# Exhibit A

UNITED STATES DISTRICT COURT
WESTERN DISTRICT OF SEATTLE AT WASHINGTON
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TIM and PENNY PATERSON, husband and wife and the marital community thereof,

Plaintiffs,

No.: 2:05-CV-01719-TSZ

-against-

LITTLE, BROWN and COMPANY, a Massachusetts & State Corporation, TIME WARNER BOOK GROUP, a Delaware Corporation, HAROLD EVANS ASSOCIATES, LLC, a New York State Limited Liability Company, HAROLD EVANS and DAVID LEFER,

Defendants.
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DEPOSITION of Defendant, HAROLD M. EVANS, taken by the Plaintiffs pursuant to Notice, held at the offices of Davis Wright Tremaine, LLP, 1633 Broadway, New York, New York, on February 6, 2007, at 10:00 a.m., before a Notary Public of the State of New York.

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ALSO PRESENT:
TIM PATERSON
PENNY PATERSON
FIGUERETTA A. INOS,
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D. Michael Tomkins, P.S.

xxxxx

A. Oh, I would think 1998, 1999.

Q. Just before beginning your quest to write the book?

A. I had begun to do -- the book required research of 200 years of many different innovators, and the first year entirely was spent trying to define which areas and which individuals.

Q. Did you ever talk to Mr. Paterson about anything?

A. No.

Q. Was there any reason that you chose not to speak to him during the five-year process of writing the book?

A. Yes.

Q. And what is that?

A. Mr. Paterson was on the public record in many places and nothing seemed to go further. Each statement seemed to be very similar. There seemed to be no advance.

Q. Did anybody, any of your consultants, publishers, editors, agents, lawyers suggest to you that you pick up

the phone and call Mr. Paterson?

A. No.

MR. JOHNSON: I'm going to object to the question to the extent you're asking for lawyer's advice.

MR. TOMKINS: Strike the lawyer's advice.

THE WITNESS: The answer is still no.

Q. I'm just paraphrasing. So I'm clear, you thought that Mr. Paterson's record was clear enough that no clarification was needed by Mr. Paterson relative to any issues that you wrote about in the Kildall chapter?

A. Yes.

Q. Did any of the people mentioned in the Kildall chapter suggest that you call Mr. Paterson for his side of the story, clarification, confirmation, whatever that looked like?

A. No.

Q. Would you agree that the chapter on

using source code. That is what I did.
Q. Do you have an opinion about that particular --
A. I'm not qualified to have an opinion about source code. I asked the industry people. They all had their opinions which is stated in the book, and I stated Mr. Paterson's vehement rejection that he had taken the source code, which is what Mr. Kildall alleged.
MR. TOMKINS: Let's take a five-minute break.
(Brief recess taken.)
Q. What is your current relationship with Little, Brown?
A. I'm under contract to write, to complete the trilogy. The first part of the trilogy was from the, "American Century, 100 Years From 1989 to today." The second part was "They Made America," and the third part would be the political history from 1776 to 1889 to tie up the American century.
Q. Who is John Wharton?

A. John Wharton is a friend of Kildall also engaged in this big public debate with Mr. Paterson. That's how it came to my attention, partly and was, I understand, an Intel engineer and professor or teacher at Stanford University.

Q. Did you speak to him personally?

A. Yes.

Q. Do you consider him an expert in computer history?

A. I consider him an expert in this particular area, yes.

Q. Do you know if he knew Mr. Kildall personally?

A. Yes, he did.

Q. Do you know if he worked with Mr. Kildall?

A. I've seen statements. I didn't actually discuss that with him, but he has such a close relationship with him.

Q. Do you know what Mr. Wharton thinks of Mr. Paterson?

A. Not personally.

Q. Do you know if Mr. Wharton thinks that Mr. Paterson misappropriated, pirated Mr. Kildall's intellectual property?

A. Mr. Wharton probably thought that Mr. Paterson made that allegation of ripping off.

Q. Do you consider the word "ripping off" to be synonymous with thievery?

A. It's his. It's not a word I use.

Q. Do you consider the phrase "ripping off" to be consistent with the word "thievery" or the concept of thievery?

A. Yes.

Q. Did you receive insight on the chapter from Mr. Wharton?

A. Yes.

Q. Would you characterize him as a consultant for the chapter?

A. A source, yes.

Q. Did he help with the edits?

A. Yes.

Q. Did he make suggestions about content?

A. Yes.

this as Exhibit 57.

(Whereupon a document from Dan Kevlas dated 1/28/04 was marked as Exhibit 57 for identification, as of this date.)

Q. I'm going to show you what we marked as Exhibit 57. I believe it's a document that you provided me through your counsel.

A. Yes.

Q. This is from Dan, correct, dated sort of late in the game, 1/28/04?

A. Yes.

Q. When you read in the second paragraph, "I suggest one caution" -- do you see that section?

A. Yes.

Q. -- "I have no specific knowledge with which to contradict any or all of those claims, but I do know that the history of technological innovation isn't usually so neat and single fathered. I suggest hedging the claim somehow by, for example, attributing them to other

authorities. Kildall was no doubt a key visionary but not likely to have been alone."

Would you agree with that statement?

A. Yes.

Q. Would you agree that one of those other people that might stand tall in this dispute would have been Tim Paterson?

A. Yes.

Q. And yet you didn't talk to him?

A. No, I think I represented Mr. Paterson's position very fairly.

I've acknowledged already the three major, one of which is controversial, which is the API's, the conversion of an Intel 8086 chip, and I've acknowledged Mr. Paterson's contributions.

The only area of argument seems to be the cloning, mimicking. You keep using the word "pirating," which I didn't use, of Kildall's API's.

By the way, in answer to the point about the general state, I did write a

gnashing of the teeth, he accepts it and moves on as not a clone, not a rip-off?

A. Well, Mr. Kildall said it was a rip-off and used that phrase often.

Q. In his memoir?

A. But he used it more often amongst colleagues. Mr. Kildall got increasingly furious.

You asked why he didn't sue and why he remained kind of complacent, really, and the answer is that he had a faith in his technology with winning the marketplace. He completely underestimated the power of IBM.

Q. So you think that Kildall thought that his operating system was so much better than anything out there that the world would beat down his door economically and at the retail store when priced against MS DOS?

A. Of course, he was shocked when he found that MS DOS was priced so much cheaper and he felt betrayed, and in fact, he thought it was a conspiracy to take the

standard, which is CP/M, and rip it off for IBM PC. He felt betrayed by that.

Q. Did anybody tell you during your research that Mr. Kildall had a major hand in pricing his own product and, in fact, demanded from IBM the price to be set and the profit to be made per unit?

A. That is inaccurate.

Q. On what do you base that opinion on?

A. On Tom Rolander and others who said -- and Gerry Davis. They tried to agree a price with IBM, and IBM said, "We cannot do that because it would be anti-Trade Restrictions Act."

And Rolander said when they got down to the store to see the IBM PC, it was as if somebody had just hit him in the face to find the difference in the prices.

Now, it is true and acknowledged that Bill Gates virtually gave the store away so that he would undercut Kildall. Kildall regarded it as a conspiracy to take the existing standard which was CP/M

and get it on the cheap.

Q. Did anybody talk to you in your research about the discussion about royalty issues?

A. Yes, it's in the book. I know Kildall, the argument whether he should have sold the system or got a royalty or whatever, the fact was that Kildall and Rolander -- Rolander told me himself, they expected to see roughly comparable prices in the store, and it was a tremendous shock to Kildall and Rolander when they found that that was not. They felt betrayed by IBM.

Q. So they believed that IBM purposely doubled the price or tripled the price?

A. They believed that Bill Gates had done a deal with IBM which was more beneficial to IBM and, therefore, they cut out CP/M.

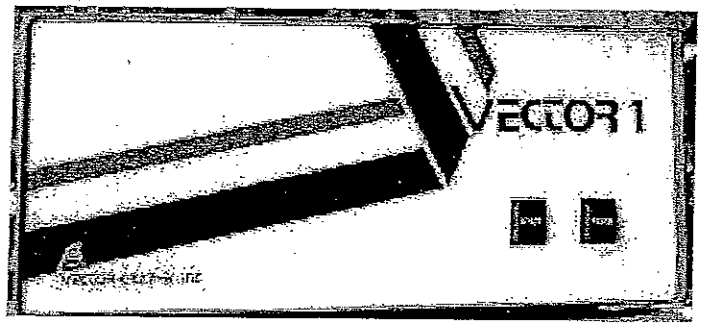
Also, I think they found Bill Gates easier to deal with than Gary Kildall.

Q. Did Mr. Davis indicate to you or Mr. Rolander indicate the royalty split?

# Exhibit B

# CP/M

## History




A typical CP/M Computer - the Vector-1.

If many people today know of CP/M at all, they think of it as "the predecessor to DOS". Here's the real story of the birth, life and death of this once dominant operating system.

### Birth

"Necessity is the mother of invention" the old saying goes. And its true; but as we all know it takes two to make a baby and in the case of CP/M the father was a man named Gary Kildall, who in 1975 was working as a consultant to Intel (inventors of the 8080 chip which at that time powered the majority of non-Apple microcomputers).

Kildall's task at Intel that year was to design and develop a language called PL/M for the 8080 chip, to be used as a systems development language. At the time, the chips themselves barely existed and Intel was just then starting to design a computer system that used the 8080. The plan was for Gary to use the 8080 emulator Intel had running on their big PDP-10 minicomputer, but he preferred to work directly on the 8080 itself, in part because by working on his own machine at home he could avoid the 50 mile drive to Intel to work every day. The only 8080-based computer Intel had available was called "Intellec-8", but it didn't have any software or disk storage attached to it. So Kildall obtained a used test floppy drive free from Shugart Associates, attached it to the Intellec-8 with a controller designed by his friend John Torode, and wrote a primitive operating system for it which he called CP/M.

CP/M was developed on Intel's 8080 emulator under DEC's TOPS-10 operating system, so naturally many parts of CP/M were inspired by it, including the eight character filenames with a three-character extension that every MS-DOS/Windows 3.X user still lives with today.

Developing and debugging an operating system is a tough job, and it always takes longer than you thought it would (probably because if you were realistic about estimating the true time and effort it will take, you wouldn't have the heart to begin). By the end of 1975, Kildall at last had CP/M version 1.0 ready and had started on PL/M, but Intel was no longer interested in the systems development language by that time. Gary offered CP/M to them, but the company saw no potential in it and declined to market it.

By 1976, the world was moving onward and upward. Intel was so busy selling bucketloads of 8080

# Exhibit C

approval when he showed that PL/M could do in one hour what it took programmers in assembly language ten hours to do. It took no more memory space.

Kildall traded more software he wrote to get Intel's new computer system, the Intellec 8. He used a DEC PDP-10 minicomputer to program it. He also borrowed $1700 to buy a printer and a video display. He writes, "I was close to techno-heaven. I now had a real computer that could actually be used to make real programs." The 8008 chip was still limited in some ways, and an Intel scientist upgraded the chip, which Intel called the 8080. The new microcomputer system was called the Intellec 8/Mod 80.

The search for memory:
Kildall's main task was to make the Intellec computer independent of the DEC PDP-10 he had been using to write programs. He now wanted to use the Intellec 8/80 to write the actual programs. To do that, he had to figure out a way to create more memory on the machine. The only thing Kildall could find for more memory in 1973 was a high-speed paper tape reader and punch machine. Kildall's experiments with cassette tape didn't work.

That year, 1973, Kildall decided to try a new "floppy disk" invented by Memorex, just down the road from Intel. Floppy disks were invented to replace paper punch cards, but they were a quantum leap ahead. A single floppy disk holding 250,000 characters has the same capacity as two thousand feet of paper tape, and whereas a paper tape reader processes 10 characters a second, a floppy disk drive reads 10,000 characters a second—a thousand times faster. A disk drive and controller came to $4500, so Kildall persuaded the marketing director at Shugart Associates, which had built an IBM compatible disk drive, to give him an old machine for free. The disk drive was IBM compatible and didn't work with his Intellec 8/80. Kildall spent hours trying to figure out the complicated electronics involved. The equipment sat in his office for a year and he couldn't get it to work.

He would have to wait to use it and therefore couldn't write a new compiler for the Intellec 8/80 on an Intellec 8/80. He went back to his DEC PDP-10, which he had programmed to simulate an Intel computer. Kildall writes, "So, I built an operating system program using the simulator. I called it CP/M, or a Control Program for Microcomputers, mimicking the name PL/M." [CP/M originally stood for control program/ monitor.] Kildall knew his program worked, but he still couldn't get it to work on the Intel hardware. PL/M was used to write CP/M.

It is important to note that like almost every other innovation, CP/M did not spring fully grown from its creator's heard. Many of the naming conventions Kildall borrowed from the TOPS operating system on the DEC PDP-10 he was using to create CP/M. Other influences found their way into CP/M code as well.

In 1974 Kildall called his friend from the University of Washington John Torode, who had a PhD in electrical engineering. He told Torode how he was trying to build a disk drive for his Intel computer. Kildall says, "He designed a neat little microcontroller and,

In 1978 Gates signed an OEM license to use CP/M. Microsoft had developed SoftCard, invented by Allen. The SoftCard plugged into the Apple IIe to run BASIC on top of CP/M. By selling SoftCard, Microsoft became the largest seller of CP/M.
In getting the license, Gates was given access to CP/M's copyrighted documentation for its Application Program Interface (API) and external User Interface (UI). The the DR-DOS lawsuit Caldera eventually brought against Microsoft has a very good definition of APIs: "In writing applications for a particular operating system, applications developers refer to a set of ground rules for that operating system, known as the Application Programming Interfaces (or APIs). APIs tell the application developer what the operating system will do in response to a defined set of requests or "calls." As long as an application is written in accordance with the rules set by the API, the application will run with a given operating system."

In writing about this, Kildall clearly wants to imply that Gates used this copyrighted material when he built DOS for IBM, but this has not been proven. We have to be careful about implying that Gates knew he was consciously stealing Kildall's work. We don't know, although Kildall believes he did.

