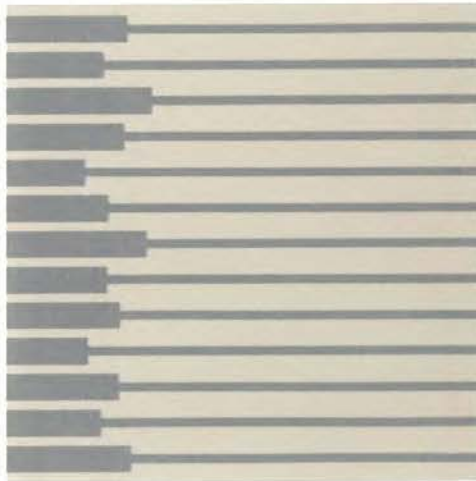


Tektronix[®]

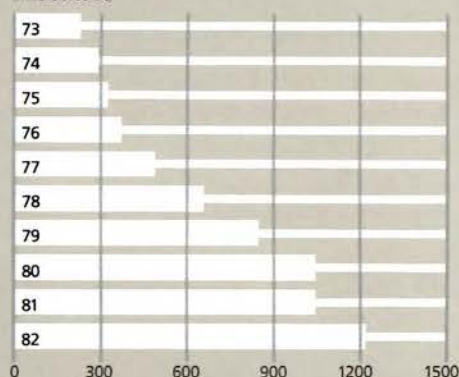
COMMITTED TO EXCELLENCE



Tektronix 1982 Income Highlights in thousands

CUSTOMER ORDERS

(millions of dollars)



52 Weeks to May 30, 1981		52 Weeks to May 29, 1982		Increase (Decrease)		
\$1,040,000	100%	\$1,221,000	100%	\$181,000	17%	CUSTOMER ORDERS , some of which were UNFILLED ORDERS at year-end.
295,000	28%	321,000	26%	26,000	9%	
\$1,061,834	100%	\$1,195,748	100%	\$133,914	13%	SALES REVENUE comprised of INSTRUMENT products, DESIGN AUTOMATION AND INFORMATION DISPLAY products, and COMMUNICATIONS products—sold to UNITED STATES customers, and INTERNATIONAL customers.
507,630	48%	567,994	47%	60,364	12%	
391,149	37%	441,420	37%	50,271	13%	
163,055	15%	186,334	16%	23,279	14%	
625,335	59%	729,369	61%	104,034	17%	
436,499	41%	466,379	39%	29,880	7%	REVENUE from non-operating sources.
\$ 26,318	3%	\$ 14,470	2%	\$ (11,848)	-45%	
\$1,007,985	95%	\$1,130,765	95%	\$122,780	12%	LESS COSTS AND EXPENSES to be paid TO EMPLOYEES who design, produce, sell and service products or who support their efforts; TO SUPPLIERS for materials, components, supplies, services and the use of their property and funds; TO GOVERNMENTS as taxes in the United States and abroad—and to provide FOR FACILITIES depreciation which allows for the use, wear and aging of buildings and equipment.
525,040	49%	581,269	49%	56,229	11%	
381,802	36%	436,726	36%	54,924	14%	
58,915	6%	56,297	5%	(2,618)	-4%	
42,228	4%	56,473	5%	14,245	34%	
\$ 80,167	8%	\$ 79,453	7%	\$ (714)	-1%	RESULTING IN EARNINGS to be reinvested in the business and for dividends to shareowners.
\$4.34	100%	\$4.25	100%	\$ (.09)	-2%	EARNINGS PER SHARE based on average shares. DIVIDENDS PER SHARE paid to shareowners.
.90	21%	.98	23%	.08	9%	

Up Front

This year was probably neither the Best of Times (although it did have its moments) nor the Worst of Times (but some days came pretty close.) Integrating the year's highs and lows proved a formidable challenge. When the dust had cleared, earnings had tailed off by about 1 per cent.

If you're counting, that makes two flat years in a row. And, like last year, it was largely our own doing (or failing to do). Orders went up; sales went up. Earnings skidded fractionally down.

Now, the figures can be qualified, explained, put into context and looked at this way and that. And probably, for your fuller understanding, they should be. Still, just the way they sit, they are not misleading.

(Were we to have our druthers, we'd far prefer to be known for strong company performance than for soul-baring annual reports. But our commitment to you has always included candor, so once again this report will tell it the way it seems to us to be.)

Now:

Tek's year was also one of excitement; high levels of personal and group achievement; outstanding freshman-year product performance; strong gains in important markets, and progress in less-charismatic areas such as product quality (it went up, as usual) and inventory (it went down, for a change).

We also continued to invest heavily in "futures" — major dollar commitments to company decentralization; to state-of-the-art manufacturing facilities and systems, and to a heavy pumping of computer power into engineering and R & D.

And, not least in a soured and inhospitable world economic climate, we saw our order rate improve.

(Orders, however, softened at year's end, and have stayed soft. "Experts" on the US economy *have* noted stirrings there, but seem unable to distinguish between a recovery and a spasm.)

But, on the books, all the good work went for naught — naught being the amount of our earnings increase over last year. Some of the sales revenue went to cover increased expenses of engineering and selling. Interest payments took an expected Pac-Man bite. But the biggest drawdown was our high and rising cost of sales. At an acute level for four years, it now has moved to whatever comes *after* acute. A main cause of high COS is our outdated manufacturing-information system. It is unwieldy; it is untrusted; it leaks. And it is being replaced.

Earnings were off \$.09 per share, down to \$4.25 from \$4.34.

That comparison isn't a direct one. Last year we jettisoned our Portable Patient Monitor group, a fine small business but one that didn't mesh with our strategic goals. Its sale added \$5.2 million to last year's earnings. Remove it, and this year's earnings are up — slightly.

But, let's not make too much of a thing of that. Having to *explain* your way to an "up" year is like squinting so your blind date will look better; there isn't much there to work with.

Sales went up 12.6 per cent from those of a year earlier, moving to \$1.196 billion from \$1.062 billion; the *US portion* was a bit the stronger, increasing 17 per cent, to \$729 million from \$625 million. The *international* segment grew by 7 per cent, to \$466 million from \$436 million.

This year Tektronix re-formed into three operating groups. Each has responsibility for one or more of our four

product divisions and for specified major central functions. The three new groups are described in detail on page 32. This new organization is intended to facilitate further decentralization of operations and better reflect our business and product strategies in the 1980's.

Here are the contributions to recent years' net sales for the products in each of the three groups:

Instrument Products

1978	\$333,350,000	55.7%
1979	\$435,108,000	55.3%
1980	\$504,380,000	51.9%
1981	\$507,630,000	47.8%
1982	\$567,994,000	47.5%

Design Automation and Information Display Products

1978	\$184,234,000	30.7%
1979	\$242,745,000	30.9%
1980	\$327,078,000	33.7%
1981	\$391,149,000	36.8%
1982	\$441,420,000	36.9%

Communications Products

1978	\$ 81,302,000	13.6%
1979	\$109,083,000	13.8%
1980	\$139,848,000	14.4%
1981	\$163,055,000	15.4%
1982	\$186,334,000	15.6%

Information Display Products, reported separately in prior years, are now included in Design and Display products. Information Display sales increased 8 percent, to \$329 million from \$304 million. They represented 28 percent of our business, compared with 29 percent in the prior year.

Earnings declined 1 per cent, easing to \$79 million compared with \$80 million the year before. *Earnings per share*, as noted, were \$4.25, down from \$4.34 per share.

Incoming orders showed a good gain, to \$1.221 billion, compared with \$1.040 billion the year before, up 17 per cent.

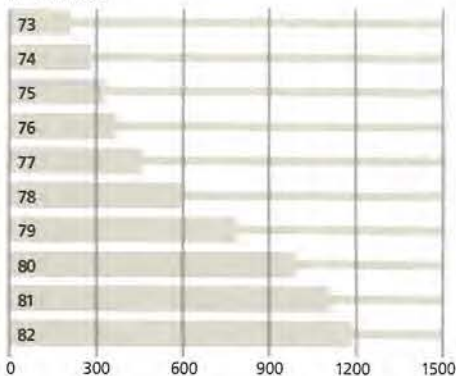
Unfilled orders at year's end stood at \$321 million. Last year at the same time they totaled \$295 million.

*Integrating the year's highs and lows
was a tough challenge.*



INFUSION OF computer-aided design helps Tektronix engineers become more productive. Tek is making a large investment in CAD.

NET SALES
(millions of dollars)



All in all, it was a better year than last year, in that we saw a recovery in our order rate. Not a giant one, perhaps (and possibly not a sustained one, either; orders have slowed since the end of the year). On the other hand, you'll recall that the preceding year's "decline" was no great shakes—minus .9 per cent.

So, in spite of our disappointment with the flattish direction of earnings, we feel *somewhat* encouraged. About as much, perhaps, as the hurdler who fell during practice, and was cheered up by his coach. The thud, the coach noted, wasn't quite so sickening this time.

Orders were good for many products, outstanding for several.

Our DAS logic analyzer proved one of the most impressive newcomers in the instrument market in years. Strong order rate for spectrum analyzers highlighted a splendid year's performance by our Communications division. Our family of microprocessor tools also got

exceptional response from customers, and Tek's range of television test instruments continued to lead the world.

In oscilloscopes, our top-of-the-line computer-coupled waveform digitizers fared very well. The new high-volume 2200 line did its intended job: it anchored the low end of the scope market. But in midrange portables, our meal-ticket area, competition gnawed and chipped away at both our market share and profit margins.

We finally saw the end of the shared shutdown weeks and shutdown days that helped us get through the preceding year. Our employee total dropped from 24,028 to 23,231, largely through normal attrition.

Our organization has been made more shipshape by moving employees into jobs of more current value to Tek. This reassignment process went well; of the roughly 1200 people involved, all but about 20 had found work within the company by year's end.

A partial result of the reassignment: Administrative expense this year used up a smaller portion of sales.

We turned the corner on inventory. It dropped \$3.4 million. Hardly what you'd call plummeting; but that was against an *increase* of 12.6 per cent in sales. Also, you must realize that most of us had never seen Tek inventory decrease at all.

We've also committed to an increased inventory turnover—which measures how long we pay for it to gather dust before it's used. In the next five years, our targeted improvement means over a hundred million dollars that would otherwise have been spent on inventory. (To put that achievement into context, our turnover even then would be only about as good as the present electronics industry average.)

So, we have a way to go. For now, the \$3.4 million reduction, and the stirrings of improvement in turnover, suggest that inventory finally may be heading the right way.

The quality of Tektronix products, historically high, continued to improve. An uncompromising out-the-door product audit showed a strong 6 per cent quality improvement over the year before.

The future doesn't come cheap. Our forward-looking capital investments are very substantial. Our manufacturing resources planning program, over three years, represents a capital outlay of about \$25 million. Another \$25 million, roughly, will go during the same period to computer-aided design for our engineering and R & D people.

Besides these expenditures, a continuing major investment in the future is in the physical plant itself.

As to buildings, we're in better shape than we really want to be, with a lot of capacity beyond what we can right now use. Our building plans had in mind a growth rate that today's subdued economy hasn't supported.

Eventually, they'll prove a good investment. Not only do our newer buildings exemplify high functional quality; the equipment is also new, much of it at the forefront of technology. What remains is for the economy to tilt up.

*Our new buildings were planned for future growth.
It's just that the future didn't get here as soon as they did.*



HIGH-VOLUME 22011 oscilloscope production line is impressive in its simplicity.

But... But, Aren't They Expensive?

A newly built Tek building *can* cost a lot. Even so, it has no impact on earnings at first. That's because we have made an even swap; we have reduced our cash, and increased our facilities, by the same dollar amount.

But once we start using that building and equipment, depreciation is charged. That charge *does* have an effect. It adds to costs and subtracts from earnings.

As our capital expenditures have grown, so has our depreciation expense. It went up this year 34 per cent, to \$56 million.

It would be nice if depreciation were the *only* effect facilities have on earnings. It isn't. Since we haven't had cash on hand for our various programs, we've borrowed some. We would have borrowed a great deal less were it not for these capital expenditures; and we wouldn't be paying this year's nearly \$30 million in interest, either.

Those Manufacturing Costs

High manufacturing costs have occurred and recurred over the years, but mostly we could live with them.

But with today's strong dollar, strong competition and weak world economies, now is a poor time to try maintaining margins by upping prices.

Poor flow of parts and materials hits near the heart of the matter. That converts into shortages of Tek-made parts; delayed deliveries, first of components, then of products; and a dishearteningly inefficient use of our

people. It provided one of the year's major drags on earnings, in three ways:

1. Cost of sales, partly for this reason, rose from high to higher, its worst level in nearly 10 years.

2. A lot of orders that might have turned into sales this year, didn't. Order backlog increased, despite our overcapacity.

3. The remedy itself (now well under way) is expensive. It includes our computer-based manufacturing planning program.

Things are Tough All Over

High interest, high taxes, high unemployment, high this, high that ... and a balky industrial segment leery of capital investment. In short, economic stagnation. There's a lot of it going around.

And not just in the US. The whole Western industrial world is in the same pickle, for most of the same reasons. Add to them one problem we *don't* have — the strong dollar.

"We" in the above sentence means the United States. It doesn't mean Tektronix; for us, the net effect of a more-robust dollar is negative.

The dollar is "strong" only in comparison to some other currency. So, as it flexes its muscle, you will see a corollary anemia in the franc, or the oompa or shekel.

If you were an American buying pizza in Pisa, you would like the strong dollar. But if you were a US-based company with substantial overseas sales and assets, the year's dollar strength wouldn't have helped you at all. We are, and it didn't.

It cost Tek \$2.7 million just in what are called *currency monetary-asset transactions and transactions*. Less-visible but no less real losses came about because of (a) sales lost when the strong dollar made our prices too high; and (b) the

dollar strengthening, and foreign currency weakening, between the time we quoted our price in that currency and the time we made the delivery.

What's more, reporting foreign sales in dollars on our consolidated books tends to disguise what, in local currencies, was a pretty good performance by Tek salespeople.

The message here is that our international sales were stronger than their dollarized total suggests.

But it was tough, what with all those currency shifts. It costs a European a lot more to buy a dollar's worth of scope than it used to.

An example of what can happen *did* happen, to Tek, in Italy. The sagging lira and the advancing dollar, coupled with some Tek price increases, meant that our products cost an Italian customer *80 per cent more* than just two years ago. European scope competitors seized upon this opportunity to offer their products at what suddenly seemed like bargain prices. The result was some loss in Tek's share of the scope market.

To keep their citizens from being lured by the high interest rates of US money markets, other countries have had to raise *their* interest also. The effect there? Just about what it has been here: Fewer people willing or able to borrow, and a dead-in-the-bog economy almost everywhere.

The brighter side of things is that most world economies seem to be showing symptoms of "bottoming out" — a vaguely defined concept meaning, probably, that things could hardly get much worse.

*A strong US dollar offset our
good sales performance internationally.*



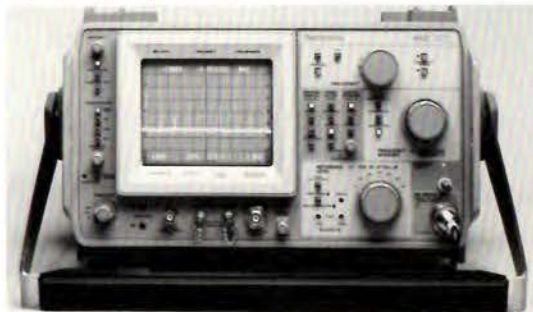
Classes introduced our new MRP system.



Sequencing components for automatic insertion.



High-volume 2200 oscilloscopes.



Type 492 spectrum analyzer.



Equipment for new circuit-board plant.



Plug-in card assembly, DAS logic analyzers.



OF150 measures signal losses in optical cable.



Computer-controlled component insertion.



GPIB assembly (general-purpose interface bus).

We Remember Jack Murdock

To honor Tektronix' founder, our new industrial tract near Vancouver, WA, was named Jack Murdock park, in dedication ceremonies July 9. Jack lived in Vancouver for years before his death in 1971.

Jack, general manager during our early years, had an immense and lasting effect on Tek's business practices. More than anyone else, he was responsible for our consensual decision-making and our avoidance of artificial symbols of power or status. He believed devoutly in the equality of people as people. His great sense of fairness impressed all who knew him. He was a superb listener, a wise counselor, skilled at non-directive management.

The tract contains planted sequoia trees, favorites of Jack—who loved the outdoors about as much as he detested the limelight. Had he been at the dedication, he would surely have squirmed and fussed at all the to-do being made over him.

