March 1984
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- Quadscreen
- Sakata Monitor
- Electric Pencil PC
- The Tax Advantage
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- Antonym Antics
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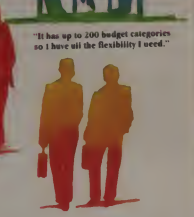

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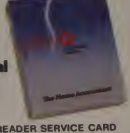

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CIRCLE 122 ON READER SERVICE CARD

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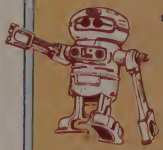

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Creative Computing Benchmark

The Creative Computing benchmark is a short test of computational speed, accuracy, and the random number generator in Basic. Computers in the chart are listed in ascending order of completion time of the test expressed in minutes and seconds. In the accuracy measure, the smaller the number the better (.0000001 is excellent while .187805 is poor). In the randomness measure, smaller is better (numbers under 15 are good and over 15 are fair).

Since running the short article about the benchmark test, we have been overwhelmed with responses from readers who ran the test on machines not listed in our original table. With letters still pouring in, here are the results for 140 different computers.

We have taken note of the criticisms of this simple test and are in the process of devising a more comprehensive one. Watch for a follow-up article.—DHA

```
10 ' Ahl's Simple Benchmark
20 FOR N=1 TO 100: A=N
30 FOR I=1 TO 10
40 A=SQR(A): R=R+RND(1)
50 NEXT I
60 FOR I=1 TO 10
70 A=A^2: R=R+RND(1)
80 NEXT I
90 S=S+A: NEXT N
100 PRINT ABS(1010-S/5)
110 PRINT ABS(1000-R)
```

Computer	Time	Accuracy	Random
Cray 1	0:00.01	.0000000014	6.1
Amdahl 470	0:00.04	.0000000001 1846	12.4
DEC System 10	0:00.10	.00494305	0.9
DEC VAX 11/780	0:00.20	.00113525	5.3
DEC VAX 11/780 (double)	0:01.5	.0000000016 3283	5.3
HP 9045B (398 bit elice)	0:03	.00000002	23.1
Control Date Cyber 730	0:03	.00000000355	6.1
HP 3000 Series 44	0:04	.112549	12.9
HP 9836	0:05	.0000000007 127329	5.5
Control Date 3500	0:05	.001302457	2.0
Wang 2200 SVP	0:05	.00000076	3.9
Alpha Micro AM 1000E	0:05	.0000000036911	12.4
IBM PC (Compiled Basic)	0:06	.01159668	20.4
DEC PDP 11/44 (RSTS)	0:07	.0000000001 50025	13.4
Wang PC	0:07	.005059375	7.2
Tandy Model 2000	0:07	.005059375	7.2
Data General Eclipse	0:08	.0000000003 45035	1.1
Eagle 1600	0:08	.005059375	7.2
Stearns Micro	0:09	.005059375	7.1
Burroughs 830	0:09	.005938744544977	3.2
Symbolics 3600	0:09	.111320135	0.5
DEC PDP 11/24	0:09	.0000000080168290	9.9
/ipha Micro AM 100T	0:10	.0000003073 37	12.4
HP 9825	0:11	.00000002	9.1
Worthstar 8/16	0:11	.005059	7.2
Burroughs B22	0:12	.005059375	15.7
NEC Adv Pers Comp	0:12	.005059375	7.2
Tektronix 4054	0:12	.0000008140425 90	0.5
Olivetti M20	0:13	.01141136	6.2
Saybrook 60000 (in Apple)	0:13	.0000000011	18.4
TI Professional	0:15	.005059375	7.1
Compaq	0:15	.005059375	7.1
HP 9845C	0:15	.00000002	23.1
Zenith Z-100 (8088)	0:17	.005059375	9.7
Samurai 816	0:17	.01159668	6.3
ACT Apricot	0:18	.005059375	7.2
Sharp PC-5800	0:18	.005059375	7.2
IBM 34 (short precision)	0:18	.1967	25.2
Eagle PC-2	0:19	.005059375	7.2
DEC Rainbow 100	0:20	.005059375	7.2
Acorn BBC Computer	0:21	.0000020746033	5.2
Columbia MPC	0:21	.005059375	7.2
Computer Devices DOT	0:22	.005059375	7.1
IBM PC	0:24	.01159660	6.3
LMI CADR	0:24	.0000201708955 1	0.6
GCE Vectrex	0:33	.0753174	0.9
Apple II, Titan Accel	0:33	.0010414235	4.5
Sharp MZ-80A	0:35	.0002172920	0.6
TI DS990/12 (Mini 70)	0:36	.0000000380	3.1
Laser 2001	0:40	.0003272295	17.4
Memotech MX-512	0:46	.0002529621 12	6.9
Coleco Adam	0:47	.0004262924 18	6.2
HP 9826C	0:48	.0000000001 27329	23.2
Lobo Max-80	0:48	.0330745	5.0
Lynx	0:51	.155	14.1
TRS-80 Model 4	0:53	.0670776	6.5
Panasonic JR200	0:57	.0002140151	15.1
SCS 100	0:59	.107005	7.4
IMS 8000	0:59	.107005	9.6
Alapa AC1-1	0:59	.107005	7.4
DECmate II	0:59	.107005	7.4
Xerox 820-II	0:59	.107005	7.4
Morrow Micro Decision	1:00	.107005	3.1
Heath H-8, Trionyx 200	1:02	.0000000001307	16.2
IBM 34 (long precision)	1:02	.0330745	7.5
Vector Graphic 3 VIP	1:04	.107005	9.5
Zenith Z-100 (8085)	1:05	.107005	7.4
Micromation Mariner	1:05	.107005	7.4
HP 125	1:00	.107005	7.4
Toshiba T100	1:09	.107005	7.4
Epson QX-10	1:09	.107005	7.4
Osborne 01	1:10	.107005	7.4
TRS-80 Model II	1:11	.107005	3.1
Hattel Aquarius	1:17	.107005	10.0
Epson QX-10	1:10	.107005	7.4
HP-85A	1:20	.00000002	14.3
OSI Challenger 1P	1:20	.32959	5.5
Morrow MD3 (Basic 10)	1:21	.000407	3.6
HP-86A, B	1:25	.00000002	13.6
Tektronix 4051	1:26	.0000001404425 90	6.1
Digital Group Bytemaster	1:27	.0000027779	3.6
NEC PC-8001A	1:29	.0330745	1.0
Atari 800 (MBasic)	1:35	.150079	2.1
Kaypro 10	1:36	.107005	7.5
Sony SMC-70	1:37	.0000004458	3.0
HP-75C	1:38	.00000002	5.0
North Star Horizon(10 dig)	1:41	.000473	3.6
NEC PC-8201	1:44	.107005	9.3
MicroOffice RoadRunner	1:48	.107005	7.4
Teleram 3000	1:48	.107005	7.4
Apple III	1:48	.011914	6.7
VIC 20	1:49	.0010414235	23.7
Commodore SuperPET	1:50	.0002093315 12	28.4
HP 9830B	1:52	.00000009	13.1
Commodore 64	1:52	.0010414235	0.9
Apple II plus	1:53	.0010414235	12.0
Apple 11e	1:53	.0010414235	12.0
NEC PC-8801A	1:54	.107005	7.4
Rockwell Aim 65	1:56	.0010414235	14.7
Compucolor II	1:57	.0330745	1.4
TRS-80 Model III	1:59	.0330745	5.0
Micro Color Computer	1:59	.0005502840867	7.6
Commodore CBM 8032, 2081	2:01	.0010414235	1.4
Heath/Zenith H-89A	2:04	.107005	7.4
Atari 2600 Graduate	2:15	.0000246797 80	7.9
TRS-80 Model 1	2:19	.0330745	12.0
Color Computer	2:23	.0000246867	7.3
Atari 800 (fastchip)	2:23	.006075	7.8
Dragon 32	2:36	.0000246804867	7.3
Epson HX-20	2:30	.0330745	23.8
DAI	2:30	.218269	9.6
Times/Sinclair 1000 (fast)	2:43	.0000000 8090	8.7
Interface Model R	2:50	.0330745	0.1
Wang 2210	2:52	.0010414232	12.5
OSI Challenger 1	3:07	.0010414235	13.9
SpectraVideo 318/320	3:40	.0000002858	8.7
TI 99/4A	3:46	.00000011	2.6
Radio Shack PC-3	4:00	.00000627	10.9
TI 99/4A, Extended	4:10	.00000011	10.7
Oricon 18	4:16	.0010414235	12.1
Datapoint 1000	4:16	.0000812842	11.3
Sinclair ZX81	4:23	.0006605257	6.3
Sinclair Spectrum	4:39	.0006605257	3.5
TRS-80 Model 100	4:54	.0006605411	0.7
Times 2068	4:55	.0006687641	12.0
Casio PF-200	5:05	.00723	30.3
Sharp PC-1500 (RS PC-2)	5:10	.0008200	7.0
Cromemco C-10	5:10	.00000001	16.1
TI CC-40	5:41	.0000001	6.2
Sanyo PHC-25	5:41	.0002675856646	18.2
Canon X-07	6:03	.0000000250	24.9
Atari 1200XL	6:45	.013959	5.2
Atari 400/800	6:40	.013959	23.0
Sharp PC-1250	11:14	.00000009	5.9
Magic	11:45	.0000000744	----
Times/Sinclair 1000(slow)	16:55	.0004125940890	7.4
IBM System 23	18:40	.0000000558 3	3.4
HP-97	23:00	.0000280 2	----
Sharp PC-1211	20:32	.0000280 2	----
TI SR-50 (Calculator)	12.7 days	.193784209	16.4

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CIRCLE 173 ON READER SERVICE CARD

7 Years Ago

The Mar/Apr 1977 issue had a special focus section on computer music that was put together by Fred Hofstetter of the University of Delaware. In the music section were articles about music dream machines (using a Plato system), the Dartmouth on-line music system, a guide to computer music recordings, dance notation on the computer, four music-oriented games, building a kluge harp for a microcomputer (by Carl Helmers), and a comprehensive bibliography.

Steve North and David Ahl prepared a major piece, "Saga of a System," which described the trials and tribulations of putting together a pair of heavily-loaded S-100 systems. Various components were described including the TV Dazzler, video display board, A/D and joysticks, bytesaver (sort of an automatic bootstrap loader), interface board, cassette interface board, beefy power supply and clock fix for the Altair (by Parasitic Engineering), and 8K static RAM board.

A thoughtful article proposed the use of a structured "pseudo Basic" to make programs more readable and understandable. Sorry to say, it never caught on. The first of the popular series of "Thinking Strategies With the Computer" by Don Piele and Larry Wood appeared in this issue—it dealt with inference and heuristic problem solving.

The ads were looking much more professional and many were in color. Cromemco announced the Z2, an early

Z80 system ($595, no memory included) and Processor Technology announced an assembled version of the Sol-20 for $1495. MITS announced the Altair Kit-A-Month plan ($79/mo. for a 680 to $107/mo. for an 8800b), and the first ad for the Poly-Morphic 88 appeared (complete 8K cassette-based system with monitor, $1750). And Advanced Computer Products was heralding a price breakthrough on static RAM boards (8K for $198). —*DHA*

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Star Gemini 15X	$499.00
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Panasonic 1092 (180 cps, 7 kb buffer, FX software compatible)	$482.00
Panasonic 1093 (160 cps, 2kb buffer, FX software compatible, 15" carriage)	$760.00
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Panasonic 3151 (22 cps/shannon, 21 cps/pica, Diablo supplies, bi-dir)	CALL
Diablo 620	$990.00
Transtar 130 (6 mo. warranty, Diablo prnt routines, 15")	$769.00
Transtar 120 (6 mo. warranty, Diablo prnt routines, 14 cps)	$500.00
NEC 3530	$1675.00
NEC 3550 (IBM compatible, 33 cps)	$1950.00

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CT 1320 V (RGB)	$500.00
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AMDEK Color II (RGB, 13", IBM, APPLE IIe, APPLE III)	$485.00
SANYO Green Phosphor (composite, no sound)	$95.00

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D C Hayes Smartmodem 1200	$549.00
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D C Hayes Micromodem II w/Software, Apple	$323.00

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A Note To Our Readers

creative computing software evaluation

creative computing equipment evaluation

Product evaluations in *Creative Computing* are different from those in many other magazines. Here's why.

A *Creative Computing* product evaluation is objective, thorough, and in-depth. Normally, we get an actual production product for testing—on loan or purchased from the manufacturer. We do not ask for or accept any special treatment, but interact with the manufacturer as a normal customer would.

In most cases, we test the product in the environment and under the conditions in which we would expect it to be used. We do not believe that we should sit in an ivory tower and pass judgment on a product that is meant to be used by a salesman on the road or a child in a classroom.

When we evaluate a prototype, we state that fact in the review. Even so, we do not simply recite the manufacturer specifications; instead, we use the product, apply our own tests, and report on the results. If it lives up to the published specs, fine; if not, we tell you.

In our evaluations, we call a spade a spade and a lemon a lemon. Advertisers do not receive special treatment—no one does. Some manufacturers do not like this policy and refuse to work with us or advertise in the magazine. But most manufacturers welcome our policy of scrupulous honesty, and for that, we applaud them.

Nevertheless, we are not right all of the time. Sometimes, a unit might perform well in our tests, but be a dog for you. For that, we are sorry. But for the most part, we trust you will find our reviews—and the rest of the magazine—credible, honest, and interesting. ■

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Shakeout or Competition?

David H. Ahl

In this issue of *Creative Computing*, we focus on the subject of competition in the computer industry. In the last six months, the popular press has had a field day with the computer industry with articles such as "Mass Marketing the Computer," "Caveat Emptor: The Shakeout in Personal Computers," and "Losses Mount in Home Computers." We've also read about the computer industry tapping marketing executives from the consumer products industry as marketing begins to loom more important than technology.

We have been following the personal computer industry since its inception nine years ago. (For what it's worth, *Creative Computing* is the only magazine that can make that claim, since we are the only consumer computing magazine that was around when the personal computer was born in January, 1975.)

Although we are a part of the industry, we have generally reported on new computers, software, and applications, and rarely on companies or the industry. However, we think that it is about time to present an objective, overall view to balance the sensationalism of the popular press.

First of all, the so-called shakeout is not new. Perhaps failures are more visible because the companies are bigger or because more people are interested in personal computers than ever before. But if you look at the ads in a five-year-old issue of *Creative Computing*, you will find that fewer than one-half of the companies are still around. The biggest-selling computer in 1975 through 1978 was the Altair. Today, it is dead. The IMSAI was a major contender, now dead. The first computer to combine the keyboard with the processor, the Sol-20 by Processor Technology, was a soaring success—for two years. And what of Polymorphic, Southwest Technical Products, VideoBrain, Exidy, Technical Design Labs, Ohio Scientific, The Digital Group, and Wavemate? Don't ask.

For some reason, for the past ten years, we did not refer to what was going on as a shakeout—it was just good, healthy, American competition. Some people made it, some didn't. Some were hurt, some found that pot of gold. But now it is called a "shakeout"—that probably sells more newspapers and sounds better on the TV news than "competition."

The word "shakeout" sells more newspapers than the word "competition."

As Mark Twain said, "The reports of my death are greatly exaggerated." So are the reports of a shakeout in the personal computer industry. What is going on is competition—just as tough and deadly as it has been for ten years.

In this special section about that competition, you will find an article on what it takes to be successful, or, how to tell the winners from the losers. We have also taken a close look at what has happened within eight companies—some are front runners, some got a late start, and some have fallen by the wayside. There is no simple reason why some are successful and others are not, but their stories make interesting reading.

We also have some interviews with key people in the industry such as Bill Gates, president of Microsoft, and outside observers such as Barbara Isgur, a securities analyst with Paine Webber. Rounding out the section is a piece about Comdex, a major industry show, that makes the word shakeout sound ridiculous.

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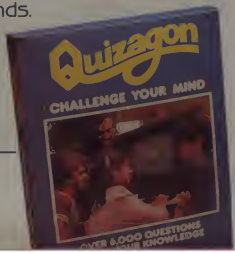

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What Does It Take To Be Successful or How To Tell The Winners From The Losers

David H. Ahl

By reading the articles in computer magazines about trade shows, you can get a good idea about the new companies and products. And by reading *The Wall Street Journal* and *Electronic News*, you can see which company filed under Chapter 11 this week and which one posted record earnings. But in between these two points, how can you tell the winners from the losers? In other words, what does it take to be successful in the small computer marketplace?

Listed below are some of the factors necessary for success. It is not an all-inclusive list, but it hits the major ones. As you read the list, it is important to keep in mind that these factors form a chain and a weakness in one or two links can cause the chain to break. A company may have eight of these factors in place, but if the ninth is weak or missing, chances are the whole thing will go down the drain.

Financing

Someone once said, "Money may not be everything, but it is a way ahead of whatever is in second place." This is doubly true for a computer manufacturer. Designing a computer, making prototypes, developing software, lining up dealers, placing advertising—all of these things must be done before a dime comes back. So big money is needed to get started.

Moreover, continuing development is necessary. One product will not last forever, and even though the firm may be making a profit, it probably will not be enough to support the company through a new product development cycle and certainly not through an economic slowdown. Consequently, when entering the small computer market it helps to be in healthy financial shape (IBM), have a wealthy parent company (Atari owned by Warner), or have gobs of venture capital (Osborne).

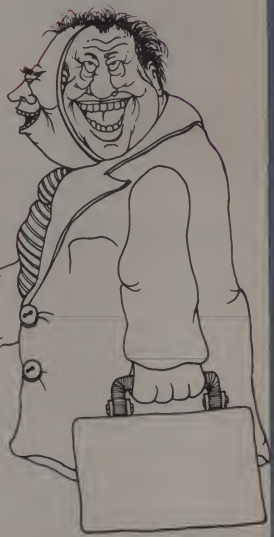
Product/Price

We lump product and price together for the simple reason that you can't consider one without the other. For example, you may think that the Timex 1000 is a terrible computer, but at $39 it sells. Thus, the price is right for the product. On the other hand, when the TI 99/4 was first introduced at $700, it was vastly overpriced; at $350 it would have been fairly priced for the product.

There are times when the price charged is higher than the product merits (say, the IBM PC), however, it is justified by other factors (the three letters, IBM). But for the most part, the price must be consistent with the value the product offers to the customer and consistent with the other entries in the market.

Evolving Product

There is no product in the world that is evolving as fast as the computer. Last year's marvel is next year's relic. The av-



See jane™ run

Once there was a time,

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Jane does away with complex command words.

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CIRCLE 106 ON READER SERVICE CARD

erage product life cycle in the computer market tends to be about two to three years. Certain exceptional products have stretched further (Apple) while some others have had lives of a year or less.

The point is that the minute a computer is in the market, the R&D department ought to be well along on its successor. Moreover, in most cases, the successor ought to be an evolving product, not a completely new one. An evolutionary product will be able to run existing software and will be attractive to existing customers who want to upgrade.

Thus, the Apple IIe was a logical successor to the Apple II and the IBM PCXT, 3270, and PCjr are logical extensions of the PC family. On the other hand, Processor Technology had no successor to the very successful Sol-20, Bally had none for the Arcade, and Atari's XL series doesn't directly run software designed for the earlier units.

Peripherals

One of the reasons that the computer market seems to be expanding without bound is that the computers themselves can be used for so many different things. While there are a few applications that are common to all users, there are thousands of other applications that appeal to small market segments. However, many of these unusual applications require unusual peripherals that are supplied by smaller specialty companies.

Thus, if a computer manufacturer designs the computer so that other boards can be plugged in (Apple, IBM, S-100 systems) or with an accessible bus (Commodore), it is more likely that third party manufacturers will make peripherals for it. And in the long run, this means staying power in the marketplace, although the next factor, software, is even more important.

Software

Around here it is known as Ahl's Axiom: "Without software a computer is just an expensive boat anchor." Equally true is the fact that no computer manufacturer can possibly make all the software that their customers will want. TI, a giant of a company, tried, and proved that it couldn't be done.

Hence, to be successful, a computer manufacturer must attract outside software vendors to make and market software for their machine. While strengths in some areas will overcome weaknesses in others, this is one factor for which a machine cannot compensate with strength elsewhere. Without software, a computer is dead. Period.

Reliability and Service

Like product and price, reliability and service go hand in hand. If you have good reliability, you won't have much call for service. Nevertheless, for the few (or many) customers who will need service, there must be provision for obtaining it. It doesn't matter if this is provided by computer stores, by exchanging units, or by a contract service organization. What matters is that broken units be serviced promptly and with a minimum of fuss.

Service may not affect many customers—7% is considered an acceptable initial defect rate by one of the industry giants—but almost by definition that small group of customers will be the most vocal. Vocal to the people where the computer was purchased, vocal to friends, and vocal to the media. No computer company can afford the reputation of having defective products. Coleco, for example, has its hands full trying to counteract the media reports of an initial defect rate of 30% and higher on the Adam.

Advertising and Promotion

There are two aspects to advertising and promotion, neither one of which can stand alone. First, a computer must be accepted by the influencers. These are the people who are the first ones on the block to get a new product or the first company in the city to try a new technology. These influencers are crucial to the success of a new computer because they are the people to whom the masses turn for advice.

The influencers are knowledgeable and must be reached through advertising in leading edge, in-depth magazines such as *Byte* and *Creative Computing*. They are not reached through general interest magazines *(Smithsonian, Playboy)*, business magazines *(Fortune, Forbes)*, or even the "mass market" computer magazines aimed at technologically unsophisticated readers *(Personal Computing, Popular Computing)*.

The second step of advertising and promotion is to reach the wider, mass market. But the manufacturer who advertises only to that market has an enormous hurdle to overcome—the lack of word-of-mouth advice from market trendsetters. Mattel ignored the influencers and blew it. So did Panasonic. And more than a few companies are headed down this same path to oblivion today.

Reviews

One of the best types of "free" publicity for a new computer is a product review. A three-page product review is probably worth as much as ten paid pages of advertising. Yet, frequently manufacturers don't allocate machines for this purpose. Indeed, we recently got a letter from Xerox telling us that all their new 1810 computers were going to customers, so none were available for review. One can only hope that customer demand will stay high, although with this approach to marketing, it does not appear likely.

Have It Your Way

David H. Ahl

Back when we first discussed doing an issue focusing on competition in the industry, our ad reps were appalled. "You editorial people will name names and call a spade a spade, and no one will want to advertise with us."

We replied, "Wait and see. We are not a muckraking magazine, and we believe that our scrupulous honesty will increase our already-excellent credibility and advertisers will be attracted to the magazine." In the coming months, we'll see who was right.

Much more botherso.ne, however, was the strong opinion expressed by Larry Sporn, president of Ziff-Davis Consumer Computers and Electronics Magazine Division, that *Creative Computing* readers weren't interested in an "industry" issue. "They don't look to *Creative Computing* for stories about competition and companies," said Larry, concluding with the strong words, "It won't sell." Again, we'll see.

However, if you like what is in this issue, and don't mind seeing us go off on an occasional tangent, please drop me a line. Better yet, drop a line to Larry Sporn and tell him what you think of the magazine. His address: Ziff-Davis, One Park Ave., New York, NY 10016.

Distribution and Delivery

Once the demand has been created, there better be product available to satisfy it. This means widespread distribution and adequate stocks of product. Nothing is worse than telling a customer whose pen is poised above his checkbook that machines aren't expected in until next quarter. That's what happened to SpectraVideo—they did everything right except get product on dealer shelves.

One reason that Radio Shack has been so successful—even with less than state-of-the-art, less than competitively-priced products—is that product is on the shelves to some 6000 stores. That's hard to beat.

Knowledgeable Sales People

Four years ago, we did several "Mystery Shopper" articles and were appalled at the lack of knowledge of sales people at the retail level. Since then, we have heard of several training programs sponsored by both manufacturers and stores, yet our general sense is that the situation is as bleak as ever.

Surveys reported have shown that after friends (the influencers mentioned above), sales people have the greatest influence on the product purchased. Yet when is the last time that you were in K-Mart or Macy's or even Computerland and felt that the salesman knew more than you did?

Out On a Limb

We have put together a small chart of the factors above and ranked some existing and defunct manufacturers. On some of the new entries such as Coleco we have had to make some best guesses. As new manufacturers emerge at Comdex, CES, and NCC why not try to see where they fit? It may give you a leg up on the stock market—and on selecting your next computer.

How They Stack Up

Computer Manufacturers

Success Factor	Apple	Atari	Coleco	Commodore	DEC	IBM	Kaypro	Mattel	NEC	Osborne	Spectra Video	Tandy	TI (home)	Timex
Financing	•••	•••	•••	•••	•••	•••	••	•••	•••	••	••	•••	•••	•••
Product/Price	••	•••	•••	•••	••	••	•••		•••	•••	•••	••	••	•••
New Products	••	•	•	••	••	•••	••	•	••	••	•••	••		••
Peripherals (ease of expansion)	•••	•		••		•••	••		••	•	••	•		•
Third Party Software	•••	•••	•	•••	•	•••	••			•••	•	••		•••
Reliability/Service	•••	••		••	•••	•••	•••	••	•••	••	•	•••	•••	•
Advertising: Influencers	•••	•••		•••	•••	•••	•		••	••	•••	•••	•••	•••
Advertising: Mass Market	•••	•••	•••	•••	•	•••	••	•••	•	•••	••	••	•••	••
Distribution/Delivery	•••	•••	•	•••	•	•••	•••	•	•	••		•••	•••	•••
Reviews	••	••		••	•	••	••	••	••	•••	•••	•••	•••	•
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CIRCLE 128 ON READER SERVICE CARD

Barbara Isgur Talks To Ken Uston

All of us who use personal computers have our own opinions as to who the winners are and who the losers will be.

Often we look at the activity of the stock market and other financial indicators and wonder where investors get their information.

Creative Computing Editor-at-Large Ken Uston interviewed Barbara Isgur of Paine, Webber, Jackson & Curtis at Comdex. His hard-hitting questions and her candid response provide some insight into the complex field of investment analysis as it applies to the volatile microcomputer industry.

Ken Uston

Creative Computing: What are your overall impressions of the show?

Barbara Isgur: It's an interesting show, centered around two groups of things. In hardware, it is the IBM clones of various types; in software, it is the notion of integrated software and easier user interface—like mice, and so on.

In software things are going forward; in hardware, they are not. I think that the IBM standard is an inhibiting factor from the standpoint of user benefits. I find that somewhat discouraging, but it is a fact of life. IBM is not going to go away, and they are not going to be that innovative.

CC: Do you mean that were it not for the trend toward IBM PC compatibility, other manufacturers might be doing more innovative things?

BI: I think so; IBM is inhibiting innovation. And I would guess that is going to continue because IBM is dominant in the corporate marketplace.

CC: From the user's standpoint, how important is IBM compatibility? We hear two opinions. One is that there are only a few things that can be done with a computer, such as write, calculate, set up databases, and make graphics, and that as long as one has a really good program, it makes no difference if one's computer is IBM compatible. The other side, of course, is that people want all the new stuff that is coming out, and that if you are a hardware manufacturer without MS DOS, your machine will soon go the way of the buggy whip.

BI: I think that you can make a case for either side. Typically in this industry until about twelve months ago, users bought a computer because they had a need. As long as they found an application that satisfied that need, they weren't concerned with the latest model software. They had a business to run and they had to do accounts payable, accounts receivable, general ledger, or

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whatever. To the extent that the computer solved the problem, it receded into the background.

As the computer has become a fashion issue, the idea of having the latest software has become more important. So I think there are two ways of looking at it.

CC: On the windows issue, there also appear to be two sides. One school says windows are great: the user can have a desk top right on his screen. Others say, "Who can work with all those different little windows? They'll make sense when we have computer screens the size of a desk top."

I think that the home computer is going to make a gradual transition into a taken-for-granted appliance.

BI: One of the programs that I saw here at Comdex was the Ovation Software Program that will run on the IBM and the Tandy Model 2000. I liked the explanation that Ovation gave for creating it the way they had. They feel that windows can be obstructing rather than helpful if they require complex commands. Ovation has invisible interaction between functions, activated by 30 natural language commands that are the same for each function. Intuitively I, as a user, like that, because it makes my life easier.

On the other hand I think that there are instances in which the notion of windows, such as in Microsoft Windows, can be important in bringing together the best appplications in each area. The user can operate the best spreadsheet with the best word processor with the best graphics package. This is because Windows is able to integrate packages from different manufacturers.

If you are really a serious computer user, Windows does offer you possibilities that don't exist in other essentially closed integrated systems which work only with their own applications, such as *VisiOn* or *Ovation*.

CC: With the PCjr, has IBM finally established a real need for a computer in the home, in contrast with the TI 99/4A, the Atari line, and the Commodore computers. Or will PCjrs eventually be sharing the dust in the closets with the other computers?

BI: I don't think IBM has established a need. But I don't think it is IBM's role to establish a need. I think the need is going to evolve over time. When the telephone was first invented, Western Union said that it would never go, that we have plenty of messengers in the world, so what did we need telephones for? And many original owners of telephones didn't use them much—there weren't many people to call. Gradually the telephone became an accepted and reasonably necessary appliance in every home and in most lives.

I think that the home computer is going to make a gradual transition into a taken-for-granted appliance.

The home computer doesn't have one compelling function, but rather a set of four or five functions that together make a pursuasive cause for having one. The uses might include doing banking at home, preparing income tax returns, providing educational assistance for children, and occasional word processing. No single use will be enough to make most of us say, "I've got to have a home computer."

CC: Do you think that home computer needs will finally be satisfied through better software while the PCjr is current or will this happen after the PCjrs are in the closet and some other computer is in vogue?

I don't see anybody with the potential to dominate the home market the way IBM is dominating the corporate market.

BI: The IBM home computer will probably establish the standard operating system for the home market as it has in business. So even if the PCjrs have gone into the closet, I think that as the software continues to evolve and increase, they will be brought out. By the way, I don't think they will go into the closet. People who buy the IBM have made a pretty substantial investment.

I think that because it is expensive, perhaps only 10 to 15% of the home market will be interested in the PCjr. I see two categories of PCjr buyers. One category is the person who is using the PC in the office and wants some portability of the software to a home machine. The other is the trend setter who wants the status of the IBM name.

The trend setter is more likely to become a non-user after the initial interest wears off—at least until, as I said, these things really get to be treated as appliances. But I don't think PCjrs will languish or that their sales will fall off at the end of 1984.

I don't think we are talking about just one computer in the home market. I think there will be multiple providers. I don't see anybody with the potential to dominate the home market the way IBM is dominating the corporate market—with the possible exception of somebody like AT&T, who might make a computer/telephone link that would be very compelling as a leading product. It hasn't happened yet, but it may.

CC: What are your thoughts on the shakeout that so many observers say is coming? What is going to happen to these 300 hardware manufacturers?

BI: It is clear that there can't be 300 successful providers. I think that the keys to success—beyond IBM—are going to be marketing ability and price or value. I think people who don't buy an IBM are going to choose the computer that gives them the most value for their money.

So I think that companies must be able to penetrate the important distribution channels, which is a marketing and finance issue. It is expensive these days. Many of these companies are finding out that if you don't get shelf space in the significant distribution channels, life becomes very difficult. I would point to NEC, which has been in the U.S. market for a number of years and has managed to achieve only a 2% market share. Because it is a well financed Japanese company, it can continue to plod along.

But there are many small companies that have a single product. If they don't gain some measure of success within 12 to 24 months, they are going to run out of money. I think we will see a gradual weeding out over the next few years.

CC: Do you see a major Japanese invasion of the computer market in the offing?

BI: I have thought about it, and it puzzles me that they haven't been here earlier. Now that the IBM PC has become the corporate standard, they have a target to shoot at. If you look around this show, you see some evidence that some of them are aiming at that standard.

A number of Japanese manufacturers have decided not to fight the distribution battle in the U.S. and are allying themselves with U.S. companies to gain an entree.

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CIRCLE 159 ON READER SERVICE CARD

I have also heard that a number of Japanese manufacturers have decided not to fight the distribution battle in the U.S. and are allying themselves with U.S. companies to gain an entree. One of the large Japanese companies, for example, has an arrangement with RCA. This may be the way that others will choose to enter the U.S. market.

CC: You no doubt have heard of Andy Tobias, who has written iconoclastic books on Wall Street. In one statement, he says that a monkey shooting darts at a listing of stocks would do as well as most investment analysts. I wonder how you react to statements like that, if it's not impolite for me to ask.

For the next 12 months Commodore and Tandy appear to be very strong competitors.

BI: No, it's not impolite. As a professional investment person, I obviously take some issue with that. My days are spent attempting to provide fundamental analysis that will enable other professional investors to make decisions that will be more profitable than those they could choose if they threw darts at the stock charts.

On Wall Street, industries come into favor and go out of favor and there is much group activity in terms of what institutions will buy and what they sell. Earlier this year the technology stocks were very much in vogue, and their prices were high. At that point some of us were saying that, with the exception of the leaders in each industry sector, it was time to begin to be a bit cautious because it looked as though prices were getting inflated. Now I think we have gone the other way.

I feel I can add to my clients' thinking by pointing out to them who the leaders are in each sector of the industry. I can say, "If you want to invest in this sector, these are the likely survivors. Therefore, you should have a better chance of doing well."

We outline the fundamentals of the company, and make an earnings projection; there is usually some relationship between earnings and stock price (the PE ratio). From that one ought to improve one's chances of doing well.

CC: Which hardware companies do you view as the best managed with the best products—the ones who are likely to be the survivors?

BI: Out of the 300, there are not that many that are public or that are investable entities for one reason or another. In the last year the home sector of the market has been the most explosive. In that sector, Commodore has done better than the others.

It is difficult to project beyond 12 to 24 months because the industry is changing so fast, and the likely survivors or dominant players change with each product cycle. For the next 12 months Commodore and Tandy appear to be very strong competitors. After the next 12 months I think Apple will either be a strong entity or on its way out of the business.

CC: Will Apple's fate depend on the Macintosh or are there other factors?

BI: Partly on the Macintosh, but not exclusively. They do have other products. I don't believe the Apple II is finished. There is life for 8-bit machines, and I think that if Apple markets it carefully, they can get a couple more years out of that product in the right markets.

CC: Do you see Coleco as a dominant factor in the home market with their Adam?

BI: No. I see them as a viable factor with a legitimate niche for 1984; it is difficult to predict beyond that. They have targeted a very special area: primarily home users who have students or teenage children who are writing term papers and who tend to be naive computer users. Coleco has tried to make the Adam easy to use and attractive to that group, consciously excluding other groups by the way they configured the machine.

I don't believe the Apple II is finished.

CC: Do you think Atari will be able to regroup and come back in early '84 with their XL series?

BI: I don't know.

CC: They are not shipping much right now, I hear.

BI: No, apparently not. They are shipping the 600. The 800's were due this week, and I haven't heard whether they are arriving or not. I think there is some question as to where Atari is going. It is interesting because the Atari 800 is a sensational machine. We have three of them, and I recently did a report at the office. I generated the graphs for that report on the Atari 800. They were as good as our graphics department could have done, and it took literally 1/10 the time.

CC: What kind of software did you use?

BI: A program called *B Graph*. It is available only for the Atari 800 now. A Canadian company distributes it; it costs $100 and is a good program.

CC: Why didn't the Atari line of computers do better?

BI: I don't think that they marketed them as well as they could have. I think the Atari 800 could have been a very attractive small business machine. But Atari chose not to pursue that line.

CC: Do Wall Street computer industry analysts personally test out the computers of the companies they analyze?

BI: As a microcomputer analyst I do test the machines. We have an Adam in the office. In fact, we had 40 clients in today to have lunch with Adam; they all got to play with it. We have a Commodore 64, an Atari 800, and a Vic 20. I have a Tandy Model 100.

CC: When we were talking about survivors, you mentioned Tandy. To what do you attribute their success?

BI: Impressive product line, magnificent distribution capability, control of the whole process from manufacturing through distribution, and a reasonably nimble management that is willing to move with the product cycle. I think Tandy's unique structure will enable them to be a survivor.

CC: I recently talked with Wall Street analyst Joe Granville, who said that he thought the market was at a pinacle and due for an unbelievable crash. He mentioned that many of the indicators that typically precede a bear market are all at their highest level: the percent of small investors, the volume of short positions, the number of companies selling their own stock, and so on. I wonder if I could get your reaction to Granville's bearish predictions.

BI: Well, I think it is all based on technical analysis, which is quite distinct from what I do as an analyst of an industry. I spend more time on the fundamentals of my industry than on trying to determine what the market as a whole is going to do. Our economist makes those analyses as do our market strategists. I, of course, listen to what they say and try to factor in my analysis of the company within the framework that they provide for the market overall. I think that there is some current thinking that there will be a correction. But I haven't heard a doom and gloom prophesy from most people that I talk to. ■

I think the Atari 800 could have been a very attractive small business machine.

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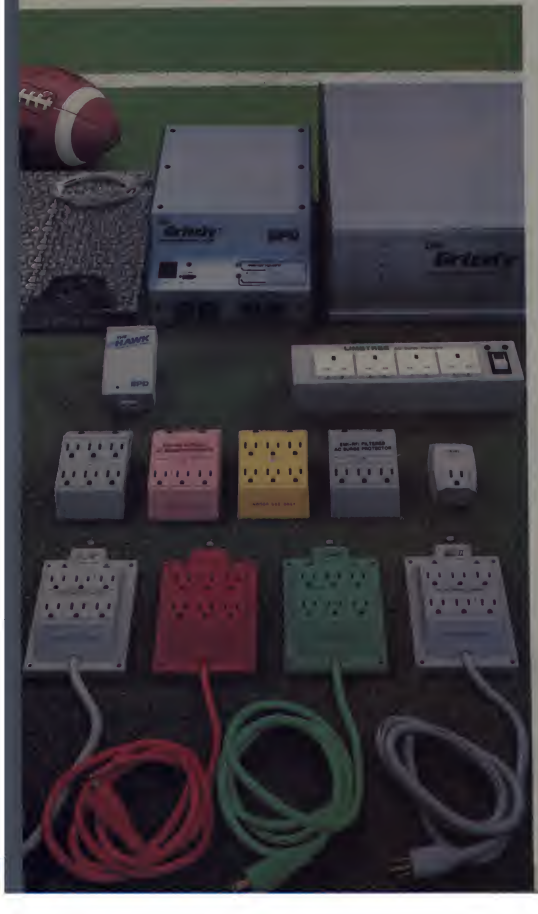

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OSBORNE
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David H. Ahl

Adam Osborne is one of the most charming, persuasive, egotistical, and supremely confident people in the computing field, indeed, in all industry. Of the failure of his company, he says, "I don't feel any personal embarrassment."

In one of the most spectacular rises and falls in the personal computing industry, Osborne Computer Corp. went from nothing to the top of the mountain and back to nothing in just three years. Its $10 million financing was one of the hottest deals in 1982. What went right—and what went wrong?

Unbelievable Growth

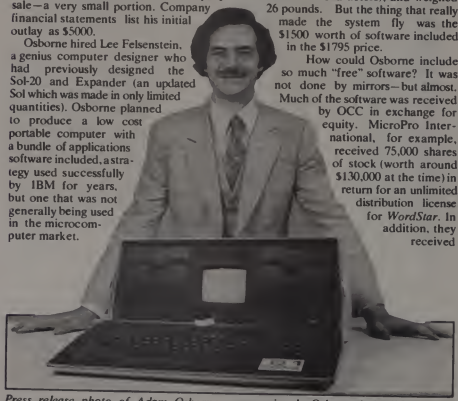
In 1979, Adam Osborne sold his book publishing company to McGraw-Hill for a rumored $3 million. In September 1979, he founded Brandywine, Inc. with a portion of the proceeds of the book company sale—a very small portion. Company financial statements list his initial outlay as $5000.

Osborne hired Lee Felsenstein, a genius computer designer who had previously designed the Sol-20 and Expander (an updated Sol which was made in only limited quantities). Osborne planned to produce a low cost portable computer with a bundle of applications software included, a strategy used successfully by IBM for years, but one that was not generally being used in the microcomputer market.

The basic design was finished by late 1980, and in December the company hired Thomas E. Davidson to head up manufacturing. In January 1981, the company incorporated as Osborne Computer Corp. (OCC) with $1 million of seed capital from Jack Melchore, a respected venture capitalist in Silicon Valley, and several private investors.

The winter and spring of 1981 were spent in frantic activity trying to build several prototype units to show at the National Computer Conference in May. The introduction was a wild success. The Osborne 1 had 64K of memory, a pair of 100K floppy disk drives, and a 5" screen (24 lines of 52 characters), and weighed 26 pounds. But the thing that really made the system fly was the $1500 worth of software included in the $1795 price.

How could Osborne include so much "free" software? It was not done by mirrors—but almost. Much of the software was received by OCC in exchange for equity. MicroPro International, for example, received 75,000 shares of stock (worth around $130,000 at the time) in return for an unlimited distribution license for *WordStar*. In addition, they received $4.60 for each copy of the program—peanuts against the normal list price.



Press release photo of Adam Osborne announcing the Osborne 1, April 3, 1981.

First shipments were in July 1981, and in the next eight months, OCC shipped 11,000 units and accumulated an order backlog for some 50,000 more. The first units had some bugs that resulted in a 10% to 15% failure rate that cost OCC some $140,000 to correct. Nevertheless, OCC appeared to be highly successful and had certainly captured the attention of the financial community.

To support the strong marketing campaign Osborne felt was needed, the company went back to their investors for another $1.6 million in late 1981. Although the company lost $1.2 million on sales of $5.8 million in the first year, most investors felt this was to be expected. With sales booming, venture capital firms not in on the original financing were knocking at the door for a piece of the action.

In mid-1982, Adam Osborne was predicting annual sales of $250 million and before tax income of nearly $9 million. In March, the company opened an assembly plant in Monmouth Junction, NJ, capable of producing 250 systems a day. The company also began development work on two new computers, a replacement for the Osborne 1, code named the Vixen, and an upper-end unit, the Osborne Executive.

On the inside, things were rosy. A nine-for-one stock dividend was declared. Stock options were granted for 337,000 shares at prices between $4 and $16 per share, and company officers bought another 45,000 shares for $4 each. The company raised $9.9 million by selling 67,000 shares of preferred stock and borrowed $7.5 million from the bank.

In October 1982, OCC announced a holiday promotion in which purchasers would get Ashton-Tate's *dBase II* free with the purchase of an Osborne 1. The promotion was so successful that the company went into two and then three shifts to meet the demand. At its peak, production was running 500 systems a day. Unfortunately, quality control broke down, and warranty problems increased enormously.

The Gathering Storm

While all seemed rosy on the inside, storm clouds were gathering on the outside. Almost unnoticed by Osborne was the introduction of the IBM PC in August 1981. Listening to Adam at the West Coast Computer Faire in March 1982, one would have thought that the entry of IBM into the market was a non-event.

Two months later, in May 1982, the Kaypro II was introduced. This was a direct competitor to the Osborne which had corrected many of the deficiencies that Osborne customers found annoying: the small screen, low capacity disk drives,

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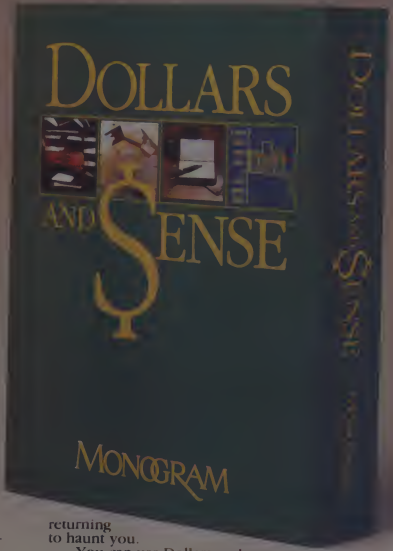

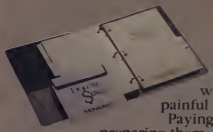

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Newspaper photo of Adam shortly after filing under Chapter 11.

and non-standard printer connections.

Having been relieved of his position as vice president of manufacturing in May, Tom Davidson resigned from OCC in September to join Porter Hurt, whose company was producing PC boards for Osborne. When it became apparent that Hurt's company was planning to introduce a computer in competition with the Osborne (the Access), OCC sued Davidson. The suit was settled a few months later.

By late 1982, the trickle of IBM software had become a flood. Several IBM look-alikes had been announced, and it was well-known in the industry that several IBM-compatible portables were on the way—most notably the Compaq. Yet, OCC was not working in this direction and was having so many problems with the Vixen project that it had to be scrapped in December.

Moreover, the end-of-year financial statements (the FY ended November 27), revealed a $1 million loss on sales of $66.8 million. What happened to the $250 million sales and $9 million profit that Adam was forecasting six months earlier? Adam attributed the shortfall to manufacturing and quality control problems. In December, he refused to discuss any future company plans or projections on the grounds that he had just signed the SEC notification of a public offering.

In January 1983, Osborne wooed Robert Jaunich II from a top executive post at Consolidated Foods. Adam said of the transition, "We are no longer a start-up company. We are a force in the microcomputer revolution. We are now the fastest growing company in the history of Silicon Valley." From then on, Jaunich concentrated on the operations end of the company (manufacturing, financial, and distribution) while Adam continued to orchestrate the marketing.

Trouble Everywhere

A move made in early 1983 was to change the fiscal year to end in February 1983 rather than November 1982. Jaunich wrote investors, "The change allows the Company to focus on sales and customer support during the peak holiday period." He went on, "By making the change before becoming a public company, we make easier communications with analysts and others who normally deal in year-to-year and quarter-to-quarter comparisons." In a lawsuit filed by OCC investors, they attribute a different motive to the change and charge it was made "to circumvent the explicit disclosure of adverse financial information."

The alleged circumvention didn't last long. In April, financial statements for the revised FY showed a $1 million loss on sales of $94 million. In early April, Jaunich reported to investors that "preliminary results for the quarter ended February 26, 1983 indicate revenues of approximately $34 million and profits at approximately break even." But in mid-April, according to financial columnist Dan Dorfman, Donald Waite, OCC chief financial officer informed Jaunich that the company had actually lost $4 million in the previous fiscal year and $1.5 million in the February quarter.

A few days later, Dorfman reports, Waite informed Jaunich of even greater losses: $8 million for the year and $5 million for

KAYPRO

Following in the footsteps of Adam Osborne, Andrew Kay introduced a portable computer about a year after the introduction of the Osborne 1. It was like the Osborne in many respects—portable, 26 pounds, similar $1795 price tag—but it corrected several annoying deficiencies in the Osborne.

Today, some 18 months after its introduction, Kaypro is flying high, but unlike OCC, their success is reflected on the bottom line. In the year ended August 31, 1983, Kaypro earned after-tax profits of $12.9 million on sales of $75.5 million.

The Kaypro II is an Osborne look-alike with an 8-bit mpu running CP/M. However, when IBM started dominating the market for software, Kaypro reacted fast. In October 1983, the company signed a deal with Microsoft to use MS-DOS, the same operating system used by the IBM PC. This system is coupled with a 16-bit processor on a board that can be installed in Kaypro machines. Unfortunately, users cannot easily retrofit existing Kaypros with this board: it must be factory installed. In November, Kaypro reported that this $400 option was being installed in approximately one-third of its new units.

This new system, the Kaypro IV sells for $2195, a price which includes 64K, 7" screen (24 lines of 80 characters), dual disk drives with 800K capacity, in a reasonably compact package. A similarly configured IBM PC retails for about twice as much.

A key difference between Kaypro and some of its competitors is distribution. Kay decided to line up his own network of some 900 independent dealers and avoid using distributors. This means more details of distribution must be handled by Kaypro, but it also means higher profit margins because there is no middleman and faster payment because most dealers pay cash on delivery.

Will Kaypro follow Osborne to the grave, or will they be able to compete successfully with IBM, the true IBM compatibles (Compaq, Hyperion, et al.), and the coming generation of notebook portables?

As the number four microcomputer maker (behind IBM, Apple, and Radio Shack), Kaypro has come a long way in a short time. The Kay brothers, Andrew, Alan, and David, assert that they are professional managers. And they point to a networking system and new smaller machine on the drawing boards. Coupled all of that together, and it looks as though they have as good a shot as anyone still remaining at the top. *—DHA*

David Kay Speaks Out

Ken Uston talked to David Kay, marketing product manager of Kaypro, at Comdex. From the interview, we have culled a few interesting quotes from David Kay.

About Kaypro and IBM: "The long-range strategy of Kaypro is to market a low cost computer in a world that is threatened by the high-priced, heavy hand of IBM, who is trying to confuse everybody, who is trying to put a shadow over the whole industry. They promote the shakeout as much as they possibly can; it all plays into their hands."

About Osborne: "He abandoned the market that he started. He was the guy giving people a fair deal, the guy standing up against IBM, but then he came out with a product (Osborne Executive) that was worth $1595 and he tried to sell it for $2495."

About the PCjr: "Frankly, the Commodore 64 is a far better computer, but the PCjr is slick looking and it has IBM's name on it. Even so, I don't think there is a market for it."

About Japan, Inc.: "You're going to start seeing products from the Japanese that can do twice as much for half the money, and have better reliability (than the U.S. machines)."

About Apple: "They better come up with something new pretty quickly, and it better be good."

About Microsoft *Windows*: "It will be great when the screen is as big as your desktop. Now, it is a nice, high-tech, exciting thing for people in the industry, but the public could give a darn." *—DHA*

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Osborne, continued...

the quarter. According to Melchore, much of this was as a result of the requirements of company auditors that reserves be set aside to account for losses due to the premature announcement of a new computer. As a result, the officers and investment bankers scrapped plans for the public offering.

A premature announcement? Well, not exactly. To give the jazzy $2495 Osborne Executive a running start, Adam began orchestrating publicity early in 1983. We, along with many other magazines, were shown the machine in locked hotel rooms. We were required not to have anything in print about it until the planned release date in mid-April. As far as we know, nothing did appear in print, but dealers heard about the plans and cancelled orders for the Osborne 1 in droves.

In early April, Osborne told dealers he would be showing them the machine on a one-week tour the week of April 17, and emphasized that the new machine was not a competitor for the Osborne 1. But dealers didn't react the way Osborne expected; said Osborne, "All of them just cancelled their orders for the Osborne 1."

Osborne reacted by drastically cutting prices on the Osborne 1 in an effort to stimulate cash flow. But nothing seemed to work, and for several months sales were practically non-existent.

Investors, on the other hand were still lined up at the door, although perhaps not as eagerly as a year earlier. Nevertheless, the original venture partners anted up another $9 million in April, and still another $11 million in June. Weeks later, however, the firm was unable to raise yet $20 million more, the amount it considered necessary to speed its IBM-compatible product from drawing board to market.

On July 27, OCC announced it was slashing the suggested retail price of the Osborne 1 from $1995 to $1295; by August, our Street Price Index showed prices in the $900 range. By this time, desperation was the watchword.

On August 2, the New Jersey plant was shut down and 89 workers were laid off. At the time, Osborne was quoted as saying, "What's happening is we're seeing some summer softening." The two-man Hong Kong office was closed and Osborne commented, "We're looking very, very carefully at manpower loadings."

The very careful look resulted in the dismissal of 200 workers from the Hayward, CA, facility a few days later. And by the end of the month, Adam Osborne was making personal appearances at one-day sales where the Osborne 1 was selling for $995 and the Executive for $1995.

But it wasn't enough. In early September, banks had seized the company's accounts receivable. On September 9, the company dismissed 270 more workers and closed the Hayward production facility, leaving just 80 employees on the payroll. Three days later, on September 12, Porter Hurt filed suit for the $4.5 million owed his firms for PC boards.

A day later, OCC filed for Chapter 11 protection in Oakland, CA, federal bankruptcy court, listing assets of $40 million, liabilities of $45 million, and 600 creditors.

On September 22, a group of 24 investors filed suit against OCC and several individuals for $8.5 million in damages, accusing OCC and its auditors of masking OCC's true financial condition while the company was seeking private financing earlier in the year. Another allegation made in the suit is that several unidentified OCC directors sold stock "on the basis of inside information." This seems particularly aimed at Seymour Rubinstein and MicroPro International who sold 7500 shares in March.

Of the allegation, Rubinstein says, "Actually, I didn't know anything." He revealed that he sold some of his stock to cover his 1982 tax bill—"and just barely enough to cover it," he says. "I still hold more than half my original purchase."

He is lucky to have sold half. Jack Melchore and the firms he advises invested $3.25 million in OCC; Thomas Unterberg put in $1.1 million; Sanford Robertson, $1 million; Ben Rosen, $400,000; William Egan, $1.8 million; and so it goes.

How much did Adam Osborne himself lose? Apparently very little. He still lives in a comfortable home in the hills over Berkeley where he is writing a science fiction novel and making plans for a new venture. What venture? He is not saying, but he hinted to a *Wall Street Journal* reporter, "It's the kind of thing that a year from now, when people look at it, they'll scratch their heads and say, 'Why didn't I think of that?' "

COMPUTERDEVICES

Computer Devices, a ten-year-old manufacturer of printing terminals, introduced the DOT portable computer at the National Computer Conference in May 1982, just one year after the Osborne was introduced. It was an innovative machine with 5" x 9" screen, Sony 3 1/2" disk drives, built-in printer, and IBM compatibility. Perhaps it was too innovative.

The problem, as we noted in our review, is that even though it uses a standard operating system (MS-DOS) and is IBM compatible, software must be converted to the 3 1/2" disk format. Furthermore, the built-in thermal printer can handle only roll paper, fine for casual work, but unacceptable for correspondence and formal memos.

As a result of these problems, coupled with some production glitches, orders have been sluggish. Thus, in September, the company announced it was seeking a partner to make an equity investment or take over the firm. With a first half net loss of $5.1 million on sales of $11.4 million, not many investors were interested, and at last report, Computer Devices was attempting to reorganize under the protection of Chapter 11. —*DHA*

Actrix

Who is this Porter Hurt who finally filed the suit that forced Osborne Computer Corp. to file for protection under Chapter 11?

He is not a bright young techie like so many other entrepreneurs in Silicon Valley. He never went to college and didn't fool around with electronics as a youngster. He got into electronics in 1968 as a stockboy for an electronics distributor. At the time his wife was pregnant and unemployed so he took his paycheck—all of it—and played "rocks"—dead serious poker for living money.

He worked his way up through the distributor to sales manager and then struck out on his own. He speculated on real estate and won big. With the proceeds, he started two other companies (Testology and PH Components) which produce and test circuit boards for computers of other manufacturers (such as Osborne).

In June 1982, he bought 80% of Access Matrix (now, Actrix) with $2.1 million that he had raised from the sale of real estate. Actrix produces the Access computer, a portable similar to the Osborne, but with a printer and telephone modem built in.

Will the Access succeed where others have failed? Certainly the failure of Osborne has left a pall over the entire industry. Osborne's collapse, says Hurt, "really hurt the small manufacturers as far as credibility in the marketplace is concerned"—not to mention the more direct wound to his two companies which lost $4.5 million and had to lay off 300 people.

Lately, according to Editor-at-Large Ken Uston, Hurt feels optimistic. Although Actrix is operating at a loss, he feels that the recent introduction of a board that will let the Access run 60% of the IBM PC programs will help, and he says that the first Actrix television ad is getting good results.

In an October *Wall Street Journal* article, Hurt is quoted as saying, "I assure you, when the big shakeout occurs, Actrix will still be around. Why? Because I'm a winner...I'm a survivor." —*DHA*

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TEXAS INSTRUMENTS

David H. Ahl

Introduced in late 1979 at $1150, the TI 99/4 was vastly overpriced, particularly considering its strange keyboard, non-standard Basic, and lack of software. Over the years, TI changed the product only slightly (substituted a full-stroke keyboard, still with too few keys), but lowered the price greatly.

A joke went around the industry that TI was losing money on every computer it sold, but was making it up in volume. And at the January '83 Consumer Electronics Show, TI spokesman Bill Cosby joked about the rebate then in effect pointing out how easy it was to get people to buy a computer if you paid them $100 to do it. The funny—and sad—thing is: neither one was a joke.

When they entered the market in 1979, TI was far bigger than any of the other players (they are still bigger than most). They had the enormous advantage of vertical integration from manufacture of chips right through to end user marketing. What, then, went wrong?

Three Mistakes

TI made three major mistakes, no one of which by itself would have been disastrous but piled upon one another, spelled doom. The mistakes were product, software, and pricing.

The first mistake was the product itself. The 99/4 had a calculator-style keyboard which did not permit touch typing, hence word processing, an important application of personal computers, was ruled out. The computer was a manageable size—almost stylish—until you started adding peripherals, each one of which plugged into the left side of the previous one. A fully configured system was a yard or more wide—hardly convenient for desktop use.

It wasn't until nearly two years later that TI offered an all-in-one interface box and replaced the keyboard with a full-stroke unit. Unfortunately, it still had too few keys for serious word processing and did not conform to a standard typewriter layout. Interfacing was still complicated and costly, and the 99/4 (and successor 99/4A) could not easily utilize peripherals manufactured by other companies. Moreover, the 99/4A was becoming dated by 1981, yet TI showed no signs of introducing a truly new machine

The second major mistake TI made was in trying to keep the software and peripheral market to itself. Certainly, this strategy has many precedents in other industries—razor blades, records, etc.—but the history of the personal computer field was pointing in quite the opposite direction.

The successful computers, even back in 1980, were those that had the most software and peripherals available. Furthermore, software came from many sources—a single company could not hope to produce everything that users wanted.

The second major mistake TI made was in trying to keep the software and peripheral market to itself.

But TI seemed to think they could succeed where others had failed. They did not license Microsoft Basic, *VisiCalc*, *WordStar*, or any popular games. Nor did they put enough effort into developing their own software. And when other vendors tried to introduce packages for the 99/4A, TI actively discouraged them with both legal delays and hardware "locks."

TI's third, and probably most disastrous mistake, was in pricing.

Initially, TI tried to sell the 99/4 with a high quality monitor for $1150. However, home users expected to use their own TV sets, so TI backed down and made available

J. Fred Bucy, president and CEO of Texas Instruments, was behind the hard decision to get out of the home computer market.

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an RF modulator. Thus, in 1980, the price for a 99/4 alone was about $700, high, but not totally out of line.

As newer machines were introduced, the performance per dollar of the 99/4 started to look worse and worse. Hence, in 1981, TI lowered the suggested retail price of the 99/4 to $550, and then to $450. Thus began a new marketing strategy which rocked the industry with a ruinous price war.

By April 1982, the price of the 99/4 had dropped to just under $400. Responding to the introduction of the Commodore Vic 20 in August (suggested price $300), TI lowered the wholesale price of the 99/4 and offered customers a $100 rebate, thus bringing the street price to about $200.

By December, the Vic was also under $200, but then, on January 10, Commodore announced still another price cut bringing the wholesale price to about $130. A month later, TI reacted by slashing $48 from the dealer price of the 99/4A bringing the retail price to about $150.

Unfortunately, the crucial factor of which TI seemed to lose sight, was that the Vic was a state-of-the-art machine and was much cheaper to produce than the 99/4. As Harry Fox, president of SpectraVideo observed, "'TI got suckered by Jack," referring to Commodore president Jack Trameil.

On April 4, 1983, Commodore dropped the big bomb with a round of wholesale

John Roach, chairman of Radio Shack said that in the long run TI's withdrawal would be "a positive thing" for the market.

cost reductions on peripherals and software that permitted dealers to advertise Vic prices under $100 in bundled systems. TI peripherals are very pricey, so to respond to this latest move by Commodore, TI offered a new round of wholesale pricing and rebates to bring the price of the 99/4A to under $100. By this time, TI probably was losing money on every unit sold.

Aggravating the downward pressure on profits, in the first quarter of 1983, TI had to withdraw the 99/4A from the market for about a month to correct a potential shock hazard. Inventories swelled because production continued (at a rate of three million units per year) while sales halted. When the product reappeared, it never regained the previous sales momentum.

To try to get back on course, TI announced, on May 23, the giveaway of a $249 expansion box with the purchase of three peripherals. Response to this among retailers was mixed because traditionally, profit margins are much higher in the after market (peripherals and software) than on the basic computer consoles.

By this time, TI was substituting price cutting for all other forms of marketing. On August 18, the prices of most peripherals were slashed by about 50%. In addition, TI said it would provide a free $100 software package with each expanded system.

A month later, software prices were cut across the board by up to 43%, but even that didn't do the trick.

Finally, the last week in October, TI announced it was withdrawing from the home computer market. The rebate program was terminated, but a price cut to dealers was made which permitted even lower end user prices—as low as $49 in many areas.

The Final Blow

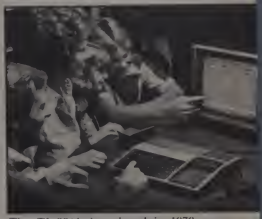
The handwriting was already on the wall in 1982 when TI responded to market pressures by price cutting instead of maintaining margins, losing a few percentage points of market share, and then releasing a new state-of-the-art computer.

Unfortunately, one of the new computers TI developed was too little and too late. Dubbed the 99/2, it was a low end unit with rubberized keys. It was first unveiled in January 1983 and was slated to sell for $99. However, by April, the price of the 99/4A was down almost as low, so the 99/2 was scrapped.

An upper level machine, the 99/8, was shown behind closed doors at the June '83 CES, but, for some reason, was not officially introduced. Very little information leaked out about the 99/8; it was said to have a built-in mass memory device and integral voice synthesis, but it is not known whether it corrected the major deficiencies of the 99/4A (keyboard, interfacing, software incompatibility). It was said to have a wholesale price around $200. Obviously, TI did not think it could compete profitably in the market, or it probably would have been introduced.

As recently as the middle of September, according to a *Wall Street Journal* article, retailers and industry sources were sharply divided over whether TI could regain momentum as the Christmas season neared. Given the production problems of Coleco and Atari, and the delay of the IBM PCjr until 1984, many retailers thought TI was in a good position to unload their excess inventory of 150,000 units and rebuild market position.

On the other hand, some felt that there was no future for TI as long as they stayed with the 99/4A. As David Seuss, president of Spinnaker Software said, "The TI is very limited in power, extraordinarily expensive to expand, and they have the worst software in the business."



The TI 99/4, introduced in 1979, was over-priced and had a horrible keyboard.

Following a $330 million operating loss in the third quarter of 1983, TI apparently also felt there was little future with their existing product, and announced their withdrawal from the field. Interestingly, TI has continued advertising the 99/4A and is attempting to maintain good relations with their large, painstakingly built dealer network. This is understandable, as many of these dealers also handle other TI consumer products such as educational devices (Speak 'N Spell, etc.), calculators, and the CC-40.

Where To Now?

For nearly half of the employees in Lubbock, the demise of the 99/4A marks the beginning of a job search. Top executives have been bailing out for the past six months or so—Bill Turner to ADP, Herb Shanzer to Data General, and Peter Field to TI's corporate marketing group.

The consumer group will continue with calculators, educational devices, and the CC-40. The company emphasized that the decision to drop out of the home computer market would have no effect on the Professional Computer program. Indeed, TI is expected to introduce a portable model of the Pro before long.

Obviously, the fire sale is affecting other computer manufacturers, as consumers snap up the remaining 99/4As at bargain basement prices. The few manufacturers of peripherals for the 99/4A are finding they must also cut prices to clear out their inventories.

John Roach, chairman of Radio Shack said that in the long run TI's withdrawal would be "a positive thing" for the market. Perhaps so. At least the price war is over—for the time being—and manufacturers can get back to the business of competing on the merits of their products. ■

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MATTEL ELECTRONICS

David H. Ahl

As a toy company, Mattel has an enviable history. First there was the Barbie doll. Then Hot Wheels. Then Intellivision. Intellivision?

Sure, Intellivision. When it was first introduced in 1979, retailers ate up the systems. As a result, profits, except in 1981, climbed steadily.

Ironically, Mattel never intended to get into the hardware business. The original plan was to design games to run on video game systems that would be manufactured by someone else. Mattel wanted to make the blades, not the razors. But the toy maker failed to convince its would-be partners to make the hardware, so Mattel finally decided to go it alone.

Outlook

Despite the problems plaguing the Mattel Electronics division and the generally disappointing performance of Mattel Toys, said Weston Publishing, the company expects Mattel Electronics will operate at a profit for the second half of the fiscal year, and the company will achieve a net loss for the full fiscal year ending January 27, 1984.

From the Mattel report to shareholders issued in the fall of 1983.

The first Intellivision system was well-received. It had better resolution than the competing Atari VCS and a comprehensive lineup of games. Had it not been for the horrible controller, the system might have done even better. Nevertheless, retailers fought for Intellivision systems at a wholesale price of more than $200 when Mattel could have sold the systems for $100.

Flushed with their success, Mattel announced a keyboard unit to turn the basic Intellivision system into a computer. The original announced price in 1980 for the keyboard unit was $700. It was test marketed in four cities and didn't do well for several reasons. First, Intellivision systems were mainly being sold through department stores and mass merchandisers, neither of which was prepared to demonstrate a computer, particularly in 1980. Second, the price, although in line with other computers at the time, was a big jump up from the typical $269 price of the basic game system. Third, and most damaging, the keyboard units were unreliable.

Over the next 18 months, Mattel redesigned and re-announced the keyboard unit at three successive Consumer Electronics Shows. But none of these reincarnations ever got past the test marketing stage.

Golden Days

Although the keyboard unit never got off the ground, Mattel Electronics was doing very well. The contribution to corporate profits from the electronics division jumped from 10% to 51% in just two years.

In 1982, Mattel went on a hiring binge, and the electronics division, by now practically a separate company, swelled from about 100 employees to more than 1000 in a little over a year.

The new employees were set to work designing a sleek, new Intellivision III system; a low-priced computer, the Aquarius; and games for competitors' systems (Atari, Coleco, and various computers).

The results of these efforts were first shown at the Winter Consumer Electronics Show in January 1983. Intellivision III was shown to selected dealers and employees (we reported that it had a resolution of 320 x 192 pixels, up to 64 moving objects, and built-in stereo sound, and could be easily converted to a computer). Unfortunately, it was only a prototype, and dealers had to settle for the existing Intellivision II.

Unfortunately also, the Aquarius Computer was not up to the same standards. With a rubberized Chiclet keyboard, no spacebar, and just 4K of memory, it was unrealistically priced at $200 retail. It was too little, and too late.

