AN EXPENSIVE WATCH IS MORE ACCURATE, RIGHT?

"Excellence is achievable, perfection is much more elusive."
(UNKNOWN ORIGIN)

When it comes to collecting vintage watches, there is one very important fact you need to know in advance. A vintage $10 manual wind Timex or digital Casio watch (if they're still working properly) will keep time just as well as, and possibly better than a $20,000 solid gold mechanical Omega, Rolex, or other very fine watch. If this statement surprises you, it is generally true. All watches tend to gain or lose a few seconds over a period of time. These are small mechanical or electro-mechanical devices that are counting out 86,400 seconds per day. Even if a watch is 99.9% accurate, it will still be off by a minute and a half in only 24 hours! Even a mediocre wristwatch has to be well over 99.9% accurate to even begin to be useful on an ongoing basis.

So, what is a reasonable expectation of accuracy from a wristwatch?

Reasonable Accuracy Expectations by Type of Watch	Seconds gain/loss per day			Best Accuracy
	Worst	Typical	Best	
Vintage mechanical watch in good repair	+/-60	+/-15	+/-5	99.9826%
Modern mechanical watch non-certified	+/-10	+/-5	+/-2	99.9942%
Modern mechanical watch chronometer certified	+6/-4	+/-3	+/-1	99.9977%
Modern quartz watch non-certified (normal)	+/-2	+/-1	+/-0.1	99.9998%
Modern quartz watch chronometer certified (rare)	+/-0.02	+/-0.02	+/-0.0	99.9999%

While some people desire wristwatches with extremely high accuracy over long periods of time, it is seldom for any reason besides personal satisfaction. The few professions that depend on precision time synchronization (such as astronomy, global navigation, train scheduling, and broadcasting) base their operations on high precision time sources, not consumer wristwatches. Ultimately, if you are living so close to the edge that having your watch off perfect time by less than a minute bothers you or otherwise throws your life into disarray, you probably need less caffeine and a vacation!

WHY WOULD ANYONE WANT A LESS ACCURATE WATCH?

The short answer is that pretty much any modern wristwatch from a reputable brand is more than accurate enough for normal use. Some people choose to enjoy the esoteric, emotional and jewellery-value advantages of older mechanical watch technologies over the small accuracy advantages of quartz watches.

WHAT MAKES A MECHANICAL WATCH A "CHRONOMETER" OR "CERTIFIED CHRONOMETER?"

Fine watchmakers often have their mechanical watch movements individually certified by the Contrôle Officiel Suisse des Chronomètres. COSC is the official Swiss institute responsible for certification of wristwatch movements. Only watch movements certified with a COSC 'bulletin de marche' (certificate of watch performance) are allowed to bear the internationally protected label "Official Swiss Chronometer" or even use the word "Chronometer" anywhere on the product, packaging or advertising.

The standard used by COSC is to test the accuracy of a mechanical wristwatch movement--before it is assembled into a watch--for consistent accuracy under a range of position and temperatures. COSC performs seven tests as part of the certification. But the most commonly mentioned is the "mean daily rate" test for which a standard men's watch size mechanical movement, the watch must maintain an accuracy within -4 to +6 seconds of variation per day (that's +99.994% accuracy!).

Mean daily rate - +6, -4 s/d
Mean variation in rate - 2 s/d
Greatest variation in rate 5 s/d
Difference between vertical and horizontal rates - +8 to -6 s/d
Greatest difference in rate - 10 s/d
Variation in rate due to temperature - +/- 0.6 s/d
Resumption on rate +/- 5 s/d

The other six less mentioned measurements are: mean variation in rate, greatest variation in rate, horizontal and vertical difference, greatest deviation in rates, rate variation due to temperature and resumption of rate. Overall, these tests measure not only the overall daily accuracy but also the consistency under various normal ranges of conditions.

It is also important to note that a "COSC certified chronometer" is not the Holy Grail of watch making. With the high quality of modern manufacturing, this test is nowhere near as important as it was several decades ago. Most decent modern watches, when adequately adjusted, should be able to match the performance specified by COSC.

A chronometer certificate is not a guarantee of future accuracy. Watch movements that have been certified can get out of adjustment and perform poorly. Movements that were not certified may still exceed the COSC standards--the manufacturer may simply have simply chosen to bypass the expense of the certification process.

AREN'T SOME QUARTZ WATCHES CERTIFIED AS CHRONOMETERS, TOO?

Yes, but they are very rare. Even a very cheap quartz watch can easily exceed the COSC requirements for a mechanical chronometer. So COSC had created a separate series of tests and standards to certify the truly superior quartz movements. They are tested under several measurements, the most important being a 'mean daily rate' of +/- 0.2 seconds per day.

Almost no watch manufacturers bother to have their quartz movements certified by COSC, though. This is primarily because the general public are seldom willing to pay extra for a certified accurate quartz watch--they expect quartz watches to be well more accurate than needed for normal life. The few companies that offer Quartz Chronometers do so mainly to appeal to niche market of super-high-accuracy wristwatch enthusiasts.

HOW IS A "SUPERLATIVE CHRONOMETER" DIFFERENT FROM A "CERTIFIED CHRONOMETER" OR JUST "CHRONOMETER?"

