

Cronosurf Wave

Welcome to the Android version of **Cronosurf Wave**! This app is based on the original design started 2014 as a web-based technology demonstrator (see cronosurf.com). It offers the same functionality as the web version plus some extra features.

Getting started

The **Button Assistant** function - already known from the Cronosurf website - that labels each button according to the momentary state of the watch, is now integrated in the app (portrait mode only). Use it for quickly getting familiarized with the basic functionality. To activate it, simply tap on the area above the watch.

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1. General

1.1. Basic features

- 12-Hour Stopwatch/Chronometer with 1/20 of a second resolution
- 12-Hour Countdown-Timer with optional automatic repetition
- Daily/Once Alarm with optional gradual volume
- Optional vibration for alarm and countdown signals
- Customizable presets for often used alarm and countdown times
- World Time with 15-minute steps
- Date and day of the week - and the unique Cronosurf's monthly calendar
- Innovative 100-year-Calendar
- [NEW] Week number
- Indication of moon phases (full moon and new moon)
- Compass (when supported by device)
- 3 battery level indicators
- Screen-On timer
- Adjustable motion mode of the second hand: pulse (1/sec) or sweep (5/sec)
- Can run as a Live Wallpaper on Android - with basic interactivity and adjustable background color
- Supports Android Wear
- Lots of extra functionality that you've probably never seen on other chronographs

PRO version features

- 5 customizable highlight colors
- 4 instead of 2 presets each for alarm and countdown timer
- QuickStopwatch function
- [NEW] Split function for the stopwatch
- Flyback function for the stopwatch
- Reference pointer for the compass
- For the Live Wallpaper, any image from the gallery can be set as a background image
- Landscape mode

- WEAR: Auto-Return to TME mode after 1 minute; long press [B] to disable until next mode change
- WEAR: [NEW] The info box shows the watch temperature
- Ad-free

1.2. Parts of the watch

The following figure shows the main parts of the watch and the operation buttons:

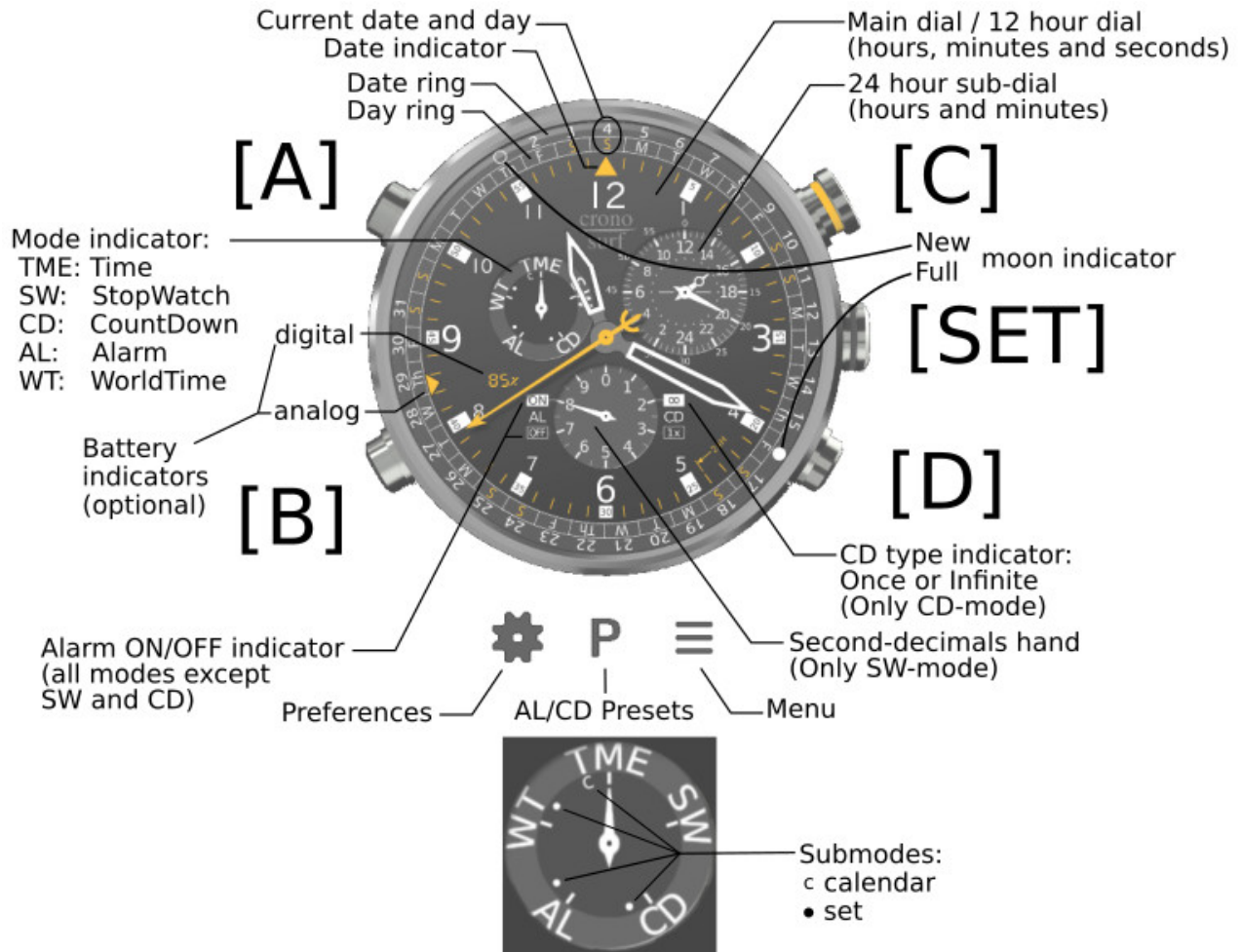


Figure 1. Parts of the watch

Press button [A] to change the watch mode clockwise and [B] to change it counter-clockwise. The function of the buttons [C], [D] and [SET] are mode dependent.

In some situations, specific buttons have a special function when they are pressed and held down for at least one second. This will be referred to in this manual as *long-press*.

Situational awareness

When reading the watch, we recommend always taking the first glance at the mode indicator in order to be aware of the current mode (and possibly submode) and therefore of what the main hands are indicating. We also

recommend often controlling the alarm ON/OFF state, which is shown by the decimals hand in all modes except SW and CD.

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1.3. Audible Signals

There are five different audible signals:

- Single beep, normal pitch:
 - confirms the START function in both SW and CD modes
 - confirms turning the alarm ON/OFF
 - confirms the activation of the CD operating mode "1x"
 - Indicates entering a setting procedure or the calendar submode
- Single beep, high pitch:
 - confirms the STOP and RESET functions in both SW and CD modes
 - indicates finishing a setting procedure or exiting the calendar submode
 - confirms the return to the time mode upon long-pressing button [A]
 - confirms the split release in SW mode (only PRO version)
- Two beeps in rapid succession, normal pitch:
 - confirm that the CD operating mode is **Infinite** (either upon mode activation or at every start of the countdown)
 - confirm the split time measurement while in SW mode (only PRO version)
- Two beeps, normal pitch, repeating every 1.5 seconds:
 - countdown alarm (30 seconds long*)
- Four beeps in rapid succession, normal pitch, repeating every 2 seconds:
 - regular alarm (30 seconds long*)
 - regular Alarm with **gradual volume** (will fade in during the first 20 seconds and continue for another 30 seconds*)

* You may cancel the countdown or regular alarm signals by either **pressing any button** or by **tapping on the watch face**. When doing so, the original function of the button or touch area will be suppressed.

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1.4. Vibration

By default, the alarm and the countdown timer signals are only audible ("Beep only"). It is now possible to change this setting to "Vibrate only" or "Both". These settings can take into account different situations like loud or silent environments, or devices which have only either sound or vibration.

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1.5. Settable Modes

The following main modes have time settings that can be changed by the user:

- CD (Countdown Timer)
- AL (Alarm)
- WT (World Time)

This is accomplished through set-submodes which are activated by pressing the [SET] button. A single beep will be heard and the hand to be set will shortly perform a wiggling motion. Now, press buttons [C] or [D] as needed to change the value of the active hand. Holding the button pressed will continuously change the value. Once the desired value has been reached, press button [SET] again to proceed with the next hand. After the last hand is set, pressing button [SET] once more will exit the set submode. This will be confirmed by a high pitched beep.