At the same time Gates was battling Gordon Eubanks for control of the BASIC market. Gates founded Microsoft on BASIC, but Eubanks, who had done his master's thesis at NPS with Kildall, came up with Commercial BASIC, or C-BASIC. Gates' BASIC had a flaw that caused rounding errors. When the language was used for accounting, it sometimes caused the gain or loss of pennies. C-BASIC fixed this problem and quickly become the favorite for commercial uses, like accounting or inventory. Gates' BASIC was more for the casual user. Perhaps the beginning of the rift between Kildall and Gates came in 1980 when DRI acquired Eubanks' company. Now Kildall had a product that could have potentially put Gates out of business.

DRI's atmosphere:
DRI (Digital Research, Inc.) was doing so well by 1978 that the company moved to a new building in Pacific Grove—an old Victorian home featured in several photographs. Kildall says [caption?] "The Victorian spawned a new, growing phase of Digital Research. It was fun. It was exciting. It made new relationships between people. It made a lot of marriages, and they made a bunch of babies. I king of like that part. The Victorian home filled with DRI people had spunk. It was alive. It was active. People moving paper and products. People defining the industry through their work." The staff was so small in the 70s that programmers had to take turns answering phones. Other engineers would taunt the poor programmer who had to go on duty answering phones. Sales were $100,000 per month with about 57% pretax profit. Software manufacturers have few expenses.

Kildall celebrated his 39th birthday with the 20 DRI employees. He got roller skates for a present, and when the party ran out of champagne, Kildall donned the skates, and sped down hill on them toward the local liquor store. He kept stumbling over small acorns littering the street and hugged a telephone for support just before getting there. He doesn't quite remember how he got the champagne back. Kildall writes, "Coincidentally,

While he was tinkering, companies clamoring for CP/M upgrades wrote pirated copies of CP/M incorporating their own upgrades. Kildall writes, "There were massive ripoffs of the CP/M design in the late 1970s." Two examples were Neil Colvin's ZDOS for the Z-80 and Roger Mellon's "complete misappropriation of the entire operating system that was sold to him by the Palo Alto Computer Store as if it were an original," Kildall writes. Kildall heard about the operating system Mellon had been using and visited him in 1979. Kildall used DRI's DDT bugger which allowed him to view Mellon's source code, and there embedded in the program was the message: "Copyright 1978, Digital Research."

Mellon apparently had not known he had been sold a pirated copy of CP/M and signed up the next day for a license. Kildall writes, "I put the copyright message in the object code for exactly that purpose and you had to be a very sophisticated programmer to remove that message. Not only that, if it was removed, CP/M would not run because the operating system checked to see if the message was there before starting, using an encryption scheme that worked quite well." (Kildall learned the encryption techniques and the Naval Postgraduate School.) Kildall then found out that Roger Billings was selling a non-licensed CP/M through his Billings Computers in Provo, Utah. Gerry Davis, Kildall's lawyer began investigated legal ways to stop Billings, but Kildall and Rolander tried a more direct approach. They boarded Kildall's single-engine Piper Archer and flew seven hours to Utah.

Billing's forced Kildall to wait in his company's waiting room, and while killing time, Kildall started playing with a sample Billings Computer system that was in the room. Kildall used his DDT debugger program he had used on Roger Mellon's system and quickly entered the innards of the computer operating system. There was his copyright message embedded in the software. Kildall writes, "Roger became quite friendly all of a sudden." Billings paid for an OEM agreement within a week.

16 bits:
In 1978 Intel introduced its 8086 16-bit microprocessor in June 1978. In 1979, the company made another slower but cheaper 8088 16-bit processor. The 16-bit chip had one main advantage: it doubled the speed of the chip, allowing data to be transferred twice as fast. By today's standards the chip would be considered incredibly slow. In early 1979 Seattle Computer Products wanted to sell its 8086 computer kit, but without the 16-bit CP/M-86, there was not much the company could do. Kildall was still busy building his PL/I programming language. In 1980 with revenue falling, SCP hired Tim Patterson to write a simplified 8086 version of CP/M. SCP DOS, which was also known as QDOS, for Quick 'n' Dirty Operating System, was another such pirated copy of CP/M. Microsoft modified its BASIC to run on QDOS and Gates and Allen later bought QDOS to sell to IBM.

Gordon Eubanks, Kildall's former student and business partner, says Patterson wrote the program because he was tired of waiting for Kildall to come up with a 16-bit version of CP/M. Rolander said there was a delay: it was six months behind schedule. Davis also said that had Kildall completed CP/M-86 in time, he would have pre-empted Patterson.

thirty-eight-year-old Kildall's love of planes and indifference to boardroom protocol. "Gary went flying"—too busy to be troubled by the most powerful technology company on earth, leaving the meeting for his wife to run. That's the Microsoft, and popular version—and since winners tend to write history, it's the prevailing one. It's not the only one. Gary Kildall is the *Rashomon* of Silicon Valley. Almost two decades later, the story of that August 1980 day still reverberates around Pacific Grove in the way that doormen at the Watergate still talk about the break-in...The Kildall tale is now just as much as part of the place as the butterflies."

Even *Newsday* wrote, "In a story often told, the starched-shirt IBM guys, after CP/M long-hairs canceled an appointment, turned to an unknown company called Microsoft, headed by an unknown computer geek named Bill Gates."

While many books on Silicon Valley have their version of the story, we have several things no one else does: Kildall's manuscript (which seems largely, but not completely reliable) as well as several interviews-- what Dorothy will tell us, the stories of Tom Rolander, who went flying with Kildall the day the IBM team came, and the memory of Gerry Davis, Kildall's lawyer, who consulted with Dorothy over the phone and who later showed up at DRI. In essence, we have the most complete version of the Digital Research side of the story.

Kildall writes, "It has made a great story over the last decade, but that airplane story was just a scapegoat. Later, PC-DOS [the IBM version] and also MS-DOS [Microsoft's version which it licensed to others], were rooted in CP/M and the industry that it had created. The user and programming interface came from Digital Research documents clearly marked as proprietary. To those who knew the industry, Gates' DOS was a blatant misappropriation of proprietary materials, revenues, and of my personal pride and achievement."

What happened to DRI, Kildall calls a conspiracy: "The conspiracy of Gates and IBM against Digital Research is founded in facts and technical issues (shown in the Appendices) and speculation about events. The conspiracy was contrived to simply take the CP/M standard at no significant ongoing cost to IBM. The established CP/M standard was to the immediate benefit of both Microsoft and IBM." As psychiatrists like to say, even paranoids are persecuted. From what we know, Kildall was completely right—there was a conspiracy.

Here is the story:
In July of 1980 IBM called Microsoft to arrange a meeting. MS had once before tried to sell some software to the computer giant but the deal had failed. Gates suggested meeting the following week. IBM said it would get on a plane in two hours. Gates cancelled in important meeting with Atari the next day to meet the IBM team. He was made to sign an confidentiality agreement, and once it was signed, MS and IBM chatted about what features were important in a PC. Gates sent a thank-you letter the next day.

wanted until DRI signed. Tensions simmered. Davis said, "Now IBM comes up with this agreement that says, 'Fuck you. We're going to deign to talk to you. And if we do we won't tell you what we're going to talk to you about.' And we didn't know for sure what they wanted. 'If we talk to you and we don't make a deal you can't ever do anything in this field we're talking about.' It's nuts. No one is going to sign a deal like that. Bill signed that agreement because he had nothing to lose, because he didn't have an operating system."

Dorothy refuses still to describe everything that happened. She couldn't reach Kildall, and Kildall writes she tried unsuccessfully to reach Gerry Davis. But Davis says she did get through to him by phone. He says he advised that the IBM agreement was too broad, but might be modified. Dorothy decided not to sign until Kildall came back in the afternoon. In the meantime, it appears, the IBM team fumed.

Davis caveat:
Gerry Davis tells a story that is very critical of McEwan. He repeatedly told me, "Don't be too hard on her." It will be hard to publish this and still get the family's permission. It is also possible Davis denigrates McEwan to distract attention from his own role, but still his story has the ring of truth. The strange thing about his stories is that they all make him look good. Davis also threatened us: "Be careful with that section that says I'm at fault for not suing. If it were ever published, I could sue, because I have a set of documents that demonstrate I did not tell him that at all." He did not show me these documents, but I quote his version of events later. He said he couldn't really talk about it because of client-attorney privilege.

Davis told me, "The problem was they had come here with the intention of signing a contract, [but didn't] due to Dorothy's inability to get along with the other lawyer—the bulk of people later told me he's the biggest asshole in [IBM's] legal department. They said, "We're not surprised you couldn't get along with him. We can't either." It was after that happened that they went to Bill."

Davis did not necessarily say this was off the record, but asked us to be careful since he has to get along with Dorothy every day--
"A large portion of it was Dorothy's inexperience. Her total business experience was working for the phone company in Seattle. I don't want her to come out with bad name, and I think under the circumstances she did quite well. [The problem was] the combination of her inexperience and that fact that she was concerned about legal fees.

After meeting the IBM people and being presented with their contract, McEwan called Davis. Davis said he told her, "Dorothy, I think the contract is ridiculous, but I think it can be modified. Why don't you let me come over and talk to this guy?" Davis also remembered McEwan response: "It's something I remember to this day: 'No, I can't afford $40 an hour. Why don't you just look at it, tell me what to do, and I'll work it out.' Dorothy had this kind of personality that made her want to do things herself."

IBM hallmark. The benefits took some explaining. If people knew the details of the operating system, they could develop software for it more easily, and VisiCalc had shown that good third-party software can help sell a machine…The operating system was also open in another way. Gates managed to get IBM to agree to let Microsoft sell its operating system to other hardware manufacturers. IBM apparently did not understand the riches they were handing to Microsoft."

IBM went flying as well.

Back at DRI:
Meanwhile, Kildall heard no further from IBM, unsure what to make of this change in attitude. They had stopped returning his calls, but be didn't worry too much. As far as he knew, no one else had a PC operating system. In 1981 CP/M ran on 90% of the roughly 500,000 or so Intel-chip-based personal computers in existence. Kildall knew he controlled the non-Apple PC market. (Apple didn't use Intel chips for its computers.) Where else could IBM go?

About half a year later, a friend of his who was a computer consultant showed Kildall a list of PC-DOS API (Application Program Interface) function calls-- the specifications for the software. These specifications had to published so that software writers would know how to write new software for the IBM PC. Kildall writes, "These calls mimicked CP/M's proprietary list to the letter."

Comparison of CP/M to PC-DOS:
Kildall writes, "Ironically Patterson had used all of those software tools that I had developed over the years to make the Seattle DOS clone of my CP/M system, including SID, the Symbolic Instruction Debugger (an improvement over DDT). The SID program would literally tear apart any instruction sequences of CP/M, and write them to a terminal or printer for Tim to view."

Kildall continues, "As for technical issues, the first twenty-six function calls of the API in MS/PC-DOS are identical to and taken directly from the CP/M proprietary documents. …The BIOS, named in CP/M, formed the basis for standardizing multitudes of manufacturers. The "BASIC I/O System" was an invention of CP/M that started the PC industry and was taken directly into DOS. Similarly, the FCB (file control block) format was taken directly into DOS and exists today."

--I've looked at the list of MS-DOS functions and CP/M functions. Some are blatant copies, some slight alterations. I see only 21 that really resembled each other, though.

According to Kildall, the architecture of QDOS mirrored CP/M's, which was originally built when computer memory was quite limited—only 4k. CP/M's design takes this limitation into account through the use of "transient programs," such as systems utilities for editing and file transfer. Kildall writes, "So, the design included three areas of memory. The BIOS (basic I/O system) for customizing CP/M to any hardware design, the BDOS (basic disk operating system) that resided within that 4k, and the TPA (transient

program area) to hold a program that was active at the time. Often, the total RAM size was restricted to only 16k, so this design was essential. Tim Patterson's Seattle DOS (commuted to MS-DOS through IBM) took all of these designs."

CP/M even began each new line with:
A:
...while the DOS prompt was:
A>

In addition, CP/M's ED program was almost the same as PC-DOS's EDLIN editor program.

Furthermore, there was an eerie similarity between CP/M's first 26 API function calls and PC-DOS's. These are the Int 21 commands Rolander described. In his appendix, Kildall lists the commands from CP/M and those from MS-DOS. I list the most obvious rip-offs below:

| CP/M: | MS-DOS: |
|---|---|
| 0 System Reset | 00h Terminate Program |
| 1 Console Input | 01h Read Keyboard with Echo |
| 2 Console Output | 02h Display Character |
| 3 Reader Input | 03h Auxiliary Input |
| 4 Punch Output | 04h Auxiliary Output |
| 5 List Output | 05h Print Character |
| ... | |
| 9 Print String | 09h Display String |
| 10 Read Console Buffer | 0Ah Buffered Keyboard Input |
| ... | |
| 15 Open File | 0Fh Open File with FCB |
| 16 Close File | 10h Close File with FCB |
| 17 Search for First | 11h Find First File with FCB |
| 18 Search for Next | 12h Find Next File with FCB |
| 19 Delete File | 13h Delete File with FCB |
| 20 Read Sequential | 14h Sequential Read |
| 21 Write Sequential | 15h Sequential Write |
| 22 Make File | 16h Create File with FCB |
| 23 Rename File | 17h Rename File with FCB |
| ... | |
| 33 Read Random | 21h Random Read |
| 34 Write Random | 22h Random Write |
| 35 Computer File Size | 23h Get File Size |
| 36 Set Random Record | 24h Set Random Record Number |

These functions were detailed in confidential DRI material, and the actual code could have been viewed by anyone who knew how to use CP/M's debugger.

Kildall says years later he confronted Patterson about the similarities between CP/M and QDOS. Kildall writes, "Patterson said that he did it to "make his DOS compatible.""

Kildall believes his work was stolen: "It was plain and simple theft, no different than stealing time on Dick Hamlet's computers [in Seattle as teenagers], only this time the candy store was much bigger."

Differences and similaries:
Rolander described some of the important differences as well as similarities between CP/M and QDOS. Rolander said, "What Tim did was very clever." Rolander said that Patterson used Kildall's BDOS interface with its Int 21 command between the application program and disk operating system to construct his own operating system that mimicked CP/M. The Int 21 command was what made Kildall's system so powerful—it allowed anyone to write programs for any computer. This is precisely what Patterson copied and Gates used in MS-DOS.