The term "Superlative Chronometer" is a trademark of Rolex. The addition of the word "Superlative" in front of the official designation of Chronometer is merely a Rolex marketing angle to give a more distinguished sound to the chronometer status of their products. All watches that have earned the privilege of bearing the official Swiss designation of "Chronometer" have been held to and met the exact same C.O.S.C. standards. Any words added before or after the official designation of "Chronometer" are merely fluff--there are not any different grades or levels of chronometer certification.

Likewise, "Certified Chronometer" also means nothing different than just "Chronometer." It is a redundant phrase--since Chronometer status is a certification--that is used like "verde green" or "hot water heater" to ensure that the reader clearly and quickly understands the point.

ARE QUARTZ WATCHES ALWAYS MORE ACCURATE THAN MECHANICAL ONES?

Typically, they are, but not always. Accuracy and precision is not the same thing.

It is important to remember that even when a mechanical watch can vary +6/-4 seconds per day that does not mean it will consistently vary by that high an amount each day. Mechanical movements--except the very rare 'tourbillion' movements that correct for it--are noticeably affected by the gravitational pull of the Earth. It only takes a performance distortion of 1/1000th of a percent for a watch movement to be one second less accurate in a day. This causes the performance of mechanical movements to be somewhat different from day to day when not stored in a fixed position. The good news is that the actual variations of a mechanical watch will often cancel each other out. This means a mechanical watch will tend to be more accurate over a longer period than the single-day COSC measurement may imply.

The day-to-day performance of quartz is much more consistent than mechanical under identical conditions. Quartz performance is affected mainly by temperature changes and weakened batteries. So, a quartz watch that you measured to gains 0.5 second yesterday will be <u>consistently increasingly</u> off correct time by about that amount. You can be certain that in 60 days, it will be about 30 seconds off. At the end of a year, it would be likely be over 180 seconds off.

Compare that to a mechanical watch that you measured to gain 2 seconds yesterday. Our example quartz watch is 4 times more accurate than this. But while the daily measured daily variations seem much higher, they are not likely to be as consistent, so will have a dampening effect. You cannot accurately predict that this mechanical would therefore be off by 120 seconds at the end of the same 60 days. It might be right on time, or it may be 200 seconds off. That broader range of variations allows most mechanical watches to stay closer to correct time than the daily variation rate implies. Over a year, some mechanicals can on average stay closer to correct time without having to be reset than a quartz watch might.

WHAT IS THE DIFFERENCE BETWEEN A CHRONOMETER AND A CHRONOGRAPH?

These two similar terms are both used with watches and are easily confused.

The simple answer is that a chrono<u>meter</u> is a certified accurate timepiece; a chrono<u>graph</u> is a timepiece with stopwatch functions. So, for any watch, one, both, or neither terms may apply.

CHRONOGRAPH

Any watch with stopwatch functions can be called a chronograph. This has nothing to do with any measurement of accuracy; it is merely a statement that the watch has this function.

In watch industry terms, the elapsed time measurement functions of a chronograph are some of the many 'complications' beyond the basic timekeeping functions of a watch mechanism. Even watches with quartz movements may implement these complications through mechanical gears, wheels, and dials. Other watch complications include date indicators, alarms, moon phase displays, multiple time zone features, and other time-related measurements shown with additional hands, windows, or sub-dials on the watch.

CHRONOMETER

The first need for very accurate timepieces came from ships needing precision timekeeping to allow precise celestial navigation. The term chronometer came in to use to describe timepieces accurate enough for ship navigation. In 1973, the Controle Officiel Suisse des Chronometeres (COSC) came in to existence as the official testing and certification control board.

Now, only a watch whose movement has been certified by COSC can be called a chronometer. For a typical men's-sized mechanical watch movement, it must have stayed within -4 to +6 seconds of variation per day during the COSC measurement at various temperatures and positions.

COSC also certifies quartz movements (their standard is +/-0.2 second per day for these). But since quartz movements are inherently very accurate and suffer little to no variation based on position or normal temperature ranges, certification is much less significant to buyers of quartz movement watches. Almost no watchmakers go to the expense to have COSC certify their quartz movements.

A chronometer certificate is not a guarantee of future accuracy. Watch movements that have been certified can get out of adjustment and perform poorly. Movements that were not certified may still exceed the COSC standards--the manufacturer may simply have simply chosen to bypass the expense of the certification process.

WHAT EXACTLY CONSTITUTES A "SWISS MADE" WATCH?

Swiss law is very specific on what points of origin and assembly are permissible in watches that are labelled "Swiss Made." In specific, the law:

> ...requires that the assembly work on the movement (the motor of the watch) and on the watch, itself (fitting the movement with the dial, hands and the various parts of the case) should be carried out in Switzerland, along with the final testing of the movement. It also requires that at least 50% of the components of the movement should be manufactured in Switzerland.

So, it is permissible for the movements in Swiss watches to contain a minority portion of parts made outside Switzerland. But the majority of movement parts must come from Switzerland AND the entire movement and watch must be entirely assembled in Switzerland.

