RETAIL STORES: GROWING AND MERGING

The retail computer store business has reached a turning point. It's not that the world is overstored. The market is growing and the world still needs more stores, dealers, consultants, direct salesmen, anyone who can help get these products into the hands of customers and support them anywhere. But we have reached the point where the stuff needs to be sold and supported, not just offered. The easy customers have already been served; now stores face the naive and the timid. More significantly, the easy competition is disappearing too; now stores face Computer-Land (see page 4), Businessland, and others.

RELease 2.0

So, you thought we were taking a long vacation when you missed your issue in August. We thought the same of you when you greeted our efforts with dead silence and complaints of missing issues. As it turns out, it was the post office that was loafing: It lost the entire press run of our August 5 issue. Score another point for electronic mail!

However, we're happy to say that what we wrote in August still holds up today (except for some bracketed updates, mostly on Osborne and Apple): We're able to send you this only slightly revised reprint. We're glad you missed us.

The changes are visible in the numbers: The number (not just the percentage) of single-unit stores is dropping, while overall growth continues strong. Future Computing of Richardson, Texas, for example, estimates that single-location stores have gone from 35 percent (630) of a total of 1800 stores in the second quarter of 1982, to only 25 percent (620) of a total of 2479 in the second quarter of 1983. Meanwhile, chains such as ComputerLand, Sears, Businessland, Entre, are growing rapidly and gaining share. Multi-unit is the way to go — for a successful single store setting up satellites, for a chain, or even for individual franchisees of a chain. ComputerLand's franchisees, themselves storeowners, exemplify this tendency: About 75 percent of ComputerLand stores opened over the past half-year belong to existing franchisees.

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Multiple units are necessary to spread the costs, share the advertising, pool product knowledge and support resources, gain the public's share of mind. In the increasingly fierce retail environment, standalone stores by and large just can't make it unless they have extraordinarily strong management and a defensible niche -- for example, Computerworks of Westport, Connecticut, which is really more of a high-class storefront consulting firm that happens to sell hardware, than a traditional retailer. Yet even Computerworks is considering setting up satellites to exploit its investment in support and operations.

Computerworks is a charter member of the Association of Better Computer Dealers, a grouping of 30 high-end independent dealer-ships that aims in part to offer some of the advantages of the multi-unit life in terms of product selection, vendor relationships and customer perceptions, but ABCD -- even with satellites -- is not necessarily enough: Witness the recent union between two of its members, Computer City of California and Computer Mart of Troy, Michigan. Computer City, with five satellite stores of its own (two of them acquired in an earlier merger with another ABCD member) will become a subsidiary of Inacomp Computer Centers, the holding company that already owns Computer Mart and enfranchises its 12 (soon to be 15) satellites. And Inacomp has further such moves under consideration.

Make or Buy?

This merger exemplifies a second trend: Although outfits like Inacomp are adopting the satellite concept -- one central store with an infrastructure of technical, service and managerial people supporting a ring of satellites -- building your own may just not be cost-effective or fast enough. For example:

Businessland, even though its espoused philosophy is to develop its own uniquely high-end stores, has just acquired Dataplace, three stores in Arizona. Dallas-based CompuShop, with 24 stores in Texas, Illinois and Colorado, has just acquired two more in California from Nolan Bushnell. Houston-based Computercraft, preparing to go public (another widespread trend), has acquired 11 in three transactions over the past few months (as well as opening three new ones). Computer Factory is on the prowl. The On Line Microcenters chain itself was a buy, by a group of Venezuelan investors who originally had thought of building their own chain but instead bought on in need of rescue.

Would-be storeowners are now facing the same choice as manufacturers: Make or buy? Market rules apply to return-generating investments (such as stores) as well as to consumable goods. As we learned in B-school, people buy rather than make when there's an oversupply. Costs to build a store exceed the price (a function of the expected returns) on the open market.

The cost of a new store, of course, includes the necessity of finding and paying for real estate that an existing store found and priced years -- or at least months -- ago, and the time needed to build a staff and a customer base. Many stores are worth buying for their leases alone -- and only for their leases. Conversely, the cost of a "bought" store can be offset by the fact that the buyer does not have that outfit to compete with -- a significant plus if you're buying one of the stronger outlets in a market.

(continued on page 7)
COMPANY CARTOONS

There's turmoil all over the computer business. Managements are changing (to put it delicately), losses are mounting, and so forth. Yet the more interesting -- and certainly the more healthy -- changes are going on where there's bending, not breaking. It's a point well-made by Ed Lee, chairman of Monterey's Pro-Log Corp., over breakfast recently. Insects, notes Lee, evolved millions of years before we did, yet they're still around pretty much unchanged. We, on the other hand, have developed remarkably in a short million years. The key is our skeletons: Where an insect is defined and confined within its skeleton, we are merely suggested and supported by ours. We thought of this as we visited several companies that week: Many were undergoing the sort of body sculpture that transforms a company even though it retains the same skeleton. Mind you, we're just talking about a facelift, a little more muscle here, a little less amleness there, rather than anything like the major surgery that may be indicated at TI, say, or Atari.

Altos: Starve the Fat, Build the Muscle

In New York, we attended a breakfast to hear Dave Jackson of Altos give an accounting of the past few months. The man who wants to build the next Digital Equipment has made a few more steps. Messily but successfully, he has done two things: Gained a firm hold in the 16-bit, multi-user market, and focused his aim.

Altos grew by offering its customers a Chinese menu -- pick your processor, pick your OS, pick your storage configuration. It supported each of them equally. Likewise, ceo Dave Jackson knew each dealer by name. But this catch-all has had to give way to an outfit where economies of scale in support and development matter. The company is now throwing its weight behind (guess what?) Intel's chips and Microsoft/IBM's operating systems. Last November, when the company went public, 70 percent of its shipments (somewhat less of revenues) were Z80-based systems; 30 percent were a variety of 16-bit systems. By July of 1984, 70 percent of shipments should be Intel 8086-family-based, up from about 50 percent now. A further 10 percent will be 68000-based (says Jackson; we think that may be high).