Rolander continued, "If you take a look at MS-DOS or QDOS, its Int 21 interface is 90 plus % identical to CP/M's. You can actually take that program...and there was very little you had to do to move that. Ironically, an invention of Gary's was used against him, because it was easy to move applications from CP/M to PC-DOS."
Rolander points out there were some important differences between CP/M and QDOS. First the way the files were laid out was very different. Second, QDOS was a 16-bit program. Rolander said, "What he did was actually use a very different layout of files on a disk. The actual layout of files on a disk was called a FAT file system, a File Allocation Table. What Gary did on CP/M was an FCB, or File Control Block, which was a different organization on the way that data was stored on the disk. Nonetheless, this Int 21 interface obscured a lot of the differences. It made it very easy to port an application to recompile or rebuild an application.

"Also, the 16-bit was a bit of a change. Basically, the machine instructions program were very different from the 8-bit processor for the 16-bit processor."

QDOS actually better in some ways:
Rolander admitted QDOS was more efficient that CP/M in some ways: "He did a more a more efficient file system. The FAT file system was more efficient for the disks that they had at that point in time. The FAT was actually a superior file system. Gary's original creation for CP/M was for floppy disks, and it was sort of extended. Any time you do a first generation version, and then a new technology comes in with more capacity, do you design a new system with a higher capacity or do you try to take your current version and apply band-aides. The design of Gary's system was sort of extended a little bit to try to handle the larger disk, whereas [Patterson's] FAT file system was designed to handle the bigger disk. It did a better job at it."

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One excuse offered as to why QDOS was so similar was that there are a limited number of ways to construct an operating system using the same Intel microprocessor chip. Davis said, "You had very, very strict constraints. There were only certain things you could do with it. There weren't very many ways you could write it. That later became an issue."

Errors in QDOS:
Rolander said, "There were actually some misinterpretations of CP/M functions. So there were actually some mistakes that were made in QDOS which were an error in one or more of the functions. It didn't operate the way CP/M did just because of misunderstandings in cloning the system."

Copyright questions:
Rolander said,"There real question is, was it legal as a copyright issue. They just went and took the Int 21s and just replicated them, just copied them over. As a copyrighted work, can you just functionally replace something underneath those calls?"

Davis said that Kildall became even more aware how similar QDOS was to CP/M after the IBM PC came out. Then he and Rolander started examining it more. Davis said, "They realized that 60 to 70% of the code was essentially the same. Really all you had to do was go through this program and where there were 8-bit instructions substitute them with 16-bit instructions....It was not a monumental project if all you wanted to do was make a rudimentary copy of it. Why CP/M-86 was a much better system is because it had those pieces that Patterson didn't give Microsoft. I don't understand it. You can ask Wharton about it. He wrote this article explaining. One key piece of the design of this system which Microsoft didn't use has been the cause of all of the problems of DOS ever since then."

Kildall was furious. He called IBM. IBM sent an attorney and another employee to visit DRI. Kildall writes, "I showed the IBM attorney definitive evidence that PC-DOS was a clone of CP/M and immediately threatened a lawsuit for copyright infringement. The IBM attorney compared the API interface and, I can say clearly that he fairly blanched at the comparison and stated that he was not aware of the similarity. I told him that he should take note and become aware at the earliest opportunity, or else he should face a major lawsuit."

IBM soon agreed to market CP/M-86 alongside Microsoft's PC-DOS in similar packaging. It had no choice. Kildall and Davis flew to Boca Raton to sign the contract with IBM on July 22, 1981. Kildall writes, "To complete the agreement, I was required to sign a release. This release stated that DRI would not sue IBM for infringement of CP/M copyrights, nor would DRI sue Microsoft for any PC-DOS infringements. This did not protect MS-DOS, only PC-DOS. We discussed pricing issues, but setting a price level, according to IBM, "was a violation of anti-trust." Pricing could not be set." It was in IBM's interest to settle quickly with Kildall, for a lawsuit for "injunctive relief" could delay the entire secret venture.

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this day, the entire scenario was contrived by IBM to garner the existing standard at almost no cost."

The UCSD Pascal operating system, the third choice was even more. (There are several discrepancies on the pricing. According to Computer Shopper magazine, PC-DOS was $60, CP/M-86 was $175, and UCSD Pascal was $450. Most sources, including Rolander and Kildall, seem to agree it was that PC-DOS was $40 and CP/M $240. Rolander the price differential was a multiple of six.)

Kildall adds, "Fundamental to this conspiracy was to obtain the waiver for their own PC-DOS produced by Microsoft. Fundamental also was their plan to price CP/M-86 out of the market. The key was pricing. At eight times the price, CP/M-86 would not sell."

Rolander says seeing the price difference was probably the biggest shock of his life. They had driven up to the Bay Area to look at the computer the day it hit the stores. Rolander says, "Talk about a shock. It was just as if I were to reach across the table right now and give you a slap across the face, something completely off-the wall. Looking at the price and knowing you had been completely screwed, that there was no intention whatsoever on there part to sell CP/M-86. It was clear they had no intention at all. There was such a trusting nature, especially in the academic world, that was collegial. This was so big-business, aggressive, killer." He and Kildall felt so naïve. They tried calling IBM to ask the company to reduce the price of CP/M, but no one called them back. They never found out who made the decision to price CP/M out of the market, IBM or Gates.

Pricing was one factor in CP/M's eventual demise, but more important was the weight of IBM's imprimatur. Microsoft was obviously IBM's operating system of choice, and programmers started tailoring their software to PC-DOS, and the MS-DOS as IBM clones appeared. Kildall hoped the IBM would not be as big a hit as everyone thought, but by the end of the year it became clear CP/M had been pushed to the margins.

Legal options:
"Look and Feel" had not been tested at time. Gerry Davis advised Kildall it would be difficult to pursue litigation against Microsoft. Nowadays, quite possible Kildall would have prevailed in court. At the time, far from clear. This type of argument had never been tested before. Kildall writes, "My attorney, Gerry Davis' position, at the time, was that software could not be protected. This position, of course, has been proven undefendable in these subsequent years." Kildall's feelings may have been poisoned over the years—in 1986 he told *Computer Shopper* magazine that although he knew Patterson had copied CP/M and made minimal changes to it, he didn't plan to go to court.

Davis said, "We agreed we would not sue IBM. They wanted us to agree not to sue Microsoft." Gary had already left Boca Raton at this point, so Davis called Kildall and said the IBM wanted a provision that said DRI would also agree not to sue Microsoft. Kildall said, 'Tell them to go to hell. We don't want that provision and we won't sign that contract." Davis told IBM what Kildall had said, and IBM then asked if they would sign a contract agreeing not to sue IBM. "I said fine, because I didn't really care. We didn't

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have to sue IBM. We could sue Microsoft. ...All we had to do was sue Microsoft and all the royalties they were getting from IBM would belong to us."

He continued, "As to why we didn't sue them there were two reasons. Early on I discussed it with Gary. The board discussed it....This is 1981, there had never been a lawsuit filed over computer software copyright infringement. I filed one of the very first computer software infringement suits against a guy in the Bay Area who was using CP/M, and we successfully put him out of business. This was about the same time. In 1981 no one was suing anyone for copyright infringement....If you had talked to any lawyer in 1981 he would have told you it was a very dicey case."

Another big problem Davis said he warned Kildall about was the fact that IBM would come to its defense. IBM had deep pockets, and DRI might have had to spend copious amounts to sue. He estimated legal fees in the hundreds of thousands of dollars. He also said that judges at the time knew very little about computers and might not have understood the details of the case.

The copyright law of 1976 wasn't amended until 1981 to specifically cover software. The amendment included a definition of software. Until then, most software was covered by trade secret law. The idea of using copyright law was new. Davis said he told everybody at the company how difficult it would be to sue. He also said there was only a three-year statute of limitations on the software: "I said, if we're going to do something, we've got to do something about it [now]."

I asked Davis if it was a mistake DRI didn't sue. He said, "Yeah, I do, but for a different reason. What we should have done in retrospect was gone in and sued Microsoft very early on, even with the uncertainty of the law, because it would have stopped the development of a competitor. And if we had stopped them to begin with, they never would have gotten the foothold they had. Finally the board said to Gary, Look, why don't you do a study of this."

Kildall had his programmers analyze the similarities of CP/M and MS-DOS. At this point Kidall was very close to the statute of limitations. "It was still my recommendation at this point to sue them," Davis said. The board decided to defer because DRI was still doing good business. "I remember Gary saying something at the time like, 'It's not nice to sue people.'...Gary went into denial and said, we're going to succeed anyway. Everybody in the company was in denial for a couple of years."

Davis continued, "Later after the statute ran, after they were really killing us, about 85 or so, Gary decided he really wanted to sue." Davis told him that it might be too late, since the statute of limitations had run out. The one option was to sue Microsoft over a later version of MS-DOS. But by this time much of the original source code had been changed and had much less of the original CP/M in it. "That would have been a much harder case," Davis. Discouraged, Kildall did not pursue the matter.

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Davis said, "He said I told because of Look and Feel we couldn't sue. I did not tell him that before the statute of limitations ran out." Davis says he will sue if we get this wrong.

He summarized, "The decision was made not to sue them early on because: one, they didn't think [MS] would succeed, two they hadn't done the analysis at all, and three Gary thought it wasn't nice to sue them and he didn't believe these people were going to do him in. I think there was a lot of naiveté on the part of a lot of us, the board, me… and then the venture capital people."

Making sense of Davis:
What Davis told me was not necessarily contradictory. Rather, he seemed to be doing what lawyers often do. They advise clients of everything that can wrong. They say, while on the one hand this, but on the other hand that. Davis was being cautious: on the one hand telling Kildall to sue, while on the other saying that any suit had a strong chance of failing. In one respect Davis was right—most lawyers would have told Kildall the same thing. He gave Kildall a list of all the things that can go wrong. He was saying, in other words, sue, but don't blame me if you lose.

How was Kildall to make sense of this advice? Ultimately it is the client's decision to sue, not the lawyer's. Davis might have tried harder to persuade Kildall to sue, but on the other hand it was his duty as a lawyer to detail all of the pitfalls Kildall would face. The greatest impediment to suing seems to have been the fact that DRI continued to run profitably for several years after MS-DOS came out. Kildall would have done well to follow Andy Grove's advice: "Only the paranoid survive."

As long as CP/M remained competitive, Kildall seemed willing to let the marketplace decide who had the better operating system. He trusted that the better technology would win out, not realizing how viciously Gates wages business wars. Also the venture capitalists who had backed DRI thought that CP/M would trounce MS-DOS.

"Given the context, the reasonable expectation was that no one was going to buy this new operating system, when you had an existing one," Davis said. Kildall was confident he had the better operating system. He had the number one operating system company. And until PC-DOS came out, Kildall didn't even realize how much Patterson had copied CP/M.

But IBM's designation of Microsoft as its standard operating system was too much to overcome. Software developers started writing programs exclusively for MS-DOS. Davis said, "The price differential had some significance. The tipping point was the this was effectively the official IBM operating system. This was PC-DOS. As far as everyone was concerned, this was IBM's operating system. They were not presented as equals. IBM clearly betrayed the impression they gave Gary and me. Gary said very clearly to them, 'Look, if we're going to do this deal with you, I want to be sure you're going to put these two operating systems out, and he thought the market would take care of it. They made very clear representations that they were going to treat these two things on an approximately equal basis. Both Gary and I were naïve on this."

Gates. The last time they had met was when Allen said Microsoft and DRI were now engaged in OS wars. Kildall says he opened up to Gates and they spoke for hours. He described his work on CD-ROMs and the two discussed standards. Kildall also described how hesitant publishers were about entering the CD-ROM business. Many were afraid to enter a new business that might affect their bottom line. No one knew what impact CD-ROMs might have. Kildall had many inquiries, one from West publishing. Potential partners would dance around but not sign a contract. Kildall called them "tire kickers" more interested in finding out about eh CD-ROM industry and whether it would put them out of business than in investing in KnowledgeSet.

To generate more revenues, Kildall was planning to hold a CD-ROM seminar at the Asilomar Conference Center in Monterey. Curious publishers would have to pay to attend. Kildall told Gates about his idea.

Kildall returned to Monterey and soon afterward found out that Microsoft was planning its own CD-ROM conference. Kildall was shocked at the timing and cancelled his own CD-ROM seminar. Microsoft had beaten him to the punch. Gates asked Kildall to be the keynote speaker, for free, which Kildall agreed to do. The conference was an enormous success. One thousand attendees paid $1,000 each to participate.

The night after the conference a Kildall writes that a Microsoft employee—Min Yee who worked in the new Microsoft publishing division-- asked Kildall: How did you like "your conference?" He told Kildall, Kildall writes, that Gates had returned to the Microsoft offices after his meeting with Kildall brimming with enthusiasm for CR-ROMs. He told Yee to hold a CD-ROM conference similar to the one Kildall had been planning. Kildall is unsparing: "It was only then that I realized Bill had usurped me. It was clever. It was divisive. It was manipulative. It is Bill Gates' nature. I must give him credit for being a very opportunistic person." One has to wonder whether Kildall really felt so abused at the time, or whether this is the bitterness of an advanced alcoholic speaking a decade later.

Kildall says he was invited to speak at the second conference a year later, but that "Bill wouldn't give me the time of day." He was invited to later conferences but chose not to attend—"I had certainly been used and did not continue to supply Gates with fodder." Again, I would not trust Kildall's version of events implicitly—there's too much rancor in his tone. Gates probably did use Kildall, but I wonder whether Gates actually did snub Kildall or was just busy running the conference.

Kildall's company, KnowledgeSet, continued to grow and worked closely with Sony. Kildall and Rolander helped developed what they called their Knowledge Retrieval System, which allowed instantaneous searches of large databases. With Sony, Kildall started a new venture called Publisher Data Services. Sony introduced Kildall to Pacific Bell, which hired him to create a CD-ROM Yellow pages for Northern and Southern California using the Knowledge Retrieval System. After the work had been completed, though, Pacific Bell decided not to sell the CR-ROM for marketing reasons. Users would find it too easy to compare prices across the state and find the best deals. Many of the businesses that listed in local yellow pages would lose money.

