# Top 20 computer systems in the World

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From soldering irons to SparcStations, from MITS to Macintosh, personal computers have evolved from do-it-yourself kits for electronic hobbyists into machines that practically leap out of the box and set themselves up. What enabled them to get from there to here? Innovation and determination. Here are top 20 systems that made that rapid evolution possible.

**MITS Altair 8800**

There once was a time when you could buy a top-of-the-line computer for $395. The only catch was that you had to build it yourself. Although the Altair 8800 wasn’t actually the first personal computer (Scelbi Computer Consulting`s 8008-based Scelbi-8H kit probably took that honor in 1973), it grabbed attention. MITS sold 2000 of them in 1975 - more than any single computer before it.

Based on Intel`s 8-bit 8080 processor, the Altair 8800 kit included 256 bytes of memory (upgradable, of course) and a toggle-switch-and-LED front panel. For amenities such as keyboard, video terminals, and storage devices, you had to go to one of the companies that sprang up to support the Altair with expansion cards. In 1975, MITS offered 4- and 8-KB Altair versions of BASIC, the first product developed by Bill Gates` and Paul Allen`s new company, Microsoft.

If the personal computer hobbyists movement was simmering, 1975 saw it come to a boil with the introduction of the Altair 8800.

**Apple II**

Those of you who think of the IBM PC as the quintessential business computers may be in for a surprise: The Apple II (together with VisiCalc) was what really made people to look at personal computers as business tools, not just toys.

The Apple II debuted at the first West Coast Computer Fair in San Francisco in 1977. With built-in keyboard, graphics display, eight readily accessible expansion slots, and BASIC built-into ROM, the Apple II was actually easy to use. Some of its innovations, like built-in high-resolution color graphics and a high-level language with graphics commands, are still extraordinary features in desk top machines.

With a 6502 CPU, 16 KB of RAM, a 16-KB ROM, a cassette interface that never really worked well (most Apple It ended up with the floppy drive the was announced in 1978), and color graphics, the Apple II sold for $1298.

**Commondore PET**

Also introduced at the first West Coast Computer Fair, Commondore`s PET (Personal Electronic Transactor) started a long line of expensive personal computers that brought computers to the masses. (The VIC-20 that followed was the first computer to sell 1 million units, and the Commondore 64 after that was the first to offer a whopping 64 KB of memory.)

The keyboard and small monochrome display both fit in the same one-piece unit. Like the Apple II, the PET ran on MOS Technology’s 6502. Its $795 price, key to the Pet’s popularity supplied only 4 KB of RAM but included a built-in cassette tape drive for data storage and 8-KB version of Microsoft BASIC in its 14-KB ROM.

**Radio Shack TRS-80**

Remember the Trash 80? Sold at local Radio Shack stores in your choice of color (Mercedes Silver), the TRS-80 was the first ready-to-go computer to use Zilog`s Z80 processor.

The base unit was essentially a thick keyboard with 4 KB of RAM and 4 KB of ROM (which included BASIC). An optional expansion box that connected by ribbon cable allowed for memory expansion. A Pink Pearl eraser was standard equipment to keep those ribbon cable connections clean.

Much of the first software for this system was distributed on audiocassettes played in from Radio Shack cassette recorders.

**Osborne 1 Portable**

By the end of the 1970s, garage start-ups were pass. Fortunately there were other entrepreneurial possibilities. Take Adam Osborne, for example. He sold Osborne Books to McGraw-Hill and started Osborne Computer. Its first product, the 24-pound Osborne 1 Portable, boasted a low price of $1795.

More important, Osborne established the practice of bundling software - in spades. The Osborne 1 came with nearly $1500 worth of programs: WordStar, SuperCalc, BASIC, and a slew of CP/M utilities.

Business was looking good until Osborne preannounced its next version while sitting on a warehouse full of Osborne 1S. Oops. Reorganization under Chapter 11 followed soon thereafter.

**Xerox Star**

This is the system that launched a thousand innovations in 1981. The work of some of the best people at Xerox PARC (Palo Alto Research Center) went into it. Several of these - the mouse and a desktop GUI with icons - showed up two years later in Apple`s Lisa and Macintosh computers. The Star wasn’t what you would call a commercial success, however. The main problem seemed to be how much it cost. It would be nice to believe that someone shifted a decimal point somewhere: The pricing started at $50,000.