Meanwhile, those 800 dealers who do fewer than 10-20 systems per month are mostly ignored, while the 200 strongest ones are eagerly cultivated. High-end systems, with their margins still intact, will be Altos's territory henceforth. Still, as Jackson says in his North Country burr, "Ye can't drop things ... [or people]. That would make everybody nervous. Ye've just got to de-emphasize 'em."

The shift hasn't been easy. It's been partly a question of finding the good dealers, and partly of taking those with potential and making them good. That means training, finding software, developing networks that work, and so forth. It also means wooing DEC and Wang dealers, with the help of software that makes conversion from DEC's and Wang's machines a relatively easy task -- if you're sold on Altos in other ways. Jackson brought in Bob Bozeman from Wang as director of applications software to spearhead an effort to encourage third-party software; Bozeman did such a good job that he's now director of marketing, with 35 people and a budget of $2.5 million a year.

Meanwhile, the company's much-heralded 186 has been held up by Intel's 80186, due out in volume in October. The system will have a Lisa-like operating environment, a bit-mapped screen, Xenix, Wang-like word processing, and all the rest.
These efforts and delays have showed up in Altos' financial statements -- always an awkward situation for a newly-public company. The stock is down from its $21 offering price to around $13. For the fiscal year just ended the company probably did 57c per share, just a step above fiscal 1982's 50c. [It came out at 58c.] For 1984, Altos should make 75c per share if it hits its revenue budget of $110 million (up from $75 million), but it hopes both those figures are low. There's a good chance of that now that Altos is in fighting trim.

Apple: Improved Coordination

With John Sculley's arrival at Apple, it was obvious there would be changes. But aside from the departures of a few general managers the procedure is not so much a make-over as dance classes for better coordination. Sculley, the famous man from Pepsi, confounded conventional wisdom: Rather than launch a new marketing campaign or something predictable like that, he is redefining product strategy. The company that was once a group of kindergartens for programmers -- with each group, Apple //e, Apple ///, Lisa, MacIntosh, the portable, following its own whims -- is now to be a vocational college, paying attention to the rough, tough world outside. Moreover, the groups are even going to pay attention to each other. Henceforth we expect to see a lot more compatibility (or at least connectibility) among Apple's various systems. Forget charisma, marketing pizazz, even discipline: John Sculley's biggest contribution to Apple is common sense.

The results are already apparent in announcements that Apple sees no reason not to put an MS-DOS window within Lisa to enable Lisa users to run IBM PC software. Mac, we sense, is being delayed while the company works to make it more compatible with IBM -- and probably with Apple's own //e and Lisa.

Sculley is prepared to take the internal heat, and the possibility of disappointing Wall Street, that this kind of tough but correct decision entails [see below]. Indeed, if you operate on the theory that five cents is easy to make up if you have a clever accountant, Sculley has already taken the tough way out with the third quarter's report, which showed earnings about five cents below Street expectations. The shortfall was a trivium, and well explained by Apple //e excess demand and Apple /// price cuts, but it reveals Sculley's famous forthrightness.

Nonetheless, now that Sculley has made the tough moral decision to offer IBM compatibility, his troops face the tough practical task of carrying out that promise. The company must also react to IBM's Peanut when it's announced. It has some ideas, but of course those plans are under wraps now. The recent Apple Home Systems Package, a bundled //e, is just a foretaste of what probably includes a further price cut and some imaginative promotion.

[Sculley has been busy since. On August 12 he made an impressive appearance before a group of analysts, where he declared publicly: We care more about market positioning than about market share. This signals a determination to fight it out with IBM not on price alone (despite the recent unbundling and 18 percent price drop on the Lisa), but rather to position the product against IBM's, along the lines of: We sell to persons, while IBM sells to companies. Indeed, Apple's new television ads for Lisa -- ending a year-long television hiatus -- will stress the individuality of its owners. One, for example, shows a 4:30 am jogger (his dog happens to be the one used in the movie Flashdance) whose wife (girlfriend?) calls the office to ask if he's coming home for...breakfast. (Let's face it, the price cut will help too, especially in the small business market where people are]
eagerly awaiting accounting applications, and have less use for the heretofore bundled LisaApplications.)

[Given the clear ascendancy of IBM in the market, this differentiation -- along with the acknowledgment of reality implied by the coming adoption of MS-DOS options -- makes a lot of sense. The recent abandonment of Apple's joint effort with Cullinet, which would have eased Lisa's interaction with large IBM mainframe data bases, seems to have foundered only from a lack of attention on either side -- and is likely to be resumed without prejudice.

[On the financially more important Apple //e front, Sculley has gently installed himself as head of that business unit, which for practical purposes constitutes Apple Computer, Inc. What will Apple do to offset the onslaught of IBM's Peanut -- whenever it happens? We're still wondering, but it's clear the //e will take on the Peanut head-on -- and avoid tangling with the higher-end Macintosh ($2500, we guess). The //e is being positioned ever more firmly in the home market, with the promotions including the recently announced PowerPad from Chalk Board, a well-designed, well-packaged touch screen that may do for computers in the home what VisiCalc did for computers in the office. Unfortunately for Apple, the parallel is not complete, since VisiCalc for a long time was available only on the Apple; PowerPad will work with the PC/Peanut as well. (See page 9.)

[As we go to press, Apple has just announced that it will have a sharp drop in fourth-quarter earnings. To the flurry of comment that will abound, let us add just these points: First, Osborne lacked three things -- management, money, and, after the first flash of inspiration, the ability to offer an encore to its first product. Apple has all these strengths, in abundance. Second, the low margins of school sales will pay off in the long run both in future sales to schools and resulting sales to schoolchildren's families. Brand preferences -- and software libraries -- are built early. Third, those heavy R&D expenditures likewise should pay off next year and beyond. Yes, Apple spent $50 million on Lisa (perhaps it should have taken less), but it can't sit back and relax now. There is much yet to do: incorporation of MS-DOS capabilities into Lisa and MacIntosh and of compatibility between those two Apple systems themselves; enhancements to Lisa, especially its word-processing, data base, and communications capabilities; and work on new products, probably an enhanced //e and a portable. Fourth, the company's decision to wind down its work on floppy disk drives and take reserves for that move is a common-sense concession to reality. "We simply missed the boat on that technology," says Sculley. "We can buy them [cheaper] from outside."