Boeing became another client. Kildall writes, "Boeing had created databases for their new aircraft, like the 767, using CAD [computer assisted design] equipment. KnowledgeSet, with MDS [Maxwell Data Systems—as in Robert Maxwell] built CD-ROMs that contained entire vector drawings for the 767. You use "point-and-click" to find references, like to the "Airspeed Indicator," then a drawing comes up. Then, use point and click to zoom into a portion of the drawing." British Airways spec'd the software into its diagnostic processes, Kildall says.

It is unclear what happened with KnowedgeSet and why it stopped running. Kildall hints that he became involved in a lawsuit with Grolier's but says he signed a Final Binding Perpetual Non-disclosure Agreement as part of the settlement and cannot describe what really happened.

GEM:
One of the great ironies of Kildall's life—and probably not lost on him—was that he didn't sue Microsoft for billions of dollars because "look and feel" patent lawsuits had not yet been tested in court. But at the one moment he might have retaken territory lost to Microsoft—by selling his GEM graphical user interface—Apple threatened Kildall with a "look and feel" patent suit. The one weapon Kildall could have used was turned against him.

Kildall's involvement with Apple stems from the very beginning of the company. Hank Smith, his old boss at Intel, had moved to Venrock, which financed Apple. In 1978 Smith asked Kildall to come in as an outside consultant to evaluate the Apple II. Kildall talked to Steve Wozniak and was very impressed.

Kildall's next encounter with Apple came in 1980 when he was invited to examine the Apple Lisa, which was under construction. DRI's graphics department was excited by the Lisa's graphical user interface—which was based on the work done at Xerox PARC. Apple sold a Lisa to DRI for a few thousand dollars so that it could do development work on it. But Kildall didn't do much work on the Lisa. He was still busy with his PL/I-G compiler project. He writes, "The Lisa was taken by our graphics group and used as a tool for DRI's very successful GEM (Graphics Environment Manager."

One member of DRI's graphics group, Lee Lorentzen, showed Tom Rolander a new idea he had—moving rapidly from one area of a graphics screen to another. At the same time, Lorentzen suggested making pull-down menus similar to the ones on the Xerox Star—and also the Apple Lisa and later Macintosh. Rolander showed the idea to Kildall who realized, "It was clear that high-res graphics was the wave of the future." He dropped another project he had been working on to start working on the new GUI (Graphical User Interface) which at the time DRI called "Crystal." The DRI graphics department came up with a demonstration, Kildall says, "that showed multiple windows with hyperbolodios repainting, expanding, with multitasking in real-time."

Kildall demonstrated the new system at the Rosen Conference in Scottsdale, Arizona—which was a who's who of the PC world. Ben Rosen ran the conference and later taken

over by Rosen's lieutenant, Esther Dyson. Dyson set up a giant screen for the demo. Hundreds of America's most elite digerati watched. Gates came up to Kildall afterward and asked him about high-resolution graphics and windowing. Soon after the conference Crystal was changed to "GEM" and the new product was soon being advertised. It was the first windows, high-resolution interface for an IBM PC. It was also an extension of Concurrent CP/M. It worked with icons and pull-down menus. A mouse controlled an arrow that points to the menus and icons. The First Quarter 1985 *Digital Research News* quoted Dr. Tom Byers, DRI's product marketing manager, as saying "The technology brought forth in GEM software represents a major step in the evolution of graphics software. GEM software changes the way people interact with personal computers. It means they can operate microcomputers through common sense rather than consulting a thick volume of documentation." (See p. 4 of *Digital Research News*.)

The battle with Apple:
Apple soon swung into battle. Steve Jobs had his attorney fire off a letter threatening DRI with a lawsuit. The letter said GEM infringed on the "look and feel" of Apple computer's GUI. It wasn't the first time the concept of "look and feel" had been invoked—McDonald's had been involved in an earlier look-and-feel suit—but it was the first time it had been applied to software. Kildall argues that GEM was not derived from the Macintosh, but from work done at Xerox PARC, which the Macintosh was also based on.

Kildall also thought it would be funny to have a little icon come on the screen after the computer was turned on that said, "hi" just like the Macintosh. Davis said, "It was funny, but not legally advisable."

Gates pushes Jobs:
Although Kildall did not know it at the time, according to Gerry Davis, Gates was behind Apple's aggressive moves. Davis said, "Gates talked Jobs into threatening to sue." He did not have more details and suggested we speak to Jacqui Morby, the venture capitalist on the DRI board. I haven't yet spoken to her, but her e-mail is jmorby@ta.com. Her phone number is 412-441-4949. This has not been reported anywhere and would be a scoop if true. It is known from court documents that Gates forced IBM to drop its backing of DR-DOS in the early 90s. (See the Caldera section at the end.)

Although Kildall was not so worried about losing the lawsuit, he was worried that Apple's deep pockets could get a temporary injunction that would keep DRI's GEM product off the shelves for months or years. DRI had just spent enormous amounts developing the product. The best course was to settle with Apple.

Kildall, DRI's new president John Rowley, and the head of DRI's GEM team went to Apple's Cupertino's offices to negotiate with Steve Jobs and several of his attorneys. The main Apple attorney was Irv Rappaport. They sat around an enormous round oak table trying to come to terms. Jobs told Kildall that Apple had the patent for "point and click." Kildall asked what specifically the Apple patent covered. Jobs said there were five steps:

1. Move the mouse to the topmost bar
2. Push a mouse button to select a drop down menu

3. Hold the button to keep the menu open
4. Drag the mouse indicator to a menu item
5. Release the mouse button on the item to select

He told Kildall, "Gary, I know you are a smart person and you can figure out how to avoid violating the patent, and that's all Apple is protecting." Kildall drove back to Monterey after the meeting and with the head of GEM changed the way GEM's point and click worked. They devised the following:

1. Move the mouse to the topmost bar
2. The menu item drops without touching the button
3. The menu item stays selected until moved and clicked
4. Move down the menu without holding the button
5. Select the menu item and click

DRI changed all of the GEM documentation and remade the software. The software was re-released and became a best-seller in the US and Europe. With GEM's market share picking up, Apple again felt its products were losing out to the IBM PC.

Another letter arrived from Apple threatening a lawsuit. DRI had invested too much to back out of the GUI market, but litigation would have been too costly. Attorneys' letters were traded back and forth for months. Legal bills piled up, and DRI's president, John Rowley, tried to placate Apple by offering it much of DRI's advanced operating system software and a $5 royalty for each copy of GEM sold. DRI had already paid Apple $50,000. Matters were still not settled.

Finally, about a year after the first meeting with Apple, Kildall and John Rowley, DRI's president, visited Apple again. Kildall and Rowley met with a team of Apple lawyers, and negotiations dragged on. Steve Jobs was not there, since he had quit Apple in September 1985 to found NeXT. Kildall finally noticed that Irv Rappaport, who had been at the first meeting, and remembered what Jobs had told him. Without making eye contact with Rappaport, [SP?], Kildall addressed the chief Apple lawyer, whom he identifies only as Eisenhardt: "Sir, Mr. Steve Jobs and I had a meeting a year ago or so, and at that meeting Mr. Jobs told me that I was smart enough to change the point and click metaphor so as not to infringe upon Apple's patent. And, using Mr. Jobs wisdom and foresight, I applied our collective talents and did so."

Kildall believes Rappaport had forgotten that meeting, but when Kildall brought it up, Rappaport tapped Eisenhardt on the arm and asked for a moment's break. The Apple lawyers retired from the room. When they returned, the Apple lawyers dropped the amount of royalty they wanted to $1.25 per copy, along with the software transfer. Kildall put his foot down and said, "No, you get nothing from DRI, and if you continue to harass us, you will be engaged in a lawsuit that will pull in Jobs, who, by the way, is probably not interested in perjuring himself, either, at this time." Kildall writes, "DRI lost the $50,000, but we never heard from Apple Computers again. They were a real pain and, in the long run, cost DRI millions of dollars using their litigious antics."

GEM did make money for DRI in the end. The company sold many applications for the software, including GEM-DRAW, which allowed users to do computer-assisted design. Again it must be pointed out that GEM was years ahead of anything Microsoft was making. The January 1987 Digital Research European Review devotes pages to all of the various applications of GEM. The pictures show relatively advanced Windows graphics.

Various GEM products listed in the newsletter included applications for e-mail, word processing, drawing, graphing, and desk accessories such as a calendar, clock, alarms, diary, and notepad. Everything Microsoft Windows later had.

It's unclear why GEM ultimately did not succeed, but the legal harassment by Apple as well as Microsoft's stranglehold on the market all took a toll.

Other products:
DRI worked with IBM to build FLEX-OS Operating System for electronic point-of-sales.

Networking:
One of DRI's most popular products was its Starlink software that worked with Concurrent CP/M. By 1984 DRI was allowing PC users to link their computers. Users would buy one single IBM-compatible PC to serve as a hub to other PCs. Cables would connect all of the computers. Kildall writes, "The difference between multiple PCs and Concurrent with Starlink is that all workstations can share a common database. And that's what made it work. Take a typical VAR [Value Added Reseller] application such as a doctor's office. Patient records are stored at the hub and are made available to each authorized secretary for billing at a station or two. A nurse at the same time, enters patient transactions, like drug dosage or the time spent with a doctor in the clinic. None of these tasks are difficult for even the most ancient IBM PC to perform. The issue was not speed, but simply sharing of common data in the office. If every workstation had a different PC, then the data for each patient could not be shared. And that, quite simply, just didn't work. But, this need for common databases fostered PC networking."

At the time IBM mainframes were disappearing and being replaced by DEC minicomputers. But the era of widespread PC networking was approaching, with DRI leading the way.

Concurrent DOS was also a decade ahead of its time. One of the main problems that has plagued MS-DOS through its incarnations in Windows 95 and 98, is its lack of ability to allow multitasking. In 1984 the company released Concurrent CP/M Release 3.1 which was compatible with PC-DOS. It was revolutionary, perhaps too much so. The First Quarter 1984 Digital Research News (see pp. 4-5) states, "Look at your desk. More than likely there are several stacks of work that need close attention. Everything is in front of you, so you don't forget one stack while you attend another. Concurrent CP/M with Windows works that way. It turns your personal computer into a simulated desktop where you can stack up several jobs at once, work on one and keep an eye on the others...Concurrent CP/M incorporates the best characteristics of previous CP/M operating systems. It is fast and it is simple. Adding windows is not simply a cosmetic

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him to examine the possibility of a MS takeover. Gates flew down to San Francisco to meet K in the United Airlines Red Carpet Room. K told Gates that he was considering selling DRI for $26 million. Gates asked how DRI was doing, and suggested DRI might become a remote development facility for Microsoft. Perhaps fearing he might be taken advantage of again, K gave Gates only public information and talked about DRI's finances more than about its latest innovations. Gates said DRI was probably worth only $10 million. K left Gates in SF and flew back to Monterey. They had no deal.

Still searching for a way out of bankruptcy, DRI signed a deal with Atari—which had been started by Nolan Bushnell to make video games but which had branched out into personal computers. DRI adapted its GEM software to Atari's new 1040 personal computer. When Apple got wind of this, it threatened Atari with a look and feel lawsuit, but Atari continued its relations with DRI, ignoring Apple.

DR-DOS:
DRI also worked out a plan with the Japanese businessman Kay Nishi to build an operating system that would compete with MS-DOS. Both deals saved DRI. Concurrent CP/M, later Concurrent DOS, was an offshoot of MP/M-86 and it later led to DR-DOS, which challenged Microsoft later. DR-DOS grew out Concurrent DOS and was developed by Steve Tucker, an English DRI researcher.

According to Kildall, Nishi's company, ASCII, was the exclusive distributor of Microsoft products in Japan, but after a falling out, Nishi became angry with Gates. Kildall writes, (validly?) that "Kay came to DRI to seek vengeance upon Gates and his company. Kay wanted to make a DOS to compete with MS-DOS. Knowing the design of DOS came from CP/M, DRI was the only company that could legally parallel DOS, because DRI had not forced suit, DOS was simply a "Derived Work" of CP/M."

There was good reason why many wanted DRI to create a MS-DOS competitor. Microsoft was not improving its operating system. The DR-DOS—Microsoft lawsuit spelled out some of the reasons why a new operating system was so in demand:

36. "Microsoft's inaction was remarkable given that improvements in hardware technology and applications software had created a demand among PC users for an enhanced operating system. By 1987, users were seeking:
    a. **The ability to support larger disk drives.** Although larger hard disks were becoming available, Microsoft did nothing to improve MS-DOS so that it could support such hard disks until Compaq developed its own version of MS-DOS with such functionality.
    b. **Improved memory management.** Microsoft did nothing to improve memory management so that larger applications programs (such as popular desktop publishing applications) could run on a computer with relatively limited memory.
    c. **Loading the operating system on a ROM chip.** Even though it had become technologically feasible to install certain portions of operating systems on a "read only memory" (ROM) chip, a feature that would

improve the function of the program, Microsoft did nothing to create a "ROM-able" version of MS-DOS.

d. Improved user interface. MS-DOS required users to master rather arcane programming commands in order to perform various operations. Microsoft failed to make its commands more user-friendly or to provide any "help" screen for users to enable them to determine which commands they should execute.

"Because of these deficiencies, a number of OEMs approached DRI and requested that it develop a version of DOS that would fill the gaps in functionality that plagued MS-DOS. At the same time, there were a number of OEMs who simply could not get Microsoft to deal with them (irrespective of product features). Many of these OEMs indicated to DRI that they would be seriously interested in an alternative DOS Software product. Accordingly, in 1987 DRI began planning for a new version of DOS, to be called DR DOS."

Kay Nishi came to DRI's offices one Saturday night in 1986—only Kildall and Stan McKee were in the otherwise deserted building. Nishi must have sensed how desperate Kildall was to get the contract for DRI, which was $10 million in debt, and knew he could do whatever he wanted. Ten minutes into the negotiations Nishi announced he was tired, lay down in the corner of the office and fell asleep. Kildall and McKee held steaming coffee cups near him hoping the odor of the coffee would wake up the one man who could save the company. Nishi suddenly woke up, returned to the table, and finished the negotiations. DR-DOS would be built, and Nishi teamed up with the head of DRI's British office, Paul Bailey, who was keeping up CP/M-86 and Concurrent CP/M.