Many of the games for systems of other manufacturers were good, but they were introduced at exactly the time the video games industry started into the doldrums.

From Boom To Bust

Aquarius was finally rolled out in April in four cities—Chicago, Detroit, Los Angeles, and Atlanta—at an average street price of $150. Even so, that was $50 or so above competing units such as the Vic 20 and TI 99/4A, and sales were sluggish. (By November the street price had dropped to around $59, realistic in view of the capabilities of the product and the competition.) Intellivision II was also under fire from the standpoint of pricing.

Starting in July, the announcements from Mattel Electronics started taking a more ominous tone. In early July, 260 employees were laid off. A month later, 400 more employees were dropped, making the total reduction some 37% of the division. Moreover, the top management of the division was dismissed.

A few weeks later on August 22, Mattel slashed the wholesale price of the Intellivision II system from $149 to $89 and offered a free cartridge with every system. In addition, they reportedly offered a free voice synthesizer to some retailers.

The layoffs and price reductions were bad news, but the financial news was a disaster. Sales in the second quarter of 1983 were $3.5 million compared to $24.9 million in the like period a year earlier.

In early September, the company announced a loss from the electronics division of $166.7 million in the first six months of 1983. In December, the loss for the first nine months was reported as $229.3 million, or 25% more than the total operating income for the division over the past four years.

Moreover, the corporate loss brought on by the electronics division forced Mattel to omit the regular quarterly common dividend scheduled for November.

Aggravating the problems, both Moody's and Standard and Poor's lowered their ratings on Mattel convertible debentures, thus making it more costly for Mattel to raise equity capital in the future.

Where To Now?

There is no absence of speculation on the next step. The doomsayers have Mattel leaving electronics altogether. Some industry executives think this would be the best course as it would result in a slimmed down, but profitable toy company.

On the other hand, a company spokesman points out that Mattel still maintains a large staff of software development people and that Mattel Electronics "clearly" has a future.

Either way, Mattel will never be the same again. But perhaps this misadventure is more consistent with CEO Arthur S. Spear's approach to running the company than it might seem. After all, in the past decade, in the name of diversification, Mattel has bought, and then sold, a circus, ice shows, a pet supply manufacturer, and a movie-production business. Even today, it is trying to sell a publisher of children's books it bought just three years ago. Anyone for an electronics company? ■

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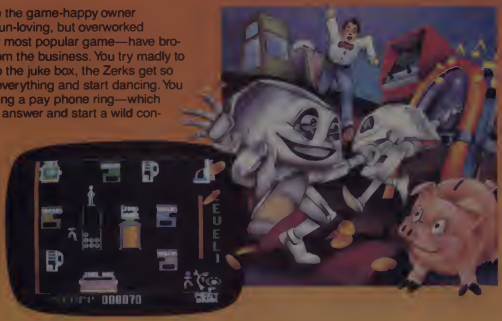

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digital

David H. Ahl

Digital Equipment Corporation, DEC for short, was founded by Ken Olsen and several other MIT-trained engineers in 1957. Funded with $70,000 in seed capital from American Research and Development Corporation, DEC has been a darling of the stock market since it went public in 1966—and with good reason.

Its return on sales has never been less than 10%, and earnings have been on a steep upward path for 12 of the past 13 years. Unfortunately, the year DEC missed was FY 1982. Net earnings dropped a whopping 32% to $284 million, and return on sales was 8.5%, the lowest ever. The stock sank to $65 a share from $132 last April. What went wrong?

DEC cites a number of factors—a massive foul-up in order processing, administrative problems resulting from a year-long reorganization, and sluggish sales of its three microcomputers.

Sluggish is right! DEC does not reveal production or sales figures, but an analyst at Shearson estimates that DEC manufactured 35,000 personal computers last quarter but shipped only 19,000. While to many manufacturers, this is a number to be envied, to DEC it is less than 6% of corporate revenues, and, more important, it is a fraction of the volume being sold by IBM. Egil Juliussen of Future Computing estimates that IBM is outselling DEC by more than ten to one.

(In an uncharacteristic move, Olsen revealed in November that sales of DEC personal computers in the first nine months of 1983 totaled 69,000 units, just slightly more than the independent estimates.)

People Don't Need Their Own Computer

How did this nimble, street smart company get in such a position? The easy answer is that, like many companies that started small, grew fast, and became giants, DEC's CEO, Ken Olsen was unable to make the switch from entrepreneur to professional manager. But that answer doesn't hold much water considering that under Olsen's direction, DEC somehow managed to grow to over $4 billion while many other mini and mainframe manufacturers were left in its dust.

The real answer is that DEC's decision-making process is incredibly conservative and follows the tradition that any decision worth making is worth making ten times. Thus, when Dick Clayton's advanced development group presented two prototype personal computers to the operations committee in May 1974 (long before there was an Altair!), the committee was divided and the decision as to whether to proceed was left to Olsen. At the time, timesharing was the rage and telephone rates were low, so Olsen's reaction was that he couldn't see any reason why a person would want his own computer when he could have easy access to a PDP-10 (a powerful timesharing system).

Under Olsen's direction, DEC grew to over $4 billion leaving both mainframe and minicomputer competitors in its dust.

DEC refused to furnish photos of Ken Olsen or any other managers unless we furnished our story to them for approval. We didn't and they didn't.

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Until recently, DEC was structured around some 18 semiautonomous business units known as product lines, although some were market-oriented groups, such as the education product line. Thus, the killing of Clayton's personal computer project didn't prevent others from springing up. Three years later, about the time the Apple was announced, another personal computer prototype was developed by Bill Turner's group, and met, unfortunately, the same fate as the earlier effort.

How many people know that DEC is the second largest computer maker behind industry leader IBM?

Olsen sees DEC as an industrial supplier rather than a consumer marketer. The company builds high quality machines and believes that sophisticated customers will eventually see their merits and buy them in large quantities. In the minicomputer industry, this is known as "pumping iron," and, indeed, the road by DEC's Marboro facility was renamed Iron Way when DEC moved in.

So when Olsen finally conceded that the company should go ahead with a personal computer, it was industrial users he had in mind as the major customers. He believed that the Professional machine ($8500 plus), derived from the 16-bit PDP-11 series, would be the big seller. However, it was released with a minimum of software and fell flat on its face in the market.

The midrange DECmate II (around $4500) is a repackaged version of DEC's PDP-8 based word processing system which allows the machine to be programmed (the word processor can't be). It bears an uncanny resemblance to one of the 1974 prototypes, which shows how product groups manage to keep things alive. That it is selling at all is testimony to its solid design; on the other hand, its price/performance is not up to the level of today's latest entries.

Of the three DEC entries, the only new design is that of the Rainbow 100 ($3500 plus), and its sales are dramatically ahead of its two big brothers. It is able to run both CP/M and MS-DOS (see review in *Creative Computing*, November 1982, and 1984 *Buyer's Guide*). Although DEC contacted outside software vendors to convert packages to the Rainbow, the process of dealing with DEC was so cumbersome, that many vendors decided to focus on other machines first. Finally, today, a year after the scheduled delivery date, the Rainbow 100 is on dealer shelves with a reasonable selection of software. Frequently, it stays on the shelf. Why?

It Takes Marketing Too

DEC has never been a marketing-oriented company. All too often, advertising was placed by individual product lines and not by the corporation centrally. As a result, DEC is hardly a household word. Olsen, incidentally, insists on referring to the company as Digital, despite the fact that both customers and insiders alike refer to it as DEC.

How many people know that DEC is the second largest computer maker behind industry leader IBM? Fewer than one in ten according to one study. Yet in the past, campaigns to build company image got little support from the product line managers.

Since these managers were judged on the performance of their products, they were reluctant to divert a portion of their product marketing dollars to corporate advertising programs. As a result of this coupled with the furious infighting among product line managers for the backing of the centralized engineering and manufacturing departments, Olsen wiped out most of the product line system in one bold stroke. But problems remain. As recently as November, Win Hindle, vice president of administration, was looking into ways of more effectively integrating the engineering, manufacturing, sales, and marketing functions. Given the size of the company, it would be unreasonable to expect results overnight.

One of the most ridiculous marketing decisions with respect to the line of personal computers was that of distribution. In September 1982, Andrew Knowles, then the vice president of the personal computers and terminals group, told us that the personal computers would be sold through several outlets: independent retailers, industrial distributors like Hamilton/Avnet, DEC's own Digital Business Centers, and by a direct sales force to large customers. It sounded like a thorough approach.

A few months later, however, DEC decided it was having trouble positioning the three products so it would solve the problem by distributing them through different outlets. Digital Business Centers got the DECmate, independent retailers got the Rainbow (and Pro if they wanted it—most didn't), and the industrial distributors got the Pro. One problem: the ads showed all three machines and didn't tell the customer where to go for what. The result was massive confusion and lost sales.

Getting Their Act Together

Digital Business Centers can now sell all three computers and DEC is now throwing in one year of free service on the customer's premises in an effort to stimulate sales. DEC sees little risk in this offer as its products are over-engineered and reliable. On an optimistic note, Olsen recently said, "We believe that more and more people are beginning to realize the importance of quality and ergonomics." But whether all of this is too little and too late is something we won't know until well into 1984.

Olsen feels that "this first round of personal computers is not the important one. The major contest will be the 32-bit machine." In this arena, DEC seems to be taking an early lead with its MicroVAX, a system slated for first shipments in March 1984. Unfortunately, DEC has not met its product release dates on 75% of the products released in the last ten years, so March is probably optimistic.

Recognizing that it will take more than a new 32-bit machine to be successful in the personal computer market, Olsen has appointed Ed Kramer, corporate marketing vice president, to oversee four task forces in the areas of personal computer marketing, sales, administration, and engineering. A company spokesman acknowledged that they were formed "to identify the personal computer group's problem areas and to implement corrections."

Olsen feels that "this first round of personal computers is not the important one. The major contest will be the 32-bit machine."

We talked to several former top DEC executives—more have left in the past year than in any other—and almost all were disgruntled about the marketing, or lack of it, at DEC. One complained that "Ken (Olsen) would rather print 10,000 handbooks than run a page of advertising." But all had great respect for Ken and felt that eventually he would see the need for more aggressive marketing. When is "eventually?" No one was saying. ■

apple computer

Stephen Arrants

For years, Apple Computer was viewed as the brightest kid on the block. Started in a garage, it has joined the Fortune 500 in just a few short years. Life seemed easy for Apple. The Apple II was hailed as a revolutionary product. The dealer base and user base were expanding, and large amounts of software were being written for the II series. Apple, it seemed, had an industry virtually to itself.

In the third quarter of 1983, faced with a highly volatile market and heavy competition—most notably from IBM—Apple posted the first quarterly profit decline from a previous year. Fourth quarter earnings dropped a whopping 73% to $5.1 million (eight cents a share) from $18.7 million (32 cents a share). Apple stock has been hard hit also. Traded at $65.25 in June of '83, at press time it hovered around $22 a share. What went wrong?

Problems

Apple's first major setback occurred with the introduction of the Apple III. Designed as a business machine (as opposed to the II which was unabashedly a "personal" computer) for competition in part with the IBM PC, the III was beleaguered from birth. There were technical problems: Some units had IC chips that worked their way out of sockets when overheated. Using the III in Apple II emulation proved more of a problem than expected. The SOS operating system was difficult to use because Apple was slow to release technical information.

Apple overcame these problems, but the III never really recovered. Although it is an excellent machine and the machine of choice among Apple employees, the III accounts for only a small amount of Apple's total sales.

By 1982 the Apple II+ was growing old. It offered a 40-column display, 48K RAM, only uppercase characters, and an 8-bit CPU, and it was not MS-DOS compatible. The price performance ratio of the machine was falling rapidly behind other machines. The recently introduced IIe was designed to address some of these problems, and Rana Systems had introduced an MS-DOS coprocessor for the IIe. Instead of bucking the tide of IBM PC compatibility it seems that Apple is tacitly going with the flow while continuing to offer the classic Apple for aficionados.

Lisa, long heralded as the next step in microcomputing, was expensive ($9995) when first introduced in February 1983 and had relatively little software. The fact that Apple allowed more than six months to elapse between the announcement of the product and first shipments also hurt sales. It may have captured the world's imagination, but as John Sculley said, "IBM captured corporate America's desktops." Lisa offers "windowed" software, which allows users to call different programs from within one another.

The new blood and a founder — John Sculley and Steve Jobs of Apple Computer.

Steve Jobs, Apple's chairman, stated that Lisa would be a phenomenal success its first year. It wasn't.

Steve Jobs, Apple's chairman, stated that Lisa would be a phenomenal success its first year. It wasn't. Industry estimates of sales ranged from 10,000 to 50,000 during 1983. One research firm, InfoCorp, estimates that only about 15,000 units have been shipped.

Lisa was virtually a machine unto itself. Initially, it ran only under its own operating system. Apple has since made it MS-DOS compatible, although at a sacrifice of some of the integrated software features. The price has dropped to $8190 with software and to $6995 for a software-free Lisa. Why the re-packaging?

At first glance this might appear to be poor judgment. After all, what can you

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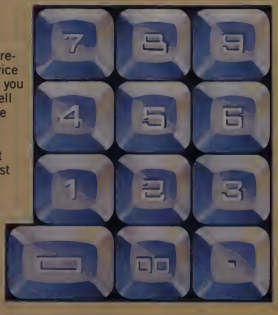

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do without software? The move makes more sense if you realize that small business users—who often don't need and won't pay for all of the Lisa software—make up the bulk of the Lisa market. Small business users prefer to adapt Lisa to their own applications. Apple's initial target market was Fortune 1000 companies. Recently, however, the company has seen the potential in the small business market.

Most other manufacturers—notably IBM—sell hardware, software, and peripherals separately, allowing dealers to assemble packages if they desire. Since a bundled Lisa looked more expensive than competing products in the store, customers balked. Now, it should be more competitive. Moreover, new software from independent sources will allow Lisa to do more at lower costs; there are now more than 165 companies developing Lisa software.

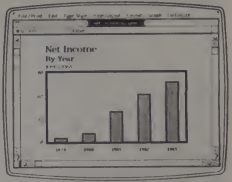
Lisa was also a stand-alone unit. It couldn't communicate with other machines, such as PCs, Apple IIs, minis, and mainframes.

Still, another problem looms on the horizon. VisiCorp, Microsoft, Digital Research, and other companies have developed Lisa-like software, which allows other computers to perform like Lisas.

Lisa's Little Brother

Coming on the heels of the Lisa disappointment is the Macintosh, or Apple 32. If Apple is to remain a major force in microcomputing, many analysts believe that Macintosh *must* be a success. It must not only be a viable product, but Apple must be successful in selling it. As important as the Apple III and Lisa were to have been, Apple survived both of these setbacks. What, then, has Apple learned?

First, production of the Macintosh has already begun—well before the release date. Second, Apple has actively involved software developers—approximately 100 of them—for the past 18 months. A large and varied body of software should be available at the time the machine reaches dealer shelves.



Net income of Apple Computer as shown on a Lisa screen.

Apple wouldn't comment on the Macintosh at press time, but some observers estimate that it hopes to sell 200,000 to 500,000 units in the first year.

Macintosh looks impressive. Everyone

The Problems of Being Popular

David H. Ahl

Being the most popular kid on the block has its problems as well as its rewards. Everyone wants to be your friend, but sometimes, even the best of friends will stab you in the back. Moreover, everyone wants to be just like you—if you wear an oversize chamois shirt today, tomorrow everyone else will have one. Unless you keep on innovating and doing new things, you will not be the popular leader for long.

Apple was in much this sort of position. The Apple was the first widely popular computer, and so it attracted the most imitators. During the first years of the Apple II, it had some nice features lacking in the Pet, TRS-80 Model I, Sol-20, and Bally Arcade. Its popularity soared—so much that every fabricator in Hong Kong, Taiwan, Singapore, and Korea started turning out Apple clones. Since all the R&D expense had been borne by Apple and since labor is cheap in the far east, these companies could sell machines at a much lower price, and still make a profit. Apple, of course, went to battle—through the courts of these countries as well as in the U.S.—and stemmed the tide somewhat. But for each company stopped, another sprang up to take its place. As Steve Wozniak said, "I found it takes just two things to start a company—a lawyer and a Xerox machine."

As if the foreign imitators weren't enough of a headache, along came Franklin Computer Corporation, a U.S. company, with a not-quite-imitation that looked different, but ran Apple software. A "workalike" they called it. A new design that didn't infringe on any Apple patents they said. Apple filed suit, but as recently as July 1983, Franklin was reassuring potential customers that the courts would find in their favor.

They didn't. In perhaps the most significant computer copyright decision yet, the Third Circuit Court of Appeals ruled that literary works "are not confined to literature in the nature of Hemingway's *For Whom the Bell Tolls*." In other words, operating systems can be copyrighted. Furthermore, the court said that even programs imbedded in the hardware, etched on a ROM chip, can be protected by copyright.

Reinforcing this decision, the Supreme Court ruled in October 1983, in a case between Bally and Arctic, that both the audiovisual effects and the computer chips that generate them are covered by copyright.

Although these rulings seem to close the door—at least the legal one—on bogus copies from the Far East, keeping them out of the marketplace is another matter entirely. Fake Apple and IBM computers are still being made in Taiwan and shipped throughout the Far East. And in an Apple imitator case in Australia, Judge Bryan Beaumont recently ruled that software is not eligible for copyright protection under Australian law

Even in the U.S., some fundamental issues of patents versus copyrights still must be addressed. A patent is issued on a "utilitarian object," i.e., something that is useless unless merged with other parts to form a working machine. A copyright is issued to an expression of an idea or a set of instructions. Clearly, programs in ROM are both. Yet when does the code become an essential part of the machine, passing from a copyrighted object into a patented one? If it can be read only by a machine, is it, therefore, ineligible for copyright protection? Or, if copyrighted on paper, can it later be protected under copyright when burned into the ROM chips, i.e., when merged into and made an integral part of the hardware?

And what about the question of infringement? Code can be re-written in a way that makes it look different while it runs essentially the same. How will the copyright office and the courts handle these problems?

It seems that struggling through the legal morass is no easier than writing the machine code in question. For now, though, it looks as though legitimate manufacturers can turn their energies to competition against each other and wait for the courts to issue rulings on this new and vexing area of copyright infringement. ■

who has seen the computer gives it praise and high marks. But technology itself may not be enough to sell a machine—especially in today's market. Traditional marketing methods are becoming more important; elegant technology matters less than airing more commercials during prime time.

There are two important questions about Macintosh. First, will it undermine sales of Lisa, since it essentially does what Lisa does at a lower cost; and second, will it cannibalize IIe sales? Macintosh probably will not hurt Lisa sales in the long run. True, it does look like a low-end Lisa, but Lisa can do more and has more expansion capability. Nor is it likely to harm sales of the IIe since Macintosh is not designed as a home machine. It can't use proDOS or DOS 3.3 based software, does not support a color display, and most important, is not being marketed by the Personal Computer Division.

Apple has cut costs, centralized manufacturing and marketing, and is turning itself into an aggressive marketer.

A New Strategy

In the face of all this, Apple has cut costs, centralized manufacturing and marketing, and is turning itself into an aggressive marketer. To do this, the company has hired John Sculley, former president of PepsiCo. Sculley is a marketer with few peers. His success at PepsiCo. was based on three things—discipline, focus, and a finely-tuned marketing strategy—all attributes that are badly needed at Apple, which until recently, was blinded by success. Amid all the accolades, the few mistakes and setbacks were little noticed. Failure to recognize one's errors in today's market is fatal, however.

Sculley stopped production of disk drives at Apple, relying instead on outside manufacturers. Apple will concentrate on what it does best, producing computers. He is positioning Apple directly against IBM, playing on Apple's reputation as a high-tech computer manufacturer and exploiting its cult status.

During 1984 Apple will spend over $50 million on television advertising, as well as entry into non-traditional (non-computer) print media. By now you have probably seen at least one of the new television spots. They are well done, and reaction from both dealers and customers has been good. These "Apple People" spots show Sculley's touch. Young, smart professionals playing basketball or riding bicycles occupy most of the commercial time. An Apple product is mentioned only at the end; as he did with the advertising for Pepsi, Sculley is not promoting a product as much as a life-style.

Sculley is also focusing on Apple's internal problems. Management meetings are now held once a week, as opposed to the previous once a quarter. He is trying to mend fences with dealers. Sculley himself has appeared in videotapes for dealers explaining the directions and policies that Apple will follow in the future. Dealers no longer need to rely on gossip and rumor about Apple; they are now seen as an integral part of Apple's future sales strategy.

Apple also hired John Cavalier, formerly president of the Atari products management division to head up the Personal Computer (Apple IIe and III) division. This function was previously handled by Sculley, who began the redirection in August 1983 when business sales were flagging. His response was to bundle the Apple IIe with games and educational software and peripherals. This reflects Apple's plans to add new products to the II line and to re-position Apple in the home computer market.

Perhaps the most significant move was Steve Wozniak's return to Apple. Wozniak is now in charge of development of new products for the IIe product line, and has made a tremendous impact in the short time he has been back. One new product he has a hand in is a mouse controller for the IIe. Apple engineers produced a prototype mouse circuit board with 21 chips—about 70% of the total in the IIe. Steve streamlined the design to *five* chips in one afternoon. Steve believes that the II—regarded by many as the Model T of microcomputing—has been neglected over the past few years by Apple—an opinion apparently shared by Sculley.

Where To Now?

Apple faces many problems. 1984 will be the most critical year in the company's history. If Macintosh does not make the impact for which its builders hope, if Lisa sales do not pick up, and if IIe/III sales remain sluggish in the face of competition from IBM, then Apple could become just another microcomputer manufacturer. But with the new direction and new blood at Apple, the company stands an excellent chance of regaining its position as an industry leader. Apple is growing up, and the process won't be easy. With the dedication of John Sculley and with Steve Wozniak back in the picture, it looks as if there *will* be an Apple in our future. ■

Apple Boosts Support

Ken Uston

After spending time at the Apple booth at Comdex and trying to read between the words of their press releases, I sensed a feeling of urgency—a fear that they will be abandoned and fail to enjoy a continuation of the enormous support their computers have enjoyed in the past. It is almost as if they are saying, "Come on, fellows. Keep supporting us, just like in the old pre-IBM PC days. Don't forget that we had the most supported personal computer in history. Stick with us."

In other words, I got the feeling that Apple was thrashing against the onslaught of IBM and MS DOS.

This is what they announced:

- A Rana co-processor to make the Apple IIe compatible with IBM, at a cost of $1795 (you also get 256K and two disk drives).
- Programs to tie Lisa to mainframe computers (perhaps in response to a recent move in which IBM stunned the industry with a similar announcement for their 370 and 3270 devices).
- "Support programs" for independent developers which offer Apple's operating system, programming language, and technical notes. I sense an attempt to get a "family" of loyal developers, as Apple also offered electronic bulletin boards and electronic mail for them.
- Apple took pains to point out that there is considerable software for Apple II and Lisa. Included free in their press kit was a $3.00 book, entitled, "Will someone Please Tell Me What an Apple III Can Do?", a description of more than 300 software programs for the Apple III.
- Apple also announced that there are 165 companies developing software for Lisa.
- An integrated word processing, spreadsheet, and database package for the Apple III, called *III E-Z Pieces.*
- A mouse for Apple II computers. ■

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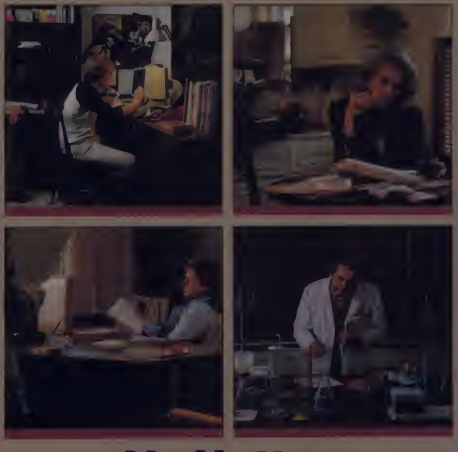

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ATARI

John Anderson

"We don't market," Steven Ross, chairman of Warner Communications, told the *Wall Street Journal.* "We've got the best goddamned computer, but we don't market it right. Im pulling my hair out."

That's just about the whole story in a nutshell. Atari has never made a dime from microcomputers. In 1979, Atari introduced two of the most advanced and best-designed low-end machines in the industry. They then proceeded to let the machines languish for four years and lost money on them each and every year. By the time they caught on and realized that it was not the hardware but the sellware that was wrong, they were on the ropes and bleeding red ink. It's a pity.

Many of the people I spoke to at Atari between 1980 and 1983 had little or no idea what the products they were selling were all about.

In The Beginning

In the beginning there was Nolan Bushnell. And there were some cockeyed ideas of his about making electronic games that people would want to play again and again. Nolan amassed some pretty good people and some pretty good products, too. In 1974 coin-operated video games like Pong and Tank Battle appeared. In 1978 Space Invaders broke through, and video games mania took hold.

Then there was the VCS 2600 programmable computer game, which began to catch on in 1978. Before it, home games computers were hard-wired to play maybe four different games. These grew boring in a hurry, and the units soon headed for the closet. The VCS ended all that. Want a new game? Simply plug in a new ROM cartridge. The games were in color, and were superior to anything seen before. They had some staying power.

Then in 1979, some hard-partying wizards from the coin-op department teamed up to create the Atari 400 and 800 computers. It is hard to overstate what a feat these machines were. Based largely on the Apple, they were designed to do everything the Apple could do, and then some. As it turned out, the machines were so far ahead of their time, Atari ended up having no clear idea just what to do with them.

Asking me to ruminate about Atari is like asking Attila to say a few words about Huns. It has been an intense love-hate relationship, to say the least. I have been writing about the problems of Atari management for more than three years now. Atari computers will always have a special place in my heart, though Atari Corporate has broken that heart many times over.

Growth And Chaos

Well, in his preternatural wisdom Nolan sold Atari, and like clockwork,

James J. Morgan, new chairman and CEO of Atari.

things started sliding fast. Many of the people I spoke to at Atari between 1980 and 1983 had little or no idea what the products they were selling were all about, or who if anyone would care. In one case, we were fed mis- and disinformation on a frighteningly regular basis, from a highly-placed someone supposedly in charge of all publicity concerning the computer systems. And chilling as the individual happenstance was, it seems to have been endemic at Atari at the time.

Atari was quite literally too big for its britches. Since acquisition by Warner, the big problem for Atari has been the very bigness of Atari. It is almost universally recognized that Atari is the single most important factor in the transformation of the electronic entertainment business in the late '70s. Before Atari, electronic games were a novelty. After Atari, they became a mainstay—a business with revenue counted in the billions of dollars.

As Atari grew—wildly and with the uncontainable force of Mount St. Helens—it also grew schizoid. It quickly evolved into a three-headed beast: the coin-op division, the consumer games division, and the home computer division all operated pretty much independently of one another. Rifts and rivalries developed. Most damaging was the split between the managements of the home games and the home computer divisions.

For at a time when those very categories were meshing in the marketplace and minds of consumers, Atari chose to isolate them totally from each other. The games division, having finally managed with the VCS 2600 game unit to overtake the coin-op division as profit leader, saw the home computer division as a threat rather than a savior. If any of their new machines could expand into true computers, the reins would automatically be handed over to the home computer division. To the games division, this was a fate worse than death.

And so it seems in their power and wisdom, they chose death.

If, in 1981, the next-generation game machine *had* been designed to be compatible with the Atari 400 and 800 microcomputers, Atari would not be in the state it is in today. Instead, the 5200 game unit was introduced. Inside, it *was* very nearly an Atari 800, and as such was a fabulous game machine. The notable exceptions were that all compatibility and expandability had been designed out, and an absolutely atrocious new game controller had been grafted on. The new game machine, with an external keyboard and 800 compatibility, could have been transformed into a product superior to the famed Coleco Adam, way back in 1982. "But noooo," to quote the late great John Belushi.

As in Greek tragedy, the fatal flaw had surfaced: the *hubris* that eventually set the stage for surrender of the high-end games market to Coleco and the low-end micro market to Commodore.

If, in 1981, Atari had decided to hire someone like Alan Alda to rework its image as a game company, it would not be in the state it is today. Instead, it failed to recognize the importance of its computers and allowed a sizable technological lead, as well as a burgeoning market, to slip away. They continue to this day to be perceived as a games company and only a games company. If I were Steven Ross, I would be bald by now.

Now that Atari's share of the micro market has been more than halved, they have hired Alan Alda, and he is doing all he can, for a reported $10 million three-year stint. He is undoubtedly worth it. Rumor has it, however, that Atari is about to abandon the hardware business entirely, in favor of software alone.

If, in 1981, Atari had decided to hire someone like Alan Alda to rework its image as a game company, it would not be in the state it is today.

Only Software?

Software is like records. Warner already knows how to sell records, and does it very well. Atari could make a profit selling software. In June of 1983 Atari announced the creation of Atarisoft, a software label that would release packages not only for Atari computers but for the IBM PC, Apple, TRS-80, and Commodore 64 machines as well. Hence the springboard for rumors.

Was that step the beginning of the end for Atari hardware? No, according to Atari. They are in the hardware business to stay. They will turn things around. They will get their computers into the black for the first time. And they will keep them there.

In the attempt to reach this lofty goal, heavy cost-cutting is evident. Atari has laid off more than 3000 of its U.S. production line staff and moved manufacture of its computers to the Far East. It has removed the internal speaker, two of the controller ports, and other so-called "needless expenses" from all its new units. It has streamlined each computer to a single board, saving pennies wherever possible. Needless to say, this is a very different environment for product development from the one that couched the birth of the 400 and 800 machines. They, as opposed to the newer machines, were remarkably uncompromised.

Despite all of this, there is certainly one thing you must hand to Atari. They are about the only company in the entire industry in the *position* to suffer 1983 losses in excess of half a billion dollars, while remaining somewhat optimistic about the future. Warner stock went down from well over $60 to just over $20 in 1983. Shareholders' equity skidded 32 percent to $953.6 million from $1.4 billion a year earlier. And yet, Atari has mustered its confidence.

Warner Communications hasn't come close to offsetting Atari's losses, even with a pretty fair year at the movie box office and an even better year in the record business. The numbers are simply staggering. The fact is that Warner has come to depend on Atari for profits. I can't see them taking risks very much longer. Atari needs to find the black, and stay there—whatever that formula requires.

New Management

In August of 1983, James J. Morgan was brought on board from Philip-Morris to replace Ray Kassar as CEO and president of Atari. His work was cut out for him.

A recent article in the *Wall Street Journal* reports that Morgan was "stunned" both by the "chaos" at Atari when he took charge and at the fact that no one seemed to have anything even approaching a coherent game plan. Frequently a supposed "chain of command" would be split across eight or nine buildings, with a supervisor rarely even seeing certain members of his crew. Morgan has set out to change this.

Among his first actions was the dissolution of the direct educational sales force. He created a department called Atari Learning Systems to fill the gap. Some analysts have interpreted this as a general move in the direction of software as opposed to hardware. He also reassigned the president of Ataritel, the telecommunications branch of Atari, which has been in existence for nearly two years now, and has yet to ship a product. If Ataritel doesn't come through soon, don't expect it to last much longer. Warner can't afford the experiment.

By 1985, Atari will have moved to a 65-acre site in San Jose. The coin-op and engineering departments will remain in

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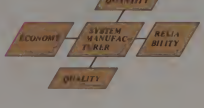

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Milpitas, but the rest of the show will be consolidated. The cost of the move will approach $200 million.

In unrelated but interesting developments of the last year, Milton-Bradley sued Atari for $43 million, as a result of an alleged breach of contract concerning nondelivery of 400,000 voice synthesis/recognition modules for the 2600 and 5200 game units.

Atari abandoned plans to introduce a keyboard add-on for the 2600, originally called "My First Computer," and later dubbed "The Graduate." Sales of such a unit were probably and rightly deemed as potentially harmful to Atari computer sales. The unit was, by the way, utterly incompatible with any other Atari computer.

Atari, it appears, has always had an unseemly habit of competing with itself. The latest clear example of this is a TV commercial aimed at Coleco—or so one would imagine. The ColecoVision has for some time had a VCS game adaptor available for it. The Atari commercial shows its own, substandard VCS version of *Pac-Man* running on the ColecoVision, then compares it to the 5200 version, which looks much better (as in fact it was bowdlerized from the 400/800 computer version). Why they chose to make their own product look bad on prime-time TV is beyond my ability to analyze. Perhaps it is some bizarre form of self-punishment for past transgressions.

Philips and Atari may yet become partners in the microcomputer business.

Coming Back

Well giants fall hard, but don't die easily. Atari may be down, and it may occasionally be eccentric, but it is far from out. It has a new XL line of 64K machines, and despite rumors to the contrary, claims to be moving ahead with plans to market all four. That includes the 1400 XL, with built-in modem, speech synthesis, and expansion capability. It includes the 1450 XLD, which sports all the features of the 1400 and a built-in high speed disk drive at an attractive price. I remain enthusiastic about these machines, if a bit less than utterly confident that they will ship in the near future.

Having personally made the recommendation that the machine on the heading of our Atari column be changed to the Atari 1450 six months ago, I surely hope to see one soon. It is hard to type with your fingers crossed.

Compatibility with existing 400/800 software has been achieved by way of a translator disk, which downloads the old 400/800 operating system to the top 16K of a 64K XL, so it can run the thousands of existing programs despite any incompatibilities with a revised XL operating system. The maintenance of some form of compatibility with the old machines was an *extremely* important step for Atari to have taken. It leaves the new line of machines in much better shape than they would have been otherwise, even after the January price hike.

Atari originally set a sales goal of 700,000 XL computers in 1983. Slipped ship dates and manufacturing problems cut that figure by nearly a power of ten, by our count. Let's hope that Atari fares better in 1984.

Philips and Atari may yet become partners in the microcomputer business. Their friendship stems from a cooperative distribution effort between Warner Records and Polygram (which belongs to Philips). In December there were rumors that Philips might actually acquire Atari. These are totally spurious, according to Atari. Still, I would not rule out the possibility of an Atari/Philips computer appearing some time in the future. It might be just the thing to breathe new life into the beast.

So to paraphrase Twain: Reports of Atari's death have been greatly exaggerated. The red ink nosebleed has been behemothic, but may now have been stemmed.

Alan Kay, once of Xerox PARC and Smalltalk fame, who has been hiding in an Atari ivory tower for some time now, may soon surface like a fairy godmother with some amazing goodies. He is a true visionary—and if he hasn't been twiddling his thumbs for three years, may have an exciting show-and-tell for us at the next CES.

A final note. Rupert Murdoch, sensationalist newspaper owner and the man who made the *New York Post* the newspaper it is today, seems to agree that Atari has some life in it yet. He has reportedly acquired 6.7 percent of Warner's stock. Murdoch is not known as an investor, so it is assumed that he seeks a controlling interest. According to the *Wall Street Journal*, he is now the largest individual stockholder in Warner Communications and could gain the control he seeks with little over 20 percent of the stock.

If that happens, my only hope is that we shall be spared images of bikini-clad computer users in Atari ad campaigns, below headlines like "Mom boils Baby's 600XL." Atari, best of luck. ■

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Commodore, which began years back as a business furniture and calculator company, was among the first manufacturers to offer an assembled microcomputer. It introduced the Commodore Pet in 1977. And despite the fact that the initial machines were slightly flaky and sported the most unfriendly keyboards around, the Pet remains in use in many homes and schools today. It is at least remembered fondly by many.

John J. Anderson

When the 5K Vic-20 machine was first introduced in 1981, it met with little enthusiasm. At $300, the machine was too cheap for the hobbyists and too expensive for the fledgling "mass market." So it remained in the harbor for a while.

But Commodore kept right on pushing the machine and, to the chagrin of the industry, made cost-cutting its basic strategy. By the time the mass market for microcomputers really began to materialize (Christmas of 1981), the Vic-20 was selling for $200. It had some decent software, too, though mostly from third-party manufacturers. And so the yacht race was on.

By Christmas of 1982, over a million Vic-20s had been sold, and they continue to be sold today, at prices well under $100. Without a doubt, the Vic was the first true mass market machine. It set Commodore afloat on the high sales seas. The dinghy had sprouted guns.

Then the Commodore 64 was christened. It was news even at a list price of $595, but it did not stay there for long. Soon after the introduction of the C-64, the first volleys of a bloody and now legendary price war were heard. Commodore abolished entirely the practice of setting list prices. They leveled the heavy guns at the competition and gave a dramatic definition of the term "vertical integration." The flotsam and jetsam of wrecked competitors will be washing up for some time to come.

Boom. Atari retreated, counting heavy losses. Boom. Radio Shack regrouped, losing its stomach for battle in the low-end theatre. Boom. Texas Instruments abandoned a swiftly sinking ship. Coleco, still at sea in an experimental sub that may or may not be leaking badly, has not surfaced in some time. All we have seen to date is what might be an occasional periscope.

Vertical integration. Definitely a buzzword, and as such, hides more than it tells. In Commodore's case, it means simply this: because Commodore manufactures its own chips, its costs are lower, and it does not need to compete with other micro makers in the micro-

Commodore's founder, Jack Tramiel, abruptly resigned on Friday, January 13, 1984 as president, CEO, and a director, saying the firm needs a "professional executive" to take it beyond the $1 billion annual sales mark reached just recently. Sources speculated that Tramiel quit following a disagreement with Irving Gould, chairman, over the choice of a new president from outside of the computer industry.

The flotsam and jetsam of wrecked competitors will be washing up for some time to come.

processor marketplace. That simple fact is a lethal weapon.

The Commodore 64 is a cheap computer. It fits in exactly the same case as its ancestor, the Vic-20. Like the Vic, it resides on a single board. It can be assembled on the same production line. At $200 retail, it can still return a respectable margin. And at the same time, it is a competitive machine. It has all the color, all the sound, and all the memory of its more expensive competitors. So why buy anything else?

Well some consumers have found what they perceive as good answers to that question. The hardware wars seem to have exacted a price from Commodore as well. Never known as a com-

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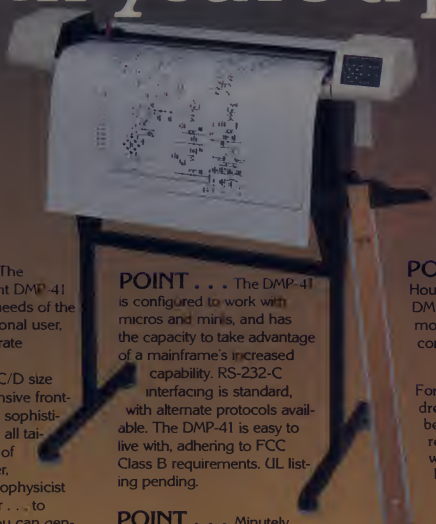

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CIRCLE 219 ON READER SERVICE CARD

pany with a remarkable support system, they have run aground on a few reefs of their own making.

In the industry, a return rate of 7 percent or below is typically considered "acceptable." Problems with reliability have plagued the C-64 since its inception, and though these problems seem largely to have been solved, there is still a ghost in the machine. Early 64s suffered from serious video problems. Later runs turned up units that were D.O.A. (dead on arrival).

Commodore stock fell $10 in late 1983, upon rumors of unreliability reported in the *Wall Street Journal*, which quoted a return rate of up to 30 percent. Commodore's own inept rebuttal to the piece probably hurt it further (See "Commodore's Port," *Creative Computing*, February, 1983). Commodore spokespersons stalwartly stuck to an "official" return rate of 7 percent. From our own experience, we can only judge ourselves as highly unlucky if that figure is true. We have been through a total of seven C-64s in our quest for four working machines.

CEO Jack Tramiel, may depending on your point of view, be painted as Commodore's Lord Nelson, or alternatively, its Long John Silver.

Then there is the mournful chantey of the 1541 disk drive. One positive by-product of Commodore's pricing strategy was to bring the notion of the disk drive to the common man. At a price of under $500 for C-64 and disk drive, Joe Consumer began to realize what a necessary peripheral it truly was. And so they started to sell.

And they kept on selling, until a funny thing happened. Suddenly there were no more disk drives. To hear it from Commodore, they were simply overwhelmed by the demand for drives. They had estimated that perhaps 30 percent of new C-64 owners would want disk drives for their machines. In reality, the number was more like 90 percent. Commodore simply could not supply the number of drives the market demanded.

According to the *Wall Street Journal* and *Electronic News*, the problem was a bit more serious than that. Drives that *were* shipping had an absolutely alarming return rate. They didn't work. The counter story was that a schematic error emanating from Commodore caused huge lots of OEM drives to be shipped with the wrong ROM circuitry.

Commodore denies this. But because more than one OEM supplied defective drives, the story has credibility. Once here at the lab, we received three dead drives within a two-week period.

Regardless of whom you believe, it is probably fair to assume that the severe shortage of drives going into Christmas 1983 had a deleterious effect on C-64 and C-64 disk-based software sales. Commodore "airlifted" drives from Japan to try to fill the gap, but this was a makeshift solution.

Commodore has also experienced problems with its monitors and printers, though not on anything approaching the scale of its problems with 64s and drives. We have been waiting for the model 1526 printer for ages now, and it seems to have slipped off the edge of the earth.

One side effect of the hardware problems in 1983 was a stockholder class action suit against CEO Jack Tramiel, who may depending on your point of view, be painted as Commodore's Lord Nelson, or alternatively, its Long John Silver. It is Tramiel himself who wields the real power of Commodore. Say what you will about him, but don't say he has been unsuccessful. He is one of the few utterly successful executives in the industry. His sense of timing is incredible.

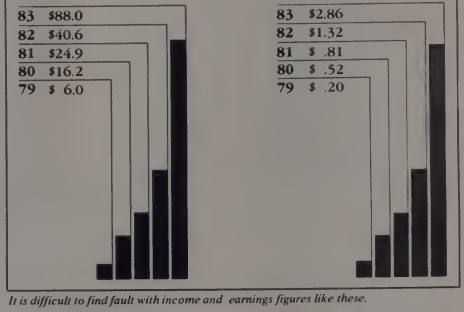
The suit cites him for the following: allowing an "autocratic individuality;" firing all sales staff outside the home office of West Chester, PA, without notifying stockholders; rushing products to market while they still displayed known bugs; and of knowingly being unable to ship enough product.

Sounds like a red-blooded American executive to me.

Hit Commodore with your best shot—it will only roll. It can handle the weather, no matter how rough it gets. While TI and Atari were losing big, Commodore had earnings of $91.7 million on sales of $681.2 million. Those figures make the criticisms sound more like sour grapes than impeachable offenses.

Commodore has some new surprises in the wings, including a Z-8000-based RGB portable and a new, ultracheap consumer machine. Along with this commitment to the hard world of hardware is a relatively new but sincere commitment to software. The Commodore software line is growing quickly, in quantity and quality. Tramiel has sold the razors. Now he wants to sell you the blades.

And while everybody else in the low-end has raised their prices for 1984, Commodore had vowed to hold the line. In fact, they have threatened further cuts if and when the Adam truly appears. They have damned the torpedos and are moving full steam ahead.



It is difficult to find fault with income and earnings figures like these.

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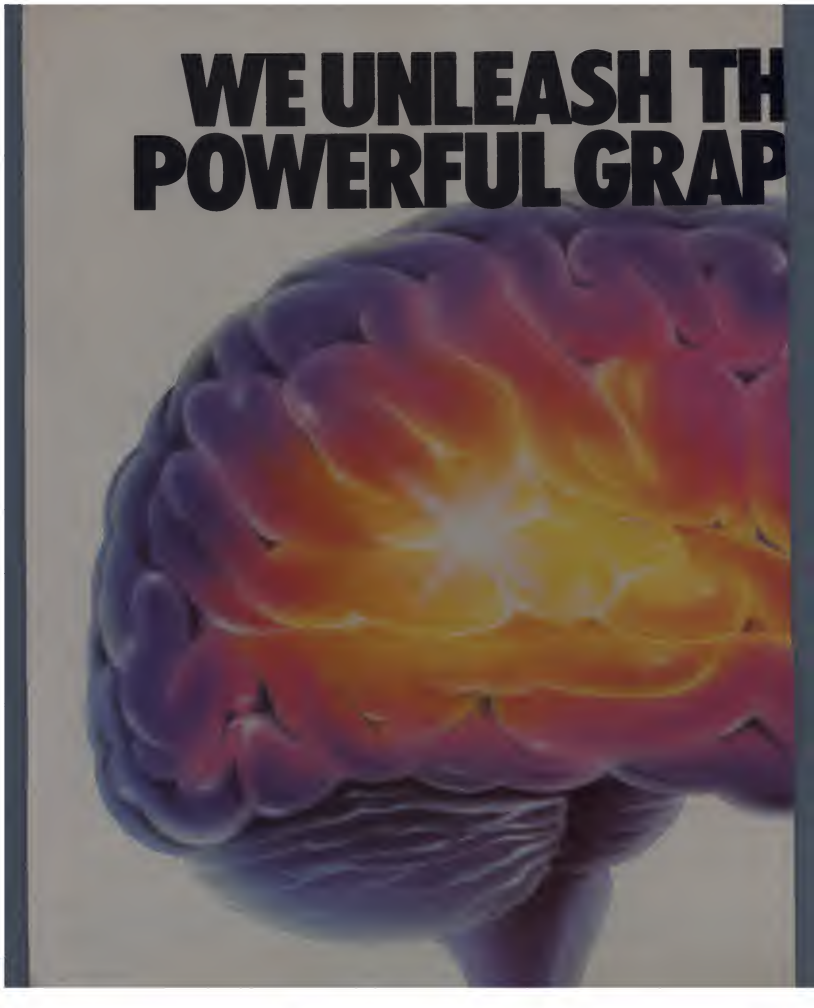

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COLECO

John J. Anderson

From the glossy pages of *Time* magazine, the photo depicted an arresting tableau. There was Coleco president Arnold Greenberg, surrounded by a bevy of cloying Cabbage Patch dolls and sitting next to an Adam computer. It was a terrific shot.

However, as you used to read in the pages of *Highlights for Children*, something was wrong with this picture. But what? Arnold was smiling warmly, the Cabbage Patch kids were beaming through their pudgy cheeks, and everything looked pretty darned rosy. Then it dawned on me.

The Coleco Adam wasn't smiling. In point of fact, the little fella looked particularly glum. The story, in a sentence, of Coleco in 1983 was that Arnold couldn't get Adam even to say "cheese."

Things have been pretty tough for Adam since he left the Coleco Garden of Eden for the cold hard world. You could argue that God himself was pretty big on hype in the Old Testament, but when it came to delivering the goods, He came through. His shipping schedule was six days, no backorders. Granted, the documentation is still coming in.

Not so for Coleco. Their Adam seems to have fallen from the Garden without even getting a bite out of Apple or a kiss from Eve. In the wake of its fall from grace is a trail of broken promises, unfulfilled expectations, and extremely skittish stockholders.

From the start, it seemed too good to be believed. But then, most miracles are. An 80K computer with mass storage, a built-in word processor, and a letter-quality printer for $525. Most agnostically-inclined pundits remained skeptical that Coleco could deliver on those promises.

And boy, were those promises made. Coleco spared no shovel in piling on the hype for its little miracle. At summer CES, you could barely approach the Coleco booth. The whole extravaganza was worthy of Walt Disney. If, in fact, you did get close to them, you noted that the Adams were on display behind cases of tinted glass. They were to be seen through a glass, darkly.

The glass helped soften tooling marks on the prototype Adam shells. If you used your powers of observation, it became clear that each unit was handmade. In addition they sported dummy tape drives. Something was afoot.

In fairness to Coleco, they did not invent the common practice of debuting products before they actually exist. In microcomputers, to do otherwise would be to break with a veritable tradition. However, in the case of the Adam, there wasn't very much inside the case of the Adam—save a souped-up ColecoVision game system, running a rather buggy prototype word processor.

As Atari derailed itself and looked on, the ColecoVision became the number one selling premium game system.

Arnold Greenberg, president, and his brother Leonard, chairman, brought the old line Connecticut Leather Company into the age of electronics. It was renamed Coleco Industries in 1961.

ColecoVision Success

The ColecoVision is a popular game system for good reason. Its graphics and sound are above average, and some very good games are available for it. As Atari derailed itself and looked on, the ColecoVision became the number one selling premium game system.

The idea of making the ColecoVision

into a full-fledged computer was planned by Coleco from its inception. Coleco began work on the project quite shortly after the games unit was introduced. And Coleco knew that as a maker of vacuum-molded baby pools, it would be up against a credibility problem in the arena of microcomputers. So it set its sights accordingly.

The 75-key keyboard is perhaps the most impressive component of the Adam computer.

Amid the current brouhaha, it is easy to lose sight of the fact that, in theory, Adam remains a very strong contender. If it were to come to full fruition, the Adam could still be a hot item. Based on the Z80 that anchors the ColecoVision, the Adam has more standard features than any other machine in its class, and in many cases even out of its class. It is an integrated system, and has two MPUs in the main console, one in the keyboard, and one in the printer.

All these components together constitute the Adam Computer System. Each can function independently of or in tandem with the other processing units. This makes multitasking possible and elevates the system to the ranks of other "smart" machines.

Adam

The Adam sports 80K of RAM, expandable to 144K. Word processing is resident in ROM and is designed to work directly with the Smartwriter daisywheel printer supplied with the system. Of course, Adam also has a ROM cartridge slot, and plays all ColecoVision games. If you already have a ColecoVision, you can buy an add-on system to make it into a full-fledged Adam.

No computer system is truly complete without some sort of mass storage device, and Adam has one. They call it a "digital data pack," and though it looks like a conventional audio cassette, it uses cassette technology different from that employed in any other microcomputer. Each specially engineered cassette is capable of storing 500K and works between eight and sixteen times faster than conventional cassette storage for the Atari, TRS-80, or Commodore.

Each Adam comes with one built-in data pack drive, and room for inboard installation of another.

The 75-key keyboard is perhaps the most impressive component of the Adam computer. It looks very much like the detached keyboard of the IBM PC—right down to the coiled telephone wire coming out the back. In some ways, it is actually superior to the PC keyboard. It is laid out Selectric style and includes dedicated word processing keys, along with truly directional cursor movement keys. It also features six programmable "smart keys," which perform flexible functions within specific programs.

The Basic computer language is also provided with the Adam package. It is not ROM-resident, but loads from digital data pack. The Adam version of Basic is compatible with Applesoft Basic; that means that Applesoft tutorials, books, and programs will work with the Adam. (It does not mean that Apple-specific Basic programs, using specific addresses, or any Apple machine language programs, can run on the Adam; they can't.)

Adam includes four expansion slots and an 80-column expansion option, as well as a CP/M option. Using the same expansion box as its dedicated gamester cousin, the Adam can play all Atari VCS games.

The graphics capabilities of the Adam match the specifications of the ColecoVision as well. This means 256 x 192 pixel resolution, the ability to generate up to 32 simultaneous sprites, and 16K RAM dedicated to screen display alone.

Where Are They Now?

Wow, huh? Sounds pretty good—we couldn't wait to get one. That was six months ago, and we are still waiting to get one. And our enthusiasm is on the wane.

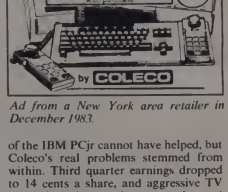
In August 1983, Greenberg claimed Coleco would ship half a million Adams by Christmas. Then the deadlines started slipping by. He said they would begin shipping September 1, then September 15, then October 1, then October 15. The leaves fell. November came. Pinkerton did not return. And the Adam did not ship.

Adam missed Christmas, except for a dribble of units here and there. On December 1, Coleco announced that it was confident that it had solved production problems and would turn out 125,000 to 140,000 systems in 1983. Evidence indicates that even that projection was overly optimistic.

Of those units that did ship, the rumored return rate was absolutely alarming. The Coleco helpline number has been ringing off the hook. Of one shipment of six machines, a Child World manager stated that, as of the week before Christmas, five had come back. He guessed that the sixth hadn't been opened yet and would be coming back December 26th.

Even when it works, the Adam has problems. Its video signal is somewhat smeared, even when connected to a high quality monitor. Its tape drive technology is in its infancy and displays some serious glitches. Its printer is noisy, slow, and doesn't look to have an exceptional mean time between failures. Sometimes communication between the CPU and the printer breaks down. Its word processing system is extremely limited but will be bolstered by a tape "utility pack" to be available later this year. The $30 cassette will give the word processor better editing capabilities.

As a result of Coleco's problems with the Adam, company stock dropped from a high of 65 in June of 1983 to 13$^{3}/_{8}$ in the third quarter of 1983. Introduction of the IBM PCjr cannot have helped, but Coleco's real problems stemmed from within. Third quarter earnings dropped to 14 cents a share, and aggressive TV and print ad campaigns were dropped for sheer dearth of the product they hyped.



Ad from a New York area retailer in December 1983.

And if there is one thing at which Coleco is superb, it is hype. Investigation has shown that Coleco annual reports have painted a rosy picture since 1973—and been exaggerated 60 percent of the time. Price Waterhouse, Coleco's accountant in 1977, would give the company only a qualified opinion in that year's financial statement, and resigned the account the following year. In some quarters the brothers Arnold and Leonard Greenberg are known as the "Sunshine Boys."

Whether the Adam has terminally flashed in the pan is disputed by many in the industry. Some feel that the bid has already been lost, while others hold out hope that the machine may still materialize and find a market.

Meanwhile, the price has gone up. The suggested price for the full system is now $725, and for the ColecoVision add-on version, $450. News of this hike has surely made Commodore very happy. ■

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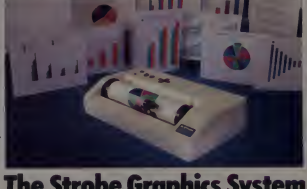

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MICROSOFT

In 1975, Bill Gates and Paul Allen started Microsoft. Their first product was Basic for MITS' new Altair computer.

Over the years, Microsoft has grown with the microcomputer industry and is, today, the largest software supplier in the market. The core business today, as in 1975, is supplying software (mostly languages and operating systems) to computer manufacturers on an OEM basis. In addition, Microsoft has licensed and developed several products which they sell directly to consumers.

Probably the best known Microsoft products are MBasic and MS-DOS, although Windows and MSX are coming on strong.

Our roving interviewer, Tom Zito, recently spent some time with Bill Gates in Microsoft's Bellevue, WA headquarters. Here are some excerpts from that interview.

Tom Zito

Windows is a key package to control the operation of the machine, but it doesn't do your payroll inventory.

Creative Computing: Recently, everybody has been talking about integrated software. What is going on at Microsoft in that area?

Bill Gates: There are two ways to approach it: you either have mechanisms to let independent packages move data back and forth, or you just throw a whole bunch of packages together. We have made some good advances in terms of a general mechanism that lets two independently developed packages talk to each other, which we think is really important. That hasn't been done yet and that's what you'll see with Windows.

CC: Isn't Windows an answer in search of a question?

BG: No, you can say that about 16-bit too. Why do people want more memory or more horsepower? Well, we get the capability to design the whole new generation of software. But most things we do don't happen immediately. Take the TRS-80 Model 100: who was going to use it, how it was going to be used, that wasn't clear to us in advance. Even take Microsoft *Word:* you can say it is very useful at this stage, but many of its features are there looking forward to having laser printers and copiers. So, with Windows, we have confidence that the sub-system will allow a much higher

Bill Gates, president of Microsoft.

type of software than what has existed in the past. We're betting on the future. The state of the art is moving so fast in software that you can take the same machine and, a year from now, do great things on the same piece of hardware just because the software is improving so rapidly.

I always like to push technology.

CC: From a practical standpoint, what will a user do with Windows?
BG: Well, it is a sub-system. It is part of the operating system, and everything in the operating system should be hidden so that you just work with your applications. Consequently, there is really nothing you do with Windows. All your applications run under it, and your applications are better because they use its graphic facilities. You can see two applications on the screen, and Windows lets you move something between them quite easily. It is a key package to control the operation of the machine, but it doesn't do your payroll inventory; we rely on packages that sit inside those windows to do the real operations.

Say you are working in your application and all of a sudden somebody calls up your computer and sends you some mail, or you are on a network and you get some mail, or you are working alone in a package and you ask the printer to print something and it is out of paper. A window comes up, and gives you that information without your having to stop the current thing to run something else to see what is going on.
CC: What will be the next step beyond Windows?
BG: Well, in the case of Windows, we are moving to higher and higher resolution graphics and color. Beyond that we've talked a lot about how we will be using voice as a possible input device, but that is two to three years out.
CC: The general trend since the introduction of the IBM PC has been toward 16-bit or 32-bit machines, yet Microsoft has made a huge commitment recently to an 8-bit standard in the form of the new MSX operating system that is being licensed to low end computer companies. Why is that?
BG: MSX is in a special category. It is intended for the under $300 home system. We knew for that market that 16-bit was still going to be too expensive, and we were thinking that chip companies would build special chips to integrate all the MSX functions into one group if it got popular enough. And so it still seemed appropriate although, you know, I always like to push technology. But for that price range we still needed 8-bit. In fact, we do see 8-bit dying in the office market and it is only in this one super low cost home computer area that I think 8-bit still has a valid place for the next two or three years.
CC: Microsoft has done an incredible amount of work with Japanese technology firms which seems to annoy many American technology firms. How does that make you feel?
BG: Well, my customers aren't annoyed—IBM, HP, Radio Shack, Apple. We work very closely with those people, and they understand that the world is the world and that technology—our standard product—is going to be available for the French, the Germans, and the Japanese. The fact is, for something like a hand-held computer—with CMOS, and small packaging, and LCD, and stuff like that—we did find that the people who wanted to make that type of product were primarily located in Japan. Things like laser printers, which are also something the Japanese are working on, really fuel the market. The personal computer market has more to do with marketing and services than with the actual hardware. Beyond that, take the IBM; it has an Epson printer, lots of Japanese parts . . . So this whole question of, is it disloyal to do things on a market basis instead of on a nationalistic basis, I think is pretty much answered by using the best products and always trying to do better products.

You will have super-advanced displays that can call up any art in a very realistic form.

CC: Microsoft in the last couple of years has begun to do some research into artificial intelligence. How much of a part do you think that has in the future of software?
BG: Well, it's a gradual process of getting the software to be more and more dynamic—to mold itself to its history of use and the user profile in terms of the way it interacts. It's something that we are looking at, and I am personally very excited about, but I doubt it will become really required in personal computer software for at least two or three years. In the direction of being able to recognize more—to do things at a higher level—the AI techniques are what is going to get us there, and eventually it will be a requirement.
CC: When you think about what personal computers might be five years from now, what do you see?
BG: Well, it is going to be pretty amazing, even if you take the idea of what sort of art you're going to look at in your home. You will have super-advanced displays that can call up any art in a very realistic form, and you can just say what you want to see and what sort of music you want, and what sort of experiences from your life you want pulled into this collage of experiences that are being created there. I see it as a giant information network, a form of intelligence that will really change the way we work. The personal computer is a product whose nature will change because what we are dealing with is information. As information gets to be more and more digital and as the cost of computation and storage goes way down and as the power of software goes up, we are going to weave this thing into the fabric of daily life. How you remember things, and how you work will be replicated in a complete network—extremely intelligent—so I'm not sure you will think about buying a personal computer at all in the same sense that we do today.
CC: In what sense will you think about buying it?
BG: Well, when you build your house, you will get a home entertainment system that has so many gigabits of memory and has voice recognition either throughout the house or just in the living room, and it is either hooked into this business database or it's not, but it will be pretty much a standard thing.

When you build your house, you will get a home entertainment system that has so many gigabits of memory.

The idea of picking up the phone to call someone, as opposed to speaking out and saying, "hey get me in touch with so and so," and having something recognize what you want to do is pretty silly. There will be no reason to have that physical device there when you already have this intelligent thing that is always monitoring everything that you ask for and do. A little like HAL, but certainly more controllable.

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CIRCLE 180 ON READER SERVICE CARD

IBM PCjr

Thomas V. Hoffmann

There is an old saying that the more things change, the more they remain the same. In 1981 when Will Fastie first looked at the IBM PC for this magazine, he described his first encounter of the close kind this way:

"I entered the contemporary but unremarkable building . . . Jeannette Maher of the Public Relations Department escorted me . . . through a tastefully decorated lobby and through smoked glass doors set in a wall of smoked glass. Inside . . . and there they were. Three IBM Personal Computers sat on three modular display stations." Then he began to drool. (You can look it up).

Two years later, my first trip to Boca Raton was like visiting Déjà Vu City. Jeannette is no longer the sole PR person, but the tasteful lobby, smoked glass (now sporting a splashy neon *object de vignage*), modular display stations, and three PCs were all there, just as Will described. Surprise! No PCjrs, not even a peanut shell on the floor.

Blind Man And Dancing Elephants

The good old days, when reviewers were ushered into the sedate presence of the original PC, have given way to more participatory modern times. The juniors were upstairs in someone's office.

We carted the stuff downstairs, cast aside the old PCs, and began setting up the juniors. The operation was totally trivial: open the box, attach the power cord to the system unit, attach a monitor to the appropriate connector, put batteries in the keyboard, and turn on the system—less than five minutes from box

creative computing

HARDWARE PROFILE

Product: PCjr

Type: Personal computer

CPU: Intel 8088

RAM: 64K, expandable to 128K

ROM: 64K

Keyboard: 62-key wireless keyboard, wire is optional

Display: Can run on IBM color display, none is included.

Graphics: 320 x 200 pixels, 640 x 200 pixels, 160 x 200 pixels

Printer: Can attach serial or parallel printer; none is included.

Ports: ROM cartridge sockets, bus extender, two joysticks, modem connection, audio output, composite video, direct drive monitor.

Dimensions: 14" x 11.5" x 3.5"

Documentation: Guide to operations, Basic manual, manual for each software package.

Price: $669 with 64K and no disk drive $1269 with 128K and disk drive.

Summary: Extremely compatible with the IBM PC, easy to set up, suitable for home, office, and classroom.

Manufacturer:
IBM Corp.
Boca Raton, FL 33432

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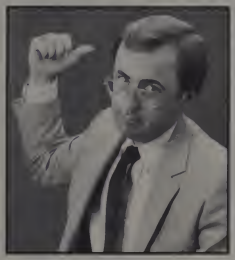

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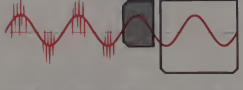

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*Softsel Computer Products Hot List **PC Magazine March 1983

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CIRCLE 170 ON READER SERVICE CARD

to operation, and only one third more calories than attaching a video game to a TV set. The PCjr might also be called IBM Lite—it weighs less than nine pounds with disk drive, and you can hold it in one hand and wave it around. (Yes, I did, and no, I don't know why. It seemed reasonable at the time.)

So just what *is* this PCjr? Is it a cheap PC or an expensive game machine? Who is it for? Where will it be used: home, office, classroom? How expandable is it? How compatible with its older siblings? Is it worth the price? The answers depend, of course, on one's point of view.

It is definitely a PC, extremely compatible with its IBM predecessors, and significantly less expensive (about half the cost of a similarly configured original PC). The enhanced graphics and sound features make it a better machine for games and animation than the bigger PCs, but there are better and less expensive game machines. The real strength of the PCjr is that it is an IBM PC in every respect: same processor (the Intel 8088), same operating system (PC DOS), identical disk formats, and compatible displays. The basic unit includes several features that are extra cost options on the big PCs: the video display adapter, serial port, and joystick adapter are all built in.

The PCjr is both more and less than the standard PC.

What, no bad news? Only a little: the PCjr is somewhat slower than previous IBM PCs, it can't support the 8087 arithmetic processor, and the current limitations on memory and disk may prevent the use of some large programs and data files. The speed difference is attributable to the design of the video display and RAM memory system, and is permanent. The other limitations, except for the absence of the 8087, are almost certainly temporary. The architecture of the PCjr will support considerable expansion; IBM and other manufacturers will certainly offer a wide variety of options. Many will probably be available within weeks of the first deliveries of PCjrs.

First Impressions

The PCjr is both more and less than the standard PC. Like the original IBM PC (now called PC1) it consists of two major components, a system unit and a keyboard, to which a display must be added to make a complete computer. The most striking difference between the junior and its predecessors is purely physical: it is *much* smaller.

At 14" wide by 11.5" deep by 3.5" high the system unit occupies only 43 percent of the volume of the PC1. The reduction in weight is even greater due to the plastic case (the others have metal cases) and external power transformer (sort of a giant AC adapter).

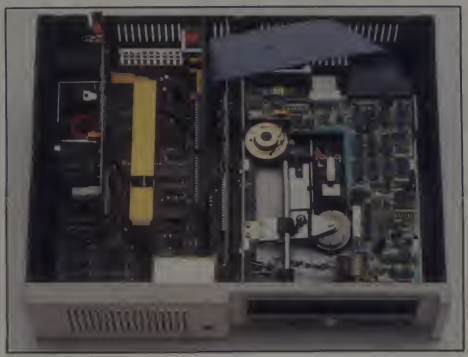
The 62-key wireless keyboard is perhaps the most innovative feature of the PCjr. It is powered by four AA batteries and communicates with the system unit over an infrared serial link with a range of up to 20 feet. An optional (i.e., extra cost) cable is available to connect the keyboard directly to the system unit. When connected by the cable, the keyboard is powered directly from the system unit, and the infrared system is disabled. This conserves batteries and eliminates interference among multiple systems in the same vicinity, as might occur in a classroom, for example. The cable may also be necessary to avoid interference with other infrared devices such as TV remote controls, in the home.

Another innovation, for IBM at least, is the provision for ROM program cartridges. Each cartridge contains 32K of ROM, but is quite a bit smaller than traditional video game cartridges. While there will be few programs available in this format initially, cartridges offer several significant advantages. They are much more rugged and reliable than disk and cassette tapes, and are safer and easier for children to use. There is no loading time; the programs are instantly available when the cartridge is plugged in. Furthermore, since the cartridge programs can execute directly from ROM they leave all the RAM available for data storage.

Finally, cartridges offer greater immunity to casual software piracy, so vendors may be more likely to charge reasonable prices per copy for programs. (It has been estimated that for many popular programs, illegal copies in use vastly outnumber the legitimate ones. This undoubtedly raises software prices as vendors try to compensate for "free" copies.)