He was a compassionate, very complex man, an uncommon mixture of visionary and solid businessman. A plaque embedded in a boulder in the park reads:

"Howard (Howard Vollum, board chairman) and I don't see how you can run a business successfully very long if your own interest is making money at the sacrifice of people. Conversely, we don't know how you can operate the thing very long if it *doesn't* make any money."

Murdock park contains our largest building, a 489,000-square-foot plant gradually being occupied by elements of our Instruments division.

It will house most of our portable-oscilloscope production. The move from Beaverton proceeded fitfully throughout the year, slowed somewhat by hitches and hiccups in employee relocation and transportation.

The first small group of Communications division people is hard at work in a rented school building at Redmond, in the middle-Oregon plateau, where Tek has acquired 100 acres. By October we'll be leasing two buildings there, to be used at first for component insertion and other assembly.

A Tektronix plant set up to produce the world's highest-quality, highest-technology and lowest-cost etched circuit boards will begin operating January 1 at Forest Grove, 20 miles west of our Beaverton park.

We've set a productivity goal of \$15,000 per month in output per employee. The best in the world now is a German company, with \$13,000.

The 174,000-square-foot building will house 450 employees. Aided by state-of-the-art automated processes, they will be expected to produce 1,600,000 square feet of board a year. Our existing ECB operation, with 700 people, produces 500,000 square feet.

Etched circuit boards are building blocks of almost all Tektronix products. They not only are the base for inserted components but also provide the perhaps thousands of feet of electrical interconnections within the instruments.

Creating the Market

The US economy continues its long nine-count, and those of other nations are about as groggy.

That's not an incidental concern to our business, of course, any more than the ocean is incidental to the success of a fish. But we long ago learned not to cast our fortunes to the winds of economic trends.

If you are merely selling products on a commodity basis — products that many companies can produce just about as well — you're a sitting duck when the economy falters and fumbles.

But the concept of *creating* markets has long mattered at Tek. If you have the right products, they will carve out a market at any given time. "Right" means new and needed, exciting and high-impact. Those who design, build and sell our new digital products, for instance, may be forgiven for pretending not to know a recession is going on.

A Strong Year for Logic Analyzers

Last year this report spoke of our new DAS 9100 digital-analysis system, and our belief that it would stand the logic-analyzer market on its ear. Based on that optimism, we set out a very aggressive business plan for the year. The year has ended, and our plan was exceeded: DAS orders were *double* what we had expected.

In a hard-fought tussle for market share in this most important new field, Tek vaulted from third position in order rate to first place. Our intention to *stay* at the top was underlined by announcing development of a barrage of new DAS products. One of them, the color version of the mainframe, was introduced in May; it is doing splendidly.

The others include 18 modules to extend and diversify DAS performance. They have not yet reached the market; divulging their existence early was, frankly, a message to competitors that we plan to *remain* the leading supplier of logic analyzers.

*If you have the right products,
they will carve out a market.*



PEDESTRIAN ATRIUM bisects Tek's largest building, our 489,000-square-foot Clark County, WA, oscilloscope plant.

This product line was described in detail in last year's report. But, just in case someone has borrowed your copy:

A logic analyzer helps design, test and trouble-shoot computers and related devices and systems, from mainframes to microprocessors. It does so by capturing, picturing and examining the coded "bits" of data streaming over many channels at once. A pattern generator stimulates circuits to produce varied formats and behaviors, so a logic analyzer can scrutinize the resulting data streams.

The DAS digital-analysis system gets its clout by combining these two instruments — and expanding their performance by use of up to six of Tektronix' modular plug-in cards, to well beyond the capabilities of competing products. Some of the cards acquire data; others stimulate the logic output. The DAS is light (50 pounds), and takes up less lab space than two instruments separately would.

Depending on which plug-ins you use, a DAS can acquire up to 104 channels of data, produce up to 80 channels of generation and work at speeds up to an unprecedented 660MHz. In spite of this, it's easy to run one, thanks to its 160,000-word memory; the English-like language it speaks, and the fact that you can control many complex operations with the push of a single key.

A New Friend: The Color DAS

It's a far cry from the days, not really that long ago, when big mainframe computers used to strike awe into folks, to the friendly computer-based test instruments of today. "Friendly" is a term meaning the instrument is easy for untrained professional people to use, comfortable to be around.

Interestingly, the same computer power that used to seem so austere is what provides this friendly quality. It enables more of the person-machine accommodation to be done by the instrument, requiring less learning from the human. Friendly machines meet the user half-way; friendlier ones, *more* than half-way.

In this sense, the Tektronix color DAS, out this year, is a *real* pal, the friendliest digital test instrument yet.

It has the basic DAS frame and innards, only its CRT provides a vividly contrasting red, green and yellow image against the black screen. This is the first general-purpose color-display test and measurement instrument—of *any* kind, anywhere.

Unlike what's often true of TV sets, color in a DAS is not just for show. It's there to work; it increases user speed and cuts operating errors by as much as 80 per cent.

A logic-analyzer display is dense with data, of at least three kinds: Information on the analyzer setting (like the preprinted parts of a form); information on the circuit under test (like the part of the form *you* fill in) and warnings and advice to the user (like the lady gives you when you mark in the wrong square).

On other analyzers (and other instruments), all the information appears in monochrome, requiring careful use to pick out some from the rest.

On the 9129, information on analyzer settings provides a green background. The user information on the test circuit is in a bright yellow. Cursors, prompts and helpful fault-indicator spotlights are all in a warning red.

Color separation is a big help when it comes to sorting out all this information. Typical analyzer applications may involve two groups of 10,000 digits, identical but for a single-digit flaw. The DAS electronically compares the two groups and flags the faulty bit of data with red. On monochrome instruments, highlighting may be done by

reversing the glitch so it reads black on white, by varying the gray scale or by causing the flaw to blink. Extensive tests show that color separation works far better.

The DAS tube is a purchased custom-made high-resolution CRT. With a standard television color tube, you might be able to read 40 sharp characters per line. For logic analysis you need about 80.

How the Eye Sees Color

Picking red, green and yellow might not seem to involve much technology. A kid could do it; or you could hold a contest.

There's far more to it. Deciding the three colors involved a year of Tek research, including the work of a perceptual psychologist on our staff, looking into just how the human eye behaves.

Given today's tube technology, there's no real limit to the number of colors we could have picked, progressing to other hues for finer subdivisions of information. But you quickly run into a point of diminishing returns; it gets to be more trouble than it's worth to separate purple data from puce data.

Besides, too-many colors brings about a circusy rather than functional look, far from the traditional subdued Tek image.

Three came to be seen as the optimum number. In choosing which three, we sought maximum contrast with minimum eyestrain. The eye has low acuity to blue; when blue and red information occupy the same screen, the eye must continually refocus, causing fatigue. Our three colors are limited to a range that can be seen in a single depth of field.



ENGINEER ADJUSTS and verifies the performance of our new color DAS log analyzer. Order rate in its first year has been excellent.

The customer who picks color over black-and-white has another good reason: There are no performance trade-offs, so common in choosing electronic instruments. There is no loss in speed, data content, anything. . .

Also — and importantly — it's less boring to work with color. Repetitive analysis tasks become monotonous, and a bored user is far more likely to overlook errors, or make some of his or her own.

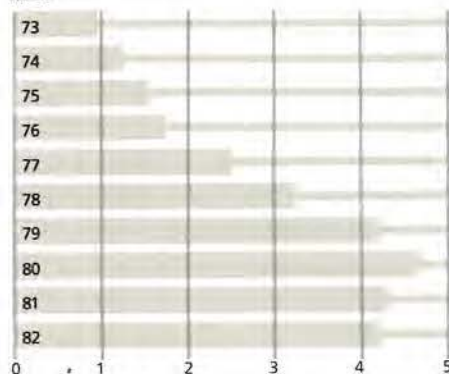
The DAS order rate is high; it's been a long while since an instrument took off like this one has. Also, that rate does not depend on large orders from few customers. (Our biggest order to date has been for 10.)

A lot of people like DAS.

Getting a Leg μ P

If the product you just bought is smarter than you, it probably has a microprocessor (μ P) inside. The powerful little computerchips are injecting electronic "intelligence" into just about everything.

EARNINGS PER SHARE
(dollars)



Designers building μ P brainpower into their products find a microprocessor development aid an essential tool.

The MDA market has two segments. One comprises systems made by μ P manufacturers themselves, which are, as you would guess, optimized for only their chips. They came first; this is still the larger segment. The other, so-called "universal" systems can work with the chips of many manufacturers. It is the smaller segment; but it is growing much faster. In the neck-and-neck race for the lead there, Tek's order rate appears to have moved a nose ahead. But it's close.

That segment is growing faster simply because there are so many μ P families out, with more chips coming all the time. Increasingly, designers may find it counterproductive to be locked into a single option when they could be playing the field.

"Universal" implies more than any product could live up to. But Tektronix comes closest of anybody, with its 8540, 8550 and (new this year) 8560 microprocessor development labs, sophisticated tools for software design and hardware debugging.

Our products' universality comes about partly from the large number of chips they support — more than any competitor (30 at last count, including powerful 16-bit μ Ps).

It also derives from the range of ways our MDLs may be used. Whatever the size or sophistication of the μ P design task, and however the designer prefers to work, Tek has an MDL to fit those needs.

We're triple-threat in this regard, and support each of the common modes of MDL use: Single-user, multi-user and host. (Both the last two are actually multiple-user systems; they vary in the role our products play in each.)

1. Single-user.

Our 8550 MDL provides *all* the functions the designer needs: Generation

of software (the program of instructions), which requires computer intelligence; debugging that software, and integrating it with the prototype hardware (which might be a μ P and circuitry to be used in some new product) in its normal environment.

2. Host.

A customer who already owns a host computer, has sophisticated programs for it and requires many designers at once to work on μ P systems can enable them to share the computer by using Tek 8540 distributed-emulation stations. The computer already can do the software writing and testing; the 8540 provides the debugging and integration.

3. Multi-user.

For the user who wants a "turnkey" (ready-to-go) system, the Tektronix 8560 software-development unit will provide the host computer intelligence, and can couple to as many as eight 8540 integrating/debugging workstations.

Because of their modular design, purchase of these products is a "maybe-also" rather than an "either-or" decision. Each of them is compatible with all the others. Thus we protect the user's investment; by mixing and matching, he or she can move, as an example, from a single-user system to multi-user by using the 8550s as workstations; or from host use of 8540s to coupling them into an 8650 system; or go back the other way.

Although optimized to work with one another, they're not that clannish. The 8540s function well with a variety of minicomputers and mainframes; and the 8560 can interact just fine with other MDA devices than ours.

Sales this year were exceptional, here and abroad, equally impressive in each of the three modes of use.

Two new products — and one veteran —
stole the market this year.



TEK SOFTWARE/HARDWARE engineer uses our 8450 8550 microprocessor development labs in product design.

Any Tek MDL simplifies software writing and editing. It converts assembly code into 1-and-0 binaries, files the sequences and puts the program in order. Then, using its emulator processor (containing a μP just like the one in the prototype), it debugs the software a bit at a time, under MDL control, watching for any errors.

Then software and hardware are integrated. The MDL transfers the program, again a step at a time, to the prototype, checking for correctness at each point. Finally, the prototype is fired up to the speed at which it will have to function in real life, and hardware/software together get one more debugging.

Tek supports more chips than any competitor. We have the best 16-bit emulator on the market. Our TNIX operating program appears to be increasingly accepted as the standard one for MDA computers; and we are continually expanding system performance. This year we added "team tools," such as documentation capability.

Use of an MDL cuts what once was weeks of software design to only days. That clearly spells "Productivity."

A Starring Role for Spectrum Analyzers

The calendar said Recession, but over at our Communications division, by golly if it didn't have all the marks of a boom year.

The outstanding performer was our line of spectrum analyzers, which capped nine years of gradually increasing market share by surging to their best year ever. Along the way they accounted for the two largest single

orders of *any* product in Tektronix history.

That may come as a surprise; a thumber through our past annual reports will find that mention of spectrum analyzers there has tended to be minimal and understated. Over the years they've managed somehow to avoid seeming glamorous.

Spectrum analyzers occupy a unique niche at Tek; for one thing, they are the only one of our major instruments with which we have *not* set out to be the leading supplier. They grew up here very much in the shadow of, and upstaged by, our dominant product, the oscilloscope. Our first analyzers were built as scope plug-ins (and continue very popular today).

On the other hand, SAs have been around here too long (two decades now) to share the limelight captured by our exciting new digital product lines.

So — undeservedly — the spectrum analyzer within Tek has taken on a lackluster all its own. It's high time its always-a-bridesmaid image was changed.

This is a really fine line of products, of two distinct types: Scope plug-ins, unique to Tektronix; and portable analyzers, in which we are pre-eminent.

A spectrum analyzer is a specialized oscilloscope that works in what's called the "frequency domain." On its CRT screen, its electron beam graphs voltage against frequency, rather than against time as on a standard scope.

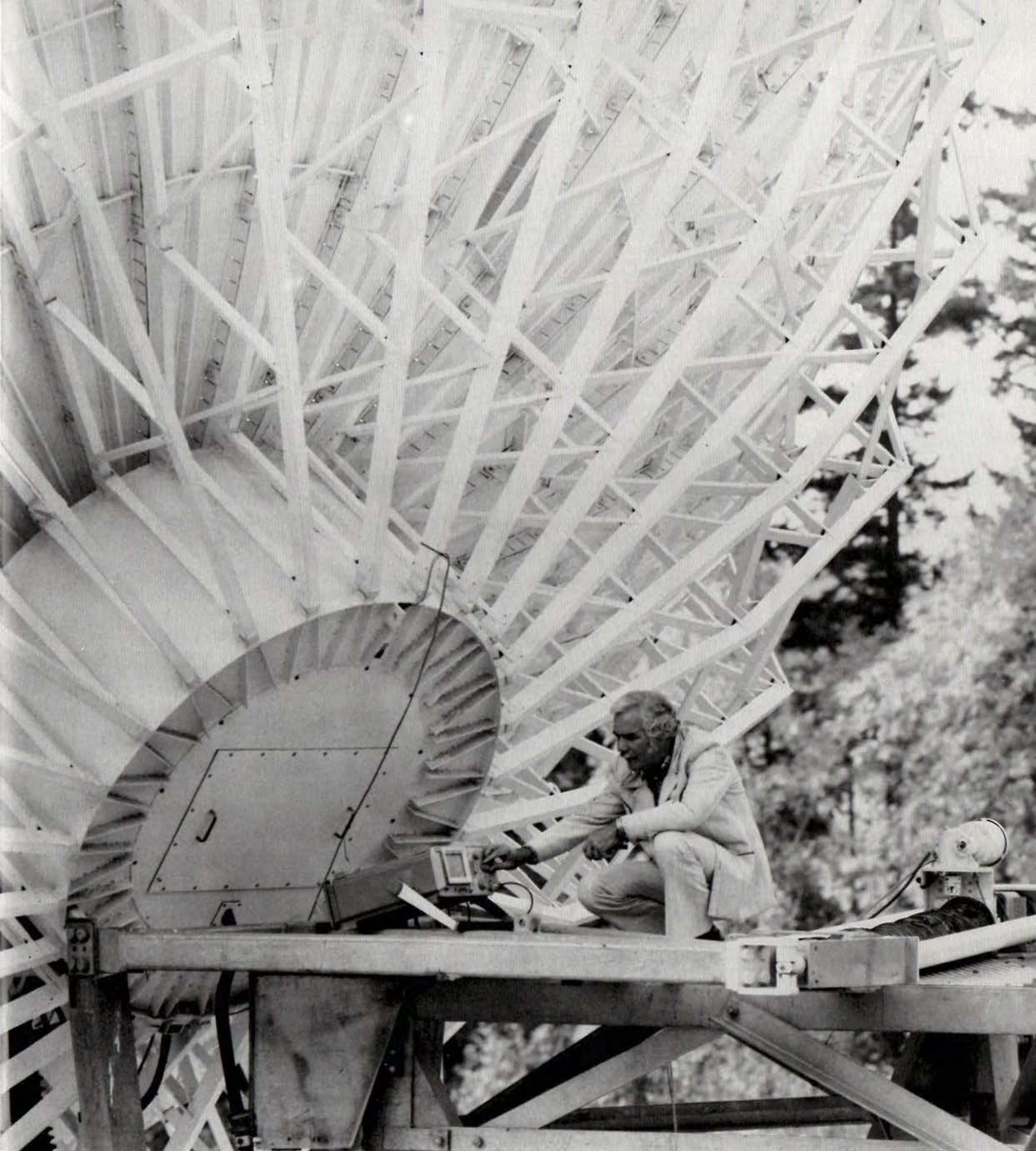
A spectrum analyzer takes apart a band (or spectrum) of transmitted frequencies (or wavelengths), tells which frequencies are present and shows their magnitude. It is an essential tool used to check and adjust transmitting and receiving equipment throughout the whole range of communications.

