

The Amazing Bulova Accutron

What's an Accutron ?

The Bulova Accutron was the world's first electronic watch. People sometimes refer to the Accutron as the worlds first electric watch. This isn't quite true but as it was the first to use a bipolar transistor it certainly deserves the former accolade. The first Accutron was manufactured in 1960 and was the watch chosen by some of the 'Original Seven' NASA astronauts to accompany man on his first journeys into space. [Scott Carpenter](#) famously modeled a Bulova Accutron 'Astronaut' on the front cover of Paris Match in 1962. Contrary to popular myth the Accutron only flew in space a couple of times on the wrist of an astronaut. It was not the watch chosen by NASA as the astronaut flight qualified time piece, this accolade goes to the Omega Speedmaster Professional. The Omega however was never (except in Apollo 13) used as the primary reference for any mission critical activities. Accutron movements were used in pannel clocks and as instrument timers.

I remember them being called 'Tuning Fork Watches'.

Yes that's correct, the watch uses a tuning fork as its prime moving element. It is a well understood physical principle that the faster your initial reference the more accurate your time keeping will be. The most accurate clocks nowadays use the vibrations of a caesium atom as their reference. In the 1950s the best mechanical watches could rely on a prime moving element with a frequency of around 2 Hz (That is two 'beats' per second). [Max Hetzel](#) an engineer employed by the Bulova Watch Company of Bienne Switzerland designed an electrically excited tuning fork movement with a a frequency of 360 Hz. Bulova claimed an accuracy of 2sec per day or 1 min per month. This was the only movement capable of the accuracy demanded by spaceflight. Accutrons were used as time references in many satellites and also to control some of the Apollo moon experiments. The Tuning Fork Movement is absolutely unique in operation emitting a distinctive hum and featuring a sweep seconds hand. Here's a reproduction of an advertisement produced by Bulova in the early 1960s.


WHAT MAKES ACCUTRON SO ACCURATE?



In place of the usual wheels and springs, time is measured by a tiny, electronically-driven tuning fork that vibrates 360 times per second. This principle makes it possible to give with each Accutron timepiece a written guarantee* of accuracy to a minute a month.



Tuning Fork Replaces the balance wheel used for over 300 years in all traditional watches.



Transistorized Electronic Circuit has over 500 feet of special wire 1/8 the diameter of a human hair.



Mercury Power Cell Operates for a minimum of one year. Easily replaced.

*Timekeeping will be adjusted to this tolerance, if necessary, if purchased from authorized jeweler and returned to him within one year of date of purchase.

Accutron calibers and marques.

The first successful accutron caliber (1960 on) was designated 214 and was available as a standard or 'hack' movement (a hack feature stops the second hand whilst the watch is being set). This movement was utilized in many marques including 'rail road approved' types and most famously the see through 'Spaceview'. The now much sought after Spaceview (as above) affords a view of the tuning forks, electromagnets and control circuitry. The 214 movement can be identified by the setting device which is located at the back of the watch. There is no setting crown ! The 214 was followed by the 218 which again was used in many marques but never a Spaceview. Most 218 movements are set by a crown located at the 4 O'Clock position (some variants have two crowns at 2 and 4 O'Clock).

The Accutron, especially the Spaceview captured the 'Zeitgeist' of the 1960's absolutely. Man's first foray into space, the birth of the electronics industry, the first useable digital computers and eventually the Apollo program; heady times indeed ! The Accutron is a worthy icon of this epoch. Later calibers included the 219, 230 and 231 which offered different geometries of both tuning fork and electromagnets.

Max Hetzel was also the creative engineering force behind both the [Swissonic](#) (never sold due to patent infringement) and the Omega Megasonic, a design that took micro-machinery to a level which is to this day stunning.

Some Accutron Facts (Engineers take note this was achieved in 1960!!)

- The index wheel boasts 320 teeth each of which is ten microns in depth
- For a thirty year old watch this means that over 2.8 E+11 teeth have have moved under the pawl jewel.
- The Accutron was used to correctly dimension Greenland for the first time.
- Each coil boasts 8000 turns of wire, the diameter of which is 15 microns.
- Assertions movements were used in the Apollo space craft panel clocks.
- The Bulova Accutron was the first wristwatch to utilize a Bipolar Transistor.

Sean's "How It Works" Page

Here we will undertake take a step by step explanation of how an Accutron functions. I will assume a very basic knowledge of electro-magnetics (about 'O' Level for us Brits or Grade ?? for our American friends). If you always hated physics at school don't click [here](#) .

Sean's "My Accutron's" Page

Click [here](#) to see some of my Accutrons (current count at around 25)

Sean's "Latest Accutron acquisition" Page

Click [here](#) to see my latest Accutron acquisition

Accutron Links Page

Here are some [links](#) that address some very common questions such as "**Where can I get my Accutron fixed ?**" and "**What's all this about batteries ?**" I have leant heavily on Rob Bercavicius site "Down Under" and Tom Mister's site in the USA

Please email me with any comments, I can be contacted at :



Sean_C@elektron.demon.co.uk

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