Progression of Wristwatch Styles: From Bracelet Watches to Smartwatches

Part 4: 1960–1979: The Bulova Accutron, Mod Era, Quartz Revolution, and Multiple Technologies (LED, Solar, and LCD)

by Randy Jaye (FL)

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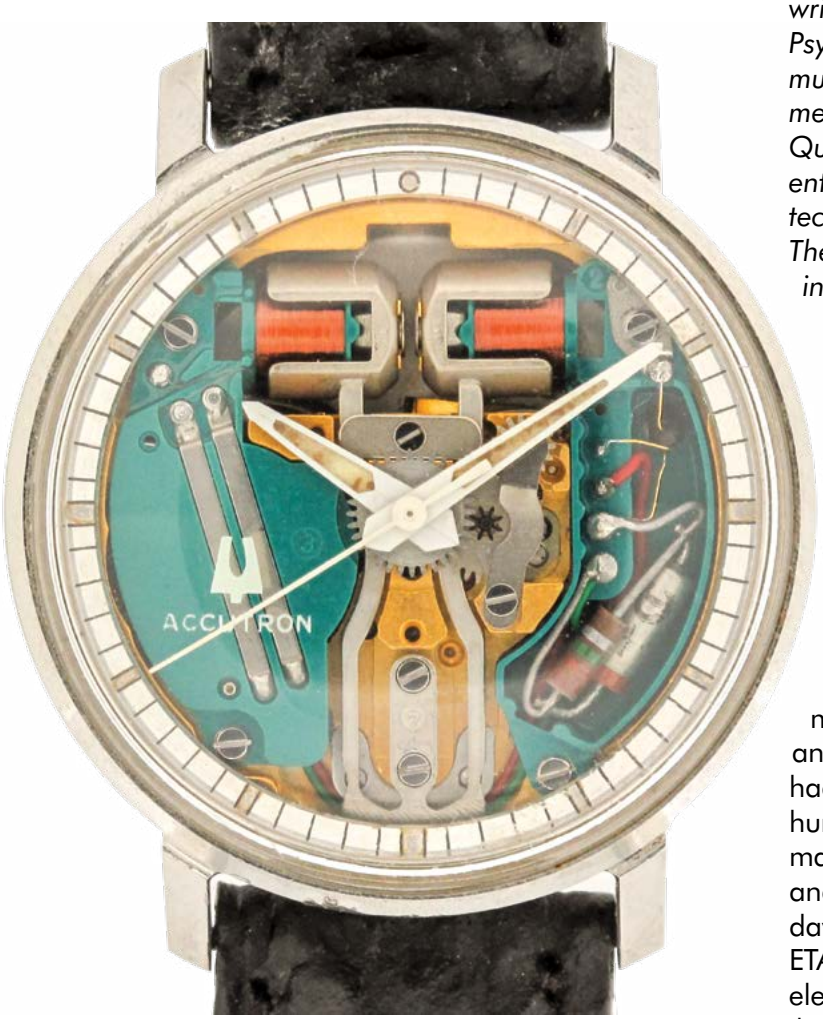


Figure 1. Bulova Accutron Spaceview Model, front dial view, ca. 1972. COURTESY OF THE NAWCC MUSEUM COLLECTION, CATALOG ITEM 78.74.1.

Author's Note: Part 4 of six parts begins with the incredible story of the Bulova Accutron that led the way for advanced technology in watchmaking. From 1960 through 1979 some of the most amazing developments and turbulent times in the history of wristwatch manufacturing occurred. The Mod and Psychedelic eras influenced wristwatch styling, and multiple technologies were incorporated into movements to expand and advance functionality. The Quartz Revolution (Crisis) seriously threatened the entire Swiss watchmaking industry while some high-tech U.S. companies temporarily entered the industry. The Asian (Japanese and Hong Kong) watchmaking industry, fueled by quartz technology, rapidly expanded. All photos are from the author's collection unless stated otherwise.

Bulova Accutron

Designing and testing electronic watch movements at Bulova started in 1952, led by Max Hetzel.[1] This resulted in Bulova designing a revolutionary battery-powered electromechanical wristwatch movement using space-age transistorized circuitry (referred to as "tuning fork technology"). The first production Bulova Accutron movement (214) was introduced in October 1960 and went on sale in November 1960. The movement had a smooth sweep seconds motion and a unique humming sound that added to its allure. It used a magnetized tuning fork instead of a balance wheel and could be regulated to within ±2 seconds per day or less—double the accuracy of a top-grade ETA[2] mechanical movement and more accurate than electric movements. In 1962, the Accutron became the first wristwatch approved for railroad use. Swiss watch manufacturers dominated the world market, but when they saw the Accutron's success, they were

forced to ponder the future of the traditional mechanical wristwatch market. The Spaceview (Figure 1) was originally sent to Bulova's worldwide distributors as a display model to show the public the state-of-the-art technology. Consumers liked the futuristic look, so Bulova added the Spaceview to its Accutron production line and it became a best seller. In 1965, Bulova released the slimmer 218 movement (Figure 2) with some electronic componentry changes, a stem and crown usually at the 4 o'clock position, and additional complications including calendar functionality. In 1972, Bulova released the 219 movement, which increased the use of plastic parts and lowered the price, to compete with cheaper quartz watches. In 1977, after selling more than 5 million Accutron watches, Bulova phased them out of production.