[But yes, the next year is going to be tough.]

ComputerLand: Becoming More Caring

Last issue we talked about Micro D and its lean and hungry character; here we meet ComputerLand, which has a vastly different view of the world. ComputerLand too sees a rough, tough environment, but it's aiming to fight back with more service so as to justify, rather than reduce, the 8 percent royalties it collects on its franchisees' sales (whether purchased through ComputerLand corporate or elsewhere). ComputerLand, once just a distribution company and royalty-collection agency, now aims to be its franchisees' back office, providing support, product selection, advertising, marketing expertise, personnel training, etc. Where ComputerLand once took orders for products the franchisees wanted, it will now select products and promote them to franchisees and help franchisees promote them.
to customers. Where it once left dealer education to manufacturers and software publishers, it will now hold training classes and provide marketing materials of its own. In addition to better individual stores, this support will also probably mean more uniformity in product stocking among all ComputerLand stores -- an advantage in dealing with multi-location customers.

The company will spend about $13 million on ads this coming year, including a television campaign featuring Guido's Fish Market (a business anyone can identify with) and a truly heartwarming little girl who says to Daddy, "It's time to talk about ...[long, awkward pause]... computers." Courtesy of J. Walter Thompson, the ads will run in the usual places -- news, football, wherever men 18-49 and $35K+ are likely to be watching. The aim is not just to bring in customers, says ComputerLand senior vice president Mike Shabazian [now president, US division], but also to give the franchisees themselves some sort of image to emulate and measure themselves by.

That's the help side. On the or-else side, ComputerLand is limiting the territory offered with new franchises to a radius of one-half mile, vs. one to three miles previously. This will give the firm a little more control over its franchisees and the power to add new stores closer to ones that aren't performing without actually having to terminate them.

To the extent that ComputerLand succeeds in upgrading its franchisees, the chain will set a new standard for the market as a whole. The danger is that, like IBM's ads which implicitly assert that anyone can run a bakery with a computer, ComputerLand's ads will raise unfulfilled expectations. But if they encourage retailers to fulfill them and weed out those who don't, that's all to the good.

Osborne: New Self-Image [or, Requiem for a Lightweight]

Like Sculley, new ceo Robert Jaunich has brought common sense to Osborne. Once the only muscle-man on the beach, Osborne is now looking around and belatedly spying the competition. In the perspective of Kaypro, COMPAQ, Hyperion, et al. -- a perspective everyone save Osborne adopted some time ago -- suddenly those old muscles don't look so good.

In response, Osborne is taking two tacks: cutting prices at the low end so that its dealers can make some money and so that it can start paying its bills again, and offering compatibility at the high end to get back into the action. The recent price cut for the Osborne 1 (which we've seen advertised for $999 retail), from $1995 to $1295, should help revive dealers' loyalty (or at least rent back their affection), since they'll be able to make some money on the machine again although they won't necessarily lower its retail price much more. [...]

Now the company's job is to wait it out until those strengths [strong dealer support and a (fading) consumer franchise] -- or rather, the lack of them elsewhere -- become apparent, and until it is ready to ship its much-delayed IBM-compatible upgrade to the Executive. [Unfortunately, the market was moving too fast, and Osborne was too far behind. Had the company been making money, it might have survived its product problems, but it ran out of cash too quickly.]

Jaunich's other contribution, [though insufficient, was] simply tighter management. Dealer support is nice; overstaffing is costly. Osborne had about twice as many as Kaypro's 450 people at the end of June; Jaunich has reduced that number by
about 300. Some of the drop was a delayed response to too-slow sales; more of it was simply a delayed response to too-fast hiring. Much as Adam Osborne believes in profitability as a concept, he couldn't get himself to care much about profits as long as his product was selling like crazy and the world loved Osborne. But by the time you reach the $100-million level you can't keep behaving like a startup and building your base for the future. Somehow the future crept up on Osborne.

[Now that Osborne is, for practical purposes, gone, should we be sad or glad? We're glad that a disruptive force -- price-cutting, lagging innovation -- is gone. The market is healthier when its competitors are healthier. Some dealers, we hear, and certainly some investors, are now leery of Kaypro -- and of personal computer vendors in general. That's not rational, is it? Osborne had its own particular problems that these other folks don't have. But they too have flaws, and shakeout is when your flaws start to matter. We expect to see many companies -- Computer Devices, for example -- find that what they called "start-up losses" are now redefined as recurring, inherent losses. Perhaps we needed a little more skepticism all along. Perhaps Osborne's investors, so quick to sue, were not duped, but merely careless.

[On the other hand, we're sorry that Osborne didn't make it: The original aim was noble, but a good product idea in 1981 rates poorly in 1983. What was needed was not just a product, but a strategy.]

Sorcim: A Thin Company Struggling to Get Out

Like the fat man of legend, San Jose-based Sorcim has never mattered much, neither offending nor impressing anyone particularly, although its good friends knew the talent that lay buried in a plethora of never-finished projects and a couple of haphazardly marketed products. Now founder Richard Frank has returned to the "farm" to work on an 18-month project; he leaves the company in the tougher but capable hands of Jim Pelkey, who has cut its project roster from 37 down to four. Pelkey has brought in a new sales vice president, Bill Ferguson from MicroPro, to give those remaining products some marketing muscle. For its 250,000 installed base, Sorcim's SuperCalc is probably the world's least-known package.