The watch casing and separate or detachable items, such as watch bracelets, do not have to be manufactured in Switzerland. But the "foreign" parts must be delivered to Switzerland unassembled, with actual assembly of them into a watch occurring on Swiss soil.

Other provisions allow for watches where the movement meets the criteria, but the watch is assembled outside of Switzerland to be labelled "Swiss Movement" on the dial. The abbreviation "Swiss Movt" is strictly prohibited, because to someone without superior vision or a magnifier, such a dial label could easily be mistaken for reading "Swiss Made."

WHAT OTHER WATCH TERMINOLOGY DO I NEED TO KNOW?

8

Many calendar watches in professional photographs will have the date set to 8. It has no major significance other than being a nice looking, symmetrical number.

10:10

Many watches in professional photographs will have the time set to 10:10, with the second hand likely at 24, 37, or 45. It has no major significance other than the 10:10 being a happy looking presentation of the watch face, this combination, including the placement of the second hand is also intended to ensure none of the hands cross each other or block any of the important information the dial. In rare cases, you will see a complicated watch, such as a chronograph, photographed with the hands in an 'impossible' position--one staged for the photograph, but not possible to occur in the normal operation of the watch.

12 hour versus 24 hour clocks

Most watches and clocks have 12-hour displays even though days are 24 hours long. Only a few rare models have 24-hour dials, though 24-hour display modes on digital watches are common. 'GMT' watches typically have one hand that operates on a 12-hour basis to display local time plus a 24-hour hand to display a second-time zone.

Before there were clocks, people used sundials to measure time. Since sundials only work during the half of the day where there is daylight, sundial dials were marked to only show the 12 daylight hours. When mechanical timepieces came into popularity, they typically used the same 12-hour format to be familiar to people used to telling time from sundials. Back then, few people dealt with anything other than local time, so day and night were obvious. It was not until many years later than trans-time zone travel, and communication would occur rapidly enough to cause 12/24-hour confusion. By then, the 12-hour clock dial was so prevalent, it remained the standard.

14K gold

555 fine gold is seldom used for fine jewelry outside the USA. Between 1933 and 1974, United States citizens were not allowed to own 18 or 24K in bullion form because of laws put in place in 1933 to prevent hoarding of precious metals (specifically gold and silver) when the US went off the gold standard for currency. Further, the US placed high import taxes on many permissible forms of gold 18K and higher--particularly jewelry and watches. These two factors discouraged the sale of solid and higher carat gold jewelry and watches in the US for many years. It was not until 41 years later (1974) that these laws were repealed, and US citizens could again purchase and own 18K and finer gold in bullion form. At the same time, the additional import taxes on many forms of gold were repealed. So many of the 14K gold Swiss watches made for sale in the United States during those years were made of genuine Swiss movements that were assembled in the US into US made gold casings.

555, 750, 925...

an indication of the purity (similar to the Karat rating) of the metal used. The meaning of this number is the parts per thousand of the pure metal in the alloy used. For a more detailed explanation, see *Karat* below.

Authorized Dealer

a watch seller who is officially sanctioned by the manufacturer. Watches that they sell will have full manufacturer warranties. Also, should you have any difficulties with an authorized dealer, you have the option to get the manufacturer to intervene on your behalf. Also see *Unauthorized Dealer* below.

Automatic

refers to mechanical watch movements that wind themselves from the wearer's physical activity. For more detail, see the two types, Bumper Automatic and Rotor Automatic.

Balance

The most critical moving part of a mechanical watch movement. This includes the balance wheel that rapidly spins back and forth and the balance lever. The lever is the ratchet mechanism that makes the characteristic 'tick' sound as it converts the balance wheel's motion into the precisely regulated increments of movement that run the watch.

Band

A vague, generic term used to refer to the band that holds a watch on your wrist. The preferred terms are **Bracelet** or **Strap**, which clearly describe the two major types.

Battery-less Quartz

Also known under various marketing names, including Kinetic (Seiko), Omega-matic (Omega), and Autoquartz (Invicta). Terms for the modern hybrid watch technology of using a quartz movement powered by a small electric current generator operated by a rotor. Electricity generated from the rotor's movement is stored in a capacitor, rechargeable battery, or similar means to keep the watch running. So, like an automatic watch, these also must be worn regularly to keep up their electrical power reserve.

Bezel

generically, the upper part of the watch body. Specifically, it usually refers to a ring around the outside of the crystal. On jewelry watches, the bezel may contain a ring of diamonds. On sports watches, the bezel may have calibrated markings and the ability to rotate in one or both directions.

Bracelet

a metal link watch band. Similar to a jewelry bracelet, may have a clasp to open it.

Bumper Automatic

a type of watch movement found only in vintage watches. It is similar to the rotor automatic which winds the watch based on the wearer's movements. The difference with the bumper automatic is the weight may have only a 180 degree or less path of movement--hitting a small bumper at each end of its path of travel.

Certified Chronometer

another term for Chronometer. This somewhat redundant phrase is used to make it clear to watch buyers that 'chronometer' is a certification. Also see *Chronometer*.

Chronometer

a watch or clock movement certified accurate by the Contrôle Officiel Suisse des Chronomètres (Swiss Chronometer Control Board).