**IBM PC**

Irony of ironies that someone at mainframe-centric IBM recognized the business potential in personal computers. The result was in 1981 landmark announcement of the IBM PC. Thanks to an open architecture, IBM’s clout, and Lotus 1-2-3 (announced one year later), the PC and its progeny made business micros legitimate and transformed the personal computer world.

The PC used Intel`s 16-bit 8088, and for $3000, it came with 64 KB of RAM and a 51/4-inch floppy drive. The printer adapter and monochrome monitor were extras, as was the color graphics adapter.

**Compaq Portable**

Compaq’s Portable almost single-handedly created the PC clone market. Although that was about all you could do with it single-handedly - it weighed a ton. Columbia Data Products just preceded Compaq that year with the first true IBM PC clone but didn’t survive. It was Compaq’s quickly gained reputation for engineering and quality, and its essentially 100 percent IBM compatibility (reverse-engineering, of course), that legitimized the clone market. But was it really designed on a napkin?

**Radio Shack TRS-80 Model 100**

Years before PC-compatible subnotebook computers, Radio Shack came out with a book-size portable with a combination of features, battery life, weight, and price that is still unbeatable. (Of course, the Z80-based Model 100 didn’t have to run Windows.)

The $800 Model 100 had only an 8-row by 40-column reflective LCD (large at the time) but supplied ROM-based applications (including text editor, communications program, and BASIC interpreter), a built-in modem, I/O ports, nonvolatile RAM, and a great keyboard. Wieghing under 4 pounds, and with a battery life measured in weeks (on four AA batteries), the Model 100 quickly became the first popular laptop, especially among journalists.

With its battery-backed RAM, the Model 100 was always in standby mode, ready to take notes, write a report, or go on-line. NEC`s PC 8201 was essentially the same Kyocera-manufectured system.

**Apple Macintosh**

Whether you saw it as a seductive invitation to personal computing or a cop-out to wimps who were afraid of a command line, Apple`s Macintosh and its GUI generated even more excitement than the IBM PC. Apple`s R&D people were inspired by critical ideas from Xerox PARK (and practiced on Apple`s Lisa) but added many of their own ideas to create a polished product that changed the way people use computers.

The original Macintosh used Motorola’s 16-bit 68000 microprocessor. At $2495, the system offered a built-in-high-resolution monochrome display, the Mac OS, and a single-button mouse. With only 128 KB of RAM, the Mac was underpowered at first. But Apple included some key applications that made the Macintosh immediately useful. (It was MacPaint that finally showed people what a mouse is good for.)

**IBM AT**

George Orwell didn’t foresee the AT in 1984. Maybe it was because Big Blue, not Big Brother, was playing its cards close to its chest. The IBM AT set new standards for performance and storage capacity. Intel`s blazingly fast 286 CPU running at 6 MHz and 16-bit bus structure gave the AT several times the performance of previous IBM systems. Hard drive capacity doubled from 10 MB to 20 MB (41 MB if you installed two drives - just donut ask how they did the math), and the cost per megabyte dropped dramatically.

New 16-bit expansion slots meant new (and faster) expansion cards but maintained downward compatibility with old 8-bit cards. These hardware changes and new high-density 1.2-MB floppy drives meant a new version of PC-DOS (the dreaded 3.0).

The price for an AT with 512 KB of RAM, a serial/parallel adapter, a high-density floppy drive, and a 20-MB hard drive was well over $5000 - but much less than what the pundits expected.

**Commondore Amiga 1000**

The Amiga introduced the world to multimedia. Although it cost only $1200, the 68000-based Amiga 1000 did graphics, sound, and video well enough that many broadcast professionals adopted it for special effects. Its sophisticated multimedia hardware design was complex for a personal computer, as was its multitasking, windowing OS.

**Compaq Deskrpo 386**

While IBM was busy developing (would “wasting time on” be a better phrase?) proprietary Micro Channel PS/2 system, clone vendors ALR and Compaq wrestled away control of the x86 architecture and introduced the first 386-based systems, the Access 386 and Deskpro 386. Both systems maintained backward compatibility with the 286-based AT.

