



THE NEWS BEHIND THE NEWS

1701/1702: New kind of product invades huge market

CUMBERSOME AS IT NOW appears, this was the forerunner of today's sleek 1701/1702. Bill Kiwiet (left), Gary Neher (center) and Mike Probstfield are pictured with the first Tek-built NC machine-control unit, designed at that time for in-house use only.

(When Tek Talk and Tekweek were combined in July 1970, it was the editor's intention to retain the best features of each publication: The regular, broad news coverage of Tekweek and the in-depth feature presentations allowed by Tek Talk's magazine format. The new feature here introduced, "The News Behind the News" is the first inclusion in Tekweek of a longer feature article. The feature will be presented frequently, and will deal with those subjects and treatments that a straight news format will not adequately handle. These articles will do a job of "depth reporting" on subjects ranging widely, from technical to human-interest to economic. As always, reader comments and suggestions are encouraged.)

A ROOM-SIZED MACHINE, gobbling raw steel forgings, spits them out as completed automobile crankshafts — at about a minute and a half per shaft.

Until you've seen this (and dozens of equally spectacular applications), you can't really appreciate the scope of the machine-tool industry, says Engineering's Lang Hedrick, still agog at what he saw in Chicago in September.

Machine tooling, on display at the giant Production Engineering show there, is one of the world's largest industries. Almost anything mass-produced of metal relies on machine tools to cut, bore, punch, turn, mill, form and weld.

Until a couple years ago, Tektronix looked at that industry just as a supplier of much of our production equipment. Today we see it differently. It has — and fairly suddenly — emerged as a Tek market, a market whose dimensions are impressive. (For instance, \$80,000 for a machine-tool system is considered cheap; the median is about \$150,000.)

Tek has had many chances to diversify, away from electronic measurement. To almost every opportunity, we've said "no."

What, then, led to the introduction this fall of our 1701 and 1702? They're not oscilloscopes, not measuring instruments at all. And — unlike

computer products, our only previous diversification — they don't serve a market well known to us.

What they are is machine-control units. And what they do is use punched-paper tapes to automatically direct the action of production machinery. On the face of it at least, a somewhat unlikely product for Tektronix.

The Chicago show was huge, befitting the industry on parade there. And, if Tek went in with slight and hopeful smiles, we came out with broad grins. Our new product met with success even beyond what we'd hoped, and has become a bright spot in a year that sure could use a couple.

Yes, machine control is something different for Tek, agrees Vice-president Bill Walker. And we got into it in a sort of interesting way.

Like other companies, Tek has turned increasingly to mechanized processes. Most machines are controlled manually; that is, someone stands there turning cranks and pushing buttons. Others have mechanical controls. A smaller but growing number use electronic numerical control, employing punched tapes, usually computer-generated.

Back two years or so, a half-dozen Tek production processes were using numerical-control units, of various makes. We weren't happy with them. Some were becoming obsolete; we felt the need to standardize on one system rather than live with the quirks of several types; and we had some specific NC needs — among them, automatic component insertion — that existing units didn't meet.

What's more, reliability was poor, and maintenance service sometimes slow. When an NC unit is down, so is the machine it controls. All you can do is twiddle and fume until a field man comes out to fix things. While the machine stands idle, hundreds of dollars an hour can be lost.

So, when Lang went overseas on a recruiting trip in 1967, one item on his shopping list was to find an engineer with numerical-control experience, who could help us buy and use NC gear.

Meanwhile, back in The Netherlands, Larry Mayhew, then manager at Heerenveen, had already interviewed Bill Kiwiet, who had had eight years of NC design experience with Philips, giant Dutch electronics company.

Lang hired him as a design engineer, Bill recalls, not specifically as an NC designer. One of his first job options when he got to Beaverton in January 1968 was with Gary Neher, Production Engineering manager in Metals, to advise on NC selection and applications.

Gary himself had had about 15 years NC background, as programmer at Boeing, in software research for Chrysler and in management at Tek.

Very shortly, the thought arose: Since Bill was a designer, why not solve our NC problems in a **direct** way — by Tek building its own controllers? We could count, at that time, about 20 possible in-house NC applications.

Building would be less expensive than buying, even including the cost of development. We also felt we could design units that met our unique needs. And, we could then count on fast, in-house maintenance.

After management approval to build one model, Gary, Bill and Mike Probstfield (a transfer from Lawrence Radiation Laboratories, where he had built NC gear) were moved into John Taylor's group in Manufacturing, which was concerned with building specialized Tek production and testing equipment.