System Unit

The system unit is a marvelous example of low cost construction that never looks cheap, just inexpensive. It consists of a plastic box with a snap-on top cover. Inside, the main printed circuit card is mounted flat against the bottom, resting on snap-on plastic studs. There are four dedicated connectors for the power regulator, memory expansion, internal modem, and disk adapter cards, which mount vertically. The on/off switch and the connector for the power cord (from the external step-down transformer) are mounted directly on the back of the power regulator card, and are accessed through openings in the outer case. The modem card has a standard modular telephone jack and a matching hole in the rear panel. All other peripheral and expansion connectors are mounted directly on the main system card and align with openings in the outer case.



PCjr under the hood.

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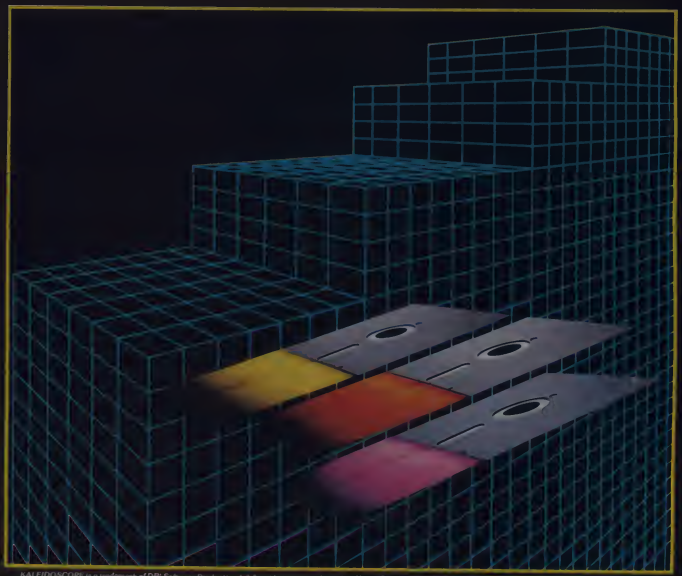

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CIRCLE 124 ON READER SERVICE CARD

The only two screws (actually bolts) in the box hold the disk drive in place. Everything else snaps in and out with bare hands: inexpensive to assemble, easy to upgrade or repair. It is a good bet that IBM has plenty of room for price reductions, should competitive pressures require them.

It is a good bet that IBM has plenty of room for price reductions, should competitive pressures require them.

The main system board is about 11" by 14" and contains the following major elements:

- An Intel 8088 processor running at 4.77 MHz. The processor is configured in "min mode," which means the 8087 arithmetic processor cannot be used. There is no direct memory access (DMA) controller. An Intel 8259A interrupt controller chip and 8255A programmable peripheral interface are also used.
- 64K of ROM comprising cassette Basic (32K), BIOS or Basic I/O System (8K), and built-in diagnostics
- 64K of RAM for user programs
- An Intel 8253 timer chip, used for keeping time of day, timing I/O operations, cassette I/O, and PCI-compatible sound generation
- Keyboard interface circuitry for both infrared and direct wire links
- Video display circuitry based on the Motorola 6845 CRT controller chip and a custom video timing and control chip, with connectors for high resolution RGB monitor, composite video monitor, TV receiver (with RF modulator), and light pen
- Audio cassette interface, compatible with that in the PCI
- Three channel sound/music generation circuitry based on the same Texas Instruments SN76496N sound chip used in the ColecoVision video game, with a standard RCA phono jack for audio output. Sound is also available through the TV when the TV adapter cable is used.
- Joystick interface
- Standard RS-232 serial interface, for external modems, printers, plotters, etc.
- Connectors for two ROM program cartridges
- I/O expansion connector for the parallel printer adapter and future add-on devices

There are two models of PCjr available. The entry system lists for $669 and includes the wireless keyboard and system unit with 64K RAM and all the interfaces listed above. The enhanced system is $1269 and comes with an additional 64K of user RAM for a total of 128K, a disk adapter, and one half-height 5¼" double sided, double density disk drive with a capacity of 360K, all mounted inside the system unit.

The entry version can be upgraded to the enhanced version at any time by plugging in the RAM expansion card and disk drive and adapter. The two-step approach costs only $20 more than buying the pre-packaged enhanced system.

The connectors for peripheral devices, such as serial printer, high-resolution display, and joysticks, are not the usual 9- and 25-pin D connectors usually found in small computers. The PCjr uses rectangular arrays of pins, similar to those used for flat cable connectors on PC cards, soldered directly to the main systems board. Special adapter cables are available for each device, where appropriate, to convert to industry standard D connectors. This lowers the cost of the system unit, but adds an occasional $20 or $30 for adapter cables for displays (essential) and serial devices.

The disk drive, manufactured by Qume, is mounted horizontally in the upper right corner of the system unit, right above the two cartridge slots. It is

First Impressions

Ken Uston

Big Blue really did it up brown at Comdex and rented the entire Gold Hall all for themselves. Among other things, every hour on the hour, I40 of us could enter a demonstration room and get our "hands on" the PCjr.

So while most exhibitors had a booth or two, IBM effectively had their own separate show. No wonder it cost them a million bucks!

The first thing I did at Comdex was to try out the PCjr. The following was written upon first sitting down at a PCjr keyboard, in the IBM demo room:

As I type my first words on the PCjr, testing IBM's new brainchild, I'm trying to figure out what the real implications of PCjr are.

IBM wasn't even in the personal computer business two years ago, and today they dominate it. The question of the day is: will IBM do the same thing in the home computer market?

The views vary from, "Of course they will. After all, they are IBM!" to "IBM really blew it this time with their overpriced home computer. Even without the (ha) Chiclet keyboard, it is priced at three times what it is worth."

I suspect the truth lies somewhere between these two extremes.

Is it disrespectful to say that IBM seems to have been stuck between a rock and a hard place? They had to come out with a creditable home unit. At the same time, they had to avoid making the PCjr too good, lest it hurt sales of the PC. Hence, the Chiclet keyboard, the single disk drive, and the limit on expandability.

As I process words on the infamous Chiclet keyboard, I am finding that it is not as bad as I expected. The keys are hard; they are not made of that soft rubbery material that we saw on Mattel's Aquarius and the Timex 2068.

However, when I type fast, I get the insecure feeling that my fingers will slide off the keys. This is because the keys, while slightly indented, are not nearly as sculptured as they are on other keyboards, such as the Commodore 64 and Atari 800.

I just looked over at the screen of the fellow next to me. On it, he typed, "I can't type fast on this, because I can't see the letters on the keyboard."

Aha! A point well taken. The characters are not shown on the keys, but are printed above them, partially hidden from view by the keys. This could create serious problems for hunt-and-peckers.

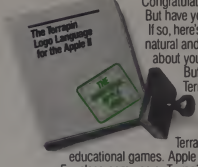
I just asked an IBM'er about that. He said this will not be a problem because keyboard overlays will be provided with much of the software, including word processing packages (to, for example, tell the user what the various function keys do). In my view, this argument isn't persuasive, because the keys are still hidden from view, overlay or not.

I am now typing as fast as I can, and I find that the display is not keeping up with me—that is, the words appear on the screen well after I type them (the computer does record them all; it just takes its time doing it.)

While this won't trouble typists who don't look at the screen very often, it could prove confusing to those who do.

I am trying to recall how it felt typing on the Commodore 64 with *Bank Street*

Now that Christmas is officially over, isn't it time you bought the Unofficial Apple Logo?



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CIRCLE 206 ON READER SERVICE CARD

The PCjr system unit atop a standard PC system unit. The round opening is the infrared receiver for the cordless keyboard. The two ROM cartridge slots are directly under the half-height disk drive.

half the height of a standard 5¼" minifloppy drive, and very slightly slower due to longer head settling times. The difference is hardly noticeable.

In a standard minifloppy drive you insert the disk and flip down a hinged door to engage the drive spindle and read/write head. On the PCjr you rotate a lever counter—clockwise to engage the mechanism; the same lever blocks the entry slot so the disk can't be removed until the lever is flipped back. I found the lever mechanism easy to use, once I overcame my instinctive groping for the flip-down door. If you have never used a standard floppy, there may be no instincts to overcome.

The 360K capacity of the floppies is identical to the PC1 and PC/XT, and quite a bit greater than most other "home" computers in this price range, where single sided, single density drives of about 100K are the norm.

Keyboard

The PCjr keyboard has generated a fair bit of controversy. IBM calls the 62-key unit "a cordless, portable, hand-held device [utilizing] full travel, carbon contact/rubber dome technology for long wear and reliability." Critics say it is a cheap, "Chiclet" keyboard, unworthy of a "real" computer, with the wireless business a superfluous gimmick. Who is right? Ask the blind man over there by the elephant.

If you are a fast touch typist word processing freak with big fingers, forget it; this is no "heads down, smoking fingers" professional data entry keyboard. But it is not supposed to be. Neither is it like pressing a box of Chiclets into your lap. The keys move up and down; they click; you can feel them hit bottom. More important, they are all in the right places (assuming you agree that QWERTY is "right"). I like the standard PC keyboard very much, but after about 45 minutes I was quite comfortable with the junior version. Once my fingers learned the spacing (the keys are a little closer together than on a standard keyboard) and developed the right

Writer a few days ago (I am currently doing a book on the Commodore 64). This is not a fair test, because the IBM program we are now using is what they call "typewriter emulation," which means that the words don't wrap around when you get to the end of a line. (Because of this, one Las Vegas reporter erroneously reported to all of Las Vegas that IBM PCjr users must hit the RETURN key at the end of each line.)

I would say that for typing, the Commodore 64 and PCjr are comparable. If anything, I prefer the former because of the poorly sculpted IBM keys.

I just asked an IBM'er the cost of the system we are all using in the demo room. Would you believe, he said he didn't know the answer? Ah, those large corporations!

I'll take a guess. We're using the advanced PCjr version with 128K and disk drive ($1260), a color monitor (perhaps $400), and a printer ($200). So with minimal software I guess we are talking about $2000 ($1600 without the monitor).

The Commodore with one drive and a printer—but no monitor—runs about $850.

Next question: will the PCjr *really* find a place in the home?

We all know about the myths foisted by the manufacturers on an unsuspecting public about the many invaluable uses of a home computer—for checkbook balancing, filing recipes, researching daily biorhythms, and so on. In fact, last fall there seemed to be a decided backlash; we read article upon article discussing how home computers really don't help us.

So the question is: will thousands of PCjrs be sold and used? Or, will they after an initial enthusiastic sales explosion, join their 99/4A brethren in the closet?

In examining the illustrative uses included on the "PCjr Sampler" (the disk that is inserted in our drives and which, I am told, will be provided with the computer), I see home budgeting, naturally; an alarm clock; and a few simple games. In other words, basically the same old stuff.

Will people start using computers at home to do things other than play games just because it *is* IBM. Will the momentum and influence of IBM cause software developers to come out with new home uses that will finally make the home computer really useful?

It is hard to say. Strangely, one of the most sensible home computer uses announced during the last week of November had nothing to do with Comdex. It happened about 400 miles to the northwest, where Bank of America announced that all owners of home computers with modems in Northern California may sign up (for $8 a month) for electronic banking. Finally, a home computer does something really helpful—like saving trips to the bank on rainy days.

And just watch for the PCjr support. An IBM'er told me that software developers were sneaking in their floppy disks and trying to put them in the disk drives to see if their programs worked on the PCjr. There are, of course, software programs developed in advance, including the *Home Word* word processing program developed by Sierra On-Line.

Wait 'til you see the rest of the support. Even PCjr magazines have been announced, including *Creative Computing's* youngest sibling, *PCjr*. Watch for many, many more.

There is also the question of when (or if) PCjr will be leapfrogged technologically. I personally know of at least three computers now under development, which offer extensive graphics, sound, and other advanced features, and should qualify PCjr for the archives. ■

rhythm, even word processing wasn't uncomfortable.

Rhythm is important for another reason. Since the PCjr has no DMA capability, disk reading and writing require the total attention of the processor. (In the previous PCs, the DMA facility allows data transfers to and from the disk to occur directly to memory, without processor intervention.) To insure correct disk transfers, the keyboard interrupt is disabled during the actual data transfer, with the result that an occasional keystroke may be lost. Instead of the desired effect, you hear a beep signalling the ignored key (well, it is better than nothing). The problem is worst during periods of intense disk activity, such as loading programs or updating files. It is best to learn to avoid typing during these times; the beeps help a lot.

Game players, slouchers, and other relaxed individuals will find the cordlessness a godsend. There is nothing to stretch or break. Tabletop users have a choice of two tilt angles with two little flip-down legs on the underside of the keyboard. The dust-and spill-resistance should be quite high, since the entire interior is covered by a solid rubber sheet with molded-in domes.

The standard PC 82-key keyboard and the PCjr 62-key cordless keyboard. Though it has fewer keys, the PCjr keyboard can generate the same codes as the standard keyboard by using the special function shift key in the upper right corner in combination with other keys.

Interior of the PCjr keyboard. The microprocessor, infrared diodes, and cable connector are on the printed circuit board at the top of the photo. The rubber sheet at the bottom covers the circuit board. Note the carbon pieces on the underside. In the center is the top cover, which holds the plastic keytops.

Glued to the underside of each dome is a little piece of carbon. When you press a key, it squishes the dome, the carbon makes contact with the underlying printed circuit card, and the keystroke is sensed by the keyboard microprocessor, which transmits the information to the system unit—simple, reliable, and cheap.

Enough about the feel. How does it look, and how can 62 keys do the work of 83? The key legends are not printed directly on the keytops, but on the surrounding bezel directly above and below the keytops, an obvious cost reduction. The legends above are white on a tan background, and a little hard to see because they are small and the colors don't contrast well. This is no problem for touch typists, but little kids and myopic adults may have problems.

The standard PC keyboard has 83 keys, the PCjr only 62. What is missing? The ten function keys on the left of the standard keyboard are gone. Instead, a new FUNCTION SHIFT key has been added to the upper right side. To generate a function code, depress the FUNCTION SHIFT key (surrounded by a green box), then the corresponding numeric key in the top row (1 through 0). For SHIFT, CONTROL, and ALTERNATE shift combinations, the same procedure applies; first hold down the FUNCTION SHIFT, then press the desired combina-

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tion. This sounds much worse than it really is. The technique is entirely consistent, logical, and obvious. Furthermore, the smaller size of the PCjr keyboard makes even the four-key combinations easy to accomplish with normal-sized hands. Three-year-olds won't make it, but they probably don't know about CONTROL-SHIFT-F5 anyway.

The separate numeric pad is also gone, as are the numeric lock and scroll lock keys, backslash, tilde, and right-hand plus and minus. The four cursor keys remain, with home, page up, page down, and end achieved via the FUNCTION SHIFT key. The other keys are also replaced by ALTERNATE or FUNCTION SHIFT combinations, with reasonable mnemonic value. For example, FUNC-S is scroll lock, and FUNC-B is break. These new meanings are marked below the appropriate keys, in white-on-green for FUNC and white-on-red for ALT.

If the foregoing leaves you totally disgusted, don't despair. The PCjr has provisions for an 83-key keyboard. If IBM doesn't offer one soon, it is certain that third party keyboard manufacturers will.

Audio

In addition to the simple tone generator from the older PCs, the PCjr has a sound generator chip with three independent channels, or voices, each with independent attenuation (volume control), plus a noise generator. Music in three-part harmony, explosions, and other neat effects are possible with the right programming. The extended Basic cartridge includes statements to support these enhanced sound capabilities.

The audio output is available at the rear of the system unit. With an external amplifier and speaker (or home stereo or tape deck) connected to the audio output jack, you can play to the whole neighborhood, record for posterity, or do other creative audiophile kinds of things. Even more interesting is the audio *input* line in the external I/O expansion bus, which can be mixed with the internally generated sound. Can add-on speech synthesizers be far behind? Daisy, Daisy . . .

Video Displays

The video display system in the PCjr is a direct descendent of the original PC color graphics adapter, with three significant improvements. First, most of the logic on the old card has been put in a single custom integrated circuit; what was previously a whole circuit board is now two big chips and a few little ones, and included in the basic price (instead of being a $244 "mandatory option"). Second, the entire 128K of user RAM can be used for video storage; previously only 16K on the video card was available. This allows many more "pages" or images to be kept in memory and switched rapidly to the display—good for quick help screens, animation, and the like. Third, the color capability has been improved significantly.

The video display system in the PCjr is a direct descendent of the original PC color graphics adapter.

The old PCs could display 320 by 200 dots in four colors (medium resolution), or 640 by 200 dots in two colors (high resolution). Unfortunately, in high resolution one of the colors was always black, and in medium resolution the color choice was limited, confusing, and a little ugly. The PCjr makes two important enhancements: independent choice of graphic resolution (160, 320, or 640 dots wide) and color resolution (16, 4, or 2 colors), and a completely general color palette. The high resolution 16-color mode would consume all 128K of memory, and thus could be reasonably used only by a cartridge program.

The color palette allows an arbitrary choice of any of the 16 possible colors to be assigned in any mode. The result is a much more flexible all-points-addressable color graphics system, much better suited to pictorial displays for games and educational programs. In other words, it looks much better and is more fun.

There is support in Basic for the enhanced color modes as well as the standard (i.e., old PC) graphics and 40- and 80-column alphanumeric display modes. The PCjr has the same 256-character display set as the previous IBM PCs. The designers have gone to considerable trouble to make the new hardware compatible with most of the software tricks that existing PC programs have used in display generation, and they have done an excellent job.

The PCjr does not support the high-resolution IBM monochrome display. There are provisions for connecting high-resolution RGB color monitors (via a $20 adapter cable), composite video monitors (via a standard RCA phono plug), and television sets (via a $30 cable including an RF modulator). The TV connection also sends the audio output to the set, where it can be adjusted with the volume control knob.

Options

There are currently four hardware options available for the PCjr: the 64K Memory and Display Option ($140), the Disk Drive and controller ($480), the Internal Modem ($199), and the Parallel Printer Attachment ($99).

The memory option brings the user RAM memory up to 128K and allows full use of the display features. I recommend the full memory expansion even for systems without disks.

The internal modem, made by Novation, is a full-featured smart modem for 110 and 300 baud communications. The modem card contains its own serial interface device, so the standard serial port is still available for attaching a printer or other device. The modem supports automatic dialing (pulse or tone) and answering, with error detection and diagnostics supplied in the system ROM.

IBM people taunted us about the mysterious connector marked L on the rear panel. They said it stands for "later."

The parallel printer attachment attaches to the 60-pin I/O channel expansion connector on the right side of the system unit. The attachment is required to support standard parallel printers such as the IBM Graphics Printer, Epson, Oki, and others. The I/O channel is passed through so that future options may be attached, always moving rightward. The current power supply

will support up to five attachments on the I/O channel, plus the internal disk and modem.

The PCjr ROMs have provisions for handling "non-Keyboard scan codes" arriving through the infrared link. Speculation about wireless joysticks received an immediate "we can't comment on that" response from IBM people in the vicinity, who then taunted us about the mysterious connector marked L on the rear panel. They said it stands for "later." Stay tuned.

Software

The built-in 64K ROM contains diagnostics, hardware I/O routines (BIOS) used by Basic, and the disk operating system, and the cassette Basic interpreter. PCjr cassette Basic is essentially the same as the standard PC cassette Basic: the essential features of the language plus program and data files on cassette tapes.

Advanced Basic features are provided in the PCjr Cartridge Basic ($75), which plugs into either of the two ROM cartridge slots in the front of the system unit. The 32K ROM cartridge augments the standard cassette Basic with advanced graphics, sound and music, communications support (including a terminal emulator), and disk I/O (with DOS 2.1). The result is a superset of the standard PC advanced Basic, which requires disk and DOS and is partially RAM resident, all in ROM. DOS is required only if you want to use disk files.

DOS version 2.1 is the recommended disk operating system for the PCjr. (Earlier versions seemed to work as well, but IBM will support only version 2.1 and beyond.) DOS 2.1 has the same functions and storage requirements as DOS 2.0, and runs on the PC1 and PC/XT as well as the PCjr. The major difference is that Basic and BasicA require Cartridge Basic on the PCjr as a prerequisite. If the cartridge isn't plugged in, disk Basic won't run. Most of the utility programs supplied with DOS are identical in versions 2.0 and 2.1; the few that are different seem to have had some minor bug repairs made, but there are no significant enhancements.

There are four game cartridges available for the PCjr: *Crossfire, Mine Shaft, Mouser,* and *ScubaVenture*. Other software is available on disk: Logo, Macro Assembler, Basic Compiler, *Multiplan, VisiCalc, HomeWord, EasyWriter, WordProof,* and dozens more. Many, if not most, of the disk software packages for the PCjr are identical to those for the PC1 and PCXT. In some cases, only the latest versions will work on all three machines. Dealers will have a complete list of IBM-produced or distributed software compatible with the PCjr.

Prices and Configurations

Here is a quick summary of the prices for representative PCjr hardware and software components, and some typical configurations.

Description	Price
PCjr System Unit (64K, keyboard)	$669
64K Memory/Display Option	140
PCjr Disk Option	480
PCjr System Unit (128K, keyboard, disk)	1269
IBM Color Display	680
PCjr Internal Modem (300 baud)	199
PCjr Parallel Printer Attachment	99
Connector for TV (with RF modulator)	30
Connector for RGB Display	20
Connector for Cassette	30
Connector for Serial Devices	30
Cable for Parallel Printer	55
Keyboard Cable	20
IBM Graphics Printer	595
IBM PC Compact Printer (thermal)	175
IBM PCjr Attachable Joystick	40
PCjr Carrying Case	60
Cartridge Basic	75
DOS 2.1	65
Multiplan 1.10	250
VisiCalc 1.2	200
HomeWord	75
EasyWriter	175
Entry Level Home Configuration	
PCjr System Unit (64K, keyboard)	$669
Connector for TV (with RF modulator)	30
Connector for Cassette	30
Cartridge Basic	75
	$804
Home Budget/WP System	
PCjr System Unit (128K, keyboard, disk)	$1269
Connector for TV (with RF modulator)	30
IBM PC Compact Printer (thermal)	175
Cartridge Basic	75
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Visicalc 1.2	200
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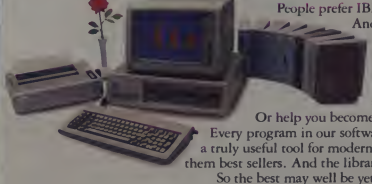

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Compatibility

Whether any given piece of software is compatible with the PCjr is hard to predict with certainty, but there are a few simple considerations to take into account. The most obvious are the current disk and memory limitations of one 360K disk and 128K of user RAM. The single disk will function as two logical drives, A: and B:, with the system prompting the operator to change disks when necessary.

For some applications, this is acceptable. For others, it is ridiculous. For example, if a program copies data from one disk to another one record at a time instead of in big blocks, thousands of insertion/removal/insertion cycles might be required. Logically, it works; physically, you should live so long.

Memory use is a little more complicated. The 128K of system memory must accommodate the 16K video display buffer and 24K for DOS, leaving only 88K for user programs (24K in a 64K system). Some programs are simply too big; they won't fit and you will get an error message from the DOS loader. Others may load, but have insufficient working storage; the good ones will tell you about it, the bad ones will go ahead and try to run anyway. Then there is the middle ground: programs that work, but with limits that may or may not be acceptable. Do you need more than 200 entries in your spreadsheet or 85 statements in your assembler program? Try before you buy.

Programs, such as APL, that require the 8087 will never work in the PCjr.

The PCjr is a credible vehicle for serious education with or about computers.

Programs that make assumptions about the length of time a sequence of instructions should take may not work, since the PCjr is slower in accessing the user RAM. Programs that directly access some devices (especially the disk and display systems) also may not work. Some software copy protection schemes might fall into these traps.

In general, programs that follow the rules of BIOS or DOS for device access, don't require more memory than is available, and don't need hardware that isn't there (like the monchrome display), will run without change on the PCjr.

Conclusions

I like this machine very much. For the home, its graphics and sound features provide a good base for high quality, enjoyable games and educational software. Its compatibility with the PC1 and PCXT make it ideal for occasional work-at-home use, sharing programs and data with the machine at the office.

The PCjr makes sense for the office, too, as a PC-compatible spreadsheet workstation, programmable telecommunications terminal, or wherever the higher cost standard PC isn't quite justifiable. It is a great machine for schools as well—at all levels. From Logo for the little ones, through introductory computer architecture for college classes, the PCjr is a credible vehicle for serious education with or about computers.

For myself, I would love to have one right now. Instead of sitting upstairs in my cold den, typing fast to keep my fingers from stiffening from the cold air flowing through the gaps around my storm windows, I could be downstairs, comfortably nestled on the couch, with a roaring fire in the fireplace, warmly, leisurely, cordlessly processing these final words. But then I might never finish. ■

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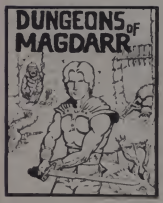

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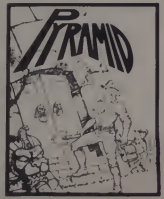

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The Timex-Sinclair 2068

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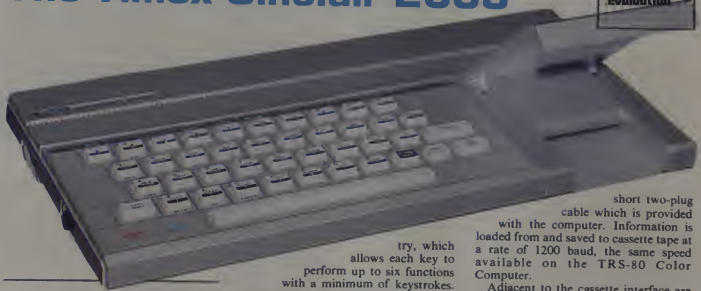


Owen Linzmayer

Having stunned the computer world with the inexpensive, tiny, black and white computer that bears his surname, inventor Clive Sinclair set out to build an even more remarkable machine. The result of his efforts first appeared in the United Kingdom as the ZX Spectrum. With several revisions and refinements, the ZX Spectrum has finally made its debut in North America under the alias of Timex Sinclair 2068.

The TS2068 is a second generation home computer from Timex Computer Corporation, the folks who brought you the TS1000, the first computer to retail for less than $100. The advertisements for the TS2068 promise 72K, along with color and sound capabilities. For $199.95, the computer delivers all of this and more.

The Timex Sinclair 2068 is an 8-bit personal color computer based on a Z80A microprocessor running at 3.5 MHz. There are 48K of Random Access Memory (RAM) and 24K of Read Only Memory (ROM) that combine to provide on-board memory capacity of 72K.

The Outside

Physically, the TS2068 is an attractive little computer. The sloping top of the TS2068 is dominated by a large 42-key full-travel Chiclet style keyboard that is a step beyond the membrane keyboard of the TS1000 but short of the standard typewriter style. Set up in the traditional QWERTY configuration, the TS2068 keyboard features "soft touch" keyword entry, which allows each key to perform up to six functions with a minimum of keystrokes.

Weighing in at 3 lbs., 5 oz., this machine sports a sleek 14.75" x 1.75" silver and grey body that sits comfortably in most laps. Located under a hinged door on the righthand side of the keyboard is a slot that accepts ROM cartridges. Timex has used some of its watch-making technology to produce incredibly thin ROM cartridge programs. By doing away with the plastic and ceramic packages of their integrated circuits and mounting the silicon chips directly onto the cartridge board, Timex was able to avoid big, bulky cartridges.

Physically, the TS2068 is an attractive little computer.

The TS2068 requires 15v direct current and comes with its own transformer for this purpose. The on/off switch is located on the lefthand side of the computer, but like so many computers before it, the TS2068 lacks a power indicator. I can't figure out why computer manufacturers refuse to spend the extra $.25 to install a small LED power indicator. Such a light is bound to save time and money on repairs in the long run.

Peripherals

At present, the only storage device available for the TS2068 is a conventional cassette recorder. This hooks up to the back of the computer via a short two-plug cable which is provided with the computer. Information is loaded from and saved to cassette tape at a rate of 1200 baud, the same speed available on the TRS-80 Color Computer.

Adjacent to the cassette interface are two RCA video output plugs. The TS2068 has a built-in VHF RF modulator which can be connected to any standard television set (color preferred). If you own a monitor and wish to use the TS2068 in the highest resolution mode, that is fine too, since there is a composite video port. The channel (2/3)

creative computing

HARDWARE PROFILE

Product: Timex Sinclair 2068
Type: Personal color computer
CPU: 8-bit Z80A, 3.5 MHz
RAM: 48K
ROM: 24K
Keyboard: 42-key Chiclet style
Text Resolution: 32/64 characters x 24 lines
Graphics resolution: 256/512 x 192
Number of colors: 8
Sound capability: 10 octaves, 130 semi-tones, built-in speaker
Ports: Serial, cassette, 2 9-pin joystick
Dimensions: 14.75" x 7.5" x 1.75"
Documentation: Barely adequate user manual
Summary: Sinclair's second computer success story. Will give Commodore 64 a run for its money.
Price: $199.95
Manufacturer:
Timex Computer Corporation
Park Road Extension
Waterbury, CT 06720

select switch is on the underside of the computer.

A maximum of two peripherals may be connected directly to the expansion port on the back of the TS2068. A partial list of peripherals for use with this computer includes the TS2400 printer, an as yet unreleased telecommunications modem, and a mass-storage device called the ZX Microdrive (see sidebar).

The TS2068 is well equipped for playing games. Located on both sides of the computer are two industry standard 9-pin joystick ports. The TS2068 uses any Atari-compatible joystick controller. In fact, the joystick offered by Timex is simply the Zircon Z-stick with the Timex name.

The TS2068 is well equipped for playing games.

The TS2068 wired for games.

Table 1. Commands.

BEEP	ERASE	LPRINT	PRINT
BORDER	FLASH	MERGE	RANDOMIZE
BRIGHT	FOR..TO..STEP	MOVE	READ
CAT	FORMAT	NEW	REM
CIRCLE	FREE	NEXT	RESET
CLEAR	GOSUB	ON ERR GOTO	RESTORE
CLOSE #	GOTO	ON ERR CONT	RETURN
CLS	IF..THEN	ON ERR RESET	RUN
CONTINUE	INK	OPEN	SAVE
COPY	INPUT	OUT	SOUND
DATA	INVERSE	OVER	STEP
DEF FN	LET	PAPER	STICK
DELETE	LIST	PAUSE	STOP
DIM	LLIST	PLOT	VERIFY
DRAW	LOAD	POKE	

Table 2. Functions.

ABS	FREE	RND
ACS	IN	SCREEN$
AND	INKEY$	SGN
ASN	INT	SIN
ATN	LEN	SQR
ATTR	LN	STICK
BIN	NOT	STR$
CHR$	OR	TAN
CODE	PEEK	USR
EXP	PI	VAL
FN	POINT	VAL$

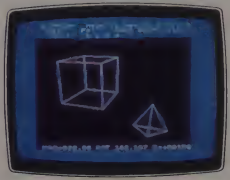
Sound

Sound effects enhance the play of video games greatly. That is why Timex has built a powerful little speaker into the bottom of the computer. The TS2068 has a range of 10 octaves and 130 semitones directly programmable from Basic.

In contract to the designers of the Coleco Adam computer, the designers of Timex felt that Basic rather than a word processor deserved to be the program in residence. The Basic interpreter within the TS2068 is very similar to that of the TS1000, but with many additions. Specific commands and functions have been added to handle the more complex graphics and sound routines (see Tables 1 and 2).

Display

In contrast to many popular home computers, the origin (0,0) on the TS2068 display is in the lower, not upper, lefthand corner. While this may present problems when converting programs from other computer systems, it is actually easier to understand for those who grew up using Cartesian coordinate graphing.



The TS2068 has two distinct display modes, normal and enhanced. The latter doubles the number of characters/pixels per line and should be used only with a display unit that can handle such fine resolution. In normal mode, the TS2068 supports 32 characters by 24 lines, and 256 pixels horizontally by 192 vertically. Yes, text and graphics can be mixed on the same screen. In fact, two characters may even be displayed one atop the other.

Graphics

When it comes to graphics, the TS2068 outperforms almost every other computer in its price range. A standard set of low-resolution graphics characters can be accessed directly from the keyboard in the "G"raphics mode. In addition to this, you can easily design your own graphics characters in Basic. In contrast to the TRS-80 Color Computer series, all eight colors can be used in both low- and high-resolution display modes.

I was a bit disturbed to discover, however, that there is no single command to draw a line between any two points. Due to the way the coordinates are set up on the TS2068 screen, and to the fact that

the DRAW command is relative instead of absolute, drawing a straight line between points is more difficult than need be. One solution is to enter this multi-command line:

PLOT (X1,Y1):DRAW (X2-X1), (Y2-Y1)

If you substitute your own values for the X and Y coordinates, you will have no problem, although a LINE command would have been greatly appreciated.

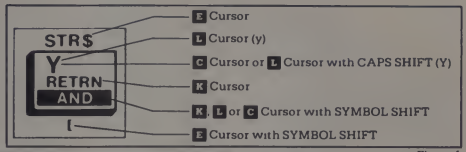


Figure 1.

The ZX Microdrive

At the October general meeting of the Boston Computer Society, representatives from the Timex Computer Corporation gave a sneak-preview of the ZX Microdrive, an innovative mass storage device that they believe will soon become the standard of the industry. Priced below $100 retail, it may well do just that!

Slated for release during the first half of 1984, the ZX Microdrive will initially run only on the Timex Sinclair 2068 computer, but users of other popular computers can expect versions of the new device for their systems in the future, stated Daniel Ross, vice-president of operations at Timex Computer Corporation.

Although exact specifications for the ZX Microdrive were not to be officially released until WCES, it appears that the drive uses small (45 mm x 35mm x 8mm) wafer-like magnetic tape data packs as the storage medium. These packs, nicknamed *diskettes*, can store 85K and will cost from $10-$20 per unit. Average access time is claimed to be less than 3.5 seconds. The BCS was given a live demonstration in which a 35K program was loaded in less than 10 seconds.

Up to eight ZX Microdrives may be connected together in daisy-chain fashion to provide a maximum of 680K for the TS2068 computer. Priced at under $100, the initial drive set includes an interface/controller box which has both RS-232 and Centronics ports built-in.—*OWL*

Whither Clive?

This is a roundabout story, but bear with us. Lotus, that outstanding manufacturer of winning race cars as well as the Lotus Elite and Elan, has been in serious financial difficulties lately. These troubles have been magnified by the death of Colin Chapman, the founder of Lotus, and the DeLorean affair. The only reason that DeLorean enters the picture is that Lotus had agreed to use the DeLorean plant for the development and manufacture of some very sophisticated lightweight cars.

The latest reports we get indicate that things are improving rapidly. First, Lotus has entered into a cooperative sports car project using engine and drivetrain components from Toyota. This sparked some spirited negotiations on the part of David Wickins of British Car Auctions to take over Lotus before it fell to the control of (horrors!) a Japanese firm. The Lotus board accepted Wickins's offer.

However, some weeks later Toyota made an offer to buy 2.9 million shares of Lotus stock (16% of the total) for £1.16 million. This offer was accepted at the Lotus stockholders' meeting. So where does Sir Clive Sinclair come in?

Clive, the electronics wizard who invented the "black watch," cheap scientific calculator, ZX80 (and its derivatives), and flat screen TV, had a new invention on the drawing boards—an electric car (shades of Tom Swift).

So Clive took a small dollop of his vast wealth (£9 million), formed a new company called the Sinclair Vehicle Project and bought the DeLorean plant in Ireland. Why? Because Lotus had already modified it to build sophisticated lightweight vehicles.

Sinclair has stated his theory that if you can't lighten the batteries (apparently you can't), you should 1) make the batteries fit the vehicle and/or 2) make the vehicle more efficient. His method for doing the latter is to use a chip (he calls it a "chopper") to chop the vehicle power demand on the battery into time slices of milli- or nanoseconds. In other words, deliver one millisecond of power then rest for two. Apparently this extends the discharge time enormously. Also, with the chip, the system can be programmed for various types and weights of vehicles.

Sounds good to us. Now when do we get one for evaluation?—*DHA*

Programming

The "trick" needed to work your way successfully around the keyboard and, subsequently, Basic is to realize that the TS2068 operates in several different modes and that the character within the flashing cursor indicates the current mode. When you turn on the power or reset the machine it defaults to the "K"eyword mode. Pressing any key, with the exception of a number, returns the entire keyword that is printed in black on that key. Then the cursor switches to a flashing L, which stands for "L"etter. As you can probably guess, pressing a key now returns the corresponding letter. The other options are the "C"aps lock, "G"raphics, and "E"xtended mode. Using a combination of shifts, character keys, and modes, each key can produce six different functions (see Figure 1). I must admit that I found this multi-function key system a bit difficult to adjust to at first, but after a while it became natural. In fact, this system is probably easier for the novice to learn, and it allows for quicker, more efficient programming in the long run.

Software for the TS2068 will be plentiful.

Software

"Software for the TS2068 will be plentiful," boasts Daniel D. Ross, vice president of Timex Computer Corporation. In addition to running a bevy of cassette and cartridge-based programs offered by Timex, the TS2068 will be compatible with all of the software designed for the ZX Spectrum, says Timex. Timex has over 40 different titles available, ranging in price from $9.95 to $22.95 each, and hundreds of packages are available from outside vendors.

One particular piece of software that I did get to evaluate is the VU-3D cassette. While not promoted as such, VU-3D can be thought of as the poor man's Computer Aided Design (CAD) program. The package allows the user to draw quickly any geometric figure by us-

ing a simple set of commands and the cursor keys. Once the object is constructed, it can be viewed from almost any angle and distance, giving it a truly three-dimensional look.

The finishing touch comes when the user dictates from which direction the light source is shining upon the figure. The computer then shades the entire object. Completed screen displays may be saved to cassette for use in other programs. If the quality of the VU-3D cassette program is any indication of things to expect from Timex in the future, TS2068 users will never have to complain about lack of great software.

Documentation

The TS2068 personal color computer comes with a single user manual. This 290-page piece of documentation is spiral bound, which allows it to remain open while lying flat and leaves the reader use of both hands for typing. Unfortunately, this is about the only positive thing I can say about the manual.

For someone who is already familiar with computers and wishes only to acquaint himself with the TS2068, this manual will suffice. But for the novice, or advanced programmer, the manual leaves much to be desired. While the authors do not claim that the manual will teach the reader Basic, I expect a little more than just a cursory summation of the commands and functions.

Summary

For $199.95 retail, the Timex Sinclair 2068 personal color computer represents one of the best buys on the computer market today. Aimed at the home user, the TS2068 is certainly capable of living up to almost any entertainment, educational, or computer tutorial expectations the prospective purchaser may have. For those satisfied with, yet looking to graduate from their ZX-81's and TS1000's, I can think of no better computer.

As an owner of a TS2068, I think it is comforting to know that Timex is committed to designing high-quality peripherals and software priced for the family budget—almost every additional piece of equipment will sell for less than $100 retail. Uncle Clive had done it once again—this time with feeling.

"The meeting will please come to order."

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Bookends	$ 125	$ 80
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Gen Manager II NEW!	$ 230	$ 180
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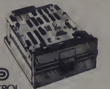

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SpellStar™	$ 250	$ 129
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creative computing equipment evaluation

Fujitsu Micro 16s

David H. Ahl

When we first published information about the Fujitsu Micro 16s in our NCC Roundup (August 1983), we had everything right except the price. We mentioned that the Micro 16s has two user-accessible microprocessors (an 8-bit Z80A and a 16-bit 8086), 128K of RAM, two double density, double sided 5 1/4" floppy disk drives, detachable keyboard, and CP/M-86. We mentioned a price of $2495 and Fujitsu's phone rang for weeks. Sorry folks, the price is $3995, but it still looks like a bargain. Read on.

According to Fujitsu, the Micro 16s was designed for the U.S. market—more specifically, for the business user. Key features are the two microprocessors and CP/M-86, under which the Z80 can run software designed for CP/M 2.2. Running the optional Concurrent CP/M-86 allows the Micro 16s to perform up to four computing jobs simultaneously.

The Micro 16s contains 128K of parity checking memory (expandable to one megabyte). An additional 48K is built in for high-resolution color video support.

The bundled system comes with CP/M-86, *WordStar*, and *SuperCalc*. Concurrent CP/M-86 and MS-DOS are optional. Other software is available from dealers, but not from Fujitsu. Interestingly, Fujitsu makes no high level programming language available for the Micro 16s—no Basic, no Pascal, no Cobol, no Ada. According to the specifications, the system "supports all standard language processors," but whether they take advantage of the high-

creative computing

HARDWARE PROFILE

Product: Fujitsu Micro 16s

Type: Small business computer

CPU: 8-bit Z-80A and 16-bit 8086

RAM: 128K

Keyboard: Detachable, 98 full-stroke keys

Text Resolution: 80 chars x 25 lines

Graphics resolution: 640 x 200 pixels

Colors: 8

Ports: Parallel, serial, light pen 4-channel A/D

Dimensions:
System unit: 19.5" x 15" x 6"
Keyboard: 18.3" x 7.7" x 1.3"

Documentation: User's Guide, Manuals for CP/M-86, *WordStar*, and *SuperCalc*

Summary: Dual processor business system able to run both 8-bit and 16-bit software packages. Rugged design, excellent keyboard. Comes with CP/M-86, *WordStar*, and *SuperCalc*.

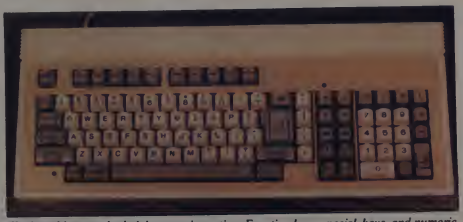
Price: $3995 for bundled system; monitor is extra.

Manufacturer:
Fujitsu Microelectronics, Inc.
3320 Scott Blvd.
Santa Clara, CA 95051
(408) 980-0755

resolution graphics or other extended capabilities of the machine we can't say. The lack of a high level language, of course, is consistent with the marketing philosophy of aiming the Micro 16s at a business customer looking for a turnkey system.

For the fanatic programmer, the 8086 mpu is accessible and the second section of the CP/M-86 manual provides documentation for assembly language programming. The first line of this manual put us off a bit, "The reader should also be familiar with the 8086 assembly language instruction set, which is defined in Intel's 8086 Family User's Manual." Gag.

Okay, so we'll skip the programming in this evaluation and look at the Micro 16s as turnkey business system.



Keyboard has standard alphanumeric portion. Function keys, special keys, and numeric keypad are all separate.

Setting Up

The Operations Guide with the Micro 16s provides extensive illustrated instructions on unpacking, setting up, and getting started. With the assistance of this guide, it took us about one-half hour to unpack and get our first disk loaded.

As we set up, the quality of the components was very evident. The system unit is in a heavy metal cabinet. Measuring 19.5" x 15" x 6", it is just a tad smaller than the IBM PC. A rocker power switch is recessed on the right side toward the back, and a reset button is recessed toward the front.

After a disk access, the drive keeps spinning for several minutes, thus speeding up subsequent accesses.

On the rear of the system unit are connectors for the keyboard, light pen, A/D, monochrome and RGB monitors, parallel printer (DB-25 connector), RS-232 serial device, AC in, and AC out (for the monitor).

Accessible through an open slot in the bottom of the front panel are 16 DIP switches. These are not described in the manual except in one illustration showing how they should be positioned for correct operation of the monitor.

On the back of the system unit are four rectangular covers. One or more of these covers can be removed when boards are plugged into one or more of the five 130-pin expansion slots. Hmmmm, 130 pins? That's not like anything of which we have ever heard. Nor is any information provided in the documentation. Guess we will have to wait until Fujitsu announces some add-ons or peripherals to see what plugs into these slots.

The system unit contains two double density, double sided 5 1/4" floppy disk drives with a formatted capacity of 320K each. An LED on each drive shows when a disk is being accessed. After a disk access, the drive keeps spinning for several minutes, thus speeding up subsequent accesses.

The system unit contains both a 16-bit 8086 mpu and an 8-bit Z80A, 128K of parity checking RAM (expandable to one megabyte), 48K of video memory, four-channel analog-to-digital converter, and interface circuitry.

Detachable Keyboard

The detachable keyboard is attached to the system unit with a cable, part of which is coiled and part of which is straight. In all, it stretches to almost six feet.

The keyboard has 98 sculpted keys including a truly standard alphanumeric keyboard, numeric keypad with arithmetic operations, ten function keys, ten special keys, and four cursor movement keys (arranged in a reasonably logical pattern). A nice touch is the LED next to the CAPS LOCK key (which indicates whether it is on), and similar indicator by the INSERT key. The RETURN key is a hefty four times the size of the standard keys.

Backspace is a destructive backspace and is where it belongs—over the RETURN key. Unlike some computers, backspace and left cursor movement are different keys, a nice touch.

A GRAPH key is used to obtain graphics characters from the keyboard; this is not a toggle key but must be held down with the desired regular key. ALT has a similar function and causes an "alternate" character set to be entered. In total, the keyboard is capable of generating 96 standard letters, numbers, and symbols; 32 graphics characters; 39 Greek letters; 10 reduced size numerals; and 26 math, music, and scientific symbols.

Cursor keys are arranged in a reasonably logical way.

The keyboard has some interesting fixed function keys including insert, delete, erase line, clear screen, home cursor, and duplicate (functions differently in different software packages).

A keyclick sound can be toggled on and off with the KCLICK command in CP/M. This produces a quiet click which is useful when holding down a key for repeated entries. All keys repeat when held down for about one second.

The standard alphabetic, numeric, and symbol keys are white with a black label, and all the other keys are medium gray. The area immediately surrounding the keys is tan, while the keyboard assembly is light cream. This color scheme is also used on the system unit and manual binders. In an informal office poll, we felt the system was reminiscent of a 1950's car—two-tone and fins—but the appearance was not indicative of the quality of the system.

High Resolution Display

Two monitors are available from Fujitsu for the Micro 16s, a 12" monochrome

FAX.
WHO DISCOVERED AMERICA?*

Chances are, you got the answer right. But not all the questions in this computer version of the popular Exidy Arcade Quiz-game are so easy. Can you name the only bachelor to become the President of the United States? Or identify what the initials stand for in O. J. Simpson's name? (If you guessed "Orange Juice," you *won't* score any points.)

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EPYX COMPUTER SOFTWARE

Strategy Games for the Action-Game Player

Christopher Columbus

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(green screen) unit and an 11" RGB color unit. Our system was equipped with the color unit.

Text resolution is either 40 or 80 characters by 25 lines. Although the SCREEN command (in CP/M) permits setting all kinds of variables, we never did figure out how to display a 40-character line. On the other hand, SCREEN lets you specify the number of lines on the screen, the number of scrolled lines, display colors, and whether or not to display the real-time clock.

Graphics resolution is 640 x 200 pixels. With the color monitor, eight colors are available. The video memory for graphics and characters is separate, so they can be displayed independently. Different software packages make use of the color capabilities in various ways. *SuperCalc*, for example, uses white for user entry, blue for spreadsheet labels, and light blue for function key labels—unobtrusive and effective.

An optional swivel pedestal is available for the monitor. This unit raises the monitor from the table or system unit about 2 1/2" and tilts from about 5 degrees forward to 20 degrees back, and turns 45 degrees to either side. We found it a nice accessory that helped compensate for various room lighting conditions.

CP/M-86 And CP/M 2.2

When the system is first started (with no disk in the drive), the following message appears on the screen:

DISK ERROR 0A
(R, H, D, S, O, X or G)

The manual tells us, "This is normal... Since there isn't a disk in drive 0, the Micro 16s displayed the error message." What do the letters mean? Who knows? Apparently, this is in keeping with the Fujitsu philosophy of not confusing the customer with extraneous information. The manual simply directs you to put a disk in drive 0, and press reset. Okay, that's what we did, but we would still like to know the meaning of R, H, D, and so on.

CP/M-86 is an operating system designed by Digital Research for the 8086 mpu. It is compatible with standard CP/M for 8080 and Z80 mpus. This means that if the disk formats are the same, as in the single density format, CP/M-86 can read the same data files as CP/M. This means that applications programs can be relatively easily converted to run under CP/M-86.

```
CP/M-86 Ver. 1.1 Serial Number 925 - 680

copyright (c) 1982 by DIGITAL RESEARCH

Fujitsu Micro 16s BIOS Ver. 3.0  copyright (c) 1983

System generated 15 June 1983

Memory Capacity = 128KB

A>dir
A: CPM      SYS : ASM86   CMD : AUTOEXEC      : COPYDISK CMD
A: COPYSYS  CMD : DDT86   CMD : ED      CMD : FORMAT   CMD
A: GENCMD   CMD : HARDC   CMD : HELP    CMD : HELP     HLP
A: KCLICK   CMD : PIP     CMD : SCREEN  CMD : SDIR     CMD
A: SETBAUD  CMD : STAT    CMD : SUBMIT  CMD : TOD      CMD
A: UNLOCKD  CMD : DIO0101 003
A>stat

A: RW, Free Space:        108k

A>hardc
```

Figure 1.

CP/M-86 can support up to one megabyte of internal RAM, 16 logical disk drives of up to eight megabytes each, and several other devices.

With both 8-bit and 16-bit mpus, the Micro 16s can run software under both CP/M 2.2 and CP/M-86.

Since the Micro 16s has two microprocessors, CP/M 2.2 programs do not have to be converted, but will run directly as loaded. Actually, the CP/M 2.2 disk will not boot up itself; instead, CP/M-86 is loaded, and then the desired CP/M 2.2 applications program may be loaded and run. The only restriction is that programs must be "pure" CP/M 2.2; this means that all calls to hardware must be through normal CP/M calls. We tried running CP/M 2.2 versions of *Perfect Calc*, *Perfect Writer*, and some other programs with mixed results. Some loaded and ran, but all too often we got a meaningless error message such as "disk not ready:" or "I/O error." We are not sure why—perhaps these programs used a direct hardware call (doubtful) or a non-standard CP/M call (possible).

CP/M-86 has a rich library of commands and associated utility programs. Figure 1 shows the startup dialog and list of utility programs on the CP/M-86 disk.

The manual is thorough and seemingly written especially for the Fujitsu Micro 16s. Indeed, except for failing to describe the error line resulting from a no-disk start, the manual is one of the most comprehensive on CP/M that we have seen, running 152 pages in the user section and another 180 pages in the assembly language programming section.

WordStar

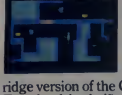
WordStar. What can we say? It is perhaps the most widely used word processor for microcomputers today. It is an exceptionally comprehensive package and has many custom features and enhancements on the Fujitsu Micro 16s.

Perhaps the biggest improvement in *WordStar* over the years has been in the documentation. Today, the manual still runs a whopping 224 pages in the main section, 31 in the appendices, 60 in the training guide, 50 in the installation section, and 17 in custom features. Nevertheless, the manual is much more readable and approachable than earlier versions.

Using the Short Course (40 pages), you can get up to speed on *WordStar* in about two hours. However, to take advantage of its many extended features will require study, practice, and experimentation over a span of weeks or months.

Some of the custom features on the Micro 16s allow *WordStar* to take advantage of the print enhancement features of the Epson MX-80 printer, ring a bell (actually a beep) on error, and use different colors for displaying text, prompts, status lines, and help.

WELCOME TO APSHAI.
YOU'RE JUST IN TIME FOR LUNCH.



Boy, have you taken a wrong turn. One moment you're gathering treasure and the next you're being eyed like a side of beef.

You're in the Gateway to Apshai.™ The new cartridge version of the Computer Game of the Year,* Temple of Apshai.™

Gateway has eight levels. And over 400 dark, nasty chambers to explore. And because it's joystick controlled, you'll have to move faster than ever.

But first you'll have to consider your strategy.

Is it treasure you're after? Or glory? You'll live longer if you're greedy, but slaying monsters racks up a higher score.

The Apshai series is the standard by which all other adventure games are judged. And novices will not survive.

They'll be eaten.

One player; Temple of Apshai, disk/cassette; Gateway to Apshai, cartridge, joystick control.

EPYX
COMPUTER SOFTWARE

STRATEGY GAMES FOR THE ACTION-GAME PLAYER.

*Game Manufacturers Association, 1983

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SuperCalc 2

SuperCalc 2 is Sorcim's spreadsheet package which has been nicely customized for the micro 16s. *SuperCalc 2* is a second generation spreadsheet and has all the commands we have come to expect in a spreadsheet with the addition of automatic sorting of rows or columns, formatting of text as well as numeric entries, protection of cells or ranges of cells, logical functions, calendar functions, net present value function, and several other goodies.

On the Micro 16s, *SuperCalc* is customized to take advantage of ten built-in and two programmable function keys, and use color in the screen display.

The manual is directly from Sorcim and reflects their years of experience marketing the package. As with *WordStar*, an eight-panel reference card is furnished with the package.

Options And Questions

The specifications on the Micro 16s mentioned several things which we did not have the opportunity to try. Obviously, external disk drives are available, both 8" floppy disk drives and 5 1/4" Winchester drives with 10 or 20 megabytes of storage.

As mentioned earlier, interfaces are provided on the system unit for a light pen and four-channel A/D converter. We have no further information on these accessories.

We are told the Micro 16s can be linked to the Omninet communications network system developed by Corvus. This allows the Micro 16s to serve as an intelligent node in a larger network, sharing resources and programs with other machines. We have a Corvus System on the next table awaiting its turn for evaluation, but none of the documentation with either system gives a hint on how to make them communicate with one another.

The Fujitsu Micro 16s is aimed squarely at the "typical" business and professional user who wants word processing, a spreadsheet and other off-the-shelf software.

And, as we mentioned earlier, we are curious to see what goes into those 130-pin expansion slots.

For Business Use Only

As it is bundled (CP/M-86, *SuperCalc*, and *WordStar*), the Fujitsu Micro 16s is aimed squarely at the "typical" business and professional user who wants word processing, an electronic spreadsheet, and little else. Although the system is capable of running a much larger library of software, the customer today will have to rely upon his dealer to get these packages and install them on the Micro 16s. The choice of packages is wide as a result of the Micro 16s being able to run 8-bit CP/M 2.2 applications as well as ones written for the 16-bit systems, CP/M-86, MS-DOS, and Concurrent CP/M-86.

We are disappointed that Fujitsu has chosen not to license Microsoft Basic directly and offer it to their customers. The hardware is exceptionally capable, and it seems that the manufacturer ought to make it as easy as possible for the user to take advantage of its many features.

In summary, the Fujitsu Micro 16s is a no-nonsense desktop computer. It is not portable; nor does Fujitsu pretend that it is. It is rugged and stylish (in a 1950's sort of way), and has a truly standard, user-friendly keyboard. At $3995, the Fujitsu Micro 16s is a full-featured, capable system, and, backed by Japan's largest computer manufacturer.

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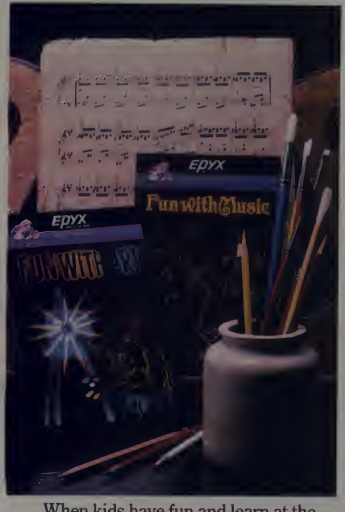

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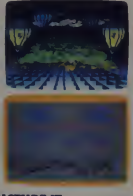

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creative computing equipment evaluation

Magic Computer

The Magic Computer is a bundled system with 12" monitor, detached keyboard, dual disks, and software library.

creative computing

HARDWARE PROFILE

Product: Magic Computer
Type: Desktop business computer (can be transported)
CPU: Z80A (4 MHz)
RAM: 64K
Keyboard: Detachable, 73 full-stroke keys
Text Resolution: 80 x 24
Graphics and color: None
Sound: None
Ports: Centronics parallel, RS-232
Dimensions: 20" x 19" x 6"
Documentation: User's Guide fair; applications software manuals excellent
Price: $2295
Summary: Bundled system with monitor, CP/M, CBasic, and Perfect Software packages. A no-frills business system with satisfactory performance.
Manufacturer:
Magic Computer Company, Inc.
Two Executive Dr.
Fort Lee, NJ 07024
(201) 944-6700

David H. Ahl

Perhaps you have seen the ads for the Magic Computer, the ones with the cartoon characters that resemble Zippy, the pinhead. Unfortunately, the tone of the ad seems to imply "computer game" and the Magic is anything but. On the other hand, the ads certainly stand out from the hundreds of look-alike ads for "serious" business computers.

In any event, once we started reading about the Magic, we got very interested. Here is a machine with both 6502 and Z80A microprocessors, 64K of RAM, dual, double density, double sided disk drives, and detachable keyboard all in a portable package. Also included in the bundled system price is a 12" monochrome monitor and a software library including CP/M, *Perfect Writer, Perfect Calc, Perfect Filer,* CBasic, and a utility that permits the use of Kaypro II software—pretty impressive for the suggested price of $2295.

Two Processors

The main processor in the Magic computer is a Z80A running at 4 MHz. A 6502 is used to control the video RAM and for certain I/O transfers.

The Z80A can access the main 64K memory, 8K of which is devoted to the operating system and 56K of which is available for user programs. A separate 3K memory is accessed by both processors for video information. Freeing the Z80A from the task of refreshing the video should result in a significant increase in execution speed in many programs.

Installation

For carrying the Magic, the keyboard tucks into a slot at the rear of the top of the system unit. A carrying handle is on the rear. Although the computer can be carried like an attache case, you would not want to set it down like one, since

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For carrying, the keyboard tucks into the back of the system unit.

you would be setting it on the front surface. While the disk drive doors are recessed, the reset switch and nameplate are not and are likely to be damaged.

Setting up the computer is a simple process. The keyboard is plugged into a DB-15 connector on the front panel, the power cord plugged into an outlet, and the monitor power cord and video cable plugged into the system unit, and you are ready to compute.

The system unit also has connectors for a parallel printer, serial RS-232 device, and "industrial video display" (whatever that is). A DIP switch next to the RS-232 connector is used to set the baud rate to one of 15 speeds from 50 to 19,200 baud.

At first glance, the disk drives appear to be full size units. However, upon opening the protective plastic doors, it is apparent that the drives are low profile (half height) units with about one inch of storage space for extra disks above each drive. The disk is held in the drive by means of a rotating handle, a system that we have found more reliable than pull-down doors. In contrast with industry convention, drive A is on the right and drive B on the left.

The power switch is on the right rear of the system unit, and a reset button is on the right front. When power is switched on, the system does a brief self-test and loads whatever disk is in drive A. CP/M comes up in about three seconds.

Designed as a business computer, the Magic does not have graphics or color.

Power on is indicated with a small red LED on the keyboard, an illuminated power switch on the monitor, and the fan in the system unit (a scaled down airplane turbine?). The fan totally drowns out the whir of a spinning disk drive.

The manual describes two hardware tests that can be done with no disk in the drive using just the keyboard and the reset switch. The first test did not seem to work on our machine, while the second one worked fine. Nevertheless, our machine seemed to work correctly in all other regards.

Also at set up time, you can set the cursor to one of six modes: block or underline, and fast blink, slow blink, or static.

The Keyboard

The keyboard has 73 full-stroke keys divided into an alphanumeric keyboard and numeric keypad (with three function keys over it). The QWERTY portion of the keyboard is absolutely standard, and touch typists will have no trouble stumbling over keys in strange places or resting their pinkies on active keys.

The numeric keypad is also standard and is not surrounded with arithmetic symbols so often found on other keyboards.

However, the keyboard has only three function keys. Thus many software packages which use single stroke function keys become two-stroke or two-key functions on the Magic (for example, CONTROL-D instead of f4).

The cursor control keys are combined with the numeric keypad which is fine for word processing, but less good for spreadsheet work. Ironically, the cursor keys are not implemented in any of the included software packages. On the Magic with *Perfect Calc*, for example, the numeric keypad is activated and the cursor moved by CONTROL-F for forward, CONTROL-N for next line, and so on. We much prefer spreadsheets which use both a numeric pad and directional cursor keys.

Keyboard has 73 keys arranged into standard alphanumeric keyboard, numeric keypad, and three function keys.

Cursor control keys double with numeric keypad, but are not implemented in the included software packages.

The caps lock key has two distinct positions so you can tell at a glance whether it is activated. Every key repeats after it is held down for about one-half second. Unfortunately, the space-bar on our machine stuck down whenever it was depressed, providing an infinite automatic repeat. We obtained a replacement keyboard which had exactly the same problem. We have, however, been assured by the manufacturer that later units no longer have this problem.

The keyboard has a rather short coiled cord which can be stretched to about 15 inches, enough for lap use as long as you don't lean back.

Except for the sticking spacebar, the keyboard had a good feel very similar to a TRS-80 Model 4.

Video Display

The Magic computer comes with a 12" monochrome monitor made by Disco Electronics in Taiwan. It displays 24 lines of 80 characters. Each character is formed within a 7 x 9 pixel matrix which permits two-pixel letter descenders. Interline spacing is three pixels, so clarity is excellent.

CP/M 2.21 has all the standard features plus several additional utility programs.

By our calculations, the screen has a resolution of 480 x 288 pixels. As far as we could determine, individual pixels cannot be addressed—at least not with any of the included software. Indeed, the character set appears to include only the letters, numbers, and symbols on the keyboard with no extra graphics characters.

The Magic is a business computer, and the designers apparently judged that business users don't need color so the capability is neither built in nor available as an option.

The monitor itself is a green screen unit in a 12" cubical metal-and-plastic housing. Behind a latching front door are controls for brightness, contrast, vertical hold, and five other less-used adjustments.

CP/M And CBasic

The operating system that Magic has chosen is CP/M, that workhorse of the microcomputer world. The version furnished is 2.21. It has all of the standard features plus a few additional utility programs not found in earlier versions. These programs include D (alphabetical directory with program size), UNLOAD, DUU (a helpful disk utility), MODEMM, COMPARE, and CCPLOC. Unfortunately, these are not described in the User's Guide, but many of them are self-explanatory.

Two other utilities are included, KAYPRO (to copy and use Kaypro II software), and CATCH (to copy IBM PC files).

Since we are not into masochism, we generally avoid using the CP/M editor, ED. This is probably the weakest link of CP/M. However, since the Magic includes only CBasic, it is necessary to generate the source code with an editor of some sort. (If you are not familiar with CBasic, check out "The CBasic Clinic" series which started in the November issue of *Creative*.)

Since we didn't know how to generate a non-document file with *Perfect Writer* (the included word processing package), we had no choice but to use ED.

To make a long story short, after several false starts, we got several short programs to run, including one which

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displayed the entire character set (only keyboard characters as we had guessed), and perform our standard benchmark.

This is not the place for a long-winded discussion of the pros and cons of different versions of Basic, but we should mention a few facts to put the benchmark test in the proper perspective. In general, a compiled language like CBasic takes less memory space and, because it is converted into machine code for execution, is faster than an interpreter. But not always.

Our benchmark is heavily computation bound; thus a compiled language is not likely to offer much of a speed advantage. Moreover, CBasic does all its computations in double precision whereas MBasic uses single precision.

CP/M, CBasic and the packages from Perfect Software are bundled in.

Thus, we would expect CBasic to be slower than MBasic—and it is—much slower (see Table 1). On the other hand, the Magic is many orders of magnitude more accurate than the IBM or Kaypro. Indeed, few microcomputers among the 103 that we have tested are more accurate.

Don't expect to be able to write CBasic programs using the Magic User's Guide. It has 1¼ pages on CBasic which was barely enough for us. A good book on CBasic is a small investment against the price of the system, although we have no idea why one was not included.

Table 1.

Computer	Time	Accuracy (lower is better)
IBM PC	0:24	.01159668
Kaypro II	1:36	.187805
Magic	11:45	.0000000744

Perfect Writer

The word processing package bundled with the Magic is *Perfect Writer* with *Perfect Speller*. This comes with a Lessons disk (with six lessons) and fat 378-page manual prepared by Perfect Software, Inc. A brief eight-page introduction to the package is also included in the User's Guide.

Perfect Writer is a comprehensive word processing package with more features than most users will ever need. It can have two windows which can be independently scrolled. This is useful for copying and moving text, and *Perfect Writer* has a wide range of commands for just that.

We are not enthusiastic about moving the cursor with CONTROL-F for forward, CONTROL-N for next line, and so on, but users will undoubtedly adjust in short order.

Perfect Writer has every imaginable print format and includes built-in support for most standard printers. For other printers, a longish menu, which need be used only once to set up the correct parameters, is included.

Perfect Calc

Perfect Calc is an electronic spreadsheet which, like *Perfect Writer*, comes with a series of lessons. Unfortunately, the file TEACHME.PC on our disk was flaky and refused to read correctly. Nevertheless, we have seen this tutorial, and it is very effective. For an even more comprehensive approach, a 346-page manual is included.

Perfect Calc is on a par with other spreadsheets and includes advanced features such as LOOKUP, NPV (net present value), and logical operators.

As with *Perfect Writer*, we don't like the control key combinations to move the cursor—hey, guys, that's what cursor directional keys are for!

Perfect Filer

Perfect Filer is a database management system designed primarily for mailing lists or other applications requiring lists of people. Of course, it is possible to set up generalized lists as well.

The package comes with two prestructured database disks, one set up for individuals, and the other for companies and other organizations. The printing utilities are geared to this format and will produce address labels, telephone lists, and form letters.

The manual with *Perfect File* is arranged as a series of tutorials. We did not think it was as effective as the more straightforward manuals supplied with *Perfect Calc* and *Perfect Writer*.

Documentation

The User's Guide with the Magic Computer consists of a 70-page manual with sections on installation, disk care and backup, CP/M, ED (the CP/M editor), CBasic (*very* short), *Perfect Writer*, *Perfect Calc*, and *Perfect Filer*.

The manual is very complete in some places and woefully inadequate in others. The first time user will need some handholding from his dealer, but more experienced people can probably muddle through.

The manuals with the applications software were all prepared by Perfect Software, Inc. and are very professional. As mentioned earlier, we don't particularly like the approach taken with the *Perfect Filer* manual. All three packages also come with multi panel, two-sided reference cards.