In 1987 the first version of DR-DOS was released. Kildall must have loved the irony that he was now selling a clone of MS-DOS. The new MS-DOS compatible, single-tasking operating system gave Microsoft a run for its money, and soon Microsoft had to start lowering its prices. Despite protests from DRI, users started calling the new operating system "Doctor" Dos, not "Dee Are Dos," since it cured so many of the bugs found in MS-DOS. It was easy to install and cost about $70 and came with four free utilities that often sold for about $100 each. According to Al Fasoldt, who reviewed the software in 1990, DR-DOS came with, "TaskMax, a hot-key program switcher, so you can have up to 20 virtual PCs running at the same time; viewMax, a nifty better-than-Windows file manager (it's just like GEM); a disk cache that automatically frees up memory for programs when necessary, and a file-compression system that gives you 50 percent more storage space....The doctor also comes with a great memory-management system for 80286, '386, and '486 computers. It automatically finds areas of memory that are not being used and puts its own operating system there. The result: A lot more space to run programs."

The August 1990, *BYTE* magazine stated: "The latest incarnation of DR DOS, Digital Research's MS-DOS clone, is an innovative and intriguing operating system that's thoughtfully designed. Version 5.0 is also packed with the extra features that Microsoft's own operating system should have (and might eventually have if the long-rumored MS-

choose. With the introduction of Windows 95, Microsoft fully integrated the graphical interface with the underlying operating system, so that today it is impossible to distinguish between the user's experience and the machine's function. ```

According to John Gilroy of *The Washington Post*, "Behind this simple answer, though, lurks some controversy. The issue: Is Windows Millennium Edition a 16-bit or a 32-bit operating system? Windows 95 and 98 run a "kernel" -- the foundation of the operating system -- that processes data in 16-bit chunks, just as the old disk-operating system did.

"You could argue that Win 95 and 98 are merely shells running over a 16-bit operating system called DOS. What's not arguable is that those DOS underpinnings make those operating systems less stable than Windows NT and Windows 2000, which are written from the ground up as 32-bit operating systems."

**X. The eternal question:**

For the last decade of his life, Kildall was hounded by people who asked if he had really gone flying the day IBM came, why he gave away the IBM business, and how it felt to have been almost the richest man alive. Kildall writes that the very day he was working on the end of his book, someone called to ask about one of Kildall's trademarks. Then the called said, "You must be the guy who gave away the business to IBM." When Kildall met the son of Sony's founder Akio Morita in late 1987, Masao Morita's first question was, "Were you really flying when IBM came calling?"

Kildall writes, "I think I'll make a cassette tape of the "IBM Flying Story." I'll carry a few copies in my jacket to give out on occasion. There's only one problem. I tell this story, and after I'm done, the same person says, "yeah, but did you go flying and blow IBM off?" I think people like that story better than the real one." Even his former student and colleague Gordon Eubanks would say things like, "Gary could have owned this business if he had made the right strategic decisions...The real issue wasn't that Gary refuse to talk to IBM. The real issue was that Microsoft had a much better vision for the business. Gary was very laid-back. He did not care that much. And Bill was extremely focused and driven." Such comments drove Kildall crazy. Even his page-one obituary in the San Jose Mercury News read, "but for a single failed business deal [Gary] might have enjoyed the wealth and fame of Bill Gates." Not even in the tomb could Kildall escape the comparison.

Rolander told a French journalist, "The more the fortune and influence of Bill Gates grew, the more he became obsessed. Day and night, the film of that day played in his head. It wasn't even a question of money. What really hurt him was the myth. Gary felt no one accorded any importance to what he had accomplished." In the early and mid 90s Gates was everywhere. Every time Kildall opened a magazine, he found Gates picture and articles hailing him as the founder of the PC revolution. It ate at him.

Rolander told me, "If Gary could have just cut off the rest of the world. Every time he met someone—there isn't a person in this industry who hasn't heard the story that if Gary

hadn't gone off flying he could have been Bill Gates—everyone, countless times, people would ask, "Were you really flying that day IBM came?" All over and over again."

His health began to deteriorate. He came down with arrhythmia of the heart. His doctor banned him from flying. Kildall gave Rolander his pilot's helmet. It was a bittersweet moment. He had so loved flying. Now one of his last refuges was taken away from him.

One of the main triggers for Kildall's emotional decline was an invitation he received to attend his 25th anniversary celebration of UW's computer science program. A friend of his from UW's first computer science class called to tell him which other classmates would be attending. Then the friend mentioned that Bill Gates would be the speaker that evening.

Kildall writes, "The UW Computer Science Department educated me so that I could produce compilers, like PL/M. Then, I made CP/M a success through millions of copies sold throughout the world, again using my knowledge gained through education at the UW. Gates takes my work and makes it his own through divisive measures, at best. He made his "cash cow," MS-DOS from CP/M. So, Gates, representing wealth, and being proud of the fact that he is a Harvard drop out, without requirement for an education, delivers a lecture at the twenty-fifth reunion of the computer science class. Well, it seems to me that he did have an education to get there. It happened to be mine, not his."

Kildall complained, but his old thesis advisor said his opposition to Gates' speaking sounded like "sour grapes." K writes, "Well, that's exactly what it was, of that there's no doubt whatsoever." He called the chairman of the UW's computer science department to protest, and was told that Gates had been very generous toward the university. Kildall says the chairman quickly hung up on him. He writes, "It was a disgusting conversation, and I nearly turned in my UW Ph. D. on the spot." But the chairman had already hung up. So ends Kildall's book.

According to Rolander, the UW incident inspired Kildall to write his memoirs, which he spent the last 18 months of his life writing.

Kildall asks, "Should I have sued IBM? Should I have sued Microsoft? Of course. But that was five years before "look and feel." I just don't want the credit taken by a "Harvard Dropout." OK?"

The End:
Kildall grew embittered. He blamed Gerry Davis for not suing. By the time "look-and-feel suits" were relatively common, the statute of limitations had passed and DRI lost its chance to sue. Kildall resented Gates, not for becoming richer, but for taking credit Kildall felt was rightly his. Kildall writes, "I have grown up in the industry with Gates. He is divisive. He is manipulative. He is a user. I know how he thinks. He has taken much from me and the industry. Had this conspiracy not occurred, the PC industry would have been advanced through the MP/M-86 product. MP/M-80, its predecessor, was widely accepted and lacked only memory space, which was corrected in the 16-bit

Caldera then split in two: into Caldera Systems and Lineo. The parent company, Caldera, Inc. remained—essentially as nothing more than a vehicle for the lawsuit. Noorda did everything to back the lawsuit and financed much of it.

Caldera claimed that Microsoft tried many illegal tactics to beat back. It would falsely announce new software that didn't exist, engage in exclusionary licensing, create false warning messages, criticize DR-DOS, use product tying, and threaten customers who used DR-DOS with legal action. The lawsuit itself states: "This action challenges illegal conduct by Microsoft calculated and intended to prevent and destroy competition in the computer software industry…. As outlined in the Justice Department's complaint, through various unfair and predatory acts, Microsoft has willfully maintained a monopoly of the market for MS-DOS operating system software and functionally- equivalent software (the "DOS Market")."
The lawsuit details the complaints:

a. License agreements which required OEMs to pay royalties to Microsoft not only when they sold PCs containing Microsoft's MS-DOS, but also when they sold PCs containing competing DOS Software or no DOS Software ("per processor licenses");
b. Unreasonably long terms for license agreements with OEMs for the use of Microsoft's MS-DOS software;
c. In lieu of and in addition to per processor licenses, pricing schemes and other license terms and enforcement practices that effectively have required OEMs to purchase their entire DOS Software requirements from Microsoft;
d. Tying arrangements under which Microsoft required OEMs to purchase MS-DOS to the exclusion of competing DOS Software products, in particular DR DOS and Novell DOS, in order to obtain its Windows software programs or to be given access to other essential information, product support and service;
e. False public statements by Microsoft executives, and Windows error messages, which have misled the market as to possible incompatibility problems between Microsoft's Windows software programs and non-Microsoft DOS Software, in particular DR DOS and Novell DOS; and
f. False public statements by Microsoft executives concerning future product features and anticipated shipment dates, known in the industry as "vaporware," timed to match announcements or releases of new versions of competing DOS Software, in particular DR DOS and Novell DOS.

"These practices have had the purpose and effect of freezing out competing DOS Software products, in particular DR DOS and Novell DOS, and thereby entrenching Microsoft as the dominant provider of DOS Software."

It is important to note that the lawsuit did not allege that Microsoft had stolen CP/M—it focused exclusively on the fact that Microsoft had illegally blocked DRI's last main software effort, DR-DOS. The lawsuit stretched on three and a half years.

The lawsuit detailed the way Microsoft made money:

# Exhibit F

1 Kildall

Harry, This is marvelous. The revision of the standard story about the origins of Microsoft's MS-DOS and how IBM screwed Kildall and CP/M is absolutely convincing. I think you should excerpt that and publish it independently in a place that will get a lot of attention. I wonder, though, if it would be worth trying to interview somebody from IBM about their side of the story, to try to find out why they wanted to favor MS-DOS and discriminate against CP/M.

Otherwise, I'd suggest one caution. Beyond the MS-DOS/CP/M story, you credit Kildall with a lot of vision, for having been the first to conceive this and the first to conceive that. I have no specific knowledge with which to contradict any or all of those claims, but I do know that the history of technological innovation isn't usually so neat and single-fathered. I'd suggest hedging the claims somehow by, for example, attributing them to other authorities. Kildall was no doubt a key visionary but not likely to have been alone.

Dan

Draft: Harold Evans.
1/28/04

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# GARY KILDALL (1942-1994)

He saw the future and made it work. He was the true founder of the personal computer revolution and the father of pc software.

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GARY KILDALL loved piloting his Lear jet, surfing his speedboats, roaring off on his motorcycles, riding the waves on his jet ski, racing his Lamborghini Countachs – at one time when he had more money than he knew what to do with he had the pick of 14 sports cars in his lakeside villa. But what Gary Kildall enjoyed most in his short life was sitting still for hours in a little office writing code for computers. "It's fun to sit at a terminal and let the code flow," he said, " It sounds strange, but it just comes out of my brain; once I'm started, I don't have to think about it." He would call colleagues in the middle of the night to tell them a program had worked. "What a rush!" he'd shout. Author Robert Cringely's metaphor is apt. He wrote code as Mozart wrote concertos.

He was utterly brilliant at programming – but that is an understatement of his crucial role in the personal computer revolution. He was the first person to realize that Intel's microprocessors could be used to build not just desk calculators,

# Exhibit G

# CBASIC-86, 16-bit Version of CBASIC Has 128 Kbytes of Main Memory

Continuing its support of 16-bit microcomputer hardware, Digital Research offers CBASIC-86, a 16-bit version of CBASIC, the most popular BASIC dialect for the business and commercial community. The product supports all the features of CBASIC, while offering 128 Kbytes of main memory and providing up to twice the space for user programs.

CBASIC-86 maintains real numbers in binary coded decimal (BCD) floating point format, retaining at least 14 significant digits. Decimal arithmetic assures that fractional parts of dollar amounts will be exact and that ledgers will balance to the penny. CBASIC-86 supports integer arithmetic to provide faster program speed and throughput.

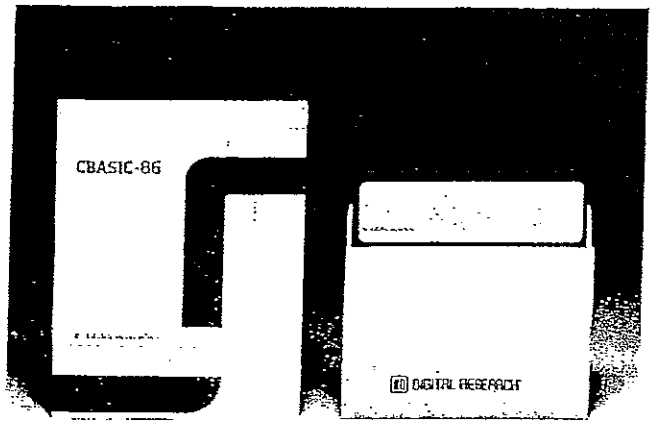
For maximum flexibility, CBASIC-86 provides two types of files: fixed record length files and stream files. Fixed record length files may have records of any length specified by the programmer. Files may be read sequentially or randomly, even allowing intermixing of the two methods. As records are read from the file, the values are automatically assigned to variables. To minimize impact on the available string space, buffers are dynamically allocated and large records are automatically processed in 128-byte segments to increase speed in accessing files.

The run-time monitor, CRUN86, is designed to provide the maximum amount of memory for user programs, while including all the features needed for commercial applications. CBASIC-86 offers a full complement of dynamically allocated string functions with algorithms specifically designed to minimize the use of memory and reduce unnecessary movement of strings in memory.

Gordon Eubanks, Jr., vice president and head of Digital Research's Language Division, said, "CBASIC-86 was designed to reduce software development time." The compiler does not penalize programmers for using blanks and comments in the source code, therefore making CBASIC-86 programs easier to read and maintain. Eubanks emphasized that programmers are further assisted by the multi-line function feature, which allows the programmer to define frequently used code as functions and then combine them to form a complete program.

*"CBASIC-86 was designed to reduce software development time."*

"CBASIC-86 is also compatible with its 8-bit counterparts," said Eubanks.




**CBASIC-86 supports all the features of CBASIC while offering 128 Kbytes of main memory and providing up to twice the space for user programs.**

Source code written under CBASIC-86 is compatible with CBASIC for the 8080/8085 microprocessor operating under CP/M, as well as CBASIC-16®, a version of CBASIC that operates under the UNIX® operating system, and the native code compiler, CB-80®. This compatibility feature allows programmers to develop and maintain only one copy of the source, thus reducing maintenance while supporting multiple hardware units.

# Altos and Artelonics Choose MP/M-86 For 16-bit Multi-User Microcomputer Systems

Altos Computer Systems Inc. and Artelonics Corporation are among several OEMs that have chosen Digital Research's MP/M-86 operating system for their 16-bit multi-user microcomputer systems. MP/M-86 is a multi-user, multi-task version of the 16-bit operating system, CP/M-86.

Artelonics uses MP/M-86 for its Series 750 and Series 1000 office work stations, which integrate word processing, data processing, communications and high-resolution graphics.

