

THE BIRTH OF THE NOTEBOOK

Mobile PC takes you on the strange and harrowing journey to the origins of portable computing



History has a way of reinventing itself. Like Michael Jackson, the past makes strange and sometimes hideous transformations — and, as with Jacko, it's not always easy to figure out what exactly happened.

Who invented the telephone? Was it Alexander Graham Bell or Elisha Gray? The Wright brothers made the first flight in a passenger plane, but what about Otto Lilienthal, whose gliders influenced the brothers in their quest? From the game of chess to the pinball machine to the fortune cookie, the birth of countless famous products is a matter for debate.

And so it is with the portable computer. Who's responsible for pioneering the biggest shift in PC technology since the punch card gave way to the magnetic disk?

It depends on whom you ask.

YOU KNOW, FOR KIDS

The notion of portable computing dates back to the early days of computing itself. Pioneering nerds may not have had Starbucks tables to occupy with their PowerBooks for hours on end, but toiling away over punch cards in a dreary back room never had much appeal. Not surprisingly, the prospect of taking your computer home so that you could work in a more relaxed atmosphere was always enticing.

The problem: In the 1950s and '60s, computers were so big that they came built into tables and bookshelf units.

In 1968, Xerox PARC's Alan Kay came up with a bold idea: Saw those legs off the table and shrink the computer down to more manageable chunks that could be stitched together and tucked under your arm. His Dynabook was originally envisioned as a computer for children. Inspired by the design of a regular hardback book, the Dynabook featured a flat-panel display, wireless connectivity, and the full capabilities of a

modern computer. Oh, and it weighed 2 pounds.

The only catch was that the Dynabook didn't exist. The technology it required simply hadn't been invented yet. At the time, only primitive LCD and plasma displays were being tinkered with, and the technology for one wireless modem took up half of an Econoline van.

The closest Kay ever got to building the Dynabook was a cardboard mock-up filled with lead pellets.

THE MINIATURE MAINFRAME

One of the factors keeping Xerox from working on the Dynabook was the market, which at the time could be summed up in one word: IBM. The computing giant had swallowed an astonishing 81-percent share of the computer market by 1961, quashing competitive innovation for years to come.

In the 1970s, Xerox was working on its Alto line (the revolutionary machine from which Apple would steal its graphical user interface and mouse), but the company shied away from a portable, mainly because no one else was doing it. "If mobile was so important," says Kay, "why wasn't IBM doing it? Of course, by the time IBM got around to doing what they called the portable computer, they did it very badly, and it set things back quite a few years."

By 1975, IBM finally got around to it. The company's first effort has largely been forgotten, but the IBM 5100 Portable Computer **1** stands as — technically — the first mobile PC. Mobile, that is, if you consider a 50-pound machine mobile. But the 5100 was still way ahead of its time: Only six or seven years earlier its 64KB of storage, integrated tape drive, and optional printer would have weighed about 1,000 pounds.

Sticklers agree: The 5100 represents the first production portable computer. So does the Smithsonian, where a prototype now resides.

13 CRITICAL MACHINES

These portables represent some of the most crucial turning points in mobile computing

1975 IBM 5100 Portable Computer

The first computer with a built-in display, this 50-pound monster was swept under the rug after the PC came out in 1981.

Introduced: 1975	Discontinued: 1982
\$8,975 to \$19,975	50 pounds
5-inch monochrome CRT	
16KB to 64KB of main storage	
1/4-inch tape drive	



1982 GRiD Compass 1100

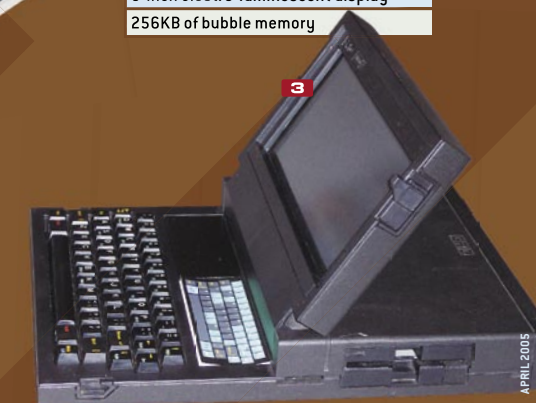
The first mobile computer with a folding screen, the GRiD Compass was a coveted survivor for more than a decade.

Introduced: 1982	Discontinued: 1992
\$8,150	8 pounds
6-inch electro-luminescent display	
256KB of bubble memory	

1981 Osborne 1

Adam Osborne's labor of love was an overnight success ... and an overnight failure. Today it is remembered fondly as a pioneer in portability.