Warranty And Service

The Magic Computer has the usual limited warranty of 120 days (30 days longer than most). Both in and out of warranty service are said to be available from both Magic Computer in Fort Lee, NJ, as well as your "authorized dealer," presumably the one who sold the computer to you.

Obviously, it is far too soon to judge the longevity of the machine or the effectiveness of the service arrangements.

Should You Buy One?

The Magic is an interesting computer with many nice features. The combined power of the Z80A and 6502 should make it faster than other machines, although this was not apparent in our short test. We like the high capacity half-height disk drives with storage space over each one. And the portability is helpful for the times you want to take your office computer home.

The weak link of the system is the keyboard. The sticking spacebar (on two units) was frustrating. We also think the cursor keys should be separate from the numeric keypad and should be implemented in the software packages (obviously, this is a minority view since the Perfect Software packages are bundled with many computers, all of which use the kludgy control/letter combinations for cursor movement). We also would have liked to see some graphics characters implemented.

The User's Guide is very complete in some places and woefully inadequate in others.

Is the Magic for you? Ask yourself: Do I want CP/M? Do I like the Perfect Software packages? Will a text-only system meet my needs? Would limited portability be a nice extra? Am I willing to do business with a manufacturer without the initials IBM? Can I get along without much handholding? Lots of yeses—look at the Magic; lots of nos—look elsewhere.

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creative computing equipment evaluation

Quadscreen

Steve Arrants

Most computers offer a text resolution of 80 by 24 characters. That is generally satisfactory for most word processing applications. When you use a spreadsheet, however, the constant scrolling around the screen can be a bit confusing. Remembering the information in cell A12 and then scrolling to cell BB125 requires more memory capacity than most people have. Quadscreen is a product designed to help alleviate this problem. Quadscreen enlarges the screen of the IBM PC and gives it the ability to generate a 160 by 64 display—large enough for most spreadsheets.

With many word processing programs, what you see is not exactly what you get. Italics are surrounded by control codes, as are underlining and superand subscripts. Scientific and mathematical formulae are rendered all but unreadable on-screen by the complicated printing codes needed to generate them. Here again, Quadscreen may be a solution. Because of the flexibility of bit-mapped displays, you can control and display information in the *exact* form you would like it printed. Bit-mapping is also useful in graphics applications. With Quadscreen you can display a graphics screen of 968 by 512 pixels.

The Quadscreen Package

The Quadscreen package contains the Quadscreen monitor, a high-resolution black-and-white screen that measures 17" (diagonal), designed to eliminate screen flicker. Resolution is 968 horizontal dots by 512 vertical lines. Up to 10,240 characters can be placed on the screen at any one time.

The Quadscreen video card contains 128K of dual-ported RAM which holds 1024 dot rows, of which any consecutive 512 can be on screen at one time.

Two disks of software are provided. One contains the Quadscreen boot program and utilities. The second contains source code for COM/EXE files. Both disks are unprotected.

Installation

As with any peripheral card installation on the IBM PC, everything must be disconnected, disassembled, and pulled apart. Once the system unit is open, the Quadscreen card can be installed in any available slot.

The most difficult—and confusing—part of installation is the setting of dip switches on the system board. The IBM manual can be confusing as to which set of switches is which. We suggest making a diagram of the settings *before* you change them.

creative computing

HARDWARE PROFILE

Product: Quadscreen

Type: High-resolution bit- mapped monitor

System: IBM PC, PC-XT

Specifications: 17" diagonal monitor with P4 phosphor CRT. Resolution of 968 horizontal dots by 512 vertical lines. Video display card and software.

Performance: When it works, it works well. Software compatibility can be a problem.

Ease of Use: Installation is time consuming.

Documentation: Good.

Price: $1995

Summary: At this price, more is expected. Mouse or joystick control of FONTEDIT and a library of pre-designed characters should be included.

Overall Mark: B-

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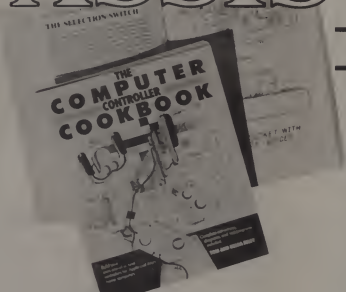

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Screen Display Mode	Driver Font #	Character Font Size
1) 80 characters by 25 lines (default)	0	12 x 20
2) 120 characters by 42 lines	1	8 x 12
3) 132 characters by 46 lines	2	7 x 11
4) 160 characters by 64 lines	3	6 x 8

Screen options are:
1) Full-screen (default)
2) Split-screen
3) Jump scroll
4) Smooth scroll (default)

Table 1.

In addition to the normal screen modes 0, 1, and 2, BasicQ includes a SCREEN mode 3, which sends all output to the Quadscreen.

If SCREEN mode 3 is selected, the COLOR statement may be used as follows:
COLOR 1 provides underline for each line of displayed text.
COLOR 2 gives inverse video for each line of displayed text.
COLOR 3 generates both the underline and inverse video.
COLOR 0 and 4 through 7 are the same as in BasicA.

In addition to the above, larger coordinate values may be selected while in SCREEN mode 3. The x and y values in a LINE statement may be 0-967 and 0-512 respectively.

Table 2.

With the switches set and the PC reassembled, you have only to connect the video card to the monitor.

Software Installation

Installing the software is much simpler. You just boot DOS 2.0, insert the Quadscreen Source Code disk, and run QSINIT. Instructions for patching the Quadscreen drivers into BasicA and DOS appear on the screen.

Operation

The standard driver allows for four display modes and four options (see Table 1).

When running Quadscreen, you specify the number of characters per line and the type of scrolling and select full or split screen. The software then selects which character font is best suited to your selections.

The FONTEDIT utility is helpful in the creation and editing of new fonts which can then be applied to the driver software. You edit a character on a screen grid with the function keys and the numeric keypad.

FONTEDIT is as easy to use as other character generators, but adding joystick or mouse control would have made it much easier. A library of pre-defined characters would be welcome.

BasicA was, of course, written for a standard IBM PC display. Quadram includes BasicQ, which takes the special characteristics of Quadscreen into account. It is compatible with BasicA in that any program designed to run under BasicA will run under BasicQ, but not *vice versa*. Table 2 points out the differences between the two Basics.

Looks Nice, But What Can It Do?

The success of any product should be determined not by what it can do, but how easy it is to achieve the desired results. With that in mind, our reaction to Quadscreen is mixed.

The large display area is striking. Having a large *VisiCalc* spreadsheet on the screen may be important to you. We think that scrolling on a standard display is an acceptable trade-off.

Not all software will work with Quadscreen. Because the screen drivers reside in system memory and not at a video address, some software may overwrite the drivers and send your PC into a coma. We tested Quadscreen with the new *Electric Pencil* word processor and could not get them to run concurrently. A call to Quadram was helpful: we had a beta-test version of *Electric Pencil* and Quadram was in the process of writing patches to the software drivers.

Quadram was also helpful when we called with a question on the documentation. In both cases, the answers were helpful and to the point. This is typical of Quadram's support. Unlike some peripheral manufacturers, Quadram doesn't leave users to turn in the wind.

"There is no such thing as a free lunch," goes the saying. That is true for Quadscreen as well. It *is* capable of a great deal. But at a suggested price of $1995, we would expect a more versatile and easier to use product. In reality, to take advantage of its capabilities, you must invest quite a bit of time. You can't use a daisy wheel printer with custom designed character sets. And chances are even your dot matrix printer won't understand these characters unless they are accompanied by control codes.

If, however, you plan to use Quadscreen only for large spreadsheet display or complicated graphics, it may be worth the investment.

"We designed this model to take some of the impersonal aura out of personal computers."

Sakata SC-100 Monitor

Sakata SC-100 color monitor on STS-1 tilt/swivel base.

David H. Ahl

Have you read a good monitor review lately? We haven't. The reviews in most magazines seem to assume that a monitor is a monitor is a monitor. Well, 'taint so.

Sakata Shokai is a Japanese Corporation (no surprise there) making a determined bid to grab a piece of the worldwide monitor market. Their units are not dual-purpose monitor/TV sets, but were designed as monitors. This approach results in a much better product than a TV set with the receiving circuitry stripped out.

The SC-100 is a 13" composite video monitor with 280 x 300 pixel resolution. Also made by Sakata are a 12" green monochrome unit and two RGB color units, the SC-200 with 640 x 240 pixel resolution and the SC-300 with 720 x 240 resolution.

All three color monitors are housed in the same off-white plastic case measuring 14.25" wide x 13.5" high x 16.6" deep. This is about an inch deeper, but an inch smaller on each front dimension than most other monitors. The screen tilts back six degrees. A matching tilt/swivel stand, the STS-1, is also available. This provides a 20 degree tilt range and swivels 45 degrees to the right and left.

On the front of the monitor is a push-button power switch, volume control, contrast control, and headphone jack. Having left various monitors on for days at a time, we applaud Sakata's use of an illuminated power switch.

Three other color controls (brightness, tint, and color) are on the rearward sloping top of the case. Obviously, Sakata reasoned that these controls will be used less frequently. Nevertheless, we would have preferred to see them on the front, perhaps hidden by a panel as Amdek does. Five servicing controls (height, horizontal hold, etc.) can be adjusted with an alignment tool which Sakata thoughtfully includes with the monitor. Vertical hold has its own small knob.

RCA jacks are used for both video and audio input. We wish manufacturers could agree on these connectors, but if you have the "wrong" connector on your cable, you can probably find an adapter in Radio Shack for a couple of bucks.

Overscan, Distortion, Linearity

Overscan means the loss of a part of the picture at the right and left edges. Overscan is common in normal TV sets, and compensates for the picture shrinking as the set gets older. Many computers designed for use with color TV sets (Atari, Commodore, etc.) put a blank area called a "guard band" at each side of the picture so that no vital information will be lost on a set with overscan. However, other computers do not have this guard band and thus may lose some active picture area if used with a TV set or monitor with overscan.

The best of all possible worlds occurs when the computer is matched to the monitor, for example, the Apple computer (which has a guard band) with the Apple monitor (with more than 10% overscan). Or a NEC computer (no guard band) with a NEC monitor (no overscan).

The Sakata SC-100 has about 5% overscan, a compromise level similar to other Japanese manufacturers (Amdek and Sanyo). When we received it, the unit had considerably more overscan at the left side (bad, because you can't see the first column or two of program listings). However, we were able to use the alignment tool and adjust the horizontal shift pot to more or less center the picture.

It is desirable that horizontal and vertical lines be as straight as possible. Naturally, there will be a slight outward curvature near the edges of the screen. The Sakata had the lowest distortion that we have seen on any monitor under $1000 professional units.

The horizontal linearity of the Sakata was also excellent. To the user, this means that text characters at all points on the screen are the same size.

Color And Brightness

Using a SpectraVideo 328, we generated 16 distinctly different colors and put various ones in blocks and circles next to each other. On the Sakata, all the colors could be distinguished from one another, although at the center setting of the controls, they were less vivid than on some other moni-

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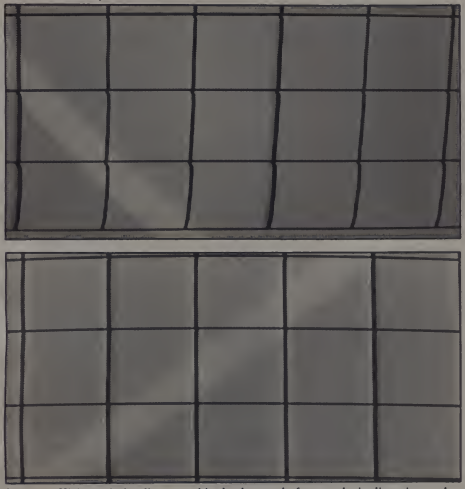

Figure 1. High resolution lines on white background often results in distortion at the bottom of the screen as shown on the Brand A monitor (top). The Sakata SC-100 is free from distortion (bottom).

tors. Furthermore, the color control did not seem to have as great a range as we would have expected. In the extreme counterclockwise position, of course, it went to black and white, but the full clockwise position produced colors just slightly more vivid than one half rotation.

Certain color combinations aggravate the picture circuitry on monitors more than others. For example, when the entire screen is white (all three color guns on), and you create a black line or rectangle at the bottom of the screen (no color guns on), this causes severe vertical nonlinearity on most monitors and TV sets. Not so on the Sakata. It passed this test with flying colors.

Another tough test is to draw a widely spaced grid of horizontal and vertical lines in the highest resolution possible on a white background. Generally, there will be vertical or horizontal distortion where the lines meet. Again, the Sakata did not exhibit this fault.

On a color monitor, when one color is displayed adjacent to another, say white text on a blue background, there should be no fringes or halos of other colors at the borders. Some color combinations are much more prone to fringes than others, especially black on white and white on black. This is because all three color guns are used to produce white, and just one or two are likely to be visible at the fine edges. This fringing effect was less pronounced on the Sakata than on some other monitors, although to get a true monochrome picture, the color control must be turned all the way off.

We did not have a computer that would produce the exact specified resolution (280 x 300 pixels) of the Sakata, so we tried it at 256 x 192 with excellent results. We then moved on to some games and graphics programs, again with excellent results. The sound from the one-watt amplifier coupled to the internal mini speaker was remarkably good, and considerably better than the monitors to which we are accustomed.

The Whole Picture

The Sakata SC-100 monitor is an excellent performer with low distortion, exceptional linearity, and good sound. The colors are excellent, although we would have expected a wider range of adjustment on the color control. Both user and servicing controls are readily accessible. At the suggested retail price of $329, Sakata should be a formidable contender in the monitor market in short order.

The tilt and swivel stand sells for $49 and makes a nice addition to the SC-100, particularly if you need to compensate for unusual lighting conditions.

For more information, contact Sakata USA Corp., 651 Bonnie Ln., Elk Grove Village, IL 60007, (312) 593-3211. ■

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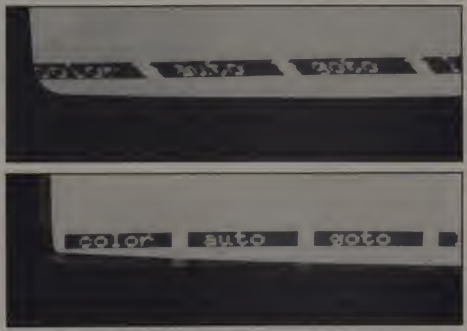


Figure 2. A small amount of black (no color guns on) at the bottom of an all-white screen (all color guns on) is a tough test for a monitor. Notice the tearing in the Brand A monitor. In contrast, the Sakata monitor is free from tearing distortion.

Electric Pencil PC

Betsy Staples

It was like meeting an old friend who had undergone a *Glamour* makeover. I was so excited I could hardly remove the shrink wrap from the *Electric Pencil* package.

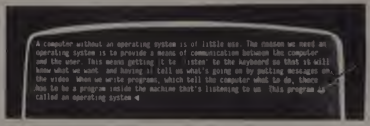
Having struggled for several months with a supposedly user-friendly word processor for the IBM PC which numbered among its flaws the simple inability to perform certain almost vital and clearly documented operations, I was ecstatic to discover that IJG had released *Electric Pencil* for the IBM.

Long-time readers of *Creative Computing* know that this earliest of word processing programs has a special place in our hearts. They know that we have used it for our typesetting for four years. They know that we considered the loss of an occasional letter during word wrap a small price to pay for the simplicity and straightforwardness of our old friend *Pencil* on TRS-80, LNW-80, S-100, and Sol 20 computers. What they didn't know until now is that *Electric Pencil PC* is now the program of choice among IBM users on our staff.

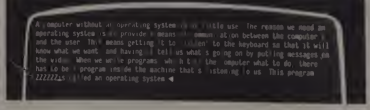
creative computing
SOFTWARE PROFILE

Name: Electric Pencil PC
Type: Word processor
System: 48K IBM PC and clones; PCjr
Format: Disk
Price: Electric Pencil PC, $299
Pencil Tutor, $49
Pencil Ace, $149
Summary: Reliable, easy to use program appropriate for home and office use.
Manufacturer:
IJG Inc.
1953 W. 11th St.
Upland, CA 91786
(714) 946-5805

With the cursor here, in insert mode, press: ZZZZZZ.



Cursor in the Middle of a Word Near the End of the Line.



After Inserting "ZZZZZZ".

Figure 1. Illustrations for description of insert mode show before and after screens.

Let me begin by saying to *Pencil* lovers like me: Yes, it is the same program. The commands are the same. The procedures are the same. The only changes are for the better—and in several months of use, I have lost not a single character.

That said, I shall try to set aside my biases and approach the program from the point of view of one whose introduction to personal computing coincided with his purchase of the IBM PC and who thinks *WordStar* is the antecedent of all word processing programs for small computers.

Documentation

The first thing that strikes you when you open the *Electric Pencil PC* package is the attractive, trade paperback size, perfect bound, 240-page operator's manual. Michael Shrayer, author of the original *Electric Pencil*, and Harvard Pennington, author of *TRS-80 Disk and Other Mysteries*, have combined their expertise and done a superb job on the manual. The authors assume nothing and present the material in tutorial style,

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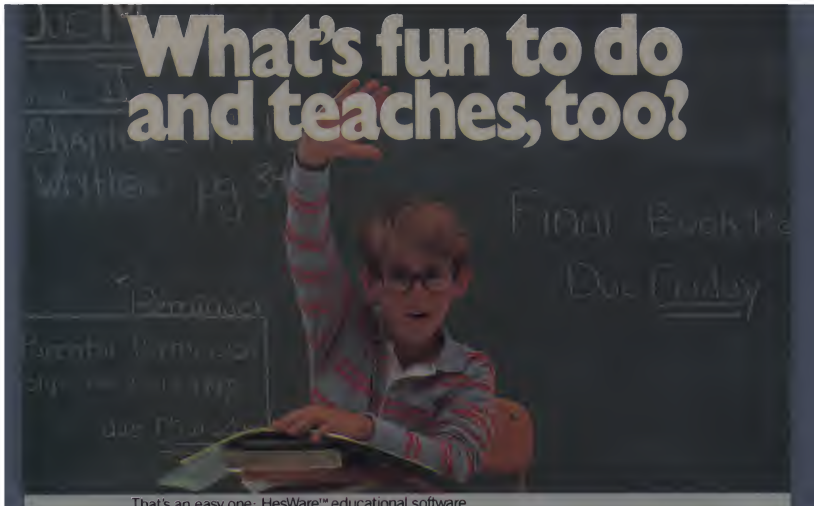

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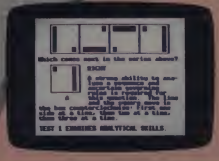

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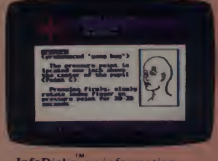

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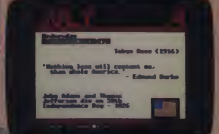

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→	Cursor right	^HOME	Text start	^N	Text end	PgDn	Page down
←	Cursor left	^B	Text start	↹	Tab lt/rt	PgUp	Page up
DEL	Delete char	^U	Delete block	^V	Srch/Replce	^K	System menu
^D	Delete char	^J	Insert block	^C	S & R cont	^P	Print menu
INS	Insert mode	^E	Scroll up	^M	Marker set	^F	Form feed
^I	Insert mode	^X	Scroll down	^L	Marker jump	^O	Hard space
^Y	Delete line	^A	Bold face	^S	Tab set	^R	Repeat
^G	Insert line	^Z	Underline	^W	Tab free	^H	Help
^T	Erase to EOL	←	Back space	ESC	Dict a-matic	↵	End record

Figure 2. On help level 4, the bottom 15 lines of the screen are occupied by brief explanations of the most frequently used editing commands; Caps Lock, Num Lock, underline, and a boldface status indicators; and a line showing the position of all tab settings and the cursor.

inviting you to experiment with each command as it is discussed. They define all technical terms as they are used and take pains to help you understand everything about the system.

Each chapter has its own table of contents, and each command is illustrated, including pictures of the screen before and after when appropriate. The notation used to distinguish key names, material typed by the user, and material displayed by the computer is consistent throughout.

Instructions for *Pencil Ace* and *Pencil Tutor* are included in the operator's manual, and there is a handy quick reference card, which you will probably be able to abandon soon after you begin using the program regularly.

In addition, the appendices include a glossary and sections on special print drivers, IBM PC characters and graphics, customer service, other programs that work with *Pencil*, and the files on the distribution disk.

Editing

Pencil performs all the operations—insert and delete characters, words, lines, and blocks; scrolling; cursor movement; search and replace—that you expect a word processor to perform.

To accomplish most of these editing changes, you need only press Ctrl along with one other key. In some cases, because of the special keys on the IBM keyboard, you can choose either the dedicated key on the keyboard or the Ctrl combination. To insert one or more characters, for example, you can use either Ctrl-I or just the Ins key. Most of the Ctrl combinations are at least somewhat mnemonic, so it is not difficult to remember them. To delete one or more characters, for example, you use either Ctrl-D or the Del key.

In insert mode, any material you type shifts the material you have already typed to the right as long as you remain on the line on which you started. When you come to the end of that line, however, the cursor automatically drops to the next line and inserts a blank line for you to type on. The program continues to add lines for your insertion until you enter a carriage return, move the cursor from the line, or press Delete, at which time your previously typed text moves up to fill in any remaining space.

Editing with Electric Pencil PC is simplicity itself.

One of the many improvements to *Pencil* appears in insert mode: when you backspace in insert mode, you get a true backspace that not only moves the cursor back, but deletes whatever it passes over. This is a marked improvement over the old *Pencil* in which a backspace in insert mode eliminated the character over which it was placed, but did not eliminate the space that the character occupied, so that if you made a mistake while typing in insert mode, you had to eliminate deliberately the space that it had occupied.

With the monochrome display that I use, underlining shows right on the screen, as do boldface and underlined boldface. These are all invoked with Ctrl and a single character.

Editing with *Electric Pencil PC* is simplicity itself. The commands are straightforward, and I can think of no editing operation I would want to perform that *Pencil* does not provide.

Help

Electric Pencil PC is replete with help features. There are four levels of help and a level that offers no help at all; all are invoked with Ctrl-H. Help level 4 uses half of the screen to list the most frequently used editing and cursor movements and the commands that implement them. It also tells you the status (off or on) of Caps Lock, Num Lock, underline, and boldface. Above all this information appears a line that indicates the position of the cursor and the location of all tab settings.

Help levels 1, 2, and 3 offer progressively fewer of these helps, and level 0 leaves you completely on your own.

The price you pay for all this assistance is loss of text area on the screen. On level 0, you have use of all 25 lines on the screen. On level 4, you get only 10 lines of text.

After a few hours of practice, it is quite practical to specify level 0 as the default condition and refer to the help display or quick reference card only when memory fails.

Printing

The *Pencil* print menu, which is reached by pressing Ctrl-P from edit mode, offers all the standard print formatting options, including right justification, left margin setting, line length, line spacing, page length, page spacing, page numbering, number of copies, and halt after linefeed.

The print menu also allows you to specify certain features of your printer, including baud rate, parity, and word length.

If you use the same print format for most of your work, you can save that format and make its values the default values in the print menu. You can also save the print formats of an individual document with the document itself so that when you load the document the print format is loaded with it—a feature that will surely be of great value to users of form letters.

Most of the options offered on the print format menu can be used as imbedded commands to provide dynamic print formatting. In addition to specifying page numbering, right justification, line length, and margins, you can center, indent text, "outdent" lines, switch headings on odd and even numbered pages, pause printing, and do quite a few other tricky things using imbedded commands.

Another useful imbedded command is conditional paging, which allows you to

Figure 3. The print menu.

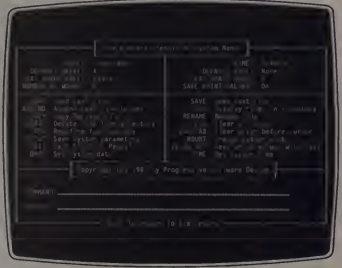

Figure 4. The system menu.

keep a paragraph from starting on a page if only one or two lines will be printed before the page ends. You can also use imbedded commands to call and print additional files from disk.

You can define any or all of the IBM PC function keys to suit your needs.

As with the editing commands, I have not had a need for any print format that *Electric Pencil PC* could not handle.

System Menu

The system menu includes all of the *Pencil* disk commands, such as load, save, append, copy, erase, directory, clear, rename, and exit. (The entire program is completely copyable, so you can make as many backup copies as you feel you need.) The system menu also displays the date and time (if you have entered them at the beginning of your word processing session), the number of words in the current file, and the amount of free text space.

From the system menu you can set the date and time, specify a default drive and file as well as other default values, save print values, and redefine the function keys.

Redefine the function keys? Yes, you can define any or all of the IBM PC function keys to suit your needs—and it is very easy to do. Each key can be defined as a string of up to 16 characters, including control characters. You might want to make one key automatically center the word MEMO or print the name of your company in boldface. You can even have the function keys substitute for Ctrl and Alt sequences as well as the sequences for imbedded commands. I, for example, have defined one of the function keys as ;CL;, the command for centering. Now, whenever I want to center something, I need to press only one key instead of four. And the process of redefinition is so simple that you could easily redefine the keys each time you sit down to type if you know that you will be using a certain phrase or command repeatedly in a given document.

The system menu also offers you an opportunity to live dangerously. When you receive the disk, the verify option is on. If you attempt to load a file into the buffer, clear the text from memory, or exit the program without having saved your text to disk, Pencil will say: Updated text not saved—Continue (Y/N)? and require you to press Y or N before it continues. This feature is obviously intended to keep you from carelessly destroying your files. If, however, you are as the manual says "oozing with confidence," you can easily turn the verify function off. The program will then allow you to do whatever stupid things you care to without interference.

Utility Functions

In addition to the print and disk system commands, *Electric Pencil* provides a group of utility functions. The most important of these are set help level, string search, and dict-a-matic.

Setting the help level allows you to choose the amount of help you want on the screen at any given time. The help level can be set as a default value through the setup command in the system menu. You can, however, invoke as much help as you want at any time simply by typing Ctrl-H from edit mode.

Using string search, you can locate and change, if necessary, all occurrences of a given string of characters. Wild cards and null characters can be used when specifying the string to be searched. After the search is performed, *Pencil* tells you how many times the string appears in your document.

To replace a string, you simply specify the word or phrase you want to substitute when the program prompts Replace with:. If you want to replace only some of the occurrences of your word or phrase, you can use conditional replacement, which allows you to see each occurrence individually and decide whether to change it or not. With masked search mode you can search and replace strings without regard for upper- or lowercase or attributes such as bold or underlining.

For people who use word processors for transcribing dictation, interviews, minutes, and the like, IJG has included a built-in cassette start/stop feature called dict-a-matic. The cassette recorder is attached to the cassette port and the Esc key becomes an on/off control. This system is not a substitute for a proper transcriber equipped with foot-controlled on/off, fast forward, and rewind switches, but for the occasional user, it is a great deal better than constantly having to remove one hand from the keyboard to control the recorder.

Pencil Ace

Pencil Ace is a separate utility program that complements *Electric Pencil PC*. The documentation for *Pencil Ace* is included in the main manual, and the program also includes a help mode.

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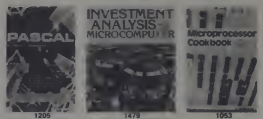

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Figure 5. The search and replace functions allow you to change all occurrences of a given word or phrase or just the ones that are incorrect.

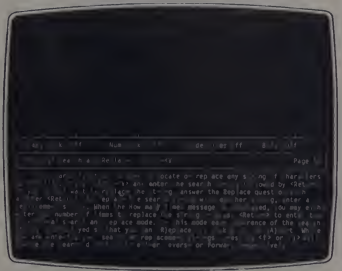

Figure 6. Pencil Tutor provides a detailed explanation of each of 62 commands.

access to an additional set of cursor control and other commands to make your editing even easier. Cursor control commands include cursor to next word, previous word, previous sentence, next sentence, next paragraph, and previous paragraph. You can also delete words, sentences, and paragraphs.

Pencil Ace even does windows. It allows you to use up to six screens or text windows at a time.

Pencil Ace even does windows. It allows you to use up to six screens or text windows at a time. I found the process very confusing and cannot conceive of any possible use for the function, but windows are the wave of the future, and those who want them will find them here.

For adherents of the what-you-see ... school of word processing, *Pencil Ace* offers the ability to set the screen width to correspond with the width of the printed document—as long as the printed document is between 10 and 80 characters wide.

Another useful feature of *Pencil Ace* is automatic key entry. You create your own automatic key entry files and name them. You could, for example, put your letterhead in an automatic key entry file. Then each time you wanted to type a letter, you would need only to specify the filename, and the letterhead would virtually type itself. This feature would also be useful for typing legal boilerplate, engineering specifications, and form letters—any task which requires repeated use of identical text. It can also be used to merge a mailing list with form letters. Boldface, underlining, and all of the abovementioned imbedded commands can be included in an automatic key entry file, and files can be chained together to create customized documents.

As if creating a comprehensive, easy to use word processor with windows were not enough, IJG offers through *Pencil Ace* the ability to reprogram the entire keyboard. Let's assume for a moment that you have been using a Brand X word processor and although you are not entirely satisfied with its features, you have grown accustomed to the function keys; Ctrl-E for backspace makes sense to you, and you are loathe to change your ways. With *Pencil Ace*, you can reprogram *Electric Pencil* to imitate the function keys of your old program or define a completely new set.

Pencil Tutor

Pencil Tutor is the second companion program to *Electric Pencil PC*. It consists of 62 separate *Tutor* screens, each of which explains one *Pencil* command.

Reliability, Thy Name is IBM ... Or Is It?

When I inherited my Sol 20 from the Creative Computing Software division in 1979, Processor Technology was already but a memory. When Steve North installed it for me, he warned that if we had any problems with the hardware it would probably be difficult to get it repaired.

As it has turned out, we have never had occasion to investigate the availability of repair services for the Sol—it is still going strong. Once it did blow a fuse in a cloud of foul smelling smoke, but a new fuse and good cleaning solved that problem in less than an hour. And, like many senior citizens, the 40-lb. Helios disk drive sometimes has trouble getting started on cold mornings. But overall, the Sol 20 remains the most reliable computer in a building inhabited by scores of systems—large and small, old and new.

Why, then, did I switch most of my word processing to an IBM PC nine months ago? Partly to find out what all the fuss was about and partly so I could try some of the myriad software packages being introduced for it every week.

So, how does the PC compare to the Sol? Well, we won't even discuss the keyboard except to say that the Sol keyboard—both in terms of touch and arrangement of keys—is still the best I have ever used. I find the documentation for the IBM and most of the software I have tried to use on it exceedingly confusing and, in many cases, totally incomprehensible. And I can reboot the Sol and Helios several times on cold mornings in the time it takes for the

At any time during your word processing session, you can press Ctrl-H followed by a command that has you confused, and the program will display an explanatory paragraph about that command. If you don't know what command you want, you can refer to the Pencil Tutor Key Guide in the manual which lists all of the commands and abbreviated explanations of each: Ctrl-G, Insert Line. *Tutor* is not intended to serve as a step-by-step tutorial, but rather as a ready reference for the person who has read enough of the manual to get started. It is also useful for veteran users who may tend to forget seldom used commands.

Summary

Is *Electric Pencil PC* for everyone? Probably not, but I can think of only one group for whom it would probably not suffice. Academicians—particularly those of the mathematical persuasion—will probably want a program that can handle superscripts and subscripts adroitly and perhaps even do automatic footnoting. *Electric Pencil PC* can be coerced into doing these things, using the infile character translation feature, but the process is cumbersome and probably best left to diehard hackers.

Pencil can, however, do just about everything else a word processor should do, and everything it does, it does with a minimum of fuss. Over the years, we have taught high school dropouts, Ph.D.s, technophobes, artists, secretaries, and many other typists and non-typists to use *Electric Pencil.* Few of them needed more than an hour or two to become proficient with the system—and none of them had the advantage of *Pencil Tutor* and the excellent new manual.

Another important consideration for all word processor users is, of course, reliability. As an *Electric Pencil* user, I have long since ceased to worry about losing files due to software problems. But I was reminded of the importance of software reliability recently when the night before he was to leave for a show, a fellow editor found himself copying a story from the screen of his Apple onto his Model 100. His word processor had taken a vacation, and he could neither save nor print his file. When I left him at 7:00 p.m., I smugly assured myself, and I can assure you, that this would never happen to an *Electric Pencil* user. In five years, power failures and my own carelessness are the only things that have caused me to lose files.

Do I recommend *Electric Pencil PC?* The answer is a resounding *Yes!* The people at IJG have taken a good, reliable program and turned it into a marvel of flexibility and dependability. And they have taken the time to debug it thoroughly before releasing it; even the Beta test copy we had performed flawlessly.

If you are a hacker who enjoys setting DIP switches, writing drivers, and inventing imbedded commands, buy another word processor. If, however, you are a computer *user* who want a straightforward, comprehensive, easy to use program, get *Electric Pencil PC.*

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IBM to run its self-test.

But my biggest complaint about the IBM concerns precisely the factor that many people cite as primary in their decision to buy the PC: reliability. The week before the warranty expired, a representative from Prodigy Computer Center, the store from which we purchased the machine, called to ask if we wanted to buy a maintenance contract. I thought for a moment about the Sol, our four- and five-year-old Apples, the Imsai 8080, and even the Altair—all of which were functioning well—calculated the amount we had spent on repairs for all of them put together, and told her we were not interested.

Less than a month later, the PC keyboard died. We took it back to Prodigy where we were told that the entire keyboard assembly was faulty and would have to be replaced. The people in the store were kind enough not to snicker.

Three months after that, the boss was using my machine and involved in much disk swapping when a small piece of black plastic flew out of disk drive B, rendering the door somewhat unstable but still usable. We tried to fix it with Crazy Glue, but couldn't get it to stick, so I tried to use drive B only when absolutely necessary, and then only with great care and gentleness.

Then, a week ago, as I opened the drive door, another small piece of black plastic flew out, and the door was dead. At first, the people at Prodigy thought they would have to replace the entire drive, but upon closer inspection, decided that they could replace the 1½" square door for a mere $45.43.

So, in less than a year we have spent $318 repairing a $3000 machine. That is more than we have spent on repairs for any single system of any age in the past five years, and $43 more than the maintenance contract would have cost.

The question remains: do we have a lemon or is the legend of IBM reliability less than it is cracked up to be? In either case, we urge readers to be careful.

—EBS

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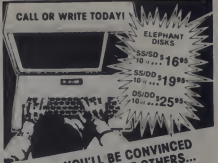

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CIRCLE 166 ON READER SERVICE CARD

Growing Up Literate

Part 4

Betsy Staples

Antonym Antics

Antonym Antics from Muse Software is an exceptionally cute vocabulary game.

The program begins with a brief introduction to antonyms which includes instructions for pronouncing the word ("First say ant . . . "), a very short definition, and an example. The introduction is revealed one hi-res capital letter at a time, which is fine the first time you play, but becomes tedious once you understand the principle and want to get on with the game. We found no way to bypass the introduction or to resume an interrupted game.

The simple instructions for playing the game appear on each screen, so there is no possibility of forgetting how to play.

For each pair of antonyms, a word appears at the lefthand side of the screen. Five additional words then appear on the right. You press RETURN to move a rectangular outline through the list of words. When the word in the rectangle is the antonym for the word on the left, you press the spacebar and immediately learn whether you were right or wrong.

Regardless of whether you were right or wrong, you next see a hi-res cartoon illustrating the word whose antonym you are trying to guess. A press of the RETURN key reveals a second cartoon which illustrates the antonym. For example, "Sally's hair is wet" and "Sally's hair is dry" show very clearly the difference between wet and dry.

If your answer was incorrect, you get another chance to guess the correct antonym after you have seen the cartoons. Subsequent misses of the same word result only in new lists of possible antonyms. You don't get to see the cartoon again until you render the correct answer.

The cartoons are extremely cute and

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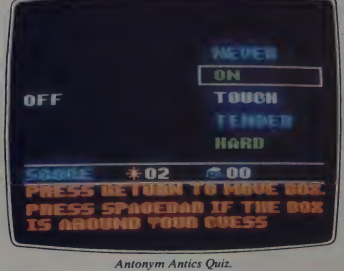
Name: Antonym Antics
Type: Educational game
Suggested Age: 6 to 8
Author: Perry Edwards
System: Apple
Format: Disk
Summary: Clever cartoons illustrate drill on antonyms.
Price: $39.95
Manufacturer:
Muse Software
347 North Charles St.
Baltimore, MD 21201
(301) 659-7212



Antonym Antics Quiz.

Antonym Antics illustration of fast/slow.

clever, although a couple of them fall a bit wide of the precise definition mark. "I never/always keep things in this room," for example, is accompanied by a picture of an empty room followed by a picture of a room full of toys and furniture. Somehow, it seems that image would better illustrate some/none or empty/full.

The other problem with the hi-res screens is that they take a long time—about 12 seconds—to load. After the initial wait, you can flip between the two illustrations instantaneously, but we wish there were a better, faster way.

The *Antonym Antics* package includes two disks. There are 13 word pairs on the program disk and 22 more on the second data disk. The program prompts you to insert the second disk after you have done all the words on the first one.

The words on the second disk are a bit more difficult than the first batch, and toward the end of the list your task is further complicated by the addition of double word pairs. You must match two sets of words and their antonyms; then the cartoon combines both sets: Lois is younger and shorter than Dick/Amy is older and taller than Neil.

Readers of this series know that we almost always downgrade educational programs that do not allow the user to add his own words or problems. *Antonym Antics* does, indeed, lack this feature, but we certainly understand why. The creation of the delightful hi-res screens that are the heart of the game would undoubtedly be beyond the abilities of most users.

Summary

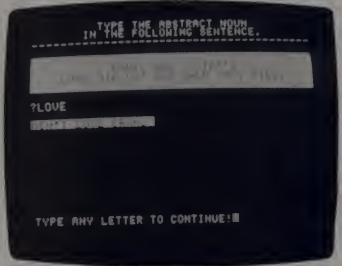
The question remains, however: is it wise to buy a program that offers only 35 exercises? Well, yes and no. If you are looking for an educational game that will keep your child occupied for hours without requiring any supervision or interaction with the parent, *Antonym Antics* is probably not the best vocabulary game to buy.

If, however, you are willing to spend time with the child and the program, talking about cartoons and the child's mistakes and using the program as a catalyst for other vocabulary games and exercises, then it could be quite valuable.

Classroom teachers in the primary grades should also be able to use the program to advantage as an integral part of a unit on antonyms.

Author Perry Edwards has done a good job with *Antonym Antics*. The words he has chosen to drill are right on target for primary school youngsters, and the clever, witty cartoons should appeal especially to children in just that age range.

CIRCLE 435 ON READER SERVICE CARD



Classes of Nouns.

Classes Of Nouns

Classes of Nouns is part of the English Grammar series from BrainBank. It is clearly designed for classroom use.

The lessons covered by the program include proper nouns, capitalization: titles are tricky, special classes of nouns, and common nouns. There is also a review exercise that keeps score.

Several of the lessons begin with colorful lo-res pictures that help to illustrate part of the explanation of the kind of noun under consideration, but most of the program is presented simply in the Apple uppercase character set. This means that the section on proper nouns that concentrates on capitalization loses a little something. The author underscores the letters that she wants to indicate as caps, but it seems a bit contrived. The good news is that screen displays appear quickly, so you don't have time to start wondering if a good grammar book wouldn't do just as well.

The approach to the subject matter is tutorial. A short bit of text defines the type of noun being studied, and examples are shown on the screen. The actual exercises which follow ask you either to identify one of the kinds of nouns by typing it or to tell whether a highlighted noun belongs to the class being studied by typing Y or N. The number of practice sentences is just about right; when you finish the exercise, you feel neither bored nor cheated.

If you get the answer correct on the first try, the program prints a word or phrase of approval which is sometimes humorous or punny ("You're no dummy" is the response to the answer "mannequin"). It is rather like having the class clown present at your private lessons.

If you answer incorrectly, the program simply asks you to "Please try again," and a subsequent correct answer evokes a simple acknowledgement, so there is no problem with reinforcing incorrect answers.

If you get the correct answer but spell it wrong, the message is "Watch your spelling!" You get as many chances as you need to spell it correctly, but, again, you get a noncommittal response ("Now I agree").

As for the information contained in the lessons, most of it is accurate and clearly explained. We were, however, distressed to see a reference to "Burt Reynolds' machismo." Perhaps Strunk and White's first rule of elementary usage has gone the way of inflection in the English language.

We also take issue with the author's insistence that the word *aunt* in "Ida's aunt Sophie" should not be capitalized. The only reference we could find to this construction preferred the uppercase use.

The review test quizzes you on all the classes of nouns you have studied on the disk. There is a true/false section and a section that asks you to identify nouns of the different classes in sentences.

The computer keeps track of your

creative computing
SOFTWARE PROFILE

Name: Classes of Nouns
Type: Educational
Author: Samantha Drogin
System: Apple, Pet
Format: Disk
Price: $60
Manufacturer:
BrainBank, Inc.
220 Fifth Ave.
New York, NY 10001
(212) 686-6565

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CIRCLE 216 ON READER SERVICE CARD

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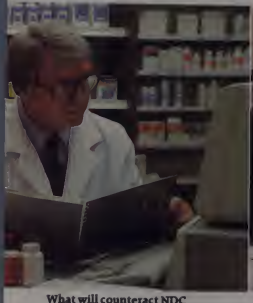

What will counteract NDC 74-0054-60?

Gary: The pedigrees for next week's auction are as follows...

Sold 1000 shares at 33 for net profit of 6000. Richard.

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CIRCLE 131 ON READER SERVICE CARD

Growing Up Literate, continued...

score and reports it as a percent at the end of the test.

Documentation

The documentation, oddly enough, says very little about the program. The eight-page Teacher Guide provides sample exercises similar to the ones on the disk and invites the teacher to reproduce them for use in the classroom.

The 18-page BrainWare Booklet is more of an introduction to computing than specific documentation for the program. The booklet begins "There are at least five lessons in every BrainBank diskette or cassette title. But you cannot work with them unless the computer is on." Armed with that bit of priceless knowledge, even the most cyberphobic teacher should feel confident.

The Booklet also includes "The Microcomputer: An Overview" and a glossary of computer terms. The booklet provides a reasonable introduction to computing, but is all but devoid of the machine-specific information that would make it really useful.

Summary

Like *Antonym Antics, Classes of Nouns* is recommended for use in the classroom. Since it, too, lacks provision for adding material, it would soon grow stale in the home where only one or two students would soon master the sentences on the disk.

In the classroom, however, it would make an excellent addition to a unit on nouns or parts of speech in general. As we have said before in this series, we approve of the old fashioned custom of identifying parts of speech and punctuation marks and drilling them.

CIRCLE 436 ON READER SERVICE CARD

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CIRCLE 192 ON READER SERVICE CARD

creative computing software evaluation

CalcResult

Gregory Yob

Consultants get unusual jobs, and I found myself one day in a firm which is well known in Silicon Valley when my manager asked me into his office for a private conference. His bosses had requested yet another revision of the salary requirements for his employees, and since this information was considered sensitive, my role as a consultant led me to a confrontation with some ledger paper and a calculator. After about 30 minutes and 30 mistakes, I got the revisions, totals, and estimates done for five employees and 12 monthly periods.

If I had had *CalcResult*, the job would have taken about ten minutes, of which six or seven minutes would have been used to set up the model and the rest for entering the various numbers. Further revisions would be merely a matter of updating the numbers that required new values.

An irony of all this is that the firm in question operates a computer network, in which it uses some 1000 computers. Every employee has a computer terminal permanently logged on to the network, but the bandwidth of a telephone line makes spreadsheets impractical to use.

creative computing

SOFTWARE PROFILE

Name: CalcResult—Advanced Version
Type: Spreadsheet
System: Commodore 64
Format: Disk and cartridge
Language: Basic and machine language
Summary: All in all, a good program.
Price: $149.95 (cartridge only, $79.95)
Manufacturer:
Computer Marketing Services
26 Springdale Rd.
Cherry Hill, NJ 08003
(609) 424-5055

What CalcResult Is And Does

Most businesses have tasks that are usually done on ledger sheet with a pencil and calculator. Most of these are small enough that the time and expense of writing a program, say in Basic, is too much for serious consideration. Many of these tasks are in fact one-time jobs, like projecting and comparing two bank loans at different terms and interest rates.

As a simple example, suppose you have taken a loan of $1000 at an interest rate of 12% per year. You are to pay back the loan at $100 per month with the interest due being paid first, and the remainder being applied to the principal. Figure 1 shows what you would end up with (I cheated and did this one with *CalcResult*.)

To set this up, I first made a grid of rectangular cells, with columns A through M and rows 1 through 10. Column A is used for titles, so that leaves the 12 columns B through M for the various numbers, including the twelve months for one year. I then put the starting information (loan amount, interest rate, and monthly payment) into cells B3, B4, and B5 for future reference. Note that the cells can be identified by their row and column co-ordinates.

The next step is to create the row labeled Month and to number the 12 months. Though this is easily done by hand, note that the value for cell C7 is the number B7+1, D7 is equal to C7+1 and so on. Now, to get the first value for the interest, I calculated 1000*12/12/100—that is principal * yearly interest rate / 12 months per year / 100 for percentage. This works out to 10. The balance is 1000+10-100 or principal+interest - payment.

The remaining months are calculated from the previous month's balance and the interest rate and payment values. For example, the interest for Month 5 is (Month 4 balance * yearly interest rate /1200) and the balance for Month 5 is (balance for Month 4 + interest for Month 5 - payment).

Once the formulae are correctly set up, all clerical errors are eliminated.

Figure 2 shows these relationships in terms of the cell co-ordinates. For example, the first month's interest comes out to be B3*B4/1200 placed in cell B9.

To get all of the numbers in Figure 1 requires a few hundred keystrokes on a calculator and a great deal of re-checking for mistakes. Yet, *all* of the monthly values are computed from the first three numbers. If the interest rate were to be changed, *all* of the monthly computations would have to be redone.

A spreadsheet program lets you specify the formulae (the relationships in Figure 2) for the monthly figures. Now, if the first three numbers are entered, *CalcResult* will automatically compute each of the 24 monthly numbers. The fear of fingers slipping on the calculator is gone forever. Even better, if you change one of the first three numbers, the automatic computation is done again, and the new monthly figures are immediately available.

To sum it up, a spreadsheet program has two advantages over ledger paper and calculators:

- Once the formulae are correctly set up, all clerical errors are eliminated.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	'My Loan '												
2													
3	'Loan '	1000.00'											
4	'Int Rate'	12.00'											
5	'Payment '	100.00'											
6													
7	'Month '	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'
8													
9	'Interest'	10.00'	9.10'	8.19'	7.27'	6.35'	5.41'	4.46'	3.51'	2.54'	1.57'	0.58'	-0.41'
10	'Balance '	910.00'	819.00'	727.29'	634.56'	540.91'	446.32'	350.78'	254.29'	156.83'	58.40'	-41.02'	-141.43'
11													

Figure 1. Example of a loan calculation. By using a grid of cells, a simple loan calculation is performed. Each cell is identified by its row and column, i.e., the label My Loan is in cell A1. The Interest and Balance in cells L9, L10, M9, and M10 indicate that the last payment is $58.40 in Month 10.

	A	B	C	D	E	F	L	M
1	' Title							
2								
3	' Title	' Number						
4	' Title	' Number						
5	' Title	' Number						
6								
7	' Title	' Number	' B7+1	' C7+1	' D7+1	' E7+1	' K7+1	' L7+1
8								
9	' Title	' B3@04/12@0	' B10@04/12@0	' C10@04/12@0	' D10@04/12@0	' E10@04/12@0	' K10@04/12@0	' L10@04/12@0
10	' Title	' B3+D9-B5	' B10+C9-B5	' C10+D9-B5	' D10+E9-B5	' E10+F9-B5	' K10+L9-B5	' L10+M9-B5
11								

Figure 2. Relationships between cells in loan calculation. The repetitive computations in the simple loan are shown here. These relationships are called formulae in CalcResult. Cells called Title hold strings for titling row and columns. Cells with Number hold values which are entered by the user. The remaining non-blank cells hold formulae which compute the number for a cell from values held in other cells. For example, cell C7 is calculated by adding 1 to the value of cell B7.

- Recomputation for new starting values is immediate and accurate, letting you try more situations when doing forecasts, budgets, loans, and the like.

Data Entry And Formulae

If you examine Figure 1 closely, you will see that it has 13 columns of eight characters each, so the loan calculation is 104 characters wide which is more than the 40 characters offered by the Commodore 64 screen. When you start *CalcResult*, it displays a portion of the worksheet 21 rows by 4 columns.

The cursor keys are used to select the cell with which you are working (a yellow cursor filling the cell shows where you are), and if you move the cursor past the edge of the screen, all of the cells move one unit, that is, the screen scrolls so that the portion of the spreadsheet in the display always has the cursor in it. Since scrolling is nearly instantaneous, this windowing is easy to live with. The cell co-ordinates are shown on the left edge and the fourth line of the screen.

When you have the cursor in the cell you want, you can enter either a "label" or a "value." Labels are entered by pressing Space followed by the text. (The text can be longer than the cell is wide.) If you enter a number, *CalcResult* sees this as a value. Entry of cell co-ordinates or mathematical operators puts a formula in the cell (*CalcResult* still calls this a value). If the number resulting from computing the formula can be calculated, this value appears on the screen. If not, the term NA (Not Available) appears.

You can alter text or numbers at any time and *CalcResult* will recompute the screen. The formulae are protected, and a special operation (blanking) must be used to re-enter formulas. This protects you from inadvertently destroying your formulae. As the cursor moves over cells, the formula for each is shown on the top line of the screen.

Main Menu Commands

Pressing the F7 key brings up an abbreviated main menu at the top of the screen. Selecting D, E, F, G, or P brings you to the second level menus. This provides access to some 50 major commands. Pressing F5 in any menu calls in from the disk a help screen which briefly describes each of the available commands. There isn't space to describe all of *CalcResult* commands (for these get the manual) but I will mention a few that I found especially useful.

The main menu serves mostly to select other menus or to escape from some function established from the sub menu commands. For example, L turns off the title, split screen, and window functions, and B serves to clear a cell holding a formula.

The command O serves to change the order of computation. If you look at Figure 2, cell D10 requires values from cells C10, D9, and B5. Normally, *CalcResult* calculates a sheet starting at A1 and going down through A2, A3 until all of the As are done. Then the B column is done and so on. Since D9 precedes D10, all of the values for D10 are ready when the calculation arrives at D10. If I had laid out the sheet in Figure 1 in a vertical format (i.e., the months going down the page) there would have been trouble.

Each of the balances is computed from the prior balance, the interest, and the payment. If I had placed my columns with the balance preceding the interest, each calculation of a balance would have needed information from a cell to its right, but the interest column would not have been calculated yet. Upon discovering the problem, I could have changed this with O. Then *CalcResult* would compute moving horizontally through the rows, and the required interest value would be ready for each balance.

If your spreadsheet uses many input

numbers, such as a budget or tax computation, it may take *CalcResult* some time to recalculate all of the other values. In fact, there may be no point in doing the recalculation until the new values are in place. In the loan example,

If your spreadsheet uses many input numbers, such as a budget or tax computation, it may take CalcResult some time to recalculate all of the other values.

a $2500 loan at 14.5% interest with $143.45 monthly payment will merely give garbage values until the three numbers in cells B3, B4, and B5 are all entered. The R command lets you select manual or automatic recalculation. In manual mode, you have to press the up arrow key for recalculation of the spreadsheet.

Disk Commands

The disk commands are the usual disk catalog, backup, scratch, load, save, and so on. One feature of interest to users of *VisiCalc* is the ability to load and save files in DIF format. Though the *CalcResult* manual merely says you can load and save in DIF format, the implication is that a *VisiCalc* file saved in DIF format can be transferred to *CalcResult*. I have not had a chance to check if this feature works. It seems that DIF is for transferring the numbers and text only, and I am not sure if the formulae can also be transferred via DIF files.

I do have one grumble which is not really the fault of *CalcResult*. If you are using a separate disk for the spreadsheet data, *your Commodore 1541 drive must be initialized every time you change disks.* In all innocence, I removed the data disk and inserted my program disk to look at a help page. When I saved the data on the re-inserted data disk, my files vanished.

Until you are working with large spreadsheets, I solemnly suggest that you make many copies of your program disk (called backup in *CalcResult* which I feel is misleading) say from a friend with a 4040 drive and save the data on the same disk. And while we are at it, don't do anything really important with *CalcResult* until you have survived a few disasters.

Edit Commands

The Edit commands are the most powerful in the *CalcResult* repertory. In Figure 2, many of the cells refer to other cells in a repetitive manner. The edit command R (replicate) lets you copy the contents of a cell, cells in a row, or cells in a column to other cells. This includes both data and formulae. For example, I can replicate the formula found in D9 to cells E9 through M9.

When I do this, *CalcResult* lets me specify the cells either by name or by putting the cursor in the cell and pressing RETURN. Then the various cells in the formula are shown and the question Absolute or Relative? displayed. A look at the formulae in D9 and E9 shows that the first cell used, B10 is Relative, i.e., in D9 this will be cell C10, and so on. Cell B4 is the same in all of the new formulae, so this is an Absolute cell. Of all the *CalcResult* commands, Replicate is the most powerful and most useful. You may also copy or move data (without replication of formulae), and insert and delete rows or columns in a similar manner.

If you want to compare distant areas of your spreadsheet, the features called Split Screen and Window allow you to do so. The split screen lets you display rows or columns side-by-side without all of the in-between columns showing. For example, if I wanted to see columns A and B and L and M on the screen at once, I would use the split screen. In a similar way, I can make a window which shows a small area separately on the screen. (When pages are mentioned, note that up to four pages can be shown at once via Split Screen and Window.)

Also included in the edit screen (I am not sure why, for I think it might fit better under Formats) is the command P for printing the screen or desired parts of the spreadsheet to your printer.

Format Commands

The Format menu provides various options for the presentation of the information in a cell. This includes the color of the characters; numeric, integer, and monetary (i.e., xxx.xx) forms for numbers, and left or right justification within the cell. The formats can be replicated—quite a handy feature.

Global Commands

Two of these commands are useful for your screen display. C is used to set the columnar width for all of the cells. F is used to select the format for all of the cells. A "local" format for a cell set from the Format menu takes precedence over any global format.

About Pages

Up to now, I have talked about only one spreadsheet, a two-dimensional grid of cells from A1 to BK254. *CalcResult* lets you build additional spreadsheets (up to 32 total) and has a group of commands (the Pages Menu) for interrelating these pages or spreadsheets. At any time, the Commodore 64 can hold two pages in RAM. The F1 key flips from one page to another, and the Split Screen and Window functions can be set up to display different pages on the screen.)

To work with many pages, *CalcResult* uses a scratch area on the disk called the work area. If you call in a page from the work area, the current page is saved to the disk first, and then the new page is read in. Several of the Page menu functions are quite straightforward, such as Copy one Page to another, Delete a Page from the work area, Erase work area, Get and Put pages from/to the work area, change a page number and Negate all values in a page.

The more exotic functions in the Page menu make all of this worthwhile. The Add function sums the values for cells in a "vertical" sense, i.e. cell C3 in page 1 is added to cell C3 in page 2, and so on. The result is stored in page 32. An example of the use of this is to sum similar reports from several departments in a business. To some degree the arrangement of added spreadsheets can vary, and it will still all work. A variation, +, is less selective than Add, as Add ignores cells whose labels or formulae don't match.

The rightmost column in use in a page can be referred to by the next highest numbered page. This is done by using cells named @1, @2, and so on. The Global Recalculation command will then perform the task of redoing the entire portfolio with the data on the right of one sheet being transferred to the next one. In this way, you can build a spreadsheet that is up to 2048 (64*32) columns wide and 254 rows deep.

If you want to compare distant areas of your spreadsheet, the features called Split Screen and Window allow you to do so.

Evaluation And Remarks

All in all, *CalcResult* is a good program. Much care has been taken to make it friendly and tolerant of mistakes. It will often turn the screen red and ring the bell when an error is

committed; most of the time the result is easy to fix.

I am not partial to "push this button, now push that button" style manuals, but I discovered that doing the tutorial did actually teach me enough about *CalcResult* to do a few things on my own without too many hasty searches through the manual.

The manual is in most cases excellent. I did find weaknesses in three aspects. First, the manual tells you to build "backup" disks, which are really your working versions of *CalcResult*, and to make "data" disks. All of this is fine, except to see a help screen you must remove your data disk and insert the backup disk. The insistence of the 1541 on initialization will get you after a while. I wish the manual were more specific about which disk is where in the tutorial section.

Second, in some cases the prompts on the screen didn't match the manual, so keep an eye on things. Third, in a few places you are advised to "play around" and then the narrative continues with the assumption that you didn't play at all. I had to do some hard thinking to get back to the tutorial a few times.

Many color photographs of the C-64 screen are provided. I found these essential as I went through the examples. I wish more manuals did this. By the way, some of the commands in the reference section are merely listed without any explanatory text. A bit of exploration is suggested.

CalcResult itself has two weaknesses, one major and one minor. The major one is the selection of white over blue for the cell area on the screen. I could not read certain combinations of numerals like 000 and 0689. When I rebuilt a version of my backup disk for a screen with one of the greys (I was expecting white over grey which is legible on my monitor), the result was yellow over grey, which was even more illegible. I hope the next version of *CalcResult* will also ask for "Data Color" to guarantee legible data.

For the present, you can survive by using one of two tricks. The first is to use the Format command to get the most legible color (I suggest light blue over the default blue screen) into cell A1. Now Replicate over the area you are going to use in the spreadsheet. This works only for small sheets, as a great deal of memory is used.

The second trick is to set the color as well as the formula for cells to be Replicated. Replicate will then carry the color along. The unused parts of the sheet will not be colored. The third option is to get a good monitor.

The minor weakness is that title protection does not transfer from the workspace when pages are being moved back and forth. I rather hope that some user-definable keystroke sequences will be included in future *CalcResult* releases. I could have defined a two- or three-key sequence to replace the 15 or so needed to restore the title protection I was using.

Another of the strengths of the program is a large variety of mathematical functions are available when you build formulae. This includes minimum; maximum; summing; mean and standard deviation over ranges of cells; net present value; a variety of higher math functions such as SIN, COS, ARCCOS, LOG10, and so on (useful for scientific work); nestable IF ... THEN ... ELSE statements; and the relational operators OR AND and NOT. All of these have precedence rules rather like Basic, so you do not have to play calculator when building formulae.

My overall evaluation is $4\frac{1}{2}$ stars out of a possible five. If you have to do business projections on a Commodore 64, *CalcResult* is a good tool.

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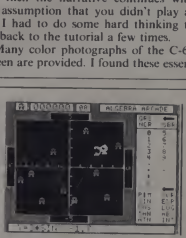

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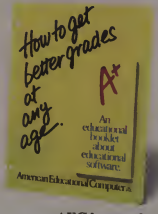

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The Tax Advantage

Arthur Leyenberger

Yes Virginia, there is a tax program for the Atari computer and it is a good one. Quality software for the Atari is finally appearing. By quality I mean software that is easy to use, intended for the non-technical user and free of bugs. The *Tax Advantage* from Continental Software is certainly such a product, and it is geared for the home user.

The *Tax Advantage* can assist you in preparing the following schedules for your federal income tax: A (Itemized Deductions), B (Interest and Dividend Income), C (Profit/Loss from a business or profession—Sole Proprietorship), D (Capital Gains and Losses), E (Supplemental Income from rents, royalties, etc.), G (Income Averaging), and SE (Self Employment Social Security Computation).

Forms 1040 and 4562 (Depreciation and Amortization) are also available. In addition to preparing these forms, *Tax Advantage* will allow up to three Schedule Cs for three different businesses and up to three properties on Schedule E for rent and royalty income. If you have a printer (highly recommended), the *Tax Advantage* can print the forms as well as the itemizations that make up any particular line item.

Many printers are automatically compatible with the *Tax Advantage* since it includes the printer control codes necessary for their operation. If your printer is not one of the supported printers, you can easily supply the ASCII printer control codes needed, and the program will do the rest. If you do not have a printer, the *Tax Advantage* is still very useful. Instead of printing the forms, you must copy the information from the screen.

Being able to itemize up to 30 items on just about any line item is especially useful for two-income families.

There are several helpful and clever aspects of the *Tax Advantage*. Being able to itemize up to 30 items on just about any line item is especially useful for two-income families. Another feature allows you to display at any time during your session 1) the currently computed adjusted gross income, 2) the tax liability based upon that adjusted amount and 3) your tax bracket. This feature is invoked simply by pressing the letter T and operates regardless of the completeness of your current 1040 form. Checking these numbers as you proceed through your session should reveal an ever-decreasing tax liability as you enter deductions and credits. Another valuable feature is the ability to enter numbers temporarily on any line of the form to determine instantly the tax consequences.

The 1040 Form is divided into ten screens with line numbers matching those on the form itself. The screens are easy to read, and each contains a maximum of nine double-spaced lines. The function menu is always visible at the bottom of the screen. Paging forward and backward through the screens is straightforward, and it is quite easy to add to, change, or delete an entry.

Itemizing And Calculating

The *Tax Advantage* really shines when it comes to itemizing and calculating. Just about any line may be itemized, and when completed, the total of the itemizations appears on the correct 1040 line, indicated by an I. All calculations are made after each line entry so their effect on your tax may be seen immediately.

The *Tax Advantage* is written in Basic A+ (OSS), but there is no need to own A+ since it comes with the package and is automatically invoked. However, you cannot use A+ separately. Since the program is written in Basic, program execution is not blindingly fast. However, the speed is not a handicap.

creative computing
SOFTWARE PROFILE

Name: The Tax Advantage

Type: Tax Preparation Program

System: 48K Atari 400/800/1200, Commodore 64, IBM PC

Format: Disk

Language: Basic A+/Machine language

Summary: A worthwhile program for preparing and analyzing an individual's federal income tax.

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I have only one disk drive, so I must perform numerous disk swaps between the *Tax Advantage* program disk and my data disk. A two-drive system would save considerable time.

Documentation

More than one tax return can be completed with the *Tax Advantage*. The only requirement is that each return must use a separate disk. The program requires 48K of RAM memory and at least one disk drive. Included are an 85-page user manual housed in an attractive blue binder, the program disk (two sides are used), and a warranty card which, when mailed with $10, will give you free updates to the program for a year.

Close reading of the manual suggests that these updates concern the program for the current tax year. However, another super bonus item is that once you have spent your money for the 1983 tax year program (don't forget, it is tax deductible), you can purchase next year's program at half price. That is a real deal.

How many times have you made a simple arithmetic error on your return and not found out about it until the IRS sent you a computer printout?

Let me remind you that this program will not automatically prepare your tax return, nor will it find all of those great deductions. It is a powerful tool for you to use in preparing your income tax return.

How many times have you made a simple arithmetic error on your return and not found out about it until the IRS sent you a computer printout? How many times have you finished spending hours preparing your tax return with schedules and subschedules, only to realize that you forgot to include a certain deduction or an additional source of income? You then had to throw out all the figures and start over again, right?

Alternatives And Corrections

These are the kinds of problems that the *Tax Advantage* eliminates. Using this program will not necessarily save you time, nor will it save you money, per se. And it does not obviate the need for good record keeping throughout the year and a systematic approach to this dreaded annual chore. What it does do is give you the flexibility to look at alternatives in preparing your tax return and to correct any omissions or errors before you file the return.

This is the second year I have used the *Tax Advantage* on my Atari computer. The first year (1982) I used it, was the first time in many years that I did not make an arithmetic error on my return. It was also the first year I was in business for myself. I successfully used the *Tax Advantage* to prepare and print the almost 35 pages of forms and supporting documentation required by the IRS.

The current version of the *Tax Advantage* is almost identical to last year's version, the major difference being that now there is an interface to Continental's popular *Home Accountant* program. The *Home Accountant* may be used throughout the year to itemize expenses. When the *Tax Advantage* is used, the itemized expenses that have been saved in the *Home Accountant* may be accessed.

The *Tax Advantage* is also available for other computers, including the IBM and Commodore 64. Kudos to Continental Software for a job well done. The *Tax Advantage* is a winner.

CIRCLE 409 ON READER SERVICE CARD

Infocom: The Steven Spielberg of Text Adventuring

Enchanter

John Anderson

At *Creative Computing* we don't look down our noses at "twitch-style" arcade games. We love them, and we play them regularly. A good hand-eye arcade game can provide hours of excitement and have an addictive power that keeps you coming back time after time.

In Praise Of Twitch Games

One of the outstanding qualities of a good arcade game is its accessibility. Boot one up and start playing immediately—no long-winded documentation to wade through, or abstract objectives to ponder. Wives, kids, friends, even parents can sit down and become quickly absorbed in a colorful, tuneful environment where the laws of physics have taken a decidedly whimsical turn.

For the fervent micro gamester, however, these games can begin to wear thin. After dozens of hours with *Miner 2049er*, even this magnificent game may seem a bit shallow. The time comes when you begin to long for a different kind of diversion. Something that ideally requires intelligence, strategy, a grasp of overall concepts, and no emphasis on physical coordination.

In Praise Of Text

That is where the text adventure excels. Nowhere can graphics or sound seem more real than in your own mind. Here a sense of narrative may unfold, as it unfolds in a novel or movie, with the power to involve you in strong and subtle ways. But a computer adventure is more than a mere novel or movie. Here the interactions of the story can be *initiated* by the user. The challenge of solving a story-puzzle can be maddeningly frustrating; likewise it can be, in its solution, very satisfying.

In Praise Of Infocom

And when it comes to text adventures, Infocom excels. In our reviews of the *Zork* series, murder mysteries *Deadline* and *Witness*, science fiction sagas *Starcross*, *Suspended*, and *Planetfall*, we have said it again and again: Infocom can't be beat. For richness of description, unfolding of storyline, sharpness of wit, and challenge of puzzles, Infocom has no equal in the software business.