Our 7000-series models are high-performance units that plug into Tek laboratory oscilloscopes. Thus the many thousands of existing Tek main-frame owners can integrate SAs into their scope systems, and combine analysis with the wide range of other capabilities the plug-in approach offers.

Our small, high-performance 492 and 496 (and their programmable versions) have the major share of the portable SA market, the smaller but faster-growing segment. Military users, a large part of this market, find they need Tek's combination of ruggedness, lightweight and high performance.

Toughness and portability haven't always mattered as much to commercial users, who don't expect their analyzers to have to rumble jeep-back onto a battlefield. We have — with growing success this year — approached those customers by the side door, their service technicians. To them, a light, high-performance, easy-to-use product is just the ticket.

From field use, these products tend to progress onto engineering benches, where their state-of-the-art performance gets noticed. (Ours is the highest-frequency analyzer in the world, for instance.) That progression, field to lab, doesn't happen overnight, but it happens. That was the route of Tek's successful portable scope line, as we recall: Catch their attention with smallness and lightness, hold it with solid performance.



TEKTRONIA 492 spectrum analyzer control & display units on 2000 watts in use field. Here a user checks micro-wave signals from a local transmitter.

It was one more good year for our line of television test instruments, paced by introduction of our 690 color monitor, which more than held its own against the best US, Japanese and European competition. Product orders increased both at Beaverton and at our Grass Valley, Cal. subsidiary.

There is a tremendous buzzing-about now in the television industry, which seemingly is trying to go all directions at once: To digital transmission, to cable, to high-resolution TV, to direct satellite broadcasting. . . .

How it all finally will shake out, who can say? But television is a growth industry, and will continue to demand the range of high-quality test products with which we have continued to lead the world.

Pace-Setting and Hot Pursuit in the 'Low End'

Last year, in a change of pace, Tek made a wholehearted move to exert price and performance leadership in the \$1000-\$2000 price range with a line of all-new portable oscilloscopes. Thus was born the 2200 series.

It tickled the fancy of two national magazines; they decided to write about us. Their renditions of what we did were very flattering, but a bit overstated, and offbase in some particulars. Tek came out looking larger than life.

Life-sized would have been good enough. The 2200 proved a very successful project.

One article bore the title, "How Tektronix Beat Japan." The reference there is to the several Japanese companies who last year were eyeing the low end of the market.

First off—as we said at the time—we weren't setting out to "beat Japan." Our goal was to position Tek strongly in that market segment, to stave off raids there by *any* competitors — including European or Oriental ones who might be sizing it up as an easy beachhead to the US scope market.

Secondly, we're not aware that Japan is "beaten." Our experience with competitors from there suggests they're more likely retooling than retreating.

But the 2200 did its job well. Light, bright, reliable, versatile, easy to work with, it provided the strong price/performance pacesetter for low-end scopes. Our ambitious high-volume order goal was met. Production costs are coming down, just about on the expected learning curve.

But competition in that area is fierce. So ours had to be good, more scope per dollar.

And it was. For instance, our toughest competitive situation, where products get the most squinty-eyed technical evaluation, is in the large major scope accounts. Last year, we didn't lose a single one.

At the far other end of the line, our high-performance digital oscilloscopes had a great sales year.

Digitizing — converting waveforms into digits so a computer can process them — was an idea ahead of its time a few years back. The time has simply caught up with the idea.

The products, the 7612, 7912 and 7854, are alike in that they digitize waveforms. The 7912 is the world's fastest digitizer (1 GHz); its compan-

ion, the 7612, is dual-beam and fully programmable; has somewhat narrower bandwidth, and contains more general-purpose functions. Both have a specialized job: They capture one-shot electrical events and convert them to digits for a computer.

The 7854 is a general-purpose digital-storage oscilloscope. It has an internal "minicomputer" and can recreate waveforms from stored digits, as well as transmit them to plotter or computer.

This year we saw a strong order rate for all these products, for use in research, automated test systems and some military applications.

These high-performance laboratory instruments embody the leading edge of technology. There are few competitors in this advanced product area, and we keep well ahead of them.

But everything was not well with our bread-and-butter line: 100-200MHz portables. Tek had to work hard this year to hold onto its commanding share of that popular market. We slipped a bit.

There were more reasons than you may want to read about:

1. We didn't bring out any new portables during the year to excite the market. (That probably is the main one, right there; the history of new Tek products is that they generate customers.)

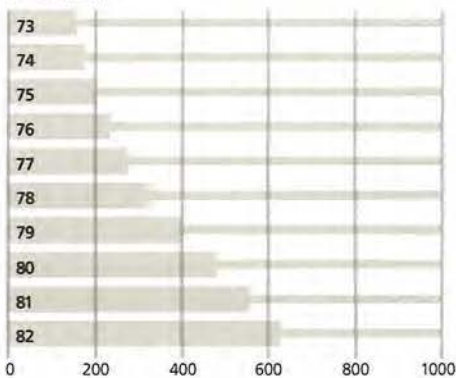
2. But some competitors did. So we competed with an aging if highly respected product line, in many cases against newer models. Offering the latest in *anything* may at least get you in the door.

Tek. with more scope per dollar, held the line against 'low-end' competitors.



LARGE-SCREEN television color monitor, the 690, was introduced this year.

SHAREOWNERS' EQUITY
(millions of dollars)



3. The strong US dollar gave European scope makers a husky price edge there.

4. Even in the US, our margins came under attack — not only from aggressive foreign scopemakers but also from domestic ones. Competition is growing.

5. But the scope market, for the moment, is not. Or at least it has shown little real growth over the last two years. So the pie has stayed constant; the pie-eaters have increased.

One reason is that most customers already own scopes. Particularly if they're Tek products (which we typically support even for years after we take them out of the catalog), the user may decide to make do with the old scope another year and spend the money instead on a newer kind of product he *doesn't* have. A Tek DAS would be a good choice.

6. Tek is the leader, with the broadest product line. It's easy for smaller companies to pick out individual products against which to compete. Japanese competition commonly *names* Tek as the standard against which it expects to be compared.

We can't control the dollar's strength and its effect on our overseas prices. We *may* exert an influence on number of competitors by helping some of them to drop by the wayside.

But the other elements we can affect considerably, by doing what we have always done best — infusing the market with innovative portables, whose performance and features lift them above the pack.

We call this process "engineering our way out." We intend to couple it to more-efficient manufacturing to sharpen our price-performance edge. That ought not only to stimulate overall market growth but also increase our share of it.

The aggressive marketing shown by competitors is less of a concern. First, we have the world's top scope sales force — better than ever, now that divisionalizing has enabled them to zero in on that product.

More important, our customers are smart; they will pick the best product. When they don't choose ours, that shows we aren't doing the job. When we *do* the job, they will choose ours.

Graphics Products Do Okay

It was a year of modest sales increase for our graphics products, a bit less modest for peripherals — plotters and hard copiers — than for terminals.

The computer graphics market is giant, and widely diverse. Almost certainly no company can "capture" it. But is it crowded! Foreign competitors are there in force; so are the big computer makers; so are a lot of small entrepreneurs; you wouldn't know them.

Tek has sharpened its focus on the user segment it knows best and has served longest — electrical engineers. Our products will continue to help them through computer-aided design and computer-aided management.

We'll leave the hotly contested office-user segment to those who relish low-margin dogfights.

Our 4114 intelligent storage terminal, introduced last year, did very well both in the US and overseas. This proves, for the umpteenth time, that direct-view storage (storage by the tube phosphor itself), deemed obsolescent as far back as 10 years, isn't out-of-date at all. It will live on as long as users need its high-resolution display fidelity.

But the trend today is to color, using raster-scan (TV-like) CRTs. This year we introduced our first large-screen color raster product, the intelligent 4113 terminal, which has done well on the market.

We do not lead in raster, nor in color; but we're very much in the game. Luckily (unlike storage, which has given a unique advantage), color-raster makers brandish no overwhelming unique technology we must buck. Most of the elements — CRTs and microcircuitry — are available to any producer. So the job is to best combine them, and best anticipate and meet user needs.

To this competition we bring our expertise in display controllers (the circuitry that drives the graphics), and our many years of CRT manufacture. We can also count on intimate knowledge of our users, for we are them; that is, electrical engineers abound at Tek. And our PLOT-10 is the most-purchased graphics-software package.

Competitors often specify Tek as the standard against which they are likely to be compared.



EXCHANGE MOTION of Tek's popular new eight-pen color plotter is examined by a mechanical engineer.

A Growing Kit of Useful Tools

Tektronix produces a wide and expanding line of high-technology tools that technical users worldwide find broadly useful, or necessary. People throughout science, industry and education use our products in research, design, production and testing of just about any product or system there is.

We are one of the two largest manufacturers of test and measurement instruments; most typically our products lead in their markets.

Our business is shared by over 50,000 commercial customers; no one of them accounts for as much as 4 per cent of it.

Our first and still our major product is the cathode-ray oscilloscope. It is the bulwark of our product line; we have led the world in its manufacture and sale for three decades now. But over the years that product line has expanded, and today it is what we call wall-to-wall — the full range of high-technology instruments.

The oscilloscope draws a graph (time vs. amplitude) of something happening within an electrical circuit. The waveform on the sensitive phosphor of the scope's cathode-ray tube results when focused electrons bombard the screen. This display allows study of events that are themselves electrical or that have been converted to voltage. The scope enables measurement of pressure, velocity, nuclear phenomena, heat, strain, sound, brainwaves and other body signals — almost anything you might think of.

Oscilloscopes differ in how wide a range of signals they can measure (their bandwidth) and how small a signal they can detect (their sensitivity). Through addition of "intelligence" and readout of waveform information they become increasingly useful.

Some are designed for use on lab benches; they are typically larger. Others are portable; our smallest works while handheld. In between, we produce the widest line of benchtop and portable scopes.

Portables are monolithic; that is, their performance is fixed, built in. Other scopes can vary their capability by using up to four interchangeable Tek plug-in units. These include amplifiers that expand either the time (horizontal) or amplitude (vertical) segments of the CRT display. Multimeters, counters, spectrum analyzers and logic analyzers also exist as scope-system plug-ins.

Some oscilloscopes are coupled to computers, or contain microprocessor intelligence. This enables further processing of waveform information, as well as their use by less-trained people. Such instruments are referred to as "smart" and "friendly."

Some contain a proprietary Tek storage tube that retains the waveform after the event ends. Others do storage by recreating the waveform, reassembling the electronically stored digits into which the signal has been broken.

A World Market, Such as it is

The technological search transcends political boundaries. Our products find markets in almost all countries.

Tektronix serves customers in major nations directly. Forty-nine commercial distributors represent us in 58 smaller or less-developed countries.

The United States is by far our largest single market; however, in any year you can expect about 40 percent of our sales to be made in other countries.

They are principally the United Kingdom, France, Germany and Japan, followed by Canada, Australia, Switzerland, Italy, Sweden and The Netherlands — not in that exact order every year.

The largest customer segment, in sales, comprises manufacturers of electronic and electrical equipment. That includes electric motors, industrial controls, radio and television sets, telephone equipment and radar systems.

The second-largest segment is the computer industry, designers and manufacturers of mainframes and mini- and microcomputers, and their peripherals.

Next, in order of sales, come:

- Governments — principally the US, but also foreign and local ones. They buy our standard commercial products.

- Education — a category that includes medical schools; vocational and technical institutions; graduate scientific or other investigative laboratories, and — as computing power costs ever less and becomes easier to use — classroom use at almost all levels of education.

- Instrumentation. Companies here are high-technology ones that include us.

- Broadcast television, and commercial and industrial cable and closed-circuit TV systems.

Our other sales are widely distributed. This dispersion continues as technology invades and enhances more and more fields. Significant customers include petroleum and other energy companies; chemical producers; transportation agencies and businesses, printers and publishers, and the medical field.

*For the first time in a long while,
the whole Western world has to witness this*



SCHEMATIC DRAWING of an integrated circuit will eventually be reduced to a chip one-quarter-inch square.

Being Our Own Supplier

For this reason or that, Tektronix over the years has found it desirable, even necessary, to design and produce many of its own components. We are a highly vertically integrated company.

That's not all a bed of roses; being a supplier has its own set of headaches. But a major benefit can result from this integration: Improved product performance from designing both instrument and component with the other in mind. The result is components optimized to fit the intended product use, products best able to make full use of the component capability.

Other reasons have simply been to have enough of the right components. Outside suppliers can't always handle short runs of unique parts — or are sometimes not interested in doing so.

We build our own cathode-ray tubes; integrated circuitry; ceramic hybrid circuits; etched circuit boards; transformers; chassis and cabinets; some semiconductors; some phosphors; potentiometers; precision capacitors and resistors; inductors; relays; oscillators; coaxial cables; waveguide mixers; and a wide variety of metal and plastic parts, many of them unique to our products.

On Excellence

Several years ago we dropped "Technical" as the third word in our four-word motto, which has since read, "Committed to Excellence." The idea was additive, not subtractive. It

sought to recognize and include in our horizons the whole tapestry of technical *and other* excellences that make up Tektronix.

In this section we've picked four examples of Tek excellence, in areas we sometimes forget to praise. One is forecasting a customer need with precision, so the product arrives *just* as its market blooms. A second has to do with a high-technology group that proves quality is not a goal, but a characteristic, of how you operate. Third and fourth are two functions, possibly routine, often taken for granted, that are very well managed year after year, and benefit us all.

The OF150: Excellence in New-Product Timing

A common means of telephone transmission is to send electrical signals over copper wire.

About three years ago our Communications division foresaw that the days of copper for this purpose were numbered, that transmission would switch to glass fiber. Glass offers many advantages: It is potentially more economical, is lighter-weight, resists electrical interference and, best of all, enables far wider-band transmission than copper. And it is compact; 10 fibers fit into the same conduit that held one copper wire.

The division proposed an instrument to meet the expected measurement needs of fiber transmission of optical signals.

The biggest limitation of copper wire is the amount of information it can carry. Growing use of digital communication, including computers, has brought pressure for wider and wider-

band phone lines. Digital signals comprise many, many bits of information; for instance, digital television requires perhaps 10 times the bandwidth that standard (analog) TV does.

Digital signals can directly interface with phone-switching systems, allowing mixing and unmixing of voice, video, telex and other signals. Digital transmission is also, at least in theory, distortion-proof.

Sending Signals Over Glass

Work has been going on for 20 years to develop a low-cost, reliable optical fiber. As it has become available, phone companies and others have begun a changeover to optical transmission over glass.

Fiber is spliced to make it easy to install (every 1 or 2 kilometers) or to insert repeater amplifiers (every 5 to 10 kilometers) to beef up a weak or distorted signal.

At each splice some signal strength is lost. If that loss is too great — and it doesn't have to be much — it can raise a hob with the quality of the received signal. Words and pictures may not come out the way they should.

What was needed was an instrument to measure the signal loss. Enter, at just the appropriate moment, the Tek OF150, many laps ahead of anything else on the market. Bell Telephone companies have adopted it as their standard, modded to suit their particular needs.

*Tuning a product to arrive
just as its market blooms.*



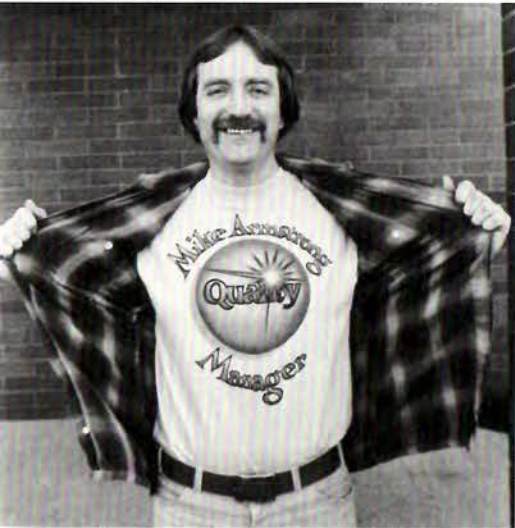
Testing plug-in cards for DAs logic analyzers.