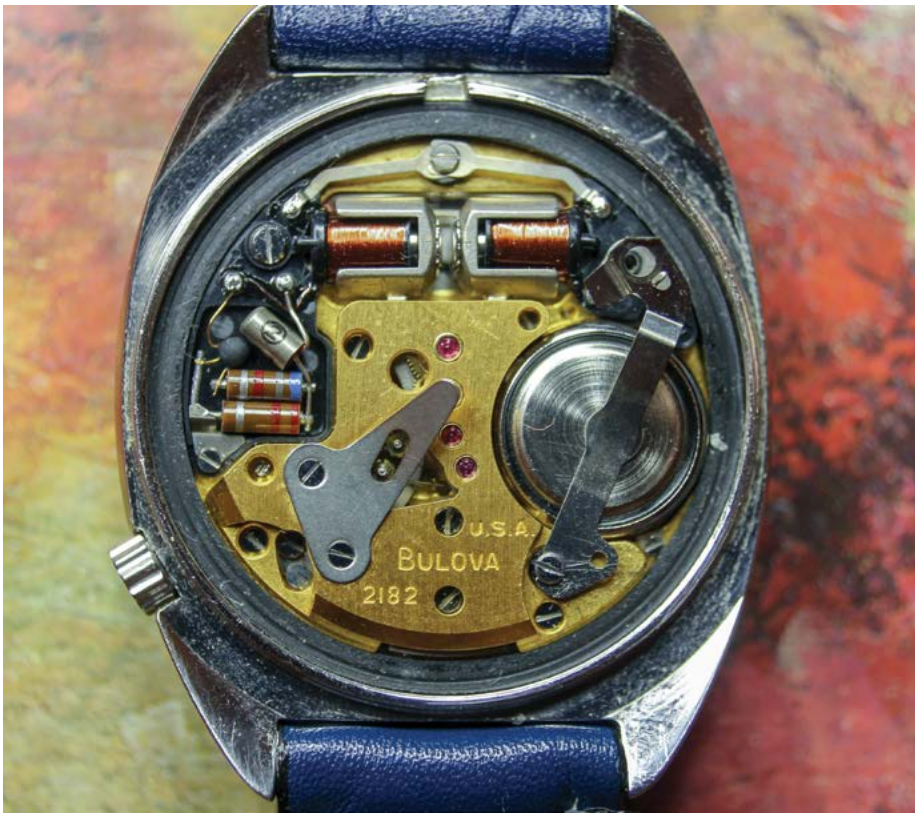


Figure 2. Bulova U.S.A. Accutron 218 (2182 variant) with day and date functionality, movement view, ca. 1969.

Mod Era

The Mod era started to emerge in the late 1950s and lasted through the 1960s and into the 1970s. Fashion styles were innovative, creative, bold, and brash; lava lamps, tie-dye shirts, and boutique clothing stores became popular. Many wristwatch styles were influenced by the Mod era and featured large "chunky" metal cases (Figure 3) with bold, brightly colored dial and bezel designs (Figure 4), creative hour markers, and funky wide straps with large buckles.

