

# A Concise History of the Quartz Watch Revolution

In the watch world, the 1970s changed everything.

By Joe Thompson

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Source: Hodinkee

The first salvo of the quartz watch revolution was fired in the last week of the 1960s. On December 25, in Tokyo, Seiko introduced the Astron, the world's first quartz wristwatch. It was a limited edition of 100 gold-case watches, priced at ¥450,000, equivalent then to the cost of a Toyota Corolla. Its battery-powered movement featured a quartz oscillator with a frequency of 8,192 Hz, accurate to within five seconds a day.

Astron was the shot heard round the watch world. But it took a while for the revolutionaries to start really storming the barricades. Seiko and other pioneering watch producers (a few Swiss brands unveiled quartz analogs at the 1970 Basel Fair) needed time to perfect the new technology and begin producing watches in volume. Seiko, for example, didn't introduce more Astrons until 1971.



*The original Seiko Astron. Source: Hodinkee*



*The Seiko caliber 35A, as used in the 1969 Astron. Source: Wikipedia*

It was digital watches, not analogs, that created the first big fuss of the quartz era. In April 1972, Hamilton Watch Co., of Lancaster, PA, unveiled the world's first digital watch, the Pulsar. The watch had a gold case, a \$2,100 price tag, and an LED (light-emitting diode) display that lit up to show the time in digits at the push of a button on the case. Unlike analog quartz watches, which had a conventional dial and hands, digitals were totally electronic, with no moving parts at all.



The Hamilton Pulsar P2, the mass produced version of the gold P1 – good enough for James Bond, in 1973 (as worn by Roger Moore in "Live And Let Die").  
Source: Hodinkee

Technically, the LED had drawbacks. You needed to use two hands to tell the time (one for the watch, the other to press the button that illuminated the display) and the light put a tremendous drain on the battery. In 1973, Seiko and others introduced LCD (liquid crystal display) digital watches which displayed the time continuously. Some early LCDs, however, could be hard to read.

Despite its drawbacks, Pulsar was a hit. In the first phase of the quartz revolution, digitals were more popular than analogs, and LEDs were more popular than LCDs.

Demand for LEDs got a big boost in 1974 when National Semiconductor entered the market with one priced at \$125, half that of the competition. With that, American electronics firms stampeded into the watch market. In 1975, there were more than 50 semiconductor companies (Motorola, Hughes, Fairchild, Intel's Microma, Hewlett-Packard, etc.) making and selling LED watches in the U.S. An October 1975 *Business Week* cover story celebrated the trend: "Digital Watches: Bringing Watchmaking Back to the U.S."



The Hewlett-Packard HP-01 LED watch.  
Source: Hodinkee

But it wasn't to be. LED supply rose, but demand fell due to quality problems and the nuisance of push-button time-telling. Prices collapsed. When Texas Instruments dropped its LED prices to \$19.95 in 1976 and to \$10 in 1977, the LED boom went bust. Hamilton sold Pulsar to a Philadelphia jewelry and watch distributor in 1977. By 1980, all the American electronics firms except TI were gone.

LCD technology became the standard for digital watches, and production moved to the Far East – to Hong Kong, Taiwan, South Korea, Singapore, and mainland China. The big winner was Hong Kong. By 1980, it was the world's fastest growing watch production center, exporting 126 million watches, more than half of them digitals.

Over time, LCD prices dropped, too. With the digital watch cheapened in both price and image, sales of the higher quality and higher priced analog quartz watches picked up in 1976. That set up the second great battle of the quartz watch revolution: Seiko vs. Switzerland.



Seiko LCD solar alarm chronograph, 1978. Seiko was first to market with a 6 digit LCD watch – the Seiko Quartz LC V.F.A. 06LC, which had an LCD display [developed by Seiko Epson](#).  
Source: [Wikipedia](#)

All Japanese watch firms adopted quartz technology, but the undisputed leader was Seiko. Cross-Tokyo rival Citizen was much smaller in those days, with revenues amounting to one-quarter of Seiko's. (Casio's quartz triumphs, particularly with G-Shock, came later. It didn't launch its first LCD until 1978.)

No other watch embraced quartz technology as avidly as Seiko did, first analog, then digital. It followed Astron with the world's first quartz analog ladies' watch in 1972. Then came a series of LCD firsts: first LCD watch with 6-digit display (1973), first multi-function digital watch (1975). Seiko consistently developed and improved its quartz technology. Its technical savvy saved it during the LED craze. Seiko salesmen and retailers begged Tokyo for LED watches. Seiko refused. Its research indicated that the LED was a bad bet. Instead, the company doubled down on the LCD. A 1985 Harvard Business School report on Seiko noted, "By 1975, Seiko had invested in plants to make integrated circuits, batteries, and LCD panels. Employees were retrained to work with the new technology. Seiko also increased its investment in robots and equipment for high-volume, automated production.