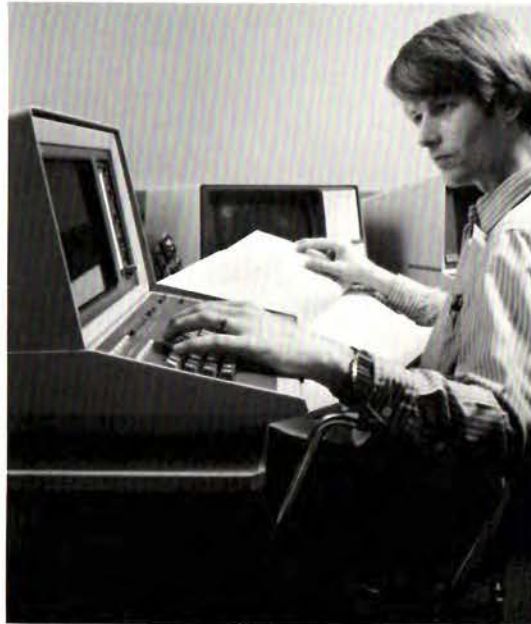
Software engineering is complex, painstaking.



Larry Choroby was Tek's United Way chairman.



Quality is central—to everyone at Tek.



Checking instructions on desktop computer.



Computer-aided design is increasing at Tek.



The 413 color terminal.



Designing software using desktop computer.

The Right Product at the Right Time

The OF150 is a time-domain reflectometer, a product type already part of Tektronix' line. A TDR sends a signal down a cable, measures its reflected echoes and thus determines the location and severity of any flaws.

The OF150 does just that, too, only by sending light over fiber rather than electrons over wire. It can look down a fiber as far as 20 kilometers, although 10 is more common; it depends on the number of flaws. Being able to look through many splices is a great benefit, enabling a single setup of the instrument rather than having to hook and unhook it all the time.

Glass fiber typically has a solid core surrounded by doped graduations or layers, each with a different refraction characteristic. The fiber acts much like a mirror-walled tube through which the signal passes.

In the OF150, a small laser diode fires a pulse of light down the fiber. As the pulse progresses, it strikes tiny imperfections in the glass; small bits of the light are bounced around in all directions — a phenomenon known as Rayleigh scatter, after a fellow named Rayleigh, who first noticed it going on, long ago. A minute portion of this scatter is reflected backward, and can be measured with an OF150.

Signal loss can be measured at each splice by comparing the scatter on both sides of the splice. It's important that this be done at installation time; once the fibers (typically in bunches in a single conduit) have been installed, correcting flaws is an expensive and tedious matter. The job calls for a technically advanced, yet rugged and lightweight instrument.

Ours is the only optical TDR that gives quantitative measurements—digital readout of precise location and of signal loss, as well as the CRT display. Others show only a picture of the signal.

The fiber-optic market is fast-growing — one of the very *fastest*-growing; foreseeable communications needs seem insatiable. The OF150 has given Tek a strong headstart in a promising new product area.

Our Grass Valley (CA) Group also has seen the value of optical fiber. They've developed a fiber-optic link over which television signals can be transmitted with virtually no distortion.

This product has been adopted as the TV transmission medium for Epcot, Walt Disney's new amusement park in Florida. Epcot (for Experimental Prototype Community of Tomorrow), embodies a variety of the most forward-looking technology.

Keeping Things Running; Excellence In Service

A field technician checks a customer's non-working instrument. The problem is a faulty circuit board. That module is replaced, then goes back to the factory. They check it to make sure it really *is* faulty.

Some modules turn out to have nothing wrong with them at all. It's easy for a field person to misdiagnose (or to hedge by pulling more boards than necessary). The "no-problem-found" percentage is an excellent measure of field technical competence.

The industry average is as high as 40 per cent; that is, field people make a wrong diagnosis 4 times out of 10.

At Tek the figure is only 13 per cent.

That's the best percentage we know of, and typifies the high competence of Tektronix service folks.

The service organization has two roles: One is doing things for customer convenience: Troubleshooting, warranty repair, providing technical information, customer training (often one-on-one). We believe a Tek product owner has these things coming.

The other part is ongoing repair and support, for which we charge a fair price.

Customers compliment it. Each year we survey to make sure our target is being met — 98 per cent of customers who respond saying we do a good job. Each year it is. It has become an assumed strength, year in, year out. We'll put it up against any service group anywhere.

We are what you might call aggressively helpful, always calling and visiting customers to make sure we know *exactly* what their repair and maintenance needs are.

We talk a lot with owners of our products, to help them understand the causes of failures—and commonly un-earth user practices that may be responsible. As we like to say, Tek fixes the product *and* the customer.

What a customer buys is the product *plus* its use for a long time. Increasingly, service is important. In today's competitive world, more and more companies may be able to offer creditable products. But we believe few if any can provide the breadth and competence of service that we do. We have 45 US service facilities, 45 overseas and 55 in distributors' facilities. It wouldn't surprise us if there's one in your neighborhood.

Tek's service organization is what you might call aggressively helpful.



DIVISIONALIZATION of Tek's sales force resulted in highly focused product-training sessions at Beaverton and in the field.

we *were* good at was inspecting, however; that and testing. As a result, customers didn't get many of the faulty tubes. In many cases, they did get good tubes awfully late.

But since its absorption into our Technology Group, Display Devices has become nearly a model operation. Tube quality is high; yields have risen, rejects and rework dropped; scrap costs are down. Our assembly plants are well-stocked with high-quality CRTs. And all with fewer people than a year or two back.

(Tek has always been known for the high quality of its products. In recent years a concerted effort has increased the levels each year; this year the improvement was a substantial 6 per cent.

(This is based on an out-the-door audit, in which we try to act even more persnickety than the toughest customer.

(Maybe our most complex component is the CRT. Of its hundreds of precision mechanical and electrical parts, we make about 95 per cent. Tek is the world's largest maker of electrostatic — non-TV-type — CRTs. The tubes require high technology and very close process control in a clean-room environment. There is just a whole lot that can go wrong.)

Display Devices now helps set the pace for Tek quality. But you wouldn't guess it; the very large number of quality-improvement programs going on there (40 to 50 a year) suggests an emergency effort to breathe life into a failing operation.

What this shows is that quality improvement is a *trend*, never a goal. And that, no matter how good you get, you never relax.

Their QIPs (quality improvement programs) seek to return up to \$4 for every dollar spent on them. They range from better operator training to improved tube brightness. Partly as a

result of them, CRT scrap costs have been cut 20 per cent this year, amounting to \$5 million saved.

Tube test yields have reached the highest level in Tek history, also a 20 per cent improvement during the year; and, despite inflation, the average tube cost dropped 8 per cent.

Other causes of better performance are tighter process specs, certification of operators, managers who know how to run each process they manage — and continuous "tweaking" of the organization toward improved quality by constant feedback on rejects, tube failures and the like.

A key approach is process control. As tube yields are reviewed, one batch may deviate widely from the quality norm, on the high side. The idea then is to stop and figure out: Just what went *right*? By duplicating those conditions, the high mark may become the new norm; thus quality levels continually rise.

We also watch to see what goes wrong, and fix it. We used to consider output after tube rework as a valid measurement; now we see rework as a cost of *un*quality. The word is: Do it right the first time.

Other words the group lives by are: Don't knowingly send a faulty tube on to the next step of the process. And never trade off quality for output — or for *anything*.

Possibly the biggest spur to better tubes is the awareness of managers that 85 per cent of the quality responsibility is theirs, not the operators' and certainly not the inspectors'.

In fact, when processes are tightened to the point that their variations are narrower than the tube specs, and those processes run normally, then we'll have no need to inspect at all.

That will be Utopia — and that, the group agrees, is a goal worth having.

Credit; Excellence in Toughness and Tact

Bad times typically have an accompaniment: Customers pay more slowly.

So it deserves at least a passing mention that Tek's accounts receivable (money owed us, on credit) improved in the past year, not worsened. It has always been one of the best in our industry.

We measure its effectiveness in number of days payments have been outstanding, amount of money owed compared to sales — the same sort of measurements you'd make.

For years this has been another of those well-managed but taken-for-granted functions. And it takes a rare mix of skills: Prudence (in giving credit where credit is due), toughness, tact — and fairness.

The credit function continues to maintain excellent customer relations while, at the same time, bringing the money in within reasonable time. And, in a year when economic conditions didn't help out at all, it got even better.

CRTs; Excellence in Quality Improvement

Tektronix' Display Devices Group does *not* have quality as a fixed goal.

Once you have a goal, the American Way is to achieve it; then relax. And relaxation is the natural enemy of product quality.

They've learned that quality is, rather, a resulting *characteristic* of the way you work. Quality permeates the group, producers of Tek's wide range of precision cathode-ray tubes.

It wasn't always so. Just a couple of years ago tube yields were poor. What

Relaxation is the natural enemy of quality.



TWO PROCESS engineers inspect a hybrid-circuit chip.

Toward Better Manufacturing

If you were to gorge on food and overdo on drink, you might well get a "stomach problem." But it wouldn't be fair to blame your stomach.

Over the years we may have been too quick to see our off-again-on-again shortages of Tek-made parts as a "manufacturing problem," and expect "them" to solve it.

Unfortunately, whatever the cause — incorrect Engineering specs, careless purchasing, a flaw in design — it always seems to show up sooner or later as a manufacturing problem. We'd like to acknowledge it for what it is and has been: A *management* problem. Admits President Earl Wantland: "For sure, it's not the troops."

In any large and complex manufacturing operation (ours produces over 70,000 separate parts and deals in short runs of specialized products), can't you count on parts shortages sometimes happening? Of course you can. Of course they shouldn't.

But it has been unfair to let our manufacturing people take all the heat. Management has pledged itself this year to solve this most-persistent and most-frustrating problem. This year it was a major factor in driving Tek cost of sales to 49.8 per cent of sales, one of our highest levels ever.

We made progress by separating our large, cumbersome electrical and mechanical components operation into four plants. This has had two benefits: (1) Doing away with some shortages; (2) enabling a focus on just where and how severe the *real* shortages are — a piece of information that our centralized reporting system had effectively smudged.

Our total components manufacture now comprises six plants: Metal work, Beaverton; Etched circuit boards, Forest Grove (by January); Plastics, cables and wiring, Vancouver; Special-support manufacturing (relays, transformers, power supplies and coils), Beaverton; Cathode-ray tubes, Beaverton; Integrated circuits, Beaverton.

The last two plants produce our highest-technology components, and employ about 3,000 people. It's worth noting that they are near-model operations, with quality and delivery levels approaching 100 per cent. No parts shortages.

Each plant does its own scheduling and materials purchasing. Up to now, usually the orderers and not the builders did the "scheduling," with any division able to declare any part high priority and push it through ahead of any other. Is that an illogical statement? Well, that's about how well it worked, too.

The early-season result of this decentralizing shows up as a decrease in our very high scrap levels, and about a \$15 million reduction in materials inventory. So, things are slowly coming around.

The goal: *One hundred per cent good parts, on time, at the lowest possible cost.*

Seeking an "A" for our Efforts

Besides the fact that initials and acronyms — CAX, DAS, MRP, CRT — make English resemble someone choking, it's hard for outsiders to keep track of what they mean.

Here's one to remember: MRP. It is a force bound to change Tektronix.

It means Manufacturing Resource Planning. Using an advanced software program, our new MRP system, being installed, is designed to yield daily operating information in such breadth and explicit detail as to not only drive our manufacturing but also powerfully affect corporate planning and strategy.

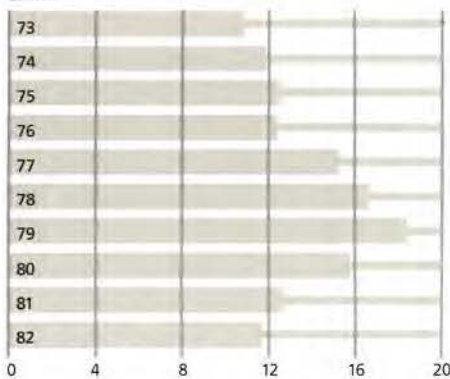
The computer part is only 10 per cent of it. The other 90 per cent is discipline. And you don't get that from software.

Tek has set itself a very tough goal — to join the only hundred or so companies with Class "A" MRP status. Class A means attaining extremely high levels of accuracy in bills of materials, routing and inventory. It implies 100 per cent quality in parts; no shortages, and continuous, thorough training.

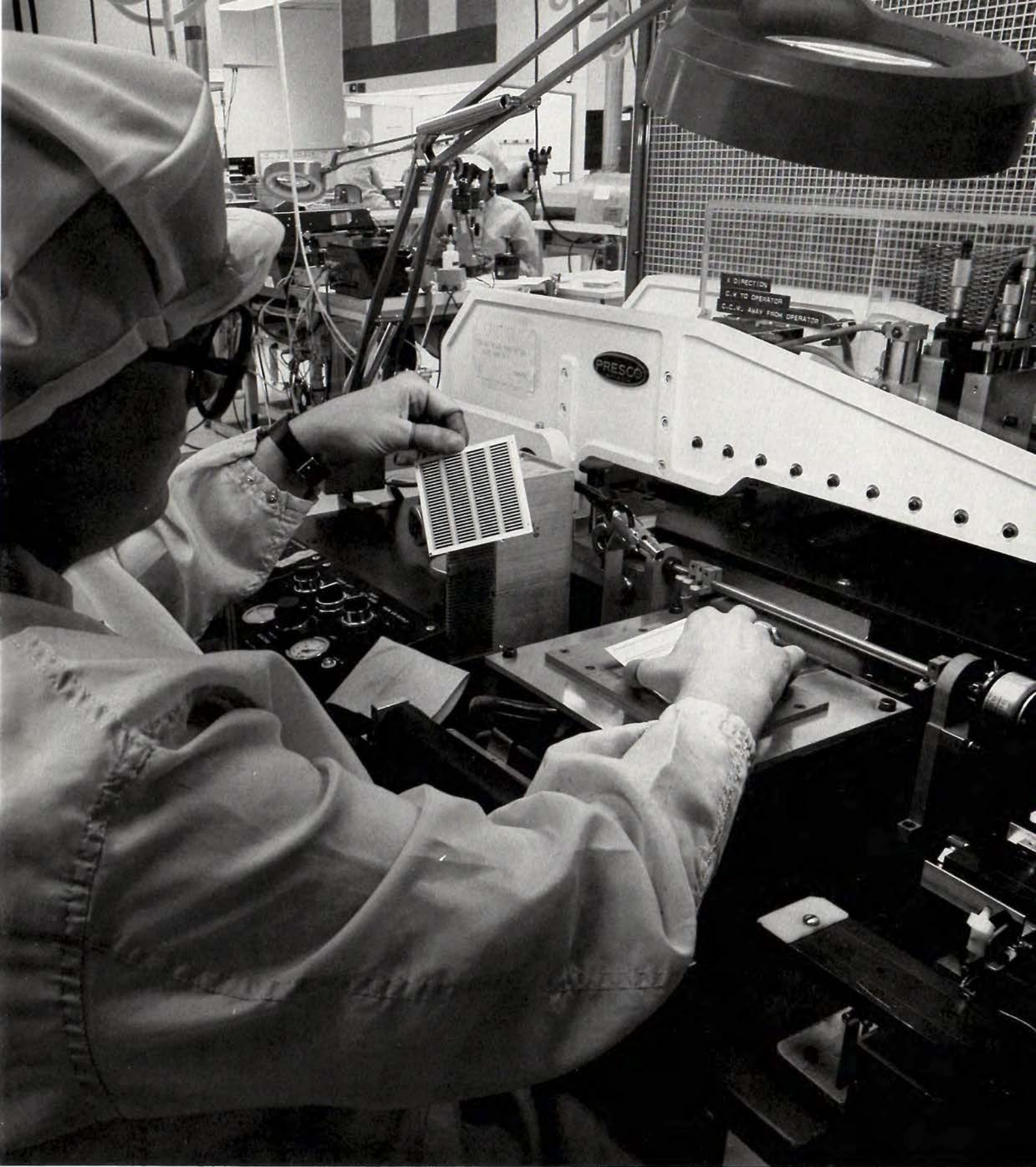
If this sounds like something any company worth its salt would be doing already, consider this: *Many* companies have set out to be Class A. The great majority have failed.

It's going to take work. And it will take some other things, too, says a Tek vice-president, who lists three of them as training, training and training.