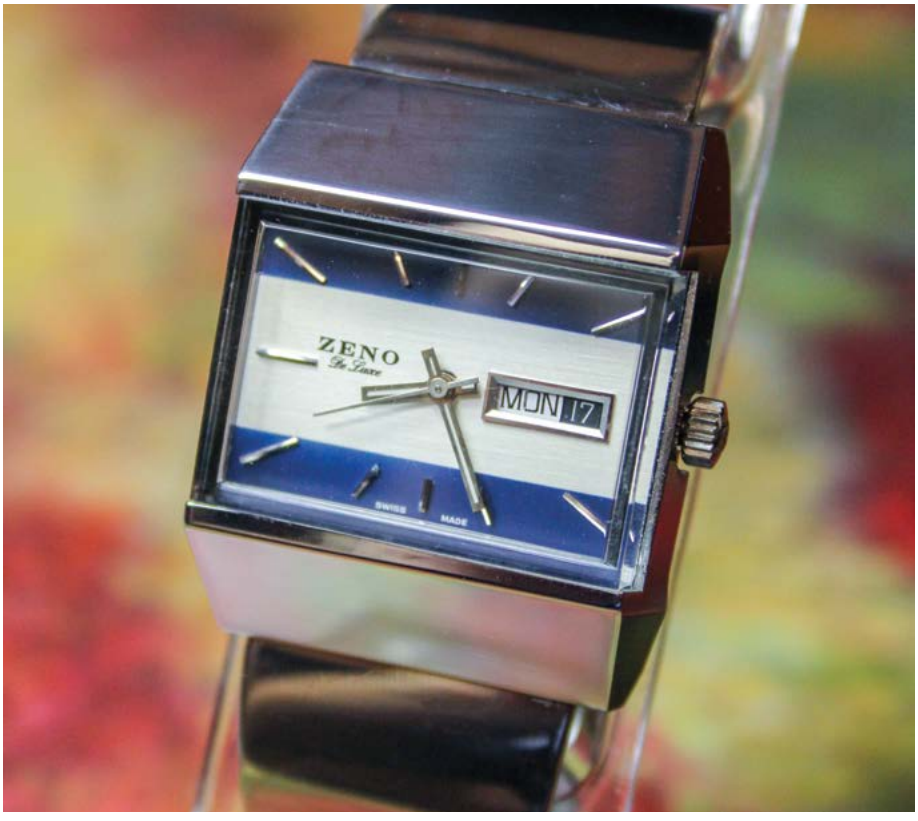


Figure 3. Zeno, De Luxe, huge high-gloss stainless steel cubed case and unique bracelet with dark blue and silver dial and day and date functionality, ca. 1970s.

Psychedelic Influence

The psychedelic era originated in the 1960s, and its influence on artwork and music attempted to re-create an altered consciousness. Clothing and jewelry styles of the era included bell bottoms, floral designs, and love beads.

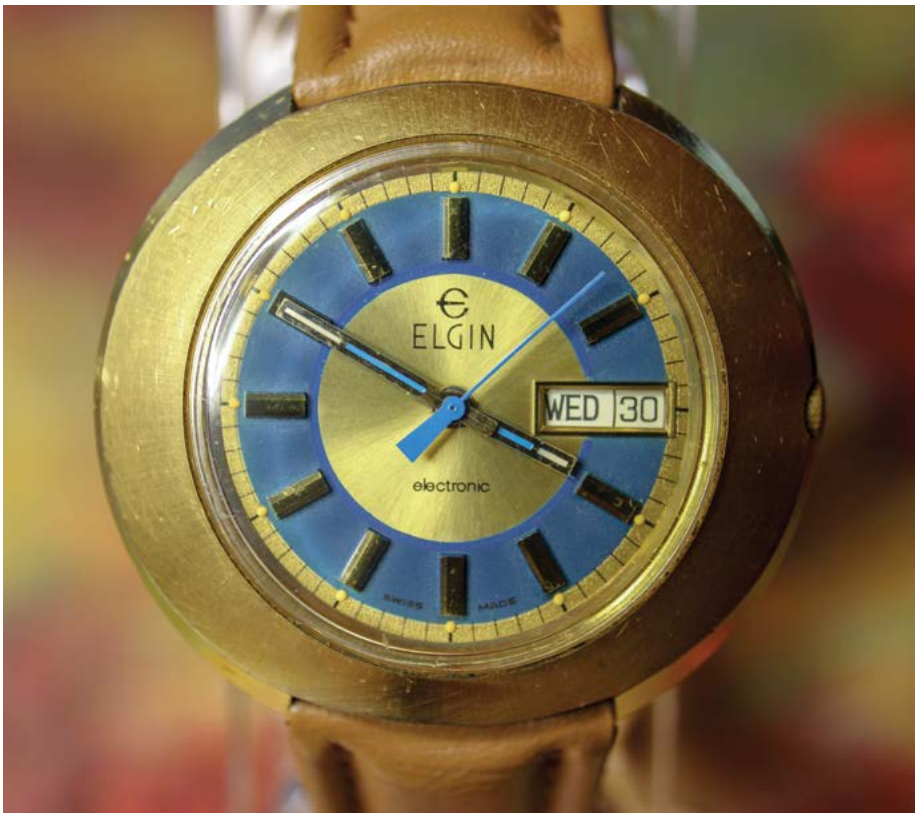


Figure 4. Elgin electronic movement with a big bold barrel case and a colorful blue-ringed dial with gold background, day and date functionality, ca. 1970s.