Depending on the preference setting for the set buttons (Advanced Preferences), its operation direction may be either logic ([C] + / [D] -) or geometric ([C] CCW / [D] CW).

Note: Each of the settable modes has a small circle on the mode dial (see Figure 1.). The mode hand will advance to this position to indicate that the set submode is active.

Note: If during the setting procedure one of the buttons [A] or [B] is pressed, the settings up to this point will be accepted, a confirmation high pitched beep will be heard and the mode will change as commanded.

Note: The watch will automatically exit the set-submode after a timeout of 90 seconds of inactivity.

As an alternative, the active hand can also be set by dragging with the finger on the central area of the watch face (see chapter [Invisible touch areas](#)).

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1.6. The 24-Hour Dial

One distinctive characteristic of Cronosurf Wave is its 24-hour sub-dial which shows the 24-hour position at the bottom, unlike most other chronographs where it appears at the top. We believe that this approach, with noon at the top and midnight at the bottom, is more intuitive and informative, since the hour hand corresponds approximately to the sun position as seen when facing south. For this reason, the 24-hour hand has a small circle on it symbolizing the sun.

This dial shows the world time when in TME mode. In all other modes however (even in calendar submode), it shows the local time. This means that, regardless of the active mode, you will always see the local time either on the main dial or on the 24-hour dial.

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1.7. Button Assistant

The Button Assistant shows the function of each button dynamically, depending on the current state of the watch. This will help you to get familiar with the operation of Cronosurf Wave in a very short time. Tap on the area above the watch to activate it. A second tap shows information fields below the watch, and a third tap deactivates again the assistant.

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1.8. Invisible touch areas

Apart from the obvious touch areas for the five operation buttons and the three icons below the watch, there are some invisible touch areas that can be used as follows (see Figure 2.):

Large circular area

- Tap to stop the alarm and countdown sound.
- When in set submode, drag with the finger in a circular motion to set the active hand. (Not available on Android Wear.)

Small circular area

- Tap to call the graphical menu.

Small rectangular area at the bottom

- When in set submode, tap to zeroize the active hand:
 - Countdown: Sets the active hand to zero.
 - Alarm: Sets the minute hand to zero when active.
 - World time: Sets the time offset to zero.
- When in calendar submode, tap to return to current month.

Rectangular area above the watch

- Tap inside this area to toggle the Button Assistant.