Altos' MP/M-86-based system is the ACS8600. It features multiple processors with direct addressing to 1 megabyte of memory, error correction on memory, a proprietary memory management design, full communications support, integrated Winchester and floppy data storage and Multibus® expansion interface. The system is available with up to 1 megabyte of random access memory (RAM).

Altos' 16-bit system joins the company's Z80®-based, multi-user 8-bit ACS8600 series, which supports CP/M and MP/M II®.

Both companies cited the large number of customers now using CP/M, as well as the established software base, as factors in the decision to support MP/M-86. More than 3,000 languages and applications run under CP/M and 8-bit software packages can be translated to run on 16-bit machines because of the file structure compatibility of CP/M, MP/M II, CP/M-86 and MP/M-86.

"These compatible operating systems will allow Altos to bring microcomputer users into the minicomputer market," said Ron Conway, Altos vice president of sales and marketing.

"Another advantage of MP/M-86 is that almost any language will run on it," said Artelonics marketing spokesman, Chuck Chargin. This allows the use of numerous application programs that are already written.

Artelonics and Altos previewed their MP/M-86-based systems at COMDEX in Las Vegas last November.

# Rowley Joins Digital Research As COO

*continued from page 1*

"The first step of this organizational change was including outside investor participation in strategic planning," said Kildall. "The second step was broadening the product line through internal expansion and the acquisition of two language companies, Compiler Systems and, soon, MT Microsystems. The third step is the current strengthening of the organizational structure with additional management expertise."

Rowley joins Digital Research from Intel Corporation, where he was marketing manager for the OEM modules operation, a recently formed derivative of the OEM microcomputer systems division. While at Intel, he also served as chairman of the strategic planning committee for OEM systems modules group.

The following functions are headed by Rowley in his new position: finance and administration; operating systems and language development; marketing and sales.

Rowley was with Intel for two years. Prior to that, he spent nine years at Tektronix in a number of positions, including marketing and engineering management for the company's graphics, terminals and computer systems.

He also spent two years in applications software development at Computer Sciences Corporation.

Rowley has done graduate work in computer science at Washington State University and he holds a BS in physics from Western Washington State University. He and his family have moved to Pacific Grove from Tigard, Oregon.

# Systems Software Available Through Hamilton-Avnet

*continued from page 1*

Hamilton-Avnet will stock Digital Research's formatted programming language packages for the Xerox 820 personal computer and the Digital Equipment Corporation VT180 personal computer, which the company now sells, plus languages for Apple computers equipped with CP/M. These languages include CBASIC, PL/I-80®, Pascal/MT+ and CB-80.

Hamilton-Avnet will also stock the CP/M-86 operating system for the IBM Displaywriter, which allows use of a wide range of languages and pre-written application programs, and the CBASIC-86 programming language for the IBM Displaywriter.

In addition to selling Digital Research systems software, Hamilton-Avnet will work closely with Digital Research in developing a substantial marketing effort for 8-bit CP/M and 16-bit CP/M-86 based applications software written by Independent Software Vendors (ISVs). The firm already sells business software packages from Systems Plus, a leading software firm.

# Where Are You?

If you have a new address, or if you are planning to relocate soon, please notify us of your new location. We want to keep you up-to-date on our activities. Please fill out the coupon below with your name, address and CP/M serial number so we'll know where to contact you. Mail to: Editor, *Digital Research News*, Digital Research Inc., P.O. Box 579, Pacific Grove, CA 93950.

Name _____

Address _____

City/State _____

Zip _____

Serial No. _____

Return to Editor, *Digital Research News*, Digital Research Inc. P.O. Box 579, Pacific Grove, CA 93950.

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FOR DIGITAL RESEARCH USERS EVERYWHERE FIRST QUARTER 1982 VOLUME 2, NO. 1

# Intel Develops CP/M-86™ on ROM Chip

Intel Corporation has developed a solid-state version of Digital Research's CP/M-86 operating system that will be available in sample quantities in the second quarter of 1982, according to Andrew S. Grove, president of Intel.

"We feel that CP/M-86 will be one of the most popular operating systems for 16-bit microcomputers, and having it available in semiconductor-chip form will open many new opportunities for system designers," said Grove.

The new part operates with the popular Intel 8086 and 8088 microprocessors, allowing a designer to develop a diskless microcomputer with all the power of the disk-based version of CP/M-86.

CP/M-86 is the 16-bit version of CP/M®, the de facto industry standard operating system for 8-bit microcomputers. The CP/M family of operating systems is now used by more than 500 manufacturers of microcomputers, including IBM, Digital Equipment Corporation, Xerox Corporation, Hewlett-Packard and Wang.

CP/M and its variations are now available only on floppy disks, and require access to a flexible or hard disk drive. The new firmware version will not require a disk, making it ideal for remote computers sharing a large-capacity disk drive. The firmware CP/M-86 also allows the manufacture of smaller, low-end diskless systems.

The new part is a complex, large scale integrated (LSI) circuit containing 16 kilobytes of read only memory (ROM) plus timers and other logic.

The CP/M-86 silicon component is designed to work in conjunction with Intel iAPX-86® and iAPX-88® microprocessors. Intel previously announced a firmware version of its RMX® operating system, designed for industrial control applications rather than the business and commercial applications in which CP/M excels.

"This silicon version of CP/M-86, plus the disk-based versions now offered by Intel's Software Distribution Organization for use on Intel hardware, add up to a powerful endorsement of Digital Research's 16-bit family of operating systems by one of the world's leading OEMs," said John Katsaros, Digital Research director of marketing.

The Intel silicon CP/M-86 chip will be available from Intel and its distributors.

**Digital Research will supply IBM with CP/M-86 for the new IBM Personal Computer. IBM joins a number of computer manufacturers who have adopted Digital Research products as a standard part of their personal, professional and managerial computer systems.**

# Rowley Joins Digital Research As COO

Gary Kildall, founder and president of Digital Research, has announced the appointment of John Rowley as chief operating officer reporting to him. "This represents an ongoing evolution of the company's organizational development, designed to manage the accelerating growth anticipated by Digital Research over the next several years," said Kildall.

*continued page 2*

**John Rowley, recently appointed chief operating officer, will help strengthen the organizational structure of Digital Research. He joins the company from Intel Corporation, where he was marketing manager for the OEM modules operation.**

# IBM PC to Use CP/M-86; Taps Large Applications Base

IBM and Digital Research have signed an agreement under which Digital Research will supply IBM with CP/M-86 for the new IBM Personal Computer. IBM will give PC users an opportunity to tap into the large CP/M-compatible applications base.

The adoption of CP/M-86 allows IBM Personal Computer users immediate access to any CP/M-86-based program, including application programs for accounting, forecasting, word processing and other uses. A wide assortment of programming languages is also compatible with CP/M-86, including Digital Research's Pascal/MT+86® and CBASIC-86®. The move also provides IBM with access to the more than 350,000 microcomputer users already familiar with Digital Research's CP/M operating system.

Digital Research prepared the customization of CP/M-86 on the Intel 8088 microprocessor, and IBM will distribute the packages. CP/M-86 for the Personal Computer will be available only from IBM, its dealers and distributors.

The IBM Personal Computer in its basic form contains the 8088 micro-

*continued page 4*

# Systems Software Available Through Hamilton-Avnet

Hamilton-Avnet, the world's largest distributor of electronic and computer products, is beginning a major program to distribute microcomputer software. The initial offerings of the $800 million arm of Avnet Corporation will include operating systems, programming languages and utilities from Digital Research Inc.

"This now rounds out our marketing strategy to offer dealers and systems integrators one-stop shopping for hardware and software," said Dick O'Melveny, vice president of computer products marketing for Hamilton-Avnet. "We understand that this is a solutions business; hardware by itself isn't the solution. Software together with hardware form the solution for the end user. Now we can stock in depth and ship Digital Research products the same day. This forms the software solution for the (ISO) Independent Sales Organization."

*continued page 2*

# MT Microsystems to Be Acquired; Pascal/MT+™ Added to Language Line

In a move to strengthen its group of language products, Digital Research has agreed to acquire the San Diego area firm, MT Microsystems Inc., developer and marketer of the Pascal/MT+ programming language. As part of the agreement, Digital Research now holds exclusive rights to manufacture, license and distribute the product.

The firm will become part of Digital Research's Language Division under Vice President Gordon Eubanks, Jr. With this agreement, the Language Division now offers what Eubanks called, "a range of language products, each the best of its kind. We're building up the Language Division in order to offer professional programmers all the tools they need—operating systems, languages, utilities, documentation, good service and support—all from one place, Digital Research."

MT Microsystems President Michael G. Lehman and General Manager Nancy J. Lehman both have moved to Pacific Grove, as has Patie McCracken, MT Microsystems office manager. Michael Lehman will work closely with Eubanks, while Nancy Lehman will direct an expanded customer service department for Digital Research.

Michael Lehman commented on the reasons for the Digital Research/MT Microsystems agreement: "First, we've got a production-quality compiler product, a professional product for the professional programmer. It's a good product; we've proven that. Already there are numerous application programs written in our Pascal version, and the number will increase dramatically as the 16-bit world moves more toward Pascal-based programs. Digital Research offers us deeper market penetration because of its resources and its standing in the industry. We didn't see any other company that was as committed to multi-language support as Digital Research. Our combined efforts will

*continued page 6*

## IN THIS ISSUE

**Featured in this issue are the increasingly important 16-bit products available from Digital Research Inc. for its users everywhere.**

# CB-80, a Fast Basic Compiler For Today's Sophisticated Business User

A true native code BASIC compiler, CB-80, is now available from Digital Research. According to Carmen Governale, marketing manager for the Digital Research Language Division, "This advanced programming language offers maximum speed and flexibility in creating applications for today's sophisticated business user."

As a derivitive form of CBASIC, CB-80 offers all the features of CBASIC, including 14-digit accuracy, long variable names, stream and record input/output, multiple line functions and other features that have made the CBASIC family the most widely used languages in the business community. In addition, CB-80 includes these enhancements: relocatable 8080 code, string variables up to 32 kilobytes, error-trapping, nested IF statements and record LOCK and UNLOCK. "All in all, some 30 technical improvements make CB-80 useful to businesses needing faster execution and expanded language capability," said Governale.

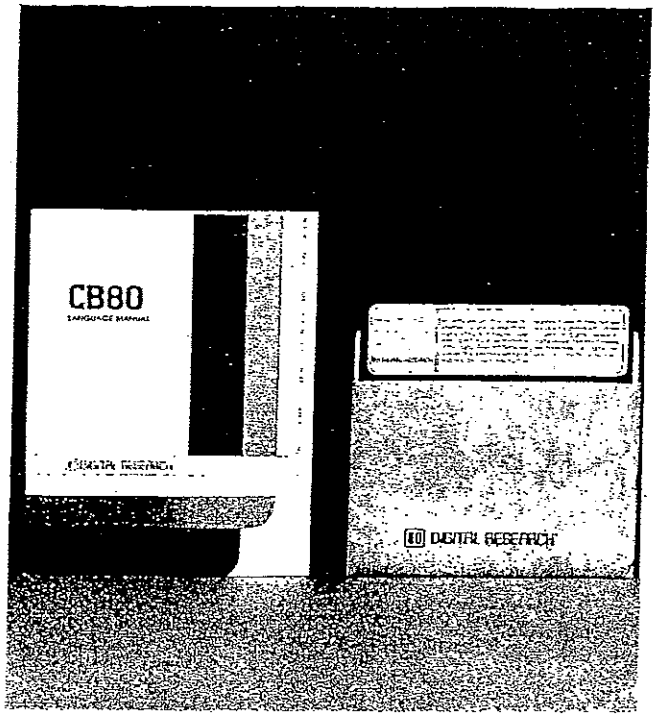
For example, data base management applications are easier with CB-80's file handling capabilities. Records can be fixed to any length, can be sequentially or randomly accessed, and up to 20 files can be opened at one time. Data base indexes are easier to build because programs can read or write individual file characters. Files can be updated by adding records at the end, thus eliminating the need to copy the file. Dynamically allocated buffers minimize the impact on string space. And large records are automatically processed in 128 byte sectors, cutting back on storage overhead.

The CB-80 package also includes the LK-80® linker, which allows users to create programs in separate modules, and then easily combine them. Powerful CHAINING capabilities, multiple library scanning and easy linkage to assembly routines are all part of LK-80, adding versatility, as well as power and speed, to Digital Research's CB-80 language.

> *"CB-80 . . . it's become very popular because of its simplicity as well as the power it adds to 8-bit systems."*

"Right now, people are out there busily writing programs in CB-80," said Governale. "It's been designed for commercial and business applications, and it's become very popular because of its simplicity as well as the power it adds to 8-bit systems. In addition, we're offering MP/M II support for CB-80 use in multi-user, multi-tasking environments."

The Digital Research Language Division is building a full family of CBASIC products: CBASIC and CB-80 for 8-bit machines; CBASIC-86 for 16-bit CP/M-86 and MP/M-86 environments; CB-86®, a 16-bit version of CB-80 now under development; and CBASIC-16 for use with the UNIX operating system.




**CB-80 offers maximum speed and flexibility in creating applications for today's sophisticated business user. A derivitive form of CBASIC, some 30 technical improvements make CB-80 useful to businesses needing faster execution and expanded language capability.**

# XLT86 Assembly Code Translator Builds 8-bit to 16-bit Bridges

Digital Research now has available a program translator to help software writers and hardware manufacturers convert existing 8-bit 8080 programs to run on 16-bit 8086-based microcomputers. The new product, called XLT86, permits a user to translate an 8080 assembly source code file into an 8086 assembly source code file compatible with Digital Research's ASM-86® assembler.

At the heart of the ease and economy benefits of the XLT86 utility is its ability to perform global data-flow analysis, first breaking each program into basic blocks of instructions, then determining each set of flags and registers used or killed by each instruction. Once this is done, the XLT86 optimizes the process by eliminating all redundant instructions.

Jim Zekas, 16-bit product manager at Digital Research, said, "The XLT86 product is an example of the way we are carefully planning for and providing tools for the independent software writer. We see XLT86 as a development tool to help writers migrate programs from 8080 8-bit to 8086 16-bit machines. XLT86 will also benefit OEMs and equipment manufacturers. It's a way of helping them make decisions involving 16-bit machines and their markets."