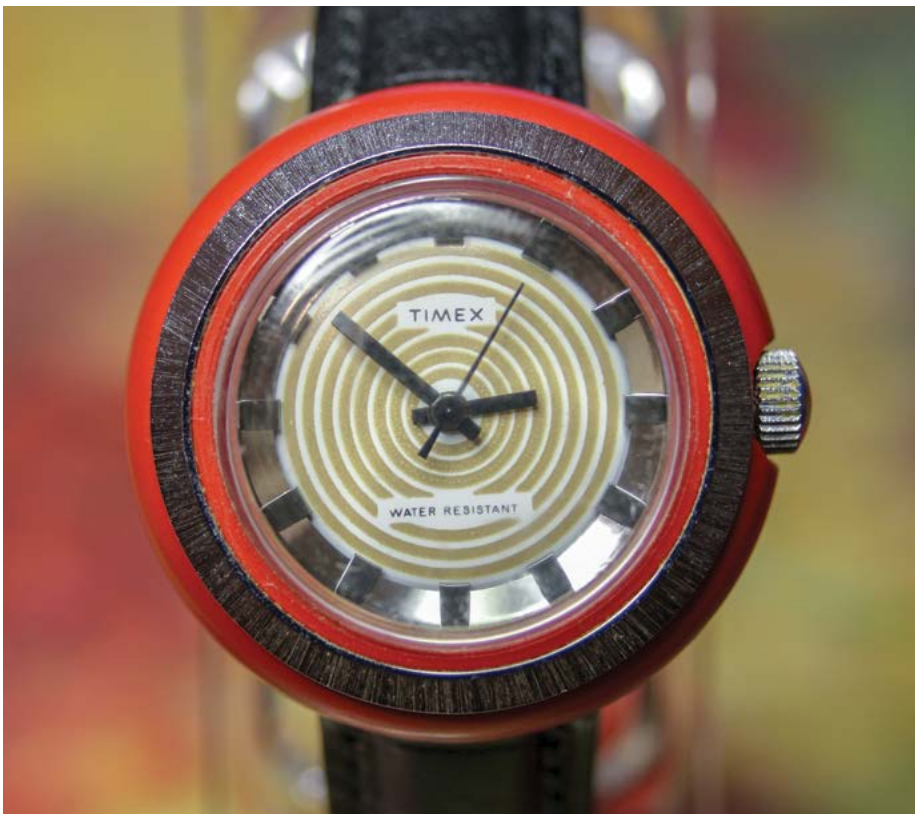


Figure 5. Timex psychedelic, Peter Max-type pop art fashion design with a plastic red case and a beige spiral with a silver-colored mirror accented dial, ca. 1960s.

Wristwatch styling used flamboyant dials with bright shapes and high-intensity colors (Figure 5), offbeat case shapes and materials, wide bracelets and straps, and wild seconds disks (Figure 6). In 1967, luxury brand Cartier released its Crash wristwatch model with a melted and distorted case that looked like it went through a violent car accident. This Flower Power[3] era of psychedelic-inspired wristwatches lasted until the early 1970s.

Quartz Revolution (Crisis)

In 1962, the Centre Electronique Horloger (CEH), a consortium of 20 Swiss watch manufacturers, was established in Neuchatel, Switzerland, to develop a quartz wristwatch movement. The Japanese company Seiko was also working on the development of an electric watch and quartz technology during the 1960s. In 1967, CEH developed the first quartz wristwatch movements (Beta 1 and one month later the Beta 2), but these movements were not released into production. In 1969, Seiko released the world's first production quartz wristwatch, the 35SQ Astron (Figure 7), which came in an 18-karat gold case and sold for $1,250. Although the original Astron wristwatch was plain looking and had many technical problems, it started a revolution within the global wristwatch industry. One of the first Swiss quartz watches was the Rolex 5100 released in 1970 and produced until 1972 (approximately 1,000 were made). The quartz movement was too large for the famous Rolex Oyster case so they made a large 40 mm, or 1.5", solid 18-karat gold case that became known by its nickname the "Texan." These early quartz watches were quite expensive.

This revolution is referred to as the Quartz Revolution (also known as the Quartz Crisis) and is a term used throughout the watchmaking industry to describe the economic turmoil caused by the development, and overwhelming global consumer acceptance, of quartz watches starting in the 1970s. Quartz watches need no winding and were the most accurate watch in history. As their popularity grew, prices plummeted so far that traditional mechanical and electric watches were being priced right out of the marketplace as their demand dramatically dropped. By 1978, quartz watches overtook mechanical watches in worldwide popularity, and the traditional watchmaking industry in Switzerland, which was reluctant to mass-produce quartz watches, suffered serious financial and global market share losses.

Light-Emitting Diode (LED) Technology

In 1971, the Hamilton Watch Co. of Lancaster, PA, released the first LED[4] watch called the Pulsar. The original Pulsar was quite expensive because it had an 18-karat gold case and sold for $2,100 (approximately $12,336 in 2017 dollars). This was also the first electronically powered watch to display time in a digital format and the first all-electronic watch. This technology produced sharp and intensely colored digits but caused a major drain on the watch's battery and only illuminated after the wearer pushed a button. Consumer enthusiasm for LED watches of the early 1970s burned out in only a few years because they were seen as impractical. By 1977, Hamilton and other watchmakers began to cease production of LED watches as other more efficient technologies (most notably liquid crystal display [LCD][5]) emerged.

Digital Quartz Watches

After the digital LED technology was incorporated into quartz wristwatches, many high-tech companies in the United States (including National Semiconductor [Figure 8], Fairchild, Hewlett-Packard, and Texas Instruments) began the mass production of their own digital quartz watches. Digital display wristwatches were becoming so successful that the traditional analog dial with hands seemed to be going out of style. These U.S. high-tech companies did not stay in the wristwatch-manufacturing business long. By 1978, Hong Kong companies, powered by cheap labor and material costs, drove digital watches to rock-bottom prices. This low-priced competition forced most high-tech companies in the United States to pull completely out of the watch industry by the end of the 1970s.

