President and Manufacturing Planning*  
BURTON A. AVERY, *Production and Inventory Control*  
FERDINAND P. BARICEVIC, *Product Manufacturing*  
ROSS PORTER, *Product Manufacturing*  
OTTO ZACH, *Product Manufacturing*  
THOMAS E. SLY, *Component Manufacturing*  
KENNETH F. SPOONER, *Component Manufacturing*  
EDWIN SREBNIK, *Component Manufacturing*  
SCOTT E. FOSTER, JR., *Purchasing*  
RICHARD W. MONTAG, *International Manufacturing*

## U.S. MARKETING & INTERNATIONAL OPERATIONS

DONALD ALVEY, *Group Vice President*  
CHARLES L. BOUFFIOU, *Vice President and Marketing Technical Services*  
FRANCIS DOYLE, *Vice President and European Operations*  
LEWIS C. KASCH, *U.S. Marketing*  
HAROLD D. BUTTS, *U.S. Sales*  
FRANK P. ELARDO, JR., *Product Marketing*  
EDWARD M. VAUGHAN, *Eastern Marketing*  
WILLIAM L. WARD, *Western Marketing*  
EBERHARD VON CLEMM, *International Marketing*  
WARREN CLARK, *European Marketing*  
LADNER GOODMAN, *Field Administration*  
MORGAN HOWELLS, *Information Display Marketing*  
ROBERT E. KEYES, *Marketing Commercial Services*  
GALE KINGSBURY, *European Finance*  
STANLEY F. KOUBA, *Field Service*  
RICHARD W. MONTAG, *International Manufacturing*  
EARL MUSIC, *Advertising*

## MANAGERS OF SUBSIDIARIES:

STEN ARKSTEDT, *Tektronix A/S, Denmark, & Tektronix AB., Sweden*  
CHARLES BILLET, *Tektronix, France*  
ALBERT E. GRAHAM, *Tektronix Limited & Tektronix Guernsey Limited*  
E. D. E. GROOM, *Tektronix U.K. Ltd. & Telequipment, London, England*  
HOWARD MIKESELL, *Tektronix Holland N.V., Tektronix Datatek N.V., Holland, Tektronix S.A., Belgium*  
RAOUL STEFFEN, *Tektronix International A.G., Switzerland*  
PETER STRONG, *Tektronix Australia Pty. Limited*  
RONALD R. WAMBOLT, *Tektronix Canada Ltd.*  
GERRIT ADRIAANSE, *Tektronix S.A., Belgium*

SONY/Tektronix Corporation, Tokyo, Japan:  
MASANOBU TADA, *President*  
TAKASHI KUMAKURA, *Senior Managing Director*



# TEKTRONIX UNITED STATES FACILITIES

## UNITED STATES

**Tektronix, Inc., Beaverton, Oregon**—Headquarters and Main Plant

### FIELD OFFICES

Albany, N.Y.	*Greensboro, N.C.	Phoenix, Ariz.
*Albuquerque, N.M.	Hampton, Va.	*Pittsburgh, Pa.
Alexandria, Va.	*Hartford, Conn.	Portland, Ore.
Alhambra, Cal.	*Houston, Texas	*Poughkeepsie, N.Y.
*Atlanta, Ga.	*Huntsville, Ala.	Providence, R.I.
*Baltimore, Md.	*Indianapolis, Ind.	*Rockville, Md.
*Boston, Mass.	*Kansas City, Kan.	*St. Louis, Mo.
Buffalo, N.Y.	Las Vegas, Nev.	*St. Paul, Minn.
Cherry Hill, N.J.	*Long Island, N.Y.	*Salt Lake City, Utah
*Chicago, Ill.	Methuen, Mass.	San Antonio, Texas
*Cleveland, Ohio	Milwaukee, Wis.	*San Diego, Cal.
*Columbus, Ohio	Morris Plains, N.J.	San Jose, Cal.
*Concord, Cal.	*Mountainview, Cal.	*Seattle, Wash.
*Dallas, Texas	Natick, Mass.	*Springfield, N.J.
Dayton, Ohio	*Oklahoma City, Okla.	Stamford, Conn.
*Denver, Colo.	*Orange, Cal.	*Syracuse, N.Y.
*Detroit, Mich.	*Orlando, Fla.	Valley Forge, Pa.
*Endicott, N.Y.	Palo Alto, Cal.	*Van Nuys, Cal.
*Fort Lauderdale, Fla.	Pensacola, Fla.	Waltham, Mass.
Fort Washington, Pa.	*Philadelphia, Pa.	

\*denotes Service Centers.

