Tom Reeder is 'GaAs ambassador'

By ART ANDERSEN

(Editor's note: This interview is one of a series with Tek's chief engineers and scientists. The Chief Engineer/Scientist designation represents the highest level in Tek's six-step career path for engineers and scientists.)

Tom Reeder is sort of a Billy Graham of gallium arsenide (GaAs). As vice president of marketing and sales for TriQuint Semiconductor, he travels the world of high tech preaching the redeeming virtues of gallium arsenide.

TriQuint is the Tek-owned spinoff that makes high-speed integrated circuits from gallium arsenide. So its people are Tek relatives, once removed, so to speak.

Although he's a true believer in the power of gallium arsenide, it's a quiet evangelism that Tom exhibits. He speaks softly, enough so that you can still make out the once-shy person who learned to play the saxophone in an Illinois town of 5000, where his father taught music, and his mother sang. And no one locked their doors.

You can clearly see the Tek Chief Scientist in Tom, the "researchy" person whose career has been shaped by work in technologies ranging from microwaves to ultrasonics to high-speed semiconductors.

Eleven patents bear Tom's name, many involving surface-acoustic-wave technology. And he's published extensively—sixty or so papers and articles describing work in microwave technology, ultrasonics, and semiconductor materials. And Tom has chaired or participated in more than thirty presentations and conferences. Not bad for an engineer that once doubted that technical writing would be a central part of his life.

The people called "Chief" at Tektronix are diverse in what they do and their manner of doing it. Although just part of that diversity is purely technical, it is mainly through research and technical contributions that Tek's chief engineers and scientists prove themselves, not only in-house but to the world-wide technical community.

Chiefs are the top of the ladder in Tek's dual-path technical career system. This system enables individuals to achieve recognition without becoming managers of large groups or divisions. (Principals and Seniors are the immediately lower rungs in the six-rung technical ladder that starts with Engineer or Scientist I.) However, Chiefs—and Principals and Seniors too—often have management or supervisory responsibilities. They don't achieve chief status as loners or disassociated from business affairs. They have to lead. Technical achievement increasingly means team achievement. To reach the upper rungs, candidates have to prove "worthy" to their peers and subordinates, not just to their boss.

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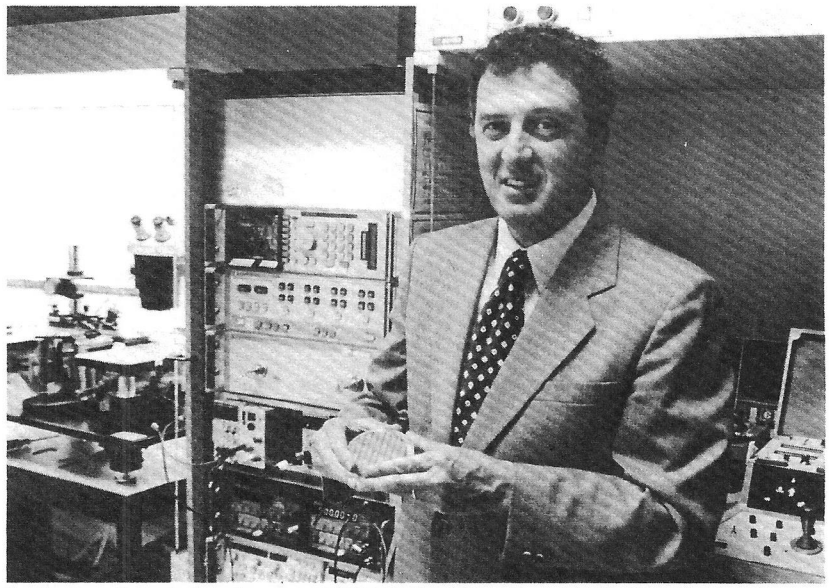
It's hard to separate Tom from gallium arsenide for very long. He talks willingly about his family, his church activities, his ways to unwind—walking, tennis, exploring the powers of personal computers, making "expensive sawdust" in his workshop—but sooner or later he moves back to the center of his working life—gallium arsenide. Not just the material, and its peculiarities, but GaAs' practical potential to break speed barriers and its ability to enhance the performance of instruments, computers, telephone communications, and military systems.

"GaAs" is the chemical symbol for gallium arsenide. Many engineers inelegantly, and sometimes irreverently, say "Gaas." But not Tom. Tom dignifies the material in his conversation by using its full name, "gallium arsenide," even though he's earned a first-name basis by years of association dating back to the sixties. The way he says "gallium arsenide" befits his respect for its potential.

It has been tough to make practical devices from GaAs. It's been a troublesome material, and devices made in it have often proven to be inconsistent. Silicon is far more workable. Producing one thousand or ten thousand identical gates from silicon is, by comparison, a technological snap.

But gallium arsenide is fast. And it holds the potential to build a new class of electronic systems that work at gigahertz frequencies (one thousand million cycles per second), a factor of 3 to 5 times faster than comparable systems today.