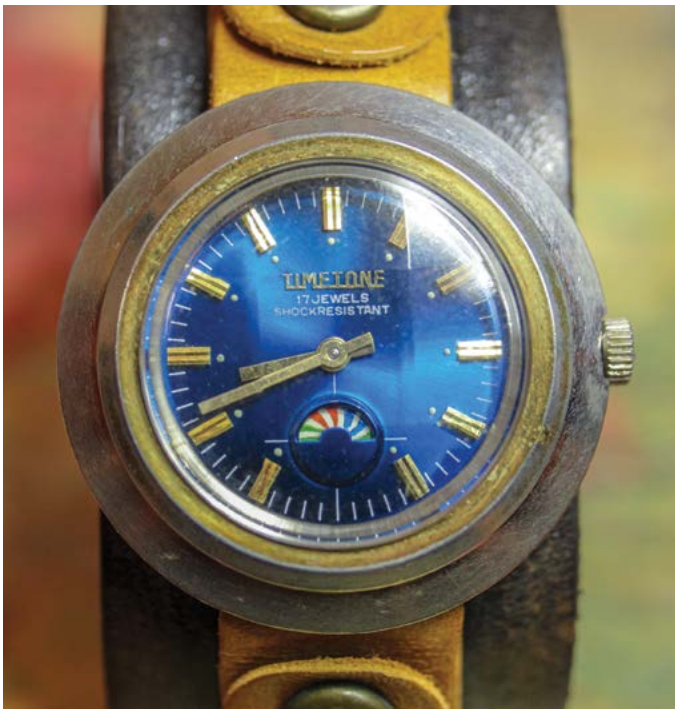


Figure 6. TimeTone nine-faceted crystal and iridescent dark blue dial with a unique perpetually moving psychedelically colored seconds disk fitted on a 36 mm, or 1.4", broad saddle hide strap, ca. 1960s.

Solar Power Technology

In 1972, the world's first solar-powered wristwatch, the Synchronar 2100 (Figure 9), was released. It was designed and developed by a self-taught electronics inventor named Roger W. Riehl (1935–2005), who worked on prototypes from the late 1960s. It included smart calendar programming and was water resistant to a depth of 750'. The style of Riehl's case design was futuristic with solar panels on the top, and when viewed from a side angle, the watch resembled a cobra's head. The time is shown in red digits by an LED display on the side of the watch that was visible in full sunlight. In 1976, Citizen released the world's first solar-powered analog wristwatch called the Croyston Solar, the forerunner to its very successful Eco-Drive models.

Liquid Crystal Display (LCD) Technology

The Gruen Teletime, introduced to the market in 1972, is believed to be the first LCD wristwatch with field-effect display. This technology reflects light rather than creating it and used far less energy than LED watches. LCDs show the time continuously (Figure 10); therefore, no buttons have to be pushed to display the time. However, buttons were included for

setting time, day, and date. In 1973, the Seiko Quartz LC V.F.A. 06LC was a fully electronic watch that used the world's first six-digit LCD to indicate the time. Capable of continuously displaying the hour, minutes, and seconds on a field-effect LCD that Epson developed for quartz watches, this groundbreaking digital watch attracted worldwide attention. The more efficient and consumer-friendly LCD virtually made the LED in the wristwatch market obsolete.

Digital Calculators, Chronographs, and More

The 1970s also produced watches that were equipped with calculators, chronographs, and other functions using integrated circuits (ICs[6]). This technology was not available on mechanical or electric watches. They quickly became popular with many consumer segments, including students, engineers, techies,[7] and accountants. In 1975, Seiko released the 0634-5019, the world's first multifunction digital LCD chronograph. Its case was made of quality solid stainless steel and it included a solid-link bracelet. Two buttons and a crown controlled the setting of the time, day, date, and chronograph functions. This was advanced technology for a wristwatch and was fairly expensive, costing $275. One of the most famous, and unusual, calculator watches was Hewlett-Packard's HP-01 (Figure 11), which was released in 1977, and was the only wristwatch ever made by that company. It is an algebraic calculator (which means it can do math in real time). This watch is truly unusual because of its integration of the time and date functions into the calculator. It is also capable of calculating days between dates and even finds the day of the week. It should be no surprise that the HP-01 is now a highly sought-after collector's item. Other watch manufacturers, including Seiko, also released calculator wristwatches during the 1970s.

Figure 7. Seiko Quartz Astron 35SQ, the wristwatch that started the quartz revolution. ablogtowatch.com. Accessed October 30, 2017. HTTPS://WWW.ABLOGTOWATCH.COM/SEIKO-ASTRON-WORLDS-FIRST-QUARTZ-WATCH-TURNS-40/.

Digital Watch Allure Changes

By the end of the 1970s, the global market became flooded with millions of cheap (price and quality) throwaway digital watches, and their mass consumer appeal began to decline. Some consumers did not like to read the time in illuminated digits, were frustrated with the cheapness of most digital watches, and wanted to return to the familiarity of analog dials. Many digital watches started to become a novelty item. But the popularity of quartz technology, with analog dials, was soaring.