Introduced: 1981	Discontinued: 1983
\$1,795	24.5 pounds
5-inch monochrome CRT	
64KB of RAM	
Dual 5.25-inch floppy drives	



PORTABLE PIONEERS

By 1980, the personal computing market was about to take off. Working independently, three separate companies were formed, each with the goal of providing the first truly portable computer. These companies — none of which are still with us — form the canonical “big three” of early portables, and each of their flagship products is an essential machine in the history of portable computing.

First there’s the strange and sad case of Osborne Computer, which has become part of technology legend: Osborne shipped its first machine in July 1981 and was bankrupt by the end of 1983. Computing pioneer Adam Osborne, operating under the mantra “Adequacy is sufficient; everything else is irrelevant,” sought to produce not just a truly portable computer, but one that the masses could afford.

Inspired by the IBM 5100 and Xerox’s Notetaker — a 48-pound machine with a keyboard that folded over the display — Osborne’s eponymous computer was cobbled together from the cheapest parts he could find. The Osborne 1 **2** hit the market at \$1,795, with dual floppy drives and a 5-inch CRT. Flip the keyboard over the front, latch it on, and your 24.5-pound computer was ready to go wherever you needed it. Osborne had amazing success with the product, but it was fatally crushed by the birth of Compaq in 1983, which copied the Osborne carefully while adding one killer feature: IBM compatibility.

A more enduring contribution to the field was made by GRiD Systems, which was founded in 1980 by John Ellenby, who, like Alan Kay, was a researcher at Xerox PARC. Ellenby envisioned a portable computer, he says, “principally for mid- to senior-level managers to be able to work anywhere they were needed.” The company’s premiere product was the GRiD Compass 1100 **3**, the first ever to introduce a

semiclamshell design, with a screen that could fold down over the system.

Ellenby recounts the innumerable challenges the Compass faced in getting to market, which finally occurred by 1982: Large flat panels and miniature modems still didn’t exist; GRiD was developing its own graphical operating system from scratch; and heat was a major problem. And then there was the issue of the target weight: 8 pounds, the mass the company determined a human being was “just able to tolerate.”

Ellenby recruited design expert Bill Moggridge to help fit all his ideas into a single case. Moggridge designed the machine to fit in “half a briefcase,” including a display that folded down from the middle of the machine and a leg on the underside that propped it all up for comfortable typing. The design was so popular that GRiD licensed it to other portable manufacturers.

Among the 43 innovations in the Compass were the electro-luminescent display, a low-profile keyboard, and the appearance of bubble memory, an ancient forerunner to flash memory. It was also the most rugged device of its era, with a case built from magnesium for strength and to help with heat dispersal. Moggridge knew that the Compass would have to be delivered via courier, so he shipped an impact-measurement device via a then-startup company called Federal Express to determine how tough it would need to be to survive the trip. As a result, a Compass can withstand a blow of a whopping 60 g’s of force.

GRiD’s biggest problem was its price: \$8,150 is a lot today and, at the time, says Moggridge, “it was an incredible amount of money.” But an unforeseen dilemma arose when GRiD approached its target market. “Executives who could pay that kind of amount weren’t used to doing anything themselves, especially with a typewriter,” says Moggridge. Ultimately, sales were strong, but the product never took off

the way it was hoped. GRiD was eventually bought by Tandy in 1989 and vanished into the maw of Radio Shack.

Nearly a footnote in the holy trinity of portables is Gavilan Computer **4**, which introduced a GRiD-like computer — the SC — with a couple of big firsts: an internal floppy drive and a primitive touch pad. The company toiled for almost five years to get its computer to market; by 1983, the SC was released to a disenchanting audience. Plagued with problems, the product and the company quickly died. As *Byte* magazine noted, “In 1984, a Gavilan executive announced, ‘The microcomputer industry is entering a new chapter — Chapter 11.’”

THE FIRST LAPTOP

In this same era, a new class of low-cost, low-power computers was born. Epson’s HX-20 **4**, introduced in 1982, was the first computer described as a “laptop.” These were tiny machines designed to be propped in your lap instead of used on a desk. The HX-20 tipped the scales at barely 3 pounds, and it included a built-in tape drive and a tiny printer. Best of all, unlike its bigger forebears, this machine could run on batteries: The HX-20 had an impressive 50 hours of life on its rechargeable nickel-cadmium cells.