Compaq’s Deskpro 386 had a further performance innovation in its Flex bus architecture. Compaq split the x86 external bus into two separate buses: a high-speed local bus to support memory chips fast enough for the 16-MHz 386, and a slower I/O bus that supported existing expansion cards.

**Apple Macintosh II**

When you first looked at the Macintosh II, you may have said, “But it looks just like a PC. ”You would have been right. Apple decided it was wiser to give users a case they could open so they could upgrade it themselves. The monitor in its 68020-powered machine was a separate unit that typically sat on top of the CPU case.

**Next Nextstation**

UNIX had never been easy to use , and only now, 10 years later, are we getting back to that level. Unfortunately, Steve Job’s cube never developed the software base it needed for long-term survival. Nonetheless, it survived as an inspiration for future workstations.

Priced at less than $10,000, the elegant Nextstation came with a 25-MHz 68030 CPU, a 68882 FPU, 8 MB of RAM, and the first commercial magneto-optical drive (256-MB capacity). It also had a built-in DSP (digital signal processor). The programming language  was object-oriented C, and the OS was a version of UNIX, sugarcoated with a consistent GUI that rivaled Apple`s.

**NEC UltraLite**

Necks UltraLite is the portable that put *subnotebook* into the lexicon. Like Radio Shack’s TRS-80 Model 100, the UltraLite was a 4-pounder ahead of its time. Unlike the Model 100, it was expensive (starting price, $2999), but it could run MS-DOS. (The burden of running Windows wasn’t yet thrust upon its shoulders.)

Fans liked the 4.4-pound UltraLite for its trim size and portability, but  it really needed one of today’s tiny hard drives. It used battery-backed DRAM (1 MB, expandable to 2 MB) for storage, with ROM-based Traveling Software’s LapLink to move stored data to a desk top PC.

Foreshadowing PCMCIA, the UltraLite had a socket that accepted credit-card-size ROM cards holding popular applications like WordPerfect or Lotus 1-2-3, or a battery-backed 256-KB RAM card.

**Sun SparcStation 1**

It wasn’t the first RISK workstation, nor even the first Sun system to use Sun’s new SPARC chip. But the SparcStation 1 set a new standard for price/performance, churning out 12.5 MIPS at a starting price of only $8995 - about what you might spend for a fully configured Macintosh. Sun sold lots of systems and made the words *SparcStation* and *workstation* synonymous in many peoples minds.

The SparcStation 1 also introduced S-Bus, Sun’s proprietary 32-bit synchronous bus, which ran at the same 20-MHz speed as the CPU.

**IBM RS/6000**

Sometimes, when IBM decides to do something, it does it right.(Other times... Well, remember the PC jr.?)The RS/6000 allowed IBM to enter the workstation market. The RS/6000`s RISK processor chip set (RIOS) racked up speed records and introduced many to term *suprscalar*. But its price was more than competitive. IBM pushed third-party software support, and as a result, many desktop publishing, CAD, and scientific applications ported to the RS/6000, running under AIX, IBM’s UNIX.

A shrunken version of the multichip RS/6000 architecture serves as the basis for the single-chip PowerPC, the non-x86-compatible processor with the best chance of competing with Intel.

**Apple Power Macintosh**

Not many companies have made the transition from CISC to RISK this well. The Power Macintosh represents Apple`s well-planned and successful leap to bridge two disparate hardware platforms. Older Macs run Motorola’s 680x0 CISK line, which is running out of steam; the Power Macs run existing 680x0-based applications yet provide Power PC performance, a combination that sold over a million systems in a year.

**IBM ThinkPad 701C**

It is not often anymore that a new computer inspires gee-whiz sentiment, but IBM’s Butterfly subnotebook does, with its marvelous expanding keyboard. The 701C`s two-part keyboard solves the last major piece in the puzzle of building of usable subnotebook: how to provide comfortable touch-typing.(OK, so the floppy drive is sill external.)

With a full-size keyboard and a 10.4-inch screen, the 4.5-pound 701C compares favorably with full-size notebooks. Battery life is good, too.

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