

Early Marketing Days of the 4051

By Gary Laroff

The Tektronix 4051, introduced to the world in November 1975 quickly became a popular product regardless whether it was positioned as a "Graphics Computer System" (1975) or a "Desktop Computer" (1978). The sure indication of a popular product is when their enthusiasm overwhelms the product manager. Buyers of winning products also eventually decide the most useful features and applications, regardless of the original promotional effort. These things were all true with the 4051.

Another indication of a winner was when customers dragged out the length of a sales call when they typically chose to end a sales call as quickly as possible. In most environments a visit from a sales or marketing representative was an unwelcome interruption in the person's day. A visit with the 4051 almost always went overtime.

A number of 4051 visits are still memorable. Months before the official product introduction we conducted sales training at major Tektronix offices. One of the first was in Rockville, MD when we were still working on Columbus Day, Monday October 13. Senior Sales Representative A. G. Yeakle had scheduled to bring me with the 4051 to visit Computer Graphics Professor Dr. David Rogers at the United States Naval Academy at Annapolis. We chose to go there after training for a quick visit before dinner. I doubt we ever ate.

Dr. Rogers was a demanding, loud, in-your-face Naval Officer who quickly challenged a number of our design decisions. A.G. expected this but hadn't warned me. Off the top

of my head, tapping in to what I remembered from years of discussions with the design engineers, we successfully defended our feature set decisions. This was my first defense of our innovative system using the Graphic Display Units (GDUs), a method of ensuring that graphics maintained its aspect ratio especially on displays and plotters. Simply put, circles look round, and squares look square. He ran us through every graphics feature and more. We defended inclusion of simple "graphics input." The engineers who designed the world's first graphics desktop computer had thought it out well and the graphics guru at Annapolis finally let us out of there. It was well after midnight!

Knowledgeable customers spread the word, doing more for us than all the marketing from Wilsonville. Life was busy supporting and publicizing the 4051 and a number of IDG employees have long lists of their own "war stories" but a number of my longer chains of events surround the U.S. Navy.

The 4051 had been announced for only a few weeks, demonstrator units were few and far between and were hogged by anyone lucky enough to get one. Senior Sales Representative John Roddy requested that I join him for a follow-up 4051 demo on the USS Talbot, a Guided Missile Frigate at Norfolk Naval Shipyard in Virginia. The executive officer, a commander, was aware of our discussion at Annapolis the previous month and had asked pointed questions about graphics input, computational speed and our ability to read fairly complex data streams. I seem to remember that we didn't meet all his needs at that time. We ran a quick programming course for a midshipman who had a specific problem to solve. People there liked the ease of programming, the line editor keys, the Step Program key and the flashing arrow that pointed out

syntax errors. Despite the fact that the 4051 had some limitations, when they quickly ordered some of the first 4051 units and certainly the first for the Navy, they said it fulfilled "Objective 1: Be able to run problems with minimum of effort and programming." That, in a nutshell, was the 4051.

A few weeks after Annapolis and Norfolk, I drove to a customer visit at the Naval Submarine Base New London at Groton, CT. I was still working at the Boston Field Office in the winter of 1975-1976. A storm was expected and I wanted to cut the visit short since I was driving an old company station wagon with worn snow tires. The locals at the submarine base also wanted to get home while they could. After all, everything is uphill from a coastal Navy base. As before, the locals had spoken with other Navy contacts and for all I knew, some of them had been at the earlier training in Norfolk. They knew programming and small systems as we worked in a large room also lined with offerings from HP, Wang and IBM. We spent a lot of time on graphics input and they felt we were not ready for prime time. They didn't like our "quick" labeling of graphics with the hardware font. They felt the screen was too small and the lines too thick for a program to be useful and that the operator or programmer would have trouble getting engaged. No, the 4051 was not a million-dollar Evans & Sutherland system, but with their quantity discount, they could buy two hundred 4051 units for a million dollars. The 4051 was portable, affordable and programmable by mere mortals.

To overcome their objections, I did the unthinkable. Violating the rules of Tek Wilsonville, I brought out the Weather Wars game tape. It got the point across on our small screen. It was perfectly interactive with the minimum of hardware. It was infectious and

kept everyone engaged. The hardware font was acceptable. We didn't finish that day and the storm came in. I stayed at a motel for the night and went back to Groton the next day. They programmed and tested the 4051 all of that second day. Ironically, a real New England ice storm came in, but our schedules were finally impacted by Weather Wars.