In Praise Of Fantasy

As a software house, they have focused specifically on the text adventure, and in the process raised the genre to high art. With *Enchanter*, they have scored again. *Enchanter* is the debut package in a new line of fantasy adventures from Infocom.

creative computing

SOFTWARE PROFILE

Name: Enchanter

Type: Text adventure

System: Apple, Atari, Commodore, TRS-80, IBM PC, CP/M

Format: Disk

Language: Machine

Summary: Another top-notch entry from Infocom.

Price: $50

Manufacturer:
Infocom
55 Wheeler St.
Cambridge, MA 02138
(617) 492-1031

In some ways it marks the return to the old Zorkish formulas of D&D (donuts and dragoons) style fantasy—sorcerers and warlocks, sweeping medieval stories of magical, untainted heroism and terrible, unthinkable evil. These are the tales that myth is made of, and they seem so at home on microcomputers by now it seems they have been there always.

Although we have enjoyed contemporary and science fiction adventures from the company, *Enchanter* is a special treat. We have grown to love the *Zork* series, and somehow the modern stories, though extremely involving, seem a bit antiseptic by comparison. They are at times very cerebral exercises in logical problem-solving—a bit lacking in the fantasy elements that can turn a person in an armchair into Merlin the Magnificent. *Enchanter* marks a welcome return to the swords and sorcery micro owners have come to know, love, and accept.

Enchanter is the debut package in a new line of fantasy adventures from Infocom.

An Enchanting Scenario

In *Enchanter*, you are a wizard third-class, chosen for a special mission specifically because of your amateur status. According to the top-flight sorcerers, who may or may not be quaking in their own upturned boots, if any of *them* were to attempt to depose the evil warlock reigning

over the countryside, they would be detected immediately. You, on the other hand, are insignificant enough to gain access to Krill's castle undetected by his powerful mind-probe. At the same time, there is an outside chance you might just be competent enough to flush out the evil magician. Thus the die is cast. And take it from us, you are bound to die quite often before you prevail.

As is our custom in reviewing these sorts of games, we will offer nothing in the way of hints to spoil your enjoyment of the game. You must have a full opportunity to savor every breakthrough. But a little bit of description won't hurt.

Spelling It Out

Your only weapons in *Enchanter* are magic, so don't waste much time looking for swords, maces, or tactical nuclear weapons. You will, however, come upon spells, which you may write to your spell book. Because you nearly flunked out of the wizard program, only six of these at a time can be committed to your somewhat dull memory. It is, hence, a very good idea to rememorize the spells in your spellbook every morning before breakfast.

Some of the spells we have come upon so far are the following:

• *Blorb*. Comes in the basic wizard's kit. Allows you to protect one treasured possession. Very handy to have around, but anything so protected is no longer portable.

• *Cleesh*. Turns beings into frogs. Guess who gives you this one.

• *Exex*. Makes things move with greater speed. We are sure this is important, but we haven't yet used it effectively.

• *Frotz*. Another one you have with you from the outset of the game. Turns darkness into light. Cannot be used in the way we initially thought, resulting in much lost time "frotzing" around.

• *Gnusto*. Allows you to write spells to your spell book. Once written, you won't lose a spell after its first casting—merely rememorize it to use it again. Another spell that comes as standard equipment.

• *Krebf*. Repairs willful damage. Important at least once to obtain another spell. Probably handy again.

• *Nitfol*. Makes you into Dr. Doolittle—allows you to talk to the animals. So far we haven't made much more than small talk, but perhaps we haven't conversed with big enough animals.

• *Rezrov*. Opens locked or enchanted objects. As indispensable as a church key at a picnic. Handy multiple times.

• *Zifmia*. Theologically and ontologically significant, but it doesn't look to be of much more use. Does, however, allow you to meet God.

Living Right

Speaking of breakfast, you must keep yourself well fed and watered, and get enough rest. Otherwise you will end up passing out or getting so tired your mind will begin to cloud. This is not to say that you shouldn't do a bit of sneaking around in the dead of night. Just make sure you get your beauty sleep.

If you are lucky enough to find a way into Krill's castle, you may learn of possible means to dispose of him. But beware: the castle is full of dangers. The cannibal pagans, for example, only have you for brunch in order to *have* you for brunch. They are a rather ill-mannered bunch of fellas. While there are no nasty grues lurking in the dark corners of Krill's castle, the dark remains about as dangerous as it is in *Zork*, so watch your step.

Enchanter is full of the delightful little touches we have come to expect from Infocom. It has a developed sense of humor. Our realization of the significance of the *Zifmia* spell left us smiling. By the time we made sense of the Burma-Shave sign, we were in hysterics. But more important, *Enchanter* has a good sense of *synergy:* this is the ability of an overall narrative to become more than the sum of its parts—to totally envelope the user within it—and to build story involvement to the point at which disbelief is suspended. This is the point at which the landing gear of a good adventure leaves the ground, so you can soar into the air of imagination. Rest assured, Infocom hires only the best pilots around.

In Criticism Of The Best

This is not to say that absolutely everything about Infocom is perfect. Debugging programs of this nature is necessarily tricky, and early versions may evidence undiscovered bugs. The Commodore 64 version of *Planetfall* we received was good enough to boot, but too flaky to play for very long. It soon came up with bizarre and fatal errors, and even more insidious stuff, like suddenly making the food you were carrying disappear off the face of the planet. This was enough to stop our playtesting sessions cold. (We are happy to report that the Apple version is fine and has us losing sleep regularly.)

Then there are the "brick walls." If you are not a hot-shot adventurer, and usually even if you are, you will reach points in any and every adventure where all areas seem mapped, all grabbable objects seem to have been grabbed, all transactions seem transacted, and all possibilities seem exhausted. You simply reach a point where you are plumb out of ideas.

This very problem explains the aversion of many people to the text adventure. Maybe diehard adventurers don't mind spending eight months solving a single title, but most normal people do. This is why embedded hints are so important. *Enchanter* has them, and like its predecessors, is wonderfully documented. It includes a parchment with seal and a Guild Directory (wizard's local) to help get you started.

Still, you are bound to hit frustration points. Like its predecessors, *Enchanter* is tough and designed to last. You won't be solving it in one night, so you might as well take your time. Rushing will only result in missed opportunities.

Making Adventures Better

Around the lab we have some pretty strong feelings about the future of text adventures, so feel free to disagree. Here goes.

A major thrust should be to make text adventures more accessible, even to people who would ordinarily select a "twitcher" instead. Several approaches to this idea may be used in concert to bring adventures to a mainstream micro audience.

Imagine being able to activate more than one character in a story, so that each player gets a turn to further his or her own plot line.

Suspended took a step in the right direction with the inclusion of a fold-out gameboard that mapped the adventure in its entirety. Admittedly, giving the user a complete floor plan may make things a bit too easy. But an alternative is to provide a partial map, with unexplored areas remaining a secret. Or, as in the case of *Suspended*, an adventure may not make the mapping phase critical to the unfolding of the story. Purists offended by the idea of a pre-drawn map can choose not to use it. It might be packed in a sealed envelope to allow freedom of choice. But a well designed adventure need not have mapping as a main component.

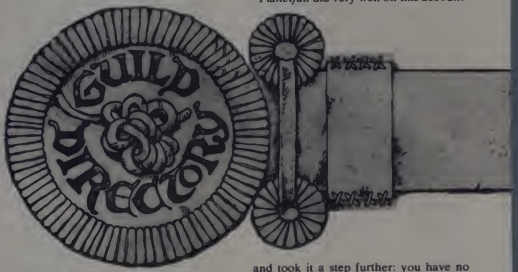
An oracle of some type should be available to aid in dissolving "brick walls." This might take the form of nested helps, wherein each time you ask for help, you get a different, and more detailed, clue. Or it might take the form of an oracle within the plot line of the story itself: perhaps even something along the lines of a guardian angel or wizened sage.

Needless to say, hints should always be vague and tricky, and never reveal actual answers. The idea is rather to continue a flow of information so that the user does not run out of ideas. Good hints can be as tough to crack as game puzzles themselves. The feat is to reveal just enough to allow the adventurer to discover something new.

Using a parser (text-translation subroutine) as excellent as those in the Infocom series would allow asking for clues pertaining to *specific* stumbling blocks. "Help unlock castle door" might return a clue designed for just that problem. Even these hints can be nested, so that the fifth or sixth time you ask for help on one problem, you get as solid an answer as you will get. The hints could recycle beyond that point.

Purists may cry treachery at the suggestion of hints of this kind. We submit that just as a map can remain unopened, hints can remain unasked for. But the idea that enough hints reside within an adventure to allow even novices to complete it successfully would change the whole psychological tone of the game by diffusing the onset of frustration.

Another concept we would like to develop is the notion of logical incidence. This device allows new events which modify the overall story to transpire in a specific place at a specific time. But there is a danger here. The concept must foremost fit logically into the flow of the narrative. It should be used sparingly, and only where it is telegraphed. This gives use of the device much greater impact, and adds to the overall synergy of the story.



For example, good use of logical incidence might consist of the following:

- If you don't seal the room in which the murder was committed, evidence may be removed or tampered with when you are out of the room.
- If you are in the room with the radio on at 4:00, you will hear the important announcement you have been clued in on.
- If you keep cleaning something long enough, you will finally be able to read the inscription on it.

Shoddy use of the same device has already taken the following unfortunate forms:

- A safe has possible combinations from one to a thousand, and no clue to the right number is given.
- If you don't look in the box three times, you don't see everything.
- If you don't say "yoho" for no foreshadowed reason, you can't leave your apartment.

The key to logical incidence is the word *logical*. Don't bring something in out of the blue and make all further progress hang on it. Let the story tell itself completely enough to allow the crafty adventurer to deduce a next move. The logic that applies need not be the logic of real life as long as it is consistent with the story, and the user has some notion of it. If, for example, there is a magic word that gets something to happen, telegraph this to the user, and give him a way to learn it.

And while richly documented adventures are a joy to pore through, an adventure program should not be too dependent on its documentation. Ideally, we should learn enough from the outer packaging to get going, then refer to enclosed material during game play to fill in the gaps and further progress. If you have to read for an hour before you can boot the program, enthusiasm may wane.

Planetfall did very well on this account and took it a step further: you have no clear idea of just *what* the objective is when you start off. This is a clever approach, of which we would like to see more.

Another feature we look forward to in adventures to come is multi-player capability. When more than one person sits down to play currently, everyone debates about what the sole character in the story should do next. Imagine being able to activate more than one character in a story, so that each player gets a turn to further his or her *own* plot line. Different players might actually have different objectives, conceivably opposing, and operate out of different locations that eventually culminate in common events or "the big showdown."

None of these suggestions should be interpreted as mitigating the achievements of the Interlogic series; we just want to offer enough feedback to keep the juices flowing. Keep 'em coming, Infocom. We can't wait. ■

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No Shakeout Here

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John J. Anderson

The key word is "windows." Car windows and airplane windows, ticket windows and cashier's windows—certainly in Vegas, cashier's windows—and the key word at Comdex 1983, too. Hey, about your micro: does it do windows?

Human beings are very partial to windows. They spend a good deal of their lives opening and shutting them on each other, and the rest peering through them. The views we see through our windows determine what we think.

Even though glass windows are, like microcomputers, an offspring of technology, the concept of the window has been with us since we started thinking. Windows are simply the frames through which we look at things. They limit and define our views, and we carry them with us wherever we go.

Let's see. There was a crowd of 90,000 at Comdex. That's a lot of windows.

Las Vegas, Nevada, is in some pretty hard country, you know. Very hard country. Hard enough just outside the city to humble you in a hurry. What's it like? Take a cliff-fringed crater the size of New York City; a lunar landscape, only much more beautiful. Fill it with all the neon and all the lightbulbs you have ever seen.

Picture an electric tourist shore town, thriving in the middle of nowhere. Remove the ocean from the picture and replace it only with a sea of money. And you have Las Vegas.

Perhaps nowhere is the incongruity of man and his glitzy aspirations more clearly delineated. Maybe the first Sears on the planet Venus will surpass Las Vegas on that account. It's hard country there too.

If he can get a haircut in Dime Box, Texas, I can get one in Henderson, Nevada.

After a trip into the surrounding mountains, you are certain to be left full of admiration for the pioneers who managed to cross that land, before Renault Alliances were available for easy rental.

I got out to Las Vegas a little early, which turned out to be a very good idea indeed. Getting a room is nearly an impossibility, even when there is no convention in town. And the tale of how my Circus Circus reservation was not honored touched nary a Vegas innkeeper's stony heart.

"Sorry, Bud. Try the Tropicana."

Because I had a day or so, I took a drive out to Lake Mead to get a look at Hoover Dam. On the way over I passed a rustic barber shop. The town was called Henderson. What really did it was a look through his window. An old guy, snipping at another old guy's last remaining hairs. The shop had an Old West feeling to it—not touristy—authentic. I wondered if there was a functioning spittoon.

Feeling slightly scruffy and having just finished Least Heat Moon's "Blue Highways," I decided to give it a try. If he can get a haircut in Dime Box, Texas, I can get one in Henderson, Nevada.

So I pulled in. I must have been a good 50 miles southeast of Las Vegas, and things sure taper off fast. I had dodged tumbleweeds and road runners to make it there. I got in the chair. Maybe he would tell tales of a time when you had to watch for rattlers behind the shop. Maybe you still had to watch for them.

"Are you with the Comdex?" the barber asked me.

"Yeah, I'm with the Comdex."

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We looked all over the place—and couldn't find a shakeout anywhere.

"That's gonna be some show. I read about it in the *Sun*."

"I'm kinda surprised you know about it."

"You're kiddin'? We know all about it. City's gonna be nuts 'till you guys leave. My son has a TRS-80, you know."

The wonders never cease. There I was looking for some local color, hoping to meet the great grandson of Jesse James. What a dude. Turns out the barber, name of Bob Calvino, hails from Pennsylvania. He moved first to Arizona, and finally to Henderson. I asked him why he made the move to such hard country.

"Sure, it's hard country. But it's good country. And I wouldn't trade it here for anyplace. Least of all back East."

"It's certainly beautiful," I responded. "But I'd imagine it takes a while to get used to it on a permanent basis. It's so . . . so stark."

"Believe it, it's awesome. And I mean awesome. Once it's in your blood, you just can't go nowhere else."

So he gave me my haircut, and we talked about computers. He said he had heard of *Creative Computing*, that he didn't read it himself, but that his son brings it home from time to time. And a pretty good haircut it was, even without a shampoo or blow-dry. He did the back of my neck with a dull straight razor, and I went on my way.

We are always looking at each other through windows, of different shapes, sizes, and degrees of opacity. I even had a window on him that I imagined to be his window on me. "Kid City Slicker," I guess it might have been titled. But we got along.

You know when you take the time to use a little Windex, you're usually surprised by what you can see. That's my opinion. Of course, if your window is made of frosted glass, polishing won't help. But you will have your privacy.

The point is, some windows are really hard to see through.

No Signs Of Shakeout

We're taking a look in this issue at a euphemism known as the "shakeout." You should have heard how enthusiastic our ad reps were when they heard about the prospect. The sentiment ran something like "Why in heaven's name would you want to do that?" In other words, let's frost that window. Advertisers are nervous enough without reading such things in *Creative Computing*.

There was no sign of a shakeout at Comdex 1983.

Well, we believe that the sensible way to come to terms with current events is to take a hard look at them. If we analyze what is happening to the industry right now, maybe we can draw some positive conclusions from it. Pretending that nothing is happening will never serve to calm us. Ignoring the problem won't make it go away.

Or will it? Comdex was a PR person's paradise. Aside from a couple of rather subtle clues, like a reserved but unclaimed booth here and there, or an undercurrent of tension at some booths, there was no sign of a shakeout at Comdex 1983. And it is just as well. Venture capital can be extremely jumpy, you know. Any sign of ill-ease, and it can fly away like a bluebird.

Enough extemporaneous philosophy. I sure can get carried away. There were some neat products at the show, and you should know about them.

Although the official festivities did not commence until the next day, a couple of press parties on Sunday night helped get us into the spirit of things. A wise showgoer knows that pacing is everything, and easing into the grind is much preferable to a head-on fling into the fray. Though we can handle it that way too, it is highly uncivilized.

The Accounting Partner

It was a brisk Sunday night, clear, with temperatures in the upper forties. We started at the Royal Hall of the Imperial Palace Hotel, in the heart of the Strip, for a cocktail reception hosted by Star Software. It was to celebrate and promote the success of *The Accounting Partner*, a complete accounting system for CP/M, CP/M-86, and now Kaypro and Epson QX-10 machines. The event was rounded out by a blackjack tournament, with a Kaypro and Epson HX-20 awarded as first and second prizes.

Despite the best efforts of the emcee of the tournament, blackjack pro Geno Monere, and an exceptionally understanding (and attractive) dealer, I promptly lost all my chips. Never was much of a gambler, I guess. Still, it gave me the confidence later to go downstairs and try my hand at the game at a real table. Somewhat costly considering its duration, but fun. I think I'll stick to the vices I'm good at.

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Retailing for under $400, *The Accounting Partner* includes four modules: general ledger, payroll, accounts payable, and accounts receivable, packaged together in a single notebook and slip case. According to David Kay, president of marketing for Kaypro, "the software will enable users to do virtually everything that could be done with a far more expensive accounting package at a fraction of the cost. We were immediately drawn to Star's comprehensive system because of its competitive pricetag and excellent capabilities."

From what I saw of the package, Kay did not overstate the case. In fact, you can get *The Accounting Partner* and a Kaypro to run it on for the price of many similarly-featured accounting programs. It uses regular 80-column business forms such as payroll and disbursement checks, invoices, purchase orders, and statements.

The agreement to market the product for the QX-10 is sure to be of interest to Epson-owning businessmen.

I also had the good fortune at the Star Software party to run into an old show buddy, Barry Bayer. Barry is a Chicago-based lawyer, who somehow finds the time to write freelance about the wonders of the spreadsheet, and take an active part in the International Apple Core. I first met him at the IIe conference held for ranking IAC members last spring. See his sidebar for some insight concerning VisiCorp and Software Arts.

And On To Visi-On

Barry and I lit off to the Grill Room at the Desert Inn Country Club, where VisiCorp was throwing a champagne shindig and, we discovered, talking strategy. As it turned out, I was quite glad I went.

More than three years of design, engineering, and user-testing were spent developing the Visi-On environment.

On a far wall, running on a bank of about 12 assorted micros, was *Visi-On*. This is the highly-touted window-based information management system for IBM PC (and of course, IBM work-alikes). Our impression after just a few minutes with the system: very nice. Quite Lisa-like, and as they say on late-night cheapo TV commercials, "it really, really works."

We'll be talking more about *Visi-On* and other products like it further up ahead. As mentioned above, "windows" is a pretty important word in microcomputers nowadays. The word that goes along with it is "integrated," and judging by the amount of bussing we witnessed during Comdex, the industry is serious about it.

Visi-On is a high performance, highly integrated operating environment for personal computers. It allows the user to work with any number of applications simultaneously, with each application appearing in a "window" on the computer monitor. A mouse is used to select windows and functions, and for data manipulation and data transfer between windows. The idea is to transform the computer into an electronic desktop.

Visi-On commands include:

- *Help.* Provides an explanation of anything visible on the screen. Describes and cross-references each part of the *Visi-On* system. Consists of over 100 pages per application.
- *Open and close.* Allows the user to set aside and retrieve windows.
- *Full.* Enlarges a window to fill the entire screen.
- *Frame.* Repositions and resizes any window.
- *Options.* Displays and permits changing of parameters that affect the way individual applications act.
- *Transfer.* Moves information

Visi-Gation?

Barry Bayer

I am told that the readers of *Creative Computing* have excellent imaginations. So close your eyes and journey back with me to those thrilling days of yesteryear (1978 or so) in a galaxy far, far away (Cambridge, MA). There, in a garret, or maybe a basement (the New England version of a California garage) are Daniel Bricklin, Robert Frankston (in, or maybe just out of Harvard Business School) and Daniel Fylstra, a budding software entrepreneur. Bricklin and Frankston have been trying to interest people in a program that they wrote for the Apple II computer and its brand new Disk II, to simulate a professor's blackboard. And Fylstra, a class or two ahead in the B School, has been doing a good job selling a chess program, and perhaps a couple of other things for the Apple, under the company name of Personal Software, Inc.

Well, the deal is being made. Bob and Dan B. will write this *VisiCalc* (or is it called *ElectroPage?*), and Dan F. and his Personal Software will publish and market the program. The publisher will pay the author a royalty of ½ more or less, and maybe everyone will make a few bucks on the project.

"Stop!" you cry. "I am from 1984, and just have to tell you guys that Dan F.'s company (VisiCorp, as it has come to be known) has just sued Bob and Dan B.'s company (Software Arts, as it has come to be known), for one hundred million dollars, give or take fifty million or so, for failure to deliver an advanced version of *VisiCalc* for the IBM PC and other more esoteric alleged breaches."

"What's an IBM PC?" they ask. "We don't put *VisiCalc* on mainframes or minis. And a suit for a hundred million dollars over a program that we're selling for $79.95? You've got to be kidding." You explain that IBM has sold a million, more or less, personal computers in the couple of years since its introduc-

Software Arts and VisiCorp, whose joint product can be said, in a sense, to have legitimatized the microcomputer industry, are so far apart in their legal battles that they can't even agree what court to litigate in.

between windows and different applications.

VisiCorp currently offers *Visi-On* products for the IBM PC, Wang Professional, Honeywell Series 7900, Compaq, Spirit, Texas Instruments Professional, and Eagle PC Plus. For full implementation, *Visi-On* requires a hard Winchester disk, at least 284K of on-line RAM, and graphics support capabilities (that means a graphics card to PC owners).

More than three years of design, engineering, and user-testing were spent developing the *Visi-On* environment, and according to Terry Opdendyk, president of VisiCorp, "based on user experience with over one million VisiSeries productivity applications, we have designed a new range of functionality." (See also the sidebar on Opdendyk.)

Four *Visi-On* packages are shipping currently: *Visi-On Calc*, a spreadsheet program; *Visi-On Word*, a word processor; *Visi-On Query*, a database manager; and *Visi-On Graph*, a business graphics package.

Their particulars are as follows:

• *Visi-On Calc.* Allows the production and automatic consolidation of large spreadsheets. Permits users to create an unlimited number of calc windows, and manipulate as well as transfer data between templates.

• *Visi-On Word.* Processes single documents of up to 500 pages and provides instant access to any page. Use of the mouse makes editing easier. Can transfer information to and from spreadsheet and database modules.

• *Visi-On Query.* Tables hold up to 65,000 records, with up to 1000 characters per record and 256 characters per field. Compatible for transfer with all other modules. New fields can be added or old ones modified without affecting previously entered data. Supports mathematical functions across fields.

"I remember the year Dave nearly got himself kicked out of NCC," laughed Jerry. "The guy's got real spunk."

• *Visi-On Graph.* Converts raw data into presentation-quality business graphs. Includes automatic scaling to provide the best representation of data within a particular window. If the window is resized, the program rescales the graph accordingly.

Look for an in-depth review of *Visi-On* in an upcoming issue of *Creative.*

Firstest With The Mostest

I had the good fortune at the VisiCorp reception to meet Jerry Pournelle of *Byte.* Jerry bestowed on us what we took to be a high compliment. "*Creative Computing,*" he said, has "kept its original flavor and attitude better than any other micro magazine." I thanked him, and commended him for his personal commitment to that same goal. Pournelle's pieces are the best reasons to pick up a *Byte* anymore.

I reminded him we were headed toward our tenth anniversary (and intend to keep up that spirit from the early days!).

"I remember the year Dave nearly got himself kicked out of NCC," laughed Jerry. "The guy's got real spunk." He became more serious. "That was five or six years ago, I guess."

Time sure flies when you're typing RUN.

Another good friend popped up at the show, and no stranger to Vegas himself, Ken Uston managed to stay away from the blackjack tables long enough to compile his Comdex impressions, too. As usual, he is right on target.

Keynoters of the show included Bill Gates, president of Microsoft, who stressed the need to get software to operate the way humans do, as opposed to

---

tion, which is pretty good, because the Apple II family has sold only a million and a quarter machines altogether. "You want us to believe that the Steves are still selling Apples in 1984? Now we know you're nuts."

Well, as astonishing as all that might be to the three friends in way back when, we know that it all happened. Apple Computer is still selling IIs, IBM has made a tremendous success out of its PC, and Software Arts and VisiCorp, whose joint product can be said, in a sense, to have legitimatized the microcomputer industry, are so far apart in their legal battles that they can't even agree what court to litigate in. (Software Arts, ensconced in a converted chocolate factory in Wellesley, MA prefers a court in the Northeast, while San Jose's VisiCorp prefers the friendlier climate of Silicon Valley. (Ah . . . I can feel the legal fees flowing. It's nice to see the lawyers make a buck in the computer industry for a change.)

What are the issues? Well, as noted above, VisiCorp is complaining that Software Arts didn't deliver *Advanced Version VisiCalc* for the IBM PC (*PCAV*) on a timely basis as required by contract. (If programmers are to be liable to their publishers for failure to deliver an acceptable product on time, this could set a very lucrative—for the legal profession, anyhow—precedent.) Not only that, complains VisiCorp, but Software Arts stopped trying on *PCAV*, directing their resources to perfecting *TK!Solver*, instead. (This theory sounds a bit less farfetched, and not quite as interesting a precedent. Liability for failure to work in good faith is old stuff.)

But skulking around among the pleadings, it appears that the real dispute may be involved not with *Advanced Version VisiCalc*, but with *Visi-On Calc*, VisiCorp's spreadsheet sold as a part of the *Visi-On* system. *Visi-On Calc*, clearly an important part of VisiCorp's hopes for the future, will undoubtedly sell quite a few copies in the next year or two—many to people who might otherwise have purchased *VisiCalc.* VisiCorp claims that *Visi-On Calc* is all new code, and not at all a copy of *VisiCalc.* Software Arts seems to be laying some sort of claim to royalty income from the product. And, as is obvious, even though Lotus *1-2-3* is considered to be the current PC bestseller as of this writing, unless *Visi-On* is a complete dud, big money for all is at stake.

What does this mean to *VisiCalc* users, or those who would like to be? According to VisiCorp President Terry Opdendyk, the lawsuit(s) are not impeding the normal intercourse of business between the two firms, and *PC Advanced Version,* if not already shipping, should be out soon. Are new *VisiCalcs* in the offing? Well that could prove to be a little more difficult. But most lawsuits do get settled eventually, and at least some of the smart money is betting that VisiCorp will eventually find a way to purchase the Software Arts rights to *VisiCalc,* thereby obviating the need to continue fighting about *Visi-On Calc.* Whatever happens, it should be interesting to watch.

(In the meantime, can't you just imagine the expert testimony on VisiCorp's cost of delaying *PCAV* for a year. "Now Mr. Witness. You say you assumed, in your calculations, that the spreadsheet market would grow 20% annually, that interest rates would hold at 10.2%, and that the retail price of the product would remain constant. But *what* would your opinion be *if* . . .") ■

the way computers do. Jack Scanlon, vice president of processor and software systems for Western Electric, underscored the importance of making software compatible over the broadest possible range of machines.

"We are finally in a technical position to make major advances in software standardization," Scanlon said. And I'll bet Western Electric is champing at the bit to meet the challenge, now that it is free to do so.

The truly oppressive thing about Comdex, spread as it was through five major sites, was trying to see everything in such a short span of time. Simply impossible. And even with my showgoer sneakers, I know I missed lots. We shall try to provide a continuing update on products we missed that deserved mention. Here goes with what we did manage to see:

Computers

The Robie, a new desktop computer that features two 2.6 megabyte floppy disk drives and an ergonomically designed

profile was debuted by **Kaypro** at the show.

The unit takes up only about one square foot of desk space. Built in to the unit are a 300 baud modem and real-time clock/calender. It features a 9", non-glare screen, tilted to the optimum viewing angle, as well as dual disk drives mounted atop the machine to allow easy insertion of disks from the most cluttered desk.

The Robie comes complete with a powerful package of ready-to-run programs, including word processor, spelling checker, electronic spreadsheet, database manager, and programming languages. Its suggested retail price is $2300.

The IBM PC compatible **Leading Edge** personal computer was introduced on the Comdex show floor. It has a number of special features which make it faster, more durable, and less expensive than the comparable IBM PC.

Based on the 8088 microprocessor, the system offers 128K RAM and an integrated RS-232 serial port. It also provides seven IBM bus-compatible expansion slots. Processing speed is more than 50 percent faster than the PC.

The design includes durability advantages such as lower socket junction temperatures to afford a longer chip life than the IBM PC. An IBM format keyboard with 83 keys, simply plugs into the front of the computer unit. It utilizes inductive technology, with fewer moving parts, to minimize future service.

The high-resolution green screen monitor

VisiCorp Speaks

At Comdex I got a chance to ask Terry Opdendyk, president of VisiCorp, to help lift the shades on the window issue. The interview follows:

Creative Computing: Windows, windows, windows, Terry. What makes the windowed approach better than any other?

Terry Opdendyk: When you have the capability to do multiple applications simultaneously, you make better use of the computer and your own time. And if can *view* multiple applications simultaneously, you make the best use of a concurrent system. There is where the power lies.

But that only is helpful if those applications are designed to be useful in that fashion. Taking an application that is designed for a large window and putting it into a tiny window doesn't do you much good. We have run standard applications the same way everybody else does. But to run in a window, you need something more. You have to design the application to take advantage of windowing power.

When we sat down at the (*Visi-On*) system, you were into the depths of the graphics product and the calc product in less than ten minutes. And yet the capabilities of those products is a generation beyond those of existing packages.

The more you use the system, the more the mouse will dominate.

The fact that you can get at it so easily, so intuitively, so painlessly, is what makes windows the word.

CC: But in a way you are making a point Barry brought up earlier. That is that the mouse is really a training peripheral, and once the user has learned a system, he is ready to move to keyboard commands.

T.O.: Yes and no. Yes, when you are at the keyboard entering away, you don't want to lift your hand off the keyboard and grab for that mouse. Always you want the fastest and most efficient approach. That's the difference between "easy-to-learn" and "easy-to-use." You can have a system that is easy to learn, but a real pain to use, or vice versa. We have all seen examples of one or the other. The easy-to-use system is the one that takes four weeks of training, and then you say to yourself, "wow, I finally got it." Then there is the ultimate easy-to-learn system, and after you have gone through the pedantic motions, unfortunately you can't do anything with it.

CC: Not to mention feeling patronized in the process.

T.O.: Exactly. Now when I am in the entry mode, I want to stay on that keyboard. When I'm in the basic mode of contact selection or positioning, a pointing device is the single most natural device for doing it. For me to use cursor keys to get it up, for me to type a cryptic command, is difficult and time-consuming. With a single button mouse, the eye and hand get to do what they are really great at. All you have to do is say "I want that there." On that score the mouse will always dominate, and the more you use the system, the more the mouse will dominate.

CC: Even if you have been reared on cryptic command codes?

T.O.: Even if you have been reared on cryptic commands.

CC: Even to open and close windows.

T.O.: You'll do it with the mouse.

CC: You know, I'm not sure in my

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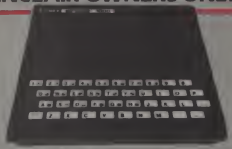

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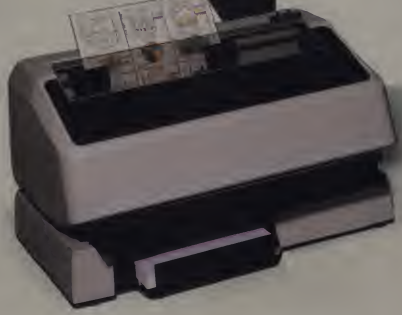

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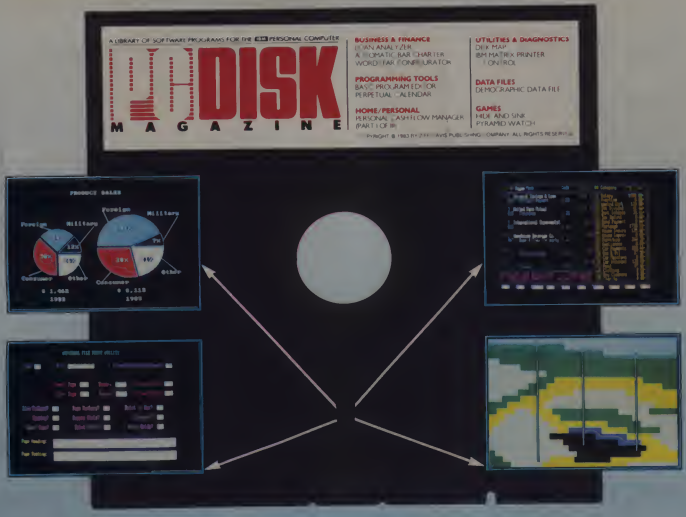

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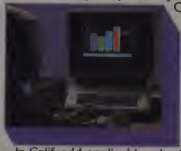

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The following software is bundled with the system: Microsoft DOS 1.25, Microsoft GW Basic, and **Leading Edge** *Word Processing*. The system will have a suggested retail price of $2895.

NCR has thrown its hat into the micro ring with the NCR personal computer. The system is available in two configurations. The first includes the NCR personal computers with dual 8/16-bit processors, 256K memory, dual floppy disk drives, operating system, and POS inventory management software for $5000. The second configuration includes a cash drawer and 10 Mb Winchester hard disk for $7900.

The inventory management software can store 19 separate facts about each of 32,000 unique inventory items. Inventory levels are automatically adjusted and displayed during each sale. An ID number verification prevents unauthorized access, and sensitive sales information can be password protected.

Actrix has announced that the Actrix DS portable computer now can be IBM-compatible. A 16-bit 8088 co-processor

case getting the screen to look like my desk would be a big advantage. My desk is usually a mess.

T.O.: A quick tangent. A profile of all of our field trial users—hundreds and hundreds of people—has shown a correlation between what their desks look like when they work and what their windows look like. We have some people who had things all over the place and some accountants with one neat little window on the righthand side of the screen.

CC: You have your anal users and your non-anal users.

T.O.: Let's get back to opening and closing windows. I'm not anal, and I have five windows on the screen. I just want to put one aside. I need to identify that window, either by position or by name. Point and click, and you've got that window. No multiple cursor keystrokes, no names to remember.

CC: It's intuitive.

T.O.: You got it. That's why windows tested out at Xerox. They had the tile approach and threw it away. It didn't test. To give this three-dimensional feeling, you do not want to be bothered with increasing and decreasing lines that partition the screen. You want it to work the way sheets of paper work.

CC: That's why it can become second nature in a very short time.

T.O.: It's a metaphor—that's why it works.

CC: Okay. Multiple applications are obviously useful, and a pointer peripheral may be too. But does the typical user need so many levels upon nested levels?

T.O.: Let's take the most pathological case—the dedicated spreadsheet user. He's sure he wants to continue using *VisiCalc IV*. He's a CPA or a member of one of the big eight accounting firms, and he is skeptical about windows.

Then he realizes what he can do with two or three spreadsheets on the screen and the ability to move information between them.

There is, in essence, a Hypertext system at work in our package.

CC: What about help levels?

T.O.: The system is seamless. I don't know if you're familiar with the old concept of Hypertext, from work ten or eleven years ago.

CC: Ted Nelson. You know, wherever I go, his name keeps coming up.

T.O.: Ted Nelson's work. There is, in essence, a Hypertext system at work in our package. When I'm at a very high level, and I want help, I get high-level help. If I'm nested deep and stuck in something, I get very specific, detailed items. I can traverse that help structure, across products, and across the system. I can even ask for an overview of help, to see the very tree structure that composes it.

CC: And then bring it up in a window.

T.O.: Windows are just one element of a complete system. Here's a virtual memory system. Here's an automatic, contact-sensitive data transferring capability. I don't have to care whether "this" is text, and "that" happens to be columns and rows. Or that "these" are pixels off in a graph and "those" happen to be numbers. The program in effect says "point to what you want, and I'll go ask the system what it can interpret, and I will make the appropriate transformations between the particular items."

And if you know one product in the system, if you spend 15 minutes with *Visi-On*, you will be able to dive into the depths of any other product—because it will operate the same, it will handle things the same, and it can work simultaneously with the other products.

Dan (Fylstra) has a saying that "windows are mirrors." If you try to say "Gee, we got windows," and you try to sell a system simply on the flash and dash of that, you are doing it with mirrors. If you have a total system, with superior functionality, seamless integration, and data transfer, as well as ease of use, then maybe your windows are worthwhile. They will be a tool for the rest of the system. —*JJA*

board is now available as an option.

Supporting both MS-DOS and CP/M-86, Actrix DS with the co-processor is capable of handling nearly all programs developed originally for the IBM PC.

The co-processor option includes 256K of RAM. When operating in CP/M-80, this memory can be used as a RAM-disk, speeding operation. The coprocessor option will retail for $500.

Bytec-Comterm, makers of the Hyperion portable, announced a series of communication packages. These terminal emulation packages allow the Hyperion to communicate directly with mainframes, in addition to performing such PC functions as editing, accounting, and telecommunications. The Hyperion can now be linked to a mainframe, simulating a fully functional portable terminal.

The company also introduced the EX expansion chassis, designed to expand the capabilities of the Hyperion computer. It has additional memory, color graphics capabilities, eight expansion slots, 10 Mb hard disk, and a built-in modem.

Altos Computer Systems revealed a new nine-user, 16-bit microcomputer system. The 986 is a fully loaded micro that

accommodates up to nine users, with ten RS-232 ports.

The unit offers a megabyte of RAM memory and uses an 8086 processor running at 10 MHz. It utilizes two Z80 processors to handle direct memory access. The system includes a Winchester disk and the Xenix operating system. The cost per station is under $2400.

Printers

Smith Corona introduced three new models at Comdex. They join the TP-II, the low-priced daisywheel printer that has headed the SCM printer line until now.

The top of the line dot matrix model from Smith Corona is the D-300. It has a printing speed of 140 cps and can print 132 characters per line at 10 pitch.

The D-300 offers nearly letter quality

Uston At Comdex

I write this report on Fall Comdex, 1983 with much trepidation (i.e., terror). Now, I do know something about computers, and I feel I did a pretty ambitious job of running around the three hotel-casinos and two convention hall floors filled with hardware and software of every imaginable type. But after a week of hearing about imaginal storage, LED's stacked in parallel, Application Advisory Support, and Digital Classified Software—to say nothing of Micro7400s, RS-232 cables, two platter CG912s, and Blis/Cobol—I am suffering from an acute case of Techno-shock.

I also read the press releases and tried to sift through them to understand what it is that we are likely to be buying next year. This process can be tricky because companies have a tendency to float "trial balloons"—that is, to announce products that may never see the light of day either because some other company came out with something better or because of lukewarm reception from show attendees.

The process of separating the wheat from the chaff seemed quite difficult, if not impossible, even (or especially) after interviews with company spokesmen.

What further confuses the whole issue is the sheer magnitude of the show—1400 booths, 11 miles of aisles, and 1¼ million square feet. Fortunately for us (but not for the people manning the booths) the show extended for five full days (from 10:00 a.m. to 5:00 p.m.). But consider this: the most ambitious of attendees had about a total of 35 hours in which to see the show, which means that to do a complete job, he would have to visit 40 booths per hour, allowing him a scant 1½ minutes per booth—no mean task what with the crowds, the five separate locations, and the difficulty of collaring company representatives.

Covering Comdex has become a physical feat as well. One show daily offered advice on how we should take care of our feet; Softsel, the software distributor, gave away inner soles (yes, they were called Softsoles), and in more than one case I spotted designer dresses and Brooks Brothers ensembles rounded out with good, comfortable running shoes. I wish I had brought mine.

What did it all mean? Who were the winners and losers? Who will be back next year? Who won't?

The most obvious winner is also the one with the least competition. That would be Sheldon Adelson, the entrepreneur who dreamed up the idea of Comdex back in 1979. Adelson grossed tens of millions of dollars this year (IBM alone spent $1 million on the show), and although many exhibitors may not be around next year as they become shakees in the ongoing shakeout, there is no doubt that Adelson's Comdex will be. Comdex, has doubled in size every year since it began in 1979, and it is still growing.

There was another big winner at Comdex. That is us—that is, those of us who want to find out what is going on in the industry. Where else in the world could we possibly learn about all the significant new computers, new software packages, and new peripherals all laid out in a single location, so we could try out the products and directly question company personnel?

Imagine in a single day being able to see and learn about *Lotus 1-2-3*, Microsoft Windows, *Visi-On*, and *Ovation;* find out what is new at Apple,

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print in a choice of six different pitches and emphasized, elongated, proportionally spaced, and italic print. It can handle bit-imaged graphics as well.

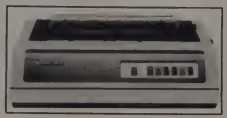
With a 2K buffer and friction as well as tractor feed standard, the D-300 looks pretty good at a suggested retail price of $795.

The SCM D-200 boasts equally high quality and reliability. It can reach speeds of up to 120 cps and 80 characters per line at 10 pitch. Its features are much the same as those of its big brother, the D-300. Both models offer standard and parallel interfaces and self-testing. The D-200 has a suggested list price of $595.

The D-100 offers good performance for a low price of $395. It can chug along at 100 cps—faster than any other printer at a comparable price. It comes with a parallel interface standard and serial capability available as an option.

Okidata introduced two very high speed printers with the codename Pacemark.

The Pacemark printers are high quality dot-matrix machines. The Pacemark 2350 delivers 350 cps bidirectionally with short line-seeking logic and extra speed horizontal slew to accelerate throughout. It prints in two colors and features dot-



addressable graphics, true descenders, superscripts, and subscripts.

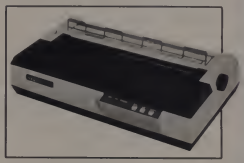
The fastest multifunction printer offered by Okidata is the Pacemark 2410. It has a 350 cps data processing mode, a 175 cps high density draft mode, and a word processing mode at 85 cps. It also prints in two colors.

C. Itoh has added a low priced daisy-wheel printer to its strong line of dot-matrix models. The A-10 lists for $995

and provides letter quality fully formed characters at 18 cps.

For the office environment, the A-10 features a low 6" profile, a 62 dB or lower operating noise level, and a choice of friction or bidirectional tractor feed.

NEC introduced the PC-8025A wide carriage dot-matrix printer. The 120 cps



printer yields 136 columns and is compatible with a wide range of microcomputers. It has a 3K buffer and tractor and friction feed. Parallel interface is standard.

The printer offers six different font capabilities: boldface, underline and subscripting, plus Greek, mathematics, and European characters.

DEC, and Radio Shack, fool around with half a dozen new portable computers; and get hands-on experience with the IBM PCjr. All of that happened to me in one day.

Software

Lots and lots of new software was introduced, and it's no wonder. Future Computing has estimated that $11½ billion of microcomputer software will be sold in 1987 (if you don't think that's a lot of money, consider that it is twice as

The buzzwords in new software at Comdex 1983 were integrated and windows.

much as the value of all the quarters kids of all ages put in coin-op machines in the peak arcade year, 1982).

The buzzwords in new software at Comdex 1983 were *integrated* and *windows*. Integrated refers to the ability to do more than one job on a computer at a time. The most popular integrated package to date is *1-2-3*, which incorporates spreadsheets, databases, and graphics. *1-2-3* which has been at the top of most business software "charts" over the past year. (Lotus received the only "hat trick," that is, three awards at The First Annual Softsel Hot List Awards Ceremony, which was held during Comdex.)

Windows refers to having more than one function appearing on the computer screen simultaneously. The most notable window programs are VisiCorp's *Visi-On*, and Microsoft *Windows*.

Interestingly, the software is placing demands on hardware manufacturers. New packages require more computer memory, hi-res monitors, and hard disk drive storage. As an example, the Ovation windows package requires 256K of memory, and a hard disk is recommended.

Among the key software houses which joined the integrated/windows fray:

MicroPro

MicroPro, the makers of the famous word processing package, *WordStar* (700,000 copies sold), showed an integrated package called *StarBurst*, which allows the use of several software programs at the same time. MicroPro exhibited a series of new programs, all ending, as might be expected, with a familiar suffix: *Plan Star* for complex financial modeling; *Chart Star*, a graphics package; and *Project Star* for project management, including critical path analysis (CPM).

MicroPro has enhanced *CalcStar* to allow more cells and living color (so that unprofitable, but automated companies will literally be able to see the red ink, just as in the days of the eye-shaded accountants).

Microsoft

I had the unusual experience of watching a Microsoft employee give a demonstration of the new *Windows* program with a Lotus executive standing next to me. She explained that *Windows* is an extension of an operating system that allows you to run several different programs all at the same time and to see the results on the screen simultaneously through separate windows.

With *Windows*, you can process words with *WordStar*, calculate with *Multiplan*, store information with *dBaseII*, and design graphics all at the same time. I asked whether we would be able to transfer data from one program to another.

The demonstrator hedged. "Not yet."

The Lotus executive watching with me, said, "*Windows* allows co-existence, not true integration."

Just then a Microsoft executive, spotting my press badge, rushed over to contradict, quickly adding, "We'll have true integration."

As I left the booth, the two company executives were discussing the true meaning of co-existence versus integration. (I proffered, "Separate, but equal

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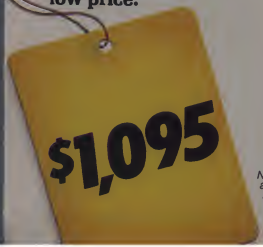

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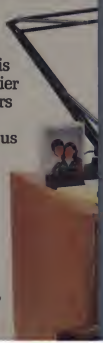
Spinwriter is the letter-quality printer preferred by more PC owners.

The Spinwriter name is one of the legends of the computer industry. That's why NEC Information Systems is the number one supplier of letter-quality printers to PC users.

In fact many famous personal computer makers recommend the Spinwriter, not only for letter-quality printing, but because it can bring out the full capabilities of their system.



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Spinwriter has capabilities you can't get on other printers.

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Our unique "thimble" print head holds up to 128 characters, enough for any special need.

type faces with up to 128 characters. And even have two type faces, or scientific and arithmetic symbols on the same thimble.

The 2000 also lets you change forms handlers quickly and easily. Seven NEC-built forms handlers give a custom look to all of your forms-oriented applications. Which means you can shift from word processing to billing, shipping or inventory control in moments.

Want to send an original letter to a few hundred customers? Our sheetfeeder mechanism handles printing on your letterhead and second page or envelope.

Other Spinwriter advantages include continuous forms handlers that take paper up to 16 inches wide, variable size forms and multi-part forms.

The 2000 plugs directly into your PC's printer port.

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Comdex, continued...

Printronix demonstrated the MVP 150B compact dot matrix line printer designed specifically for compatibility with the IBM PC and other micros.

The multi-model unit prints high quality office correspondence at 80 lines per minute, and drafts easy-to-read reports at 200 lines per minute.

Using the MVP 150B block graphics character set, the user can generate custom business forms and other graphics.

Suggested end-user price is $3745.

The ComWriter CR-III, a quick, quiet daisywheel printer for under $1000, was shown by **Comrex International**.

The unit has a print speed of 23 cps and a 132-column carriage. Two-color printing capability is also provided. Another feature is the Copy mode, a 5K buffer that can retain a documennt for reprinting at a later time.

A wide selection of interchangeable type fonts, including foreign languages, provides the quality and variety needed for professional documents. The CR-III also offers superscript, subscript, backspace, underline, boldface, double strike, and proportional spacing. Both a cut-sheet feeder and a tractor feed are available as options.

Canon introduced two near-letter-quality printers and reintroduced its color ink-jet printer. The two new models are the PW-1080A and the PW-1156A. The PW-1080A can print 80 characters per line, the PW-1156A, 156 characters per line, both at a rate of 160 cps. Both printers have a noise level of under 60 dB, which is relatively quiet. Other features of the units are removable cartridge ribbon, high-resolution graphics, near-letter-quality dot matrix print, superscript and subscript, and international character sets.

Canon rechristened its A-210 color printer as the PJ-1080A. This is a low cost color ink-jet printer capable of seven colors on plain paper or transparency. The unit reaches speeds of up to 37 cps, with a noise level of under 50 dB.

windows," but nobody laughed).

Anyway, *Windows* is unusual in that it has the support (or at least tacit cooperation) of many in the industry. When it was announced just prior to Comdex, representatives from nearly two dozen hardware manufacturers and a half dozen software companies (including Lotus) were at the press conference.

VisiCorp

VisiCorp once again displayed their *Visi-On* operating system, an integrated window system which allows multiple jobs to be performed simultaneously.

There is an interesting industry battle going on here. When I first saw *Visi-On* at a computer show many months ago, industry wags were predicting that it would diminish the potential of Lisa, since a mouse system for the IBM PC would be so much cheaper than the Lisa, which was then priced at $10,000.

Then Microsoft announced *Windows*, and people started to question the viability of *Visi-On*. Next, VisiCorp publicized at Comdex its agreement with IBM, in which Big Blue agreed to distribute *Visi-On*. The VisiCorp people claim that this will put them way ahead in the field.

We shall see.

Ovation

Ovation Software allows users to work on several different functions at the same time, instructing the computer with 30 English language commands. The programs are linked, so that changes made in a spreadsheet, for example, are automatically reflected in a word processed report or a graph.

Ironically, Ovation may have accomplished exactly what competitor Bill Gates of Microsoft was quoted as saying was sorely needed: fewer commands in plain English.

When I see a sales brochure that reads, "America applauds the most important business tool since the personal computer," I become skeptical. In this same promotional piece, we find that Ovation package is endorsed by the contestants for Miss America, Albert Einstein ("it crunches numbers almost as fast as I can"), and Napoleon. Don't get me wrong. I think that Ovation may have a fine product—perhaps even a unique innovation.

Lotus is one of the most dramatic industry success stories of 1983.

Lotus

Lotus is one of the most dramatic industry success stories of 1983. The company went public during the year as a result of the enormous success of its *1-2-3* package. The net worth of its 33-year-old president, Mitchell Kapor, has recently been reported at around $50 million.

Prior to Comdex, Lotus had announced that it was developing *1-2-3* for the TI Professional computer. At Comdex, Lotus has both good news and bad news for Apple II owners. The good news: *1-2-3* will be available for Apples. The bad news: to run it, Apple owners will need a Rana co-processor, which has 256K and two disk drives and costs $1795. Add $495 for *1-2-3* and you have almost reached the price of an IBM PC system.

What's coming from Lotus in the future? I can tell you this: when a Lotus spokesman accepted an award at the Softsel ceremony, he said, "Thanks for helping make *1-2-3* the success it is. I look forward to being here next year to do the same thing—with *4-5-6*."

DESQ

This company displayed a software integrator, which allows you to use, for example, Louts *1-2-3*, *WordStar*, and *dBase II*, all at the same time, with each having it own window.

Mosaic

Mosaic exhibited an integrated package, *Integrated 6*, which incorporates a database, word processor, spreadsheet,

Comdex, continued...

Dataproducts exhibited its line of daisywheel, matrix, and band printers.

The letter quality daisywheel printers, the DP-35 and DP-55, operate at 35 and 55 cps respectively, which is very fast for daisywheel print. Both units accommodate industry standard plastic or metal printwheel and a 90 degree tilting printhead mechanism for easy printwheel changes.

They also displayed the P-Series matrix printers from recently acquired Integral Data Systems (IDS).

Dataproducts also demonstrated its bar code and graphics matrix printer, the M-100L. This 140 cps unit is designed to automatically print block letters and a broad selection of resident bar code types, as well as graphics or text, in any combination.

Peripherals

Apple demonstrated a mouse and new software called *MousePaint* for Apple II, II+, and IIe computers.

AppleMouse II will be packaged with the software to design charts, diagrams, free-hand drawings and other visual aids for reports and presentations. Users can insert text in a drawing and can choose from a variety of character fonts and fill patterns. *MousePaint* simulates bit mapped graphics to support the Apple II high-resolution capabilities.

The ProFile Winchester drive, once only for use with the Apple III and Lisa machines, can now be utilized with an Apple II. ProDOS, Apple's new operating system for the Apple II, enables the computer to communicate with mass storage devices including the ProFile hard disk.

The ProFile Apple II version lists for under $2200. It offers storage capacity equal to 35 floppy disks—about 1200 single-spaced, typewritten pages—and retrieves information ten times as fast as a conventional disk drive.

Mouse Systems Corporation announced that its optical PC Mouse now works with VisiCorp's *Visi-On* and Microsoft *Word*.

PC Mouse can also be used with any program that uses the Microsoft mouse driver. For software developers, PC Mouse includes MSMOUSE.LIB which supports a super-set of the languages supported by Microsoft's library.

PC Mouse works with existing hardware and connects to the IBM PC and PC compatibles through an RS-232C asynchronous port. The suggested retail price is $295 and includes all software drivers and hardware.

Key Tronic Corporation announced a plug-compatible, deluxe keyboard for IBM PC and XT computers. Called the KB5151, the low-profile unit features separate cursor command keys, a separate numeric keypad,

---

graphics, inter-computer communications, and a mainframe link. It competes with Lotus, Context, and VisiCorp, among others.

Digital Research

What with the huge move toward MS-DOS and IBM compatibility, a big open question, it seems to me, is what is going on with CP/M and its producer, Digital Research. The story is widely told (whether it is apocryphal or not we do not know) that when IBM was looking for an operating system for its PC, they sent several three-piece-suiters out to Pacific Grove to talk with Gary Kildall about CP/M.

The story goes that Gary was out flying his airplane and that the three-piece-suited IBM'ers, not accustomed to the whimsical postponement of business meetings, left and took the next flight to Seattle to see Bill Gates. As a result, the story goes on, the IBM PC comes with MS DOS rather than CP/M.

Well, at the Digital Comdex booth, we were told about Concurrent CP/M, which allows different CP/M-86 programs to run concurrently on a CP/M system.

Obviously, the folks at Digital are giving much thought to a variety of subjects: to MS-DOS, to coming up with something new to perpetuate their prosperity, and perhaps to taking steps to ensure that Gary gets to all future business meetings on time.

What Does It All Mean?

OK. I am sold on *VisiCalc* and the new improved spreadsheet programs. They make financial analysis very easy to do. I have worked with electronic spreadsheets and have joined the coterie that can't imagine doing it any other way.

I also buy *1-2-3*. The charts (line, bar, or pie) are fabulous, and if I were a financial VP, I would want them to make my graphics.

But I admit to being quite skeptical about this window stuff. I have spent a few years consulting and have written dozens and dozens of business reports which incorporated tons of figures, charts, and graphs.

At Harvard Business School they insisted we display our figures as separate exhibits.

At almost every integrated software booth, we were shown how easy it is to put a calc sheet right in the middle of text, or to insert a little pie chart between two paragraphs. At first blush, this seemed to make sense.

But then as I thought about how I write reports I began to wonder. When I work on a project, I usually first work out the figures to see what they show. Then I decide how I want the charts and graphs to be organized to emphasize the points that should be highlighted. Then, and only then, do I write (or dictate) the report.

So I am a bit bewildered by all this fuss about windows—about the crying need to insert spreadsheets in the middle of the text, instead of including them on separate pages. Besides, most spreadsheets I have seen not only fill up an $8\frac{1}{2}$ by 11 sheet, but often have to be reduced so they can fit on one.

Now, I may be biased; at Harvard Business School they insisted we display our figures as separate exhibits. But let me just raise the question:

Could windows be a solution in search of a problem?

Where is software going in the future? We were given clues to this from two of the keynote speakers on the first day of the show. Bill Gates, chairman of the Board of Microsoft, noted in his keynote address that it currently takes about 150 commands to make five typical programs work. He feels that this should be reduced to about 20 commands and that the commands should be in plain English. Another keynoter, Jack Scanlon of Western Electric, predicts far more standardization of software and foresees that programs will be usable on any computer, whether micro, mini, or mainframe. —*KU*

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- Includes double density CP/M 2.2.

The ATR8000 can read and write CP/M disks from other computers. Some of these are: Kaypro • Osborne • Xerox • Cromemco • TRS-80 I • H89 • NEC PC100A • Z100 and more!

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top-row function keys with removable template, and a pencil and book holder ridge.

As opposed to the standard keyboard, the unit has familiar typewriter key placement with shift and return keys located in the proper position, and LED status indicators on all lock keys. List price for the KB5151 is $295.

Key Tronic also introduced its own mouse. Designed to facilitate cursor control

and menu selection, the Key Tronic Mouse attempts to eliminate many of the drawbacks associated with mice that have come before.

Although a version of this mouse can plug into an RS-232 port, no adaptive hardware is required when channeled first through the Key Tronic keyboard described above. All data entry is thereby handled at one location in a uniform and consistent manner.

In addition, the Key Tronic Mouse incorporates a solid-state "strain gauge" sensing element, rather than optical sensors or a mechanical ball. No special surface pad is required, nor will dirt or dust affect operation, since the base is solid.

Key Tronic intends to supply its mice in tandem with made-to-order keyboards for OEM applications, with an end-user version available soon.

Creative Communications, of Provo, UT, demonstrated the Lettronics 731, the first multiple protocol electronic mail system, designed to fulfill all business correspondence needs.

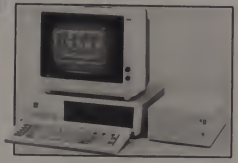
The system has the capability to store and interpret many communications protocols. It is capable of automatically dialing, attaching to, and transferring messages between itself and a wide variety of communication services and timesharing systems. Access to over 1.5 million Telex

and TWX terminals throughout the world is possible via Western Union's EasyLink service. Non-electronic mail users can receive messages via telegram, Mailgram, or ECOM (the U.S. Postal Service electronic mail system).

Once a letter is ready to send, no further user intervention is required, and delayed transmission (at reduced rates) is a standard feature. Normal business correspondence may be prepared using the Lettronics word processing capabilities.

List price, including display terminal and letter quality printer, is $2600.

Control Data announced two 5.25" Winchester disk subsystems with 18 million or 30 million bytes of storage capability for its StorageMaster line.



The new subsystems are for use with personal computers employing IBM architecture. While IBM Winchesters offer a maximum capacity of 10 Mb, the CDC model 518 offers 18 Mb, or the equivalent of 9000 typewritten pages. The model 530 offers 30 Mb, the equivalent of 15,000 typewritten pages or 93 IBM diskettes.

List prices for the units are $2600 for the model 518, and 3400 for the model 530.

Texas Instruments announced a new 10 Mb Winchester disk as an option for the Texas Instruments Professional Computer. The TI manufactured disk will give TI Professional Computer users twice the data and program storage of the current 5 Mb disk option, while increasing the suggested retail price by only $100.

Suggested retail price for the 10 Mb Winchester is $2995 and includes both the controller board and diagnostics software package. The new disk is now available at TI Authorized Dealers. A limited quantity of the 5 Mb disk will also be available at the reduced price of $1795.

The **Datamac** division of Disk Drive Systems, Inc. unveiled a family of three mass storage devices, including a 10 Mb model listing for $1450 retail. Each features a universal interface that allows for easy attachment to a variety of micros.

The Trustor 10 Information Module is a mass storage subsystem in a compact

case. It packs a 10 Mb hard disk, Xebec S1410 controller, and a power supply in a 14.75" x 5" x 6.7" case. It lists for $1450.

The Trustor 30 Information Module packs 30 Mb into the same size case, and lists for $2895. It has an average access time of 45 milliseconds and advanced error detection and correction features.

Still unpriced at the show was the Trustor 30T, a 30 Mb drive with built-in high capacity cartridge tape drive. This serves as a back-up and for archival storage.

Shugart Corporation introduced a double-sided microfloppy disk drive capable of storing one megabyte of information on the industry standard 3.5" media.

The Shugart 350 is 6 x 4 x 1.6", and weighs 1.3 lbs. In OEM quantities, the drive will be priced under $200.

Cromemco displayed a new color graphics interface that digitizes images from a television camera or other video source. The SDD Color Digitizer Board uses the output from a standard television camera

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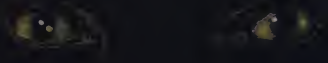

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Detachable keyboard	No	STD
Full numeric key pad	Option	STD
Full functions keys	No	41
Built in disk controller	No	STD
Parallel printer port	No	STD
RS 232 serial port	No	STD
Game port	1	2
RGB video out	Option	STD
Composite video	STD	STD
RF video for TV	Option	STD
CP/M	Option	STD
HI Res graphics (6 color)	STD	STD
Low Res graphics (16 color)	STD	STD
64KB memory	STD	STD
Half high disk drives	No	STD
Converters for vehicles boats and aircraft	No	Option
Aluminum carrying case	No	Option
List price	$1940*	$1099.00*

*Compatible with one disk drive

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to allow the user to digitize and store images of 484 vertical by 754 horizontal pixel resolution. The output of the board can be stored on disk or in memory.

In addition, the output can be transmitted serially to another machine. Images handled in this way can then be placed in graphics memory for display, modification, and enhancement.

Price of the unit has been set at $995.

Software

New from **CBS Software** are titles covering entertainment, education, and college board training.

Charles Goren: Learning Bridge Made Easy teaches opening bids, responses and rebids. It provides 100 specially-selected hands for practice in play. The computer allows opportunities to make the correct bid before revealing the best answer and explaining it.

The package comes with a 144-page book that tutors bidding and playing, and lists for $80. Available for Apple and IBM micros.

Murder by the Dozen is a logic and deduction game for up to four would-be detectives which can be played either cooperatively or competitively. It challenges players to unravel 12 cases of murder—all committed in the city of Micropolis. List price of the program is $35. Available for Apple, IBM, and Commodore 64 computers.

Success with Math is a series of four math review programs, designed to help students learn and practice math skills at their own pace. Step by step, they take the students through known stumbling blocks of arithmetic and algebra concepts. The packages are available for Apple, Atari, and Commodore 64 computers. Suggested prices are $25 for disk and $20 for cassette versions.

Match-Wits is a game of memory, logic, and strategy for one to two players. As it is also user-programmable, the game invites players to create their own game files. Available for the Apple and IBM at a suggested list of $30.

Mastering the SAT is a preparation program for the Scholastic Aptitude Test developed in cooperation with the NASSP—a professional association of more than 35,000 junior and senior high school principals and school administrators. Accompanying the package is a 96-page workbook. Available for the Apple and IBM PC at a list price of $150.

Mastering the College Board Achievement Tests: English Composition is a five-disk, self-paced program for students taking the English Achievements.

The program contains over 1000 problems that offer practice in rewriting sentences, phrasing, identification of grammatical errors, and pointers on sentence structure. It provides an approximate score and error analysis to indicate areas where further work is needed. Suggested price of the package is $175. Available for the Apple and IBM PC.

Howardsoft demonstrated *Tax Preparer* a package that helps users cope with the preparation of income tax forms.

Tax Preparer, unlike many other packages in the field, is designed for first-time computer users. It is capable of maintaining tax records throughout the year, comparing the various filing alternatives to determine minimum liability, and printing final, IRS-accepted forms that are ready for mailing. The package offers 22 separate forms that are commonly used.

The package comes in versions for the Apple and IBM PC, and retails for under $300. Annual updates for the IRS packages are under $100.

Digital Research introduced two new versions of Concurrent CP/M, its single-user, multi-tasking operating system for personal computers.

The new software includes an OEM generic version of Concurrent and an IBM PC package for end users. The PC package includes windowing capability.

The key feature of Concurrent CP/M is that it creates an integrated operating environment. One piece of software can share data with other applications. Window capability in the retail version allows users to view the execution of four programs simmultaneously. PC-DOS compatibility lets most application software written for PC-DOS 1.1 to run under Concurrent CP/M.

The retail version will market at an initial promotional price of $150.

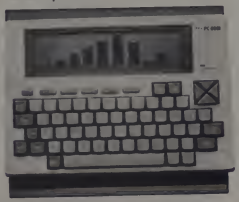
Leading Edge introduced a word processing package for the IBM personal computer and compatible systems which is designed to meet the needs of both the novice and sophisticated word processing user.

Outstanding features include cursor control by character, word, line, sentence, screen, or page; attributes; underline; boldface; super- and subscripts; strike through; doublewide letters; color (eight on the screen and eight on the paper); automatic pagination, including widow and orphan control; split-screen windowing; and glossaries.

All functions are accessible from the function keys without using multiple keystrokes. The suggested list price is $295.

NEC Home Electronics is bundling 14 business, utility, and entertainment packages with its $800 PC-8200 portable computer.

The package includes a text formatter program; Investment Portfolio, which evaluates a portfolio of stocks with current



data; Linear Forecaster, which uses linear regression forecasting; Loan Evaluator; Appointment/Scheduler; Bar Code Reader; Memory Calculator, which computes a series of calculator-type operations; Tank and Snake computer games; Music, which allows users to compose and play music; three bank switch utilities, which allow users to transfer and copy files from one bank to another; and Terminal Mode Selector, allowing users to set up their most commonly used information protocols.

Software Products International introduced *Open Access*, an integrated software system for the IBM PC and compatible computers.

Using the package, the user can crunch numbers, create 3-D color graphics, write reports, transmit data, scan multiple files, and keep an electronic appointment calendar.

Open Access takes its name from a relational database manager that allows all internal programs to "talk" to each other. Spreadsheet data can quickly be transferred to a report to support forecasts with hard figures. Color graphics depicting these figures are also available. The program lists for $595.

New integrated software for Apple IIe and III computers was announced by **Apple**. The packages combine word processing, database management, and financial modeling into a single program.

For the Apple IIe, the product is called *AppleWorks* ($250), and for the III, *III Easy Pieces* ($300). Special features of the programs are the following: commands mean the same or similar things in each application to reduce learning time; with a few keystrokes, users can move freely among files in any of the three applications, eliminating time-consuming swapping of disks; users can move information among files produced by the same application or from any file to a word processing file, using the "cut and paste" function.

The word processing application displays documents as they will appear when printed. The spreadsheet program provides a work area of 999 rows by 127 columns for financial models. The database manager can arrange up to 30 categories of records in alphabetic, numeric, date, or time order. Sorting is fast—800 records will sort in ten seconds.

Fox Research, Inc. announced an information management network that allows users of IBM PC, PC XT, and PC-compatible microcomputers to create, organize, and share data with other PC users within an organization.