Pelkey, an earnest 37-year-old who's been a consultant around the Valley for the past few years, professes amazement at customers who haven't been talked to since they signed OEM contracts with Sorcim years ago. The company is now launching a full-scale corporate accounts marketing and support campaign, beginning with six 500+-unit evaluation contracts signed last month. Ferguson will serve the corporate market with the full range of training, support, training materials, etc., nourishing them just the way mainframe companies do.

Come September [28 in Boston, to be exact], the company will make some product announcements to enhance its position in the spreadsheet business, now redefined by Lotus to include graphics, and by the market to include a closely linked word processor such as SuperWriter. There will also be a new line for genuinely portable computers such as Gavilan's Mobile and the Sharp.

Although Sorcim (of course) doesn't release numbers, it may well be one of the industry's most profitable companies -- an easy feat if you're not spending much on growth. In fact, the company has never done an outside financing. Pelkey is at least thinking of changing that: He's eager to see the growth rate go up -- and willing to see the margins go down, a little, if that's what it takes.

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Congratulations to Jerry Pearlman. The new president of Zenith didn't have to move any further than down the hall to take over. We figure that Pearlman, coming from the computer side of the company although his title was senior vp, finance, is likely to make the company a little more visible in the pc business.

Remember when Tandy opened its 25th Computer Center in 1979? Well, it just announced its 25th telephone store, to open later this year....

IBM tail that wags the dog annexes a haunch. The IBM Personal Computer unit has become a division. Don Estridge, who ran the PC unit, will run the division, which will expand to include the much-upstaged Datamaster and Displaywriter. While this is clearly a coup for the PC forces, it also means that the PC will be under tighter control of and closer contact with the rest of the corporation. To the extent that creativity is necessary in marketing (as it clearly wasn't in technology), this could dampen some of the PC's fire. But to the extent that marketing muscle and IBM's Fortune 10^x presence matter, this shift will only strengthen the PC's sway.

The creditworthy give credit. As Sears, Penney and Bloomingdale's (among others) well know, credit sales cost extra for the seller as well as the buyer — whether you're paying the expenses of the program yourself or simply losing it off the top by using a third-party credit grantor like the three companies mentioned below. The benefit comes in increased product sales that offset the lower margins.

Thus the hottest new thing in the pc market now is credit. Apple and Eagle are offering end-user credit plans to help increase customer loyalty to their products; ComputerLand is offering the same to increase loyalty to its stores. Tightwad Kaypro, by contrast, ships a full 75 percent of its machines to dealers COD. That eases credit problems and gives the company a good handle on sellthrough -- but it doesn't make us too sanguine about the quality of Kaypro's dealer base. [Kaypro went public late in August at a price of $10 (down from a planned $15 to $18); the stock is now trading around $9.]

Commodore bites the hand that advertised it. One of the few unabashedly nice mentions we've made of Commodore concerned its advertising (Dec. 20, 1982). Now we hear that Commodore has just dropped its advertising agency, Ally & Gargano (known also for its Federal Express and MCI commercials), in favor of an unnamed replacement.

Dear Juan & Alice, My Lisa has arrived at last! You can look forward to some terrific graphics as soon as I get it installed. It came in seven boxes: I guess that's the real difference between a desktop and a portable -- the number of pieces, not the number of pounds. [And now, even the printer has arrived and is working fine -- see our issue of September 12.]
Ashton-Tate opens the Vault. Ashton-Tate soon to go public, will have a lot to write about in its prospectus. One of the most interesting deals is its recent acquisition of 20 percent (with an option on to another 30 percent) of Vault Corporation, a 10-person company devoted to software protection using hardware and software keys on a disk. (The scheme, PROLOK™, adds less than a dollar to the cost of a package, peanuts if you're selling business software, and is virtually transparent to the user -- as long as he's got his original disk in place when he tries to run his software, although the software itself may be stored on a hard disk.) Ashton-Tate's aim is to create a standard, and to do so it is going all the way in openness. It is offering to sell shares of its extra 30 percent to other "substantial" software vendors who agree to use the PROLOK™ system.

VisiCalc for the home? You may recall the marketing joke about Tampax, where a little boy spends his 50 cents (it's an old joke) on Tampax because "You can do anything with Tampax: Swim, play ball, go sailing..." In the same way, a businessman might buy VisiCalc to balance books, make forecasts, cut costs...

The customer who buys a PowerPad ($100 list) from Chalk Board Inc. to go with his PC/Peanut, Apple //, Atari or Commodore computer, however, is going to be a lot less disappointed than either the little boy or the businessman. It really does let a child paint, make music, design a golf course, make and break codes, or play BearJam™, although in this case too there's a little snag: The requisite add-on software packages (there are six out now with more to come) cost from $25 to $50 apiece. PowerPad itself is simply a large 12x12-inch touchpad, attractively mounted, with the so-far unique ability to sense multiple (10 fingers, say) touches simultaneously. This lets a player produce musical chords, for example, rather than just single tones, or lets two kids play a game at the same time.

Chalk Board is an Atlanta company formed by the founders of Target, who sold their spreadsheet company to Comshare in 1981. Taking the high-class route, they announced their product only when it was in production -- early this month. The announcement, orchestrated by Miller Communications, the same people who brought you Lotus 1-2-3 and COMPAQ, took place at New York's tony Tavern on the Green, and swarmed not only with press (Parents' This as well as Electronic That) but also with venture capitalists. So far the company has been privately financed, and is just now looking for outside financing to expand production and fund marketing.

Production in time for this Christmas will probably be limited to something under 200,000 PowerPads, with many of them going to K mart, Service Merchandise, Video Concepts, and Pacific Stereo. Softsel, SKU and others will also be distributing the product to stores, although the company would prefer to sell direct. As noted on page 5, PowerPad will also be part of Apple's Apple //e promotion, which should be vigorously marketed this fall.