Seiko took quartz accuracy to yet another level in 1978 with the release of its Twin Quartz watch that included an analog dial. This technology addressed the temperature problem on the frequency of the quartz crystal oscillator, which constrained the accuracy of quartz watches. By adding a second quartz crystal, the accuracy was improved from five seconds per month to five seconds per year. After the 1970s, digital watches continued to be manufactured with more and more added functionalities, but many models appealed to a specialized customer base.

Swiss Analog Quartz Watches Arrive Late in the Quartz Revolution

Although Swiss companies were late (mid-1970s) in entering the quartz watch market, they began to develop quartz watches with attractive styling using analog dials and much thinner movement and case designs. These Swiss quartz watches were of higher quality and appeared more refined and sophisticated than most of the technically designed, cheaply made, and disposable digital watches. Swiss brands, such as Vacheron Constantin and Ebel, released "luxury-styled" quartz wristwatches. In 1977, Rolex released its in-house developed 11-jewel quartz movements (5035 caliber for its Datejust and the 5055 caliber for its day-date Oysterquartz [Figure 12] models). These Rolex quartz movements were considered to be advanced technical marvels when they were released.

By the end of the 1970s, the Quartz Revolution changed the major players in the watch industry as Hong Kong became the world's largest exporter of watches (by numbers), and Japan was about to surpass Switzerland as the world's largest watch producer.