Early in the game, someone — just who, no one recalls — suggested that we build into (or onto) our controller a Tektronix 611 display device, thus adding a visual dimension to a field that had made almost no use of that feature. Our first unit, with 611 attached, was

finished in January 1969. Hooked up to a Bridgeport milling machine in the Model Shop, it performed excellently. Management gave its approval to build 20 for in-house use.

But by that time the unit was being looked at in a new light. The designer and builder — and people who were using it or who had watched it run — began to feel that here might be an excellent Tek product, even though in a field unrelated to electronic measurement.

A committee was selected to evaluate it and, by March 1970, it had official approval. Bill and Mike were transferred into Lang's Engineering area, and Gary went into Marketing, to work on NC applications and information.

The place to introduce it, everyone agreed, was at the Chicago show. Work began to repackage the unit into a Tektronix format. It was ready in August.

When we say it was "well-received" at the show, what does that mean? It's hard to compare, says Bill Walker, but Tek got about the same number of customer inquiries about this product alone that we normally expect for all our new products at a WESCON show. These inquiries ranged from "How soon can you sell us one?" to "Can you add such-and-such a special feature?" (In most cases the answer is "yes," the units are designed for easy modification.)

When you go into a show with what you know is a good product, why should you be surprised when it goes over big?

"Well, first," says Bill Kiwiet, "you never know what competition is going to come up with. And, you can't be certain that customers will see the need for your product as clearly as you've seen it."

But competitors offered nothing like our units, in either cost or size. And the closest thing to our 611 feature was some use of "refreshed" TV-type CRTs, reading out lists of numbers.

The caliber of the people who visited our booth impressed us. These were not technicians, students or gawkers, but people obviously in responsible decision-making positions. On the strength of their response, we've considerably beefed up the NC developmental effort.

There's one offset to the enthusiasm, Gary points out: The machine-tool industry is an extremely cyclic one, very responsive to economic ups and downs—so much so that Wall Street sees it as a reliable barometer of the US economy.

But, just as it leads into recessions, it also leads out of them. So it may be that, when the economic upturn finally comes, our first market to bounce back will be this brand new one.

There were several reasons, recounts Bill Walker, why Engineering Planning approved the MC unit as a Tek product. A main one was that we could use the 611, and thus add a new capability to machine control.

What the 611 beam does is to trace, on the CRT screen, the machine tool's path — that is, it "draws a picture" of the part being produced.

You'd be hard put to find a more nearly ideal 611 use, Lang says. Its 11-inch storage screen can retain whatever the CRT beam writes on it, without having to be "refreshed," or continuously rewritten. Although less useful when you have to display very fast-changing information (such as TV tubes must do), this kind of image-retention ability — of something written just once — is almost perfect for machine-control use.

The 611 visual feature has some value in letting the operator monitor the tool path. But its greatest use is in "previewing" the control tapes themselves, to check them for error. As the tape is fed into the unit, the tool path is traced on the screen, a "drawing" of the part. Any error on the tape is quickly detected.

Otherwise you'd have to actually build the part to check the tape. And making a part may take from several to several hundred hours of costly machine time.

Another way to "preview" a tape is to feed it into a mechanical plotter, whose pen arm draws the part on paper. That at least saves you machine time. But a plotter isn't very fast, either. One that Tek owns moves at the rate of 210 inches per minute — which means the drawings may take from a few minutes to several hours (in the case of a very complex part.) And plotter time costs money.

By contrast, the 611 CRT beam moves as fast as the tape can be fed in. (We can now, in fact, go from an Engineering drawing of a simple part, through tape checkout, to a com-

pleted manufactured part in less than an hour, Bill Walker notes.)

A second reason for approving the unit was that we had — in Gary and Bill Kiwiet — competent, experienced project leaders.

A third: It seemed to be a good value for the money. Bill feels its price is maybe 30 per cent under what comparable competition costs. It costs about \$10,000 for the 1701, about \$11,000 for the 1702; \$2800 for the 611, and \$1000 for the "software" program that lets the user make his own tapes.

A fourth: Tek's in-house users were, without exception, enthusiastic about what it could do.

What does the 1701/1702 offer that competition — well-entrenched in this field — does not?

Many of the unit's advantages lie in Tek-quality workmanship, and in skillful and innovative circuitry packaging. But the visual ones — those the customer can see — are two. One is the 611 feature; the other is small size.

COUPLED TO production machinery, a Tektronix 1701 controls the machine-tool operation. At the same time, the tool path is traced on the screen of our 611 display unit, "drawing" the part as it's being made.