The success of products like the HX-20 and the TRS-80 Model 100, which followed in 1983, was phenomenal. Epson sold a quarter million HX-20s, and the laptop moniker stuck in many circles, even after the industry had long since abandoned this limited form factor.

The only problem with laptops was performance. With such a small screen and limited power (16KB of RAM didn’t get you far, even in 1982), there just wasn’t much you could do with them. By the mid-1980s, the dominance of the IBM PC platform led the mobile computing world in an entirely new direction.

THE IBM CONNECTION

It’s impossible to understate the importance of the IBM PC, introduced to the world in 1981. Finally, wireheads could get a relatively affordable machine (at \$1,565) with standard hardware and an operating system the industry would come both to adore and to hate: MS-DOS. *Time* named the PC “man of the year” a few months later. Microsoft’s shrewd decision to retain the rights to MS-DOS launched the PC revolution, as other companies could now get in on the action, leading at long last to a standardized computing environment.

And so it wasn’t long before the clones started to arrive, but the first and most important came from Compaq, a scrappy little company formed in a Houston pie shop by three former Texas Instruments employees. The idea was elusively simple: Do something that would be compatible with the IBM PC but that wouldn’t compete directly with it. The possibility of a smaller, portable version of the PC immediately sprung to mind, and the team fleshed out the company’s first product on a place mat. This idea led to the company’s name — Compaq being a variation on the word “compact.”

Announced at Comdex in 1982, the 28-pound Compaq Portable **5** (affectionately referred to as a “luggable”) was somewhat bigger than the Osborne and far more expensive (at \$3,590), but its 9-inch CRT put the earlier system to shame. The real key, of course, was compatibility: If a program would run on an IBM, it would run on the Compaq. Compaq made that happen by painstakingly reverse-engineering the PC’s BIOS, which took its engineers a year to complete.

Compaq’s runaway success is legendary: The company sold \$112 million worth of Portables in its first year, and it consistently set U.S. business records for growth throughout the 1980s, eventually becoming one of the industry’s strongest leaders until it was bought out by HP in 2002.

13 CRITICAL MACHINES



1983 Gavilan SC

An early form of touch pad (that’s it between the keyboard and the screen) made the Gavilan a pioneer. Alas, bankruptcy came calling inside of a year.

Introduced: 1983	Discontinued: 1984
\$3,995	9.9 pounds
400 x 64-pixel monochrome LCD	
32KB to 128KB of RAM	
Proprietary floppy drive	

1982 Epson HX-20

The world’s first “laptop,” designed as a slate with no folding display.

Introduced: 1982	Discontinued: 1992
\$1,795	3.5 pounds
120 x 32-pixel monochrome LCD	
16KB of RAM, 32KB of ROM	
Optional microcassette drive	



1983 Compaq Portable

The first 100-percent compatible IBM PC clone, the “luggable” and its successors were business standbys for years.

Introduced: 1983	Discontinued: 1986
\$3,590	28 pounds
9-inch monochrome CRT	
128KB to 640KB of RAM	
Dual 5.25-inch floppy drives	

1984 Commodore SX-64

The first color portable computer, the “Executive” had a 5-inch color TV built into the case. Commodore SX-64s are still prized collectables.

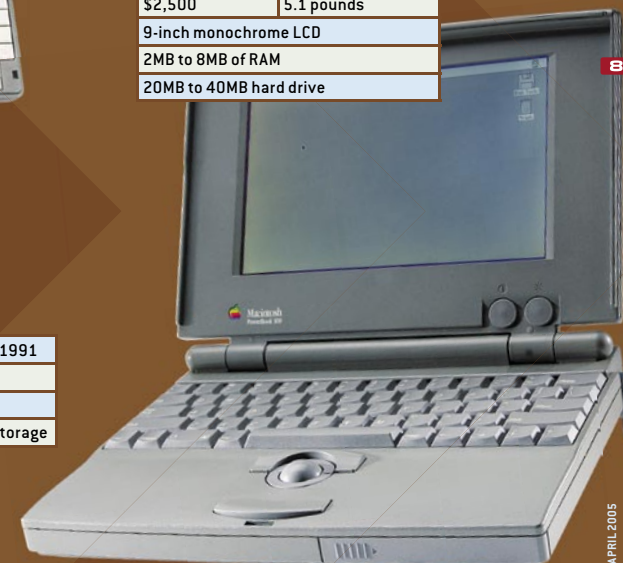
Introduced: 1984	Discontinued: 1986
\$995	23 pounds
5-inch color CRT	
64KB of RAM	
5.25-inch floppy drive	



1991 Apple PowerBook 100

The keyboard should be to the rear of the notebook and the track ball up front? You don’t say! This design has been the standard for nearly 15 years.