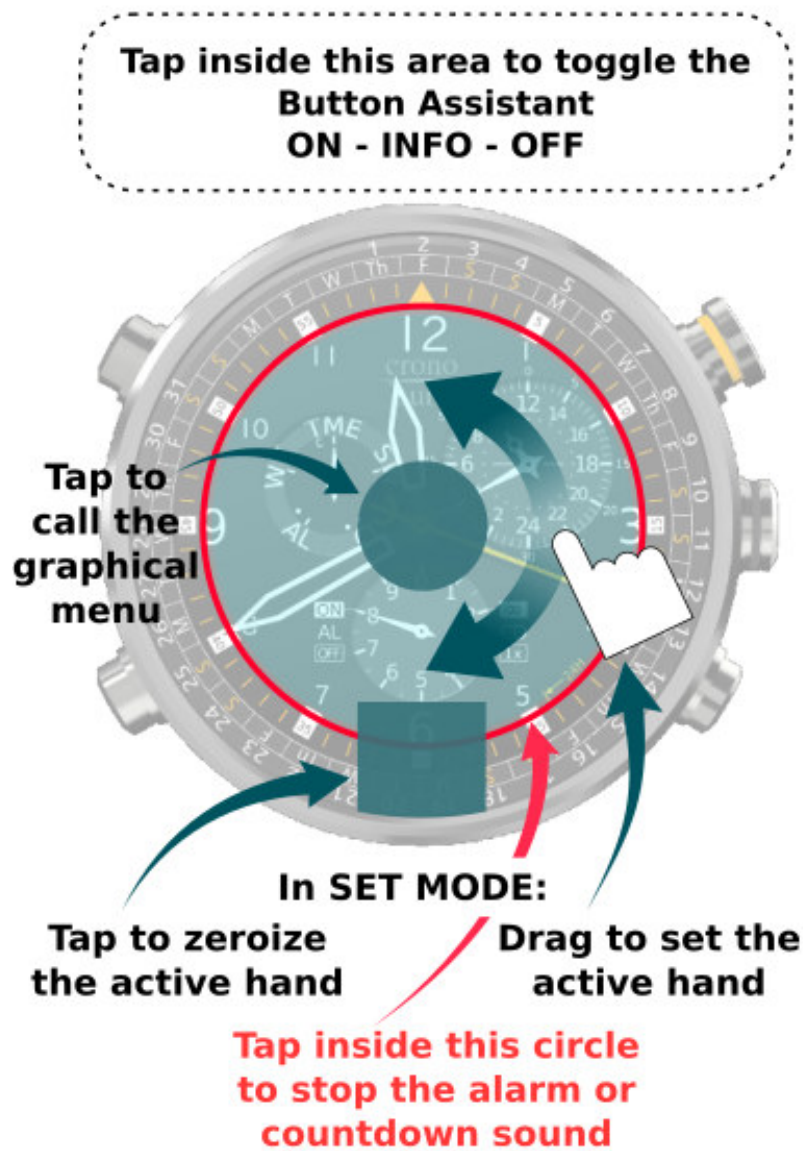


Figure 2. Invisible touch areas

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1.9. Graphical Menu

Touch on the center of the watch face to open the graphical menu. It gives quick access to often used functions, like changing the highlight color (PRO version) or toggling the Screen-On timer. It consists of a 3x3 grid with different buttons that depend on the version (free/PRO) and on the type of device.

The graphical menu of Cronosurf was introduced as a user interface on smartwatches, but is now also available on the regular app for a more consistent user experience.

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1.10. Android specific

Lock Screen

If you turn on your device and the (standard) Lock Screen is active, Cronosurf will nevertheless run on top of the Lock Screen, provided it was in the foreground before turning the device off. This is a feature that allows you to quickly access and operate Cronosurf without having to unlock the device. To access the Lock Screen, just press the HOME or BACK button on your device.

Live Wallpaper

Cronosurf can also run as a Live Wallpaper (LWP) on the homescreen (we preferred the LWP over the Widget, because of the inferior graphical performance of the latter). It offers basic interactivity which includes positioning and resizing of the watch as needed, changing the watch mode and starting the main app. In order to avoid inadvertent operation, the interactivity needs to be activated. To do so, tap on the center of the watch face. The controls will become visible, and after 2 to 3 seconds of inactivity, the interactivity will be disabled again automatically.

The procedure to set Cronosurf as an LWP is the same as for any other LWP. This may vary depending on your Android Device. The standard method is to long-press on an empty area on the homescreen and then select "Live Wallpapers".

Moreover, the standard Android Lock Screen shows the active LWP in the background, which lets you see the Cronosurf LWP without having to unlock the screen. However, some devices may have different implementations of the Lock Screen which require a special procedure or an external app to accomplish this, or do not allow it at all.

Graphics

The graphical animation works most of the time at 5 frames per second. This is good enough even for the sweep motion of the second hand. Only when the hands have to move quickly by a large amount, the frame rate goes temporarily up to 40 frames/s. This is also the case during the smooth animation phases that are used in the SW and CD modes. In sum, Cronosurf is designed to have low graphical performance requirements.

5 Second limit

Starting with Android 5 (Lollipop), the operating system does not allow alarm events less than **5 seconds** ahead. Because of this, this is also the minimum countdown time that Cronosurf allows to set on devices running on Lollipop or later.

Automatic restore function

After rebooting the device, Cronosurf will reactivate automatically any pending alarm and/or countdown-timer.

Android Wear swiping and dragging

Swiping and dragging is reserved for the system and is therefore not available for the operation of the watchface.