All of that paid off. By 1977 Seiko had become the world's largest watch company in terms of revenues. According to the Harvard Business School study, Seiko's watch revenues for 1977 totaled \$700 million on a production of 18 million pieces. Timex was number two, ahead in unit production (35 million) but far behind in revenue (\$475 million). What's more, Seiko's decision to develop both analog and digital quartz watches proved to be very wise. (The American electronics firms ignored quartz analogs and the Swiss

mostly ignored digitals.) By 1979, approximately half of the quartz watches sold globally were analog and half digital. Of the digitals, more than 80% were LCDs. *Business Week* touted Seiko's success in a June 5, 1978, cover story called "Seiko's Smash: The quartz watch overwhelms the industry."

"A formidable Japanese watchmaker, K. Hattori & Co., manufacturer of Seiko brand timepieces, has emerged as undisputed kingpin of the \$6 billion world watch industry after more than a decade of marketing upheaval and corporate turmoil," *Business Week* wrote. "Looking ahead, Seiko management is convinced that it is riding the wave of the future – with much of the watch industry trying to catch up." They were talking, of course, about Switzerland.

It was one thing for a single large company like Seiko to pivot from mechanical production to quartz. It was quite another for an entire industry, particularly one as fragmented as Switzerland's. The industry had two large watch groups: SSIH, whose star was Omega, and ASUAG, whose top brand was Longines.



Two early examples of Beta 21 Swiss quartz movements from Omega watches. Though the first Beta 1 prototypes were tested at CEH (Centre Electronique Horloger) in 1967, and the first Beta 21 watches launched by some 20 firms in 1970, delivery of ready-for-market quartz watches lagged badly in Switzerland at first.

Source: Hodinkee

They were, respectively, the third and fourth largest watch firms in the world in 1977, with combined sales of \$545 million. The rest of the industry consisted of hundreds of brands, most making their own watches from components supplied by more than a thousand small producers. The little guys looked to the big guys to lead the way out of the crisis. But it wasn't easy with everybody's sales down due to the quartz onslaught.

Eventually the Swiss realized that the crisis required a total restructuring of the industry. Between 1978 and 1985, two men, Ernst Thomke and Nicolas G. Hayek, Sr., teamed up to inflict the painful reforms that the industry needed.