Fox introduced *10-Base*, a relational database management software package based on the Sequel relational DBMS language originally developed by IBM for mainframe computers. *10-Base* runs on the MS-DOS 2.0 operating system, and requires 192K of RAM, a cursor-addressable 25 x 80 resolution CRT, and at least one disk drive. The *10-Base* program can exchange information with *Lotus 1-2-3*, *WordStar*, *MailMerge* and other popular microcomputer applications software packages.

A comprehensive and flexible financial and business tool to organize and manage a small business—that is the description given the **Wilson Jones** software released at fall Comdex.

General Ledger, Accounts Receivable, Accounts Payable, and Fixed Assets for the IBM PC were unveiled. Payroll is scheduled for release soon.

Texas Instruments announced a new software emulation package that allows any member of the TI Professional Computer Family to act as a remote terminal to an IBM or IBM-compatible SNA (System Network Architecture) mainframe computer. The software allows all TI Professional Computer models to emulate a standard IBM 3276 Model 12 control unit/display station with a 3287 printer.

The 3270 SNA will run under MS-DOS in the TI Professional Family and will have a suggested retail price of $675.

Firms Mentioned In This Article	Reader Service Number
Actrix Computer Corporation 2159 Bering Dr. San Jose, CA 95131 (408) 263-3660	437
Altos Computer Systems 2641 Orchard Parkway San Jose, CA 95134 (408) 946-6700	438
Apple Computer 10260 Bandley Dr. Cupertino, CA 95014 (408) 996-1010	439
Bytec-Comterm Inc. 110 Boul. Hymus Pointe Claire, PQ Canada H9R 1E8 (514) 694-3030	440
Canon One Canon Plaza Lake Success, NY 11042 (516) 488-6700	441
CBS Software One Fawcett Dr. Greenwich, CT 06836 (203) 622-2500	442
Control Data Corporation 8100 34th Ave. S. Minneapolis, MN 55440 (612) 853-4000	443
Comrex International 3701 Skypark Dr. Torrance, CA 90505 (213) 373-0280	444
Creative Communications Inc. 1662 West 820 North Provo, UT 84601 (801) 373-9843	445
Cromemco Inc. 280 Bernardo Ave. P.O. Box 7400 Mountain View, CA 94039 (415) 964-7400	446
Datamac 432 Lakeside Dr. Sunnyvale, CA 94086 (408) 720-0800	447
Dataproducts Corporation 6200 Canoga Ave. Woodland Hills, CA 91365 (213) 887-8451	448
Digital Research 160 Central Ave. Pacific Grove, CA 93950 (408) 649-3896	449
Durango Systems 3003 N. First St. San Jose, CA 95134 (408) 946-5000	450
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CIRCLE 143 ON READER SERVICE CARD

The CBasic Clinic

Part Five

John A. Libertine

Those of you who have been looking for a "practical" program or a more elaborate one should be pleased with this month's tutorial. It will not only be a little more of a challenge, but it can be adapted to use in the real world.

The program is adapted from one I use every month to print out a profit and loss statement for my own business. I have simplified it a bit to keep the listing somewhere within the bounds of reason. However, you can expand and modify it to suit your requirements. This program assumes you are on a "cash basis" accounting system and use a "one write" checkbook system of some kind (such as sold by NEBS) or a bookkeeping system like The Dome Book.

Don't confuse this with a computerized checkbook. You do not enter each individual check. You enter categories (examples: Gross Sales this Month or Automobile Expenses). Either of the above types of systems will give you the total for each category which is what you enter. You can also enter the Beginning Balance as it appears in your checkbook each month. Doing this automatically provides a proof that the figures are entered correctly since the beginning balance minus outgo plus income will equal the ending balance (new balance).

Now that you have been tempted, let's digress a bit. The program contains a good deal of what has been discussed in our previous sessions. There are a few minor new functions and one very major one. This latter one requires a bit of explanation. We are about to explore *arrays* or *subscripted variables.* (For all practical purposes, the two terms can be used interchangeably.)

Let's start by looking at a couple of simple variables:

```
Variable.name$        Number.variable
```

Now, let's convert them to subscripted variables:

```
Variable.name$(1)     Number.variable(1)
```

The 1 in parentheses indicates that there are several other variables with the same base name. The (1) is a subscript. That subscript can be any number from zero (although most programmers use 1 as the lowest number) to a number limited only by the memory in your computer. From a practical standpoint, the larger number is usually smaller than 100 and rarely larger than a few hundred.

Assigning Variables

With this in mind, let's look at two ways of assigning variables to three name strings:

Simple Variables	**Subscripted Variables**
Name1$="John"	Name$(1)="John"
Name2$="Joe"	Name$(2)="Joe"
Name3$="Harry"	Name$(3)="Harry"

If you think about it, the two different ways of assigning variables have a great deal in common. You could actually print out the variables in the same way as, for example:

```
PRINT NAME1$,NAME2$,NAME3$
```

or

```
PRINT NAME$(1),NAME$(2),NAME$(3)
```

Assuming you have assigned the same names to each, the printout would be identical in both instances. So why bother with the subscripted variables at all? Let me give you just one example. Let's assume you have a list of 50 names. You want to print them out one name to a line. With the regular variable format, the output portion of the program would look something like this:

```
PRINT NAME1$
PRINT NAME2$
PRINT NAME3$
  etc. for 50 lines.
```

Now look how it can be done using subscripted variables:

```
FOR I% = 1 TO 50
PRINT NAME$(I%)
NEXT I%
```

You have just reduced 50 program lines to three. And that is just the beginning. The significant value of subscripted variables is that the subscript itself (that portion in parentheses) can be made into a variable as above. All kinds of shortcuts and sophisticated handling techniques are made possible. This can be especially useful for writing to and reading from files, in inputs and, as we have just seen, in printouts. Our program this session takes advantage of this ability in several ways. If it were not for this, the program could easily run three to five times as long as it is.

You must dimension all arrays in advance.

You should also know that subscripts come in various degrees. So far, the one you have seen above are *one-dimensional arrays* or one-dimensional subscripts. You can have two-dimensional arrays like String$(1,1) or three-dimensional arrays like String$(1,1,1). We will barely scratch the surface of multi-dimensional arrays, but bear in mind that they are available and useful in some circumstances.

In some Basics, you can use arrays up to a given number without having to pre-declare them (*dimensioning* is the correct terminology for this). This is not true of CBasic. There is no default setting. You must dimension *all* arrays in advance, and the DIM statement must be the only one in the program line.

For example, if you were going to use the 50-name listing above, you would need the following line in your program *before* using the array:

```
DIM NAME$(50)
```

You are telling CBasic to dimension a string called NAME$ to accept up to 50 subscripts (actually 51 if you count the zero). Naturally, you are not restricted to string variables. You can use integer and real number variables in arrays (NUMBER%(1) or REAL.NUMBER(1) for example).

Some instruction books make a big deal out of arrays. One even spends the better part of an entire chapter pointing out the difference between an array and a matrix. Don't get upset by all this. If you simply remember that VARIABLE1 and VARIABLE(1) are exactly the same in every way except that the latter gives you more flexibility, you will be able to use the technique without getting involved in the technicalities.

You do have to remember to dimension an array before using it. Otherwise, they should present no real difficulty. The best way to learn about arrays is to use them. The program this month should give you enough practice and insight in the use of one-dimensional arrays to make them fairly clear.

Multi-Dimensional Arrays

Although the program this month does not use multi-dimensional arrays, let's take a quick look at how a two-dimensional array works so you can compare. Look at this printout:

ABLE	BAKER	CHARLIE
DONUT	EAGLE	FOX
GOAT	HOUSE	ICE

Simply think of these as nine names arranged in three equal lines. You could, of course, assign them as individual variables (A$, B$, etc.). Or you could use a two-dimensional array. You could call the three horizontal lines 1 to 3 and the three vertical columns also 1 through 3. That means the word fox would be in line 2 of column 3. In an array, that would be shown as WORD$(2,3). That is purely arbitrary, of course, because you could set up your program so the column comes first. In that case, fox would be in column 3 of line 2 and the variable would be: WORD$(3,2).

Can you now imagine a three-dimensional array? Try to visualize nine more names arranged behind or under the first ones above. Think of a three-dimensional array as a layered cube. Each series of columns and lines are arranged in levels or tiers. In our example, that second tier might look like this:

JOHN	KNIFE	LAMP
MARY	NANCY	OPAL
PETER	QUEEN	RUBY

If this were placed behind or under the first nine words, the word opal would be behind or under fox. We could then say: opal is in the *second* tier of the *third* column in the *second* line. If you set up your array in that order, you can reach Opal with WORD$(2,3,2). Or you could set it up so: Opal is in the third column of the second line in the second tier. Then you would have to make your variable read: WORD$(3,2,2). We now have two "levels," but there is no reason you have to stop at two.

If you add a hundred tiers or levels, you are still in a three-dimensional array.

Don't be confused, however. If you add a hundred tiers or levels, you are still in a three-dimensional array. You have three dimensions: horizontal, vertical, and depth. Can you begin to visualize this? If so fine. If not, don't let it bother you. It will come with practice when the need arises.

Now, can you visualize a four- or five-dimensional array? If you can, please write and explain it to me because my mind just can't think that way. A math whiz might find use for them, but it is doubtful that you or I would. From a practical standpoint, one-dimensional arrays will frequently be used, two-dimensional will sometimes be helpful, but you will rarely use three-dimensional arrays and probably never have to concern yourself with four or more.

With this introduction, let's go into this month's program. You can name it anything you want. I have used PROFLOSS.BAS (for profit and loss). As you will recall from last session, long programs do take up disk space, so plan in advance. The base program (PROFLOSS.BAS) will occupy between 10 and 14K of memory. The intermediate (PROFLOSS.INT) program will need about 5 to 8K.

Each month, you will be writing two files that use up about 2K each. Simple arithmetic tells us you will be needing close to 50K by the end of the year. I have my program (which actually is somewhat larger) on a disk with CBasic and *WordStar* plus a few utilities like STAT. Since my system is a double density 8" disk, that presents no problem.

If you have small disk capacity, you might consider putting all the programs and files on a separate disk. This means you must change all the program and file names to include a prefix (B: most likley). As just one example, the first file to be named is done in the line:

```
LET FIL$=MONTH$+".FIL"
```

If you want it on disk B, change the line to read:

```
LET FIL$="B:"+MONTH$+".FIL"
```

If you do this, be sure you do it with *all* file names.

The Program

Okay, let's start reading through the program listing. The long REM statements at the beginning and throughout the program need not be typed in since you already have a printout of the entire program. If you did not have the printout, however, they could be vital weeks or months later when you wanted to make a change or correction.

Note that there are six major variables, all of them subscripted. S$ is for the string descriptions (Gross income, Sales Ex-

"...I lost my calendar watch....what year is it?"

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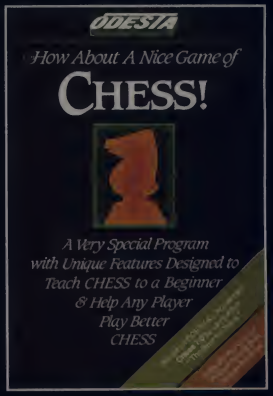

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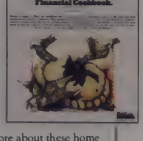

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penses, etc.). The other five are all numeric variables associated with each of the strings. A is the figures you enter for the current month; B reads out the previous month's figures for year to date; C computes the new year-to-date figures by adding A and B (current month plus previous year-to-date); P computes the percentages for each A figure based on the number divided by the gross sales times 100; P2 does the same for the C figures to give the percentages on the new year-to-date basis.

You might notice that the above are all short, one-letter variables. This may seem strange when I have pointed out that a feature of CBasic is to allow long variable names. In this case, I am using short variables for two reasons: 1) to keep the listing reasonably short for *Creative Computing*; 2) to make it easier to type out the long output lines at the end of the program. In general, it will pay to use longer variable names.

Immediately under the descriptions of these variables is the all-important DIM statement that dimensions each of the variables to accept up to 22 different inputs. If you change the program to your own bookkeeping system, you will probably have to change the number 22 to whatever is needed in your case. My own program, for example, is dimensioned to 47 subscripts.

In general, it will pay to use longer variable names.

The next section simply assigns the string variables from 1 through 22. Note that you will enter only 14 numeric inputs for these strings. The other eight numeric variables are computed by the program. I have typed those strings which will have computed numeric figures in all caps to help you visualize this.

The next section of the program clears the screen and presents a title screen. By now, this should be "old hat" to you. Next, the program asks that you type in the month for which you are going to enter the figures. You will also see a rather simple correction routine here. This will be used frequently throughout the program. It allows the operator to proofread the entries on the screen and re-enter if a mistake has been made. The same type of thing immediately follows as you are asked to type in the company name.

Now comes an important section that will convert the month you entered into a filename. The first step is to be sure all the letters are in uppercase. The UCASE$(X$) function does this. It says to convert all letters in the string X$ to uppercase. If you already typed it in uppercase, that is fine, but it will convert January or january to JANUARY.

Next we will take the first three letters of each month as part of the filename. We use the LEFT$(X$,N) function to do this. This simply takes the first N letters of X$ (three in this case) starting at the left. In other words, JANUARY becomes JAN. This will be used shortly in the filename.

Now notice the line that reads IF MONTH$="JAN" THEN GOSUB 2000. This is necessary to make a special previous month file for the first month of the year. That file will have all zeros for numerics. Thus the first time the program is run, the year-to-date will be the same as the first month (a first month figure plus zero will equal the first month figure). Take a look at the subroutine at line 2000 near the end of the listing. You can see how using subscripted variables simplifies this task. You must remember that the program is now set up with January as the first month. If any other month is your first month, you must make changes as indicated in the REM statements throughout the program.

The next 12 lines assign a previous month for each month. This will be needed for the previous month filename.

The actual filename for the current month is figured next, and the file itself is created. Now inputs are called for and assigned to A(N) variables (N being a number from 1 to 22). You should be able to figure out this part of the program from past experience. The only real difference is the use of subscripted variables, which by now you should understand. Notice that some variables are computed as you go along. The Total Direct Expenses for example is computed by LET A(5)=A(2)+A(3)+A(4). In this case, you are *not* asked to enter an input for A(5). It is a computed variable.

At the end of the input module, the inputs are read into the file on disk using only three lines thanks to the use of the array. The file is then closed, and the output module begins. Three files are named next. The first two exist on disk, and they are read into memory. The third is created after adding A variables to B variables (add the current month figures to the year-to-date figures). These are the C figures. This last file is written to the disk; the file is closed to assure the numbers are in the file; and then the file is immediately re-opened. We now have three files both on disk and in computer memory. It is then a simple matter of computing the percentages for both the A and C figures, and we are ready to printout.

Simple PRINT USING statements are used for the Gross and year-to-date gross figures. After this, the rest of the printout uses a long format string to set up a column format which will be printed with the PRINT USING statement. You saw how most of this was done last session, but note a new type of format which looks like this:

```
/1234567890123456789 0/
```

This format is used for *strings* not numbers. Basically, it takes a string variable and prints out the number of characters between the first and last slash mark. The numbers in between are not necessary. You can use blanks or any characters. In our case here, there are 20 spaces between the slashes. Add two spaces for the slash marks themselves, and you have a total of 22. This means a string longer than 22 characters will truncate at 22 spaces. It also means a string shorter than 22 characters will print the characters and then print spaces up to a total of 22. For example, the string Cash Flow would printout as follows (if you consider the lowercase s to be a space):

```
Cash Flowssssssssssssss
```

The rest of the long format string then uses numeric formats as we discussed last session. Just remember that in a long, single line format such as we are using here, the spaces between the format strings are counted as part of the string. Thus if you put four spaces between two numeric formats, those four spaces will always print out. This helps to space for column formats and assures that all the figures will line up with a decimal point or with the last digit.

The printout itself should be simple to understand if you go over it carefully. However, an even better way to visualize this is to enter the program and print it out. Nothing can take the place of actually seeing the results on your screen or printer. Look at Figure 1. This is how your printout should look if everything goes well.

At the end of the printout, the three files are closed, and the program ends. Again, note the STOP between the program end and the start of the subroutines. Remember you cannot use an END here. If you do, the compiler cannot go on to compile the subroutines, and your program will not work.

You have your work cut out for you. Try revising this program to fit your needs (either for business or for a home budget). It is not as difficult as it appears at first. Give it a good try. The results are worth the effort. More important, if you really understand what you are doing, you are close to the point at which you can start to write some programs on your own. To help you do that, our next session will go into the planning and thinking which you must do *before* sitting down at your computer.

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CIRCLE 200 ON READER SERVICE CARD

Listing 1.

```
Print out of PROFL$$.BA ...PAGE 1

REM  This is a simple "Profit & Loss" program for a small
REM  business.  The actual categories will probably have to
REM  change for a specific business and it is very likely
REM  that there will be many more categories than shown
REM  in this example.

        REM  All the major string variables are assigned as
        REM  parts of an array named "#$".  The first is the
        REM  string "GROSS" assigned as S$(1).  S$(2) is
        REM  "Cost of Material" and so forth for a total of
        REM  22 strings (the last is S$(22) = New Balance.

          REM   Dimension the arrays
          REM   #S(X) = string variables
          REM   A(X) = numeric inputs (current month)
          REM   B(X) = read-out of previous month's
          REM              figures (year-to-date)
          REM   C A) = A + B to equal the new year-to-
          REM              date figures
          REM   P(X) = percentage, current month
          REM   P2(X) = percentage, year-to-date

10DIM #(22),A(22),B(22),C(22),P(22),P2(22)

1000 REM ASSIGN STRING VARIABLES
#$(1) = "Gross"
#$(2) = "Cost of Materials"          REM Note that values for
#$(3) = "Contracted Components"      REM those strings typed
#$(4) = "Other Direct Expenses"      REM in upper & lower case
#$(5) = "TOTAL DIRECT EXPENSES"      REM are entered by operator
#$(6) = "Office Expense"             REM and that the strings in
#$(7) = "Sales Expense"              REM all UPPER CASE are
#$(8) = "Postage & U.P.S."           REM automatically computed.
#$(9) = "Tel. & Utilities"
#$(10) = "Auto Expense"
#$(11) = "TOTAL OVERHEAD"
#$(12) = "TOTAL O.E. & O.H."
#$(13) = "Net Wages"
#$(14) = "Withholdings"
#$(15) = "GROSS WAGE"
#$(16) = "Taxes Fed/State"
#$(17) = "Social Security"
#$(18) = "TOTAL EMPL. TAX"
#$(19) = "GRAND TOTAL"
#$(20) = "CASH FLOW"
#$(21) = "Beginning Balance"
#$(22) = "NEW BALANCE"

10000 REM 10000          REM CLEAR SCREEN
PRINT "      'PROFIT & LOSS' STATEMENT' GENERATING PROGRAM"
PRINT
PRINT "     For use with a cash basis small business system"
PRINT "            such as 'NEBS' or 'THE DOME BOOK'"
PRINT:PRINT:PRINT:PRINT:PRINT
INPUT "Type <Return> to start.....";LINE Dummy$
REM start of input
10 GOSUB 10000
PRINT "    TYPE IN THE MONTH FOR WHICH YOU ARE"
PRINT
PRINT "    GOING TO ENTER FIGURES.  WRITE OUT THE"
PRINT
INPUT "   WHOLE MONTH NAME  (i.e.   January).";M$
PRINT:PRINT:PRINT:PRINT:PRINT
   REM  Correction routine follows
PRINT "You have entered ";M$;" as the month."
PRINT
PRINT "Type <Return> if correct"
PRINT
INPUT "or type 'C' then <Return> to correct";LINE CORRECT$
IF CORRECT$ = "C" OR CORRECT$ ="c" THEN GOTO 10
GOSUB 10000
INPUT "TYPE YOUR FULL COMPANY'S NAME:";LINE COMPANY.NAME$
10.1 PRINT:PRINT:PRINT:PRINT:PRINT
PRINT "      YOU HAVE TYPED IN THE FOLLOWING"
PRINT
PRINT "    AS YOUR COMPANY NAME: ";COMPANY.NAME$
PRINT:PRINT:PRINT:PRINT
PRINT "IF CORRECT, TYPE <RETURN>"
INPUT "OR TYPE 'C' THEN <RETURN> TO CORRECT:";LINE CORRECT$
IF CORRECT$="C" OR CORRECT$="c" THEN GOTO 10.1
```

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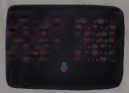

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CIRCLE 126 ON READER SERVICE CARD

Listing 1. (continued)

```
REM  Convert month into filename
LET MONS = UCASE$(MS)  REM make month All upper case
LET MONTHS = LEFT$(MONS,3)  REM Use first 3 letters only
IF MONTHS = "JAN" THEN GOSUB 2000  REM if this is first
                                   REM month, set up a
                                   REM file for the pre-
                                   REM vious month which
                                   REM is filled with zeros.
                                   REM This allows reading
                                   REM of previous "year-to-
                                   REM date" file for the
                                   REM first month.  If your
                                   REM first month is NOT
                                   REM January, you will have
                                   REM to change "JAN" to some
                                   REM other month.


REM    Assign "Previous Months"
IF MONTHS="JAN" THEN PMONTHS="DEC"
IF MONTHS="FEB" THEN PMONTHS="JAN"
IF MONTHS="MAR" THEN PMONTHS="FEB"
IF MONTHS="APR" THEN PMONTHS="MAR"
IF MONTHS="MAY" THEN PMONTHS="APR"
IF MONTHS="JUN" THEN PMONTHS="MAY"
IF MONTHS="JUL" THEN PMONTHS="JUN"
IF MONTHS="AUG" THEN PMONTHS="JUL"
IF MONTHS="SEP" THEN PMONTHS="AUG"
IF MONTHS="OCT" THEN PMONTHS="SEP"
IF MONTHS="NOV" THEN PMONTHS="OCT"
IF MONTHS="DEC" THEN PMONTHS="NOV"

LET FILS=MONTHS+".FIL"   REM name current month file
CREATE FILS AS 1     REM create file as number one
GOSUB 10000   REM clear screen
PRINT " FOR THE FOLLOWING ENTRIES, ENTER THE NUMBERS"
PRINT
PRINT " WITHOUT DOLLAR SIGNS OR COMMAS.  ALSO, YOU DO"
PRINT
PRINT " NOT HAVE TO ENTER THE DECIMAL POINT AND ZEROS"
PRINT
PRINT "  IF THERE ARE NO CENTS."
PRINT
PRINT "  EXAMPLES:  Enter $10,000.00 as 10000"
PRINT "                  or enter $1,234.56 as 1234.56."
PRINT:PRINT:PRINT:PRINT:PRINT:PRINT
INPUT "   HIT <RETURN> TO START ";LINE DUMMY$
20 GOSUB 10000  REM CLEAR SCREEN

INPUT "TYPE IN GROSS SALES FOR CURRENT MONTH:";A(I)
PRINT:PRINT
INPUT "TYPE IN COST OF MATERIALS:";A(2)
PRINT:PRINT
INPUT "TYPE IN OUTSIDE CONTRACTED COMPONENTS:";A(3)
PRINT:PRINT
INPUT "TYPE IN OTHER DIRECT EXPENSES:";A(4)
REM CORRECTION ROUTINE FOLLOWS
PRINT "  PROOFREAD ABOVE.  IF ALL OKAY, ENTER <RETURN>."
INPUT "  OR TO CORRECT ENTER THE LETTER 'C':";LINE C$
IF C$="C" OR C$="c" THEN GOTO 20
LET A(5)=A(2)+A(3)+A(4)  REM total up direct expenses
30 PRINT:PRINT:PRINT:PRINT:PRINT:PRINT
INPUT "TYPE IN OFFICE EXPENSES FOR MONTH:";A(6)
PRINT
INPUT "TYPE IN SALES EXPENSES:";A(7)
PRINT
INPUT "TYPE IN POSTAGE & UPS FOR MONTH:";A(8)
PRINT
INPUT "TYPE IN TELEPHONE & UTILITIES:";A(9)
PRINT
INPUT "TYPE IN AUTOMOTIVE EXPENSES:";A(10)
PRINT:PRINT:PRINT:PRINT
INPUT "IF OKAY, ENTER <RETURN> OR 'C' TO CORRECT";LINE C$
IF C$="C" OR C$="c" THEN GOTO 30
LET A(11)=A(6)+A(7)+A(8)+A(9)+A(10)  REM Total overhead
LET A(12)=A(11)+A(5)  REM total overhead plus direct expenses
40 PRINT:PRINT:PRINT:PRINT:PRINT:PRINT
INPUT "TYPE IN NET WAGES PAID FOR MONTH:";A(13)
PRINT
PRINT "TYPE IN WITHHOLDINGS ON WAGES (INCLUDE ONLY THAT"
INPUT "PORTION ACTUALLY DEPOSITED OR PAID TO IRS, ETC.)";A(14)
PRINT:PRINT:PRINT:PRINT
INPUT "IF OKAY, ENTER <RETURN> OR 'C' TO CORRECT";LINE C$
IF C$="C" OR C$="c" THEN GOTO 40
```


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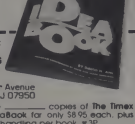

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Listing 1. (continued)

```
LET A(15)=A(13)+A(14)  REM total wages
50 PRINT:PRINT:PRINT:PRINT:PRINT

REM  ***Note that categories below will be different for
REM      each state (or city).  You may want several more
REM      categories than shown here.
INPUT "TYPE IN EMPLOYER FEDERAL & STATE WAGE TAXES:";A(16)
PRINT
INPUT "TYPE IN EMPLOYER SOCIAL SECURITY TAX:";A(17)
PRINT:PRINT:PRINT:PRINT
INPUT "IF OKAY, ENTER <RETURN> OR 'C' TO CORRECT";LINE C$
IF C$="C" OR C$="c" THEN GOTO 50
LET A(18)=A(16)+A(17)  REM total employer contributions
PRINT:PRINT:PRINT:PRINT:PRINT
PRINT "                 ****IMPORTANT****"
PRINT
PRINT " You will be asked to type in the 'Beginning Balance'."
PRINT
PRINT " This is the amount in your checkbook at the start of"
PRINT " the month after balancing your checkbook"
PRINT:PRINT:PRINT:PRINT
PRINT "Type in your Beginning Balance"
INPUT "Do NOT use dollar signs or commas!";A(21)

LET A(19)=A(12)+A(15)+A(18)    REM GRAND TOTAL
LET A(20)=A(1)-A(19)  REM cash flow = gross less grand total
LET A(22)=A(21)+A(1)-A(19) REM new balance = beginning
REM                            balance plus gross less
REM                            grand total
REM ***END OF INPUT MODULE

FOR I% = 1 TO 22  REM  write inputs to file on disk
PRINT #1;A(I%)
NEXT I%

CLOSE 1

REM ***START OF OUTPUT MODULE

REM Name 3 files
FILE1$=MONTH$+".FIL"    REM Current month file
FILE2$="YTD"+PMONTH$+".FIL"  REM Previous year-to-date file
FILE3$="YTD"+MONTH$+".FIL"   REM New year-to-date file

REM Open and read 2 files from disk
OPEN FILE1$ AS 1
FOR I% = 1 TO 22
READ #1;A(I%)
NEXT I%

OPEN FILE2$ AS 2
FOR J% = 1 TO 22
READ #2;B(J%)
NEXT J%
REM       Add "A" variables to "B" variables
REM       to create "C" variables (this will be
REM       the new year-to-date file)
FOR K% = 1 TO 22
C(K%)=A(K%)+B(K%)
NEXT K%

REM       Create new file and read above "C" variables
REM       into file on disk.
CREATE FILE3$ AS 3
FOR L% = 1 TO 22
PRINT #3;C(L%)
NEXT L%
CLOSE 3

REM Re-open file 3 and read into memory
OPEN FILE3$ AS 3
FOR M%=1 TO 22
READ #3;C(M%)
NEXT M%

REM Compute percentages for both current month and
REM for year-to-date
FOR I%=1 to 22
P(I%)=(A(I%)/A(1))*100
NEXT I%

FOR J%=1 TO 22
P2(J%)=(C(J%)/C(1))*100
NEXT J%
```

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```
GOSUB 10000
PRINT "          ******** READY FOR PRINTOUT! ********"
PRINT:PRINT:PRINT
PRINT "          BE SURE PRINTER IS READY"
PRINT:PRINT:PRINT:PRINT:PRINT:PRINT
INPUT "        TYPE <RETURN> TO START PRINTOUT";LINE DUMMY$

LPRINTER   REM  Following output is to go to printer!
PRINT "      PROFIT & LOSS STATEMENT FOR ";COMPANY.NAME$
PRINT
PRINT "                    FOR THE MONTH OF ";MON$
PRINT
PRINT "GROSS, ";MON$;"...";
PRINT USING "$$###,###.##";A(1);    REM This format is good up
PRINT "  GROSS, Y. T. D. ...";      REM to $999,999.99. Change if
PRINT USING "$$####,###.##";C(1)    REM your figures go higher
PRINT
REM  The following is the format string for all printouts
FOR$= "/123456789012345678#0/  $$###,###.##  ###.#  $$###,###.##  ###.#"
PRINT "    DESCRIPTION                    CURRENT      %        Y.T.D.      %"
PRINT "-----------------------------------------------------------------------"
FOR I%=2 TO 4
PRINT USING FOR$;$$(I%);A(I%);P(I%);C(I%);P2(I%)
NEXT I%
PRINT "-----------------------------------------------------------------------"
PRINT USING FOR$;$$(5);A(5);P(5);C(5);P2(5)
PRINT
FOR I%=5 TO 10
PRINT USING FOR$;$$(I%);A(I%);P(I%);C(I%);P2(I%)
NEXT I%
PRINT "-----------------------------------------------------------------------"
PRINT USING FOR$;$$(11);A(11);P(11);C(11);P2(11)
PRINT
PRINT USING FOR$;$$(12);A(12);P(12);C(12);P2(12)
PRINT
FOR I%=13 TO 14
PRINT USING FOR$;$$(I%);A(I%);P(I%);C(I%);P2(I%)
NEXT I%
PRINT "-----------------------------------------------------------------------"
PRINT USING FOR$;$$(15);A(15);P(15);C(15);P2(15)
PRINT
FOR I%=16 TO 17
PRINT USING FOR$;$$(I%);A(I%);P(I%);C(I%);P2(I%)
NEXT I%
PRINT "-----------------------------------------------------------------------"
PRINT USING FOR$;$$(18);A(18);P(18);C(18);P2(18)
PRINT
FOR I%=19 TO 22
PRINT USING FOR$;$$(I%);A(I%);P(I%);C(I%);P2(I%)
PRINT
NEXT I%

CLOSE 1,2,3    REM CLOSE OUT 3 FILES

STOP  REM  END OF PROGRAM

2000 REM          set up "previous year-to-date" file with all
     REM          zeros for first month read out.
CREATE "YTDDEC.FIL" AS 1    REM Change "DEC" if necessary!!
FOR I% = 1 TO 22            REM Example: if first month is
A(I%) = 0                   REM July, change to "YTDJUN.FIL"
NEXT I%
FOR J% = 1 TO 22
PRINT #1;A(J%)      REM  print to the file on disk
NEXT J%
CLOSE 1             REM  close the file
RETURN

10000                REM  CLEAR SCREEN SUBROUTINE
FOR I% = 1 TO 25
PRINT
NEXT I%
RETURN
```


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CBasic Clinic, continued...

Figure 1.

PROFIT & LOSS STATEMENT FOR XYZ Widget Company, Inc.
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GROSS, FEBRUARY... $37,481.54 GROSS, Y. T. D. ... $59,063.04

DESCRIPTION	CURRENT	%	Y.T.D.	%
Cost of Materials	$9,478.21	25.3	$17,880.57	30.3
Contracted Components	$1,058.10	2.8	$2,458.30	4.2
Other Direct Expenses	$4,002.78	10.7	$9,149.89	15.5
TOTAL DIRECT EXPENSES	$14,539.09	38.8	$29,488.76	49.9
Office Expense	$2,046.28	5.5	$3,192.15	5.4
Sales Expense	$628.92	1.7	$1,149.10	1.9
Postage & U.P.S.	$210.00	0.6	$315.00	0.5
Tel. & Utilities	$216.52	0.6	$452.99	0.8
Auto Expense	$185.46	0.5	$391.06	0.7
TOTAL OVERHEAD	$3,287.18	8.8	$5,500.30	9.3
TOTAL D.E. & O.H.	$17,826.27	47.6	$34,989.06	59.2
Net Wages	$4,182.71	11.2	$8,372.03	14.2
Withholdings	$821.40	2.2	$1,633.80	2.8
GROSS WAGES	$5,004.11	13.4	$10,005.83	16.9
Taxes Fed/State	$412.00	1.1	$824.55	1.4
Social Security	$249.27	0.7	$503.57	0.9
TOTAL EMPL. TAX	$661.27	1.8	$1,328.12	2.2
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Creating A Letterhead With Your Daisywheel Printer

Thom Hogan

If you own a daisywheel printer such as a Diablo, Qume, or NEC, you may have noticed somewhere in the specifications that your printer is capable of generating graphics. If you were like me, you probably filed that information in the back of your brain and commenced to use your printer for listings and documents.

Several years ago I bought one of the first Diablo 630 printers as they were introduced. This letter-quality machine prints characters using a standard daisywheel element (like a Selectric "golf ball," only flat) at a rate of 45 characters per second.

Since I am a busy author, the Diablo 630 has more than proven its worth; I estimate that I have run more than 300,000 pages through the printer without experiencing a single problem.

Recently I found myself with a bit of extra time on my hands, and for some reason the notion of daisywheel graphics came popping out of my random thoughts. I decided to see if I could make the Diablo do something simple, like print my name in big letters at the top of the page, simulating a simple letterhead. By the time you finish reading this article, you, too, should be able to create simple graphics on your daisywheel printer.

Some Background

Before getting to the actual process of creating graphics on a daisywheel printer like the Diablo 630, we need to be sure that we are all working from the same base of information. So, first some background information you will need to know.

Diablo was the first to introduce a daisywheel printer. The daisywheel looks much like a daisy; the spokes that hold the characters to be printed are held together in a flat carrier that looks a bit like a flower with letters on each petal.

The principle of printing with a daisywheel is simple.

The principle of printing with a daisywheel is simple: rotate the spokes of the daisywheel until the proper character is on top, then hit the spoke so that it impacts the paper (through the ribbon) with a small metal hammer.

In addition to producing a machine to print characters like a typewriter does, Diablo decided to make the printing of the daisywheel more flexible. They did this by making the mechanism that moves the daisywheel back and forth across the paper capable of moving in extremely small increments. What this means is that the Diablo is capable of doing print in elite, pica, or any other spacing of characters across the page.

In addition to offering this flexibility in the horizontal direction, Diablo made it so that the printer was capable of a similar move in the vertical direction, meaning that characters can be printed six lines to an inch, or any other number the user dictates.

Other daisywheel printers followed the Diablo. Most notable are the Qume Sprint series and the NEC Spinwriters (although the NEC uses a different typing element, called a Thimble, its design is similar to that of the Diablo). Recently, other daisywheel printers have appeared, including one from Radio Shack manufactured by Ricoh, a Japanese company. With the exception of the low-cost typewriter-based printers such as the Smith Corona TP1 and the Brother, the techniques described in this article should work with most daisywheel printers.

Now let's be more specific about the Diablo printing abilities.

In the horizontal direction, the Diablo (and others) is capable of moving the printhead $\frac{1}{120}$th of an inch at a time. That is right, you could print 120 characters an inch if you so desired, although I can't imagine what the font that would do that would look like, since it would be unbelievably small. The rea-

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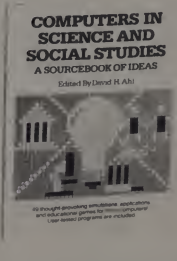

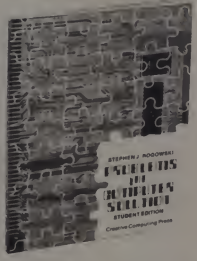

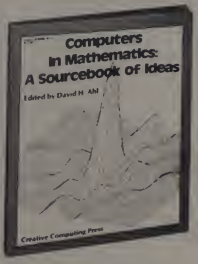

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```
.LH 1      set vertical spacing to 1/48th of inch
.CW 1      set horizontal spacing to 1/120th of inch
 ........
 ........
 ........
 ........
 ........
 ........
 ........
 ........
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```

Figure 1.

son Diablo built this precise horizontal motion into the printer was to allow for proportional and incremental spacing, where each character is separated by a varying amount of white space to make the right margin line up.

In the vertical direction the Diablo can move the print mechanism in increments of 1/48th of an inch. Thus, the maximum density of information you can print using a Diablo 630 is 120 x 48 in a square inch.

As for graphics, the normal method of obtaining them is to print a period (dot), move the print mechanism in the direction and amount you desire, then print another period. If you do this correctly, you can create graphs, drawings, and even different type fonts.

Obviously, there is some limit to the ability of the Diablo when used as a graphic printer. First, there is the speed penalty: remember that the 630 prints at 45 characters per second, which means that graphics will appear at 45 dots per second. If you have a great deal of drawing to do, it will take time. Second, you will find that, even with a good tractor feed, the resolution of the printer (ability to place a dot accurately) is more accurate in the horizontal direction than in the vertical. Part of this is the disparity in dot densities (48 versus 120), but much more is simply that the paper is kept steadier on the horizontal axis than on the vertical.

Getting Started

Having looked up all the relevant information in the Diablo 630 manual, I began searching for the simplest method of making use of the Diablo features.

There is an *escape sequence*—a group of characters that begins with an escape—that is used to tell the printer to move its print mechanism. With these commands you can move the printing in any direction you want, in the increments I have described above.

The more I looked at this method of telling the printer what I wanted to do, the more I knew there had to be an easier way. Fortunately, I was right; if you have a sophisticated word processor, there is an easier way.

WordStar, the word processor I use, has so-called *dot commands* that allow you to reset the way the printer works. For instance, a .LH 8 in a text file means that *WordStar* should tell the printer to move 8/48ths of an inch each time a linefeed is encountered. Likewise, a .CW 12 tells *WordStar* to move the Diablo to move 12/120ths of an inch each time a character is printed.

Having decided upon the size of the graphic I wanted to create, I began working on the design.

Bear in mind that these commands work only if you have correctly installed *WordStar* for your daisywheel printer. If you are not sure if your printer has been installed for the capabilities of the daisywheel, consult your manual or the dealer who sold you your equipment.

Since I wanted to use dots to print out graphics, and since *WordStar* could do the control of the printer in the manner I wanted it to, I began to experiment. I decided that first I would try to print out a large block, about the size I wanted the characters in my name to be printed. Figure 1 shows the *WordStar* file with which I began.

I made the box eight characters wide by ten deep since that is the same *matrix* used in the character set in my computer; I figured that I could start by using the characters already on the computer and then improve upon them. Note that the periods that make up the information I want printed *cannot* start in column 1, since *WordStar* interprets a period in the first column as a command not information to print.

Those of you with other word processors will have to look up in your manual to learn how to change the horizontal and vertical printing parameters. Some, like *Perfect Writer,* do not allow you to print graphics in the manner I describe for *WordStar.*

The block came out well, although it was a little smaller than I had imagined. I widened it to 16 dots wide to compensate for the fact that the horizontal motion is smaller than the vertical, and again printed out my result.

Having decided upon the size of the graphic I wanted to create, I began working on the design. Since I wanted primarily to print my name in large letters, as on a letterhead, I began designing my font. The letter A, for instance, appeared as in Figure 2 when I was editing it in WordStar:

```
.LH 1
.CW 1
    ..........
   ............
  ....      ....
  ....      ....
  ..............
  ..............
  ....      ....
  ....      ....
  ....      ....
 ......    ......
```

Figure 2.

I next tried printing it out; the result can be seen in Figure 3a. A little small, I decided. Instead of redoing the character, however, I simply changed the .cw 1 to a .cw 2. The result of this change can be seen in Figure 3b, where the character is twice as wide as before. I decided to try one more idea, making the line height 8/48ths instead of 1/48th. This result is seen in Figure 3c. The nice horizontal stripes that form in this version are suggestive of the latest look in logos.

The next step was to create my complete alphabet. You can see the matrix and the results in Figure 4.

Putting It Together

Finally, I was ready to try my hand at creating my letterhead. I had a complete

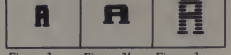

Figure 3a. *Figure 3b.* *Figure 3c.*

Figure 4.

set of letters and numbers in a file I called LARGE.FNT, and each individual letter in its own file, such as A.FNT, B.FNT, and so on.

By using the block read command and the column block move command, I was able to read in the letter I needed next, then move it to the position on the page at which I wanted it. Since *WordStar* has horizontal scrolling up to 250 characters, I could theoretically put almost 20 of my large characters across the page without having *WordStar* begin to wrap lines around so I couldn't easily see the placement (Note: make your right margin 250 when editing your graphics, or you will end up at some point fighting the attempts of *WordStar* to put all those periods into a incrementally spaced line, i.e., *WordStar* attempts to split long lines into shorter, formatted ones).

After getting my characters correctly placed, the next step was to print my address in normal text. After much experimentation, I discovered the best way to do this was to put the line of text I wanted printed normally at the end of the graphics, then use the superscript command to raise it into the position I desired. The resulting file (with a dummy address) can be seen in Figure 5.

One cautionary note: if you are using the graphics for letterhead, you will have to do a bit of experimenting to establish where the end of the page should be. *WordStar* sets the end of page by counting lines, and we have a bunch of lines that are only 1/48th of an inch apart, while others are spaced at 9/48ths. Generally, the manner in which I determined my proper page length was to do the following:

1. Measure the vertical size of my graphic.
2. Write my text, leaving the amount of space blank I determined in step one.
3. Find where *WordStar* split the page.
4. Add my graphic at the top of the text.
5. Then reset the page length command on the first page so that the page break is where *WordStar* put it in step 3. Make sure to reset the page break to the default beginning with page 2.

Wrapping It Up

That is all there is to it. With the method I have outlined above, you should be able to create your own large characters, drawings, and other graphic material to place at the top of your letterhead. I have tested this with Diablo, Qume, and NEC printers. It should also work with the Radio Shack, Ricoh, and other incremental-spacing daisywheel printers. ■

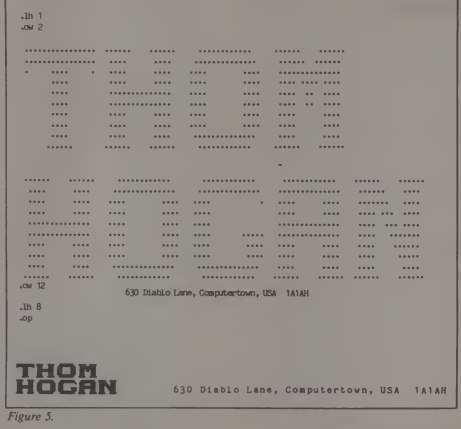

Figure 5.

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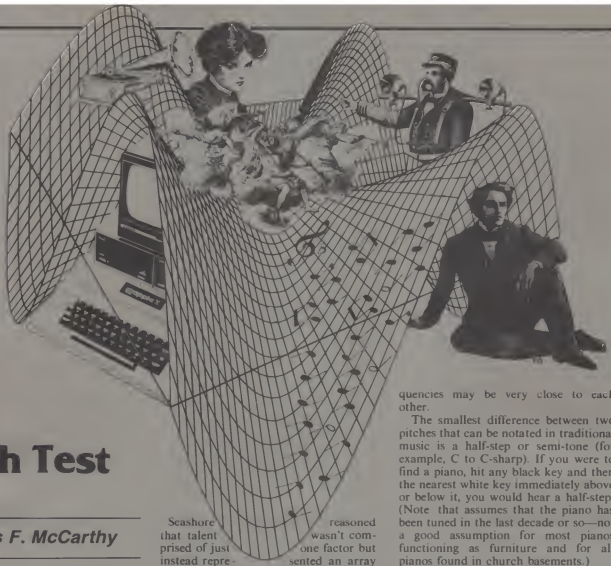

The Pitch Test

James F. McCarthy

Many people believe that musicians are born with some sort of ability not possessed by mortals without which significant accomplishment as a performer or composer isn't possible. Musicians, to paraphrase Fitzgerald and Hemingway, are very different from you and me: they have more talent.

But talent is a slippery notion, and the more you try to draft it as an explanation for genius, the more evasive it becomes. Suppose, for example, we hear a young boy playing the piano brilliantly, with technique and expression far beyond his years. We would almost certainly conclude that the lad had oodles of the right stuff, that he plays so well because he is talented, has the "inner spark," or whatever. But how do we know that he has talent? Because he plays so well. And why does he play so well? Because he has talent.

You see the problem: We seem to be thinking in circles, saying "Talented is as talented does" and vice versa. But in 1919, a psychologist named Carl Seashore constructed what he claimed to be the first scientific, objective way of measuring potential musical ability.

Seashore reasoned that talent wasn't comprised of just one factor but instead represented an array of discrete skills. His Measures of Musical Talents were, therefore, a battery of separate tests that evaluated a person's sense of pitch, loudness, rhythm, time, timbre, and tonal memory (1939 and later versions).

The best known test from the battery is probably the pitch test, a computer generated version of which for the Apple accompanies this article. The purpose of the test is to see, as musicians would put it, whether or not you have a tin ear; in the erudite academic ghetto where I hang out, it is described as a test to determine how well you can discriminate betweeen the two tones whose frequencies may be very close to each other.

The ability to detect small differences between pitches is an important skill for most performers to have.

The smallest difference between two pitches that can be notated in traditional music is a half-step or semi-tone (for example, C to C-sharp). If you were to find a piano, hit any black key and then the nearest white key immediately above or below it, you would hear a half-step. (Note that assumes that the piano has been tuned in the last decade or so—not a good assumption for most pianos functioning as furniture and for all pianos found in church basements.)

With a little more plunking about, you might also discover that the whole keyboard is laid out in half-steps and that there is no way to coax out quarter tones or even smaller beasties lurking in the cracks between the keys.

Since the tuning of a piano is preset by somebody with a wrench, it is possible that a pianist could have a fairly crude sense of pitch discrimination and still perform well. People who sing or who play wind or string instruments are not so blessed. Every note they produce is liable to vary wildly in pitch, and they must constantly monitor and control precisely the tuning of their performance. What musicians call a good ear—the ability to detect small differences between pitches—is an important skill for most performers to have, and it seemed to Professor Seashore that a test to determine who had one and who didn't would be quite valuable.

Seashore also believed then, as most people believe now, that a talent like the sense of pitch was inborn and thus impossible to improve with training. This largely unexamined belief led to a

kind of discrimination other than pitch: if public school band directors could administer a test to determine who had talent and who didn't, they could accept only those students who would help them look good at the music contests and reject those who would not.

Predictably, the use and abuse of the test generated some controversy. Some critics took the Gestalt view that musical talent was a holistic phenomenon and that it was somehow sinful to measure its component parts. Others, most notably behavioral psychologists, objected to the claim that talent is inborn and that the scores on the test couldn't be improved with training.

Still others expressed strong reservations over the ethics of using a test to weed out allegedly untalented fifth graders from the school music program, reasoning that age ten or so was a bit early to be making permanent decisions about children's careers or hobbies. But the most severe problem for the test was that it just couldn't predict with acceptable accuracy those who would become the next flowers of the music world and those who would never be able to sing "Come To Jesus" in whole notes.

The arguments have abated in the 75 years or so since the inception of the test, and perhaps they now seem interesting only to academic types such as myself or to whichever readers of mine remain awake. The pitch test is almost certainly what it claims to be—a measure of one's ability to detect small changes in frequency—but almost no one is naive enough now to believe that his child's high score on it should cause him to rush out and buy an accordion.

My own opinion is that it tests not ability but disability, that very low, repeatable scores probably mean you might do better playing computer than violin, but that you should do either or both if you want. In any event, few music teachers now use any sort of talent test to select students, reasoning instead that music instruction will be of some benefit to almost all children, not just the extraordinarily talented.

The Test

The Pitch Test shown in the listing more or less emulates Seashore's pitch test, and works like this: a tone is presented and, after a brief pause, a second tone is heard. You must decide whether the second tone is higher or lower in pitch than the first. In other words, the first tone is an "anchor" or standard tone that never changes frequency, while the second is always different from the first and is the one you judge to be higher or lower than the anchor.

The test is 25 items long and is divided into five levels of difficulty, each with five trials. Difficulty is determined by proximity of the second tone to the first in frequency, and Table 1 shows the frequency differences in Hertz (Hz) between paired tones for each of the five sections.

Frequency and Percent Differences Between Tones

Level	Trials	Freq. Diff.	% Diff.
1	1-5	7.9 Hz	1.9%
2	6-10	6.3 Hz	1.6%
3	11-15	4.8 Hz	1.2%
4	16-20	3.2 Hz	0.7%
5	21-25	1.6 Hz	0.4%

Table 1.

There are some structural differences between this test and the Seashore test, most of which represent improvements. First, the pattern of high/low presentations is chosen randomly by the program so it is not possible to memorize the answers no matter how often you take the test.

Second, the quick and crude machine language routine POKEd by the program produces complex tones instead of the sine waves (pure tones) claimed by the original version, although it is probable that the low fidelity equipment commonly used to play the old records added an audible amount of harmonic distortion.

Incidentally, the waveform coming out of (not going into) the Apple speaker could best be described as an alcoholic sine wave drying out; it has a bad case of the shakes and is not a pretty sight.

Third, the original test used a frequency of 500 Hz for its anchor or standard tone, while this program outputs it at 406 Hz. The time between trials on the Seashore was a fixed interval, while here the next pair of tones isn't played until some response to the previous trial is made.

In addition, when the two tones in a pair are closest in frequency and hardest to distinguish from each other (the last five trials), the difference between the two computer generated tones is 1.6 Hz or .39% at 406 Hz. This is virtually identical to the smallest difference between tones on the Seashore (also the last five notes): 2 Hz or .4% at 500 Hz. Nevertheless the computer test is probably superior, since the substantial levels of wow and flutter in the old record players could easily have yielded frequency variations greater than the smallest difference between two tones supposedly played by the recordings. Finally, there are 25 trials on this test vs. 50 on the Seashore, the duration of the tones is 315 msec (Seashore = 500 msec), and you can get immediate feedback after each trial if you choose that option instead of waiting a week for someone to score your test.

The Program

The program is structured as a series of modules laid in an increasingly common format: routines for which speed is not critical (initialization, instructions, etc.) are placed at the end of the listing, while routines that need to move along processing user input are placed near the top in priority order of need for speed.

Since the listing is littered with remarks and the variables have names that describe themselves, the program should be fairly easy to read and understand. The main program begins at line 400, and the test items are presented by means of a double loop extending from lines 490 to 610.

The values for PITCH and DURATION are POKEd in memory locations 6 and 7, and changes in PITCH are tied to the current value of LEVEL in the following manner: variable CHANGE is set equal to the current value of LEVEL and then added or subtracted randomly to or from PITCH just before the second tone is presented. For example, if LEVEL = 5 (as it does in the first five

Listing.

```
10  HOME   DIM ANSWER$(25): REM  ARRAY FOR USER'S ANSWERS
20  GOSUB 1740  REM  CREDITS
30  GOTO 420  REM  JUMP TO MAIN PROGRAM
40
50
60  REM   ***** SUBROUTINES *****
70
80  POKE  - 16368,0  GET ANSWER$  RETURN   REM  GENERIC INPUT
90  POKE  - 16368,0: CALL  - 756  RETURN   REM  GENERIC 'ANY KEY'
100  POKE 6,PITCH: POKE 7,DUR  CALL PLAY: RETURN   REM  PLAY 1ST TONE
110  HTAB 30  INVERSE  PRINT "RIGHT "  NORMAL   RETURN
120  HTAB 30  PRINT "WRONG "  RETURN
130
140  REM  CHANGE PITCH, PLAY 2ND TONE
150 CHANGE = L HILOW =  INT ( RND (1) * 2) + 1
160  IF HILOW ( 2 THEN  POKE 6,PITCH + CHANGE  POKE 7,DUR: CALL PLAY:
ANSWER$(NUMBER) = "L"  RETURN
170  POKE 6,PITCH - CHANGE  POKE 7,DUR  CALL PLAY: ANSWER$(NUMBER) = "H"
RETURN
180
```

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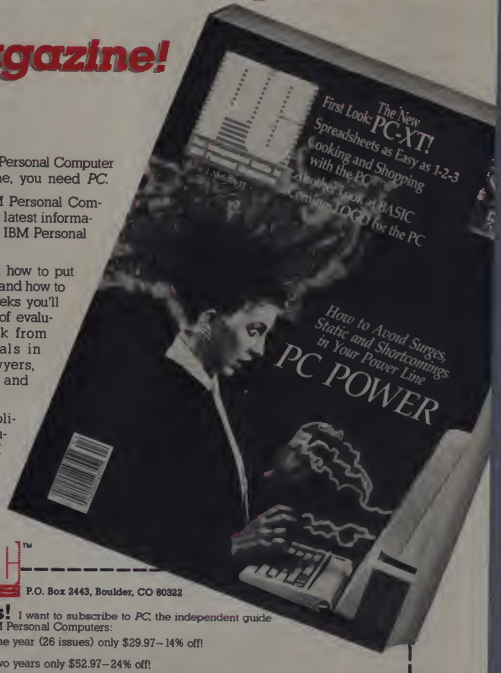

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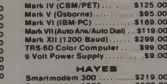

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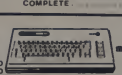

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trials), variable CHANGE will also be set to 5.

PITCH will always equal 250 for the first tone of each pair (the standard or anchor tone), while for the second tone PITCH will be altered by adding or subtracting CHANGE from it, depending upon the random setting of variable HILOW. Thus for the second tone PITCH will equal either 245 or 255. In the last five trials of the test, the value of PITCH for the first tone will still be 250, but since LEVEL now equals 1, CHANGE also equals 1, and the PITCH of the second tone will be set to either 249 or 251 (plus or minus one).

Interpretation

The first feedback section I wrote was very much like getting the results of the old Seashore test, and consisted of nothing more than an overall percent correct score. The more I thought about that the more it seemed wrong. You see, what tests like this really do is to determine something called your Difference Limen (DL), and that creature simply shouldn't be described by a percentage score.

A Difference Limen is the point at which you can no longer tell the difference between two stimuli. It is the point at which you start guessing whether two very similar hues of color are the same or different, whether one of two objects nearly identical in weight is heavier or lighter than the other or whether the second of two tones very close in frequency is higher or lower than the first.

Since most tests of DL grow more difficult by progressively reducing the difference between choices, what is important is not your overall score but the frequency difference at which you can no longer distinguish between tones and begin to guess at the answers.

Suppose, for example, you took the test and got four correct in Level 1, answered all the items correctly in Levels 2 through 4, and then missed two in Level 5. Since it is highly probable that guessing on a two-choice, five-item bunch will get you two or three correct most of the time, your DL—your guessing point—is at Level 5. A look at Table 1 (a similar version is also printed out at the end of the program) shows that you could discriminate between two tones 3.2 Hz or 0.7% apart (Level 4), but that your ability to detect changes in frequency began to fail when the difference was 1.6 Hz or 0.4% (Level 5).

What about the first level, where you got one wrong: couldn't that be your DL? Well, since you aced Levels 2 through 4, which are more difficult than Level 1, the mistake you made there could have been due to your unfamiliarity with the test (and you got the hang of

```
190  REM  GET ANSWER, TRAP ERRORS
300  HTAB 13: PRINT "(H OR L)? ";  HTAB 24: GOSUB 80
310  IF ANSWER$ <  > "H" AND ANSWER$ <  > "L" THEN  HTAB 24  CALL  - 868:
GOTO 300
220  RETURN
330 :
240  REM  CHECK ANSWER   IF RIGHT, INC. COUNTER
250  PRINT ANSWER$;  IF ANSWER$ = ANSWER$(NUMBER) THEN RIGHT = RIGHT + 1:
RIGHT(L) = RIGHT: IF SWITCH = 1 THEN  GOSUB 110: RETURN
360  IF SWITCH = 1 THEN  GOSUB 130:  RETURN
370  PRINT ""  RETURN   REM  NULL CHAR
380 :
390  REM  TRIAL LABEL
300  PRINT "TRIAL #";NUMBER:  RETURN
310 :
320  REM  CENTER MESSAGES ON SCREEN
330  INVERSE
340 H = INT (20 -  LEN (MSG$) / 3) + 1
350  VTAB V: HTAB H: PRINT MSG$:  RETURN
360 :
370  REM  ***** ENO SUBROUTINES *****
380 :
390 :
400  REM  ***** MAIN PROGRAM *****
410 :
420  HOME
430  GOSUB 1480: CALL  - 144:  REM  POKE BOUNO ROUTINE
440  GOSUB 720:  REM  INITIALIZE
450  GOSUB 840: REM  INSTRUCTIONS?
460  GOSUB 1410:  REM  IMMEOIATE FEEOBACK?
470  GOSUB 1500:  REM  ANNOUNCE BEGINNING
480 :
490  REM  BEGIN TEST LOOP
500  HOME: NUMBER = 0
510  FOR L = LEVEL$ TO 1 STEP  - 1
520 RIGHT = 0
530  FOR T = 1 TO TRIALS
540 NUMBER = NUMBER + 1: GOSUB 290: REM  PRINT PROMPT
550  FOR I = 1 TO PAUSE * 2:  NEXT I
560  GOSUB 100: REM  PLAY 1ST TONE
570  FOR I = 1 TO PAUSE: NEXT I
580  GOSUB 150:  REM  PLAY 2NO TONE
590  GOSUB 300:  REM  GET ANSWER
600  GOSUB 250:  REM  CHECK ANSWER
610  NEXT T: NEXT L
620  PRINT : HTAB 12:  PRINT "PRESS ANY KEY   ":  GOSUB 90:  HOME
630  GOSUB 1540:  REM  SHOV RESULTS
640  PRINT :  PRINT "WOULD YOU LIKE TO TRY AGAIN? ";  GOSUB 80
650  PRINT ANSWER$:  IF ANSWER$ = "Y" THEN  HOME:  GOTO 440
660  HOME : VTAB 12:  HTAB 18:  PRINT "DONE"  END
670 :
680  REM  ***** END MAIN PROGRAM *****
690 :
700 :
710  REM  INITIALIZE
730 PITCH = 350:  REM  HIGHER #'S = LOWER PITCH   350 IS MAX W/ 5 LEVELS
730 OUR = 355:  REM  HIGHER # = LONGER OUR(ATION)
740 LEVEL$ = 5:  REM  # OF OIFFICULTY LEVELS
750 TRIAL$ = 5:  REM  # OF TRIALS PER LEVEL
760 PAUSE = 500:  REM  TIME BETWEEN TONES ANO TRIALS
770 PLAY = 768 HZ$ = "HZ"
780  FOR L = LEVEL$ TO 1 STEP  - 1
790  FOR I = 1 TO 2
800  READ TABLE$(L,I)
810  NEXT : NEXT
820  DATA  7.9,1.9,4.3,1.6,4.8,1.2,3.3,0.7,1.6,0.4
830  RESTORE : RETURN
840 :
850  REM  INSTRUCTIONS?
860  VTAB 10:  PRINT "WOULD YOU LIKE INSTRUCTIONS (Y/N)? ";
870  GOSUB 80:  REM  GET INPUT
880  IF ANSWER$ <  > "Y" ANO ANSWER$ <  > "N" THEN  PRINT  CHR$ (7);
GOTO 870
890  PRINT ANSWER$:  IF ANSWER$ = "N" THEN  RETURN
900  HOME :  PRINT "THIS IS A TEST OF YOUR OIFFERENCE LIMEN"
910  PRINT "(OL) FOR PITCH, OR YOUR ABILITY TO HEAR"
920  PRINT "SMALL DIFFERENCES BETWEEN TWO TONES "
930  PRINT
940  PRINT "THERE ARE 25 TRIALS IN THE TEST.  IN"
950  PRINT "EACH TRIAL, YOU'LL HEAR TWO PITCHES "
960  PRINT "THE FIRST IS THE  STANOARO OR 'ANCHOR'"
970  PRINT "TONE THAT NEVER CHANGES FREQUENCY."
980  PRINT "WHILE THE SECONO TONE IS ALWAYS EITHER"
990  PRINT "HIGHER OR LOVER THAN THE FIRST."
1000  PRINT
1010  PRINT "YOU ANBVER BY TYPING AN 'H' IF YOU"
1020  PRINT "THINK THE SECONO TONE IS HIGHER THAN"
1030  PRINT "THE FIRST, ANO AN 'L' IF YOU DECIOE"
```

it later), a distraction, or just plain Brain Fade.

Improving Performance

Although Seashore claimed that the sense of pitch was inborn and that scores on his test weren't improvable, studies have shown him to be wrong. You can test this yourself by using the item feedback switch in the program. Simply take (or give) the test with no feedback after each trial two times or until you get a stable DL. Then take it twice with the immediate feedback switch on. Assuming that you didn't score 100% in the no-feedback condition, you may improve your DL by one or more levels due to the immediate reinforcement effect of seeing how you did after every trial.

Another way to improve your score is to use a trick. Most people can hear a singer going flat (singing lower than the proper pitch) earlier than they can detect sharp (high) pitch errors. For some reason our aural system is more sensitive to changes in frequency that decrease rather than increase. On the test, as the difference between the two frequencies comes close to your DL, you may be able just barely but consistently to detect a difference when the second pitch is lower than the first, but not when the second pitch is higher. The trick is to always guess H(igher) when you can't hear a difference.

Although Seashore claimed that the sense of pitch was inborn and that scores on his test weren't improvable, studies have shown him to be wrong.

You can save yourself typing time by deleting all the remarks except the magazine citation, which refers you back to this article. Nothing bad ought to happen if you do since 1) you are holding the permanent documentation in your hand (you do save all your old copies of *Creative*, don't you?), and 2) all of the GOSUBs and GOTOs gosub and goto lines with program statements, not REMs. The instructions are probably too long, but they are there for anyone who might use the text to collect data on pitch perception. If you can do without them, delete line 490 and lines 910 through 1400.

Have fun with this program, and please don't take it too seriously. ■