A gentleman's prerogative... Speaking at the well-attended, informative Alex. Brown software conference earlier this month -- in the lion's den, so to speak -- Software Publishing's Fred Gibbons said "maybe." He bravely confessed that he doesn't think his company is quite ready to go public, and that he'd prefer to wait. "There's still a lot of uncertainty in this business," says he, "and we're not prepared to guarantee the kind of steady quarterly growth people expect of public companies." Some people do make guarantees, and many regret it.
THE TRIUMPH OF CMOS

In recent years the computer and semiconductor industries have affected each other so intimately that neither can be understood without a comprehension of the other. The development of microprocessors at Intel and elsewhere has palsied the profits of the minicomputer industry and spawned a huge market in personal computers. Now an event in the computer industry made possible by new semiconductor technology is casting a similar shadow over semiconductor markets.

That event is the market breakthrough of the TRS-80 Model 100. The first truly portable lap-size computer to capture the public imagination, it essentially fulfills the 1977 prophecy of Alan Kay, then at Xerox, of a notebook-sized computer, with a liquid crystal display and "sufficient storage and speed to support high-level languages and interactive graphics."

Kay predicted that this "personal computer" would play a role comparable to the role of the first printed or "personal" books. His prophetic triumph would be sweeter if he were not now serving as chief scientist at Atari, which let his notebook project slide.

Nonetheless, the Tandy device promises to exert the impact that Kay predicted. First, its immediate success suggests the domination of the low end of the computer market -- from word processors to oscilloscopes -- by lightweight, low-power, battery-capable devices, mostly with liquid crystal displays (LCDs). Just as important, this shift will inevitably enlarge the role in semiconductor markets of CMOS products -- and create a new opening for Japan in the US.

A Japanese Specialty

CMOS (complementary metal oxide semiconductor) combines N-channel and P-channel transistors tied to a single input in each cell. Whether the input is positive or negative, only one transistor can conduct. Thus the device can switch with virtually no current flowing through it and uses about one-tenth the power of N-channel-only systems. And because CMOS systems swing crisply between the high and low voltages of the complementary transistors, they offer clearer "one" and "zero" outputs and require less sensing, latching, and amplification than most other TTL circuits.

Introduced at the 1963 ISSCC by Frank Wanlass and C.T. Sah, then of Fairchild, and first manufactured at RCA, CMOS has since become a specialty of the Japanese, who have refined it for battery-operated consumer products. At the last two ISSCCs, no fewer than five Japanese companies -- but no American firms -- have presented papers on the most advanced current CMOS product, the 64K static RAM, equivalent in complexity to a 256K DRAM. The Japanese have also led the development of large liquid crystal displays.

Thus Tandy's Model 100 and its follow-ons, with their message of accelerated movement to CMOS and LCDs, are not good news for American companies. Most of them have bailed out of LCDs, are relatively weak in CMOS, and fail to understand the new rhythms of the computer industry, now pulsing with the rapid product cycles familiar in consumer items like hand-held calculators.

In coming years, US semiconductor firms may be particularly vulnerable to this shift toward CMOS. The current boom in chips largely springs from the low-end end-user computer systems most affected by the move toward portability. Unless the Americans act decisively, the Model 100 may signal the move of a further segment of chip and computer markets into the laps of the Japanese.
The Nippon Gutenberg  For those who missed it (including, as a measure of the problem, many US semiconductor magnates), the Model 100 is a three-pound lap-sized computer. It comes with a full-sized keyboard, an 8x40 display, and a built-in modem, as well as Microsoft BASIC, word processing and database software in ROM. The 24K RAM (CMOS, of course) version sells for $999.

The nub of the problem -- from our side -- is that although it is a Tandy product, the Model 100 is manufactured by Kyocera and full of Japanese CMOS chips. Its CPU is an Intel-designed 8085 -- made in CMOS by Oki. It is a serious machine, already under consideration, for example, by the Washington Post for distribution to reporters. But its importance stems not so much from its own formidable capabilities as from the stream of products that are following in its train from Japanese companies such as NEC, Sharp and Casio and from American companies critically dependent on Japanese chips and LCDs.

TI and Intel Unprepared  Consider the predicament of Texas Instruments. The leading US semiconductor company and a major force in consumer electronics, it as yet has little advanced CMOS capability despite heavy recent investments. Although its director of research and development is George Heilmeier, the inventor of the liquid crystal display, TI has abandoned its LCD development program. With a one-line display and a maximum 18K of RAM, TI's Compact Computer is more a programmable calculator than a contestant in the portable sweepstakes.

Consider the position of Intel. The dominant force in microprocessors, it has yet to achieve a major CPU in CMOS. It told the ISSCC of a fast static RAM in its CMOS process but failed to deliver. It has proudly launched its 8-bit microcontroller, the 8051, in its new CMOS III technique. But reports from Chrysler, a major early customer, indicate significant problems in meeting the auto firm's specs for input power margins. Although Intel is determined to meet the CMOS challenge, current indications are that most CMOS versions of Intel microprocessors will be manufactured by other companies during these next two years of crucial new designs.

The flaw in Intel's strategy is illustrated by its 188 microprocessor. A national resource as the world's most promising CPU for portables, it combines an 8088 with some 20 support chips on board, for a sevenfold increase in cost performance. Since the 8088 already drives the IBM PC, the IBM compatibles, the TI Professional, the Gavilan Mobile and most of the major Japanese pcs, a CMOS 188 might command a huge market in lighter-weight, lower-power, and lower-cost versions of these estimable machines. But the only company said to be contemplating a CMOS version of the 188 is Oki, which is the world's fastest-growing large semiconductor company over the last two years and the single company that has best defined and executed a small-box CMOS strategy.

Technology-Driven CMOS  One reason for the US lapse is that the CMOS capabilities of most US firms are still unequal to the task of executing such a formidable complex chip as the 188. But a deeper problem is that their view of CMOS is technology-driven rather than market-driven. Ask any leading American semiconductor executive the reasons for the inevitability of CMOS and he will tell you that it is indispensable to overcome the problems of heat dissipation and power warp on complex chips. For example, he will relate how Hewlett-Packard's remarkable 32-bit, 400,000-gate NMOS microprocessor was hobbled by elaborate cooling systems for its power-hungry circuitry. All subsequent 32-bit devices from Hewlett-Packard and other American companies will be made in CMOS.