RETURN ON CAPITAL
(percent)



*New manufacturing systems will
require training, training and training*



MICROCIRCUITRY manufacturing at Tek boasts near-perfect quality and delivery levels. Shown is an early stage in fabricating a thick-film hybrid circuit.

And, warns an MRP advocate, it will run very happily on junk.

This means it will be only as good as the data that feeds it. So, our first (*pre-MRP*) steps are to clean up our information. We're shooting for a bill-of-material accuracy of 99-plus per cent. (Our Communications and Design Automation divisions have been brought to that level this year.) And all inventories are being put into a controlled environment; the days of easy-come-easy-go open stock areas are through.

For you must know inventory *exactly* at any given moment, or you may overorder or underorder, then overproduce or underproduce. We have done all the above.

It's much like a wife searching the refrigerator for mayonnaise to put in salad, only to find that the husband had used it all on a midnight sandwich, just forgot to mention it. Then, next day, the wife replenishes the supply; but the husband, to make up for his fridge raid, also buys a quart on the way home — or perhaps two, they being on special that evening.

The box score of this process: No salad mayonnaise when needed on Monday, treble the amount anybody could use on Tuesday. It takes up refrigerator space that might otherwise be used for soda pop (except, of course, that the pop money was spent on the redundant mayonnaise).

And that's the way it works when inventories are not *very* fussily managed.

All inventory will from now on be accountable to one of our divisions or plants. Now a lot of Tek inventory simply "belongs to the company," so it's hard to develop a strong sense of stewardship toward it.

In a plate of ham and eggs, someone points out, the chicken was involved. But the hog was *committed*.

Our new MRP requires commitment — what the pulps used to call grim-jawed determination. Companies who have failed in their quest for Class A often didn't take it seriously enough. Commitment must start at the top.

You see, we were onto something back in '65, when we began our computerized manufacturing requirements system. Had it received the necessary starch — trained employees and committed managers — Tek might have become one of the very first companies with an effective MRP. ("Might" implies "might not." The program ran on a single central computer; the overload of data might have meant a mismatch from the start.)

But it had an outside chance. However, only some areas used it. Users weren't always trained. It was updated irregularly. Its use became increasingly half-hearted, and the data fed into it had less and less integrity. Tek developed a high tolerance for bad information, and a distrust of the system.

So it became of only limited value. About like Manhattan traffic lights, which chonk red-green-red while pedestrians ignore them. Walkers wait instead for breaks in traffic, then rush like lemmings across the street in the pragmatically correct direction. And it manages to work.

So did Tek manufacturing work, by competent people end-running or bandaging the old MRP with informal "systems," typified by padded orders and cushioned schedule estimates. To run this kind of fudge-factor manufacturing, sighed one manager, "takes a cast of thousands." Its stars have been the many expeditors, coordinators, checker-uppers and finaglers who sort of help the MRP along. (You'll find them under "O" for Overhead.)

Ours will be, if we have this right, the largest single MRP conversion ever made. There will be 19 plants reporting. It will have the support of six major computer systems, linked by a company-wide network.

Tektronix' executives have been MRP-oriented. Training is working its way through the organization. First, managers participate; then they train their employees. The manager *is* the change agent, modeling the attitudes and strict disciplines the program demands.

Class A says 80 per cent of our people must be trained. *We* say 100 per cent.

Divisionalizing and MRP could have happened separately. But it's better that they happened together; Tek nowadays is not in much of a mind to start another centralized *anything*.

Coming Apart at the Seams as Fast as we can

Decentralizing will take awhile; five years, is our guess. Four to go. As promised, we *have* re-formed into four product divisions; that's been the easy part. What you should know, however, is that this leaves out most of the company.

Our functional organizations that provide goods and services across *all* Tek product lines remain outside the division structure. They account for most Tektronix people, who work in centralized R & D, product and component manufacture, marketing, international, quality assurance, finance and control, administration, planning and legal functions.

Although the big payoff from divisionalizing will be long-term, it has already shown results in a revitalized sales effort. Salespeople are now free to concentrate on specific products rather than dissipate their efforts over a large and ever-broadening product line. That has been a major reason for this year's increase in orders. Divisional controllers, although barely in place, already are showing signs of making a comparable contribution.

"Our opportunities are above-average; our problems are above-average. We must have above-average management."



HIGH-VOLUME cathode-ray-tube production line (shown here as a model) will increase tube output and manufacturing efficiency.

Manufacturing Resource Planning (MRP) program is being phased in, Larry will be responsible for it also.

Logic-analyzer systems, which capture and analyze parallel streams of binary data from computers and other digital systems, and display it in monochrome or full color; microprocessor-development systems, tools that assist designers in writing software, debugging digital hardware and integrating the two; and large semiconductor test systems.

The group also is responsible for producing these information-display products:

Graphic computer terminals, which display pictorial material (charts, graphs, diagrams) as well as words and numbers, in monochrome or color; graphic computing systems, which can either work as desktop computers or interact with a host mainframe; hard-copy units, which make paper copies of CRT screen graphic content; display monitors; and digital plotters that produce up to eight color plots on mylar or paper.

Most of our terminals and computing systems use unique Tek-made storage CRTs, which retain a transmitted image after it has been written a single time. Others employ purchased raster-scan CRTs that, like television picture tubes, rewrite ("refresh") the image all the while it is being viewed. Some models combine the two modes.

Some of our terminals and all our computing systems are "intelligent"—that is, they incorporate microprocessor or other computing power.

The group also produces a wide range of electrical and mechanical components.

▪ *The Communications and International Group* is managed by Group Vice-President Larry Mayhew. It includes our Communications division, makers of spectrum analyzers, cable testers and television test instruments; and the following functional organizations: International Operations, Corporate Marketing and Service, Distribution, and Procurement.

This group produces Tek's communications products:

Television waveform and picture monitors, signal generators and vectorscopes, all of which in some way measure and display the quality of video-signal transmission; and, from our California subsidiary, The Grass Valley Group, Inc., production and routing switchers and special-effects systems for television. Both Tektronix and Grass Valley products are the leading ones.

Spectrum analyzers; data comm analyzers; and both electrical and optical cable testers.

Each of these men will be responsible for the success of the operations he manages and for supporting the other groups, as well as for helping transfer responsibility from centralized functions into divisions. They report to the Office of the President.

They are richly qualified for this assignment. Each has a varied background at Tek, and has proved himself a strong leader as well as an effective manager. Each is committed to divisionalizing, and a leading advocate of MRP. Each has the ability to cut through the smoke and focus on major problems. And each is forthright and outspoken; they'll help keep Tek on the track.

Together with Earl Wantland, chief executive officer; Bill Walker, chief operating officer, and Larry Choruby, chief financial officer, they form our new Executive Council. Strategy and goals will be set, policy determined and corporate decisions made by Earl, Bill, Wim, Larry, Larry and Larry.

Importantly, this move also represents decentralization of the most-pervasive central function of all, the Office of the President. The group executives, as time goes on, will assume a growing share of the responsibilities now held by Bill and Earl.

So, divisionalizing is working; now, it needs to be driven faster and harder.

As a step in that direction, we've formed three operating groups, whose managers will share the difficult job of integrating major functional organizations into product divisions.

▪ *The Instruments and Technology Group* is managed by Group Vice-President Wim Velsink. It includes the Instruments division, our largest; and the Technology Group, our high-technology component-manufacturing and R & D organization.

The group is responsible for the following test and measurement products:

Oscilloscopes and plug-in units for them that vary and extend their performance; and scope accessories, including probes, attenuators and waveform-recording cameras. Tektronix is the world's leader in oscilloscopes and scope systems.

Programmable and manual modular instruments; semiconductor curve tracers; and isolators and ground-isolation monitors.

The group also produces high-technology components; Storage and conventional cathode-ray tubes, integrated circuitry and hybrid circuitry.

▪ *The Design Automation and Information Display Group* is headed by Group Vice-President Larry Sutter. It includes the Design Automation division, producer of logic-related instruments; and the Information Display division, which produces graphic terminals and computing systems and peripherals. It also encompasses our Electrical/Mechanical Component Manufacturing function. And, while our new

*Divisionalizing is working.
Now we'll drive it faster and harder.*



TEKTRONIX 2D drafting workstation enables rapid updating of facilities plans.

Of course, something that happens on paper can hardly be said to have "happened" at all. Functions and divisions have an apples-and-oranges quality about them. Integrating them will be a long-term effort. Some functions will fairly easily disassemble and be shuffled into the divisions. Others (for instance, manufacturing groups that share the economies of scale of production processes and integrated plants) may prove less "biodegradable."

But our conviction is that, the sooner and the more optimally the functions and divisions can integrate, the better off we'll be.

Wim and Larry Sutter were appointed Group Vice-Presidents by the board of directors July 22.

Wim, who has been director of the Technology Group and, before that, of Tek Labs, began work at Tek as design engineer in 1961. He has a background in advanced product development. Wim has been a vice-president since 1973.

Larry's first job at Tek was product marketing manager, in 1976. Later in that same year he became general manager of a business unit. He has been a vice-president since 1981.

Moving Right Along

The divisionalizing process is going pretty well. "Better than I expected," admits Bill Walker, chief operating officer, who adds:

"And, if I'd realized how complex it would be, I wouldn't have expected as much."

It's moving right along, he feels, for three reasons:

1. The problem was real: Rigor mortis was setting in, in some of our large, centralized functions.

2. The remedy was the correct one: Decentralizing decision-making and moving to more-responsive product divisions.

3. The process wasn't just left to happen; Bill and President Earl Wantland have personally directed it.

The biggest problem: Staffing. The biggest need: Time.

As new division jobs have opened up, our inhouse pool of some specialized skills has been used up. We've had to do more outside hiring than usual to fill some of these professional positions.

Also, the division structure—and its expected offspring, product-oriented business units—call for a new breed of Tek person, the General Manager.

Tek has been a centralized, functionally oriented company through its history, and hasn't needed many general managers. (One would suffice, most years.) Thus we have not provided a breeding ground for that set of skills. So, we don't have many; we will need more and more, and we lack the luxury of time in which to grow them. So it is a matter of choosing the fittest and best and "force feeding" — accelerating their growth.

Whether it is an "orderly, evolutionary process" (newsletter describing divisionalizing) or "like the Great Oklahoma Land Rush" (manager comment), it's a sure thing no change as major as this can be totally smooth. Some managers are already straining their leashes for more responsibility; others may wish for a bit of time to let the last thing sink in.

Change always causes some confusion, and even some unease. To minimize that, we've proceeded on a known schedule and communicated each completed step to employees.

In place now at the division/function level are controllers, and purchasing, human-resource, facilities, materials and production managers.

How much autonomy will be given how fast will depend largely on how quickly the organization can assimilate each succeeding step.

Earl feels that, so far, divisionalizing has gone well, given the size of the task and the large number of things we suddenly have to know about.

"Each of us has a plurality, if not a majority, of ignorance," he points out. "But I think we're replacing ignorance with intelligence pretty fast."

Tektronix Worldwide

Tektronix, Inc.

CORPORATE OFFICE:
Beaverton, Oregon

UNITED STATES MANUFACTURING:

Beaverton, Oregon
Portland, Oregon
Redmond, Oregon
Vancouver, Washington
Wilsonville, Oregon

UNITED STATES SALES AND SERVICE:

Albany, NY	New Orleans, LA
Albuquerque, NM	Newport News, VA
Atlanta, GA	Oklahoma City, OK
Baltimore, MD	Orlando, FL
Boston, MA	Pensacola, FL
Chicago, IL	Philadelphia, PA
Cleveland, OH	Phoenix, AR
Concord, CA	Pittsburgh, PA
Dallas, TX	Portland, OR
Dayton, OH	Poughkeepsie, NY
Denver, CO	Raleigh, NC
Detroit, MI	Rochester, NY
Fort Lauderdale, FL	Rockville, MD
Houston, TX	St. Louis, MO
Huntsville, AL	St. Paul, MN
Indianapolis, IN	Salt Lake City, UT
Irvine, CA	San Antonio, TX
Kansas City, KS	San Diego, CA
Knoxville, TN	Santa Clara, CA
Long Island, NY	Seattle, WA
Los Angeles, CA	Syracuse, NY
Milford, CT	Woodbridge, NJ

AMERICAS-PACIFIC OPERATIONS:

Tektronix, Inc.
Beaverton, Oregon

EUROPEAN OPERATIONS:

Tektronix Europe B.V.
Amstelveen, The Netherlands
Tektronix Limited
Guernsey, Channel Islands

INTERNATIONAL MANUFACTURING:

*SONY/Tektronix Corporation
Tokyo and Gotemba, Japan
Tektronix Guernsey Limited
Guernsey, Channel Islands
Tektronix Holland N.V.
Heerenveen, The Netherlands
Tektronix U.K. Limited
Hoddesdon, United Kingdom

INTERNATIONAL SALES AND SERVICE:

Australia—Tektronix Australia Pty. Limited,
Sydney, Adelaide, Brisbane, Canberra,
Melbourne and Perth
Austria—*Rohde & Schwarz-Tektronix
Ges. mbH, Vienna
Belgium—Tektronix S.A., Brussels
Brazil—Tektronix Industria e Comercio Ltda.,
Sao Paulo and Rio de Janeiro
Canada—Tektronix Canada Inc., Barrie,
Calgary, Edmonton, Halifax, Montreal,
Ottawa, Toronto, Vancouver and Winnipeg
Denmark—Tektronix A/S, Copenhagen
Finland—Tektronix Oy, Helsinki
France—Tektronix, Paris, Aix-en-Provence,
Lyon, Nanterre, Rennes, Strasbourg and
Toulouse
Germany—Tektronix GmbH, Cologne, Berlin,
Hamburg, Karlsruhe, Munich, Nuremberg
Ireland—Tektronix U.K. Limited, Dublin
Italy—Tektronix S.p.A., Milan, Rome and
Turin
Japan—*SONY/Tektronix Corporation, Tokyo,
Fukuoka, Nagoya, Osaka, Sendai and
Tsushima
Mexico—*Tektronix S.A. de C.V., Mexico City
The Netherlands—Tektronix Holland N.V.,
Badhoevedorp
Norway—Tektronix Norge A/S, Oslo
Spain—Tektronix Espanola S.A., Madrid and
Barcelona
Sweden—Tektronix A.B., Stockholm and
Gothenburg
Switzerland—Tektronix International A.G.,
Zug and Geneva
United Kingdom—Tektronix U.K. Limited,
London, Harpenden, Livingston,
Maidenhead and Manchester

The Grass Valley Group, Inc.

MANUFACTURING:
Grass Valley, California

EUROPEAN OPERATIONS:

G.V.G. International Ltd.
Winchester, United Kingdom

UNITED STATES SALES AND SERVICE:

Arden Hills, MN	Fort Worth, TX
Atlanta, GA	Palo Alto, CA
Edison, NJ	Woodland Hills, CA
Elkhart, IN	

*Joint Venture Companies

Tektronix Management Review

Tektronix experienced modest growth in demand for its products during the past fiscal year. New models in the Company's basic product lines, introduced during the past two years, have contributed significantly to this improvement. Increases in orders occurred principally in the United States; foreign demand was adversely affected by economic conditions abroad and by a strengthening U.S. dollar, which caused increases in the cost to the customer, stated in foreign currency, of acquiring the Company's products.

Since its founding in 1946, the Company has played a significant role as a supplier of products contributing to the advancement of science and technology. Management views the principal focus for the future of the Company as that of a broad-based supplier of products in this field. Management believes Tektronix' future strength depends to a large extent on the continuing renewal of its product offerings by the successful development and introduction of innovative new products.

The accounting view of inflation is set forth in the Notes to Financial Statements. Inflation has had a significant effect on the Company's materials and labor costs, as well as on the total amount invested in recent years in new plant and equipment. While inflation has put upward pressure on costs and expenses, an unfavorable economy, weakness in foreign currency exchange rates against the dollar and competition have limited the Company's ability to counteract higher costs and expenses with price increases. As a result, margins have decreased over the period covered by this review.

Financial Condition— Management believes that Tektronix' financial condition positions the Company well for the future, with substantial internal cash flows as well as the capability to seek additional funds from outside sources.

1978	1979	1980	1981	1982	
\$250,148	\$275,652	\$347,086	\$359,264	\$ 388,714	Working capital
491,130	642,907	841,693	953,753	1,042,287	Total assets
10,351	28,997	45,809	50,175	66,334	Short-term debt
37,086	62,094	136,196	146,143	132,060	Long-term debt
326,696	402,800	483,338	557,544	630,449	Shareowners' equity

Tektronix' working capital has varied between thirty-three percent and thirty-six percent of net sales for the past three years. A substantial portion of current assets is represented by short-term overseas investments. The average annual accounts receivables total, as a percentage of net sales, was 18.1 percent in 1980, 19.0 percent in 1981, and 18.2 percent in 1982; average inventories were 24.6 percent of net sales in 1980, 26.2 percent in 1981, and 24.4 percent in 1982. Current liabilities have remained at a constant level relative to sales.