# TEKTRONIX INTERNATIONAL FACILITIES

**Tektronix Export Corporation, Beaverton, Oregon**—A Domestic International Sales Corporation

### MANUFACTURING SUBSIDIARIES

**Tektronix Guernsey Limited, Guernsey**—Principally serving European Free Trade Association;  
**Tektronix Holland N.V., Heerenveen, The Netherlands**—Principally serving European Common Market;  
**Tektronix U.K. Ltd., London**—Teleequipment Instruments;  
**SONY/Tektronix Corporation, Tokyo, Japan**—Serving Japan.

### MARKETING SUBSIDIARIES

**Australia**—Tektronix Australia Pty. Limited, Sydney, Melbourne, Canberra and Adelaide;  
**Belgium**—Tektronix S.A., Brussels;  
**Canada**—Tektronix Canada Ltd., Montreal, Toronto, Ottawa, Calgary and Vancouver;  
**Denmark**—Tektronix A/S, Copenhagen;  
**England**—Tektronix U.K. Ltd., Harpenden, London, Manchester and Scotland;  
**France**—Tektronix, Paris, Toulouse, Nice, Lyons, Rennes and Nancy;  
**Japan**—SONY/Tektronix Corporation, Tokyo, Osaka and Nagoya;  
**Sweden**—Tektronix AB., Bromma and Gothenburg;  
**Switzerland**—Tektronix International A.G., Zug and Geneva;  
**The Netherlands**—Tektronix Holland N.V., Voorschoten;  
**The Netherlands**—Tektronix Datatek N.V., Schiphol.

## MARKETING REPRESENTATIVES

Serviced by **Tektronix Limited, Guernsey, Channel Islands**

**Angola**, Equipamentos Tecnicos, Lda., Luanda;  
**Austria**, Inglomark Markowitsch & Co., Vienna;  
**Finland**, Into O/Y, Helsinki;  
**Federal Republic of Germany**, Rohde & Schwarz Vertriebs-GmbH, Cologne, Hamburg, Munich, Karlsruhe;  
**West Berlin**, Rohde & Schwarz Handels-GmbH;  
**Greece**, Marios Dalleggio Representations, Athens;  
**Iran**, Berkeh Co. Ltd., Tehran;  
**Israel**, Eastronics Limited, Tel Aviv;  
**Italy**, Silverstar Ltd., Milan, Rome, Turin;  
**Kenya**, Engineering & Sales Co., Nairobi;  
**Lebanon**, Projects, Beirut;  
**Morocco**, F. Pignal, Casablanca;  
**Mozambique**, Equipamentos Tecnicos, Lda., Mozambique;  
**Norway**, Morgenstjerne & Company A/S, Oslo;  
**Portugal**, Equipamentos de Laboratorio Lda., Lisbon;  
**Republic of South Africa**, Protea Physical & Nuclear Instrumentation (Pty) Ltd., Johannesburg;  
**Spain**, C. R. Marés, S.A., Barcelona, Madrid;  
**Tunisia**, Selection Internationale, Tunis;  
**Turkey**, M. Suheyl Erkman, Istanbul;  
**Yugoslavia**, Elektrotehna, Zagreb, Belgrade;  
**Zambia**, Baird & Tatlock (Zambia) Ltd., Ndola, Lusaka.

## MARKETING REPRESENTATIVES

Serviced by **Tektronix, Inc., Beaverton**

**Argentina**, Coasin S.A., Buenos Aires, Cordoba, Rosario;  
**Brazil**, Importacao Industria E Comercio Ambriex, S.A., Rio de Janeiro, Sao Paulo, Porto Alegre;  
**Ceylon**, Maurice Roche Limited, Colombo;  
**Chile**, Equipos Industriales, S.A.C.I.;  
**Colombia**, Manuel Trujillo Venegas e Hijo, Ltda., Bogota;  
**Hong Kong**, Gilman & Co., Ltd.;  
**India**, Hinditron Services Private Limited, Bombay;  
**Korea**, M-C International, Seoul;  
**Malaysia**, Mecomb Malaysia Sendirian, Berhad, Selangor;  
**Mexico**, Tecnicos Argostal S.A., Mexico D.F., Monterrey, Guadalajara;  
**New Zealand**, W & K McLean, Ltd., Auckland, Wellington;  
**Pakistan**, Pak-Land Corporation, Karachi;  
**Peru**, Importaciones y Representaciones Electronicas, S.A., Lima;  
**Philippines**, Philippine Electronics Industries, Rizal;  
**Singapore**, Mechanical & Combustion Engineering Co., Ltd., Singapore;  
**Taiwan**, Heighten Trading Co., Ltd., Taipei;  
**Thailand**, G. Simon Radio Company Ltd., Bangkok;  
**Uruguay**, Coasin Uruguay S.A., Montevideo;  
**Venezuela**, Coasin C.A., Caracas.