**Release 1.0, September 22, 1983**
This technological orientation leads the US firms to see CMOS chiefly as a long-term imperative, to be phased into the most advanced and complex parts, rather than an immediate mandate of the marketplace. Yet the lesson of the Model 100 is that the market is moving to CMOS faster than it is moving to 32-bit devices. Components for the majority of the most promising personal computers being designed today will be made in this low-power form. At the moment it appears that the bulk of these chips may be Japanese CMOS versions of prime US designs.

An Opportunity for Startups?

The usual antidote of the US semiconductor industry for the failures of large companies is the emergence of new firms. The CMOS lapse is evoking a considerable flow of entrepreneurial energy and venture funds. But so far the new companies seem too little and too late to meet the immediate Japanese threat. Indeed, their leaders hasten to deny any intention of directly confronting the Japanese. Nonetheless several of the companies offer interesting approaches to the business and the long-run prospect of a US revival in this crucial technology.

Integrated Device Technology

IDT has come a long way since we told its story five months ago (RELase 1.0, March 8, 1983). Its president then was a young process engineer from Hewlett-Packard who in 1978 had been assigned to survey the future of VLSI. Concluding that it was CMOS, and that HP was uninterested, he started IDT in 1979 to make 16K fast static CMOS RAMs. In a moment of enthusiasm last year he predicted annual sales for IDT of some $450 million by the mid-1980s, an estimate which piqued our interest. We were relieved on meeting him, though, when he made no claims to be the reincarnation of Napoleon, or even of Robert Noyce, but rather turned out to be a softspoken, intelligent immigrant from Taiwan named George Hwang, with a powerful vision of a CMOS world.

That vision gave IDT a three-year head start on most of the industry in developing high performance CMOS products. Now Hwang is vice president of engineering and John Carey, a founder of AMD (another firm with little interest in CMOS), is chairman and president. Although conceding some slippage from the $450-million sales projection (there was a recession, after all), Carey also makes heroic claims. Just as Bell Labs, RCA, and GE dominated the age of germanium transistors, and Fairchild, TI and Motorola led in the era of silicon and bipolar ICs, just as Intel, Mostek, AMD and others prevailed in NMOS and PMOS, so the 1980s will be the age of high-speed CMOS and it will be similarly dominated, so Carey says, by Hitachi, Toshiba, Fujitsu, and yes, IDT.

Furthermore, the company even has products. In 1982 it introduced the first and fastest full family of 16K CMOS SRAMs, with 45-nanosecond access times and by-1, by-4, and by-8 organizations — and sold some $4 million worth, mostly to the military. Last month, it offered the same chips in 64K ceramic modules which bear four 16K devices plus an address decoder and decoupling capacitor in leadless chip carriers sealed on the package.

Since the modules are compatible with the 28-pin monolithic 64K SRAMs planned for release next year and are faster at 55 nanoseconds than current Japanese parts, IDT believes that the device will earn design wins for its future products. Finally, the company plans early release of a 16-by-16 digital signal processing multiplier resembling TRW's highly successful part but using one sixth the space and one tenth the power.

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Eschewing design innovation, IDT's aim is to execute the proven NMOS and bipolar designs of others in its well-honed CMOS process. At present it is producing wet-etched 2.5-micron geometries on projection aligners; next year it will move to dry-etched 1.5-micron features on lx steppers. IDT expects to be profitable next quarter and to generate $16 million in sales in the year ending next March.

With $15 million in equity and $8 million in lease and loan guarantees, IDT is a significant presence in the CMOS arena. But its product line reflects the niche orientation of most of the US companies. It fails to meet the small-box challenge of the Japanese and sidesteps the largest impending CMOS markets. Perhaps it will discover them next year. Meanwhile, fierce competition is arising to pay IDT the sincerest form of flattery: a nearly identical strategy.

Sevin Plants a Cypress

The last time L.J. Sevin planted a company it turned out to be Mostek. His decision to become chairman of Cypress Semiconductor would make it a cynosure even if the president were not T.J. Rodgers. The inventor while still at Stanford of the ingenious but ill-fated VMOS process, Rodgers at 34 is now one of the industry's most formidable figures. Even without a fab or a faster RAM, Cypress is already the contestant to beat in the startup CMOS sweepstakes.

Rodgers, who like John Carey hails from CMOS-poor AMD, describes IDT's static RAMs as state of the art and pays IDT the further compliment of cloning them. He plans to produce still faster CMOS products with a 1.3-micron process on top-of-the-line steppers, leapfrogging IDT and the rest of the industry in the next two years by creating, he hopes, the world's most advanced CMOS devices. Like Micron and other aggressive startups, Cypress will automate test & assembly and do it at home.

Although Rodgers denies being spooked by Japan, his strategy, like IDT's but unlike Micron's, avoids direct confrontation. Thus he may miss some of the most profitable and fast-growing CMOS markets in components for low-end computers. Of course, even low-end computers need high-performance silicon on their critical data paths. But as soon as these markets need something, it is no longer a niche; and venture capitalists now throng to niches, if possible ones defended by the full deterrent force of the Pentagon and its buy-American procurement policy.

Rodgers' high-end business plan has already raised $21 million in equity and leases and envisages a second financing of another $21 million. L.J. Sevin believes. So does erstwhile editor of this letter Ben Rosen (no longer connected to it). So do we. Cypress may not grow Apples soon but it should be a CMOS winner.