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2. Using Cronosurf

2.1. Watch Modes

Time Mode (TME)

This is the basic watch mode for local time keeping with conventional hands for hours, minutes and seconds on the main dial (12 hour dial). When in this mode, the 24-hour dial indicates the world time, whereas the second-decimals hand shows the state of the alarm (ON or OFF).

With the help of the date indicator, you can easily determine whether the indicated time corresponds to AM or PM. (See below [Date and Day.](#))

Shortcut

To return to the time mode from any other mode, long-press button [A].

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Stopwatch Mode (SW)

The stopwatch or chronometer mode offers a time measuring function from 0 to 12 hours. While the hours, minutes and seconds are shown by the big hands on the main dial, the small dial on the bottom shows the decimals of a second. On this dial, half decimals can be indicated which leads to a resolution of 1/20 of a second or 0.05 seconds.

Press button [C] to start and stop the stopwatch. While stopped, press button [D] in order to reset the hands to the zero position. The operation START is confirmed by a normal pitched beep, while the the operations STOP and RESET are confirmed by a high pitched beep.

During the first five minutes, the second hand will be driven smoothly (high frame rate) and the second-decimals hand will run continuously. After this period of time, the stopwatch will change into the power saving mode. In this mode, the second hand will move in the regular sweep mode or one-second-step fashion (depending on the setting under advanced preferences), and the second-decimal hand will be parked at the zero position. Once the stopwatch is stopped, the second-decimal hand will move to the value that corresponds to the time measurement.

If you change to another mode while the stopwatch is running, the time measurement will continue to work internally. Since it is based on timestamps, even rebooting the device will not affect the accuracy of the time measurement.

QuickStopwatch function (only PRO version)

When the "QuickStopwatch" function is enabled (advanced preferences), pressing button [C] while in time mode (TME) will immediately change the mode to SW, reset the stopwatch if needed and start it. In case the stopwatch was already running, only the mode will change to SW and the current measurement will continue.

Flyback function (only PRO version)

Press button [D] in SW mode when the stopwatch is running to stop, reset and restart the stopwatch at once. This function is often used by pilots. It is useful to perform repeated time measurements or to immediately correct the start of a time measurement in case of error - with one push of the button, instead of three.

The flyback function is also known by these names:

- Taylor system
- Permanent zero setting
- Retour-en-vol (French)

Split function (only PRO version)

While the stopwatch is running, you may measure a split time by pressing [SET]. This will be confirmed by two beeps in rapid succession at normal pitch and by the mode hand pointing at the 'S' of SW (stands for Split). The stopwatch hands pause to show the split time, but the stopwatch continues to run in the background.

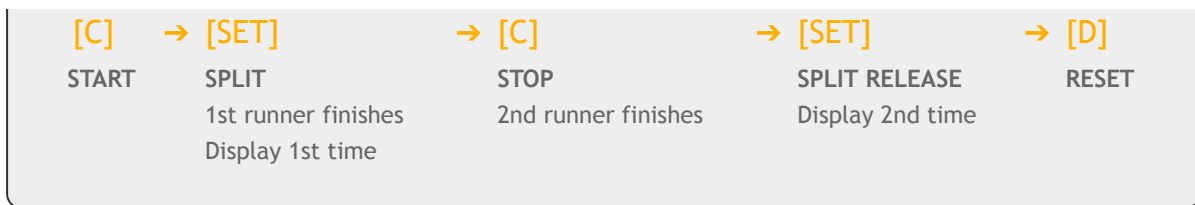
Press [SET] again to release the split time. This is confirmed by a high pitched beep.

To measure cumulative split times:

[C] → [SET] → [SET] * → [C] → [D]
START SPLIT SPLIT RELEASE STOP RESET

* Repeat SPLIT → SPLIT RELEASE as needed

To measure two times, like the finishes of two runners:



Countdown Timer Mode (CD)

The countdown timer gives an audible signal after a predefined time that can be set between 1 second (or 5 seconds if on Android 5 or later - see [5 Second limit](#)) and 12 hours.

Press button [C] to start and stop the timer. While stopped, press button [D] to reset the hands to the preset countdown time. The operation START is confirmed by a normal pitched beep, while the the operations STOP and RESET are confirmed by a high pitched beep.

