

# BLUETOOTH PHOTOCELLS



CRONOPIC **FB-2**

Release 1.2  
CRONOPIC

## QUICK GUIDE

1. The “receiver” is the one with 4 AA batteries.
2. The “emitter” is the one with 2 AA batteries.
3. The emitter sends the infrared signal and the receiver detects that signal.
4. When you turn ON the receiver you will hear an annoying BEEP. When the receiver is aligned to the emitter, the BEEP stops (which means they are aligned).
5. Now, when something crosses the invisible barrier, you will hear a short BEEP, and the receiver will transmit a bluetooth signal to the phone/laptop.
6. If you are testing it indoors, increase the barrier separation to at least 2 meters away to avoid abnormal behavior due to the strong signal and infrared beam bouncing off the walls.
7. To use it with the phone you must enable bluetooth on your phone.
8. To use it with the laptop you must connect the CRONOPIC USB Bluetooth interface.

## BATTERY LEVEL INDICATOR

1. The yellow light is the battery level indicator. The following light code will let you know the battery level in one of two cases:

- a. Alkaline batteries (two levels only)
- b. Ni-MH rechargeable batteries (three levels)

a.



Continuous light -> normal level



Slow blink (one per second) -> low level (replace batteries)



Fast blink (several per second) -> dead batteries

b.



Continuous light -> high level



Slow blink -> medium level



Fast blink -> low level (recharge batteries)

## BATTERIES

Battery life is over 20 hours with good alkaline batteries or 2000 mAh Ni-MH rechargeable batteries (life can be drastically shortened below -5 °C temperature). Don't buy cheap rechargeable batteries and watch out for pirated copies. We recommend SONY CYCLE ENERGY, PANASONIC ENELOOP, and RAYOVAC. Pay attention to the capacity, a 2000 mAh battery will last twice as long as a 1000 mAh battery. But don't trust high capacity batteries like 3000mAh or more, they could be fake. Rechargeable batteries will last longer if you use them at least once a month (otherwise we recommend alkaline batteries) and when you store them not fully charged and not fully discharged, but 60 to 80% charged. With Ni-MH batteries, it is not necessary or advisable to fully discharge them before charging.

## CHARGERS

If you use rechargeable Ni-MH batteries you will need a proper charger. There are three types of chargers:

- a. Slow chargers
- b. Fast chargers
- c. Intelligent chargers

a. Slow chargers:

It charges the batteries for about 10 hours and then stops, even if the batteries were full. Try to make a full charge only when the photocell indicator shows a low level, otherwise, give them a half charge (5 hours for example) because otherwise you could overcharge them and reduce their useful life.

b. Fast chargers (less than 5 hours):

We don't recommend these chargers because it's even easier to overcharge your batteries if you don't pay attention to the previous battery level.

c. Intelligent chargers:

They charge only what the battery needs, so they can't overcharge your batteries. In addition, they charge the batteries individually and do a controlled fast charge. It is especially recommended if you have many photocells and you need to charge them quickly. We recommend NITECORE "intellichargers".

## ACCURACY

The accuracy is 1 ms (0.001s). The photocell will detect anything that crosses the infrared barrier and takes more than 1 ms. That means it can detect a motorcycle going over 300 km/h, for example.

## DEAD TIME

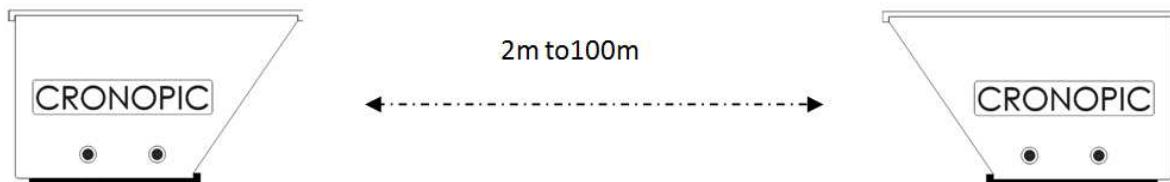
Dead time is the minimum time between two shots, don't confuse it with accuracy time. The minimum dead time is 0.05 seconds. If you need a longer dead time, you can choose it in your timing app. For example, in a ski race, you may want a dead time of 1 or 2 seconds at the start line, to give the runner that time to cross the barrier, otherwise your app could take two or more splits (the first split when he crosses his right arm, the second when he crosses his body, and the third when he crosses his left arm).