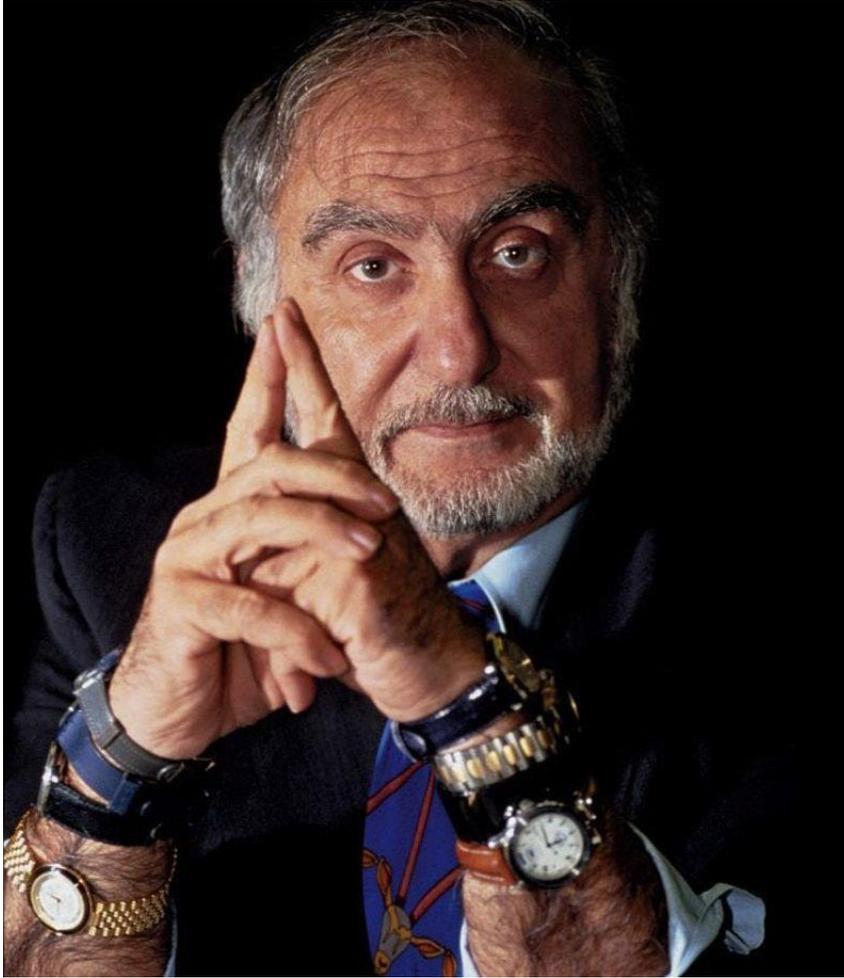


An early advertisement for the Concord Delirium at Tiffany & Co.  
Source: Hodinkee

Thomke arrived first. ASUAG hired him in 1978 to restructure its Ebauches SA division, which made movements and parts for its 16 brands and many others. He streamlined and reorganized the various Ebauches subsidiaries into a new company, called ETA SA. He cut production costs, reduced headcount (from 20,000 to 8,000 by 1982) and sped up ETA's conversion to quartz analog production. It led to Switzerland's first victory of the quartz conflict.

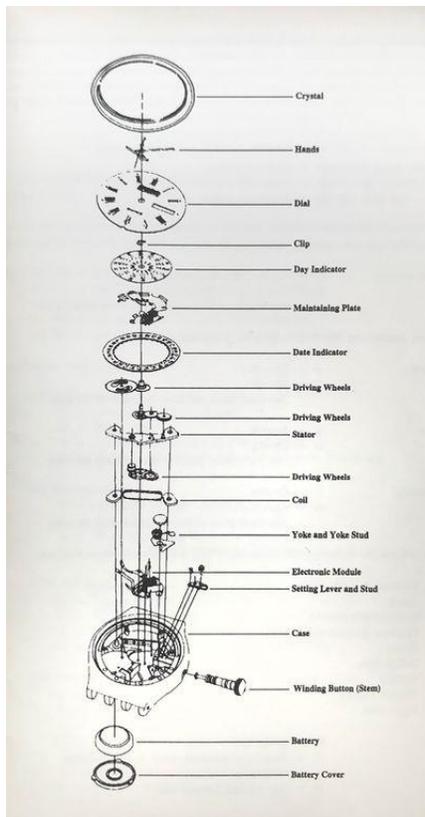
In 1978, Citizen introduced the world's thinnest watch, the Exceed Gold, with a case 4.1mm thick. Later that year, Seiko surpassed it with a watch 2.5mm thick. In January 1979, ETA stunned the watch world with a 1.98mm thick watch called Delirium. (It debuted in the U.S. under the Concord brand; that's because Concord owner Gedalio Grinberg invested money to help ETA, strapped for cash, to develop the movement.) Seiko struck back with an even thinner watch, but ETA was ready. It won the Thin Watch War by issuing three more Deliriums. The last, Delirium IV, had a case that was astounding 0.98mm thick, and is still the thinnest watch ever made.

Delirium was a big win. It signaled to the world that Switzerland had mastered quartz technology and could compete with Japanese producers. In fact, Swiss quartz analogs were enjoying some success in the in the middle and upper price ranges of the market with thin, elegant models from brands like Cartier, Raymond Weil, Gucci, Ebel, and Concord.



*Nicolas G. Hayek.*  
*Source: Breguet*

But they weren't enough. Losses continued to mount at SSIH and ASUAG. A consortium of Swiss banks had to bail out the two groups to rescue Switzerland's third largest export industry. In a series of rescue packages between 1981 and 1983, Swiss banks pumped more than SF550 million into the industry. In this crisis, the banks turned to Hayek, owner of Hayek Engineering in Zurich, Switzerland's top consulting firm. The banks commissioned Hayek to come up with a plan to save the watch industry. Completed in 1983, Hayek's radical solution was to merge the two groups into one company and separate the brands from the production units. All production would be concentrated in ETA SA. The brands, who previously produced their own movements, would focus on design, marketing and sales. The banks accepted the plan and hired Hayek to execute it. The new company was called SMH for, in English, Swiss Corporation for Microelectronics and Watchmaking. (Note that microelectronics precedes watchmaking.) Today it is known as the Swatch Group.