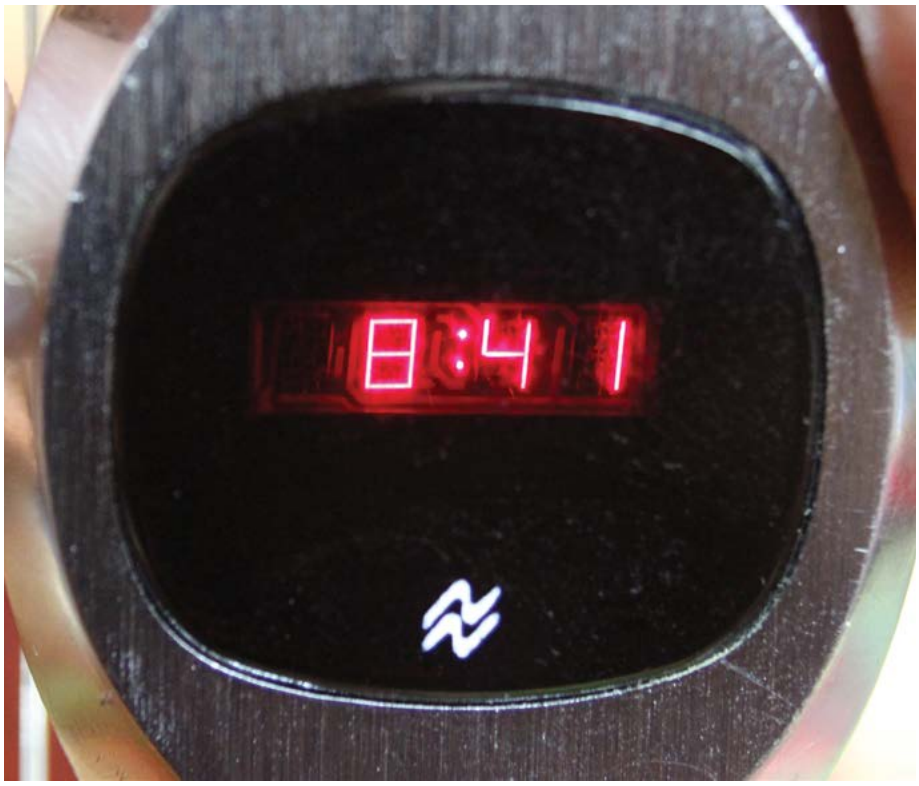
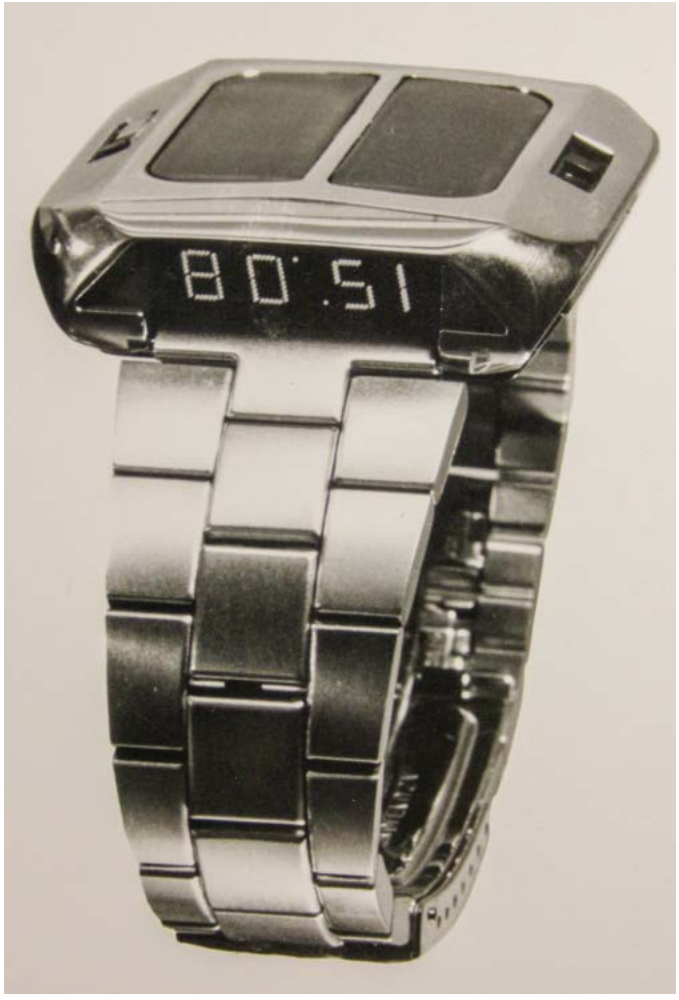
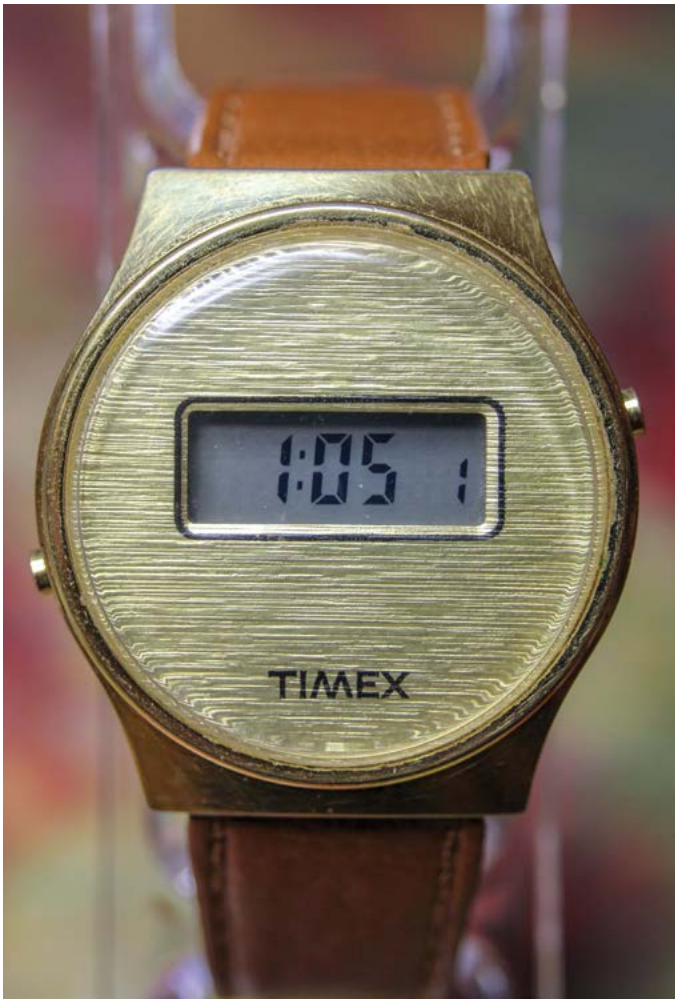


Figure 8, left. National semiconductor-light-emitting diode (LED) illuminated red digits, metal tonneau case with a push button that activates the digital display, ca. 1970s.

Figure 9, bottom left. Synchronar 2100 featuring a stainless steel case and bracelet. The world's first solar-powered wristwatch. Riehl Time Corporation Press Release Photograph, ca. 1977.

Figure 10, bottom right. Timex digital LCD display, brushed gold dial with rectangular display window and two push buttons that set the time and date, ca. 1970s.