Clasp

the fastener or catch used to open and close a watch bracelet. Also see *Deployant Clasp*.

Clockwise

the direction of movement of the hands of a clock. The definition of clockwise came from the way the shadow indicator moves on sundials in the northern hemisphere. When the Europeans and Chinese made mechanical timekeepers, they made the hands move the same way because that was the way people were used to reading time.

COSC

is the Contrôle Officiel Suisse des Chronomètres (Swiss Chronometer Control Board). They are the official Swiss agency that certifies all watch movements that bear the internationally recognized and protected status of "Chronometer."

Crown

the knob on a watch - often at the 3 o'clock position - used for winding and setting the watch.

Crystal

the glass front of a watch. Often made of a mineral glass or acrylic, but on many finer watches, it is a synthetic sapphire which is very hard to scratch.

Deployant Clasp

a clasp mechanism for use with watch straps. This allows a leather or other watch strap to operate similar to a watch bracelet. This gives a nicer, more finished appearance than the traditional tang-type buckle on most straps. Sometimes mistakenly called a 'deployment' clasp.

Ebauche

A base watch movement. Often, manufacturers will make custom modifications to the base movement to add complications (features), decorate the movement, and electroplate or upgrade certain parts for added durability.

Gold, Rose Gold, Yellow Gold, and White Gold

The only natural form of gold is yellow gold. But since gold is too soft in its pure form to make jewelry, it is normally made into an alloy by mixing it with other metals. The portion of pure gold to other metals determines the Karat rating. 24K is pure gold. 18K is 75% pure. The exact nature of the other metals used determines the color. A moderate amount of copper in the alloy creates Rose Gold. A moderate amount of palladium and nickel in the alloy turns yellow gold into white gold--by literally washing out the yellow color of the metal.

Gray Market

Are unauthorized sellers of **new** watches.

Hack

The feature on many mechanical movement watches that stops the second hand when you pull the crown all the way out to set the time. This makes it much easier to set a mechanical watch precisely to the second when synching with a time signal or known accurate clock. Older watches less commonly have this feature. To simulate the hack feature on many watches that don't have it, pull the crown out to the time setting position, then try gently turning the crown backwards. This puts a small amount of back pressure on the watch movement, which may stop the second hand long enough for you to synchronize it with another clock.

Incabloc

A method of shock protection for a wristwatch movement, developed in the 1930's. Other named techniques for shock protection include Parachoc, Kif, Unisafe and Novochoc. Incabloc prevents shock damage by allowing the jeweled balance of the watch to move laterally and vertically within a spring-mounted setting. Incabloc is used by many movements including most modern ETA and Omega movements. See also 'Kif' below.

Jewels

Are elements used in mechanical watches. Usually a very inexpensive form of synthetic ruby, these are used for virtually frictionless pivots or hubs at certain critical places into the watch mechanism. These jewels are worth only pennies and do not add any monetary value to a watch. It is also important to understand that more jewels do not necessarily make a better watch. While too few can certainly be a problem, the exact number needed for optimal performance depends on the specific design and features of the movement. Overall, 17 jewels are the lowest number needed for most standard mechanical watch movements. Other movements that implement different designs, or complications such as chronographs, may use more. But a novice cannot derive useful basis of evaluation or comparison from whether a watch has 17, 21, 25 or more jewels.

Karat or **K**

An indication of the purity of the metal used, expressed in the number of 1/24th of the pure metal used in the alloy. Metals such as gold are too soft in their pure state use in jewelry, so they are typically made into an alloy with other metals for strength. 24K (equal to 24/24ths) is pure metal. 18K is 18 parts pure metal mixed with 6 parts of other metals. That translates to 18/24=0.750, which is 75% pure, or 750 parts per thousand.

Gold is often used in 18K (750 fine), 14K (555 fine), and occasionally 10K (425 fine). Silver and platinum are harder in their natural form, so are usually used at 22K (925 or 950 fine) or 24K (999 fine). Also see the entries above for *Gold* and *555, 750, 925*.

Keeper

The one or two loops included on watch straps, used to help hold any extra part of the strap protruding past the buckle.

Kif

A method of shock protection for a wristwatch movement, developed in the 1930's. Other named techniques for shock protection include Parachoc, Incabloc, Unisafe and Novochoc. Kif is the shock protection system used several watch makers, including Rolex. See also 'Incabloc' above.

Lugs

The four protrusions on a typical watch case used to attach a bracelet or strap.

Manual-wind

is pretty much self explanatory--it refers to a watch movement that you have to manually wind it every day or two to keep it running. This is the oldest method of powering a watch. While much less common today, manual-wind watches are still available from many finer watch manufacturers.

Minute Repeater

A special complication found on a few very high end mechanical watches and some more affordable quartz watches. On the major quarters of the hour, or when activated by the wearer, the watch chimes the current time. The minute-repeater chiming pattern uses a mid-note for each hour, followed by a high-mid note pair for each quarter hour, and if chiming a time between the quarters, adds a high-note for each minute past the quarter hour. So, a time like 2:22 would chime as: "dong, dong, ding-dong, ding, ding, ding, ding, ding, ding, ding."