But at the finish line, riders cross the barrier faster and closer to each other, so you might want a timeout of 0.5s or less. The less dead time you choose for the finish line, the more runners crossing together you can detect, but if they cross slowly, you might have extra shots in your app (don't worry, you can delete those splits and take only the first one).

To avoid extra shots due to slow riders, you need to choose a suitable height for the photocells, usually on the riders chest.

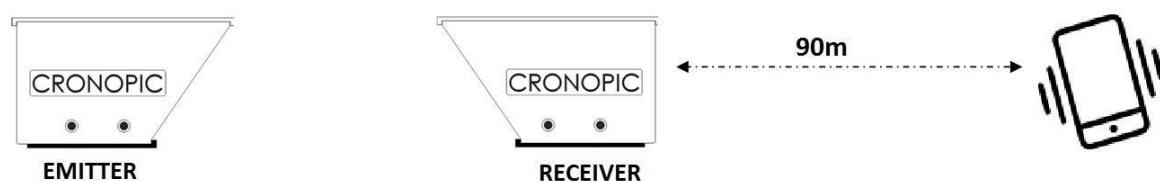
## OPTICAL RANGE

The maximum recommended separation between the emitter photocell and the receiver is 100 meters.



We recommend a minimum separation of 2 meters, otherwise you may get abnormal behavior due to the strong signal. This is especially recommended if you are using the photocell indoors because the signal will be even stronger and the infrared beam will bounce off the walls.

## WIRELESS RANGE



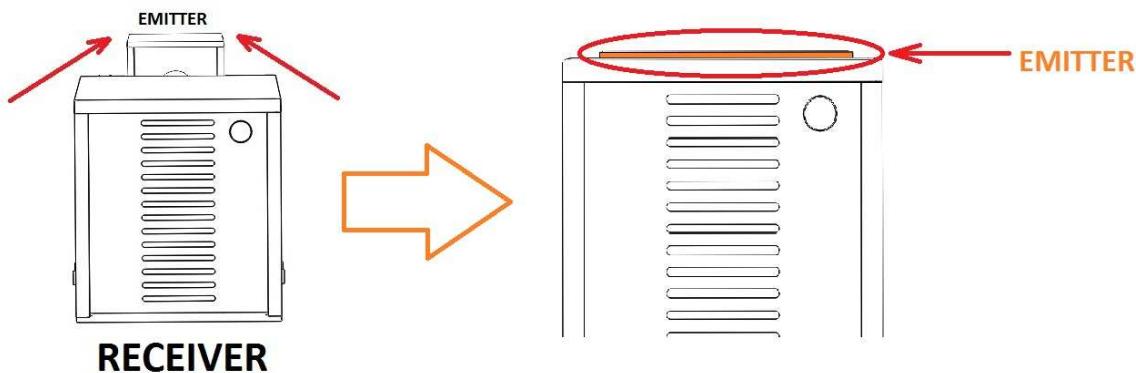
The wireless range is the maximum distance between the receiver and the phone/laptop, and this distance is about 90 meters for phones and about 50 meters for laptops. This distance could be drastically reduced in high humidity conditions or if there are obstacles between the receiver and the phone / laptop or if the height of the photocells is too close to the ground. Even if the phone / laptop can detect the photocell correctly at longer distances, we do not recommend that during a race as it could cause missed shots.

## ALIGNMENT

Even if the BEEP stops (which would mean that the photocells are aligned), that does not mean that they are aligned correctly.