The Return of Frank Wanlass

There is more to success in semiconductor entrepreneurship, however, than slick credentials and business plans and purchases of advanced steppers to eke out a few hundred angstrom edge in device geometries. There is also genius. Frank Wanlass invented CMOS in 1963, holds the key CMOS patent, created MNOS E-squares in the early 1970s, and founded several forgotten firms (as well as the ruefully memorable Nitron). After running through a lexicon of companies, from Actron to Ultra-Logic, he has now reached Zytrex, alphabetically at least, the end of the line. He has no steppers or fast talk and now concedes he has little talent for business. But he has a genuine innovation: a simplified fast CMOS process using double metal and only eight masks from pads to substrate, compared to around 12 for most of the competition. He also has a certified public accountant to run the company and avoid some of the snarls of the past, and an impressive vp of operations to run the fabs.
Although skepticism abounds in Silicon Valley, Zytrex will be a significant force in the move to CMOS. The company has chosen to apply the new process first to high-speed logic chips that meet standard Schottky speeds of under 10 nanoseconds (nearly twice as fast as prevailing devices) and that markedly lower heat dissipation and power usage in microprocessor-based systems. The Wanlass process also leads Zytrex to promise an array of further products, including a 256K CMOS ROM with a tiny die of under 20,000 square mils, and a CMOS mask-programmable PAL.

Wanlass has always specialized in inviting concepts. But the first product family -- a set of 16 octal-interface circuits -- is already in production for delivery in late August. Using contact printers at the Zytrex facility in Sunnyvale, the company is now ramping up to produce 1.3 million per month of this ubiquitous but low-margin item by early 1984. Then it plans to buy steppers and other new fab equipment and proceed with the more ambitious Wanless devices. Wanless believes his process could impart major benefits to most CMOS designs (though not to the SRAMs of IDT and Cypress). If he is right, the end of the line for Wanless could bring him back into the lead in CMOS for the first time in over 20 years.

**Big Can Still Be Beautiful** Although the established firms face more serious problems than they let on in meeting the new challenges of CMOS, they still dominate the market. The Oedipal scenario offered by IDT and Cypress, which sees the low-power technology as a weapon to fell the previous generation of NMOS companies, stirs the competitive juices and summons investors to battle. But it fails to consider firms such as TI and Motorola that have prospered in all the industry's major product phases for the last quarter century. And it fails to acknowledge firms such as National Semiconductor, RCA, and GE's Intersil that are staking a position on the frontiers of CMOS.

General Electric recently announced a 1.2-micron process that yields laboratory devices running at one gigahertz, with 500-picosecond gate delays. It plans a major entry into high-end CMOS markets, with stress on industrial products. Motorola, the largest producer of CMOS logic, is moving with RCA rapidly to convert the 68000 family to CMOS. And National Semiconductor, the US firm with the broadest range of CMOS products and projects, is introducing the first American 64K CMOS SRAM this fall and is working under a VHSIC contract ending next May on a 64K CMOS SRAM with 20-nanosecond access. National's NSC-800, a Z80 in CMOS, has even gained key design wins in new Japanese portables from Canon and Sanyo.

Nonetheless, the US firms need a clearer strategic focus on the rapidly changing needs of the volatile mass markets in computers. Just as CMOS instantly obsoleted much of the NMOS calculator product line, so the rise of products like the Model 100 will wreak unexpected changes in the computer and instrument businesses. An objective appraisal still shows the Japanese significantly ahead in the relevant technologies. But the appropriate response is not to shy off into niches but to apply the innovative genius of American industry as much to these commercial markets as to the exotic demands of VHSIC. There is no long-run reason why the triumph of CMOS, as it extends the demand for chips into ever broader markets, cannot become a source of strength for the semiconductor industry bestride the largest market of all.
CALENDAR HIGHLIGHTS

[The full calendar begins on page 16.]

September 28 Advertising Women of New York will hold an evening "Inside Industry" symposium on the personal computer and how to sell it. Speakers will include Arthur Einstein of Lord, Geller, Federico, Einstein, advertising agency for the IBM PC; Dave Beckerman, vice president of advertising for Tandy; Joan Trude of Booz Allen; Michele Preston of L.F. Rothschild; and Esther Dyson, editor of RELease 1.0. For information, call Dorothy Wayner at (212) 751-6660.

October 18-20 ADAPSO, the Association of Data Processing Service Organizations, will hold its annual meeting and conference in Palm Springs this year. ADAPSO's Microcomputer Software Association subgroup, the industry's only real trade association, will be particularly active, with several sessions scheduled (integration of micros into other offerings, UNIX, training, marketing, micro-mainframe connections, support, software protection, and an open MCSA meeting) and a substantial number of its 115 members present. Speakers will include William Coggshall of Software Access International, Charles Paparelli of Informatics General, Marion Brown of Digital Research, Jay Hanson of Ashton-Tate, David Solomont of Business and Professional Systems, Rusty Luhring of Ferox Microsystems, Dan Fylstra of VisiCorp, Bill Gates of Microsoft, Karen Orton of National Training Systems, Wayne Rosing of Apple, and of course Esther Dyson of Rosen Research. Call ADAPSO at (703) 522-5055 for information.

November 21-22 Esther Dyson will be the keynote speaker at Robert Fertig's Enterprise Information Forum. The overall subject is pc/micro software strategies, mostly from the Fortune 10x perspective, and the venue is Palm Springs (the very same hotel as ADAPSO). Other speakers include David Cole of Ashton-Tate, Ralph Ungermann of Ungermann-Bass, Umang Gupta of Oracle Corp., Robert Berland of IBM Information Programming Services, Ed Millsap of Applied Data Research, David Britton of Britton-Lee, and Gerald Cohen of Information Builders (Focus). For information, call Liz at EIS at (203) 629-3510.

1984 Rosen Research/L.F. Rothschild Personal Computer Forum This year's Forum will take place in Phoenix February 5 to 8. We'll be sending out registration materials to RELease 1.0 subscribers in October.

Hold this date... IBM will announce the Peanut, a new low-end machine with a

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ANALYSTS' & MANAGERS' CALENDAR
1983

SEPTEMBER 27

SEPTEMBER 26-28

SEPTEMBER 27
Tektronix analysts' meeting - New York City. Call Fletcher Chamberlin, (503) 643-8181.