Zekas emphasized that Digital Research considers the 16-bit environment to be of primary importance, demanding industry support now with machines, operating systems, languages and application programs. "Right down the line, Digital Research is working to support 16-bit development with products, technical assistance, information, our planned 16-bit development laboratory and in other ways," said Zekas.

"Our philosophy at Digital Research is to provide a family of upward-compatible products, and XLT86 helps us do that."

Programs translated by XLT86 operate on any 8-bit CP/M or MP/M II system, and also under the VMS operating system for use on DEC VAX® series minicomputers.

# CP/M-86 Helps Structured Systems Develop Applications for 16-bit Machines

**Keith Parsons, president of Structured Systems, said the choice of CP/M-86 was easy. "It works. Other CP/M-86 look-alikes don't really look so much alike once you get into them," he said.**

Structured Systems, a 25-person Oakland, Calif. company that specializes in writing applications programs for business users, has been engaged in advanced testing of Digital Research's CP/M-86 operating system for the past few months.

The company had used 8-bit CP/M software from Digital Research in the past. When it decided to market applications for 16-bit machines, Structured Systems chose CP/M-86 as the operating system to use in developing products such as accounts payable, accounts receivable, general ledger, name and address and payroll. A total of 12 16-bit business-oriented packages are currently sold by the company.

Keith Parsons of Structured Systems said the choice of CP/M-86 was easy. "It works. Other CP/M-86 look-alikes don't really look so much alike once you get into them." The company has tested the CP/M-86 operating system on Artelonics and Zendex machines, as well as on the IBM Displaywriter, for which Digital Research produces a special version of CP/M-86.

## Trade Shows: A Great Place to Meet

Digital Research will attend several trade shows during the first half of 1982. DRI will have booths 421 and 423C at Computer Faire, being held from March 19 to 21 at the San Francisco Civic Auditorium; NCC, booth A507, June 7 to 10 in the Astrohall, Houston, Tex.; and COMDEX/Spring '82, booth 1912, from June 28 to 30 in the Atlantic City, NJ Convention Hall. Plan to stop by the Digital Research booth and meet the marketing and technical people who will be there to answer questions and introduce the latest developments in the DRI family of products. Digital Research/Vector International will also attend the microsystems show in England, Feb. 24-26; the Hannover Fair in Germany, April 21-28; and Europe Software in Holland, May 25-27.

## Jim Zekas: New 16-bit Product Mgr.

James Zekas joined Digital Research in September as 16-bit product marketing manager. Jim provides end users and OEMs with product and licensing information and in turn provides feedback to Digital Research development staff on end user and OEM needs. He is the "resident expert" on 16-bit industry development and is actively involved in marketing strategies for the growing family of 16-bit Digital Research products.

Jim comes to Digital Research from Lodestar Computer Services, a systems house directly serving major construction and development firms. He was the sales and marketing manager for the Sacramento, Calif.-based firm and acted as its representative in various local and national construction trade organizations.

Jim received his B.A. degree in Computer Aided Instruction at the University of Hawaii during his 12-year stay as an island resident.

Jim Zekas

## IBM Uses CP/M-86 For Personal Computer Line

*continued from page 1*

processor, a 40 kilobyte built-in version of BASIC, a video monitor and printer adapter, 16 kilobytes of user memory, a speaker and room for two 5¼-inch floppy disk drives. A cassette recorder for storage and a standard TV monitor are used in the minimal configuration. Upgraded versions can add floppy drives, a color monitor for color graphics, a dot-matrix printer and other add-ons, including memory boards.

Most significant, however, according to industry sources, is IBM's decision to use outside software sources such as Digital Research for the operating systems and application programs it will supply with the Personal Computer. Digital Research will also publish and make available information and technical assistance, including source code listings of the microcomputer's BIOS and diagnostics.

IBM now joins a number of small and large computer manufacturers who have adopted Digital Research products as a standard part of their personal, professional and managerial computer systems. Digital Research also supplies CP/M-86 for the IBM Displaywriter. CP/M-86 converts that dedicated word processor into a powerful microcomputer system that can run CP/M-86-compatible application programs and languages.



## Who to Call

The Technical Hot Line is intended for use by registered Digital Research customers to answer specific questions about Digital Research products. If you are not registered, or if your question is in regard to sales, licensing, distribution or availability of DRI products or compatible application programs, please call the Marketing Department, or our foreign representatives.

- If you have a suspected bug, please send it to us in documented form, without a call to the Hot Line.

**Marketing Department**
**(408) 649-3896**

**Technical Hot Line**
**(408) 375-6262**

**Answered during regular business hours**

# Full-Service Marketing Plan Supports Distributors

In recent months, the Digital Research marketing staff has been busy designing a distributor and dealer support program that will set an example for the software industry, according to Bill Smale, Digital Research marketing representative.

"The nucleus of our marketing effort will be distributors who will service dealers in their geographical areas," said Smale. "We've planned a system that will back up distributers in all aspects of (ISO) Independent Sales Organization marketing.

"We're certainly not going to ignore dealers. Although we expect them to be working more frequently with distributors in the future, we will continue to supply dealer support."

The Digital Research distributor/dealer support program includes sales training to familiarize distributor and dealer sales people with all the features and benefits of Digital Research operating systems, languages and utilities. Distributors and dealers will benefit from special volume pricing, making it easier for them to qualify for significant discounts.

Also, merchandising programs and co-op advertising plans are being developed for distributors. Dealers will be supplied with merchandising tools for marketing Digital Research products in retail stores.

"Contract warranties that protect customer investments in Digital Research products also support distributors and dealers," said Smale. They get fast response on returned products that have defects or shipping damage, with the liberal Digital Research return policy.

A strong communications program is also part of Digital Research's support. Up-to-date product briefs, price lists, order forms, dealer agreements, catalogs and Independent Software Vendor Support Plan materials will be sent to distributors and dealers to help them keep in touch with products and markets.

"The large market for Digital Research products is steadily growing with more microcomputers in use, and with users adding more software to their systems. Digital Research products are recognized throughout the industry and the user community as high quality, standard-setting packages," said Smale. "Now Digital Research has a plan in place to ensure that this growing market is well-served by its partners in the marketing process, the distributors and dealers."

# CP/M-86 Languages Lead to Applications

"Software developers recognize the benefits of CP/M-86's compatibility with CP/M, and a number of them have expressed their support of it," reported John Katsaros, director of marketing at Digital Research.

"CP/M-86 has been out for almost a year and software companies have mobilized their resources and are using it," said Katsaros.

More than 15 languages run on CP/M-86 systems. "Having languages for CP/M-86-based systems also means applications software is being written to run on CP/M-86," said Katsaros. "For example, more than 60 companies write hundreds of application programs in CBASIC. The availability of CBASIC-86 means that these application programs can now be moved over to CP/M-86-based systems."

## Programming Languages and Utilities on CP/M-86

**C Compiler**
**The Code Works**
5266 Hollister, #224
Santa Barbara, CA 93111
805/683-1585

**C Compiler**
**Computer Innovations**
75 Pine Street
Lincroft, NJ 07738
201/530-0995

**VEDIT, a screen editor**
**Compuview Products**
618 Louise
Ann Arbor, MI 48103
313/996-1299

**LISP, Compiler, muMATH**
**The Soft Warehouse**
P.O. Box 1174
Honolulu, HI 96828
808/734-5801

**Pascal/M, TRANS-86**
**Sorcim**
133 Lawrence Expressway, #418
Santa Clara, CA 94041
408/727-7634

**MAINSAIL**
**Ryan-McFarland Corporation**
3233 Valencia Avenue
Aptos, CA 95003
408/622-2522

**CBASIC-86, Pascal/MT+86**
**Digital Research**
P.O. Box 579
Pacific Grove, CA 93950
408/649-3896

**CIS COBOL**
**Micro Focus**
1601 Civic Center Drive
Santa Clara, CA 95050
408/496-0176

**Wordmaster**
**MicroPro International**
1299 Fourth Street
San Rafael, CA 94901
415/938-2680

**Forth**
**Stackworks**
321 East Kirkwood
Bloomington, IN 47401
812/336-1600

**APL/V86**
**Supersoft Associates**
40 Main Street, #403
Champaign, IL 61820
217/359-2112

**APL/V86**
**Vanguard Systems Corporation**
6901 Blanco
San Antonio, TX 78216
512/340-1978

**Digital Research is developing a 16-bit laboratory for use by ISVs to help them develop and test CP/M-86 and MP/M-86-compatible application programs.**

# 16-bit Development Lab to Open for ISVs

Digital Research is also developing a 16-bit laboratory for use by ISVs to help them develop and test CP/M-86 and MP/M-86-compatible application programs.

The company has asked popular hardware manufacturers to participate in the establishment of the 16-bit laboratory. Already in place are the IBM Personal Computer, the IBM Displaywriter, an Intel Development Station and a Sirius Systems Computer with new hardware products is expected shortly.

With the publication of the latest CP/M Compatible Software Catalog, the establishment of a 16-bit development and test laboratory for use by ISVs and new distribution channels, which include the services of Hamilton-Avnet, a well known, nationwide computer product distributor, Digital Research is supporting the software vendor from start to finish in the software marketing effort.

From the beginning, Digital Research has supported the Independent Software Vendor (ISV) with an ambitious program of seminars, technical information, communications and other services. Now, as the microcomputer industry moves into the 16-bit world, the company is taking steps to assist ISVs who write special application programs for that environment.

The CP/M Compatible Software Catalog helps users find the right software for specific tasks. Descriptions of products from more than 100 ISVs were included in the first edition of the catalog. Now, the new CP/M Compatible Software Catalog is available with program listings from more than 300 independent vendors. This new edition includes 16-bit products for the first time.

More than 30,000 copies of the first edition have been sold to interested users. The new catalog has a better index and highlights 16-bit products. The cost is still $5.

# Formatted Languages Offered for DEC and Xerox Microcomputers

Digital Research now markets packaged programming languages that operate on Digital Equipment Corporation's new VT180 microcomputer and on the Xerox 820 personal computer.

Initial offerings of both DEC and Xerox-formatted packaged software products are CBASIC, CB-80 and PL/I-80. Digital Research will soon announce Pascal/MT+ for both systems and BT-80™, a record retrieval system, for the Xerox 820. Availability of these languages off the shelf should aid both end users and software writers, said John Katsaros, director of marketing. "We see both the DEC and the Xerox hardware as very significant entries into the market, and we want to ensure the availability of high-quality, professional languages to their users."

DEC's VT180 is the company's VT100 terminal with a VT18X option installed. The VT18X is available from DEC as a kit that mounts inside the VT100 cabinet. The kit includes a Z80-based microprocessor module with 64K byte RAM, a dual mini-floppy disk drive, connecting cables, user guide and documentation plus a diagnostic disk to check system performance.

This computer is the first product from DEC that uses Digital Research CP/M, which is the standard for the microcomputer industry. Now, purchasers of the DEC VT180 and the Xerox 820 will be able to use more than 3,000 application programs and languages that operate under CP/M, including sophisticated business programs for accounting, data management and financial forecasting.

The four programming languages give software authors a choice of products to best suit their needs.

CBASIC, a commercially-oriented compiler-interpreter dialect of the popular BASIC language, is the most widely used version of BASIC for business applications. CB-80 is a native code compiler version of CBASIC that maintains full compatibility with CBASIC while providing significantly faster execution. Both languages offer full support for MP/M II, the multi-user, multi-task version of CP/M.

PL/I-80 is based on Subset G of the PL/I programming language, and is compatible with minicomputer and mainframe environments. It saves program design time, minimizes debugging and maintenance problems and aids the design of high-quality output.

Pascal/MT+ is a block structured language proven especially useful in commercial data processing and industrial control. It is designed specifically for professional applications and supports the complete International Standards Organization Standard for Pascal.

The record retrieval system, BT-80, is designed for PL/I-80 applications. It incorporates a B-Tree index organization technique and is a key element in developing data base management systems.

These products will be available from Digital Research, its distributors and dealers.

# Language Applications Directory Assists in Locating Software Products

The recently expanded Digital Research Language Applications Directory is proving to be a much-used information source for a wide variety of DRI customers. The directory features in-depth descriptions of programs written in one or several of the Digital Research languages: CBASIC, CB-80, CBASIC-86, CBASIC-16, PL/I-80 and Pascal/MT+.

While the CP/M Compatible Catalog helps users locate companies using CP/M, the directory, with its more complete application descriptions, assists in locating specific software products and in writing and marketing application packages written in DRI languages.

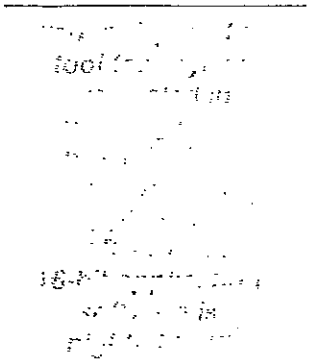
Over 110 companies are listed, encompassing more than 300 application packages including general accounting, business, commercial and manufacturing software and ranging from banking and investments to word processing. Each listing contains the company name, address and phone, product names, memory requirements and a description of each product. Some vendors have also included their company logo and a brief profile. Three separate indexing systems facilitate location of specific firms, languages applications and individual software packages.

All products in the directory support CP/M and/or MP/M II. The two-color, professionally produced publication will be available through Digital Research, computer retailers, distributors, system houses and microcomputer manufacturers.

Writers of software in CBASIC, CB-80, CBASIC-86, CBASIC-16, PL/I-80 or Pascal/MT+ who would like to be included in the next directory, due to be released late in 1982, should write to Lori Forrest at Digital Research. She will send an application form at the appropriate time. To obtain copies, please use the enclosed order form. Price: $7.50.

# New Edition of CP/M Catalog Contains Valuable Information

Volume II of the CP/M Compatible Software Catalog is now available, containing valuable information about applications software and the names and addresses of companies that distribute it.



The first edition of the popular catalog contained the names of more than 100 companies that write CP/M compatible software. The second edition, just released, contains the names of more than 300 companies that write CP/M compatible application software. Companies are cross referenced by application type, using an expanded program listing for easy reference.

Director of Marketing John Katsaros described the catalog as "an indispensible tool for anyone interested in learning what is available in CP/M compatible application software. The second edition not only expands the information supplied in the first catalog, but also presents the information in a much easier to use format." Sixteen-bit application software is highlighted, and although the publication has tripled in size, the cost will remain $5.