NOS or New Old Stock

Items that are older but still technically considered new as they have never been used or sold to a customer. Often these are unsold watches, watch bracelets or other parts that have been in a store's inventory or warehouse for a long time--often for years or decades after that model has been discontinued by the manufacturer. Sometimes improperly used by watch sellers on auction sites to describe watches that are older but still look vaguely in 'like new' condition.

Power Reserve

A measure of the amount of time a watch will run after being fully powered or wound, with no additional power input. Normally, this means when a mechanical watch is fully wound, or a quartz watch has a brand-new battery. Many modern mechanical watches have a power reserve of 40 hours. Power reserve also applies to battery-less quartz watches, which may have power reserves from 40 hours to 6 months. On battery-operated quartz watches, the term is sometimes used to refer to the expected battery life--typically 12 to 32 months.

Rotor Automatic

The most common form of automatic watch, and pretty much the only type manufactured today. In it, a weight inside the back of the watch has a 360-degree free path of rotation. Activity of the wearer causes the rotor to move. Its movement in one or both directions (depending on the exact watch movement) winds the watch.

Self-Winding

See *Automatic* above, which is the preferred term.

Strap

A watch band made of cloth, rubber, leather or other non-metal material.

Superlative Chronometer

Is another term for Chronometer. The use of the word Superlative in front of the industry standard term Chronometer is a Rolex trademark to give more panache to their product. But the term Superlative is merely fluff. There is only one grade of chronometer. Any watch bearing the any form of Chronometer designation has been certified by the same agency (COSC) and to the exact same standards as any other Chronometer. So, the terms 'Superlative Chronometer' and 'Certified Chronometer' and 'Chronometer' all mean the exact same thing. Also see *Chronometer*.

Tantalum

A metal with a texture like titanium, but a color similar to gold. Used by Omega for the gold-like trim on certain titanium watches. Many of these watches are also available in titanium with real gold trim.

Turbillon

a special complication found on only a few very high end mechanical watches that compensates for the effect of gravity. This eliminates the small variation in watch movement performance based on the position of the watch (face up, face down, on side, etc.).

Unauthorized Dealer

a watch seller who is selling a particular brand of watches, but without being officially sanctioned by the manufacturer. These are typically dealers that buy the watches through indirect, closeout or 'back door' channels. Since they have no direct business relationship with the watch manufacturer, the manufacturer cannot ensure the quality of product or service the dealer provides. Further, any official factory warranties form the manufacturer are voided on watches bought through these unofficial 'back door' dealers. The warranties that such dealers promise is their own warranty coverage, not the manufacturer's factory warranty. Also see *Authorized Dealer* above.

Watch Winder

a powered device that rotates an automatic watch to keep it wound and running when not on a person's wrist.

Waterproof

a term no longer used because it incorrectly implied a more complete resistance to water entry than such watches were actually capable of. See *Water Resistant*.

Water Resistant

> a designation indicating a watch has been tested to resist entry of water into its casing based on static pressure tests.

THE HANDS OR BEZEL MARKINGS DO NOT LINE UP PERFECTLY - CAN THIS BE FIXED?

Don't panic. A barely perceptible misalignment is not unusual and normally is not a sign of a defect or problem.

Certain moving or movable parts of a watch, particularly the second hand and the rotating calibrated bezels on sports models, have their exact stopping positions controlled by mechanical components (springs, gears, and ratchets). So, the exact precision of the stopping points for these elements can change slightly over time as the new mechanisms settle in and gradually wear over time from use.

The unaided human eye can perceive detail down to about 1/100th of an inch (0.25 millimeters), so it is possible to barely see these normal alignment differences of 1 or 2 hundredths of an inch. The few places where these might be noticed are:

- The markings on a rotating bezel compared to the corresponding marks on the dial.
- The second hand of a quartz watch, where it stops every second.
- The second hand of any watch when the watch is stopped.

These are not defects or imperfections. They are minor differences within normal tolerances of precision and wear for such mechanisms. In some cases, the watch manufacturer may intentionally set components a small fraction of an inch off to compensate for how the mechanism is expected to settle in from use.

Certain parts, like rotating bezels, hands, and dials are at different heights relative to each other. Depending on the exact angle you look at the watch, the parallax of three-dimensional perspective can cause them to appear misaligned by small fractions. This is simply an aspect of human perception that no product can force itself to look correct under all circumstances.

It is not unusual for a new luxury watch owner to scrutinize their watch to extremes and stress over any perceptible inconsistency they can find. Omega is committed to delivering extremely fine watches and will address any real problems with their products. But some buyers go to the level of observing details that are below the threshold of reasonable expectation of perfection in a consumer wristwatch. A surprising number of watches get returned and many customers are unhappy over STAGGERINGLY TRIVIAL DETAILS. Relax. It is just a wristwatch. Do not behave like someone that never owned anything expensive before by demanding a return or exchange over nearly imperceptible trivialities. If you do, then YOU are the one ruining your enjoyment over your purchase.

WHY MY MINUTE AND SECOND HANDS ARE ARE NOT HITTING THEIR MARKS AT THE EXACT SAME TIME?