Total assets have increased as a result of substantial capital investments in technically advanced buildings and equipment. Expenditures in this category were \$115.9 million in 1980, \$114.1 million in 1981, \$102.4 million in 1982. Management expects capital spending will continue in 1983 and 1984 at about the present rate. The cost to complete facilities projects authorized at year-end 1982 is estimated to be \$97 million.

The Company's expanding asset base has been financed largely by funds generated from operations: \$117.5 million in 1980, \$121.9 million in 1981, and \$144.7 million in 1982. These internal funds have been supplemented with external borrowings and the sale of shares to employees. Management expects that future funding needs can be met from the same sources. The Company currently maintains \$115 million in long-term bank lending commitments and had \$80 million of unused short-term credit lines at fiscal year-end.

Short-term borrowings and maturing long-term debt increased \$16.8 million in 1980, \$4.4 million in 1981, and \$16.2 million in 1982. Long-term debt increased by \$74.1 million in 1980 and \$9.9 million in 1981, and then was reduced \$14.1 million in 1982. The need for debt financing has declined since 1979 as the Company's rate of sales growth slowed. Borrowed funds have increased in amount, but the ratio of total debt to invested capital has declined from 27.4 percent in 1980 to 23.9 percent in 1982.

An ongoing program that encourages employee ownership in the Company has added \$32.3 million to share capital during the last three years. This, together with \$195.3 million of earnings that have been reinvested, increased shareowners' equity 56.5 percent since 1979.

Results of Operations— Fiscal year 1982 was the second consecutive year in which sales fell short of management's expectations, and earnings declined from the prior year. Since spending is based in part on expected sales levels, margins suffer when these levels are not achieved. Management attributes the shortfall in sales to economic conditions, competition, exchange rates and difficulties experienced in the Company's production scheduling.

1978	1979	1980	1981	1982	
\$598,886	\$786,936	\$971,306	\$1,061,834	\$1,195,748	Net sales
94,139	121,448	147,849	138,036	146,447	Operating income
56,846	77,151	85,072	80,167	79,453	Earnings
3.19	4.28	4.66	4.34	4.25	Earnings per share
.48	.60	.79	.90	.98	Dividends per share

Customer orders increased more rapidly than sales in 1982, gaining 17.4 percent while sales increased by 12.6 percent. The sales gain was higher than the 9.3 percent increase for 1981 over 1980, but still below the 23.4 percent growth in sales for 1980. The increase for orders in 1982 was a substantial improvement over order performance in 1981, which was essentially unchanged from 1980 levels. In each of the years, price increases accounted for a substantial portion of the sales gains.

Manufacturing cost of sales continued to consume increasing amounts of sales revenue. Cost of sales was 47.2 percent of sales in 1980, 48.3 percent in 1981, and 49.8 percent in 1982. Production scheduling problems, increased expenses for indirect labor and under-utilized manufacturing facilities contributed to the rising trend of manufacturing costs.

Over the past three years the Company has made substantial new investments in facilities, expanded manufacturing capacity and improved manufacturing systems. As a result, depreciation expense, based on accelerated methods, has grown from 2.7 percent of sales in 1979 to 4.7 percent in 1982. This growing burden, which amounted to \$56.5 million in 1982, affects both cost of sales and operating expenses.

Operating expenses have remained relatively constant as a percentage of sales, ranging from 37.6 percent to 38.7 percent. Selling and engineering expenses have increased as a percentage of net sales each year since 1980. Engineering consumed 9.1 percent of sales revenues in 1982, compared with 8.0 percent in 1980. Selling expenses went from 13.9 percent of net sales in 1980 to 15.1 percent in 1982. Administrative expenses increased from 9.1 percent of sales in 1980 to 9.5 percent in 1981, but returned in 1982 to the 9.1 percent level. Profit sharing expense, which includes certain executive incentive compensation, and the amount of which is generally dependent on income levels, has declined for three consecutive years. It represented only 4.6 percent of net sales in 1982, compared with 6.5 percent in 1980.

Interest expense increased by 16.9 percent in 1982, because of increased borrowings and higher rates. Non-operating income amounted to \$5.0 million in 1980, \$19.6 million in 1981, and \$9.5 million in 1982. Of the 1981 amount, \$10.5 million represented proceeds from the sale of the Company's portable patient monitor business; after taxes and profit share, that transaction contributed \$5.2 million, or 28 cents per share, to earnings for the 1981 year. Other factors influencing non-operating income have included investment income, which has increased substantially (as explained in the Notes to Financial Statements), and currency fluctuations, whose effects have largely offset this increase.

Income tax expense increased in 1981, as a percentage of income, over the 1980 rate, but declined again in 1982, to 37.1 percent. Inventory relief in the United Kingdom reduced tax expenses by \$3.1 million in 1982, as it had by \$1.1 million in 1980. This favorable impact was partly offset by generally higher foreign taxes resulting from foreign currency translation losses which do not reduce income taxes. The new United States research and experimentation tax credit amounted to \$3.8 million for the year.

Earnings increased in 1980 by more than ten percent over 1979, but declined in 1981 and 1982 by six percent and one percent, respectively. To a large extent, the decline in earnings flowed through from the decline in gross profit margins discussed above. Increases in the number of outstanding shares caused dilution amounting to 5 cents per share in 1981 and 1982.

AUDITORS' OPINION

To the Shareowners of Tektronix, Inc.:

We have examined the statements of consolidated financial position of Tektronix, Inc. and subsidiaries as of May 29, 1982, May 30, 1981, May 31, 1980, May 26, 1979 and May 27, 1978, and the related statements of consolidated income and reinvested earnings and of consolidated changes in financial position for the years then ended. Our examinations were 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, such financial statements present fairly the financial position of the companies at May 29, 1982, May 30, 1981, May 31, 1980, May 26, 1979 and May 27, 1978, 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.

Deloitte Haskins & Sells

Portland, Oregon
July 22, 1982

Tektronix Consolidated Financial Position in thousands

1978	1979	1980	1981	1982	
\$357,704	\$428,787	\$540,917	\$573,791	\$621,981	CURRENT ASSETS are cash and assets that should be converted to cash or used in operations within one year
66,208	41,788	57,145	47,862	73,331	CASH AND CASH EARNING INCOME — bank deposits and short-term investments
115,100	153,568	198,069	204,952	230,573	ACCOUNTS RECEIVABLE — due from customers after an allowance for doubtful accounts
163,523	214,533	263,563	293,705	290,268	INVENTORIES — materials, accumulated manufacturing costs and finished products awaiting sale
12,873	18,898	22,140	27,272	27,809	PREPAID EXPENSES — supplies and services that have not been used, and deposits that will be refunded
107,556	153,135	193,831	214,527	233,267	CURRENT LIABILITIES are obligations that are to be paid within one year
10,351	28,997	45,809	50,175	66,334	SHORT-TERM DEBT — borrowed for less than one year and that portion of long-term debt repayable within a year
33,108	42,033	49,034	60,405	63,856	ACCOUNTS PAYABLE — owed for materials, services, interest and miscellaneous taxes
18,458	20,444	27,404	28,788	23,118	INCOME TAXES PAYABLE — to United States and foreign governments
45,639	61,661	71,584	75,159	79,959	ACCRUED COMPENSATION — payable to employees, and their retirement and incentive plans
250,148	275,652	347,086	359,264	388,714	WORKING CAPITAL is the current assets in excess of the current liabilities
119,533	194,454	276,771	340,912	379,122	FACILITIES — the cost of land, buildings and equipment after deducting accumulated depreciation
13,893	19,666	24,005	39,050	41,184	OTHER LONG-TERM ASSETS — the equity in joint ventures, receivables not due within a year, and intangibles
37,086	62,094	136,196	146,143	132,060	LONG-TERM DEBT — funds borrowed for more than a year, less that portion due within a year
16,029	19,150	23,974	30,765	41,124	DEFERRED TAX LIABILITY — income taxes which have not become payable
3,763	5,728	4,354	4,774	5,387	OTHER LONG-TERM LIABILITIES — incentive compensation payable in future years
326,696	402,800	483,338	557,544	630,449	SHAREOWNERS' EQUITY is the book value owned by the shareowners
24,332	31,950	41,844	52,515	64,277	SHARE CAPITAL — the proceeds of common shares sold less the cost of any shares repurchased
302,364	370,850	441,494	505,029	566,172	REINVESTED EARNINGS — accumulated earnings that have been reinvested in the business
17,913	18,143	18,372	18,574	18,807	COMMON SHARES — the number of shares outstanding at year-end, of the forty million no par value shares authorized

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

Tektronix Consolidated Income and Reinvested Earnings in thousands

1978	1979	1980	1981	1982	
\$598,886	\$786,936	\$971,306	\$1,061,834	\$1,195,748	NET SALES and rentals to customers for products, replacement components and services
266,474	359,740	458,464	513,145	595,340	COST OF SALES—the materials, labor and facilities related to manufacturing goods and providing services
332,412	427,196	512,842	548,689	600,408	GROSS PROFIT remaining from sales revenue after production costs
49,832	60,561	77,797	91,147	109,086	ENGINEERING EXPENSE — for research and the development of products and components
86,850	113,461	135,405	157,105	180,631	SELLING EXPENSE—for marketing and sales programs, and the distribution system
53,063	68,044	88,343	100,715	108,977	ADMINISTRATIVE EXPENSE—for general management and supporting services
48,528	63,682	63,448	61,686	55,267	PROFIT SHARING — the incentive portion of employee compensation
94,139	121,448	147,849	138,036	146,447	OPERATING INCOME remaining from sales revenue after the costs and expenses of operations
4,246	6,428	15,956	25,274	29,537	INTEREST EXPENSE — the cost of borrowed funds and banking services
6,068	11,631	5,029	19,630	9,493	NON-OPERATING INCOME—investment income, joint venture earnings, currencies, and other income and expense
95,961	126,651	136,922	132,392	126,403	INCOME BEFORE TAXES remaining from sales revenue after operating costs and expenses and non-operating items
39,115	49,500	51,850	52,225	46,950	INCOME TAXES—provided for income related taxes levied by United States and foreign governments
56,846	77,151	85,072	80,167	79,453	EARNINGS remaining from sales revenue for reinvestment in the business and for dividends
256,219	302,364	370,850	441,494	505,029	REINVESTED EARNINGS — from prior years
(10,701)	(8,665)	(14,428)	(16,632)	(18,310)	DIVIDENDS—declared for payment to the shareowners
302,364	370,850	441,494	505,029	566,172	REINVESTED EARNINGS at year-end
17,808	18,031	18,264	18,482	18,691	COMMON SHARES—the weighted average number of shares outstanding during the year
\$3.19	\$4.28	\$4.66	\$4.34	\$4.25	EARNINGS PER SHARE — the earnings allocated to each of the weighted average common shares outstanding
.60	.48	.79	.90	.98	DIVIDENDS DECLARED PER SHARE—accrued for payment
.48	.60	.79	.90	.98	DIVIDENDS PAID PER SHARE—received by the shareowners

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

Tektronix Consolidated Changes in Financial Position in thousands

1978	1979	1980	1981	1982	
\$ 69,879	\$ 96,385	\$117,472	\$121,934	\$144,690	WORKING CAPITAL PROVIDED from operations
56,846	77,151	85,072	80,167	79,453	EARNINGS—the primary source of working capital
15,294	21,258	30,303	42,228	56,473	DEPRECIATION—non-cash charge to income for facilities
(4,187)	(5,145)	(2,727)	(7,252)	(1,595)	JOINT VENTURE EARNINGS—reduced by their dividends
1,926	3,121	4,824	6,791	10,359	DEFERRED INCOME TAXES—payable in future years
7,698	39,230	84,968	41,658	41,174	WORKING CAPITAL PROVIDED from other sources
	28,096	77,604	32,910	23,329	LONG-TERM DEBT—new borrowings
6,429	7,618	9,894	10,671	11,762	COMMON SHARES—sold to employees
1,269	3,516	(2,530)	(1,923)	6,083	OTHER—sources and uses of working capital
53,397	110,111	131,006	151,414	156,414	WORKING CAPITAL USED for
41,697	100,349	115,926	114,065	102,410	FACILITIES—additions of land, buildings and equipment
999	1,097	652	20,717	35,694	LONG-TERM DEBT—due for payment within one year
10,701	8,665	14,428	16,632	18,310	DIVIDENDS—declared for payment to shareowners
24,180	25,504	71,434	12,178	29,450	WORKING CAPITAL INCREASE made up of changes in
(28,746)	(24,420)	15,357	(9,283)	25,469	CASH AND CASH EARNING INCOME
27,808	38,468	44,501	6,883	25,621	ACCOUNTS RECEIVABLE
45,100	51,010	49,030	30,142	(3,437)	INVENTORIES
3,297	6,025	3,242	5,132	537	PREPAID EXPENSES
(4,969)	(18,646)	(16,812)	(4,366)	(16,159)	SHORT-TERM DEBT
(9,021)	(8,925)	(7,001)	(11,371)	(3,451)	ACCOUNTS PAYABLE
1,187	(1,986)	(6,960)	(1,384)	5,670	INCOME TAXES PAYABLE
(10,476)	(16,022)	(9,923)	(3,575)	(4,800)	ACCRUED COMPENSATION
225,968	250,148	275,652	347,086	359,264	WORKING CAPITAL from the prior year and the working capital increase above results in
250,148	275,652	347,086	359,264	388,714	WORKING CAPITAL at year-end

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

Tektronix Consolidated Notes to Financial Statements

ACCOUNTING POLICIES

Principles of Consolidation—The consolidated financial statements include the accounts of Tektronix, Inc. and its wholly owned subsidiaries (the Company) since dates of organization or acquisition. All material intercompany transactions and balances have been eliminated.

Joint Venture Companies—Investments in joint venture companies, where the Company holds fifty percent or less of the share capital, are stated at cost plus the Company's equity in their reinvested earnings. All material intercompany profits have been eliminated.

Foreign Currencies—Foreign affiliate monetary assets and liabilities, as well as any foreign currency exchange contracts, are translated into United States dollars at year-end rates of exchange. Inventories, facilities and related depreciation, and other non-monetary assets are translated at historic exchange rates prevailing at the time the assets were acquired. Sales and expenses, other than cost of sales and depreciation where historical rates are used, are translated at rates prevailing at the beginning of each accounting period. Translation of net monetary assets and exchange transaction gains and losses are included in non-operating income.

Inventories—United States inventories are stated at the lower of market or cost, with cost determined on the last-in, first-out (LIFO) basis. Foreign inventories are stated at the lower of market or cost on the first-in, first-out (FIFO) basis.

Facilities and Depreciation—Facilities are stated at cost. Depreciation for financial accounting purposes is generally provided by accelerated methods over the estimated useful lives of the facilities ranging from 10 to 48 years for buildings and 3 to 15 years for equipment. Leasehold improvements are amortized on a straight-line basis over the estimated useful life or the lease term, whichever is less. Depreciation and amortization for tax reporting is provided over the shortest allowable lives.

Engineering Expense—Expenditures for research, development and engineering of products and manufacturing processes are expensed as incurred.

Pension Expense—Pension expense is funded as accrued, including amortization of past service cost by the declining balance method over twenty years.

Income Taxes—Investment tax credits are accounted for by the "flow-through" method, which recognizes the reduction in income tax in the year the related facility is placed in service. Tax deferral resulting from Domestic International Sales Corporation (DISC) subsidiaries is recognized in the provision for income taxes and included in the deferred tax liability.

Per Share Amounts—The earnings per share are based on the weighted average number of shares outstanding during the fiscal year.

Fiscal Year—The Company's fiscal year is the 52 or 53 weeks ending the last Saturday in May. The 52 week years are comprised of 13 four-week accounting periods separated into two 12 week quarters ending during August and November, a 16 week quarter ending during March, and a 12 week quarter ending during May. A 53 week year results in a five-week accounting period and a 13 week quarter at the beginning of the fiscal year. 1980 was a 53 week fiscal year.

Rounding—All financial amounts, except per share, are rounded to the nearest one thousand dollars in the financial statements and notes.