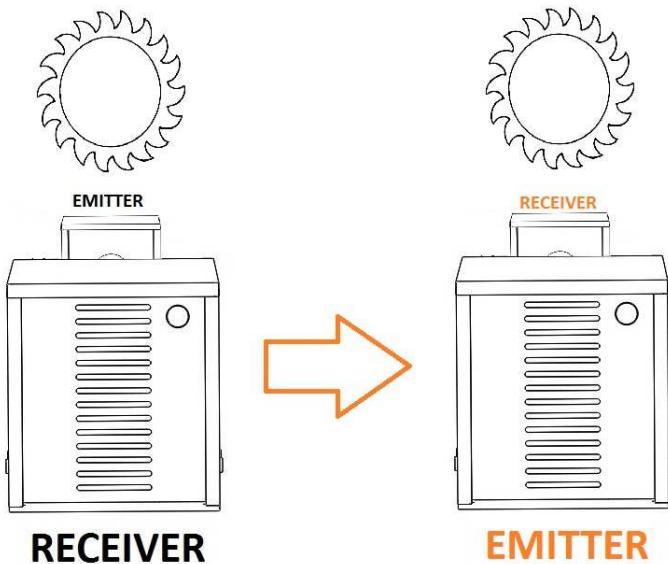
To make a good alignment, you must follow these steps:

1. Cross the barrier with a thin stick like a pen, about 7mm wide (or 1/4 inches). If the barrier is correctly aligned, the photocell should not shoot a BEEP. The alignment ends here. Otherwise, if the photocell shot a BEEP, you will need to perform a better alignment (continue with step 2).
2. Adjust the emitter parallel to the ground (you can use the bubble level of your tripod), then adjust the receiver to the same height and then, using the two axes of your tripod, try to point the receiver to the emitter from behind as you would with a rifle. Repeat step 1 and 2 until is done.



## OTHER TIPS

1. Think of the infrared barrier as an elastic cord. The longer you stretch the cord, the thinner and weaker it becomes, making it easier to cut. If the pen or stick in step 1 doesn't shoot the photocell, it means the infrared beam is strong and you won't get false shots due to small objects like dust, rain or insects. Of course, the less you separate the photocells, the easier the alignment process will be.
2. Avoid direct, low sun in front of the receiver, such as the afternoon sun, to avoid false shots. In that case, you can redirect the barrier (or at least the receiver) to right, left or down, or you can exchange the position of the emitter with the receiver. That position of the sun pointing directly at the receiver won't last more than a few minutes.



## CONNECTING TO A PHONE/TABLET

Just enable Bluetooth on your phone, iphone, tablet or ipad and follow the instructions of your favorite timing software that is compatible with CRONOPIC photocells. No need to pre-pairing or enter a password. Works on Android 7 or later and iOS 8.0 or later.

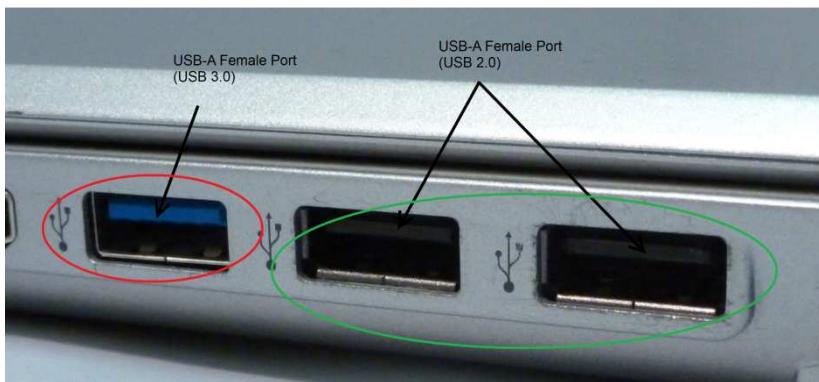
Notice that under the receiver there is a number (0 to 9) or a letter (A to Z). That is the identifier of your photocell. If your receiver has no identifier, it means that its identifier is "1". In case you buy three photocells for example, we could send you three receivers named "1", "2" and "3". The purpose of this is just to identify them, in case your software has that feature. If you are timing a race with a start and finish very close to each other and that short distance allows you to use only one phone for both photocells, then your software could get the start and finish times separately. Otherwise, no matter what identifier your receiver has, your software will connect to all of them if they are all close to your phone and turned on.