No watches are geared to *force* the minute and second hands to exactly their marks simultaneously. Think about it: for a watch to do that, the minute hand would have to jump in 1-minute increments when you set the watch to stay in sync with the current position of the second hand. That's just too impractical to accomplish with a mechanical watch.

Instead, the minute hand on mechanical watches stays in whatever alignment relative to the second hand that you leave it in when you set the watch. So all you have to do is set the watch correctly and it will stay perfect. If your minute and second hands are not currently in sync, your watch is perfectly fine and is suffering only from the watch manufacturer's typical negligence in providing adequate instructions describing the best procedure to set your watch.

Here is the correct and simple procedure to ensure the alignment is right. It works on any mechanical watch with a 'hack' feature--meaning the second hand stops when you pull the crown all the way out to set the time.

1. Stop the second hand exactly at 12.
2. Set the time, positioning the minute hand *exactly* on the appropriate minute mark.
3. Restart the watch.

That's all you have to do. When set the watch this way, the hands start off in the correct alignment and will stay that way. The only conditions that could likely change the alignment are if the watch is set again without this attention to detail or the watch receives a physical shock significant enough to bump the alignment off.

WHY DOES MY AUTOMATIC WATCH KEEP LOSING TIME? DOES IT NEED REPAIR OR ADJUSTMENT?

If your automatic watch seems to be running slow, the answer may be that it is 'power starved. Simply put, you might not be wearing it enough active hours of the day to keep it properly wound. Without enough power stored in the spring, the mechanism of the watch runs slightly slower then needed to keep accurate time. In fact, it may even briefly be stopping without you noticing!

So, before you get frustrated at the apparent poor performance of your fine watch or take it in for a probably totally unneeded repair, read the section that follows about Power Reserve to better understand your automatic watch's needs.

WHY DOES MY AUTOMATIC WATCH STOP AT NIGHT OR OTHERWISE RUN DOWN IN LESS TIME THAN THE STATED POWER RESERVE?

'Power Reserve' means the number of hours the watch should run **from being fully wound up**. But a common mistake with automatic watches is to wear them only a few hours a day, or every few days, and think that is enough movement to keep it wound. Automatic watches need to be worn regularly and for more than just a few hours a day with you moving normally (more than watching TV or napping). Even then, the watch may be far from fully wound at the point you take it off at the end of the day, so may not continue to run overnight or over a full weekend. How much you wear the watch over weekends is important too, as people's behavior is frequently different them, often leaving the watch much more or much less wound by Monday.

An automatic watch uses its stored power constantly by running continuously. But it only gains more power if you manually wind it or from the automatic winding that occurs from your motion while you are active while wearing it. The net effect is that if you are not wearing it enough, it uses more power during a day than it gains from the number of hours of active motion it receives.

Since almost all automatic watches lack an indicator of how 'full' their power reserves are, here are some usage guidelines to help you keep your reserves up:

- If your automatic watch stops, manually wind it about 20-30 turns when you put it on. Don't depend on the automatic winding to get your watch back up to power--that can take too long and still leave your watch low on reserves by the end of the day.
- In general, an average watch wearer's motion is enough to power an automatic watch for 2-3 times as many hours as it is actively worn.
- If you wear your automatic watch at least 10-12 active hours 7 days a week, you should maintain 50% (about 20 hours) of power reserve by the end of the day when you take it off.
- It does not hurt an automatic watch to manually wind it every once in a while, to make sure its power reserve is 'topped off.'
- And finally, automatic watches are not the right solution for everybody. That is why battery-operated quartz watches are popular too. Some people really need watches that run for days or months without attention or need to wear. Although some owners and salespeople might lead you to think otherwise, there is nothing wrong with selecting a quartz watch over an automatic if it better fits your needs or lifestyle.

HOW CAN I TELL IF I'M GETTING THE STATED POWER RESERVE ON MY AUTOMATIC WATCH?

To test to see if your watch is really getting its full power reserve, try this: manually wind your watch at least 40 turns and make sure the time is correct. Then leave it on the dresser for two to three days and see what time it stops. If it runs for close to the stated power reserve (usually 40-44 hours for many modern mechanical watches), then your watch is perfectly fine. If it runs significantly less than that, it may need cleaning or an adjustment.

If your power reserve is functioning correctly, then you may need to simply manually wind the watch when you take it off to ensure it is sufficiently wound. Or you may choose to change your wearing habits to keep the watch on your wrist for more active time. And finally, you can always consider getting a watch winder to keep your automatic watch ready to wear even when you do not use it regularly.

WHY DOES MY DATE NOT CHANGE RIGHT AT MIDNIGHT?

There are two major ways a mechanical date window changes on a watch. So the answer to this question depends on which type you have. This applies to any watch, mechanical, automatic or quartz, where the date window is implemented as a mechanical function instead of an electronic display.

Watches with slow date change have the date roll over very slowly. Sometimes these watches may take one to four hours for the date to completely roll over. This is perfectly normal for many watches. Though it can be confusing if you are awake between 11:00 PM and 3:00 AM and want to be certain what date it is.