Howard Vollum recognized the inconsistency problem as early as 1959. Years later Howard told Tom of the problems he experienced trying to make two identical sampling diodes from gallium arsenide. Tom describes that meeting this way: "It wasn't discouraging, that conversation. On the contrary, I was impressed that Howard both knew the fundamentals of the problem—and how necessary it was for someone to solve it."



Tom Reeder sells products and services of TriQuint's GaAs IC foundry and test facility in Building 59.

In the fifties, among the materials that would function as transistors, GaAs was a front runner along with germanium. (No one talks much of germanium now.) That was before semiconductor pioneers started putting the silicon in the "Silicon Valley."

GaAs, at that point, became an interesting but rejected technology. Rejected, that is, until researchers pushed silicon faster and faster, edging performance up to where the material itself limited speed. Then gallium arsenide's potential for speed made it worthwhile, even necessary, for the industry to solve the bedeviling problems of inconsistency.

Tek, in 1978, was in a good position to solve at least some of these problems. That's the year Tom signed on with Tek Labs as manager of its Solid State Research Lab. However, he wasn't hired to chase GaAs devices per se.

But since he was hired to manage physicists who knew materials, engineers and scientists who knew high-speed technology, and experts in making semiconductor devices, he had a mighty resource to apply in productizing gallium arsenide. That's part of how TriQuint got started.

Now that we have Tom hired by Tek—and in a position to try making practical, consistent devices from gallium arsenide—let's go back and fill in some of his history.

Tom got his BSEE from the University of Illinois, then went on to Stanford University. There, he earned both an MSEE and the right to be called Doctor Thomas M. Reeder. He did his doctorial research by working out a new way to achieve high microwave-frequency power from traveling-wave tubes. "TWTs" they are called. TWTs have become a widely used component for the amplification of terrestrial and satellite-borne telephone communications. Tek's fast scopes of the fifties and sixties employed related technologies. Tom didn't know it at the time, but his work on microwave TWTs would prove to be a great asset to him in directing R&D on high-speed GaAs devices.

"Even now, Tek is a great place to be. It has the resources to do great things."

Early in his career, Tom worked as a research scientist on microwave and ultrasonic devices for companies in England and California. Returning to Stanford in 1968 as a research associate, he continued his heavy involvement in developing practical devices from surface-acoustic-wave (SAW) technology—transducers, filters, signal processors and the like. "SAW" technology is a thin film-based technology closely related to semiconductor work.

It was at the United Technologies Research Center, between 1971 and 1978, that Tom's expertise in fast electronics and small electrical devices confronted gallium arsenide in earnest. He developed a unique radar correlator device in gallium arsenide that combined the material's ability to store analog waveforms using surface acoustic waves with programmable electronics built into the gallium arsenide using integrated circuit techniques.

After Tom joined Tek in 1978, he recruited a research and development team that would concentrate on developing gallium arsenide technology. By 1981, this team had achieved international recognition for its work. In 1981, Tom transferred into Tek Labs' Electronic Systems Laboratory to spend full time researching the systems applications of gallium arsenide and other high-speed technologies. He was named Chief Scientist in 1982 as a result of his work in gallium arsenide and other solid state technologies at Tek.

Although he didn't think about it then, much of his work during 1978-82 was actually technical marketing. So much so that he became known as the "ambassador of gallium arsenide."

In 1983, Tom helped put together a proposal to develop gallium arsenide as a Tektronix business. This was a bold idea. Tek had never before marketed its solid state technologies to outside customers.

In looking for a leader for the new business, Tom could have proposed himself. "But since I didn't have business management experience," he explained, "I wasn't the best choice. My colleague Al Patz was better. Al, who was then controller for the Technology Group, had worked as a microwave component development manager for a California company. I felt that these experiences were the excellent background we needed for leading this new business."

In August 1983, Tom outlined to Al his proposal to develop the business. Two months later, Tom was pleased to see Al accept the position of general manager for the new Gallium Arsenide Strategic Program Unit (SPU). When the SPU was spun off as the Tek subsidiary TriQuint in March of 1985, Al became president.

In January 1984, Tom joined Al's new SPU as marketing manager. Nearly all of Tom's gallium arsenide research team also joined the SPU. More people, some from Tek's silicon IC design and manufacturing areas, asked to be a part of this new business. Today, TriQuint has grown to 87 people. And Tom is having fun, pursuing a long-held objective: to bring a technology out of the lab and into the marketplace.

Tom's career hasn't been meteoric. It's been a steady push forward and outward. He's been around, working in enough environments outside of Tek to say with conviction, "Even now, Tek is a great place to be. It has the resources to do great things."

At the risk of making Tom seem platitudinous, here's some of his career advice: "Go for the longterm; expect little glory along the way." And, "If you complain early in the game, perhaps you are part of the problem." And, "By staying awake through it all, you can find the great reward—the immense satisfaction of someone using and appreciating your work."□