To set the countdown timer, press button [SET] while the timer is **stopped**. The hour hand will shortly wiggle. Change its value with buttons [C] and [D] as needed. Repeat the procedure for the minutes and second hand. Pressing [SET] once again finishes the setting procedure which is confirmed by a high pitched beep.

The countdown timer has two different modes, "1x" and "∞":

- Mode 1x (once): Once the countdown has been completed, the audible CD alarm will be heard (2 normal pitched beeps every 1.5 seconds) during 30 seconds, unless it is confirmed by pressing any button. After this, the CD will be automatically reset and be ready for its next use.
- Mode ∞ (repeat infinitely): The timer will reset itself automatically and run from the beginning in an endless loop. Each time a countdown cycle is completed, there will be only one CD audible signal cycle (2 normal pitched beeps).

The current mode is indicated by the second-decimals hand (only when in CD mode). To change between 1x and ∞ modes, press button [D] while the timer is running.

During the first 60 seconds after start and the last 5 minutes of a countdown period, the second hand will be driven smoothly. Outside of these periods of time, the countdown timer will change into the power saving mode. In this mode, the second hand will be moved in a one-second-step fashion (or sweep depending on the setting under advanced preferences).

If you change to another mode while the countdown timer is running, it will continue to run internally and the audible signal will be heard after the countdown has been completed. Even if the device is rebooted, a pending countdown will be resumed accordingly.

Shortcut to 5 or 10 minutes

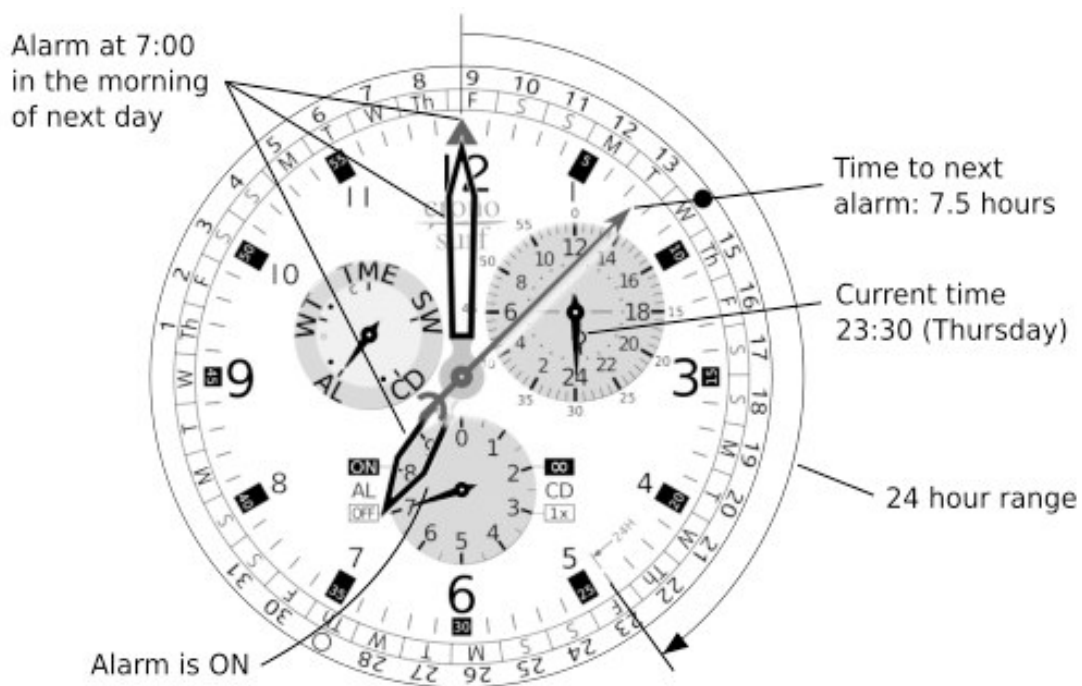
To quickly set the CD time to 5 or 10 minutes, long-press button [SET] in CD mode whenever the timer is **not** running or while in set submode. The setting will alternate between 5 and 10 minutes at each long-press.