Watches with rapid change date have the date window rollover very fast--often within a fraction of a second. This is a more precise way of displaying the date, but requires a more complicated mechanism. Having the precise time that this rapid change occurs be off from midnight is a common issue. Rapid date change watches usually come from the factory set for the date change to within 10 minutes of midnight. But it is not unusual for this to get further out of adjustment over time from one of several causes.

It is possible that a shock to the watch right around the date change can throw the mechanism off. The more common causes are from the owner manually changing the date within three or four hours either side of midnight, or setting the time backwards across midnight. The frequency that this problem occurs makes it disconcerting that few watch makers provide warnings about this in their instruction manuals. What happens is that if you alter the date setting while the date change gear is near to pushing the date forward, you may push the mechanism slightly out of alignment. This seldom causes any real damage, though it can. Most often, it will shift the time that the date change occurs--usually further from midnight.

The good news is that this is easily corrected when the watch is being serviced. Simply mention the date change is off when you send the watch in for its routine cleaning or other service.

WHY DOES MY DATE CHANGE AT NOON INSTEAD OF MIDNIGHT?

Most mechanical calendar watches are not AM/PM aware--they simply advance the date *every other* time the hands pass forward across 12:00. Where people get confused with this is because they assume it is more complicated than that.

When setting a watch that has run down, make sure you roll the hands forward past 12:00 at least once so you can see when the date changes. Then set the time accordingly so the next date change will occur at midnight, not noon.

Digital watches do not have this confusion, because you have to explicitly tell them whether it is AM or PM. Watches that display 24-hour or military time also are clear on where in the 24-hour day the time is. But most watches display a simple 12-hour representation of the time--leaving it up to the wearer to understand which half of the day they are in.

WHY DOES THE DATE SOMETIMES DROP 1, 2, OR 3 DAYS BEHIND OR SHOW THE 31ST WHEN IT IS THE 1ST?

As mentioned above, most mechanical calendar watches take a very simplistic approach to handling the date. This is because the modern Gregorian-based calendar follows somewhat complex rules. While the rules are simple for a digital watch to handle, they get very complex to execute in a tiny mechanical device. Most particularly complicated is that correct computation of the number of days in each month requires the watch to keep track of not only the current date, but also the month and year.

A conventional calendar watch is mechanically very simple--it takes the elementary approach that ALL months are 31 days. The watch simply rolls the date forward by one every other time the hands pass forward across 12:00. The date goes up to 31 then restarts at 1. They are not aware of any concepts of month, year, decade or century.

The only down side to this greatly simplified approach is that five times a year, you have to manually roll the date forward to correct for this. In addition to the normally short month of February, there are four months of the year that have only 30 days: April, June, September and November. So, on the 1st day of the following months, you will have to advance the date by one so your watch will correctly display the 1st.

The "perpetual calendar" watches that do handle this are much more cumbersome to set. They have to understand not only the day but also the month and the year. Making a mechanism that can not only do that but can be changed and reset when needed is pretty intricate. Since it is FAR simpler to merely correct the date five times a year, few manufacturers bother to add the expense of such a feature to their watches.

Digital watches have no problem with the number of days in a month because they can easily set and track both the month and day.

WHY IS MY "SWEEP SECOND HAND" MOVING IN SMALL JUMPS?

That is the way is it supposed to work. The 'sweep' motion of a mechanical watch movement's second hand is not like the sweep of the second hand on an electric clock. Depending on the 'beat' rate of the mechanical watch movement, the second hand typically moves 5 or 8 times in a second. That is considered 'sweep' in a mechanical watch movement.

Due to the "persistence of vision," the limit of human perception is about 18 movements per second. That's why early movies from around 1900-1920 which were shot at 16 frames-per-second looks jumpy, but modern film (24 frames/sec) and TV (30 unique frames/sec in the NTSC format used USA & Japan) give the appearance of continuous motion.

So the 'sweep' action of 5 to 8 movements/second looks somewhat, but not perfectly smooth and continuous.

MY MECHANICAL OR AUTOMATIC WATCH IS OFF A FEW SECONDS PER DAY, HOW CAN GET BETTER ACCURACY?

Keep in mind that because of gravity, a mechanical watch runs a little differently in different positions. Also remember that each time you open a diver's watch or other watch with water-resistance, you must have the whole thing pressure tested again to make sure the water-resistant seals were put back right. So, it is best to avoid unnecessary opening of the case to have a watchmaker regulate the watch!

If your watch is a Chronometer and is off by over 10 seconds per day, it may be is worth having a watchmaker adjust it. But if your watch is only off by a few seconds per day, try the following method of compensating for it. Before you go to bed, check the accuracy of your watch against a reliable time source. Write the information down, then place your watch on the nightstand and go to sleep. When you wake up, measure the accuracy again, write it down, and put the watch on. For the next several days, keep doing the same thing except put the watch in a different position each night. Try face up, face down, crown up, crown down, 12 o'clock high, and 6 o'clock high.

After you have tried all the positions, you will have a list showing exactly how much your watch gets off during the day AND how much it gains or loses in each possible position at night. Find the position to keep it at night that does the most to cancel out the variation the watch experiences during the day. For example: If your watch loses 5 seconds while being worn during the day, try to find a position in which the watch gains about 5 seconds overnight. That way, by simply knowing which position to put your watch in on the nightstand while you sleep--you may be able to cancel out the daily variations and have a very accurate watch!