SEPTEMBER 28

SEPTEMBER 28-30

SEPTEMBER 29-30

SEPTEMBER 29
SIA Forecast Dinner - Santa Clara. Call the Semiconductor Industry Association at (408) 246-1181.

SEPTEMBER 29-OCTOBER 1

OCTOBER 3-4
High-Technology Financing - Arlington, VA. Contact Carol Hertzoff at (212) 687-3177.

OCTOBER 4

OCTOBER 4-6
IBM PC '83 East - Boston. Featuring IBM PCs and Compatibles. Contact Northeast Expositions, (800) 343-2222.

OCTOBER 10-13
Info '83 - New York City. Call (212) 661-8410.

OCTOBER 17-19

OCTOBER 18-19

OCTOBER 18-20
Cherry Hill Test Conference - Philadelphia (not quite Cherry Hill, but close). Sponsored by the IEEE. Call Harry Hayman (301) 589-8142.
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<th>Date</th>
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<th>Contact Information</th>
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<tr>
<td>OCTOBER 18-21</td>
<td>Data Show '83 - Tokyo, Japan. Contact Japan Electronic Industry Development Association, Kikai Shinko Building, 3-5-8 Shibakoen, Minato-ku, Tokyo 105, Japan.</td>
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<td>OCTOBER 19-21</td>
<td>National Software Show - San Francisco. Call Raging Bear Productions at (415) 924-1194.</td>
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<td>OCTOBER 24-27</td>
<td>Comdex Europe - Amsterdam. Call The Interface Group at (617) 449-6600.</td>
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<td>OCTOBER 26-27</td>
<td>Semicon Southwest '83 - Call Susan Castillo at (415) 964-5111.</td>
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<td>OCTOBER 26-NOVEMBER 1</td>
<td>Fourth World Telecommunications Forum - Geneva. Sponsored by the IEEE. Call John Ryan at (201) 949-5813.</td>
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<td>OCTOBER 27</td>
<td>Intel analysts' meeting and cocktails - Palo Alto. Call Jim Jarrett at (408) 987-8080.</td>
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<td>OCTOBER 28</td>
<td>National Semiconductor annual/analysts' meeting - Santa Clara. Call David Dahmen at (408) 721-6033.</td>
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<td>NOVEMBER 1</td>
<td>SofTech Microsystems press conference - New York City. Call Deborah Cromer at (619) 451-1230.</td>
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<td>NOVEMBER 1-3</td>
<td>Electronic Displays '83 - London. Call Network Exhibitions Ltd., 044 (028 02) 5226.</td>
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<td>NOVEMBER 1-3</td>
<td>Federal Office Automation Conference - Washington, D.C. Contact (800) 343-6944 or, in Massachusetts, (617) 358-5356.</td>
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<td>NOVEMBER 2</td>
<td>IBM PC Market and PC Technology Day - Fort Lauderdale. Call Meg Burgess at Future Computing, (214) 783-9375.</td>
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<td>NOVEMBER 3-4</td>
<td>Software Distribution Channels Forum - Fort Lauderdale. Call Meg Burgess at Future Computing, (214) 783-9375.</td>
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NOVEMBER 8–10  SOFTWARE/expo - Wembley, London (UK). Contact Richard Lewis, (800) 621-2134 or, after June 15, (800) 323-5155. (In Illinois, call (312) 263-3131 or (312) 299-3131.)

NOVEMBER 8–10  Wescon/83 and Mini/Micro-West - San Francisco. Contact Lisa Humbert, Electronic Conventions, (800) 421-6816 or (213) 772-2965.


NOVEMBER 13–16  First Boston Corporation Third Annual High Technology Conference - Boston. Contact Sharon Rae, (212) 909-2381.

NOVEMBER 15  Perkin-Elmer analysts' meeting - Norwalk, CT. Call Charles Dayton at (203) 762-1000.


NOVEMBER 29–DECEMBER 1  Global telecommunications Conference - San Diego. Sponsored by the IEEE. Call Estil Hoversten at (714) 457-2340, ext. 1612.

NOVEMBER 29–DECEMBER 2  Comdex/Fall '83 - Las Vegas. Contact Pete Young, The Interface Group, (800) 225-4620 or (617) 879-4502.


DECEMBER 6  NYSSA Microcomputer Seminar - New York City. Sponsored by the New York Society of Security Analysts. Call John McMullen at (914) 245-2734.


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1984

JANUARY 7-10 Winter Consumer Electronics Show - Las Vegas. Call Bill Glasgow at (312) 861-1040.


FEBRUARY 13-16 Cowen & Co. 1984 Electronics Conference - Palo Alto. Contact Susan Ahern, (617) 523-3221. (Invitation only.)


APRIL 4-11 The Hannover Fair. Call (800) 526-5978.

JUNE 3-6 Summer Consumer Electronics Show - Chicago. Call Bill Glasgow at (312) 861-1040.

JUNE 11-13 World Computing Services Industry Congress IV - Tokyo. Contact ADAPSO (co-sponsor) at (703) 522-5055.

JULY 9-12 National Computer Conference - Las Vegas. Sponsored by AFIPS. Call Trudy Riley at (703) 620-8952.

RELease 1.0, September 22, 1983
Two years from now, what will we see? Probably a smattering of tony, high-class stores, many of them flagships for regional satellites who send their customers to the base store for service, training and support. A large number of chains of all varieties, both franchised and owned, each with a slightly different flavor; among them: ComputerLand, Businessland, On Line Microcenters, MicroAge at the high end. A host of home sales outfits, stressing children's education and home training. Occasional single-unit locals who eventually join one of the other categories, or disappear. And then there will be Sears, Tandy, and the other offshoots of big retailers. We don't expect to see much of DEC or Xerox.

So long, Mom & Pop!

**QUESTION:** WHAT MAKES A '10' COMPUTER STORE?

**ANSWER:** A '5' THAT HAS BOUGHT OUT ALL ITS COMPETITION.