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Alarm Mode (AL)

The alarm mode offers a 24-hour alarm. The alarm time is indicated on the main dial. As in the normal keeping mode, refer to the date indicator to differentiate between AM and PM.

A unique feature of Cronosurf is the indication of the remaining time till the next alarm, which naturally can be in the range of 0 to 24 hours. This is indicated by the second hand by pointing anywhere between the 0 and 24 position on the second scale. As a graphical reminder, the latter position is labeled with "24H".



The alarm status ON/OFF is indicated by the second-decimal hand at any time except when in SW and CD modes. When in alarm mode, but outside of the setting submode, press button [C] to switch the alarm ON or OFF.

To **set** the alarm time, press button [SET]. The hour hand will shortly wiggle. Adjust as needed with buttons [C] and [D] and press [SET] again. Now adjust the minute hand. Pressing [SET] once again finishes the setting procedure which is confirmed by a high pitched beep. Note that as soon as any hand is adjusted, the alarm will be automatically switched on.

Shortcut

A long-press of button [SET] while on alarm set submode will quickly set the alarm time to the current local time plus two minutes. The second hand will reflect this by pointing at the 12 o'clock position, meaning that the alarm will sound shortly (less than two minutes). From here, you can further set the alarm time as you need. This comes in handy if the alarm time that you want to set is close to the current local time or you simply want to test the alarm.

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World Time Mode (WT)

When in world time mode, the main dial will show the user defined world time. By default, it will be the UTC time (Universal Time Coordinated), but it can be set to show any desired fixed offset between -26 and +26 hours in 15-minute steps relative to the local time (now indicated by the 24-hour dial). The 15-minute steps are needed for some countries that have an extra 15 or 45 minutes offset to UTC.

Refer to the date indicator to differentiate between AM and PM and to monitor the date of the world time, which can deviate by up to +/-2 days from the local time date.

To set a fixed offset for the world time, press the [SET] button. The hour hand will shortly wiggle. Adjust it as needed with buttons [C] and [D] and press [SET] again. Now adjust the minute hand as needed in 15-minute steps. Pressing [SET] once again finishes the setting procedure which is confirmed by a high pitched beep.

UTC Time

A long press of button [SET], regardless of in set submode or not, will reset the World Time to UTC. Note that the UTC time is a special setting and its offset to the local time can be variable. The correct indication of UTC and local time relies on the proper time and timezone settings of the device at system level.

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2.2. Date and Day

The two outer rings on the main dial show the date (1-31) and the day of the week (first letter). Both are indicated at the 12 o'clock position by the date pointer (the triangular shape at the 12 o'clock position). Since the date rings turn steplessly, the date pointer gives a hint of the time of the day. Around midday, the date pointer will be centered on the day.

Furthermore, the rings show a practical overview of all days of the current month, which can be used as a one-month calendar.

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2.3. Week number

Press and hold [SET] when in TME mode to consult the current week number based on local time. The minute hand will point to the corresponding number on the minute scale for as long as the button is pressed. The shown number can be in the range 1 through 53.

There are different week numbering standards worldwide. By default, Cronosurf uses the numbering that corresponds to the language/country that is set in the system settings. Under advanced preferences, you may change the default setting (Auto) to ISO-8601 standard (most countries) or to US standard.

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2.4. Calendar

The Calendar is a submode of the time mode (TME) and offers a complete 100-year-Calendar for the years 1940 to 2039.

Calendar for the current month

Pressing button [SET] while in TME mode will enter the Calendar submode, starting **always at the current date**. The date and day of the week are still indicated at the 12 o'clock position as in TME mode. But now, the year, month and last day of the month are additionally shown.

The current year is indicated by its two last digits. The possible range of 100 years begins at 1940. Therefore, 40 stands for 1940, 00 for 2000 and 39 for 2039.

The second-decimal (lower sub-dial) hand indicates the tens digit of the year, whereas the hour hand on the main dial indicates the ones digit. Both can point to a number between 0 and 9 (the 12 position on the hour scale corresponds to 0). Example: For the year 2014, the second-decimal hand points to 1 and the hour hand to 4 (see Figure 3.).