WHY DON'T IDENTICAL WATCHES/MOVEMENTS RUN EXACTLY THE SAME?

Given two identical mechanical watches, or watches with the exact same mechanical watch movement inside, it would seem that the accuracy and performance under different positions should be the same--but they will not be. Each may be noticeably different in their performance. These are mechanical devices, built to exacting tolerances finer than 1/100ths of an inch. Even virtually imperceptible variations in alignment in such tiny parts can make a difference. That plus exact levels of lubrication and wear patterns as the movement settles in are enough to make the exact operation of each 'identical' movement slightly different.

Consider, each mechanical movement is counting out 672,000 beats per day. If one or more miniscule variations in wear, alignment or lubrication makes a 0.00001 (one hundredth of a percent) difference, that will throw the watch off by 8 beats a day--or a difference of 1 second. So over relatively short periods of time, even miniscule variations are amplified into discernable variations in the accuracy. That's why all movements have what is effectively a universal compensator--the big regulation screw that adjusts the base speed of the movement. That single feature allows the overall regulation to compensate for a multitude of these extremely minor variances in tolerances and performance, allowing you to have a coin-sized mechanical device on your wrist that can even attempt to compare decently to the accuracy of million-dollar atomic clocks!

HOW DO I MANUALLY WIND THE WATCH ENOUGH WITHOUT OVER WINDING IT?

Manual-wind watches normally give you feedback when they are sufficiently wound by offering resistance at the crown. Never attempt to wind more after you start to feel this resistance--you can severely damage the watch. Automatic watches operate quite differently. Since they have the capability of winding themselves, they also need protection against over winding. So, all automatic watches are equipped with a gear that disengages when the spring is fully wound. The advantage is that it makes it impossible to manually overwind an automatic watch. The disadvantage is that you lose the feedback of when you have wound your automatic watch enough. Generally, mechanical watches take somewhere in the range of 20 to 30 turns of the crown to wind them fully from being completely run down.

WHICH WAY DO I TURN THE CROWN TO WIND THE WATCH?

Mechanical watches wind when you turn the crown clockwise. When you are looking at the face of the watch, this means rotating the upper face of the crown upwards, toward the 12.

Most watches are perfectly accommodating in allowing you to turn the crown the other way too, but the reverse direction is simply a neutral gear mode which does not wind the watch. Some people prefer to turn the crown back-and-forth without taking their fingers off of it. Other people rotate it forward, reposition their fingers, then rotate forward again. Both are equally valid and effective ways of winding a watch

HOW DO I OPERATE AND HOW MUCH SHOULD I TIGHTEN THE SCREW-DOWN CROWN?

Many watches that are highly water-resistant have screw-down crowns. Essentially, the crown of the watch (the knob on the side used to wind and set the watch) screws in place like a tiny bottle cap to make sure that part of the watch is extra water-resistant. To open the crown, simply turn the crown anti-clockwise to unscrew it (takes about 4 or 5 turns). To close it back, push it in while turning clockwise. Do not close it real tight, just with mildly firm finger pressure. It is the threading that provides water-tightness, so over tightening does nothing to increase the water protection and can overstress the metal, eventually damaging it and ruining the water protection of the crown. A few diving watches also have a "helium relief valve." If yours does, check that it is closed similarly. Once the crown is unscrewed and in the "neutral" position, the crown operates like any normal watch.

IS IT OKAY TO LEAVE MY CHRONOGRAPH FUNCTION RUNNING ALL THE TIME?

On most mechanical chronographs, yes, it is okay. Some people prefer to do this to have the large second hand running. There is no evidence this causes any additional wear of any significance to the watch. It also makes little difference in the power reserve on your mechanical watch. Omega reports that their watches should lose less than 2% of their power reserve having the chronograph running continuously. On quartz chronographs it is certainly okay. Though some quartz chronographs may limit the duration that the chronograph will run. Also, some quartz watches may disable the chronograph functions to conserve battery power when the battery is very low.

WHEN I SET MY WATCH, IS IT OKAY TO ROLL THE TIME BACKWARDS?

As a general practice, no for mechanical watches, yes with some limitations for quartz watches. For some watches with mechanical movements, this is a bad idea for several reasons. First, the mechanisms are usually designed around moving forward, so some cannot take the stress of reversing properly. Second, after a mechanical watch settles in, reversing the watch against the pattern of wear may cause unnecessary additional wear. Both mechanical and quartz watches with dates and other complications handled by mechanical parts can be harmed by rolling the time backwards--especially near midnight. Despite that, many modern watches can be reversed with no problem. But it is best to check with the manufacturer to be sure.

The one general rule is that if your mechanical watch's second hand does not stop when you put the watch in time setting mode, then you should not turn the hands backwards. The types of watches where it never matters to turn the time backwards are quartz watches where neither the date window nor the hands are moved directly by the crown. Two examples are the Breitling Aerospace and Omega Sea Master Multifunction. On both, the date appears on a digital display and the hands are moved forward or backwards electronically by commands issued by rotating the crown.