The two-color, professionally-produced publication is distributed through Digital Research, computer retailers, distributors, system houses and microcomputer manufacturers.

Writers of CP/M comptaible software who would like to be included in the next catalog, due to be released late in 1982, should write to Lori Forrest at Digital Research. She will send an application form at the appropriate time. To obtain copies, please use the enclosed order form.

# Application Software Listing Available For IBM Displaywriter

In addition to compiling information for the CP/M Compatible Software Catalog and the Digital Research Language Applications Directory, Digital Research is also creating a listing of CP/M-86 compatible application software for the IBM Displaywriter. This listing, which is constantly being updated, is a tool for users who are purchasing CP/M-86 to run on the IBM Displaywriter. Current application listings include accounting software, legal programs, languages, a personal date book and a financial management package. A copy of this listing may be obtained by contacting Tom O'Neill in the Marketing Group at Digital Research.

# New Journal: *Data Cast* Aides Microcomputer Software Users

A new magazine for microcomputer software users published its first issue in late 1981. *DataCast*, published six times a year by Wireless Digital Inc., serves the CP/M user community with application-oriented tutorials, user's reference documentation and feature articles on software "consumer" issues.

DataCast also provides up-to-date information on electronic communication systems being proposed for linking microcomputer users to other microcomputer users and with other computer systems.

Issues will focus on specific applications, and will also contain articles on using software tools to develop programs.

For subscription information, write 333 Swett Road, Woodside, Calif. 94062. Price: $18 per year.

# Books About CP/M and PL/I Address First-time Users

In last quarter's *Digital Research News*, several commercially published books were reviewed. These independently produced publications have caught on very fast, and such an interest has been generated in tutorials for the first-time user that Digital Research now offers these books to customers through its own distribution channels.

The books discussed in the last issue include:

- ☐ *CP/M Primer* by Murtha and Waite
- ☐ *The CP/M Handbook with MP/M* by Zaks
- ☐ *Using CP/M* by Fernandez and Ashley
- ☐ *Data Structures and PL/I Programming* by Augenstein and Tenebaum.

This quarter, Digital Research introduces another publication that the first-time user may find valuable. The book, *Osborne CP/M User Guide*, by Thom Hogan, takes the first-time CP/M user gradually through the information he needs. It covers basic, practical information needed to get started and then introduces CP/M commands and CP/M compatible support programs. The functions of MP/M and CP/NET are explained, along with a summary of commands unique to these operating systems. A section of the book is also devoted to assembly language programmers who wish to modify CP/M or use CP/M for program development. Price: $12.95.

To obtain copies, please use the enclosed order form.

# MT Microsystems Addition to Provide Strong Base For New Language Division Market Place

*continued from page 1*

have greater impact than each of us could have individually."

Digital Research Vice President Dorothy McEwen said that the MT Microsystems agreement "will provide a strong base for our new Language Division; now we're in an excellent position to compete in the Pascal market place." Marketing Director John Katsaros said, "MT Microsystems has a quality product, quality documentation and quality people. There will be a synergy at work that will strengthen everyone involved."

The Pascal/MT+ product is a total system that includes a true native code compiler, linker, Pascal-level debugger, disassembler run-time subroutine library and the exclusive SpeedProgramming Package. "Pascal/MT+ helps eliminate the need for assembly language programming," said Lehman, "allowing the programmer to construct programs ranging from ROM-based controllers and operating systems to extensive data base applications."

The SpeedProgramming Package is a set of productivity tools allowing the creation of Pascal/MT+ programs, the checking of syntax and identifiers and formatting in the editing environment before invoking the compiler. The package shortens the programming time significantly by correcting all syntax and spelling errors.

MT Microsystems General Manager Nancy Lehman will be building up a stronger customer support department for Digital Research. "It's a big opportunity for me," she said. "Although I've learned a lot about language support, I'll also be in charge of support for all Digital Research products, and for all our customers from ISVs to microcomputer users and hardware manufacturers."

**John Rowley, recently appointed chief operating officer, welcomes Michael G. Lehman and Nancy J. Lehman of MT Microsystems. The firm has become part of Digital Research's Language Division.**

grammable interface to CP/M-86 corresponds to the 8-bit CP/M, thus allowing simple translation of existing 8-bit machines with little work. CP/M-86 and CP/M have completely compatible file structures, and the newly announced XLT86 program-level language programs will recompile with almost no modification.

Aside from the 16-bit system's greater power and efficiency, end interface is an extension of CP/M's and CP/M-86 make CP/M-style mixtures of code and data acceptable to the 8086 16-bit CPU.

## DIGITAL RESEARCH® Order Form

| Product Description | Media Formats 8" Diskettes: Single Density | Double Density | Diskette Only: Single Density | Double Density | Documentation Only Price | Documentation Description | Order Details All single density diskettes are IBM 3740 soft-sectored. All double density diskettes are Intel MDS 800. |
|---|---|---|---|---|---|---|---|
| **Operating Systems** | | | | | | | |
| CP/M® 2.2 | $150 | $200 | $135 | $185 | $25.00 | Seven manual set includes: CP/M Alterations, Interface, Dynamic Debugging Tool, Context Editor, Assembler, Features & Facilities and User's Guides. | NA |
| CP/M SBC 80/20 | $200 | NA | $185 | NA | $25.00 | Same as CP/M 2.2 Documentation. | System & Disk Only include ROM. |
| CP/M-86™ 1.0 | $250 | NA | $220 | NA | $40.00 | Five manual set includes: CP/M-86 System and Programmer's Guides, CP/M 2.2 User's, Features & Facilities and Context Editor. | PROM set available for $100. |
| MP/M II™ 2.0 | $450 | NA | $420 | NA | $40.00 | Five manual set includes: MP/M II User's, Programmer's and System Guides LINK-80 Operator's Guide and MAC Language Manual and Applications Guide. | LINK-80 Guide and MAC manual included with system only. |
| MP/M-86™ 2.0 | $650 | NA | $610 | NA | $50.00 | Three manual set includes: MP/M-86 User's, Programmer's and System Guide. | NA |
| CP/NET™ 1.0 | $200 | NA | $195 | NA | $15.00 | CP/NET User's Guide. | NA |
| **Languages and Programming Tools** | | | | | | | |
| PL/I-80™ 1.3 | $500 | $500 | $475 | $475 | $35.00 | Five manual set includes PL/I-80 Applications, Language and LINK-80 Operator's Guides PL/I-80 Command Summary and MAC Language and Applications Guide | MAC manual included with system only |
| CBASIC™ 2.8 | $150 | $150 | $130 | $130 | $30.00 | CBASIC Reference Guide | NA |
| CBASIC-86™ 1.0 | $325 | $325 | $305 | $305 | $30.00 | CBASIC/86 Reference Manual | NA |
| CBASIC-16™ 1.0 | $325* | NA | $305* | NA | $30.00 | CBASIC/16 Reference Manual | *Media Format-DC BASE 300A Data Cartridge Note: You must specify hardware. |
| CB-80™ 1.1 | $500 | $500 | $460 | $480 | $30.00 | CB80 Language Manual | NA |
| PASCAL/MT+™ 5.5 | $350 | NA | $335 | NA | $25.00 | PASCAL/MT+ User's Guide | NA |
| Speed-Programming Package™ 5.5 | $200 | NA | $195 | NA | $10.00 | SPEEDPROGRAMMING PACKAGE User's Guide | Available for PASCAL/MT+ version 5.2 or greater. |
| PASCAL/MT+ with Speed-Programming Package™ 5.5 | $475 | NA | $455 | NA | $30.00 | Two manual set includes PASCAL/MT+ User's Guide and SPEEDPROGRAMMING PACKAGE User's Guide. | NA |
| MAC™ 2.0 | $ 90 | $115 | $ 80 | $105 | $15.00 | MAC Language & Applications Guide | NA |
| RMAC™, LINKLIB & XREF 1.1 | $200 | NA | $185 | NA | $25.00 | Two manual set includes: LINK-80 Operator's Guide, MAC Language & Applications Guide | NA |
| LINK-80™, PLILIB, LIB & XREF 1.3 | $100 | NA | $ 95 | NA | $10.00 | LINK-80 Operator's Guide | NA |
| BT-80™ 1.0 | $200 | NA | $185 | NA | $25.00 | BT-80 Reference Guide | NA |
| XLT86™ 1.0 | $150 | NA | $145 | NA | $10.00 | XLT86 User's Guide | XLT86 is available in the VAX VMS version for $8000.00. |
| **DEC® VT180 Compatible Products** | | | | | | | |
| CBASIC® DEC VT180 2.8 | $150 | NA | NA | NA | $30.00 | CBASIC Reference Manual. | These products are designed for a DEC VT180 microcomputer. |
| CB-80® DEC VT180 1.2 | $500 | NA | NA | NA | $30.00 | Two manual set includes: CB-80 Language Manual and LK-80 Operator's Guide. | " |
| PL/I-80® DEC VT180 1.3 | $500 | NA | NA | NA | $35.00 | Five manual set includes: PL/I-80 Applications, Language and LINK-80 Operator's Guides. PL/I-80 Command Summary and MAC® Language & Applications Guide. | " |
| PASCAL/MT+® with Speed-Programming Package® DEC VT180 5.5 | $475 | NA | NA | NA | $35.00 | Two manual set includes: PASCAL/MT+ User's Guide and SPEEDPROGRAMMING PACKAGE User's Guide. | " |
| **Utilities** | | | | | | | |
| SID™ 1.4 | $ 75 | $100 | $ 70 | $ 95 | $10.00 | Two manual set includes: SID User's Guide and SID Command Summary. | NA |
| ZSID™ 1.4 | $100 | $125 | $ 95 | $120 | $10.00 | Two manual set includes: SID User's Guide and ZSID Command Summary. | NA |
| TEX 2.1 | $100 | $125 | $ 95 | $120 | $10.00 | TEX User's Guide | NA |
| DESPOOL™ 2.0 | $ 50 | $ 75 | $ 45 | $ 70 | $ 2.50 | DESPOOL Operator's Guide | NA |

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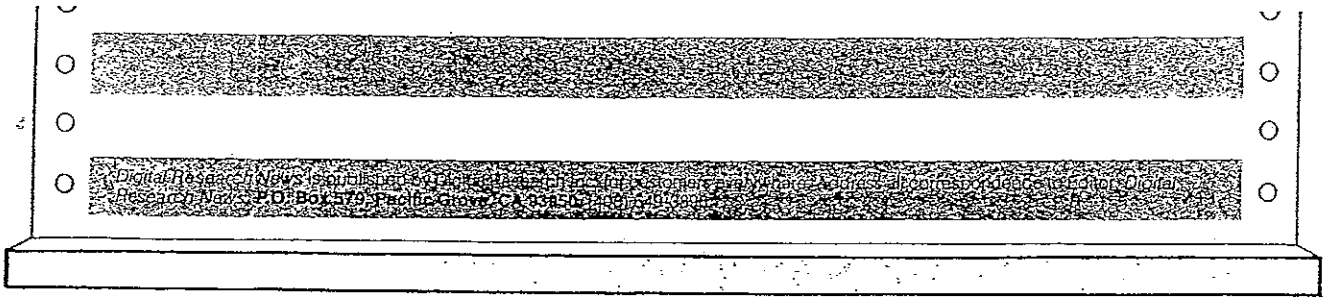


**New Products:**
**IBM Displaywriter™ Compatible Products**

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| CP/M-86 DW 1.0 | $325 | NA | $285 | NA | $50.00 | CP/M-86 DW documentation | These products are designed for a Displaywriter with the following configuration: Electronic Module, Display, Disk Drive and Printwheel Printer. |
| CBASIC-86 DW 1.0 | $325 | NA | $305 | NA | $30.00 | CBASIC/86 Reference Manual | |
| CP/M-86 DW & CBASIC-86 1.0 | $600 | NA | $530 | NA | $80.00 | Two manual set includes: CP/M-86 DW documentation and CBASIC/86 Reference Manual. | |

**Catalogs & Books**

| | |
|---|---|
| CP/M Compatible Software Catalog lists over 100 Independent Software Vendors (ISVs) who write CP/M compatible software. Your guide to accounting packages, word processors, languages, utilities and more. | $ 5.00 (Must be pre-paid) |
| CBASIC Software Directory. A listing of software vendors that market products written in CBASIC. | $ 7.50 |
| OSBORNE CP/M User Guide by Hogan | $12.95 |
| The CP/M Handbook with MP/M by Zaks | $13.95 |
| The CP/M Primer by Murtha & Waite | $11.95 |
| Using CP/M by Fernandez & Ashley | $ 8.95 |
| Data Structures & PL/I Programming by Augenstein & Tenenbaum | $25.95 |

**Ship To:**
Name_____
Company _____
Address_____
City_____
State_____ Zip _____
Requester's Name _____
Phone ( ) _____ Ext _____

**Bill To:**
Name_____
Company _____
Address_____
City_____
State_____ Zip _____
Requester's Name _____
Phone ( ) _____ Ext. _____

**Shipment Method:**
_____ UPS (for continental USA orders)
_____ Mail Service (for International orders)
_____ Air Freight (by request)

If you request Air Freight, the shipping charges are due upon delivery

**Shipping Charges:**
**$5.00 for Canada and Mexico, $10 for overseas
If you include payment (check, money order or credit card), we will pay the UPS charges on continental USA orders

**Payment Method:**
All international orders must pre-pay in U.S. dollars (Bank transfers may be made to Bank of America, Pacific Grove, California, Account #35-08558-00133.)

_____ Check enclosed
_____ C.O.D.
_____ MasterCard
_____ Visa

Name on Card_____
Account Number_____
Expiration Date _____
Signature_____
Phone Number_____
Bill my company P.O. Number _____
**All Purchase orders will be billed actual shipping charges
Authorized signature_____
Title _____
Date_____

| Qty. | Product Description (please specify single or double density) | Unit Price | Total Price |
|---|---|---|---|
| | | | |
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| | | | |
| | CP/M Compatible Software Catalog | $5.00 | |

Subtotal _____
California shipments add 6% sales tax. _____
**Shipping _____
Total Order _____

The prices shown are USA domestic prices. International prices are 10% higher for systems, and 20% higher for documentation.



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