The current month is indicated by the minute hand on the main dial. The positions 1 to 12 correspond to the months January to December.

The second hand points toward the last day of the month on the date rings. This can be any day from 28 to 31.

The 24-hour dial shows the local time.

So in summary, you have the complete date and time at one glance as follows:

- Second-decimal hand (bottom dial) = tens digit of the year

Note: The watch will automatically exit the calendar submode after a timeout of 90 seconds of inactivity.

Digital year indication

In case that the digital battery indicator is active (advanced preferences), this indicator will show the year of the calendar digitally when the calendar submode is active.

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2.5. Moon phases

Both full moon and new moon days are indicated on the date ring. A filled circle and an outlined circle will be shown respectively. The date at which each event occurs depends on the current time zone of the device. Therefore, changing the timezone can sometimes lead to a change of a given moon event by up to two days.

The indication of the moon phases will persist in the calendar month. This enables you to see all past and future moon phases within the full 100 year range of the calendar.

By default, this function is enabled, but you may disable it through the advanced preferences.

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2.6. Compass

If supported by the hardware, Cronosurf offers a compass function that runs as a submode of the world time mode. The availability of the compass is recognizable on the mode indicator by a gray dot at the left of the world time mode mark. If the compass sensor is available, the gray dot will be visible and the compass function can be started. Once started, the mode hand will point to this dot. (Otherwise, the gray dot will **not** be visible and the compass function **cannot** be started.)



Starting the compass

To start the compass, change to the world time mode and press button [D]. Both the minute and the second hands align together to form the north pointer of the compass needle, whereas the hour hand aligns to the opposite direction, hence pointing south.

Note that most Android devices need a compass calibration before the readings are reliable. This consists generally of spinning the device in a figure 8 pattern. Please make sure that you employ the proper method for your device.

Exiting the compass

To exit the compass, either press [D] again or change the watch mode. Otherwise, the compass will stop automatically after 5 minutes of inactivity. (You may press button [SET] to restart this 5 minute counter without changing anything.)

Reference pointer (only PRO version)

While in compass submode, press button [C] to freeze the second hand on its actual position. This will help you to comfortably monitor the deviation from a previously established direction.

The app will save the reference value and retain it even after a restart of the device.

Press [C] again to release the hold.

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2.7. Presets for alarm and countdown

This function gives you a quick access to your favorite alarm and countdown times - two each (four in the PRO version). To access the presets, press on the "P" symbol below the watch. This will open a window showing all the presets together with the current alarm and countdown settings at the top. You may now activate/start any desired preset by touching it.

If you want to change a preset, first set the alarm or countdown time as needed. Then open again the presets window and overwrite the desired preset through long pressing on it. A second long press will restore the default value.

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2.8. Battery level indicators

There are three different battery level indicators:

- Analog manual through the second hand: Press and hold button [D] while in time mode (TME). The second hand will show the battery level on the hour scale. The 12 o'clock position corresponds to 0%, while 10 o'clock corresponds to 100%. Release the button to restore the timekeeping mode of the second hand.
- Analog battery indicator: When this option is enabled (advanced preferences), a small triangle shows permanently the battery level on the hour scale, just as the second hand in the previous point. While charging, its color will be white, otherwise the color will be the same as the highlight colors of the watch face.

- Digital battery indicator: When this option is enabled (advanced preferences), a digital indication of the battery level appears on the left side of the watch face. While charging, a charging symbol appears on the left side of the digits.

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2.9. Screen-On timer

In order to keep the screen for a longer time than the device screen timeout time, you can use the inbuilt Screen-On timer. To activate it, swipe* to the right on the watch face. At each swipe, the timer will toggle through three possible settings:

OFF → 5 minutes → 10 minutes → 20 minutes → OFF

If the timer is active, its status will be indicated below the 24-hour dial by a sun symbol and the remaining minutes.

Note: This function is also available through the graphical menu. Its button shows a sun and a timer symbol.

* On Wear smartwatches, swiping is reserved for the system. Use the graphical menu instead.

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3. Disclaimer

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