A specification diagram for the original 1983 Swatch.  
 Source: *W.B.S Collector's Guide for Swatch Watches*

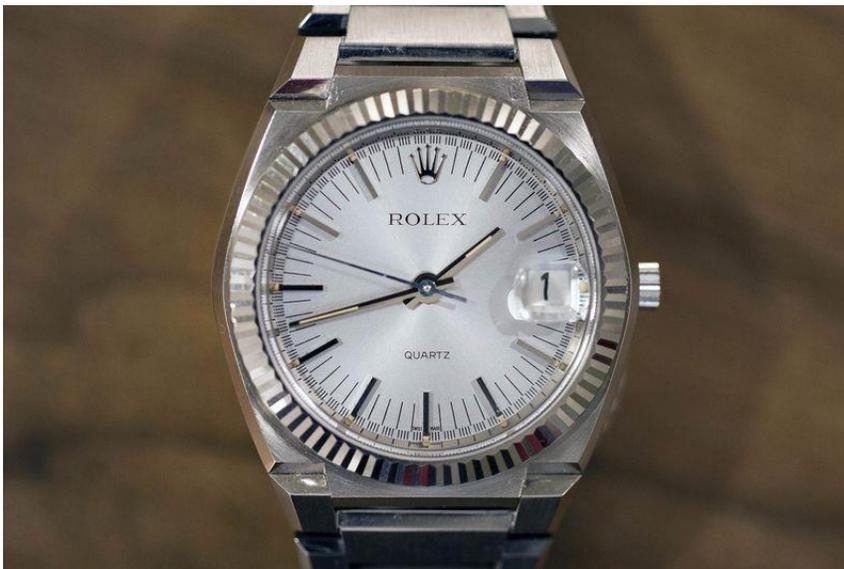
There's a reason for that. After the success of the Delirium watch, Thomke and his team began a secret project they called "*Delirium vulgare*," Latin for a "Delirium for the masses." The plan was for ETA to use the engineering developed for Delirium to make an inexpensive quartz analog watch to mount a Swiss comeback in the low end of the market. The Swiss had dominated that market with pin-lever mechanical movements at the start of the 1970s, but had lost it to cheap quartz watches. (Pin-lever, or Roskopf, movements accounted for 44% of Swiss production in 1970.) *Delirium vulgare* could win back some of that market. For Delirium, to save space, ETA eliminated the bottom plate of the movement and attached those parts directly to the caseback. They would do the same in the new watch to save, not space, but costs. It would have a plastic case for the same reason. ETA would sell the finished watch itself directly to retailers and make a hefty markup on each watch, despite its \$35 retail price.

Thomke's problem was that he needed investment money to make the watch. The banks, tired of watch bailouts, refused. When Hayek arrived, Thomke showed him the secret plans for the *Delirium vulgare*. Hayek told him he would get the funding from the banks. And did. ETA launched its plastic watch in 1983 under the name Swatch. It was an overnight sensation. Swatch shocked the watch world. No one expected the Swiss to strike in the low end of the market where they previously could not compete due to their high labor costs.



*A first generation 1983 Swatch.  
Courtesy swatchandbeyond.com*

Swatch marked the turning point in the quartz crisis for the Swiss. Quartz technology had wreaked havoc on the industry. By 1985, watch industry employment had fallen to 32,000 from 89,450 in 1970. (It bottomed out at 28,000 in 1988.) Between 1974 and 1983, Swiss watch production fell from a record 96 million units to 45 million. But just two years after the Swatch launch, production had rebounded to 60 million units. That year 80% of Swiss watch exports were quartz watches, 42% of them plastic. That was the Swatch effect. What's more, after losing money in 1983, the new SMH group was in the black. The empire was striking back. Little wonder that Hayek, Mr. Swatch, as he came to be known, changed SMH's name in 1998 to the Swatch Group.



*In 1970, Rolex would release the reference 5100, with its own in-house quartz movement.  
Source: Hodinkee*

Advances in quartz technology have continued. Today there is a new generation of so-called "super quartz" watches with extreme accuracy from brands like Breitling and Grand Seiko. Solar, or light-powered technology (like Citizen's Eco-Drive) and motion-powered technology (like Seiko's Kinetic) have eliminated the nuisance of replacing batteries. Junghans and Citizen in the 1990s pioneered radio-controlled watches that receive time signals from atomic clocks. Those led to today's GPS watches that

receive ultra-accurate time signals from satellites in space – pioneered by Casio, in 1999, with its PRT-1GP.

The clearest sign of the pervasive impact of quartz technology on the watch world is the number of quartz watches produced each year. In 2015, according to the Japan Watch & Clock Association, 1.46 billion watches were produced. Of those, 1.42 billion were quartz, 97% of the total. Analog quartz watches accounted for 81% of the total, digital quartz 16%. Watch aficionados love mechanical watches and value them for their complexity, their artistry and their rarity. As well they should. Because nearly half a century after Seiko launched Astron, from a production standpoint, the watch world is almost entirely quartz.