## CONNECTING TO A PC/LAPTOP WITH WINDOWS

You need a CRONOPIC USB interface. The identifier below the receiver must be the same as the identifier below the interface:

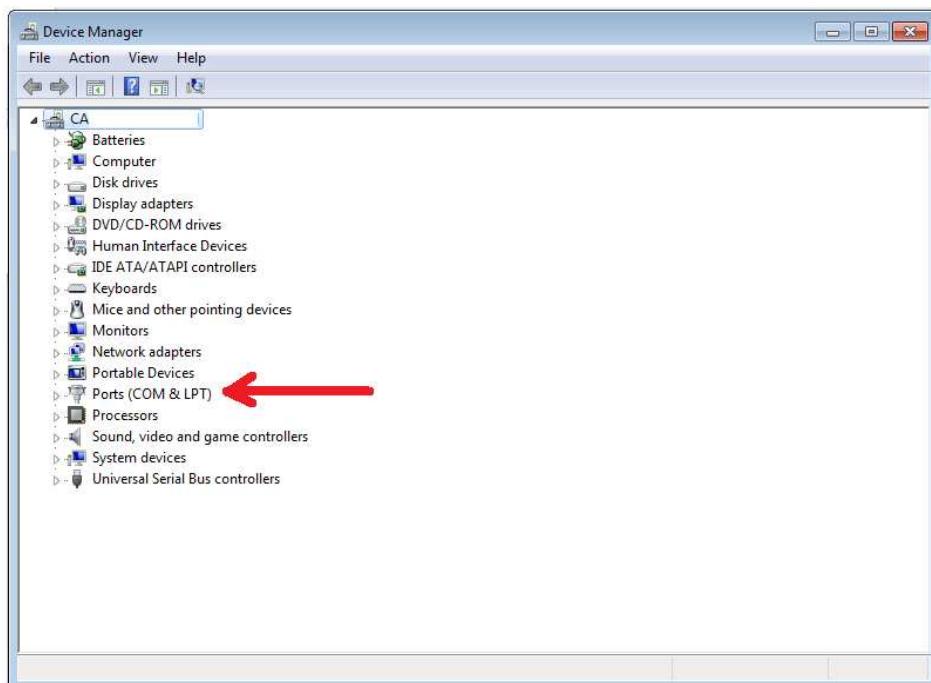


Try to avoid USB 3.0 ports (the blue ones). They are unstable for long connections

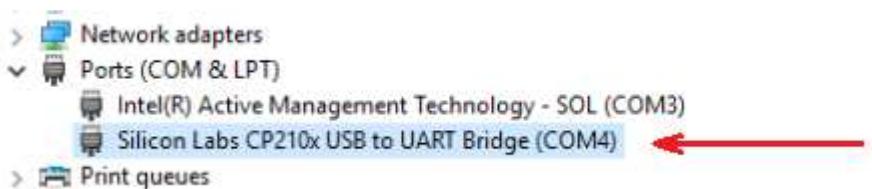


Instructions:

1. Go to <https://www.silabs.com/developers/usb-to-uart-bridge-vcp-drivers>
2. Go to the *Download* Tab, and download the latest driver for your operating system.
3. Install it (do not plug in the CRONOPIC USB interface yet).
4. Plug in the USB interface to a non 3.0 USB port.
5. Go to your *Device manager*:

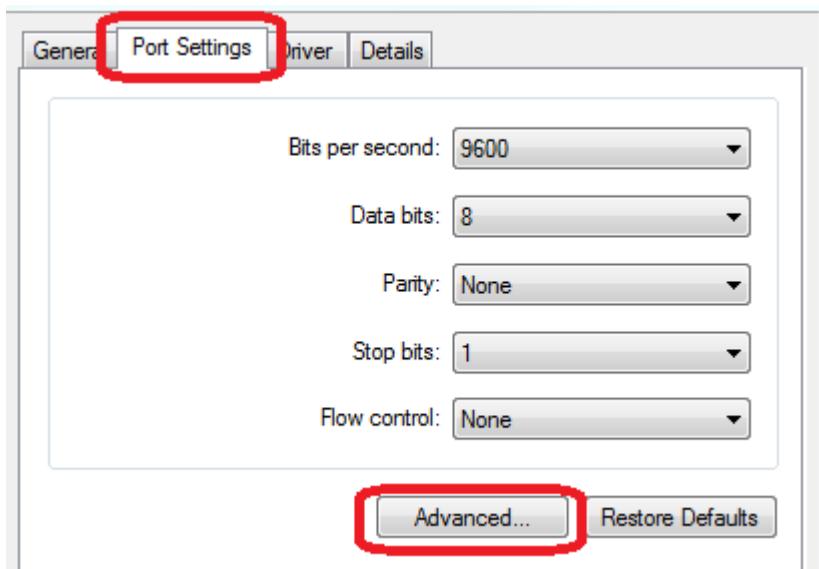


6. Expand the *Ports* components

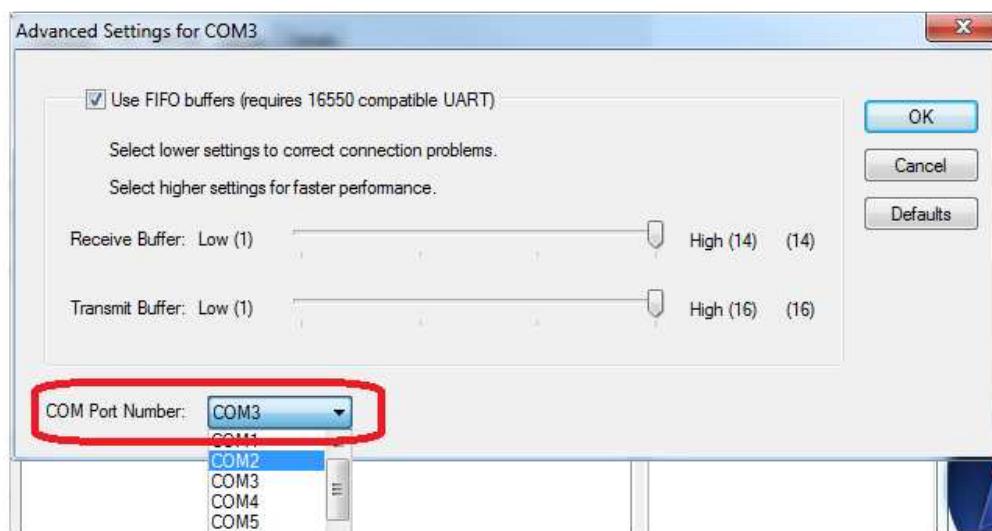


7. In this example, the port number of the USB interface is "4", but it could be another number. If you want to change it to another number easier to remember (like "10" for

example), you can change it by accessing the properties (by right-clicking), then go to Port Settings and Advanced....



Then choose the port number you want



Acept all, unplug the USB interface and plug it in again.

8. Now you need to enter this port number into your timing software and connect the port. Be careful of accidental disconnections. Unlike your flash drive, these types of USB connections are emulated serial ports, which means that in the event of accidental disconnections, you can not just unplug it and plug it in again. First you must disconnect the virtual port (not physically but from the button of your software), then, if the interface is still physically plugged in, unplug it and plug it in again. Wait three to five seconds and reconnect the port by clicking the button in your software. Make sure the USB interface is free from future accidental touches or movements.

**STILL DOUBTS?**

Just write to us at [info@cronopic.es](mailto:info@cronopic.es). We will help you immediately.