BUSINESS SEGMENTS

The Company and its joint venture affiliates operate predominantly in a single industry segment; the design, manufacture and sale of electronic measurement and display instruments used in science and industry.

Geographically the Company operates primarily in the industrialized world. Sales, income and assets in the United States, Europe and other geographic areas were:

1978	1979	1980	1981	1982	
\$381,465	\$487,172	\$591,760	\$ 625,335	\$ 729,369	Sales to U.S. customers
31,949	47,167	57,805	71,714	89,212	U.S. export sales
107,590	147,414	185,772	219,976	237,339	Transfers from U.S.
521,004	681,753	835,337	917,025	1,055,920	U.S. sales
160,663	225,388	288,630	322,900	328,469	European sales to customers
2,580	1,665	577	2,665	25,756	Transfers from Europe
163,243	227,053	289,207	325,565	354,225	European sales
24,809	27,209	33,111	41,885	48,699	Other area sales to customers
(110,170)	(149,079)	(186,349)	(222,641)	(263,096)	Inter-area eliminations
\$598,886	\$786,936	\$971,306	\$1,061,834	\$1,195,748	Net sales
\$ 79,952	\$102,702	\$123,170	\$ 118,688	\$ 121,547	U.S. operating income
21,374	28,506	34,002	30,132	31,363	European operating income
578	1,418	2,139	3,768	4,186	Other area operating income
(3,496)	(6,025)	(5,529)	(8,412)	(2,937)	Inter-area eliminations
98,408	126,601	153,782	144,176	154,159	Area operating income
(4,269)	(5,153)	(5,933)	(6,140)	(7,712)	General corporate expense
(4,246)	(6,428)	(15,956)	(25,274)	(29,537)	Interest expense
6,068	11,631	5,029	19,630	9,493	Non-operating income
\$ 95,961	\$126,651	\$136,922	\$ 132,392	\$ 126,403	Income before taxes

Business Segments continued

1978	1979	1980	1981	1982	
\$324,657	\$464,330	\$607,686	\$ 680,138	\$ 748,140	U.S. assets
85,942	120,525	156,444	198,702	192,785	European assets
9,720	11,554	13,203	16,383	18,042	Other area assets
(4,759)	(8,571)	(11,027)	(14,395)	(15,992)	Inter-area eliminations
415,560	587,838	766,306	880,828	942,975	Area assets
11,885	17,030	19,759	27,011	29,377	Joint venture equity
63,685	38,039	55,628	45,914	69,935	Corporate cash
<u>\$491,130</u>	<u>\$642,907</u>	<u>\$841,693</u>	<u>\$ 953,753</u>	<u>\$1,042,287</u>	Assets at year-end

Transfers of products and services are made at arms-length prices between geographic areas. The profit on transfers between geographic areas is not recognized by the manufacturer until sales are made to unaffiliated customers. Area operating income includes all directly incurred and allocable costs, except identified corporate expenses. Identifiable assets are those which are specifically associated with the operations of each geographic area.

Net sales to United States or foreign government agencies were not more than ten percent of consolidated net sales in any of the past five years, and no other customer accounted for more than four percent.

FOREIGN AFFILIATES

The Company has 18 foreign operating subsidiaries located in Australia, Belgium, Brazil, Canada, Denmark, Finland, France, Germany, Guernsey, Italy, The Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom with a branch in Ireland. The assets, liabilities, sales and income of foreign subsidiaries are included in the consolidated financial statements in these amounts:

1978	1979	1980	1981	1982	
\$106,098	\$141,446	\$169,051	\$208,864	\$218,375	Current assets
32,105	39,090	55,483	68,207	68,548	Current liabilities
15,337	18,585	22,185	28,938	34,787	Facilities less depreciation
889	1,118	907	410	603	Other assets
2,222	6,732	7,857	8,228	9,449	Other liabilities
\$185,472	\$252,597	\$321,741	\$364,785	\$377,167	Net sales
57,352	77,878	97,367	105,403	109,479	Gross profit
22,281	29,941	37,446	34,285	30,808	Operating income
23,632	31,809	39,781	33,301	34,326	Income before taxes
16,714	22,853	29,882	19,401	23,426	Earnings

The Company has investments in three joint venture companies located in Austria, Japan and Mexico. The Company's share of the assets, liabilities, sales and income of these unconsolidated affiliates consisted of:

1978	1979	1980	1981	1982	
\$ 12,991	\$ 21,713	\$ 24,873	\$ 32,173	\$ 33,429	Current assets
7,359	10,936	12,903	16,892	16,166	Current liabilities
3,577	3,939	5,477	8,686	9,114	Facilities less depreciation
3,662	3,202	3,063	4,236	3,895	Other assets
1,772	1,145	1,558	1,417	1,237	Other liabilities
\$ 25,457	\$ 40,551	\$ 46,064	\$ 59,660	\$ 61,520	Net sales
10,118	16,740	16,107	23,728	21,613	Gross profit
6,017	10,385	8,859	14,181	11,161	Operating income
7,235	10,618	8,041	15,575	10,419	Income before taxes
4,249	5,222	2,930	7,597	4,023	Earnings

The Company had arms-length sales to, purchases from, and accounts receivable due from joint venture companies amounting to:

1978	1979	1980	1981	1982	
\$ 22,499	\$ 34,904	\$ 44,764	\$ 54,130	\$ 59,244	Sales to
5,312	6,106	8,628	10,954	10,665	Purchases from
4,306	6,458	8,487	10,143	11,803	Accounts receivable

There are no significant restrictions which prevent dividends to the parent company from subsidiary or joint venture companies.

ACCOUNTS RECEIVABLE

The accounts receivable have been reduced by an allowance for doubtful accounts which was \$1,238,000 in 1978, \$1,752,000 in 1979, \$2,022,000 in 1980, and \$2,177,000 in 1981, and \$2,186,000 in 1982. The net charges to this reserve for uncollected credit sales were not material.

INVENTORIES

The inventories valued on a first-in, first-out (FIFO) basis approximate current cost. These inventories, less the reserve for inventories adjusted to the last-in, first-out (LIFO) basis, consisted of:

1978	1979	1980	1981	1982	
\$ 32,609	\$ 43,989	\$ 62,197	\$ 57,698	\$ 42,895	Purchased materials
96,504	128,926	169,706	196,925	220,735	Work-in-process
46,977	66,567	81,388	115,181	130,221	Finished goods
176,090	239,482	313,291	369,804	393,851	Inventories at FIFO
(12,567)	(24,949)	(49,728)	(76,099)	(103,583)	LIFO reserve
<u>\$163,523</u>	<u>\$214,533</u>	<u>\$263,563</u>	<u>\$293,705</u>	<u>\$290,268</u>	Inventories

A domestic subsidiary adopted the LIFO basis to value its inventories in 1982. The effect of this change is not material.

FACILITIES AND DEPRECIATION

The original cost of facilities, additions and disposals consisted of:

1978	1979	1980	1981	1982	
\$ 6,495	\$ 6,511	\$ 8,240	\$ 15,524	\$ 27,656	Land at prior year-end
16	1,880	7,360	12,668	1,200	Additions
	(151)	(76)	(536)	(605)	Disposals
6,511	8,240	15,524	27,656	28,251	Land at year-end
74,574	83,598	102,976	163,598	195,132	Buildings at prior year-end
9,722	20,460	61,057	34,935	17,790	Additions
(698)	(1,082)	(435)	(3,401)	(977)	Disposals
83,598	102,976	163,598	195,132	211,945	Buildings at year-end
83,461	102,122	142,257	193,514	254,126	Equipment at prior year-end
24,194	48,513	59,342	69,119	82,194	Additions
(5,533)	(8,378)	(8,085)	(8,507)	(14,038)	Disposals
102,122	142,257	193,514	254,126	322,282	Equipment at year-end
4,697	12,462	41,958	30,125	27,468	Construction at prior year-end
7,765	29,496	(11,833)	(2,657)	1,226	Net changes
12,462	41,958	30,125	27,468	28,694	Construction at year-end
<u>\$204,693</u>	<u>\$295,431</u>	<u>\$402,761</u>	<u>\$504,382</u>	<u>\$591,172</u>	Facilities

The accumulated depreciation, depreciation expense and depreciation related to disposals consisted of:

1978	1979	1980	1981	1982	
\$ 26,279	\$ 28,887	\$ 32,331	\$37,462	\$ 44,736	For buildings at prior year-end
3,053	3,648	5,346	7,535	9,317	Depreciation expense
(445)	(204)	(215)	(261)	(284)	Depreciation on disposals
28,887	32,331	37,462	44,736	53,769	For buildings at year-end
47,573	56,273	68,646	88,528	118,734	For equipment at prior year-end
12,242	17,610	24,957	34,693	47,156	Depreciation expense
(3,542)	(5,237)	(5,075)	(4,487)	(7,609)	Depreciation on disposals
56,273	68,646	88,528	118,734	158,281	For equipment at year-end
<u>\$ 85,160</u>	<u>\$100,977</u>	<u>\$125,990</u>	<u>\$163,470</u>	<u>\$212,050</u>	Accumulated depreciation

OTHER ASSETS

The other long-term assets consisted of:

1978	1979	1980	1981	1982	
\$11,885	\$17,030	\$19,759	\$27,011	\$29,377	Investments in joint-venture companies
1,062	1,118	1,661	1,993	3,506	Long-term contracts receivable
946	1,518	2,585	10,046	8,301	Goodwill and other intangibles
<u>\$13,893</u>	<u>\$19,666</u>	<u>\$24,005</u>	<u>\$39,050</u>	<u>\$41,184</u>	Other long-term assets

SHORT-TERM DEBT

A summary of short-term borrowings is:

1978	1979	1980	1981	1982	
\$ 9,352	\$17,900	\$17,457	\$29,458	\$30,640	Bank borrowings at year-end:
9.8%	11.1%	16.2%	17.1%	16.0%	Outstanding
					Average interest rate
\$ 6,941	\$13,072	\$17,541	\$23,144	\$29,855	At accounting period-end:
9.2%	10.0%	13.0%	15.7%	15.5%	Average outstanding
					Average interest rate
\$10,494	\$20,415	\$24,981	\$31,224	\$45,312	Maximum outstanding
	\$10,000	\$27,700			Commercial paper borrowings at year-end:
	10.0%	11.4%			Outstanding
					Average interest rate
	\$ 714	\$49,763			At accounting period-end:
	10.0%	15.2%			Average outstanding
					Average interest rate
	\$10,000	\$83,100			Maximum outstanding

The Company has lines of credit with United States and foreign banks which aggregated \$111 million at May 29, 1982, of which approximately \$80 million was unused. The charges are not significant for those lines that are fee compensated.

LONG-TERM DEBT

The long-term indebtedness consisted of:

1978	1979	1980	1981	1982	
			\$ 31,000	\$ 51,900	Commercial paper borrowings
		\$ 75,000	75,000	75,000	11% Notes due July 15, 1990
\$35,000	\$35,000	35,000	35,000	35,000	8 $\frac{7}{8}$ % Notes due May 15, 1983
	20,000	20,000	20,000		9 $\frac{1}{8}$ % Note due November 15, 1981
3,085	8,191	6,848	5,860	5,854	Other borrowings
38,085	63,191	136,848	166,860	167,754	Long-term borrowings
(999)	(1,097)	(652)	(20,717)	(35,694)	Current maturities
<u>\$37,086</u>	<u>\$62,094</u>	<u>\$136,196</u>	<u>\$146,143</u>	<u>\$132,060</u>	Long-term debt

The commercial paper borrowings, with a weighted average interest rate of 14.1% at year-end, have been supported by revolving credit commitments since 1981. These commitments aggregated \$115 million at May 29, 1982, and are convertible to four year term loans in 1985. The Company intends to replace these commercial paper borrowings at some future time with long-term financing.

The 11% Notes may be redeemed at any time at the option of the Company on or after July 15, 1986, at the principal amount together with accrued interest. The 8 $\frac{7}{8}$ % Notes became redeemable on November 15, 1981.

Aggregate long-term debt principal payments for each of the next five years will be \$35,694,000 in 1983, \$4,123,000 in 1984, \$754,000 in 1985, \$13,196,000 in 1986, and \$12,949,000 in 1987.

RETIREMENT AND INCENTIVE PLANS

Pension—The parent company and a domestic subsidiary have defined benefit pension plans which are integrated with social security and cover all United States employees. The weighted average assumed rate of return used in determining the actuarial present value of accumulated plan benefits is 7.5%. The actuarial present value of accumulated plan benefits, the plan net assets available for benefits and pension expenses were:

1978	1979	1980	1981	1982	
			\$39,577	\$48,788	Vested benefits
			11,864	13,725	Non-vested benefits
			<u>\$51,441</u>	<u>\$62,513</u>	Plan benefit value
\$20,127	\$30,079	\$42,145	\$60,205	\$78,262	Plan net assets available for benefits
5,714	8,475	9,406	12,172	14,857	Pension expenses

Foreign subsidiaries provide for employee retirement in keeping with the practices and laws of the countries in which they operate. Foreign plans are not considered to be material and are not required to report to United States government agencies. Foreign subsidiary pension expenses were \$1,605,000 in 1978, \$1,924,000 in 1979, \$2,360,000 in 1980, \$2,733,000 in 1981, and \$2,900,000 in 1982.

Profit Sharing—As a part of compensation, most employees receive cash and deferred profit share amounting to 27.5% of the income of participating companies before profit sharing, incentive compensation, charitable contributions and income taxes. Additional profit share of 7.5% is contributed to a retirement trust for parent company employees.

Incentives—The Company has incentive compensation plans for executives. The plans provide for compensation based on consolidated performance over a three-year period. These charges are included in profit sharing and amounted to \$737,000 in 1978, \$869,000 in 1979,

\$106,000 in 1980 and a reduction of previous years' accrual of \$218,000 in 1981. There was no charge to income for incentive plans in 1982. Amounts owing under retirement and incentive plans, included in accrued compensation, were \$22,750,000 in 1978, \$31,691,000 in 1979, \$33,964,000 in 1980, \$33,870,000 in 1981, and \$31,078,000 in 1982.

Employee Share Purchase — Employees of the parent company and a domestic subsidiary are eligible to participate in an Employee Share Purchase Plan in which 4,735 employees were participants, of 19,844 eligible employees, at May 29, 1982. Under the Plan 102,876 common shares of the Company were reserved at May 29, 1982, and 329,842 at May 30, 1981. During 1982, 226,966 shares with a market value of \$11,654,000 were issued for \$9,323,000, while 168,311 shares with a market value of \$9,914,000 were issued for \$7,931,000 in 1981. The share purchase discount provided in the plan has been charged to non-operating income.

Stock Options — The Company has a stock option plan for selected employees. At May 29, 1982, there were 573,237 common shares reserved for issuance under the plan. There were 484,639 shares subject to outstanding options, of which 265,000 were exercisable. The outstanding options are held by 535 participants, are exercisable at prices from \$12.13 to \$59.45, and expire between August 29, 1984 and October 22, 1991. The options that have been exercised under this and prior plans are:

1978	1979	1980	1981	1982	
144,313	110,417	64,750	33,294	6,740	Number of shares
\$ 2,989	\$ 1,855	\$1,022	\$ 757	\$ 108	Option value

The stock option plan allows stock appreciation rights (SARs) to be granted to participants. When granted, all or part of an option may be surrendered for shares or payment in an amount equal to the difference between the option price and the market price of the option right surrendered. The Company accrued and included in profit sharing expense \$1,973,000 in 1978, \$2,116,000 in 1979, nothing in 1980, \$1,671,000 in 1981, and a reduction of previous years' accrual of \$2,060,000 in 1982 to provide for the difference between current market price and the option price of outstanding SARs.

There is no material potential dilution to earnings per share from unexercised stock options.

EXPENSE SUPPLEMENT

A summary of selected expense categories is:

1978	1979	1980	1981	1982	
\$ 9,997	\$10,416	\$12,393	\$14,169	\$15,166	Advertising expense
15,227	22,454	31,477	36,433	38,006	Maintenance and repair expense
5,699	8,199	12,322	16,179	17,582	Rental expense

NON-OPERATING INCOME

The non-operating sources of income and expense which comprise non-operating income consisted of:

1978	1979	1980	1981	1982	
\$4,180	\$ 3,448	\$4,593	\$ 8,183	\$10,447	Investment income
4,249	5,222	2,930	7,597	4,023	Equity in joint venture earnings
(15)	435	1,729	(3,309)	(2,679)	Currency gains (losses)
	4,507		10,538		Non-recurring income
(2,346)	(1,981)	(4,223)	(3,379)	(2,298)	Other income (expense) — net
<u>\$6,068</u>	<u>\$11,631</u>	<u>\$5,029</u>	<u>\$19,630</u>	<u>\$ 9,493</u>	Non-operating income

The non-recurring income is the satisfaction of a patent infringement judgment in 1979, and the sale of the Company's patient monitoring business in 1981.