```
1040  PRINT "THAT IT'S LOWER "
1050  PRINT
1060  PRINT "THE TEST IS OIVIOEO INTO FIVE LEVELS"
1070  PRINT "OF OIFFICULTY: AFTER EVERY FIFTH TRIAL"
1080  PRINT "THE OIFFERENCE IN FREQUENCY BETWEEN THE"
1090  PRINT "TWO TONES OECREASES. AND THE TRIALS"
1100  PRINT "BECONE MORE OIFFICULT."
1110 MSG$ = "(PRESS ANY KEY TO CONTINUE)":V = 22: GOSUB 240: GOSUB 90
1120  HOME : PRINT "YOU MAY CHOOSE TO HAVE THE CORRECT"
1130  PRINT "ANSWER GIVEN IMMEOIATELY AFTER EACH"
1140  PRINT "TRIAL IF YOU WANT.  WHEN THE TEST IS"
1150  PRINT "FINISHEO, THE PROGRAM WILL PRINT A"
1160  PRINT "TABLE THAT SHOWS"
1170  PRINT : PRINT : HTAB 3: PRINT "I   THE LEVELS OF OIFFICULTY "
1180  HTAB 2: PRINT "2.  THE OIFFERENCE IN FREQUENCY"
1190  HTAB 7: PRINT "BETWEEN NOTES."
1200  HTAB 2: PRINT "3.  YOUR SCORE (# CORRECT) PER LEVEL."
1210  PRINT : PRINT : PRINT "YOUR 'SCORE' IS YOUR OIFFERENCE LIMEN"
1220  PRINT "(OL). OR THE FREQUENCY AT WHICH YOU"
1230  PRINT "STARTEO TO GUESS AT THE ANSWERS.  YOUR"
1240  PRINT "'GUESSING POINT' (YOUR OL) IS THE LEVEL"
1250  PRINT "AT WHICH YOU FIRST GOT LESS THAN A"
1260  PRINT "PERFECT SCORE (LESS THAN 5 OUT OF 5) "
1270  GOSUB 240: GOSUB 90: REM  ANY KEY
1280  HOME : GOSUB 1530
1290  PRINT "IF, FOR EXAMPLE, YOU ACEO THE TEST UP"
1300  PRINT "THROUGH LEVEL 4, ANO THEN GOT THREE"
1310  PRINT "CORRECT IN LEVEL 5. YOUR OIFFERENCE"
1320  PRINT "LIMEN (OL) SHOWN IN THE TABLE WOULO BE"
1330  PRINT "1.4 HERTZ OR 0 4%."
1340  PRINT : PRINT "IF YOU WERE TO GET ALL 25 TRIALS RIGHT,"
1350  PRINT "YOUR OL WOULO BE VERY GOOO INOEEO. ANO"
1360  PRINT "BEYOND THIS TEST'S ABILITY TO MEASURE!"
1370 MSG$ = "ANY KEY ...":V = 23: GOSUB 340: GOSUB 90
1380  HOME : RETURN
1390
1400  REM  FEEOBACK AFTER EVERY TRIAL?
1410  VTAB 15: HTAB 1: PRINT "WOULO YOU LIKE TO SEE THE ANSWERS"
1420  PRINT "AFTER EVERY TRIAL (Y/N)? ";
1430  GOSUB 80: REM  GET INPUT
1440  IF ANSWER$ <  > "Y" ANO ANSWER$ <  > "N" THEN  PRINT  CHR$ (7);:
GOTO 1430
1450  PRINT ANSWER$
1460  IF ANSWER$ = "Y" THEN SWITCH = 1: RETURN  : REM  IMMEOIATE FEEOBACK
1470 SWITCH = 0: RETURN : REM  NO IMMEOIATE FEEOBACK
1480
1490  REM  FOR THOSE OF YOU WHO REMEMBER THE ORIGINAL...
1500 V = 20: SPEEO= 50:MSG$ = "READY NOV, FOR THE PITCH TEST . ....":
GOSUB 340
1510  SPEEO= 255:MSG$ = "(PRESS ANY KEY TO BEGIN)":V = 22: GOSUB 340:
GOSUB 90: RETURN
1520 :
1530  REM  SHOW FREO.OIFF TABLE
1540  HOME : VTAB 6:
1550  PRINT "LEVEL"; TAB( 9);"FREO.OIFF "; TAB( 21);"% OIFF "; TAB
( 21);"# CORRECT"
1560  PRINT "-----------------------------------------": REM  29 OF THEM
1570 NUMBER = 0: PRINT
1580  FOR L = LEVELS TO 1 STEP  - 1
1590 NUMBER = NUMBER + 1
1600  HTAB 2: PRINT NUMBER; TAB( 10);TABLE$(L,1);" HZ"; TAB
( 23);TABLE$(L,2);" % "; TAB( 25);RIGHT(L);"/5"
1610  NEXT L
1620  PRINT
1630  PRINT "-----------------------------------------": REM  29 AGAIN
1640  PRINT : PRINT : RETURN
1650 :
1660  REM  POKE CODE W/LAM TECHNIQUE
1670  REM  AT 768 ($300)
1680 CODE$ = "300: A6 07 A4 06 A0 30 C0 88 00 F0 CA 00 F5 60"
1690 CODE$ = CODE$ + " N 0823G"
1700  FOR I = 1 TO  LEN (CODE$). POKE 511 + I, ASC ( MID$
(CODE$,I,1)) + 128: NEXT
1710  POKE 72,0. RETURN
1720
1730  REM  CREOITS
1740 MSG$ = "                    ":V = 7: GOSUB 320: REM  MSG$=16 SPACES
1750 V = 7: GOSUB 330
1760 MSG$ = "   ":V = 8:H = 12  GOSUB 350  REM  2 SPACES
1770 MSG$ = "PITCH TEST":V = 8: GOSUB 240
1780 MSG$ = "   ":V = 8:H = 24  GOSUB 350: REM  2 SPACES
1790 MSG$ = "                ": V = 9: GOSUB 340: REM  MSG$=16 SPACES
1800  NORMAL :MSG$ = "JAMES F. MC CARTHY":V = V + 5  GOSUB 240
1810 MSG$ = "SCHOOL OF MUSIC":V = V + 2  GOSUB 340
1820 MSG$ = "WESTERN MICHIGAN UNIVERSITY" V = V + 3: GOSUB 340
1830 MSG$ = "PRESS ANY KEY TO BEGIN...":V = 22: GOSUB 240: GOSUB 90
1840  RETURN
```

Notebook/Portable Computing

John J. Anderson

Have you ever seen the movie by Peter Weir called *The Last Wave?* Do catch it if you can. The reason I have been thinking about the film lately is that we have had about six inches of rain in the past two days. The sound of water dripping into a galvanized bucket is punctuating my thought here in the lab today. It started early this morning, and missed my disk drive by about an inch and a half. Thank God for small miracles. Worse luck at home. I'm thinking of installing a diving board in the deep end of the basement. Sure hope it stops soon.

In the movie, the rain never does stop. It just gets harder and harder. After a while, the protagonist (Richard Chamberlain) starts to realize that it is not just a bad shower, but the end of the world. And it is too late to build an ark.

Funny how rain can get you down.

But we are not here to talk about precipitation. We are here to talk about the precipitous growth of notebook computers. So let's get going.

At Comdex, I was amazed and gratified by the popularity notebook computers seemed to muster on the show floors. The idea of a *truly* portable computer, able to handle big jobs despite its diminutive lap size, has truly taken hold. Miniaturization has always had its devotees—up until now mostly in the realm of audio or video components. But nowhere can electronic miniaturization be more dramatic than in a microcomputer.

Take the 32K Model 100 machine in my traveling bag, for example. I used it to write about Comdex as the show was taking place. Using a modem I was able to send files back to *Creative* from my hotel room. That same power used to require a machine as big as my hotel room. The machine I used is not much heavier than a Totes umbrella and rainhat.

And as we out here in the wilds of Morris County can well attest, it never rains but it pours. News about portables has been, well, flooding the place. It is about time we made an attempt to catch up.

Defining Our Terms

Before we become immersed in the technical stuff, let's get our terms straight. I have been a bit confused lately hearing about portables, transportables, notebook computers, lap machines, pocket machines, and a new term that really makes me wince: "kneetops."

The word has turned up repeatedly in the industry publication *Electronic News*, and I suppose the idea is that as the TRS-80 Model 4 is a "desktop," the Model 100 is a "kneetop." I still dislike the term. It grates. I guess if you have a PC with winchester you can by extension call it a "hardtop."

Have you ever seen the movie *Monty Python and the Holy Grail?* Do catch it if you can. In it appears a bizarre group called the "Knights Who Say Nee." Every time they say that mysterious word, those within range writhe in agony. So it is when I hear the term "kneetop." It makes me cringe. Can't we leave knees out of microcomputing?

I'll readily admit that my own nomenclature has been somewhat awkward. I have been known to speak of "sewing machine portables" like the Kaypro and "notebook portables" like the HX-20. We really should make a better effort to define our terms, and try to arrive at a standard we can all agree upon.

How about this: the HX-20 and Model 100 are truly portable, and so along with other notebookish units shall be known simply as "portables." The Kaypro, Compaq, and Osborne are not half so portable, and so shall have the moniker "semiportable." Machines like the ACT Apricot, which are somewhat portable but sport an external CRT, shall be known as "transportables."

And here's to the hope that the term "kneetop" will not be with us much longer.

Portables And Planes

In a recent piece for *InfoWorld*, our good friend Danny Goodman wrote of the still unresolved question of portable computer use on passenger airlines.

The airlines worry that low-level radio frequency interference caused by portable computers might be picked up by the receiving antenna of the plane, disrupting navigation and communications systems. Danny wrote: "I assure you that all of these keyboard gadgets emit energy that could interfere with sensitive equipment . . . (an) aircraft and its crew depend on radio and critical navigation gear when making approaches and departures. There is no sense in taking a chance that a spreadsheet recalculation will cause cockpit readings to bring the plane down onto a freeway."

The honestly silly thing about this question is that no one seems to know just what the dangers are—if any truly exist. The *Wall Street Journal*, in yet an-

other example of its splashy but shaky micro coverage, spoke of the possibility of a passenger typing on a portable during flight and in the process accidentally lowering the landing gear. I'm a bit skeptical about that.

Please don't get the idea that I am attempting to ridicule the problem. If you have ever used an Osborne with an FM radio playing nearby, you will respect the issue. Just as the use of portable TVs is barred from commercial jets, because they emit large amounts of RFI in frequency bands that could cause problems, I fully agree that CRT-based semiportables should not be used in flight. And as Danny points out, disk drives are electronically noisy too, and probably should not be allowed. I also understand that the carriers themselves do not wish to introduce any new variable into the airline safety equation. Their, and our, concern is completely justified.

FLASH

As of January 9, United Airlines allows the use of notebook computers on board. We hope to see other airlines follow their lead.

As a result, however, some airlines have prohibited the use of all portables. "The technology is so new that all we know is that we don't know about the computers," an airline spokesman told the *Wall Street Journal.* "And we aren't going to take a chance on something we don't know about."

Well the time has come to find out. Our lab tests on the TRS-80 Model 100 have shown the emission of an utterly negligible amount of radio frequency interference. Although our testing methods were rather crude, I am convinced that use of the Model 100 during flight creates no more interference than the use of a handheld calculator, which is allowed by nearly all airlines. I am absolutely convinced that no combination of keypresses on the Model 100 can in fact act to lower the landing gear. You would certainly need a special interface to do that.

Of all American carriers, only United has reported any problem with passenger computer use. A United spokesman said that in one instance a portable computer seemed to cause faulty readings on navigational equipment. He did not specify the make of the offending computer itself. I personally have used the Model 100 on four United flights and know that the flight attendants were aware I was using it. I was never asked to turn it off or put it away, and I managed to arrive safely each time.

A federal commission has now convened to examine the issue, and it is hoped that a clear set of industry standards will result. The study was undertaken after the Radio Technical Commission for Aeronautics received an alarming letter from Eastern Airlines. Eastern reported an incident in which intermittent RFI actually shut down an engine on an aircraft in flight. The RFI was ultimately traced to a handheld Pac-Man game being used by a passenger. Talk about the dangers of videogames! [*In an ironic twist, United twice has stopped me from using my Model 100, yet another passenger who inquired was told that handheld and pocket games were allowed.—DHA*]

The FAA itself has detected no danger from portable computers, however. "We've run tests on the computers ourselves," an FAA spokesman told the *Journal.* "We held one right up against a plane's instruments, and there was no effect. None."

We'll keep you apprised of developments in upcoming columns.

Bar Code Software For The HX-20

Interface Solutions, Inc., of Memphis, has developed bar code decoding and printing utilities which run on the Epson HX-20 portable and FX-80 printer. The system is designed to provide business and industry with a self-contained bar code system.

Interface Solutions bar code software for Epson HX-20 and FX-80.

Particular applications can be flexibly created from Basic to fit the job. The package includes an IS-3000 handheld wand, software on microcassette, and complete documentation. The printing package produces a very precise bar code image on the Epson FX-80 printer. Decoding and printing packages are available in the following symbologies: code 3-of-9, UPC, Codabar, Interleaved 2-of-5, and Plessy.

Bar code symbols and text can be combined on the same printout. The documentation covers both the software and symbology configuration. List price of the reader system has been set at $290, including hardware and software. The price of the printer package is $130.

Model 100 Wafer Microdrive

In my review of the TRS-80 Model 100 in the August 1983 issue of *Creative Computing*, I suggested that wafertape technology might be the ideal replacement for finicky serial access cassettes. When it comes to portable mass storage, standard audio cassettes are a definite drag.

Well, Holmes Engineering, of Salt Lake City, has risen to the challenge. They have introduced the PMD-100, a completely portable, battery operated waferdrive.

The drive is attached to the Model 100 RS-232 connector via a coiled telephone cord. The operating system is then downloaded to the Model 100 using

the built-in Telcom software in the Model 100. The operating system then resides in nonvolatile memory for future use.

The operating system provides a menu for the user's convenience. A program or file may be saved to the tape or loaded from the tape into the Model 100 by simple, single key commands executed from the menu.

Operation of the drive is very similar to that of a standard floppy disk. The user first inserts a tape cartridge into the waferdrive. Files may then be saved or loaded. A directory of all files on a cartridge may be displayed on the LCD screen of the Model 100. A file may be deleted from anywhere on a tape, and another file may be put in its place. The PMD-100 operates at 9600 baud, and a 16K RAM buffer inside the unit makes file transfers fast and efficient.

The manufacturer plans a user's group which will provide support for the waferdrive. Popular Model 100 programs will be made available in wafer-tape format, and users are invited to submit programs for distribution.

Included with the package are five wafertapes, a battery charger, a cable to connect the drive to the Model 100, and complete operating instructions. A cable to allow the Model 100 itself to operate from the battery pack in the PMD-100 is also included. As this battery pack is rechargeable, it offers an alternative to opening a credit account with Duracell.

The unit retails for $350.

Model 100 Bytes The Apple

I offhandedly mentioned in the original Model 100 review that I had the Model 100 communicating with my Apple, which is the machine I use to write for the magazine. Since then, I have been barraged with requests for the interface specifications.

There isn't much to tell, really. I didn't even require the $30 nonsequitur we have been hearing so much about, a null modem. Probably more as a result of my ignorance than of my expertise, I had the Model 100 dumping files to the Apple in an hour or so. Believe me, this arrangement has made life much easier. Rough draft composition takes place on the Model 100, on-site, at work, in bed, or lying on the couch watching MTV—then to the Apple for revision and finishing.

I have an Apple II+, with an SSM serial/parallel card. From the dedicated parallel socket extends my printer cable, which passes through a 64K Microbuffer before heading toward the Oki 92. From the dedicated serial socket extends a modem cable. The SSM card is set at 300 baud to match the modem. Also appearing as a socket on the board is a socket labeled serial/terminal. Using a cable identical to the one for the modem, with an Apple-style Amphenol on one end and an RS-232 Male DB-25 on the other, you can hook this DTE terminal socket directly to the RS-232 connector on the back of the Model 100. If you have the SSM serial/parallel card, it is as simple as that.

You will need a terminal package for the Apple, and any should work. My favorite is *Transend*, and I highly recommend it. From the Model 100, you use the Telcom program. I transmit at 300 baud, which is slow, but it saves me the bother of reconfiguring the card, which is set to work with a 300 baud modem. The stat setting is 37N2D, and if, like me, you usually use the internal modem to access Compuserve or bulletin boards, the stat setting will have to be changed from M711E, and then back again after the upload. Make sure you are in full duplex and that the cable is fully plugged into the RS-232 port.

To date, the major disappointment facing TRS-80 Model 100 owners is the appalling lack of software from Radio Shack.

From there, simply get both machines into the terminal mode. Anything you type on the Model 100 should then appear on the Apple screen, and anything typed on the Apple should appear on the Model 100 LCD. Press function 3 on the Model 100, for upload, and indicate the filename to upload. As the Model 100 must unfortunately format the output, it will ask you for a column width. I specify 132, to minimize the number of extraneous carriage returns to be excised later. The Model 100 will then zap the file over to the Apple.

Remember that the Model 100 can transmit only text files. If you wish to send a program listing, you must first save it as a text file, alongside its Basic incarnation. It can then be transmitted without muss or fuss.

I have played with many word processors in my day, but for reasons I do not care to defend here, I am utterly loyal to *ScreenWriter II* from Sierra On-Line. One of the advantages of this system is that it stores files in ordinary Apple text file format. This is exactly the format *Transend* and other terminal packages use to save buffer files. That means that once I have saved a transmitted file from *Transend*, it can be directly accessed under its existing filename from *ScreenWriter II*. I then pull out all unneeded carriage returns, polish the copy, and resave. Voilà—a finished document.

I can't remember the last time I had the Model 100 connected directly to a printer. No need for that anymore, or for a Model 100-based word processor/print formatter that eats up precious RAM. I need all 32K for first draft text copy.

What could be simpler?

Mailbag

Here's a letter from Michael Neidich, of Syosset, NY:

"Notebook Computing is a welcome addition to *Creative Computing*, since there certainly needs to be an honest forum devoted to the genre of computers a/k/a 'lap machines.' Certainly Radio Shack deserves kudos, because the Japanese are not best known for innovation. Quite the contrary, their marketers are extremely cautious about entering a new arena, viz., their very late entry into the PC market.

"To date, the major disappointment facing TRS-80 Model 100 owners is the appalling lack of software from Radio Shack. While I am not a professional programmer, I inquired of Radio Shack if they have made a memory map available, and got a negative answer. The Japanese are notoriously slow in supplying software products, but Radio Shack has no excuse, since they so vociferously claim motherhood of the product.

"The other disappointment is that there still is no announced microfloppy disk drive from Radio Shack. This is a major marketing boo boo, since a small, battery operated floppy is totally feasible, and could be packaged in a substantially smaller size than the (expletive deleted) cassette recorders they are selling for the Model 100.

"Another obvious peripheral is a video adapter so that a CRT can be used if desired. We all love the LCD display when on the road, but why be limited to it when in arm's reach of a video display? It makes you wonder what marketing people use for brains.

"I guess I just don't understand the marketing mentalities of these companies. I have watched in bewilderment as my other favorite computer maker, Atari, commits suicide. Why don't marketing people ask customers what they want, and then listen? We are certainly vocal enough.

"But what's the sense of complaining? It seems that the computing world

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CIRCLE 190 ON READER SERVICE CARD

would rather sit in a mediocre big blue puddle than soar in the adventurous blue skies.

"We love your magazine, and encourage you to continue with your truth and criticism. It is so necessary for individuals to keep their orientation in the world of commercial hype, me-too-ism, and deceptive advertising."

Thanks, Michael. I agree completely. And if the rain ever stops, I may try to do something about it.

And until next time, turn off that portable when the seat belt sign comes on. We want you to be intact for next month's column. Ciao.

Firms Mentioned In This Column

Interface Solutions Inc.
1710 Shelby Oaks Dr. North, Suite 21
Memphis, TN 38134
(901) 372-3764

Holmes Engineering Inc.
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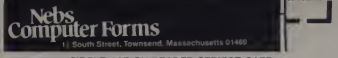

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CIRCLE 167 ON READER SERVICE CARD

Telecommunications Talk

Brian J. Murphy

Spring's murmurs are nearly audible as you read this, but for many, no matter what the season may be, it is a winter of discontent.

In recognition of this we are reviving an old feature of the Joe Pyne television talk show, the Beef Box. You might remember the late, great Joe. He was an arch-conservative from California who had a nationally syndicated talk show which delighted some and angered many.

The one unforgettable feature of the show was the Beef Box. It was a podium from which members of the audience could expound on their pet peeves. It turned out to be the liveliest and most interesting feature of the show. If you got nothing else from the experience, at least you learned that the pet hates of Southern Californians tend toward the colorful.

Not wanting to miss out on a good thing, especially if it makes this column more interesting to read, we hereby announce, on an experimental basis, the establishment of the Telecommunications Talk Beef Box.

This will be, depending on reader support, a semi-regular feature of the column in which I will print your complaints, comments, and suggestions concerning the telecommunications community in particular, plus any general comments on personal computers, the industry, and this column that I think are relevant.

To participate, simply send your comments by regular mail to me c/o *Creative Computing*. I can also be reached via Delphi E-Mail (BJMurphy) and on CompuServe EMAIL c/o user ID 70426,143. I really look forward to hearing from you.

To kick things off, I have a peeve about the people who write documentation for communications software. It seems to me that the manuals either tell you too little or they offer so much material that a first-time user or novice is discouraged from even attempting to learn to use the software.

Then there is the problem of the way in which the manuals are written. As you are probably aware by now, manuals are usually written by the programmers themselves. This is frequently insurance that the manuals will unintentionally gloss over areas important to users that are taken for granted by the programmers. Many programmer/manual writers tend to forget that the user probably does not know as much about the software as the author does.

A more serious problem is simply bad writing and organization. My suggestion is that manual writers approach the subject in an organized manner. A manual should begin with a section on how to set up the software for use with your system. Next should come sections which tell you, in a step-by-step format, how to accomplish the various tasks for which your software is designed. Some sample section headings which I herewith provide free of charge are: How To Send A Text File, How To Receive A Text File, How To Send Your Data To Your Printer, How To Save Your Data On A Disk, and How To Receive Calls And Save Them To Disk While You Are Away.

Let's face it, a growing majority of personal computer users are not hobbyists anymore but ordinary individuals and businesspeople who want their systems to work as simply as possible without having to undertake a lengthy tutorial on how to make a communications program work.

I am not suggesting that the material that hobbyists and serious users need be excluded from manuals from now on, merely that manufacturers write these books so that users at any level of expertise may chart the clearest and most direct course to their goals.

There will probably be a hiatus of a couple of months before the Beef Box appears again, to allow time for you to get your comments in to me. In the meantime, keep those cards and letters coming.

Info Utilities Bulletin Board

It looks as though this is the month in which we introduce all of our new features, so here goes . . .

The Info Utilities Bulletin Board will be devoted to news about the major utilities, The Source, CompuServe, and Delphi. We shall look at new products, the latest on the services provided by the utilities, the latest on prices, and other items of news which we think will interest you. Now let's get started.

Source News: The Source is now offering a special package of telecommunications software for IBM PC users called *Source Link*. The major advantages include a simplified Source sign-on procedure: a single key command dials the Source and reads in your ID and password automatically, saving you the trouble of typing them in manually. When,

as it sometimes happens, the first access number you try is busy, the *Link* will automatically redial (assuming you have an autodial modem). You can also preprogram the *Link* with up to three access numbers.

Another feature is called *information archiving*. This procedure allows you to save your E-Mail or any other file from the Source, such as news and financial quotes, quickly. You can use the *Link* to save to memory, to a scratch disk, or to your printer. You also have at your command editing features, using Source protocols.

Another claim made for *Source Link* is that uploading and downloading data between your disk and the Source is greatly simplified; it becomes virtually a single key function. If you transfer lots of data to or from the Source, this could be a very important feature.

File management and printing are also accomplished using simple commands. In file management, you can name and rename data files, delete them, copy them to a second disk, or quickly transfer them to the Source. The print feature sounds fairly straightforward. You just press a key and what appears on screen from the Source is also dumped to your printer. By the way, *Source Link* also supports Source colorgraphics.

The cost of this package is $49.95. If you buy a subscription to the Source at the same time, the package price is $149.95 (no package reduction there that we can detect).

I haven't been able to review this software personally for two excellent reasons, 1) I don't have a copy, and 2) I don't have an IBM PC. If you have a PC and a copy of *Source Link*, drop me a line. If your critique is well-reasoned, I'll use at least parts of it in an upcoming column.

A new SIGN-ON!—the introductory guide to the Source—is available from The Source by sending a SourceMail request to TCA068. This is a 16-page booklet which gives you complete log-on instructions for Sourcenet, Telenet, Tymnet, Uninet, and WATs and instructions for Canadian users. The guide is free.

Speaking of Uninet, here is a state-by-state listing of Uninet cities in where you can log onto the Source: CA: Monterey, Pomona; CO: Grand Junction; FL: Cape Canaveral, Leesburg; IL: Bloomington; ME: Bangor; MD: Perryville; MA: Northampton; MI: Dearborn; MN: St. Cloud; NE: Columbus; NH: Hanover; NJ: Branchburg, River Edge, Roseland, Woodbridge; NY: Babylon, Latham; NC: Beaufort; ND: Bismarck; OH: Delaware; OK: Bartlesville; OR: Hood River; PA: Collegeville; TN: Bristol, Johnson City; TX: College Station, Grand Prairie; VT: Rutland; VA: Covington; WA: Everett; WI: Sheboygan; WY: Laramie.

Compuserve News: In the Home Services area, a new Education Research Forum was instituted last fall. Sponsored by the Mid-Western Educational Research Assocation, the forum is designed to promote communication among educational researchers, educators, and anyone else concerned with education in general.

"The purpose of the forum," according to an announcement on CompuServe, "is to share research results, develop ideas for research, and share information about state and federal policies affecting education and research."

If this sounds like your cup of tea, access the Home Services Menu "Education," or type GO HOM-28 at any prompt in the Consumer Information Service (CIS).

"Ms. Rainbo's Reviews" now include home computer software in addition to her book reviews on fiction, cook books, mysteries, and children's literature. You can request reviews of specific software through her feedback program page. To access this area, type GO WIT-200 at any prompt in CIS.

Delphi News: By the time you read this, the long-awaited Comp-U-Store feature should be a reality. It has been on the menu for some time, but there has been a lag between the arrival of the menu item and the completion of arrangements for shopping. We'll review this service in an upcoming column and compare it with the CompuServe shopping service.

Also in operation by now we hope is the Delphi bulletin board service. The old service has been largely discarded in favor of this new, rewritten one. In an upcoming column we'll have a brief look at it.

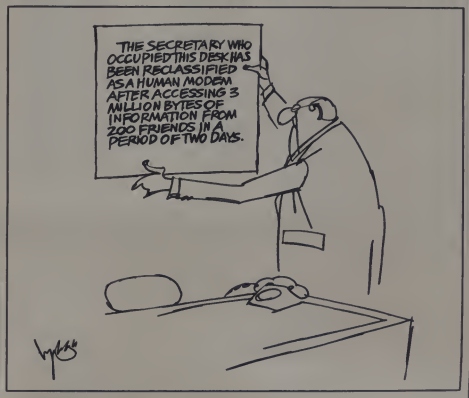
Special interest conferencing similar to the kind that makes CompuServe so much fun is being added to Delphi. Keep your eyes peeled for announcements in your areas of interest.

Genesys Is Born

It looks as though another information utility is in the final stages of development. This one is called Genesys, and it is the product of a Baltimore firm called Intercomp Associates.

We first ran across this bit of news when we were pottering about in Delphi E-Mail. The announcement, for all users, states that charter memberships for this service were open until January, 1984. It is evidently too late now to get in as a charter member, but let's have a look anyway.

First, per-hour connect time charges will be "as low as" $10 for daytime use (8:00 a.m. to 6:00 p.m.) and $3.50 for off-peak use. This is competitive pricing, but what do you get for your money and



when do you get it?

Genesys is expected to be in operation by May or June 1984 with a range of services similar to those already offered by other info utilities.

The Genesys E-Mail service will allow you to perform sophisticated file maintenance on your messages. It will allow you to send messages to any number of users. Mail forwarding is also available. E-Mail messages will have no length restrictions.

On-line conferencing, one of the most popular aspects of today's info utilities, will be a part of Genesys as will various public access bulletin boards. Also popular is game playing, and Genesys will offer a variety of public domain entertainments for multiple participants and for competition against the computer.

Other features will include:

- A user directory that will contain information on the special interests of Genesys members.
- Special interest groups, including sigs for Apple, Atari, IBM PC, Commodore, and TRS-80 owners.
- Newsletters, for any and all user and special interest groups.
- Programming services in a selection of languages including Basic, Cobol, Fortran, Pascal, and Macro assembler.

Line and screen editors and debuggers will also be available.

Genesys vows that the command structure, prompts, menus, and documentation will all be very user friendly. In case that doesn't prevent you from being stumped when you do something wrong, the service will maintain a 24-hour voice hotline for advice.

If you are interested in receiving more information about this service, write to Intercomp Associates, 7512 Lisburne Rd., Baltimore, MD 21208.

About 95% of all Apple modems will now interface with TermExec.

New Products

Now we come to another new feature in the column, the New Products section, devoted exclusively to communications hardware and software. If you are the manufacturer of a new product in this field, send your press releases and/or products to me c/o Creative Computing, 39 E. Hanover Ave., Morris Plains, NJ 07950.

We can't promise that all releases will be printed or that all products will be reviewed, but we'll do our best. Now, on to the new products.

Executive Software of Lexington, MA, has released a new version of *TermExec*, a communications software package for Apple II+ and IIe. This new version offers full Apple IIe 80-column support with backscrolling to review work which has previously appeared on screen.

The ability of *TermExec* to capture and send files in the unattended mode has been extended to support an optional error-checking protocol, known variously as Christensen, Xmoden, and Modem7. Using this protocol, which is common to many local bulletin boards and info utilities, you can insure that a downloaded program has not encountered an error during transmission.

The full screen editor has been improved to perform global string search and replacement, and simultaneous echo-printing of screen text. It also buffers characters to allow 1200 baud operation with slow printers. In addition, *TermExec* has been expanded to offer an auto-answer capability.

The list of supported modems has been increased to include the Novation Apple Cat II, which means we will be able to profile it thoroughly in an upcoming column and, more important, that about 95% of all Apple modems will now interface with *TermExec*.

It is worth noting that there is a hotline for technical support of this software, a 300 baud users' bulletin board, and upgrades for $19.95 per upgrade. It is also worth a mention that the new version of *TermExec* is sold at the old price, $79.95.

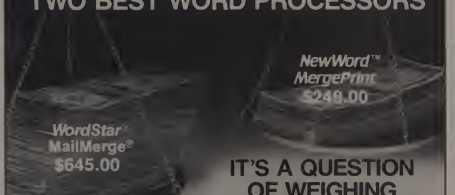
If you want more information about *TermExec* version 1.2, write Exec Software, Inc., 201 Waltham St., Lexington MA 02173.

It's getting so you can't plug anything into the wall socket anymore without someone threatening you with the damaging effects of line surges, spikes, and so forth, but we had no idea that this problem extended to modems.

The Kleen Line Security Model PDS-11/SUP lets you plug into your modular phone socket without fear of line surges caused by static discharges or the operation of other gear on the line. The price is $81.95. The unit is available from Electronic Specialists Inc., 171 South Main St., Natick, MA 01760.

That wraps up Telecommunications Talk for this month. See you in April.

WHEN IT COMES TO THE TWO BEST WORD PROCESSORS



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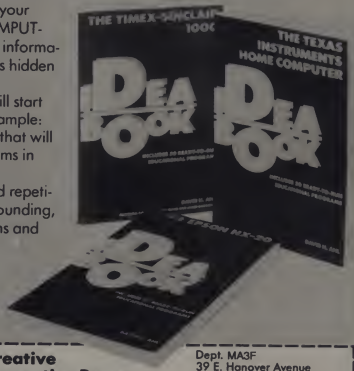

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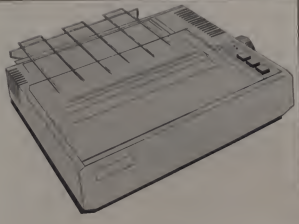


Print About Printers

David H. Ahl

This month we tested two printers at opposite ends of the price and performance spectrum. The Alphacom 42, at $120, is one of the least expensive printers we have ever tested, while the Toshiba P1350, with a 24-wire printhead, is an exceptionally versatile unit with outstanding print quality. Of course, these features come at a price; the suggested list price of the P1350 is $2195.

In the middle of this range is a new $699 daisy wheel printer from Juki Industries. For now, you will have to settle for some advance information; the full-blown review will appear at a later date.

Juki Model 6100

Tokyo Juki, a manufacturer of sewing machines and typewriters, introduced the Model 6100 daisy wheel printer at the suggested retail price of $699.

The unit prints bi-directionally at 18 cps; utilizes 100-character daisy wheels; has 10, 12, and 15 pitch and proportional spacing. It supports word processing functions including subscripts, superscripts, bold and shadow printing, double strike, and underlining. It also has limited graphics capabilities.

The 6100 has a 2K buffer, expandable to 8K. A Centronics parallel interface is supplied as standard, with an RS-232 serial interface available as an option. Also available as options are a tractor feeder and a single sheet feeder.

For more information, contact Juki Industries, 299 Market St., Saddle Brook, NJ 07662. (201) 368-3666.

CIRCLE 432 ON READER SERVICE CARD

Toshiba P1350 Printer

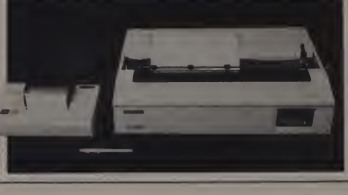
The Toshiba P1350 is called by the manufacturer, a "three in one printer." By this they mean that it produces letter quality, draft quality, and graphics.

We first saw the P1350 at the National Computer Conference last June. It was attached to an IBM PC and producing amazingly detailed graphic screen prints. We arranged to get one for review but, because we put higher priority on reviewing the Toshiba T100 computer (November 1983), the printer took a back seat. Well, not exactly—we have been using it with a variety of computers for the past four months and feel that we now have a good feeling for the unit.

Novel Printhead Design

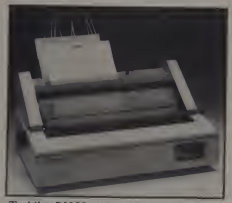
The P1350 employs a unique 24-pin printhead design that uses fine eight-mil pins to create tiny, precisely placed overlapping dots at a single pass. This exceptionally high dot density—up to 180 dots per inch—results in high quality characters and graphics. Another bonus from the dense dot spacing is that the P1350 is able to produce a variety of

Alphacom 42 (left) and Toshiba P1350 are at opposite ends of the price/performance spectrum.



Juki 6100 is a low-cost daisy wheel printer.

Toshiba P1350 is a high-quality dot matrix printer.



Toshiba P1350 with optional single sheet feeder installed.

type fonts and densities.

In the draft mode (font 0), the P1350 prints characters within an 11 x 16 dot matrix at a speed of 192 cps at 12 characters per inch, or 160 cps at 10 pitch.

Two fonts are available in the letter quality mode, Prestige Elite (font 1) and Courier 10 (font 2). In this mode, characters are formed within a 16 x 24 dot matrix. Print speed is approximately 93 cps at 12 pitch and 78 cps at 10 pitch. The characters in these two fonts are amazingly good and, without very detailed examination, cannot be distinguished from those produced by a daisywheel printer.

Forms And Feeding

The printer can handle up to four-part forms. Curiously, multiple part paper slows the print speed by about 30%.

Paper or forms can vary from 5" to 15" in width.

A friction roller is the standard feed mechanism. Options include a tractor feeder and automatic single sheet feeder. We tried the latter device. It simply clamps onto the top of the printer and a multi-pin connector plugs into the printer back.

The feeder has a moderately complicated paper cover and separator mechanism, but once in place, it needs no further attention. The paper bin holds about 50 sheets of 20 lb. paper. When the printer is turned on, one sheet is automatically fed to the platen and positioned for printing.

```
24x18 for Word processing
16x11 for Data Processing

This is an example of 10 pitch
This is an example of 12 pitch
This is an example of 15 pitch

This is an example of PRESTIGE ELITE
    0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ

This is an example of COURIER 10
  0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ

Font 0 Regular and elongated
Font 1 Regular and elongated
Font 2 Regular and elongated

subscript, superscript, boldface, underline
```

Figure 1. Print sample from Toshiba P1350 shows dot structures, pitches, fonts, and print enhancements.

Figure 2. Entire printing character set of the P1350 includes 126 letters, numbers, and symbols and 30 graphics characters.

33	!	34	"	35	#	36	$	37	%	38	&	39	'	40	(	41	)	42	*				
43	+	44	,	45	-	46	.	47	/	48	0	49	1	50	2	51	3	52	4				
53	5	54	6	55	7	56	8	57	9	58	:	59	;	60	<	61	=	62	>				
63	?	64	@	65	A	66	B	67	C	68	D	69	E	70	F	71	G	72	H				
73	I	74	J	75	K	76	L	77	M	78	N	79	O	80	P	81	Q	82	R				
83	S	84	T	85	U	86	V	87	W	88	X	89	Y	90	Z	91	[	92	\				
93	]	94	^	95	_	96	`	97	a	98	b	99	c	100	d	101	e	102	f				
103	g	104	h	105	i	106	j	107	k	108	l	109	m	110	n	111	o	112	p				
113	q	114	r	115	s	116	t	117	u	118	v	119	w	120	x	121	y	122	z				
123	{	124	|	125	}	126	~	160	´	161	à	162	ç	163	£	164	`	165	µ				
166	°	167	ˇ	168	†	169	§	170	®	171	©	172	¼	173	¾	174	½	175	¶				
176	¥	177	A	178	ö	179	ü	180	ç	181	~	182	ä	183	ö	184	ü	185	ß				
186	™	187	é	188	ù	189	è	190	¨	191	ƒ	192											
225	▫	226	°	227	▪	228	▪	229	▫	230	▪	231	▬	232	▬	233	▮	234	▮				
235	▛	236	▜	237	▙	238	▟	239	▟	240	┌	241	─	242	┐	243	┬	244	├				
245	┤	246	└	247	┘	248	┴	249	┤	250	┼	251	◤	252	◢	253	◥	254	◣				

```
10 FOR I=225 TO 254
30 LPRINT I;CHR$(27);"=";CHR$(I);CHR$(27);"? ";
40 C=C+1
50 IF C<10 THEN 70
60 C=0:LPRINT
70 NEXT
```

Figure 3. Graphics characters are specified with control codes in the software. Line 30 prints the value of I, sets the graphics code (CHR$(27);=), prints the graphic character (CHR$(I)), and then sets the normal print code.

If you are printing a document or program listing that uses more than a single sheet of paper, the printer is smart enough to stop while it ejects the first page and loads the next, and then resume printing. The printer has a relatively small one-line buffer, but it never lost a single character in months of varied use.

Word Processing

The P1350 has built-in software that emulates the Qume Sprint 5. (Since the Sprint 5 emulates the Diablo 1620 family, why not say that?) In any event, this includes all the various control codes for setting tabs, margins, vertical spacing, form length, and proportional spacing of characters. Hence, most word processing packages will be able to use the features of the P1350 automatically.

Moreover, all three fonts can be selected by either software or hardware. Hardware selection means setting the position of a DIP switch immediately behind the front panel controls. Software selection is accomplished by sending two control codes to the printer; this overrides hardware selection.

Also selectable from software are subscripts, superscripts, boldface, and underline. Curiously, the manual gives the selection codes only in hex and provides no examples. We did some hex to decimal conversions and tried out some of these codes with satisfactory results, but another column in the manual with decimal codes would certainly have made things easier.

Graphics

As we mentioned, our first exposure to the P1350 was watching it do marvelous graphics driven by an IBM PC. But most users should not expect simply to plug it in and do such graphics. In the first place, the manual contains no information on graphics whatsoever. In the second place, you probably don't want to write the software for graphics when obviously someone else has done it—after all, why reinvent the wheel? Who has done it and where is it available? Your guess is as good as ours. We just couldn't get past the starting line on graphics other than reading in the specifications that graphics resolution is 180 x 180 dots per inch. Perhaps well-informed dealers will be able to help.

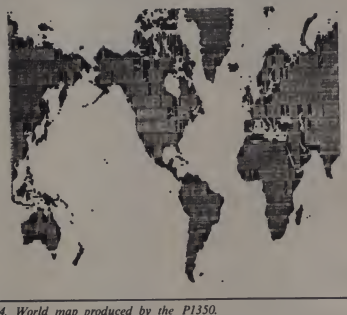


Figure 4. World map produced by the P1350.

Documentation

Why do printer manufacturers think all of their customers are techies? The first 13 pages of the manual are excellent and have many diagrams that show how to set up the P1350. However, the remaining 54 pages read like an advanced computer science textbook with a little EE thrown in for good measure.

We wanted to change bit 7 on DIP switch 1 which would provide an automatic linefeed (required by Radio Shack computers). Did the manual tell us the location of switch 1 (or 2, 3, or 4)? Not a clue.

We disassembled about half of the printer in search of it, but finally gave up just short of removing the print mechanism. Good grief!

Summing Up

At the suggested retail price of $2195, the Toshiba P1350 offers outstanding print quality and much more flexibility than other units in this price range. It includes a standard Centronics parallel interface, but a serial RS-232 interface is available at no additional charge. If you intend to use the graphics, be sure your dealer supplies you with the necessary software. While the installation portion of the manual is okay, the rest of it is incomprehensible, but chances are you won't need it.

For more information, contact Richard Lockman, Toshiba America, Inc., 2441 Michelle Dr., Tustin, CA 92680. (714) 730-5000.

CIRCLE 433 ON READER SERVICE CARD

Alphacom 42

Alphacom produces a low-cost line of dot matrix thermal printers. Interfaces are available to connect these printers to several different computers, notably

Alphacom 42 is a 40-column dot matrix thermal printer.

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CIRCLE 171 ON READER SERVICE CARD

Commodore, Tandy, Atari, Mattel, and TI. As several of these computer manufacturers have recently left the field, this might be the only source to which existing owners can turn for a printer.

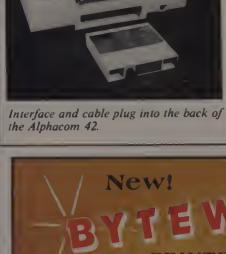
The printer comes in two widths, 40 and 80 columns, priced at $79.95 and $169.95 respectively. By itself, the printer is practically useless; you need an interface cable, which costs $20 for most of the 40-column printers ($40 for the TI 99/4A cable), and $44.95 for 80-column units used with Atari and Commodore computers, and $55.95 for TI and Apple computers. In addition, Alphacom said it plans to offer an add-on box that will include either an RS-232, IEEE, or Centronics parallel interface for use with other computers.

```
88888888888888888888888888888888888888888888888
11111111111111111111111111111111111111111111111
88888888888888888888888888888888888888888888888
11111111111111111111111111111111111111111111111
```

Figure 5. Alphacom 42 self-test with no interface installed.

```
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJ
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJK
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKL
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLM
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMN
```

Figure 6. Self-test with interface cable produces entire character set (eventually).



Interface and cable plug into the back of the Alphacom 42.

We tested the Alphacom 42 with an Atari interface, but we believe our results would be similar for other combinations.

The 42 is a 40-column unit. Print speed is approximately 70 characters per second, slightly slower than most impact dot matrix units, but considerably faster than daisy wheel printers.

The printer is amazingly light and compact (10.1" x 7.4" x 3.8"). It uses an external 26.8-volt power supply that comes with an extraordinarily long ten-foot cable. The printer has only two controls: power and paper advance. Unfortunately, there is no way of determining if the unit is on or off.

The printer uses special rolls of 4 5/16" wide thermal paper. One 83-foot roll of paper is packed with the printer. Paper is available in blue or black. The manual states that "replacement rolls are available at your Alphacom dealer or by using the paper reorder form packed with the printer." It is a good thing, as few office supply dealers have ever heard of the stuff.

Off and Running

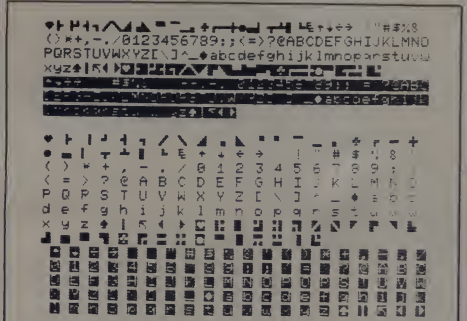
To get a thermal printer into operation, about the only thing that has to be done is load the paper. The end is usually glued down to prevent it from unrolling, and it is always a frustrating task to undo the end and trim it neatly; we usually waste two or three turns of paper doing this. However, once trimmed neatly, the paper loaded easily, and we really didn't need the four illustrated pages in the manual showing how to do it.

Once loaded, there is a self-test which is activated by holding down the power and paper advance buttons together. The self-test prints alternative rows of 1's and 8's (see Figure 5).

The interface is enclosed in a small rectangular box which fits into the back of the printer. After this is plugged in, but before it is connected to the computer, a second self-test may be activated (same way), which prints out the entire character set (see Figure 6).

The cable connected to the interface box terminates in the appropriate connector for the intended computer. Four pages in the manual describe how to use the printer with your computer. In the case of the Atari, this involves only four Basic statements: OPEN, PRINT #, LPRINT, and CLOSE. We tried the sample programs in the manual which

CIRCLE 121 ON READER SERVICE CARD



```
3 OPEN #4,8,0,"P:"
5 FOR N=0 TO 255
20 PRINT #4;CHR$(N);" ";
30 NEXT N
```

Figure 7. A short program produces all 255 Atari/Alphacom printing characters.

worked fine, although the last seven lines of the last example were not printed in the manual.

Although PRINT # and LPRINT should function exactly the same, we found they did not. In particular LPRINT "HELLO"; spaced to the next line (the semicolon should prevent this), whereas PRINT #4; "HELLO"; worked correctly and did not cause a linefeed. This may well be the fault of Atari Basic and have nothing to do with the printer, but it is worth noting.

Characters are printed within a 5 x 7 dot matrix with one-dot descenders for lowercase g, j, p, q, and y. Interline spacing is two dots, even when printing graphics characters. The entire Atari character set is shown in Figure 7. The quality of standard alphabetic characters is somewhat better than inverse characters, although all are legible. Obviously, the quality is considerably less than you would want for correspondence (although we get letters produced on such printers), but it is satisfactory for program listings and informal work.

Although the Alphacom advertisements and the illustrations on the box boast of the graphics capability, the manual is decidedly vague; it tells how to get into the "bit map" graphics mode but not what to do once you get there. Obviously, a great deal of experimentation is called for.

Summing Up

The 40-column Alphacom is not a correspondence or even draft quality unit (the 80-column unit may qualify for rough drafts). To do graphics will require experimentation and perseverance (except with the 80-column Apple interface which, reportedly, includes graphics software). Nevertheless, if you are on a limited budget, there are few, if any, printers of any type available for $119.95. Considering the price, the Alphacom 42 is a remarkable performer.

For more information, contact Alphacom, Inc., 2323 S. Bascom Ave., Campbell, CA 95008. (408) 559-8000.

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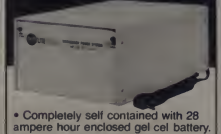

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CIRCLE 105 ON READER SERVICE CARD

Commodore's Port

John J. Anderson

Ahoy. Hope your Commodore computers are ship-shape and seaworthy, as we shall embark on a sizable voyage this month. News pertaining to the C-64 has been coming in at a rapid pace—it is pretty tough to keep up. We try to keep on top of it all.

Foremost, we have been hearing all sorts of rumors about new machines from Commodore. One concerns an RGB portable, and we have had second-source confirmation on that one. Another is about a hard disk portable. Could it be the same machine? Who knows. Yet another rumor we just heard yesterday told of a supercheap single board machine without sprites to retail for under $80.

Which should you bank on? Only Commodore knows for sure. Then again, perhaps not even Commodore itself is quite positive as yet which machines will actually see the light of day.

We are happy to report, however, that the Executive 64 is shipping now. Hurray for Commodore. The Executive 64 is one of the nicest portables we have ever seen, and it really does retail for under $1000. No bundled software—yet. But the idea of a C-64 for the executive, or salesperson, or businessperson, has now arrived.

One thing is rock sure about Commodore. Like Paul Masson, the company will sell no product before its time. As a direct result, the Commodore line is not about to be shaken out. Of all the low-end micro manufacturers, Commodore has managed to remain the most consistently successful. That lead is not about to be squandered, either—at least not anytime soon.

Whatever does turn out to be next from the company in West Chester, PA, you can bet it will be a hot seller. Commodore does not experiment with the marketplace. It makes sure that there is a market for everything it intends to sell.

Magic Desk Delay

We had intended this month to review *Magic Desk*, a software package that supposedly makes your C-64 behave something like a baby Apple Lisa. After seeing a demo at Chicago CES, we were very excited about getting the package up and running. After a long wait, we finally received a release package.

Magic Desk is a word processing and file program which uses icon-based commands and a joystick to act as a mouse peripheral. Its features offer the ease and quick training of much more expensive pointer-based software.

The review was to appear in this issue. Unfortunately, it was not to be: The *Magic Desk* cartridge we received was sealed in a protective plastic sleeve, but alas, would not work properly. *Quelle* disappointment.

Neil Harris of Commodore assured me that it was an exceptional problem and that a new package would be arriving at the lab soon. If and when it does, a full-blown review will appear.

C-64 Bank Street Writer

One package we received for the C-64 works and works extremely well: *Bank Street Writer* for the Commodore 64. This program from Broderbund was originally released for the Apple and Atari and is now available to Commodore owners.

Originally developed by Bank Street College, Franklin Smith, and Intentional Educations Inc., *Bank Street Writer* was designed to be accessible by youngsters as well as adults. The idea was to design a word processor at once simple enough to learn and sophisticated enough to support business needs. The result is a product the whole family can use.

A full review of *Bank Street Writer* appeared in the June 1983 issue of *Creative Computing*. Some of its features include universal search and replace, block move and "unmove," automatic centering and indent, inverse highlighting of text, word wrap, disk storage and retrieve functions with password protection, easily redefinable default values, and a potent print format routine that includes document chaining, page headers and page numbering (top or bottom), partial printing, and inspection of page breaks prior to printing.

In addition, *Bank Street Writer* includes a special on-line tutorial that teaches word processing basics in a very helpful "hands-on" manner.

For $70, the package represents an extraordinary value for C-64 owners with disk drives.

Easy Script 64 From Commodore

Commodore has begun shipping the cartridge-based word processor *Easy Script 64* for C-64 owners with or without disk drives. It has many of the features of the best low-end word processors and retails for under $50.

It includes a special "form letter" command to allow you to create personalized salutations and body copy

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from separate files simply by storing the information—usually names and addresses—as a form letter merge file. A simple command tells *Easy Script 64* to insert the information into the body of the form letter.

In addition, the package includes the following features: change display colors, global/local search and replace, goto line number, optional sound effect prompts, print up to 240 characters per line, special function key editing, superscripts and subscripts, transfer words and phrases, vertical as well as horizontal tabs, view or scroll 764 lines by 130 columns.

Easy Script 64 users can also add a spelling dictionary called *Easy Spell 64* containing up to 30,000 words. This companion software product points out possible misspellings by highlighting questionable words. In addition to the built-in 20,000 word vocabulary, *Easy Spell 64* lets you add up to 10,000 additional words, such as technical jargon or a personalized list of commonly misspelled words.

Game Translations

We are taking some flak for a statement we made last time around concerning games for the C-64. We said that by and large Apple and Atari translations made up the best games currently available for the Commodore 64. Well to reiterate, in no way did we mean to slight original efforts for the C-64, as we said at the time.

As you will learn up ahead, original games for the machine are growing in quantity and quality. We still stick by the assertion, however, that the best games we have seen to date for the C-64 come by way of the Apple or Atari. And we have further evidence to back up the case.

You should remember, by the way, that in the final analysis it does not matter whether a program was developed on the Commodore 64 or was translated to run on it. What really matters is how the final implementation performs. The bottom line is that many first-rate software packages are now available, proving that the C-64 is, in fact, a first-rate machine.

Sublogic Flight Simulator

Sublogic is offering a fine Commodore 64 translation of *Flight Simulator II*, which puts you at the controls of a Piper 181 Cherokee Archer with full flight instrumentation (avionics included) and a colorfully realistic panoramic view.

The program lets you practice takeoffs, landings, and even complicated aerobatics. It features more than 80 airports in four scenery areas: New York, Chicago, Seattle, and Los Angeles. Complete navigation facilities are included. And, additional scenery areas are available.

Sublogic Flight Simulator II.

High speed color-filled 3-D graphics provide a spectacular view out the cockpit window in either day, dusk, or night flying modes. Weather conditions are user-adjustable, from clear blue skies to grey cloudy conditions. The complete documentation, including flight handbook, will get you airborne quickly even if you have never been in a plane before. And when you think you are ready, you can test your flying skills with the World War I aerial battle game that is included.

We guarantee that this game will take up much of your C-64 flight time, well into the future.

Tronix Strikes Again

Tronix was one of the first top-notch game companies to discover and run with Commodore machines. Leave it to them to have finally introduced original C-64 games that rival and even outdo game translations from other machines.

Two adventure/strategy games, *Waterline* and *Suicide Strike*, and two twitchers, *Motocross* and *Slalom*, are now hitting the stores. In *Waterline*, the player must choose between being a hero by saving passengers of a sinking ship, and being greedy by grabbing gold from the hull of the ship. *Motocross* and *Slalom*, meanwhile, are realistic enough to appeal to advocates of the actual sports.

The game designers at Tronix worked closely with graphics experts and professionals in both sports during the design of the action games. They consulted professional athletes, understanding that the key to success is to evoke the actual feeling of the sport. They had found that many action games on the market were not at all like the actual sports they purported to simulate.

World-class skier Molly Colt worked with *Slalom* creator Steve Sidley in developing graphics that truly capture the excitement of ski racing. As a result,

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Your COMMODORE 64, COMMODORE DISK DRIVE and MAGIC DESK are an unbeatable combination. Filing operations are automatically linked to your Commodore disk drive—but you don't have to know any commands—just "file" the pages you type in the file cabinet and your text is automatically saved on diskette. There are 3 file drawers with 10 file folders in each drawer and 10 pages in each folder.

To PRINT a page you've typed, just "point" at the picture of the printer and your pages are automatically printed on your COMMODORE PRINTER or PRINTER/PLOTTER. If you want to erase what you've typed, the WASTE-BASKET under the desk lets you "throw away" pages. There's even a DIGITAL CLOCK which helps you keep track of time while you're typing.

Not only is MAGIC DESK easy to use...it's hard to make a mistake! Just press the COMMODORE key and one of several "help menus" appears to tell you exactly what to do next. Special messages show you how the various picture commands work and help you when you make a mistake. Help messages also show you how to use the printer, filing cabinet, digital clock and wastebasket.

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Juice.

Kid Grid.

Slalom really looks like a competitive course. The player starts to think like a ski racer, anticipating gates still out of view.

Designed by Jim Rupt, *Motocross* projects the perils and excitement of that sport as well. *Motocross* realistically presents the obstacles a rider has to dodge. The player gets the feeling of racing against time.

While the adventure strategy games are as much fun to play, they also require more than good hand-eye coordination. In *Suicide Strike,* for example, the player must manuever his aircraft through waves of enemy planes and fire to reach his military target. Meanwhile, he must juggle considerations of time vs. fuel. The unique rear view mirror feature shows action behind as well as in front of the player.

These new Tronix games join C-64 translations of *Juice* and *Kid Grid,* which have already been praised in the pages of this magazine. *Kid Grid* has been enhanced for its Commodore 64 incarnation, taking advantage of the extra memory available. It features improved animation, backgrounds which change, and new music at each level of play.

Juice has a genuinely three-dimensional feeling to it, and reminiscent of the arcade hit Qbert, offers delight to pattern-game devotees.

The games list for $35 in disk version, $40 as ROM cartridges.

Let's Get Sirius

Sirius Software has entered the Commodore market, and is now making its Apple and Atari megahit *Wavy Navy* available for the Commodore 64. In case you haven't heard about it, *Wavy Navy* is a raging battle on the high (and they do get high) seas, featuring solid and amusing graphics and new "wave" maritime music. One to four players can work their ways from galley slave to president in ten increasingly complex rounds.

Huge rolling waves force the player to change positions continuously, as he is exposed to mines and enemies in the air. Imagine playing *Galaga* from a roller coaster, and you might get some feeling for *Wavy Navy.*

Also new from Sirius is the C-64 version of *Critical Mass,* an Apple hit. This is an animated adventure game featuring colorful graphics, music, challenging action sequences, and a positively devious plot. The adventure is literally a race against time to save the world from a madman determined to blow it to pieces. A built-in time clock adds problem-solving dimensions to the game, as the player deals with plane schedules, business hours, and international time zones. The Apple version was an instant bestseller.

Wavy Navy lists for $35, and *Critical Mass* for $40.

Commodore Voice Encoder

We have seen a couple of products that give the Commodore 64 the power of speech. But imagine giving it your *own* voice! *Voice Master,* from the Covox Company, allows you to do just that.

Covox Voice Master.

The *Voice Master* is a digital speech recorder. It allows you to enter individual words or phrases through a microphone and play them back in any order using simple instructions from Basic. Requiring only about 400 bytes for the average word, the size of the addressable vocabulary is limited only by available memory. Special vocabularies can be stored on disk or tape.

The product is supplied with several Basic programs which show how to manage and edit the vocabulary, create special effects, and construct a talking clock, calculator, and blackjack game.

In addition, Covox has announced word recognition software for release soon. The list price for *Voice Master* is $120.

Vic Mailbag

Sorry, Vic owners, that we have spent the whole column this time around talking about the Commodore 64; we always try to remember Vic owners too. We recently received a letter that may be of interest to those of you experimenting with alternate Vic character sets.

Peter Conrad, of New Haven, CT, wrote in with the following:

"In the July 1983 issue of *Creative Computing* and again in November, you spoke of moving the Basic pointer when redefining a character set. In so doing, I know you must have moved the ROM pointer as well. Why not just put the character memory pointer *after* Basic, so you don't need to move the Basic pointer? This is done by setting memory location 36869 to 255 (which points to location 7168). Listing 1 demonstrates this.

"Now using the Screen Codes chart in the back of the Vic user's manual, you can code any character as shown in Fig-

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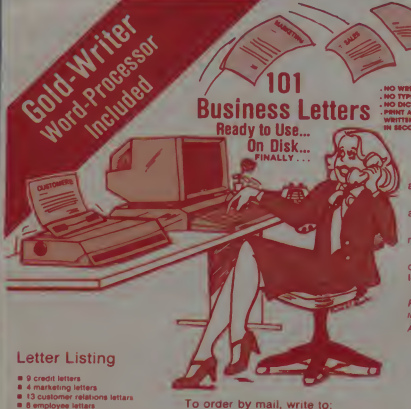

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```
10 POKE 52,28:POKE 56,28:REM SETS END OF
   MEMORY POINTER SO THAT YOUR CHARACTER
   SET WON'T BE OVERWRITTEN
20 FOR X=7168 TO 7679:POKE
   X,PEEK(X+25600):NEXT
30 REM LINE 20 MOVES THE NORMAL
   CHARACTER SET INTO RAM, STARTING AT 7168
```

Listing 1.

```
100 FOR X=7168+(CODE*8) TO
    7168+(CODE*8)+7
105 REM CODE=THE SCREEN CODE (PG.
    141-142 IN THE OWNER'S MANUAL) FOR THE
    CHARACTER YOU WANT TO REPLACE
110 READ A:POKE X,A
120 NEXT
130 DATA (YOUR EIGHT NUMBERS HERE)
```

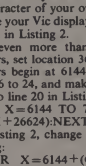
Listing 2.

```
 1 REM AUTO SMASH
 2 REM CONTROLS--J=LEFT
 3 REM            K=RIGHT
 4 REM            +=SPEED UP
 5 REM            -=SLOW DOWN
 6 REM AVOID OTHER CARS WITHOUT GOING OFF
   THE ROAD
 7 REM YOU ARE THE ONE ON THE BOTTOM
 8 REM GOOD LUCK!
 9 NG=61:D=100
10 PRINT CHR$(147);
30 A1=7690+INT(RND(1)*2)
40 A2=7690+INT(RND(1)*2)
50 YP=8131
55 FOR X=6144 TO 6656:POKE X,
   PEEK(X+26624):NEXT
56 FOR A=6144 TO 6151:READ A:POKE
   X,A:NEXT
57 DATA 60,189,255,189,60,189,255,189
58 POKE 36869,254
59 PRINT CHR$(144)
60 FOR X=1 TO 11:PRINT
   CHR$(17);:NEXT:PRINT"        AUTO SMASH"
61 FOR X=38400 TO 38905:POKE X,0:NEXT
65 G=8170:FOR Y=1 TO 22
70 FOR X=G TO G+10 STEP 2:POKE X,0:NEXT
90 FOR X=G TO G+10:POKE X,32:NEXT
100 G=G-22:NEXT
130 PRINT "PRESS A KEY"
140 GET A$:IF A$=""THEN 140
144 FOR X=6360 TO 6367:POKE X,255:NEXT
145 PRINT CHR$(145);"                    "
150 FOR X=7689 TO 8173 STEP 22:POKE
    X,27:POKE X+3,27:NEXT
157 EN=180
158 POKE 36874,EN:POKE 36878,10
159 FOR X=7702 TO 7701+ND:POKE X,0:NEXT
160 POKE A1,0:POKE A2,0:POKE YP,0
161 A3=A1:A4=A2:P=YP
170 A1=A1+22:A2=A2+44
180 GET A$:IF A$="J" THEN YP=YP-1
190 IF A$="K" THEN YP=YP+1
191 IF A$="+" THEN D=D-5:EN=EN+1:GOSUB
    500
192 IF A$="-" THEN D=D+5:EN=EN-1:GOSUB
    500
193 PRINT CHR$(19)"CARS PASSED: ";SC
195 IF NG=0 THEN PRINT
    CHR$(144)+CHR$(19);:FOR X=1 TO 11:PRINT
    CHR$(17);:NEXT:PRINT "GAME OVER":GOTO
    400
200 IF A1>8184 THEN
    A1=INT(RND(1)*2)+7690:SC=SC+1
210 IF A2>8184 THEN
    A2=INT(RND(1)*2)+7690:SC=SC+1
220 IF A1=YP OR A2=YP THEN 310
230 IF YP>8131 OR YP<8130 THEN 310
300 FOR X=1 TO D:NEXT:POKE A3,32:POKE
    A4,32:POKE P,32:GOTO 160
310 PRINT CHR$(147);:FOR X=1 TO 11:PRINT
    CHR$(17);:NEXT:PRINT"        CRASH!"
315 POKE 36874,0:POKE 36877,128:FOR X=15
    TO 0 STEP -.5:POKE 36878,X:NEXT
316 FOR X=1 TO 1000:NEXT:POKE
    36877,0:POKE 36878,10
317 PRINT CHR$(147)
320 FOR X=38400 TO 38905:POKE
    X,0:NEXT:D=100:NG=NG-1:GOTO 150
400 POKE 36874,0:FOR X=1 TO 3000:NEXT
410 PRINT CHR$(147);"PRESS 'Y' TO PLAY
    AGAIN OR ANY OTHER KEY TO END..."
415 GET A$:IF A$="" THEN 415
416 IF A$="Y" THEN RUN
430 END
500 IF D>100 THEN D=100:EN=180
501 IF D<0 THEN D=0:EN=EN-1
520 POKE 36874,EN:RETURN
```

Listing 3.

Figure 1.

1. Each character is set up as an 8x8 square:



2. Taking each row, we find that it is one binary byte:

= 00011000

3. This can be translated into a decimal number:

128	64	32	16	8	4	2	1	
0	0	0	1	1	0	0	0	16+8=24

ure 1. Each character is made up of eight of those codes. By establishing the codes for a character of your own design, you can make your Vic display it by POKEing as shown in Listing 2.

"For even more than 64 redefined characters, set location 36869 to 254 (as characters begin at 6144), set locations 52 and 56 to 24, and make the following change to line 20 in Listing 1:

20 FOR X=6144 TO 7679:POKE X, PEEK(X+26624):NEXT

"In Listing 2, change line 100 to the following:

100 FOR X=6144+(CODE*8) TO 6144+(CODE*8)+7

"The program appearing as Listing 3 is Auto Smash, which demonstrates this use of redefined characters. A word of warning before you play: the Vic keyboard buffer holds up to ten characters, so be careful about what you press!"

Thank you, Peter, for an interesting program and some good comments. And until next time, Commodorians, stay off the poop deck whenever possible. Catch you next time. ■

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TRS-80 Strings

Stephen B. Gray

As we peer into the sixty-first boxcar in the TRS-80 express, we see it contains a card reader, along with four Color Computer Program Paks for the CoCoNuts: Logo, two games, and the Graphics Pak.

Card Reader

Radio Shack's CR-510 card reader will read data from punched or marked cards, and transfer the data to a disk-based TRS-80 Model I, II, III, 4, 12 or 16 computer that has an RS-232C interface, for use with an applications program.

The CR-510 (Figure 1) costs $1595, and uses a photoelectric cell to read light reflected from the cards. Up to 150 cards a minute can be read, in single-feed, demand-feed or continuous-feed modes, controlled either manually with switches or through the application program.

Designed mainly for educational administration, the CR-510 is aimed at applications such as evaluating surveys and polls, keeping attendance records, and recording grade reports and test scores. It could also be used to grade multiple-choice tests, although the format of the general purpose standard card (Figure 2) isn't optimum for student use.

The cards are $4.95 for 200, and contain 40 columns of 12 rows each. A number is recorded as a single punch (or mark) in the 0-9 squares. A letter is recorded as two punches (or marks), one in the 12-0 zone, the other in a 1-9 square. The black tics at the bottom of the card are strobe synchronizing marks to tell the photoelectric cell when to read each column as it passes through the reader.

Special driver programs, available at no cost, are required to operate the 16½-pound card reader, via serial I/O ports, with TRS-80 computers.

Color Logo

Perhaps you've heard that Logo is a graphics program for children that allows them to draw figures easily. That is partially true; one form of Logo makes graphics quite simple for kids. However, the programmed form can get quite complicated.

Radio Shack's Color Logo offers Doodle, for children too young to read or to type accurately, and programmed Logo. The $49.95 Program Pak requires at least 16K of memory; the $99 disk, at least 32K.

Figure 1. The Radio Shack CR-510 card reader uses a photoelectric cell to read punched or marked cards.

Figure 2. General purpose standard cards contain 40 columns of 12 rows, which can record numeric or alphanumeric information.

Doodle Logo

Doodle Logo requires putting a template over the Color Computer keyboard, and uses all ten of the numeric keys, for: clear, home, pen up, pen down, right 45, left 45, forward 1, forward 10, right 15, left 15.

At the beginning, a small rectangle with a pointed end appears in the middle of the screen. This cursor is called a turtle; its shape can be changed, using the SHAPE statement, to look more like a real turtle, or like an airplane, or whatever the user wishes.

The turtle can leave a track (in color), or raise its tail (pen up) and not leave a track. It moves forward, either one or ten units, or turns left or right, 15 or 45 degrees. With this limited set of commands, some fairly complicated drawings can be made.

Multiple turtles, dozens of them, can be created to draw several figures at the same time, or to draw different parts of one complex figure.

Programmed Logo

The Doodle commands have equivalents in turtle graphics commands, for keyboard programming. Type

```
FORWARD 40
```

and the turtle moves up the screen about an inch and a half. The same effect is achieved by typing FD 40.

In addition to FORWARD (FD), RIGHT (RT), LEFT (LT), BACK (BK), there is

```
HIDETURTLE
```

to make the cursor invisible and

```
SHOWTURTLE
```

to bring it back.

A rectangle can be drawn (Figure 3) by typing

```
TO RECTANGLE
   FD 50 RT 90
   FD 30 RT 90
   FD 50 RT 90
   FD 30
END
```

This is called a procedure; it requires a name at the beginning and END at the end. The procedure is typed in Edit mode, and then, when Logo is put into Run mode, typing RECTANGLE will draw the figure.

Now comes the fun. Note that the turtle has made only three right turns. Therefore, at the end of the figure, the turtle faces west. Enter RECTANGLE again, and another rectangle is drawn, to the left of the first one. Do this twice more, and you have four rectangles (Figure 4).

This can be simplified by adding another procedure that calls RECTANGLE four times. But first let's simplify things by changing the name RECTANGLE to BOX. So then we have:

```
TO FOUR
   BOX
   BOX
   BOX
   BOX
END
```

which can be further simplified:

```
TO FOUR
   REPEAT 4 (BOX)
END
```

so that when you call the FOUR procedure, it automatically repeats the BOX procedure four times, generating the same four rectangles as in Figure 4.

To make a more complex figure, based on the set of four rectangles, suppose we make Logo repeat the set several times, but rotated to the right each time, to make a step-and-repeat pattern.

This is simple in Logo; just add another procedure that repeats the FOUR procedure, but a few degrees clockwise each time:

```
TO MANY
   REPEAT 10 (FOUR RT 9)
END
```

Call the MANY procedure, and it calls FOUR, which repeats BOX four times, turns the cursor nine degrees clockwise (to the right), then repeats itself again and again. This is the same idea as nested subroutines. The result looks like a many-spoked wheel (Figure 5).

Logo Variables

Instead of specifying variables within a procedure, the user can do so when calling the procedure, by naming the variable and preceding it with a colon. Thus the procedure:

```
TO SQUARE :SIDE
   REPEAT 4 (FD :SIDE RT 90)
END
```

is called with the name SQUARE plus a number that the procedure will use for the length of the side. So

```
SQUARE 40
```

when used with the procedure, will draw a square that is 40 units to a side. Logo takes the 40, stores it as :SIDE, and uses it when that name comes up in the body of the procedure.

More than one variable can be specified, to allow a procedure to be used for a wider range of applications.

Turtle tracks can be colored, and can change colors during the drawing of a figure.

Figure 3. Rectangle drawn with seven Logo turtle-graphics commands.

Figure 4. Call the RECTANGLE procedure four times, and you get this figure.

Figure 5. Rotate the four-box figure and draw it every nine degrees, and you get a complex-looking wheel.