Many people are aware that a year later, from late 1976 through the end of the product life of all succeeding 4050 series products, the U. S. Navy was the largest or one of the largest long-term high-volume customers. Those of us in sales, sales support and marketing can pat ourselves on the back as much as we like, but the success of the 4051 was due to its enormous attractiveness and approachability in a field of programmable calculators without screens and a few products with screens but no graphics.

Gary Laroff

At Tektronix 1973 – 1999, and then VideoTele.com, a Tektronix subsidiary, through 2002

Gary Laroff started with Tektronix as a Calculator Systems Analyst working out of the Boston Field Office and relocated to Wilsonville in 1976 to be the Product Marketing Manager of the 4050 Series.

The Tektronix 4051

By Bill Gellatly

In 1974, Information Display was growing quickly. I was working on the mechanical design of the 4006, a fourth-generation graphics terminal weighing in at about 40 pounds, and sporting an 11" direct view storage tube. We were looking forward to our move to the new headquarters for Information Display under construction on 260 acres in Wilsonville. Engineering for the division was cramped into close quarters in the Sunset plant, while product manufacturing was pushing the walls of the old Plant 4, in building 47 of the Beaverton Campus, and rapidly pushing capacity in our circuit board operations.

Modular portable office space was added next to the west-bound ramp onto Highway 26 (near today's OR-217), and it was occupied by the group from Beaverton who were extending the calculator product line we had acquired from the purchase of Cintra, down in Sunnyvale, CA. The Tek21 and Tek31 were our first additions to that line, but newly formed team was crafting what would become one of Tek's very widely appreciated tools, the 4051 Graphic Computing System.

Electronics Magazine, in its October 30, 1975 issue described the new 4051 offering this way, "Building on its expertise in graphics

equipment, the Information Display Group of Tektronix Inc. appears to be edging its way into the desktop computer business with the model 4051 Graphic Computing System. The 65-pound system can also serve as an intelligent terminal that will reduce computer time-sharing costs, and as an instrumentation-system controller, being compatible with the new IEEE general-purpose interface bus." Note: the same issue carried an ad for the Motorola 6800 chip at \$69 in quantities up to 100. That article can be found at:

http://www.swtpc.com/mholley/Microprocessors/Microprocessor_History.htm

I asked Jack Grimes, one of the original team members to describe the initial concepts. "The 4051 was based on two main product ideas. 1) the Tek31 programmable calculator, and 2) the 4010 Graphics terminal. The Tek31 had just a simple numeric display and a proprietary programming language. The 4010 Graphics terminal was not programmable, but featured a proprietary storage-based graphics display. There was no separate memory to hold the graphics data. Instead, the direct view storage display itself displayed the graphics data.

"The 4051, in effect, formed the host computer for a 4010 Graphics terminal. The host aspect of the 4051, was provided by the BASIC programming language, and a magnetic tape storage subsystem. The host aspect also included a CPU and main memory. The BASIC interpreter was held in a ROM memory, such that when the 4051 was powered on, the system was ready to execute BASIC programs and a set of operating system commands. The magnetic storage was a 3m tape unit that we thought of as an industrial quality version of an audio cassette tape unit.

"Recall that the Personal Computer was introduced after the 4051. This meant that the initial formulation of the 4051 was as a programmable calculator, compared with both the Tek31, and the HP 9800 family of programmable calculators.

"The 4051 CPU was a Motorola microprocessor, the 6800. The ROM memory held the OS



and BASIC interpreter. There was over 32Kbytes of ROM and up to 32Kbytes of RAM. One of the design assumptions was 'memory is free.' That is, we made little or no attempt to worry about the amount of semiconductor memory in the product design. We, instead, assumed that as the years passed, the manufacturing cost represented by the memory would decrease, resulting in an overall decrease in the total manufacturing cost of the 4051."

So, what was a 4051?

From my viewpoint, the 4051 was a 4006 terminal (\$3995) with another \$3000 worth of computer, tape drive, RS-232 and a GPIB ports. Those of us who took one of these home for the weekend understood the effort of getting the awkward and heavy device onto a cart and into our car.