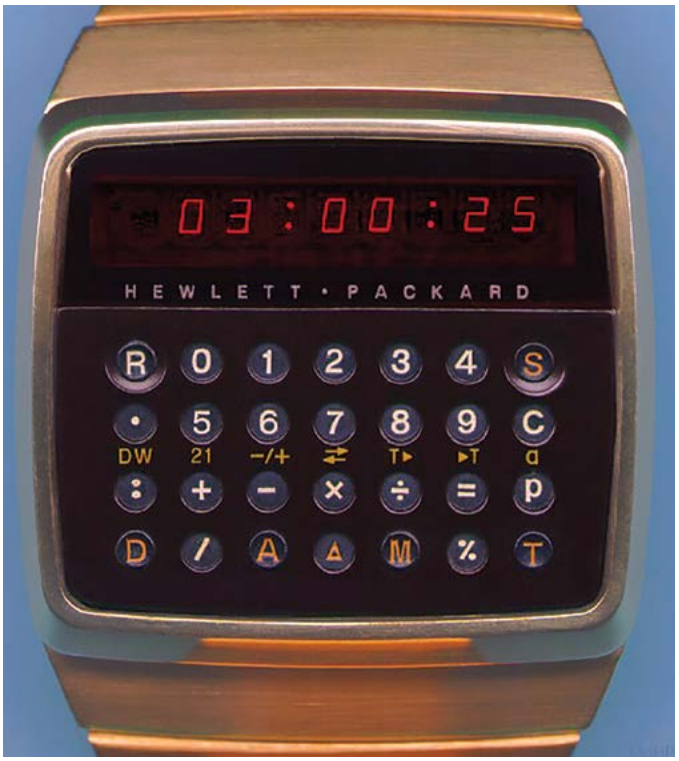


Figure 11. Hewlett-Packard introduced the HP-01 model as "…a new dimension in time management and personal computation." Front dial closeup view, ca. 1977. The Museum of HP Calculators. Accessed November 22, 2017. HTTP://WWW.HPMUSEUM.ORG/HP01.HTM

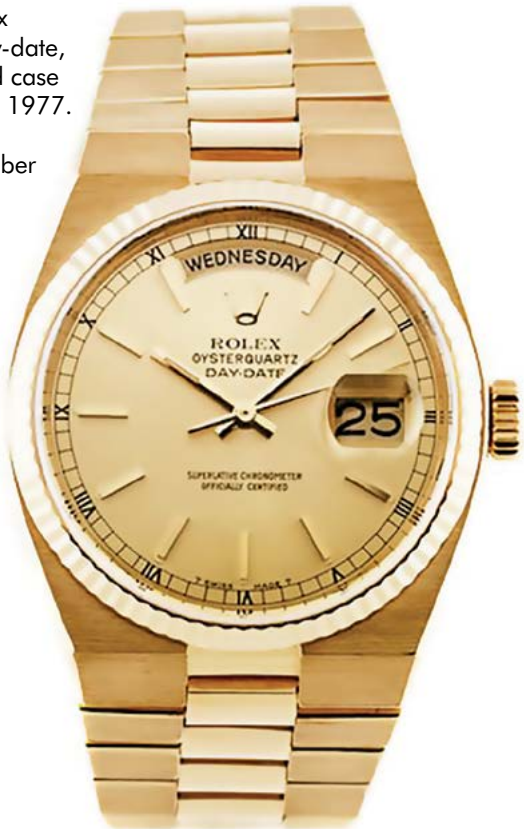


Figure 12. Rolex Oysterquartz day-date, 18-kt yellow gold case and bracelet, ca. 1977. Beckertime.com. Accessed November 17, 2017. HTTPS://BECKERTIME.COM/2017/10/27/POPULAR-ROLEX-WATCHES-1970S/.

Notes

1. Max Hetzel (March 5, 1921–September 12, 2004) was a research and development engineer and chief physicist at the Bulova Watch Co. in Biel, Switzerland, from 1950 through 1963. He developed the Bulova Accutron (the first true electronic watch movement), the precursor of the quartz watch movement.

2. ETA SA Swiss Watch Manufacturer (ETA) designs and manufactures mechanical wind, automatic, and quartz watch movements. The company is headquartered in Grenchen, Switzerland, and is a wholly owned subsidiary of the Swatch Group Ltd. ETA is the result of mergers and consolidation within the Swiss watch industry and is now the largest manufacturer of Swiss watch movements. ETA makes various movements for many watch companies. Some industry analysts say that ETA now has a monopoly over the production and supply of Swiss-made watch movements.

3. The slogan "Flower Power" was coined by the American beat poet Allen Ginsberg in 1965. It symbolized peace and was meant to transform Vietnam War protests from physical clashes with police and the National Guard into passive resistance and nonviolent opposition.

4. A light-emitting diode (LED) is a two-lead semiconductor light source that emits light when activated.

5. Liquid crystal display (LCD) is an electrooptical device used to display digits, characters, or images that has low electrical power consumption, which enables it to be used in battery-powered electronic devices such as digital watches, calculators, and portable computers.

6. An integrated circuit (IC), also referred to as a chip or microchip, is a mass-produced set of electronic circuits fitted onto one small flat piece (chip) of semiconductor (usually silicon) material. ICs are now used in almost all electronic equipment and have a multitude of functions, including timers, counters, oscillators, amplifiers, and computer memory. ICs have revolutionized the worldwide electronics industry.

7. A techie is a person who is proficient, highly interested, studies, and/or is employed in a technical field, especially associated with electronics or computers.

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About the Author

Randy Jaye has been the president of Chapter 154 in Daytona Beach, FL, for many years and was the General Chair for the 2016 and 2017 Florida Mid-Winter Regionals. He is a watch and clock collector and occasional restorer. He has contributed several articles to the *Watch & Clock Bulletin* and is planning to complete several more in the near future with a focus on wristwatches and "modern" horology. He recently wrote and published a history book titled *Flagler County, Florida: A Centennial History*.

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