Introduced: 1991	Discontinued: 1992
\$2,500	5.1 pounds
9-inch monochrome LCD	
2MB to 8MB of RAM	
20MB to 40MB hard drive	



1989 NEC UltraLite

The first true notebook, the original UltraLite had no hard drive; instead it used solid-state storage with no moving parts.

Introduced: 1989	Discontinued: 1991
\$4,000	4.4 pounds
9.3-inch monochrome LCD	
640KB of RAM, 2MB of solid state storage	

THE FIRST NOTEBOOK

It wasn't until 1989 that someone had the bright idea that the power of a luggable and the portability of a laptop didn't have to be mutually exclusive. Thanks to miniature parts and new LCD flat-panel screens, you could finally have both.

The NEC UltraLite **7** was the first true clamshell-style machine, with a hinge at the back instead of the middle — the way it folded in half spawned the term *notebook computer*. The UltraLite was more than just a creative design, though; it also contained some impressive innovations.

For starters, there was no hard drive: The UltraLite had no moving parts, with storage contained on a solid-state memory card. NEC even threw Lotus 1-2-3 into ROM and included an early type of PC Card slot for loading additional programs.

While Zenith also had a notebook around this time, it was quite a bit heavier, had less storage space, and offered a slower modem. The UltraLite might have become a major hit, but its lack of a floppy drive, \$4,000 price tag, and a number of production delays made the UltraLite little more than a fond memory in computing history. (NEC also has the honor of claiming one of the industry's most boneheaded moves: It dropped the UltraLite name in favor of "Versa," and *ultralight* quickly became a generic term for small notebooks.)

THE RISE OF THINKPAD

By all accounts, IBM's portable endeavors leading up to the early 1990s were a joke. Heavy, underpowered, and just plain broken, IBM portables were in the curious position of having the platform that everyone wanted to emulate with hardware that was half-assed at best.

By 1990, portable computers were a \$5.4 billion market, and the future couldn't have looked brighter. After 15 years of making shoddy portables (see "The Worst Notebooks of All

Time," at right), IBM figured it ought to get its act together. When it did, no one could have expected the degree to which it would quickly dominate the market.

The IBM ThinkPad was the product of a kind of skunk works team that was considerably isolated from the rest of the company. What that group came up with in 1992 made observers' heads spin: A black notebook, when IBM's identity at the time was stark white? A funky nubbin in the center of the keyboard instead of a mouse — colored red, the universal symbol for *error*? And was anyone supposed to take a portable from IBM seriously after so many flubs?

Hell, yes. The ThinkPad 700C **9** ripped apart what everyone had come to expect from notebook computers. The centerpiece: A gargantuan 10.4-inch LCD (an inch and a half bigger than any of the competition's, and in color). Nothing compared to the 700C, and IBM soon found itself years ahead of the rest of the industry.

ThinkPads became the hottest item in tech, so coveted that the company had to ship them in plain brown boxes, because anything with the IBM logo was being stolen from warehouse loading docks in the hopes of getting a ThinkPad. Until the ThinkPad division was sold to Lenovo in 2004, the company sold over 20 million units.

APPLE GETS IN THE GAME

ThinkPads were red hot, but IBM was still a corporate brand for corporate users. College kids and aspiring hackers wanted portables, too: They bought the Apple PowerBook.

Apple had just come off one of the worst beatings in computer history: The Newton had bombed miserably, and the 16-pound Macintosh Portable (see "The Worst Notebooks of All Time") was a laughingstock of computing.

Apple rebounded from both. Apple designer David Levy, who worked on the groundbreaking 1991 Apple PowerBook

100, notes, "The Macintosh Portable was a black eye for the company. We were Apple! There was lots of pressure to do something that set the world straight on Apple's ability to design a great product. And we did."

The Apple PowerBook 100 **8** spawned countless innovations, the most notable being moving the keyboard to the back of the machine and making room for a trackball front and center. In 1995, the PowerBook 500 **10** offered the first true touch pad, expansion bay, PC Card slot, and more. But it was the PowerBook 500's curvy case that really turned heads, proving that portable computers needn't look like shoe boxes any more.

In its early '90s heyday, the PowerBook owned a crushing 40 percent of the portable computing market, until the rest of the industry figured out how to do the same thing, only cheaper.