There was optional Tektronix software for statistics, mathematics and some rudimentary tabular bookkeeping we later called spreadsheets.

The display board was an assembly shared by the 4006 and the 4051, and appearances had similarity, with the use of die castings to achieve a look not attainable with sheetmetal. Gary Burgess and Michio Haniu were the industrial designers, and both wanted our products to look more like office products than engineering test equipment.

This was a transformational product in many ways, and I think most would agree that it represented an important point along the path from mini-computers to the personal computer. Many parallel paths were being taken that led up to the devices built with the ubiquitous Microsoft Disk Operating System (DOS) and the IBM PC. It's worth noting that the IBM PC was not introduced for another eight years.

Applications

Through the Wizard Workshop, Tek began publishing subroutines and programs that were submitted by customers. One that fascinated me, and for which I found a serious use was one developed by a local timber company. It would take surveying measurements (an array of x, y and z axis data) and create a

topographical plot. The basic element is computation of where elevation (z) lines cross the x-y grid. The contours were fairly rough, with each being a polygon rather than any smoothed lines. I was able to adapt the program to analyze measurement data for a molded rubber belt where we had trouble with consistency for the thickness. With some study, the molding process was dramatically improved.

Steve Hunter, one of our Information Display mechanical product evaluation engineers, wrote a very involved program that helped with design improvements of the paper path in the 4631 Hard Copy Unit. It allowed some of the production adjustments to be optimized. Today we'd call it a sensitivity analysis, because part tolerances could also be changed, every one of which would affect actions like the cutting of the print from the roll of paper. One way of visualizing the program would be like looking into the back side of a wrist watch, and calculating the motion of the parts, but in detail, it is a very long list of equations that combine the geometry of the parts **and kinematics for part motions. It was a precursor to motion analysis** taken for granted in today's mechanical CAD software.

Death Notices

Anderson, Velma R -d5/22/2017

Chalumeau, Bernard Achille - d7/10/2017 @Tek 30 years

Cook Jr., William Bays -d8/14/17

Gallipeau, Joseph G. -d1/29/2017 @Tek 10 years

Glathar, Gorden -d9/2/2017

Gregware Jr., Kendrell R. - d9/16/2017 @Tek 32 years

Herb (Coates), Agnes -d12/23/2016 @Tek 19 years

McHenry, Michael -d8/9/2017 @Tek 28 years

Neudorfer, Nancy M -d8/16/2017

Ravins, Mary Margaret -d10/4/2017 @ Tek 16 years

Smith, Ralph R -d6/17/2017 @Tek 22 years

Takacs, Anita Marie -d12/14/2016 @Tek 18 years

Warren, Carlton Daniel -d5/23/2017

RETIREE BENEFIT INFORMATION & ADDRESS CHANGE PROCEEDURE Retiree Medical and/or

Life Insurance

Anyone who is a past employee with Retiree Medical and/or Life Insurance will need to request information or make changes in writing to A & I. You must include your signature and Social Security number.

Tektronix Post Employment Services
A & I Benefit Plan Administrators, Inc.
1220 SW Morrison St., Suite 300
Portland, OR 97205-2222
Toll Free: 1-800-778-7956
Fax: 503-228-0149

401k Benefit

Anyone who has a 401k benefit must contact Fidelity for information or to change their address directly with them at:

1-800-835-5092

Cash Balance Plan

The Cash Balance Plan has been transferred to Danaher Pension Plan Processing Center with Hewitt. Questions or changes should be directed to:

1-800-580-7526

Tektronix Retiree Volunteer Program

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CALENDAR

Previous Tek-Employees Luncheon

11:30 a.m. 2nd Monday monthly

Peppermill Restaurant

17455 SW Farmington Road #26B

(Corner of Farmington

& Kinnaman Rd)

Aloha, OR 97007

Details: Annetta Spickelmier

503-649-2491

Redmond Breakfasts

8:00 a.m. 1st Monday monthly

Shari's Restaurant; Redmond, OR

1565 SW Odem Medo Way

Spouses welcome

Details: Nick Hughes 541-548-1201

TERAC

6:00 p. m.

Round Table — Beaverton

Weekly on Friday

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