Figure 6. This space-filling figure is easily programmed in Logo, using recursion.

Logo Recursion

In Color Logo, a procedure can call itself, which is recursion, a powerful tool. The manual cites a clever example of recursion by Hofstader in his book, *Godel, Escher, Bach:* Hofstader's Law: It always takes longer than you expect, even when you take into account Hofstader's Law.

Some fantastic figures are easily drawn using recursion, including a fanciful TREE (with eight procedure lines), a snowflake (with only four lines), and an endless space-filling program (Figure 6) with only a dozen lines.

Printing Logo

Although you can save your procedures and/or print them out, Color Logo has no way of printing the graphics created with your procedures. The manual recommends taking photographs of the screen, to save your figures. With some trial and error, you can get good pictures, but the colors may not look as good as they do on the screen (Figure 7).

Radio Shack's manual for Color Logo is one of their better efforts, with 129 pages that spell out all the essentials, including many more than described here. Logo is a lot of fun to use, especially in recursive procedures, where a few lines can create graphics you could never figure out how to do with Basic, unless you are Leo Christopherson or one of the other graphics geniuses.

The full Logo language barely fits 64K, so it obviously doesn't fit into the Color Computer memory. Radio Shack's Color Logo is limited to turtle graphics. However, Logo for the Apple II, for instance, has many highly useful features not found in Radio Shack's Color Logo, including numeric operations such as arctangent, cosine, integer, rounding, and square root. There are also word and list operators, conditional expressions, input/output statements, and many other goodies, including facilities to print turtle pictures.

If you are very much interested in Logo, look at the Apple version. It does more, and costs more: $175.

Canyon Climber

Stay away from Radio Shack's fiendish game of *Canyon Climber* (Figure 8) if you value your sanity, because you can't possibly win. Even if you manage to avoid all the mountain goats, climb all the ladders, place the dynamite charges at each end of the five bridges, and set off the explosion, all this does is "rock you into Indian Hills."

Although you may have mastered the coordination required to get through the opening Crevasse part, Indian Hills is a new challenge: if you fail to jump over just one arrow fired in your direction, that's it; back to the Crevasse and the mountain goats. Which means you get very few chances to practice jumping over arrows. Unfair!

If you do manage to climb Indian Hills, which you don't have a chance in a million of doing, you are "spirited away to Eagle Cliffs," where you have to jump from one plateau to another, avoiding eagles. And even if you get to the top, there is another %@&#! mountain goat.

Don't spend $34.95 on this game unless you are a confirmed masochist.

Doubleback

Radio Shack's *Doubleback* (Figure 9), for one or two players, is basically easier than *Canyon Climber,* but requires

Figure 7. This colorful figure, created by repeating a simple pattern, would be difficult to reproduce with a printer.

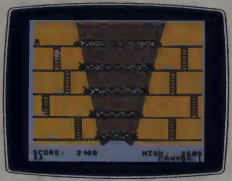

Figure 8. Canyon Climber is a game for the expert or the masochist.

Figure 9. In Doubleback, Player Two is trying to circle the cherries, while learning to use the joystick.

considerable one-handed joystick skillfullness rather than arrow-key ambidexterity. The emphasis here is on two-dimensional movements.

The basic idea is simple: objects appear on the screen, and you use a joystick to circle them. If you manage to form a complete loop around an object with your trail, you get points, which vary with the object, and the objects disappear from the screen.

The catches are several: the trail fades quickly, so you have to move fast; if you hit three objects, the game is over; and as you complete the loop around an object, you lose full control of the trail for a moment, so you may hit another object you thought you were about to circle.

Several strategies help you stay in this $19.95 game for at least 10,000 points. The main one is to always keep the joystick at the outside edge of its travel (its maximum loop speed, which provides the longest trail), and play by moving the joystick around the circumference of its largest circle. As you get near an object, speed up, and you can turn a very tight loop around an object, or spiral in on it if it is one of the moving objects. The other strategy is more obvious: stay on the periphery of the game field until an object pops into play; otherwise, you may hit it.

Long after you have given up playing *Canyon Climber* (unless you are a World-Class gamer), you will be playing *Doubleback*, trying again and again to beat your opponent, or, if playing alone, trying for 100,000 points, then 200,000, then . . .

Color Graphics Pak

For $39.95 you can get a marvelous Program Pak for the Color Computer that lets you create charts and graphs as easily as possible. You can display them on the screen in color, or print them in black-and-white on a dot matrix printer, or on a four-color graphics printer. You can also photograph the screen and make slides for presentations.

Graphic, which requires a 16K Color Computer with Extended Color Basic, provides all the popular formats: vertical or horizontal bar charts, pie charts, and line charts. You can label the lines used in the graphs with a key "legend." You can save your charts on cassette tape.

The 76-page manual provides a great deal of information. Several sample sessions lead you through the creation of various types of charts. The program itself is menu-driven, to help you create charts and graphs in as little time as possible.

Extra-wide charts can be printed over two sheets of paper on the dot matrix printers. Extra-tall charts can be printed over two sheets of paper on a color graphics printer.

Pie Charts

Using menus, you type in the title of your pie chart, how many slices in your pie, the size and name of each, and that is all you have to do before the chart is displayed (Figure 10). The black-and-white dot-matrix printout doesn't do justice to the handsome screen display in color.

That is all, and in only a few minutes, if you accept all the various defaults. If you prefer, you can offset a slice (move it out of the pie), shade any or all slices, change the colors used, or display the chart in low resolution, although the text is not very legible in lo-res.

The pie is displayed, with a legend at the lower right, showing what percentage of the pie each slice takes up. If you wish, you can edit the program to change the text or the display.

For example, you can switch from a reference letter in each slice to a line drawn from the description of each slice to that slice. You can delete the percentages, and so on.

Bar Charts

You have a choice of vertical or horizontal bar charts, showing one or several items per period (Figure 11).

To compare a printout with the handsome screen display, compare Figure 11 with the photo in Figure 12, which shows monthly stock prices.

Graphic automatically assigns different colors to the bars, but you can specify the colors yourself. If you show several items per period, meaning several bars next to each other, *Graphic* displays alternating shaded and unshaded bars, but you can overrule this too.

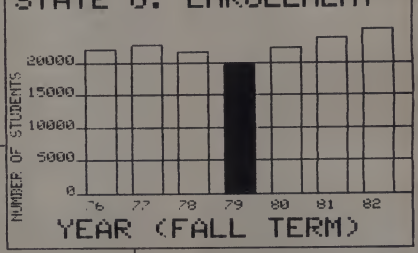

Figure 11. The 1979 bar is shaded to emphasize the low enrollment for that year.

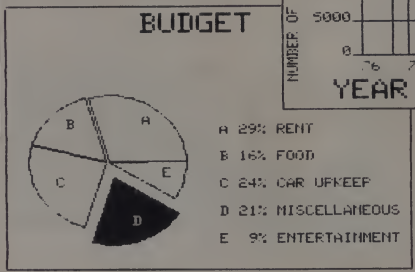

Figure 10. For emphasis, slice D of this pie chart is offset and shaded; any other slice (or all) can be offset and/or shaded.

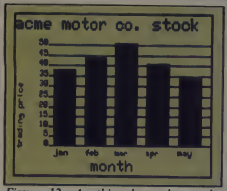

Figure 12. As this photo shows, the Graphics Pak displays are suitable for making slides for presentations.

Line Charts

A line chart is a graph of points (values) connected by a line. You can make the points small or large, with nine choices of size, and in any of four colors.

Either single-line or multi-line charts can be drawn. Theoretically, you can have 255 lines in a chart, but beyond six or eight, it is hard to differentiate one line from another, and the chart looks cluttered.

Key legends can be added in a corner of a multi-line chart (or a multi-group bar chart), shaded to show which line (or bar) is which. The manual goes into much detail on this, since a variety of key legends is offered.

Displaying/Printing Charts

Any of the charts can be displayed in four-color lo-res (with three-color shading), or two-color hi-res (with three-color shading), or printed in black and white with three types of shading, or with a four-color graphics printer.

Here again the manual goes into great detail, because of the options available. Image Size Reduction permits reducing the screen image to a half, quarter, or eighth of the original size. This is useful when building charts that are larger than the size of the hi-res screen.

Company logos (or trademarks or slogans) can be added to chart displays, and the manual shows in detail how to create them, by combining text of varying sizes with points, lines, rectangles, arcs, circles, etc.

If your company, school, or publication needs charts and graphs, *Graphic* is a program to consider. You might even be able to make some money as a freelance computer artist, by creating color slides for business presentations, in much less time than it takes to assemble them by hand. For fast slide-making, Polaroid has an AutoProcessor that produces slides, in less than five minutes, directly from Polachrome 35-mm color film, and costs less than $100.

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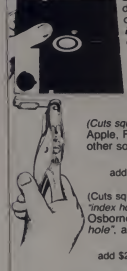

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CIRCLE 179 ON READER SERVICE CARD

Competition from PCjr., Macintosh, proDos, and Recovering Deleted Files

Apple Cart

Stephen Arrants

Welcome to another Cart! Some important dates—Seymour Papert, Logo's father was born on March 1, 1928; Adam Osborne turns 45 on the sixth. And on March 13, 1970, Digital Equipment Corp. (DEC) announced the PDP-11 minicomputer. By 1980 PDP architecture is the most widely used by minis. This month, a discussion on IBM vs. Apple; will the PCjr. eat away at the Apple IIe? Also, a brief look at Macintosh; a review of proDOS, Apple's new operating system; questions answered, and three short utility programs.

IBM Takes Aim

Let's face it. The Apple II is the Model T of computing. It has become the prototype for home and office computers. Since the Apple I, every manufacturer has had to take the Apple into account when designing a machine. The question has been "How can we make it better than an Apple?" not "How can we make a computer?"

IBM recently released a new PC, the PC jr. In anticipation of the announcement, Apple Computer shares have dropped from a high of 63¼ to the low 20s. Is there any need to worry? Can Big Blue sink Apple? Will the Apple II go the way of the Texas Instruments 99/4A?

At first glance, the fear is not without basis. As we were eagerly waiting for IBM to announce the PC jr., Texas Instruments left the home computer market after losing over $600 million in a futile effort to gain a market share. Osborne has declared Chapter 11, and Victor Technology and Fortune Systems are cutting back on personnel and manufacturing. And at press time, Coleco *still* had not delivered one Adam to stores.

The shake-out is here and many people are frightened. As bleak as it looks, Apple will not only survive; it may thrive.

Why do I believe that? Inside information? Tarot cards? No, just a calm look at certain facts. The Apple II line (II, II+, IIe), the bread-and-butter of the company, almost totally controls the critically important education market. It is an excellent machine for controlling experiments in schools, laboratories, and factories at a relatively low cost. There is also a vast body of educational software available for it.

1984 is an important and exciting year of transition for Apple.

Apple is *the* home computer. Most unbiased observers agree that an Apple is still the ideal home unit. Why? The software library for the Apple is *huge*. After all, designers and authors have been writing for the Apple for years. It will take a long, long time for a similar amount and variety of software to be available for the PC jr.

The Apple software library continues to grow, too. New word processors, spreadsheets, database systems, etc. are constantly being added to the gigantic Apple collection.

One of the most important—and fun—things about owning a computer is sharing the experience with others. With 1.5 million Apple IIe owners as a base and unofficial sales force, the machines are selling almost faster than Apple can produce them. At the moment (November of '83) Apple is selling slightly more than 500,000 Apple IIe's per year. It is expected that IBM will sell slightly fewer. The number of IIe owners coupled with the number of II and II+ owners makes a potent market. I can always find another Apple owner to share programs or techniques with. How many PC jr. owners will be able to make that claim by this time next year?

Yet despite my optimism, 1984 is an important and exciting year of transition for Apple. This is the year of Macintosh. What role will Lisa's little brother play? As the PC jr. looms over Apple, Macintosh will loom over the market for IBM and IBM compatibles. Until Macintosh enters the market, Apple stock will be sluggish. If Mac can do what Apple promises at the expected low price, we will know whether Apple Computer will maintain its leadership in a volatile market or is just marking time.

I think IBM made a crucial mistake in announcing the PC jr. before it could deliver. Since the announcement of the PC jr., IIe sales have heated up. If this trend continues, supplies of the IIe could be very short. That could be a problem. However, John Sculley, who joined Apple from Pepsi-Cola, is a marketer with few equals. He may be able to cut through the problems and keep Apple ahead of any marketing problems.

Still, the IBM challenge is nothing to be brushed away. IBM is big and is merciless when dealing with the competition. One point that Apple has to overcome is the IBM brand name. To

	Apple IIe	Macintosh	Lisa
Microprocessor	6502	68000	68000
O/S	DOS 3.3	MAC	LISA
Optional	proDOS	MS-DOS	MS-DOS
Memory	64-128K	128K-	1Mb
Disk Storage	5¼"	3½"	3½"
Optional	Hard disk	Hard Disk	Hard disk
Color?	Yes	No	No
Resolution	Regular monitor display	Bit-Mapped	Bit-Mapped
Keyboard	Full-size	Full-size	Full-size
Special Features		Mouse	Mouse
Expansion	Internal slots	External Bus	External bus
Price	$1995 (bundled system)	$2495	$9995 (bundled system)
Software	Apple & third party	Apple & third party	Apple & third-party
Compatible	CP/M	MS-DOS	MS-DOS

At press time, it is expected that the Apple IIe will be unbundled and that the price of the main unit will drop with the introduction of the Macintosh. Lisa is available at a lower price without software.

many people, IBM equals computers. The Apple IIe may a Model T, but the IBM PC is seen as a Silver Shadow.

Apple must contend with the new features of the PC jr., such as its infrared keyboard. Using this keyboard, a user can activate the PC jr. from almost any direct line location in the room. Then again, who really wants to pay for the ability to sit 10 feet away from your computer? Are binoculars included with the keyboard? The infrared keyboard is fundamentally unimportant.

The PC jr. does not have the advanced features of either the IIe or the PC. The PC jr. keyboard is certainly nothing to get excited about. A Chiclet keyboard for your IBM? C'mon! That's like an automobile with a lawn chair for a driver's seat. The PC jr. has only one disk drive. The IIe can handle many more, and with the release of proDOS, better hard disk storage is available. Memory expansion is limited to 128K. No one will be bringing *Lotus 1-2-3* files home from the office to run on the jr. No, on features the IIe wins hands down. Even at its higher price, the IIe still offers more performance per dollar.

Apple didn't get where it is entirely by luck or chance. Jobs and Wozniak created the personal computer of the past and their company is busy creating the personal computer of the future. Future efforts of IBM may slow Apple down; they certainly have in the past. But Apple is here to stay. To use a phrase from another industry, "There's an Apple in your future." And also in IBM's.

Can Macintosh Make It?

Related to this is the problem of the Macintosh. The chart lists the specifications of the Macintosh as compared to the IIe and Lisa. Can Apple sell a machine like the Macintosh? For one thing, Apple fanatics like me won't be junking the IIe in favor of the Mac.

You can't run proDOS or DOS 3.3 based software on Macintosh. It has no color, and the expansion possibilities are limited. Then there is the price. With the Macintosh expected to sell for around $2495, Lisa at around $5000 (unbundled of software), and the IIe fully configured for $1995, there will be much confusion and hesitation.

Will businesses go for Macintosh instead of Lisa? How does the Macintosh affect the Apple III market? These are tough questions that Apple must ponder. In their rush to get Macintosh to market, they may end up shooting themselves in the foot. It will be interesting to see what happens with Macintosh.

Drexel University has ordered 3000 units for students. Since it will run MS-DOS, it is compatible with the IBM PC. Still, one can't help wondering if the Macintosh will turn out to be Apple's Edsel. We'll have an in-depth review of the Macintosh in an upcoming issue.

proDOS Arrives—Worth The Wait?

During the summer of 1983, Apple released to developers a new operating system for the Apple II called proDOS, Professional Disk Operating System.

For the most part, proDOS commands are compatible with DOS 3.3. There are some changes and improvements, however. Most, but not all, Applesoft programs will run without modification.

ProDOS will not support Integer Basic in any form, and almost all assembly language programs will require extensive modification to run. Any commercial software written under DOS 3.3 will have to be run under DOS 3.3. The copy protection schemes used make them incompatible with proDOS.

ProDOS requires 64K RAM, its files are not compatible with DOS 3.3, and you need a special program to initialize disks. That's the bad news.

The advantages outweigh any disadvantages, however. Type a dash followed by a file name and it will be RUN, BRUN, or EXECed. The STORE command saves the current values of the variables of a program, and RESTORE places them in the same or a different program.

When using DOS 3.3, you must clear long Basic programs out of high-resolution graphics memory yourself; proDOS does it automatically. CHAIN is available for use in Applesoft, whereas it will work only with Integer Basic programs under DOS 3.3.

File structure and use are similar to the Apple III SOS. SOS-based data disks can be read on the II by proDOS, although program files cannot, since the II and III use different Basics.

The most significant difference appears with hard disks. Under DOS 3.3 a hard disk had to be initialized to resemble 30 or more floppies, each having a different volume or drive number. ProDOS treats a hard disk as one disk which may contain up to 32 Mb, with a single file limit of 16 Mb. Creating files larger than 128K is almost impossible

creative computing

SOFTWARE PROFILE

Name: proDOS
Type: Operating System
System: Apple II, 64K
Format: Disk
Summary: Apple's new, improved OS.
Price: $50, free with purchase of Disk II
Manufacturer:
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by NEIL KONZEN

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80-COLUMN COMPATIBILITY: All edit & global features support **Apple IIe 80-column cards** and most 80-column cards on *any* Apple IIe, IIe+ or II

DEFINABLE ESC FUNCTIONS: Define ESC plus any key to perform any task For example, **ESC-1** can catalog drive 1 **ESC-L** can do a "HOME: LIST" **ESC-N** could type an entire subroutine *Anything* you want *whenever* you want

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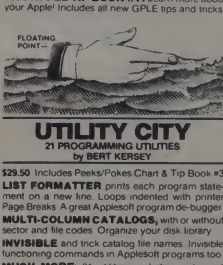

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PLUS: GOTO & GOSUB may precede variables, as in "GOSUB FIX" or "GOTO 4+X" Escape-mode indicated by special ESC CURSOR Replace awkward Graphics screen-switch pokes with 1-word commands Change ctrl-G Beep to any tone

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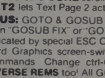

```
1 FOR S 768 TO 773: READ A:
  POKE S,A: NEXT: POKE 232,0:
  POKE 233,3: RUN: DATA 1,0,0,5,0,0
2 HGR2: FOR R 0 TO 192: ROT R:
  SCALE 50: XDRAW 1 AT 140,95:
  SCALE 30: XDRAW 1 AT 140,95
5 PEEK(49200): NEXT: RUN
```

PRONTO-DOS
HIGH-SPEED DOS / DOS-MOVE UTILITY
by TOM WEISHAAR

$29.50 Includes Peeks & Pokes Chart

TRIPLES THE SPEED of disk access and frees 10,000 bytes of extra memory by moving DOS

Function	Normal	Pronto
BLOAD HI-RES IMAGE	10 sec	3 sec
LOAD 60-SECTOR PROGRAM	16 sec	4 sec
SAVE 60-SECTOR PROGRAM	24 sec	9 sec
BLOAD LANGUAGE CARD (Text Files No Change)	13 sec	4 sec

Boot the Pronto disk or your updated disks, created with the normal INIT command Compatible with all DOS Commands, GPLE, Double-Take, DOS Boss, DiskQuik and almost all unprotected programs

MOVE DOS to your Language Card, RAM Card, or standard Apple IIe upper 16K, freeing up **10,000 EXTRA BYTES** of memory for your programs

15 EXTRA SECTORS per disk Catalog Free-Space displayed every time you catalog a disk

TYPE-COMMAND "TYPE filename" prints contents of sequential Text Files on screen or printer

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DISK DRIVE EMULATOR
by HARRY BRUCE and GENE HITE

$29.50 Includes Peeks & Pokes Chart Requires Apple IIe with Extended 80-column Card

ACTS LIKE A DISK DRIVE in Slot 3, but much faster, quieter, more reliable and $350+ cheaper! Enjoy the benefits of a 2nd (or 3rd or 4th) drive at less than 1/10th the price Catalogs normally with "CATALOG S3" command Load & Save any kind of files into RAM with normal DOS commands

SILENT AND FAST: Since no moving parts are involved, DiskQuik operates silently and at super-high speeds See it to believe it Your Apple IIe's Extended 80-column Card (required) can hold about half the amount of data as a 5¼" floppy disk!

MANY USES: For example, auto-load often-used files like FID etc , etc , into RAM when you boot up, so they are always available when you need them Copy files from RAM onto disk and vice versa, just as if a disk drive were connected to slot #3

FRIENDLY & COMPATIBLE with 80-column display GPLE, ProntoDOS, and all normal Applesoft and DOS commands and procedures Will no interfere with Apple IIe "Double Hi-Res" graphics

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80-COLUMN COMPATIBLE: All features support IIe and most other 80-column cards

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CROSS-REFERENCE: Sorts and displays line numbers where each variable & string appears

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Apple Cart, continued...

under DOS 3.3. Such large files are often required for sophisticated database and spreadsheet operations, however. New data file size is almost limitless with proDOS.

The file structure is hierarchical. In other words, one disk can have many directories, each leading to another level. The main level holds 51 files and one directory file. The directory file is accessed to read the sub-levels.

For example, let's say you are just starting up, and want to use a word processor with a specific set of print values, a specific text file, and a specific glossary file. Instead of booting the word processor, and then loading each file, you would just type the pathname /WORD/FEBCART/PRT.CART/CARTGLOSS. Everything would load at once (or almost, given the speed of hard disks). The use of path names speeds up disk access and program use.

Two readers have complained that when using AppleWriter IIe with large text files, letters are lost when typing.

Unlike the way this operates in the Apple Pascal Operating System, you don't have to know what you are looking for before you find it.

File names are limited to 15 characters under proDOS. A pathname is limited to 64 characters. Filenames can't include anything other than letters, numbers, or a period. Spaces cannot be used in file names. That is about the only mistake Apple has made with proDOS. Why this was changed is a mystery. Why make files more confusing?

ProDos is much faster than DOS 3.3 and a bit faster than DOS speed-up utilities. When an extended memory card is installed, proDOS automatically uses it as RAM-disk memory. It also time and date stamps files if a clock is present.

Your disk controller card works as is; no changes are required, and it uses the same hardware as DOS 3.3. ProDOS is a useful product and a major development. But you shouldn't worry about replacing DOS 3.3 with proDOS right away. Both will continue to be supported by Apple and by independent software developers. In time, proDOS will replace DOS 3.3, however. Already, Apple is shipping proDOS with disk drives, and DOS 3.3 is an option. But you already have DOS 3.3 on your own disks. And if you just bought an Apple, it is probably on at least one disk you have.

Questions And Answers

I have received a few letters asking how to transfer files from a TRS-80 Model 100 to an Apple. The technique isn't as complex as you might think. John Anderson explained it in a previous review. Here is all you need do: Attach a cable from the Model 100 RS-232 port to a serial card in your Apple. Run a telecommunications program on the Apple and the Model 100 telecommunications program. Make sure the baud, bit, and parity rates are set correctly and download from the 100 to your Apple, saving as a text file. That's it. Edit the text file with a word processor and print it out. Thanks, John.

Two readers have complained that when using *AppleWriter IIe* with large text files, letters are lost when typing. This has happened to me, and I just attributed it to my typing style or a keyboard problem. I now think that it may be a problem with Apple memory when a large file is used. If so, this is a serious bug in *AppleWriter IIe.* I have contacted Apple, and they promised to get back to me with an answer or solution.

Debbie Issaacs in Lincoln, NE wants to know if there is a way to remove REM statements from Applesoft programs without using a text editor or word processor. It is possible, and I know that there are commercial utility programs that do this. Can anyone write one of his own? Send it in, and we'll publish it in Apple Cart.

Well, the program to recover a deleted file is all written. I am having some problems debugging it, however. When it recovers a file, it saves it as a 980-sector file. So, until it gets debugged, here are three short programs. The first program is really nothing more than two pokes. When run, this program will give a catalog of a disk, including deleted files. They are highlighted by an inverse character. The second program will show the amount of free disk space, and can be re-written for use inside other programs. The third program writes a text file of the Applesoft pointers, HIMEM, End of Strings, Bytes, End of Variables, LOMEM, End of Program and Start of Program. RUN the program and EXEC the file APPLE POINTS.

Next month: reviews of new books for the IIe, third-party 80-column cards for the IIe, a program to read individual tracks and sectors, and what you can do with that information. See you in April.

Listing 1.

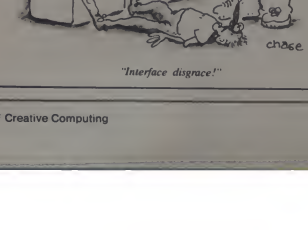
```
10 O$ =  CHR$ (13) +  CHR$ (4)
20 HOME
30 POKE 34,9
40 POKE 44505,234  POKE 44506,234  REM --THIS WILL ALLOW DELETED FILES T
   O BE SHOWN
50 PRINT "DELETED FILES WILL BE SHOWN WITH AN      INVERSE CHARACTER TO T
   HE RIGHT":"
40 PRINT : PRINT
70 PRINT "YOU CAN INCLUDE THESE FOKES IN YOUR      HELLO PROGRAM,"
80 PRINT : PRINT
90 PRINT "OR POKE THEM IN AND INIT A DISK "
100 PRINT D$"CATALOG"
```

Listing 2.

```
10  REM  THIS IS A ZERO==) 0            THIS IS THE LETTER AFTER N==)O
20  HOME
30  POKE 34,3
40  PRINT "THIS PROGRAM WILL SHOW THE AMOUNT OF    FREE OISK SPACE"  PRINT
    "JUST TYPE CALL 748 ".
50 O$ = CHR$ (13) + CHR$ (4)
60  FOR X=-748 TO 843  REM  THIS AREA  IS MEMORY PAGE 3 AND THE BLOCK AV
    AILABLE AS FREE SPACE FOR USER PROGRAMS
70  READ Y  POKE X,Y
80  NEXT
90  PRINT D$,"BSAVE FREE OISK,A748,L98"
100  POKE 34,0
110  END
120  OATA   72,152,72,138,72,32,247,175,169,0,133,48,133,49,162,140,160,8
     ,189,242
130  DATA   179,10,144,6,230,48,208,2,230,49,134,208,244,202,208,234,145,
     49,240,14
140  DATA   56,145,48,233,100,133,48,145,49,233,0,133,49,232,16,236,32,14
     2,253,160
150  DATA   2,138,32,70,174,200,185,84,3,9,128,32,237,253,201,141,208,243
     ,104,170
160  OATA   104,168,104,96,32,70,82,69,69,32,83,69,67,84,79,82,83,141
```

Listing 3.

```
10 O$ =  CHR$ (13) +  CHR$ (4) A$ =  CHR$ (34)
20  PRINT O$;"OPEN APPLESOFT POINTS"
30  PRINT O$;"WRITE APPLESOFT POINTS"
40  PRINT "HOME"
50  PRINT "PRINT"A$"AVAILABLE POINTS"A$
60  PRINT "PRINT"A$"103/104 = "A$" PEEK(103) + PEEK (104) * 256"A$"  STAR
    T OF PROGRAM"A$
70  REM  LOC 103 & 104 IS THE APPLESOFT TEXT TABLE POINTER
80  PRINT "PRINT"A$"105/106 = "A$" PEEK(105) + PEEK (106) * 256"A$"  LOME
    M  PTR"A$
90  REM  LOC 105 & 106 IS THE APPLESOFT VARIABLE TABLE TABLE POINTER
100  PRINT "PRINT"A$"107/108 = "A$" PEEK(107) + PEEK (108) * 256"A$"  END
     OF VARIABLES"A$
110  REM  LOC 107 & 108 IS THE APPLESOFT ARRAY TABLE POINTER
120  PRINT "PRINT"A$"111/112 = "A$" PEEK(111) + PEEK (112) * 256"A$"  ENO
     OF STRINGS"A$
130  REM  LOC 111 & 112 IS THE APPLESOFT POINTER TO END OF STORAGE
140  PRINT "PRINT"A$"115/114 = "A$" PEEK(115) + PEEK (116) * 256"A$"  HIM
     EM  PTR"A$
150  REM  LOC 115 & 116 IS APPLESOFT HIMEM POINTER
160  PRINT "PRINT"A$"175/176 = "A$" PEEK(175) + PEEK (176) * 256"A$"  ENO
     OF PROGRAM"A$
170  REM  LOC 175 & 176 IS THE APPLESOFT POINTER TO THE ENO OF THE PROGRA
     M
180  PRINT "PRINT"A$"AVAILABLE MEMORY = "A$" (PEEK(111)+PEEK(112)*256)-(P
     EEK(109)+PEEK(110)*256)-1"A$" BYTES"A$
190  PRINT D$,"CLOSE APPLESOFT POINTS"
200  END
```



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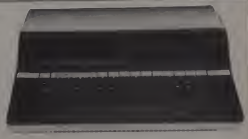

Outpost: Atari

Arthur Leyenberger

Hello there. Once again our paths have crossed. Sit down, put your feet up, relax and let's talk shop. Around here we are pretty excited about Atari home computing and like to share what we know.

This month I have a couple of odds and ends to share with you but I want to spend most of the time talking about languages. Computer languages to be sure, but there are many similarities between a spoken language and a computer language. Just as you and I communicate in English, a computer language allows us to communicate with our computers.

For example, words spoken (or entered) into the computer must be spelled correctly or the computer will not understand. Misspelling a computer command or statement is like mispronouncing a word. If the word was unfamiliar to you, you probably would not catch my verbal mistake nor would you understand what I was trying to say.

I have been programming computers of one sort or another for more than ten years and have learned to speak about a half dozen different languages during that time. But every time I sit down to learn a new language I am reminded of going to the beach. Learning a new computer language is like taking a swim in the ocean.

At first you walk up to the surf and look around. You want to see if anyone is already in and how the water is. Then you figure that you might as well get started, so you test the water with your big toe. Not bad. You then wade in up to your knees thinking, "how will I *ever* get all the way in?"

You continue inching forward until the water is over your hips. The worst is past; you have reached the point of no return. You continue ahead cautiously until you are suddenly engulfed by a wave, and you realize that it is not so bad now that you are in.

Think of a computer language. First you open the manual and try to read it like a novel. No way! You convince yourself that this stuff is totally incomprehensible. So you look around to see who else knows this language. You figure maybe he can help, so you talk to him. What you get is a familiar reply: it is not so bad once you learn it. In fact come on in; the water is fine.

Your next step is to sit in front of the computer, manual at your side, and try a few simple commands. Maybe a few statements such as PRINT, C=A+B, LIST, etc. That is not too hard. So you try a few more statements and commands. Gradually you learn more, and your self-confidence is increased. Maybe you discipline yourself to spend only an hour at the keyboard at each session. Your first successful program comes and goes, and the next thing you know, the wave has enveloped you, and you find yourself working on a program to maybe keep track of your business expenses. That is how it usually is when learning a computer language.

Atari Microsoft Basic II

One of the programming languages of which you should be aware is Atari Microsoft Basic. It is now in a cartridge version, and for about $80 you get a 16K cartridge, an extension disk, a spiral-bound user manual, a quick reference guide, and a brief overview.

When the cartridge and the disk are used together, this version of Microsoft Basic is exactly the same as the disk-based version released about two years ago. The main difference is that Atari was unable to fit 18K bytes worth of Microsoft Basic into a 16K cartridge. Therefore, the accompanying disk contains 2K bytes worth of "extension" features. Fortunately, the extension disk is copyable under DOS, so a backup can be made. This is especially useful for combining the extension commands with your own programs on disk. Disk swapping is minimized, and once the disk is inserted into drive 1, it need not be removed until the end of your programming session.

There are ten commands that did not make it into the cartridge that are on the extension disk. They are: AUTO, for automatic line numbering; DEL for deleting individual or blocks of lines; RENUM for renumbering lines; TROFF and TRON for tracing (on and off) the sequential flow of a program; NAME . . . TO for renaming disk files from within Basic itself; VERIFY for comparing a disk file with the current contents of memory; DEF for defining numeric or string functions; NOTE for obtaining the disk sector number and byte count of a DOS file; and PRINT USING for formatted screen or printer output. Seven of these commands are development aids, while three (DEF, NOTE, and PRINT USING) are used from within a program. However, once the extension disk is booted up, the entire language is memory resident.

The other major difference between

the current and previous versions is the documentation. The user manual accompanying the previous release was adequate but nothing extraordinary. The new documentation is much easier to understand and use.

For example, the PRINT USING statement was not explained very well in the old manual and consequently was confusing to use. The section pertaining to this command in the new manual is much clearer and includes some examples. Also included in the user manual are tutorial sections on player/missile graphics and character graphics. The separate quick reference guide is especially helpful, well organized, and clearly presented.

When using the Bit-3 80-column board with Atari Microsoft Basic II, there seems to be a problem switching to the 80-column mode in DOS by means of the binary load ON file. When the ON file is loaded, you are returned to Basic but without a screen display. If you then type (very carefully) DOS, L and OFF, which calls DOS and then loads the OFF file, you are put back into 40-column mode with the screen displaying the DOS menu.

The only solution to this problem that I have found is to turn on the 80-column mode with a USR statement. Typing A = USR(54818) from Basic puts you into 80-column mode. As long as you have previously created a MEM.SAV file, you can do your programming and go in and out of DOS while retaining 80 columns.

The Atari Microsoft Basic II language, documentation, and packaging are well done. Having it on a cartridge will eliminate most of the previous complaints. Specifically, the inability to make a backup disk of the language, which discouraged the development of any serious software, has now been eliminated.

Logo

Another language worthy of mention is the new Atari Logo. This long-awaited language is unique compared to other implementations of *Logo*, in that it allows up to four turtles to be on the screen at once, has a two-voice sound capability, and permits the turtles to be dynamically controlled.

Logo, like Pilot, is finding itself in schools. For children, or as a first language, it really cannot be beat. This is because it is easy to use, and provides quick feedback. Take error messages for example. In Basic, misspelling a command like LOAD would result in the computer responding with a Syntax Error message. In Logo, if you typed LAD instead of LOAD, the response would be I DON'T KNOW HOW TO LAD which is obviously much more friendly and less intimidating to the novice. It also is more helpful since it points out the source of the error.

For $100, Logo comes with a 16K cartridge and two glossy spiral-bound manuals. One is a 215-page reference manual, and the other is a 156-page book entitled, *Atari Logo: Introduction to Programming Through Turtle Graphics.* A rather complete quick reference guide is also included.

Logo is similar to Lisp in that procedures may be named and later used as if they were built-in commands, and that lists are used for printing and recursion (a part of a program calling itself). Unlike Basic, Logo allows parameters to be passed between procedures. To write a procedure to create a square, I would use the following steps:

```
ST
TO MYSQUARE
> FORWARD 30 RIGHT 90
> FORWARD 30 RIGHT 90
> FORWARD 30 RIGHT 90
> FORWARD 30 RIGHT 90
> END
```

ST means show turtle and TO MYSQUARE initiates the ability to write a procedure. Each of the first four lines tells the turtle to move forward 30 units and then rotate to the right 90 degrees. Using abbreviations and the idea of a list to repeat a series of steps, the following is a shorter, equivalent program:

```
ST
TO MYSQUARE
> REPEAT 4 [FD 30 RT 90]
> END
```

Once this procedure has been defined, I can simply use MYSQUARE as a new command. In fact, I can use it in a new more complex procedure. The following procedure draws a square 12 times and turns right 30 degrees after each square.

```
ST
TO RESQUARE
> REPEAT 12 [MYSQUARE RT 30]
> END
```

So far I have defined two procedures. Either one may be used by just typing its name or including it as part of another procedure. The other Logo commands are equally easy to use. The manual, which teaches programming via turtle graphics, is well written. Variables are used in an understandable way. If I wanted to modify my square drawing procedure to include the capability for specifying the length of each side, I would change the program to the following:

```
TO MYSQUARE
> REPEAT 4 [FD :LENGTH RT 90]
END
```

The following program shows all four turtles drawing in three different colors at the same time. The background cycles through 26 of the 128 colors. The program will continue until you press the BREAK key.

```
TO ALLFOUR
> TELL 0
> ST PU SETPOS [50 50]
> TELL 1
> ST PU SETPOS [-50 50]
> SETPN 1
> TELL 2
> SET PU SETPOS [50 -50]
> TELL 3
> ST PU SETPOS [-50 -50]
> PENCOLOR
> TELL [0 1 2 3]
> PD SMALLB 0
> CHGCOLOR 0
> WAIT 360
> END
```

TELL lets you talk to a particular turtle, 0 through 3. PU is pen up. SETPOS places the turtle on the screen at the coordinates given. SETPN means set the pen number. PENCOLOR, SMALLB, and CHGCOLOR refer to procedures listed below. PD is pen down, and WAIT is a delay in 60ths of a second. Typing ALLFOUR will start the program once all of the procedures have been entered.

Here is a very short program that demonstrates the dynamic aspect of Logo. The turtles may be given commands while they are moving. For example, typing TELL 0 LT 30 SETSP 150 will make turtle 0 turn left 30 degrees and increase its speed to 150. Try experimenting with some of the other commands.

```
TO SHORTY
> TELL [0 1 2 3] ST SETSP 25
> END
```

There is much more to Logo than the few examples I have presented here. I have not even mentioned the TOOT command for sound, for example.

Logo is a very accessible language for children. I have seen children spend hours in front of the screen trying out different procedures and ideas. It takes only a few minutes to learn enough

about Logo to start being creative.

Listings 1, 2, and 3 are procedures to get you started. Try to figure out what they do, then run them and incorporate them in some programs of your own.

Listing 1.

```
TO PENCOLOR
> TELL 0 SETPN 0
> TELL 1 SETPN 1
> TELL 2 SETPN 2
> TELL 3 SETPN 0
> END
```

Listing 2.

```
TO SMALLB :SIZE
> FS
> IF :SIZE > 80 [STOP]
> PD
> MYSQUARE :SIZE
> PU
> REPEAT 2 [LT 90 FD 5]
> RT 180
> SMALLB :SIZE + 10
> HT
> END
```

Listing 3.

```
TO CHGCOLOR :CODE
> IF :CODE > 127 [SETBG 74 STOP]
> SETBG :CODE
> WAIT 60
> CHGCOLOR :CODE + 5
> END
```

Head Games

For a long time I have stayed away from text adventure games. I thought that they must be pretty dull because there are no graphics on the screen. And besides, it takes hours and hours to complete one. Boy, was I wrong in a big way.

I have recently begun playing PLANETFALL by Infocom. Perhaps a better description is that I have recently become hooked on *Planetfall*. The game is superlative. It is humorous and witty. If you enjoy science fiction and a challenge, *Planetfall* deserves a closer look. For a complete review of this excellent adventure game see the December issue of *Creative Computing*.

As their ads proclaim, the graphics inside your head are far better than those appearing on any video screen. This is also true for other Infocom adventures including: *Starcross* (science fiction), *Deadline* and *The Witness* (mystery), and *Suspended* and *Enchanter* (fantasy). You owe it to yourself to own at least one of these marvelous text adventure games from Infocom. You will be in for hours of enjoyment. And now for something completely different.

The Commodore Connection

You are probably asking yourself why the name Commodore is appearing in the Atari column? Normally I would not even think of such a heretical act lest my loyal Atari readers string me up by my Basic variables.

I find it ironic that Atari has to rely on Commodore to make its computer look good.

But there is a good reason to mention the word, if only in a hushed whisper, because they have a video monitor that is simply fantastic. I am of course referring to the Model 1702 (formerly the 1701) color monitor. This little beauty makes the Atari computer look like the king of the graphics machines that it truly is. Somehow, I find it ironic that Atari has to rely on Commodore to make its computer look good. I guess that is show biz. Come a little closer and let me tell you why I like this tube.

The model 1702 is a 13" NTSC color video monitor measuring 14½" x 14½" x 15½" and weighing about 32 pounds. On the rear of the unit are three RCA phono jacks for luminance, chrominance, and audio input. There is also a slide switch for selecting medium or high-resolution mode. On the front are

Late Flash—Atari 800XL Report

I have been using an Atari 800XL computer for about a week. Although I do not have enough space to present a full review of this long awaited machine, I wanted to give you some good news: the 800XL is software compatible with the 400/800 computers!

This is achieved through the use of the Translator disk, a pre-boot program that loads the old operating system into the XL computer. Existing programs that use non-standard calls to the operating system will then run. The Translator also works on the Atari 1200XL.

I have tried the Translator with just about every major program available for the Atari computer. From *Pinball Construction Set* to *VisiCalc* to *Letter Perfect*, they all work.

There are actually two Translator programs. One is supposed to take care of 95 percent of the "problem" programs while the other handles the remaining 5 percent. The only program I found that required the "industrial strength" Translator was the original version of the *Bank Street Writer* word processor.

Remember, it is not necessarily Atari's fault that these programs did not run on the XL machines. The programs were written using non-standard calls to, and locations of, the operating system, against the guidelines suggested by Atari. When Atari changed the operating system, the programs did not work. If Atari can be blamed, it is for taking almost a year to find a solution to this problem. The Translator programs solve the problem so the issue is now dead.

In the January Outpost, Atari's Bill Bartlett stated that compatibility was a central theme of the new XL line of computers. Although software compatibility does now exist, I have found several hardware incompatibilities of the 800XL. The video output jack lacks a chroma output. That means if you were to buy the Commodore color monitor, described in this month's Outpost, you would not be able to use it in the high-resolution mode. You can cheat however, and route the composite video output into the chroma input of the monitor.

If you have been unable to find an 850 interface to operate a printer, you might have purchased one of the printer interfaces that connect to serial I/O port and receive power from pin 10 of the I/O bus. On the 800XL, pin 10 no longer has +5 volts; therefore the current models of these printer interfaces will not work.

Finally, the RESET key on the 800XL causes a cold start rather than a warm start as it does on the 400/800. This could cause a few rude surprises for the unsuspecting programmer.

There are several human factor problems as well. The power jack and the video output jack are similar DIN connectors. One has seven pins, the other five. That means you can plug your monitor into the power jack. I do not know if this will cause any damage but I am unwilling to find out. The left SHIFT key presents the other problem. Since this oversize key has only one contact point on the left, it is possible to press down on the right edge of the key and have it tilt to the right, rather than travel directly down to make contact.

All things considered, I like the 800XL. The keyboard feel is somewhat different from the 800 but I soon became accustomed to it, and now actually prefer it to the 800. The computer is certainly attractive, and the fit and trim are of a higher quality than a certain computer named after a naval rank.—*AL*

two additional RCA phono jacks for composite video and audio input. Behind a flip down panel are the usual controls you would expect to find: tint, color, brightness, contrast, horizontal position, vertical hold, and volume.

To describe how well the Commodore monitor works, I must first explain the video signals that are produced by the Atari computer. Those of you who are familiar with this topic are excused for the next four paragraphs. For the rest of you, here it is.

The Atari 800 computer has several types of video output. RF or Radio Frequency is sent through the cable that is permanently attached to the computer. The RCA phone plug on this cable plugs into the antenna switch box on the back of your television. RF is really a variety of different signals, including the brightness of the picture (luminance), color (chrominance), audio, TV synchronization, and modulation.

Your TV set takes this signal and breaks it down into the various components. The quality of the picture you see on the screen is a result of how well your TV performs this process and its convergence capability. Convergence is simply the ability of the TV picture tube to focus a signal on the screen. An RF signal fed to your TV, generally produces a low- to medium-resolution image.

Another type of video output generated by your Atari computer is called composite video. This medium-resolution signal is made up of color, brightness, and synchronization. It is available at the monitor jack on the 800 on pins 4 and 2 (ground). The third type of signal coming out of your computer is called composite luminance. This signal lacks color information and is typically used for monochrome monitors. It yields the sharpest and brightest picture possible. Pin 1 of the 5-pin D.I.N. jack carries the signal.

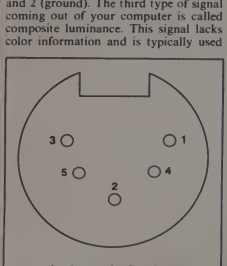

Figure 1. Atari 800 monitor jack.

The other signal that is produced by the Atari computer is called composite chrominance, or chroma. It is found on pin 5 of the jack. This signal has only color information. Normally, it is not used because few video monitors can accept it. By the way, pin 3 of the D.I.N. jack is the audio signal. If you want to hear the best sounds you ever heard from any computer, run leads from pins 2 and 3 into the auxiliary input of an amplifier and crank up the volume. I guarantee you will be impressed.

Okay, now you need a cable that has a 5-pin D.I.N. plug on one end and four RCA jacks on the other. You can make your own if you wish (see Figure 1 for the Atari D.I.N. jack pinouts). I know of one source for this type of multi-jack cable. It is Gemini Enterprises, 86 Ridgedale Ave., Cedar Knolls, NJ 07927. The cable costs $9.95 (plus $1.50 shipping) and is part #AC54.

Once the Luma, Chroma, and audio plugs are connected to the back of the monitor and the composite video plug is attached to the front, you are all set. With the rear slide switch set to "rear", you will see the most stunning and crisp picture that rivals that of an expensive RGB monitor. Boot up *Q-Bert, Pole Position, Axis Assassin,* or *Donkey Kong* and marvel at the quality of the high-resolution video image. It is so good it really has to be seen to be appreciated.

When the rear slide switch is set to the "front" position, you are using the composite video output of the Atari and the quality is about the same as a very good TV set. When you are running software that uses artifacting, a technique used to get multiple colors out of a single mode, the Commodore monitor must be set in this mode. Otherwise you will have only a black and white image on the screen.

I am very excited about this video monitor. It has the best quality image I have seen on any color monitor. The audio section of the monitor is just as good. You can turn the volume up and not have to suffer the distortion that is usually heard on TVs and other monitors. I highly recommend this non-Atari peripheral, which carries a suggested retail price of about $300.

That's a wrap for this month. Next month I will shed some light on a game that has been called the sleeper of 1983: *Planet Missionary* by Magical Software. I will also review some new software from an unusual source, a supermarket, and have a few other surprises. Until then, happy programming.

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IBM Images

Susan Glinert-Cole

Almost every book publisher seems recently to have discovered microcomputers, with a particular emphasis on the IBM PC, XT, jr, 370/XT, and 3270 PC. All are breathlessly signing up authors in anticipation of the next six entries from Big Blue. In just the last two months I must have received 30 books for review, many of them part of projected series from single publishing houses. The books divide into about six areas: introduction to the IBM PC, programming in Basic, graphics, how to use application software like *SuperCalc*, hardware and software directories, and everything else. I divided most of the recent acquisitions, which total precisely 22, into six piles, and have read, skimmed, fondled and otherwise ergonomically interfaced with each and every one of them.

I am sorry to say that the overall quality of many of these books is not very good. The pressure to rush into print left a wake of poorly proofread text and some amazing grammatical *faux pas*. It is not very surprising that many of the books within each category were the same book. I don't mean that the authors indulged in mass plagiarism, but rather that they exhibit little creativity, lackluster prose, and poorly designed graphics. There wasn't much to set any one apart from the swarm of like offerings. It is true that there is only so much to be said about the PC before sounding like a broken record, but I don't think this is an excuse to give computer book publishing a bad name, nor is it a reason to reduce the written word to the level usually reserved for certain vinyl cheese products and plastic palm trees. I would not be overly dumbfounded, nor particularly despondent, to see the bottom drop out of the How-to-Turn-on-Your-PC-and-Amaze-Your-Friends book market very soon.

The stack of three directories towers above the other six groups; to these books go the cockroach-squashing award of 1984. *The IBM Personal Computer and XT—The Software Guide* by Gerald Van Diver from Micro Information Publishing, Inc. has exactly 1001 text pages, disregarding the order blanks bound into the front and back of the book, conveniently placed should you require an additional doorstop or wish to barricade your spouse behind a wall of database manager blurbs. Ten pages are devoted to the table of contents, a title page, an acknowledgement page, and a one-page introduction. Sixteen plus 1001 equals 1017. Even counting the order blanks, I come out with a total of 1025. Now why should I be bothered with all of this enumeration? Because the press release stuck in the front claims the book has 1036 pages and this inaccuracy was pretty blatant. However, after a browse through the text of this directory, I think it is probably one of the more accurate claims made therein. Other, interesting facts I picked up inside the Guide:

1. UCSD Pascal runs under MS-DOS. How clever of it.

2. CP/M-86 is written in Basic. A remarkable performance by a much-abused language.

3. *The Word*, a Bible study program, found its way into the word processing section. A revelation.

4. Several programs were written in a language called Macro. This language is probably a derivative of Micro (see CP/M 81 below).

5. One program ran under an operating system called CP/M 81. I presume that Micro and Macro will also do nicely in this system.

6. There are two categories for networking: Networking, and Networking & Networking. No, I didn't make that up. PCnet was put into Networking, and Everyone Else was tossed into Networking & Networking. Will the real Networking please stand up?

If you buy this book, I promise you many hours of howling fun, especially if you enjoy reading press releases. The book is composed of zillions of them, sorted by category. It has some value, in that if you want to see how many word processors there are to choose from, this book will give you a head start. However, because each and every press release claims that its product is by far the fastest and most flexible and has more windows/mice/colored help screens, it is doubtful that the entries will enable you to make a thoughtful choice.

The ICP Software Directory—Business Applications for Microcomputers from Robert J. Brady Co. is not anywhere as heavy as *The Software Guide*, and it certainly wasn't as much fun to read either. It does contain some very outdated information on programs available to the business community, including agriculture, engineering, pharmacy, fruit stands, and payroll. Although the book was published in 1983, most of the programs reviewed are for Apple, Altos, North Star and TRS-80; very few appeared to be for the IBM PC. Furthermore, although the book claims to deal with IBM PC microcomputer products, a word processor I use daily on the PC was said to require a Data General

Micro, and several obscure operating systems for that machine, but no mention was made of the PC. Other software required such popular microhardware as the IBM System 23, the Digico Prince, the ICL Personal Computer and the Ontel OP1/50-70. This book might be useful if you are looking for an obscure application program for an obscure computer. Check the library for it first before you buy it.

PC Clearinghouse Software Directory is subtitled *The Yellow Pages to the World of Microcomputers*. Of the 816 pages within the admittedly phonebooky-looking covers, only 95 of them are yellow—a mere 11.64%. This book contains no product reviews or press releases. Within each category—business, program editors and so on—there is a subdivision for each microcomputer manufacturer and the computers produced by that company. Listed under the specific computer are the products available, along with the required operating system and the price. Again, although published in 1983, the book is sadly out of date for the PC. There are a few weird entries. Under books for the PC, for example, a product calle Books is available from Addison-Wesley and costs between $100 and $199. I know the price of paper was rising, but that seems a smidge out of line. Because there is no description of the software product, the listings can serve only as a starting point for further information gathering.

Graphics

The four graphics books I have here span the range from puerile to quite technical. The worst of the lot is *Introduction to Graphics for the IBM Personal Computer* by Grillo and Robertson from Wm. C. Brown Company. If you eagerly opened the cover of this book without reading the subhead, you could swear it was written for the TRS-80; there isn't a mention anywhere of the color capabilities of the PC. Most of the examples are text/block graphics, with such useful and aesthetically overwhelming examples as a Virgo zodiac sign drawn in zeros and a smiley face drawn crudely with block graphics (cutely titled "for my last impression...librarian in Boston's combat zone"). Having once or twice been at that location by some temporal miscalculation, I know perfectly well that nobody, with the possible exception of a nine-foot jujitsu expert, would lounge around that area with a wimpy smile on the puss.

The eight chapters consist mostly of example Basic programs, without much explanation as to why these things are being done. Many of the programs are bizarrely scientific; example: display the varying concentrations of up to six ionic species that may coexist in a solution of varying acidity (note that the *may* here should be the more grammatical *can*). Instead of at least taking advantage of the special graphics characters in the PC, the authors actually produced the graphics with number characters. If you really need a silhouette of a witch done in percentage signs, then by all means run right out and buy this book. Otherwise, read on.

A bit more information, but still pretty drab, is *Graphics Programs for the IBM PC* by Robert Traister from TAB Books. The *first* chapter is devoted to an overview of the PC, including warranty and maintenance information. I tend to think that anyone who would be thinking of buying a book on IBM PC graphics would probably already own a machine, or at least have seen one, and I question the wisdom of including a fuzzy black and white photo of the system unit in a book supposedly devoted to pretty pictures. The second chapter is a slim discussion of Basic; it is actually more of a glossary-type summary of commands. The explanations are pretty good, but there is more information in the Basic manual, so why bother? Chapter 3 starts off talking about selecting a color graphics monitor and how to install it and gives a brief overview of the different types of graphics available in the computer. This chapter is rehashed in Chapter 4, in which he discourses further about color monitors: "Upon uncrating the Amdek monitor, I was immediately struck by the size of the device." (I would have written that "Zounds! What a Monolith!" but that is, of course, a difference in style.)

It isn't until chapter 5 (mind you, there are only eight chapters in the book) that he starts talking about graphics. The chapters cover text graphics, "high-resolution" color graphics, animation and printer graphics. Most of us will agree that the color graphics capabilities of the IBM are actually applied in medium-resolution mode, unless you want to count the fancy trick of stuffing a color for the hi-res mode; this bit of inaccuracy might wash in the text, but not in a chapter heading for Heaven's sake.

Most of the book presents short programs, accompanied by a verbose running commentary on how the programs do their little pixellacious thing. The printer graphics chapter is devoted to a slightly modified version of a screen dump program that appeared in this column a while back, with the major part of the text devoted to recounting conversations with the original author. (He said...I said...Then he said... Then I said...) There are several attractive color photos and a good glossary in the back, but I don't think you'll learn much about graphics from this book.

Quite another cup of tea altogether is *Graphics for the IBM PC* by B.J. Korites from Kern Publications. This is an excellent self-teaching guide to writing graphics software; the programs listed in the text are available on disk for an additional $21.50. For some strange reason, the author lowercases PC, but this is the only item in the book that is a bit off. It is packed with useful information and excellent explanations of scaling, windowing, two- and three-dimensional rotation and translation, perspective, hidden line removal, shading, matrix concatenation, and 3-D interactive graphics. It is fairly mathematical; the author points out rightly that some math is required when writing this type of software, but he has been at pains to present the material in a concise and simple manner. Anyone who works through this book will have a solid foundation in the subject.

Far spiffier in appearance, and equally informative, is *Computer Graphics for the IBM Personal Computer* by D. Hearn and M. Baker from Prentice-Hall. This book is much more technical than Korites', and is also somewhat more extensive. (It is also about 100 pages longer and quite a bit heavier.) I got the feeling that the book may have been directed toward the college student, because there are many problems at the end of each chapter, but anyone interested in graphics would benefit from doing them. I lean towards the Korites book for a fast tutorial on graphics, but this one contains a lot of material I might want later on if I were about to embark on an electronic crayon spree.

Introductory Texts

I know there must be more than three of these on the market, but for some reason, these are the only ones that have recently crossed my path. *Using the IBM Personal Computer* by Kenniston Lord, Jr. from Van Nostrand Reinhold starts off with a bit of a baffle. It starts off asking "Is There a Computer in Your Future?" which tells the reader how nifty a computer can be for balancing a checkbook and keeping track of car mileage. It then leaps right into the next chapter, "How a Computer Works," which is a description of Basic. After the poor confused reader has dutifully typed in a few of the programs, the Basic editor is finally explained. Sequential files are introduced many chapters before DOS and disks. Similarly, a slew of little music programs (Marine's Hymn, Onward Christian Soldiers, and God Bless America) are listed in the chapter on graphics.

About a third of the book lists programs that would be of use to a small business—accounts receivable, mailing list, and so on. A two-page epilogue makes a few statements about BasicA. The organization of this book is very poor, although there is a fair amount of information there. It isn't a beginner's book; there is too much missing or sketchily covered. A more

knowledgeable person would probably be after more specific information than provided here.

Guide to the IBM Personal Computer by Walter Sikonowiz from McGraw-Hill is a much better introductory text. It covers Basic, DOS (including DOS 2.0), graphics debugging, serial and parallel ports, light pens, and joysticks, and even has a bibliography. The writing style resembles the weather in Albuquerque: clear and perfectly dry. If you don't mind this, the book looks as if it would be a handy accompaniment to a brand-new PC.

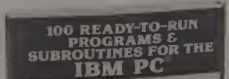
The *IBM Personal Computer Handbook*, edited by Dzintar E. Dravnieks for And/Or Press is one of the richest offerings of its type around. It is a mixture of several ideas: introductory material and directories of software, hardware, and books. Each of the ten "learning about it" chapters is written by a different author, about all facets of the PC, from how to buy it to networking. The chapter on word processing, for example, explains what it is and how to do it, and includes a features questionnaire for evaluating different products.

The second section of the book lists, with a small description, much stuff available for the PC: software packages, printer accessories, reference material, security supplies, and bumper stickers. There is even a section on consultants—something which a small business would find invaluable. This one is highly recommended.

Basic Programming, Routines And Subroutines

For those with the will, but not the wherewithal, there are several offerings full of ready-to-type-in (and hopefully run) Basic programs and/or fragments thereof. *Mostly Basic: Applications for Your IBM PC* by Howard Berenbon for Howard Sams lists a Basic telephone dialer, a digital stopwatch, language flash cards, a depreciation schedule, and so on. It is a mixed bag of stuff that would appeal to those who buy mysterious boxes at yard sales for the sheer joy of discovering what is in them. Interesting inclusions are several circuits and hardware add-ons to build yourself: an interface circuit for the dialer, how to modify TRS-80 Color Computer joysticks for the IBM, and a computerized lock.

The TAB book, *100 Ready-To-Run Programs and Subroutines for the IBM PC*



by Jeff Bretz and John Craig only superficially resembles the one that has been available for years for 8-bit computers. Interestingly enough, this book has some artistically *avant garde* graphics programs, including a font design program. There are several utilities worth looking at: a cross referencer, a memory dump routine, and a communications program. This looks like a more interesting mixture of programs than the above book, and might well be worth the investment if you are looking for a collection of customizable and relatively cheap software.

The User's Guide with Applications for the IBM Personal Computer, and *Techniques of Basic for the IBM Personal Computer* are brought to you by the same folks who did *Introduction to Graphics for the IBM Personal Computer* and both are pretty dull. The *User's Guide* has a neat picture of a child holding a calculator and a splendid description of a four function ditto. After seven pages of explanations about the TV Science Fiction Computer and the Spy Movies Computer, interlarded with swell photos of more hand-held calculators, we get the usual fuzzy photo of the IBM PC.

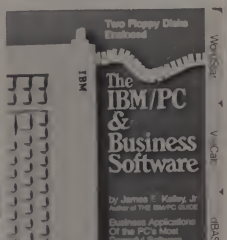
The title of the book doesn't have much to do with the text, which is more of a general exposition on gee-whiz technology and business profundities like: "In businesses, the reduction of the time between goods sold or services performed is known as 'reduced float.'" In case you weren't aware of it, "File management can be thought of as the operations performed on any file." I thought this was supposed to be a user's guide, not a tour through businessland.

In case you are tired of your PC and are already lusting after another computer, there is a chapter devoted to other machines. There are no descriptions of anyone's application software, unless you consider the sentence "The supplier of hardware is often an excellent source of software" a useful line into a spreadsheet. The chapter on system programming is enough to give any system programmer a stitch in the side. The programs are too small and limited; if you are really looking for useful Basic programs to type in, get the TAB book described above. Both of these are by John Grillo and J.D. Robertson for Wm. C. Brown Company.

The *Techniques of Basic* book is a little better; at least it covers the titled subject. Some of the same graphics programs in *Introduction to Graphics* written by these people are used here as well. Sikonowiz's book *The Guide to the IBM Personal Computer* is a much better treatment of Basic and programming techniques.

Applications

The new generation of printed material often is accompanied by one or several

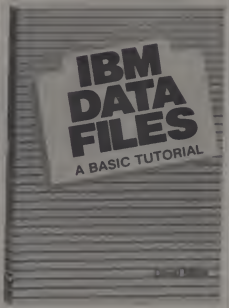


disks to eliminate the tedious keying-in of listings. *The IBM/PC and Business Software* by James Kelley Jr. from Banbury Books is the beginner's guide to *WordStar, VisiCalc* and *dBase II.* This book practically reaches out and holds your hand, makes soothing noises when you make a mistake, and covers just about everything dealing with these three popular software packages. The appendices include instructions for firing up the PC from start to finish. The disks appear to contain working models for the programs; because I don't own any of them, I couldn't take a look. The beginner who has just brought home a PC and one or more of these programs would do well to get this book. It looks as if it would produce an expert in short order.

Financial Planning for SuperCalc and the IBM PC from Howard W. Sams is the financial designer's answer to Seventh Avenue. It explains how to create personalized calculators, and provides, on a disk, 18 calculators/worksheets for thrilling excursions into discounted cash flow analysis, compound growth, basic statistics, and real estate financing. If you aren't sure you even know what half the things mean, each chapter explains the financial concepts involved in clear, albeit formula-laden, prose. This book will save a lot of time if you need some spreadsheet templates.

If you are just interested in *VisiCalc*, or you feel your image needs some upgrading *The Executive's Guide to the IBM Personal Computer* by Alan J. Parker from Reston Publishing may help you out, but I rather doubt it. The section on *VisiCalc* is very small and won't tell you very much that couldn't have been gleaned from reading the *VisiCalc* documentation. Most of the book concerns itself with teaching Basic to the businessperson, and the content presupposes that the student already knows how to operate the machine. But, in the introduction, the author assures the reader that when this book is finished, he should be able to understand the manuals that came with the PC. This is putting the cart before the horse: he continually refers the reader to these manuals for information on getting the system up, using DOS, and dealing with disks.

There is a little section on How to Use a Computer, but this deals with computerizing payrolls and such. It might better have been titled How to Put a Computer to Use (or What Should I Do Now That It's Plugged In?). All the exercises and problems are on a disk, provided with the book which, by the way, is one of the handsomer offerings around. The chapters cover simple calculations, data entry, and files. Again, if a person is going to all the trouble to buy a $4000 computer for a business, you would think that he would spend the money for a decent business package, rather than write one himself. The programs are not very comprehensive, and would be suitable only for very simple applications.



Miscellaneous

I have two books on files and file structure; both of them are good. The first one, *IBM Data Files, a Basic Tutorial* by David Miller from Reston, covers sequential, random, and DIF (*VisiCalc*) files. There are several extensive listings for a home inventory system and a program that creates DIF files. It is well written, but I like Grillo and Robertson's *Data and File Management for the IBM Personal Computer* from Wm. C. Brown better. This book covers not only sequential and random files, but sorting, strings,

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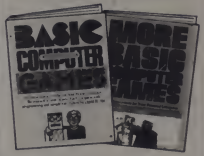

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IBM Images, continued...

linear and linked lists, trees, pointers, and inverted files. This book is worth buying for the information on data structures and sorting algorithms. The examples are amusing (files of mushrooms and flanging/fluting/flensing/fluming) and the listings are extensive.

The Software Sifter by Philip Frankel and Ann Gras from The Free Press is completely unique in the computer book arena. It is a set of shopping questionnaires for different software and hardware categories like word processors, spreadsheets, graphics, and payroll. Each section is preceded by an explanation of what features a buyer should look for, and what a reasonable product should be able to do. Following the introduction is the "shopping list." A buyer can decide which features are important to his application and then compare available products with the questionnaire to see how they measure up. The concept is a clever one, and if you are shopping around for expensive software packages and aren't sure what you should be looking for, this book will ease the road to the personal bankruptcy that often accompanies such activities.

The last book, *The 8087. Applications and Programming for the IBM and Other PCs*, by Richard Startz from Robert J. Brady Co. is for the advanced assembly language programmer. It has extensive examples and gives thorough coverage to the numeric co-processor. At the moment, it is the only book out there on this subject, so if you like crunching, gumming, or otherwise noshing numbers, this book will give you a sizable quantity of snacking information.

Firms Mentioned In This Column

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Robert J. Brady Co.
Route 197
Bowie, MD 20715

PC Clearinghouse Inc.
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Fairfax, VA 22033

Wm. C. Brown Company
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Dubuque, IA 52001

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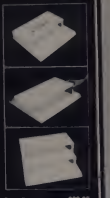

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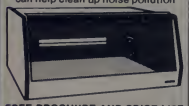

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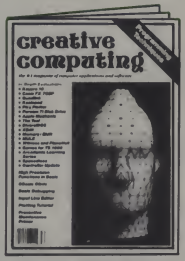

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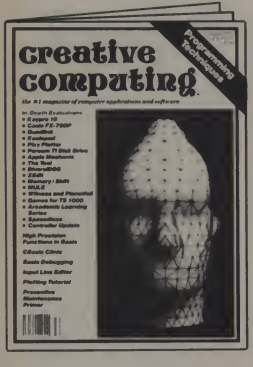

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Heath/Zenith	E	P
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Radio Shack/Tandy TRS-80	G	R
Texas Instruments	H	S
Timex Sinclair	I	T
Other (specify)	J	U
None	K	V

3 For what, if any, business application(s) do you use the microcomputer you currently own? _____

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Heath/Zenith	E	P
IBM	F	Q
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Timex Sinclair	I	T
Other (specify)	J	U
None	K	V

3 For what, if any, business application(s) do you use the microcomputer you currently own? _____

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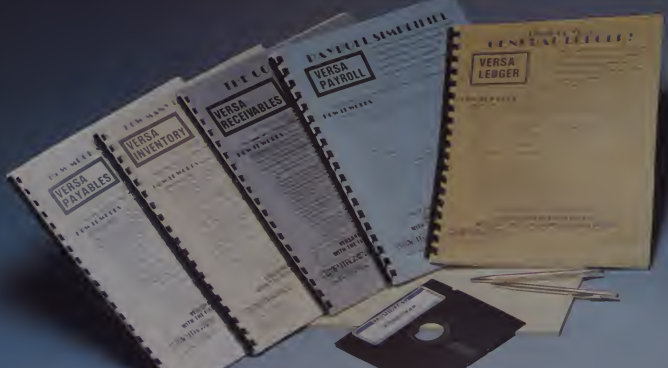

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