THE LATE '90S AND BEYOND

The PowerBook 500 remains the last machine of critical importance before the modern era. By the late '90s, the notebook formula had pretty much been worked out, and vendors took their eyes off of outrageous new designs and focused on trimming weight while adding power and features such as internal optical drives, bigger screens, and longer battery life.

Noteworthy machines include the 1999 Sony Vaio C1 Picturebook, which was the first to include a built-in camera, and the Sharp RD3D, released in 2003, which pioneered a primitive 3D display. Last year's OQO Model 01 **11** took computing in yet another new direction, with the first fully functional Windows XP machine that weighed less than a pound.

So where do we go from here? Computing seems to be nearing a terminal weight and size — any littler and you won't be able to punch the buttons. How could they get any smaller?

Erk, never mind. We all know what happened the last time we said that. ☹

THE WORST NOTEBOOKS OF ALL TIME

Lapflops? Craptops? Jokebooks? Whatever you call them, these were some of the world's most disastrous mobile PCs ever unleashed

Data General DG/One, 1984

The 12-inch LCD was phenomenally large for its day, if only you could actually read the text on it.



Osborne Executive, 1984

How do you sink your company? Announce a next-generation product but don't ship it for another year, leading everyone to cancel their orders on the first-generation product. Without any cash coming in, Osborne rapidly went bankrupt, barely getting the Executive to market at all.



IBM PC Convertible, 1986

Looks like a cash register, doesn't it? This was IBM's final, monumental disaster before getting the ThinkPad project under way.



Apple Macintosh Portable, 1989

Apple's first foray into mobile computing was an unmitigated catastrophe, namely because this 16-pound behemoth cost a whopping \$7,300. Apple quickly buried it and launched the svelte and successful PowerBook in its place.



Compaq Concerto, 1993

Consumers weren't ready for a pen tablet with a removable keyboard, and neither was Compaq: From a design standpoint this machine is a train wreck.



IBM ThinkPad 701C, 1995

IBM's breathtaking "Butterfly" keyboard design won raves from the press, but no one bought the freaky machine. The product was obsolete at introduction and was ultimately a disaster for the company.



Liebermann Hollywood Gold, 2004

Books could be written about Liebermann (aka Go-L Computers), which promised notebooks with unheard-of benchmarks, and prices to match. Turns out it was all a big lie: The computers never existed. Liebermann even tried to sue our sister magazine *Maximum PC* when it wrote a story about Liebermann.



13 CRITICAL MACHINES



1994 Apple PowerBook 500

The 500 offered the world's first true touch pad on a notebook, not to mention a handful of other innovations that set the stage for a decade of portable computing.

Introduced: 1994	Discontinued: 1995
\$4,839	7.3 pounds
9.5-inch active-matrix color LCD	
8MB to 40MB of RAM	
160MB to 500MB hard drive, internal floppy drive	



1999 Sony Vaio C1 Picturebook

Sony's team of miniaturizers got the industry thinking about ultrathin notebooks, including this machine, which included a built-in camera.

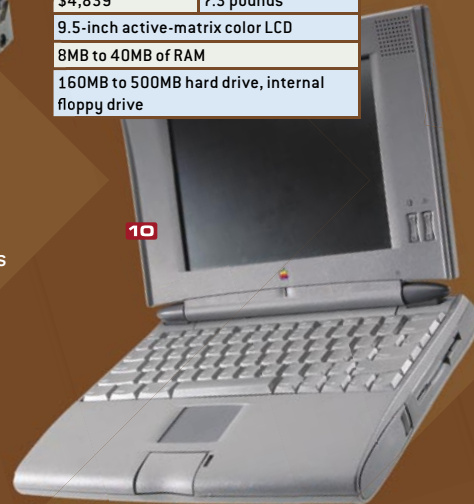
Introduced: 1999	Discontinued: 2003
\$2,300	2.5 pounds
8.9-inch color TFT	
64MB to 128MB of RAM	
4.3GB hard drive	



2004 OQO Model 01

The smallest self-contained PC ever built, the OQO hints at a future where technology literally goes anywhere you do.

Introduced: 2004	Discontinued: NA
\$1,999	0.9 pounds
5-inch touch-screen color TFT	
256MB of RAM	
20GB hard drive	



1992 IBM ThinkPad 700C

The birth of the IBM revolution. It could have been a disaster: The TrackPoint's early names were "Pogo Stick" and "Whiskers" (instead of "mouse," get it?), according to the book *ThinkPad: A Different Shade of Blue*.

Introduced: 1992	Discontinued: 1994
\$4,350	7.6 pounds
10.4-inch color LCD	
4MB of RAM	
80MB hard drive	