INCOME TAXES

The provision for income taxes consisted of:

1978	1979	1980	1981	1982	
\$28,342	\$33,422	\$34,468	\$31,225	\$28,950	United States
3,855	7,122	7,483	7,100	7,100	State
6,918	8,956	9,899	13,900	10,900	Foreign
39,115	49,500	51,850	52,225	46,950	Income taxes provided
37,189	46,379	47,026	45,434	36,591	Currently payable
<u>\$ 1,926</u>	<u>\$ 3,121</u>	<u>\$ 4,824</u>	<u>\$ 6,791</u>	<u>\$10,359</u>	Income taxes deferred

The deferred income taxes are provided primarily on undistributed earnings of Domestic International Sales Corporation (DISC) subsidiaries and \$4,667,000 in 1982 for depreciation timing differences.

The above provisions were less than the amounts which would result by applying the United States statutory rate to income before income taxes.

Income Taxes continued

A reconciliation of the difference is:

1978	1979	1980	1981	1982	
\$46,061	\$59,779	\$62,984	\$60,901	\$58,145	Income taxes based on U.S. statutory rate
				(3,821)	U.S. research and experimentation tax credits
(1,926)	(3,786)	(5,296)	(5,258)	(6,041)	U.S. investment tax credits
(402)	(1,903)	(556)	(2,204)	2,054	Other U.S. adjustments
2,013	3,754	4,052	3,833	3,829	State income taxes, net of U.S. tax
(4,591)	(5,879)	(7,986)	(1,552)	(5,365)	Effect of foreign subsidiaries taxed below U.S. rate
(2,040)	(2,465)	(1,348)	(3,495)	(1,851)	Effect of after tax joint venture earnings
<u>\$39,115</u>	<u>\$49,500</u>	<u>\$51,850</u>	<u>\$52,225</u>	<u>\$46,950</u>	Income taxes

Undistributed reinvested earnings of foreign subsidiaries and DISCs amounted to approximately \$265 million at May 29, 1982. Except for accumulated deferred income tax provisions of \$31 million, primarily for DISCs, relating to approximately \$94 million of such reinvested earnings, no provision has been made for additional United States income taxes which could result from the transfer of undistributed reinvested earnings to the parent company. If the undistributed reinvested earnings were to be transferred, foreign tax credits would be available to partially offset the amount of United States income taxes otherwise payable. The Company has no present intention of transferring such earnings.

Equity in the reinvested earnings of joint venture companies amounted to approximately \$29 million at May 29, 1982. No provision has been made for United States income taxes which could result from the transfer of such earnings because foreign tax credits would be available to offset the amount of United States income taxes otherwise payable.

COMMITMENTS

The Company is committed under operating leases for buildings and equipment in the aggregate amount of \$41,337,000; payable \$11,959,000 in 1983, \$8,976,000 in 1984, \$5,417,000 in 1985, \$3,578,000 in 1986, \$1,888,000 in 1987 and \$7,925,000 thereafter.

The cost to complete facilities projects authorized at May 29, 1982 is approximately \$97 million.

INFLATION (unaudited)

The effects of inflation are not apparent in traditional financial statements which are based on historical cost. The Company has attempted to identify the financial effects of changing prices using two different methods which are highly dependent upon approximations and estimates.

Adjustments to the historical cost statements are necessary to restate financial information under both methods. Cost of sales is revised to reflect changes in inventory prices for foreign inventories which are not on the last-in, first-out (LIFO) basis. No adjustment is required for United States inventories which are valued on the LIFO basis, because this method already matches current costs against current revenue. Depreciation expense is adjusted to reflect increased costs to construct facilities at today's prices. This revision is based on the same depreciation methods, useful lives and salvage values as used in the historical cost statements. Income taxes are not adjusted because current tax laws do not recognize the effects of inflation.

The first method, called constant dollar, measures the effects of general inflation by changing the unit of measurement for the historical cost financial statements to units of general purchasing power, using the average consumer price index for all urban consumers. Selected financial information, in average 1982 dollars, adjusted for the impact of general inflation is:

1978	1979	1980	1981	1982	
<u>\$899,695</u>	<u>\$1,083,441</u>	<u>\$1,183,715</u>	<u>\$1,155,806</u>	<u>\$1,195,748</u>	Net sales
		\$ 103,678	\$ 87,263	\$ 79,453	Earnings
		(2,654)	(5,182)	(3,907)	Adjustments for:
		(11,602)	(11,180)	(13,383)	Cost of sales before depreciation
		<u>\$ 89,422</u>	<u>\$ 70,901</u>	<u>\$ 62,163</u>	Depreciation expense
		<u>\$ 736,523</u>	<u>\$ 794,469</u>	<u>\$ 851,910</u>	Earnings adjusted for general inflation
		4.90	3.83	3.33	Shareowners' equity
\$.90	\$.65	.96	.98	.98	Earnings per share
58.70	64.44	56.94	63.30	52.63	Dividends declared per share
186.5	203.5	230.0	257.5	280.3	Share price at year-end
					Average consumer price index

General inflation also causes gains or losses in the purchasing power of monetary items which are money or a claim to receive or pay money in an amount which is presently fixed or determinable. Since the Company owes more to its creditors than it holds in cash and has due from customers, a future gain occurs as these creditors are paid with money that has declined in purchasing power as measured in constant dollars. Such unrealized gains, in average 1982 dollars, were \$6,565,000 in 1980, \$8,775,000 in 1981 and \$5,710,000 in 1982.

The second method, called current cost, measures changes in specific prices for the goods and services actually used in the Company's operations,

using appropriate price indexes related to the costs and expenses incurred. Selected financial information, in average 1982 dollars, adjusted for the impact of changes in specific prices is:

1978	1979	1980	1981	1982	
		\$103,678	\$ 87,265	\$ 79,453	Earnings
		(3,738)	(2,778)	(1,485)	Adjustments for:
		(11,420)	(9,949)	(10,135)	Cost of sales before depreciation
		<u>\$ 88,520</u>	<u>\$ 74,538</u>	<u>\$ 67,833</u>	Depreciation expense
					Earnings adjusted for changes in specific prices
		\$714,670	\$765,003	\$831,361	Shareowners' equity
		4.85	4.04	3.63	Earnings per share

At May 29, 1982, the current cost of inventories was \$399,895,000 and facilities was \$494,905,000. The increase in specific prices for inventories and facilities aggregated \$37,136,000 in 1982 which is \$17,989,000 less than the increase attributable to general inflation, both amounts in average 1982 dollars. The difference results because the costs of materials and components used in the design and manufacture of the Company's products have not increased as much as general price levels. The excess of the increase in general inflation over the increase in specific prices for inventories and facilities, also in average 1982 dollars, was \$38,355,000 in 1980 and \$37,492,000 in 1981.

QUARTERLY FINANCIAL SUMMARY (unaudited)

In the opinion of management, this unaudited quarterly financial summary includes all adjustments necessary to present fairly the results for the periods represented:

12 Weeks to Aug. 23, 1980	12 Weeks to Nov. 15, 1980	16 Weeks to Mar. 7, 1981	12 Weeks to May 30, 1981	52 Weeks to May 30, 1981	
\$232,501	\$248,714	\$310,823	\$269,796	\$1,061,834	Net sales
125,563	127,754	155,691	139,681	548,689	Gross profit
31,760	32,579	35,953	37,744	138,036	Operating income
29,166	29,740	40,017	33,469	132,392	Income before taxes
16,916	17,738	23,819	21,694	80,167	Earnings
.92	.96	1.29	1.17	4.34	Earnings per share
.21	.23	.23	.23	.90	Dividends per share
12 Weeks to Aug. 22, 1981	12 Weeks to Nov. 14, 1981	16 Weeks to Mar. 6, 1982	12 Weeks to May 29, 1982	52 Weeks to May 29, 1982	
\$252,212	\$276,567	\$347,873	\$319,096	\$1,195,748	Net sales
129,125	138,637	175,157	157,489	600,408	Gross profit
33,831	33,004	40,666	38,946	146,447	Operating income
26,548	27,296	37,602	34,957	126,403	Income before taxes
19,098	15,906	23,652	20,797	79,453	Earnings
1.03	.85	1.26	1.11	4.25	Earnings per share
.23	.25	.25	.25	.98	Dividends per share

The quarter ended March 7, 1981 was affected by the non-recurring gain from the sale of a business unit and the quarter ended August 22, 1981 by the recognition of income tax benefits relating to inventory relief in the United Kingdom.

COMMON SHARE PRICES

The Company's common shares are traded on the New York and Pacific Stock Exchanges. There were 7,824 shareowners of record at July 30, 1982. The market price range and close are the composite prices reported by The Wall Street Journal rounded to full cents per share:

1978	1979	1980	1981	1982	
\$37.50	\$46.88	\$59.50	\$70.25	\$61.50	First fiscal quarter:
33.38	40.00	48.63	47.50	47.25	Highest trade
37.50	46.00	57.25	67.63	47.38	Lowest trade
					Closing share price
					Second fiscal quarter:
39.50	50.50	61.50	69.88	54.75	Highest trade
35.00	39.00	53.25	59.25	45.13	Lowest trade
39.25	43.25	59.00	65.50	53.00	Closing share price
					Third fiscal quarter:
40.00	54.00	64.25	68.50	56.00	Highest trade
33.38	41.50	51.00	50.50	45.00	Lowest trade
33.75	51.38	51.13	52.63	45.00	Closing share price
					Fourth fiscal quarter:
44.00	57.00	52.00	63.25	56.25	Highest trade
32.50	46.88	41.63	51.75	42.38	Lowest trade
40.50	49.25	49.75	60.75	52.63	Closing share price

DIVIDEND POLICY

Dividends are paid at the discretion of the Board of Directors dependent upon their judgment of future earnings, capital expenditures and financial condition.

Tektronix Consolidated Financial Performance

1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	
17.13	21.38	18.69	30.13	33.88	40.50	49.25	49.75	60.75	52.63	SHARE PRICE AT YEAR-END
-35.8%	24.8%	-12.6%	61.2%	12.4%	19.5%	21.6%	1.0%	22.1%	-13.4%	Market appreciation
.4%	.6%	.5%	.6%	.7%	1.4%	1.5%	1.6%	1.8%	1.6%	Dividend yield
11.4%	12.9%	13.9%	13.9%	17.4%	18.9%	21.2%	19.2%	15.4%	13.4%	RETURN ON EQUITY
8.3%	7.9%	7.8%	8.2%	9.7%	9.5%	9.8%	8.8%	7.5%	6.6%	Earnings margin
1.40x	1.67x	1.78x	1.69x	1.80x	1.99x	2.16x	2.19x	2.04x	2.01x	Equity turnover
10.8%	11.9%	12.6%	12.3%	15.4%	16.9%	18.4%	15.8%	12.7%	11.6%	RETURN ON CAPITAL
8.4%	8.0%	8.3%	8.7%	10.0%	9.8%	10.1%	9.4%	8.5%	7.7%	Preinterest margin
1.30x	1.50x	1.52x	1.41x	1.53x	1.73x	1.81x	1.68x	1.50x	1.51x	Capital turnover
232,000	297,000	329,000	376,000	513,000	650,000	847,000	1,049,000	1,040,000	1,221,000	CUSTOMER ORDERS
33.3%	28.0%	10.8%	14.3%	36.4%	26.7%	30.3%	23.8%	-.9%	17.4%	Increase
22.8%	24.9%	18.5%	18.6%	25.0%	27.5%	28.2%	30.2%	28.4%	26.3%	Orders unfilled at year-end
202,855	271,428	336,645	366,645	454,958	598,886	786,936	971,306	1,061,834	1,195,748	NET SALES
21.1%	33.8%	24.0%	8.9%	24.1%	31.6%	31.4%	23.4%	9.3%	12.6%	Increase
49.4%	49.9%	51.4%	53.8%	56.9%	55.5%	54.3%	52.8%	51.7%	50.2%	Gross profit margin
14.2%	14.2%	15.1%	15.8%	16.8%	15.7%	15.4%	15.2%	13.0%	12.2%	Operating income margin
15.0%	14.2%	13.9%	15.1%	16.6%	16.0%	16.1%	14.1%	12.5%	10.6%	Pretax margin
45.1%	44.5%	43.8%	45.5%	41.9%	40.8%	39.1%	37.9%	39.4%	37.1%	Income tax rate
16,739	21,353	26,329	30,089	43,971	56,846	77,151	85,072	80,167	79,453	EARNINGS
42.3%	27.6%	23.3%	14.3%	46.1%	29.3%	35.7%	10.3%	-5.8%	-0.9%	Increase
.97	1.23	1.52	1.71	2.49	3.19	4.28	4.66	4.34	4.25	Earnings per share
.10	.10	.10	.12	.225	.48	.60	.79	.90	.98	Dividends per share
206,599	251,061	306,616	344,860	415,328	491,130	642,907	841,693	953,753	1,042,287	TOTAL ASSETS
1.07x	1.20x	1.21x	1.13x	1.20x	1.32x	1.39x	1.31x	1.18x	1.20x	Asset turnover
5.25x	5.50x	5.78x	5.58x	5.78x	5.92x	5.86x	5.52x	5.27x	5.49x	Receivable turnover
3.17x	3.27x	3.30x	3.52x	4.18x	4.25x	4.16x	4.06x	3.81x	4.10x	Inventory turnover
4.35x	5.10x	4.68x	4.28x	4.95x	5.57x	5.01x	4.12x	3.44x	3.32x	Facility turnover
167,330	199,461	244,906	273,659	319,287	374,133	493,891	665,343	753,862	828,843	INVESTED CAPITAL
7.0%	12.0%	17.4%	15.2%	14.1%	12.7%	18.4%	27.4%	26.0%	23.9%	Short and long-term debt
93.0%	88.0%	82.6%	84.8%	85.9%	87.3%	81.6%	72.6%	74.0%	76.1%	Shareowners' equity
10,580	12,693	12,664	12,970	14,637	19,147	21,291	23,890	24,028	23,231	Employees
2,612	2,940	3,420	3,705	3,906	3,987	4,935	5,921	7,300	7,486	Square feet in use

Returns, ratios and turnovers are based on average assets and capital. Amounts are in thousands except per share and employees.

BOARD OF DIRECTORS

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JAMES B. CASTLES, *retired Vice President and General Counsel*
JOHN D. GRAY, *Chairman, Omark Industries, Inc.*
LEONARD LASTER, *President, Oregon Health Sciences University*
LOUIS B. PERRY, *President, Standard Insurance Company*
HOWARD VOLLUM, *Chairman of the Board*
WILLIAM D. WALKER, *Executive Vice President and Chief Operating Officer*
EARL WANTLAND, *President and Chief Executive Officer*
FRANK M. WARREN, *retired Chairman, Portland General Electric Co.*

OFFICERS

HOWARD VOLLUM, *Chairman of the Board*
EARL WANTLAND, *President and Chief Executive Officer*
WILLIAM D. WALKER, *Executive Vice President and Chief Operating Officer*
LARRY N. CHORUBY, *Group Vice President-Finance*
LAWRENCE L. MAYHEW, *Group Vice President*
LAWRENCE T. SUTTER, *Group Vice President*
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CHARLES H. FROST, *Vice President*
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PHILIP J. ROBINSON, *Vice President*
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KENNETH H. KNOX, *Treasurer*
BILL J. ROBINSON, *Controller*
N. ERIC JORGENSEN, *Assistant Secretary*
EDWARD J. LEWIS, *Assistant Secretary*
FLETCHER C. CHAMBERLIN, *Assistant Treasurer*
JAMES O. HUGHES, *Assistant Treasurer*

SHAREOWNERS' MEETING

The annual meeting of shareowners of Tektronix, Inc., will be held on Saturday, September 25, 1982, at 9 a. m. Pacific Daylight Time, in the Assembly Cafeteria Building, S.W. Karl Braun Drive, Tektronix Industrial Park, near Beaverton, Oregon.

Exchange Listings:

New York Stock Exchange
Pacific Stock Exchange

Transfer Agents:

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

Registrars:

Citibank, N.A., New York
First Interstate Bank of Oregon N.A., Portland

Corporate Office:

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COMMITTED TO EXCELLENCE