

Measuring Seiko #0 shutter times (Rev 2) By M.Vettore

Every Zenanon lens for ETR, SQ and GS camera families has embedded its Seiko #0 central (leaf) shutter; the outcome is large part of the shooting process depends on lens while on the focal plane shutter cameras the lens has little relevance on the shooting phase usually it only sets the diaphragm at the chosen aperture. Because of that, verify the health of a focal plane shutter camera lens is quite simple, check Zenanon lenses not.

To test this kind of lens a shutter speed meter is needed. Further than an expensive professional meter it is possible to build a cheap shutter speed meter utilizing the microphone input of the PC sound card. For the details refer to:

http://photo.net/bboard/q-and-a-fetch-msg?msg_id=0044cW&tag=

or

<http://www.baytan.org/prak/shutter.html>

I've built one of these and it is enough accurate to test the lens but a little complex to use, indeed it is necessary to arrange in a line the shutter meter, the camera without back and the light source; cock the camera, arm the program used to perform the measure then shot, better using a shutter release cable. By the way it is practically impossible to test a lens without the camera body or a bare bone shutter at their default time

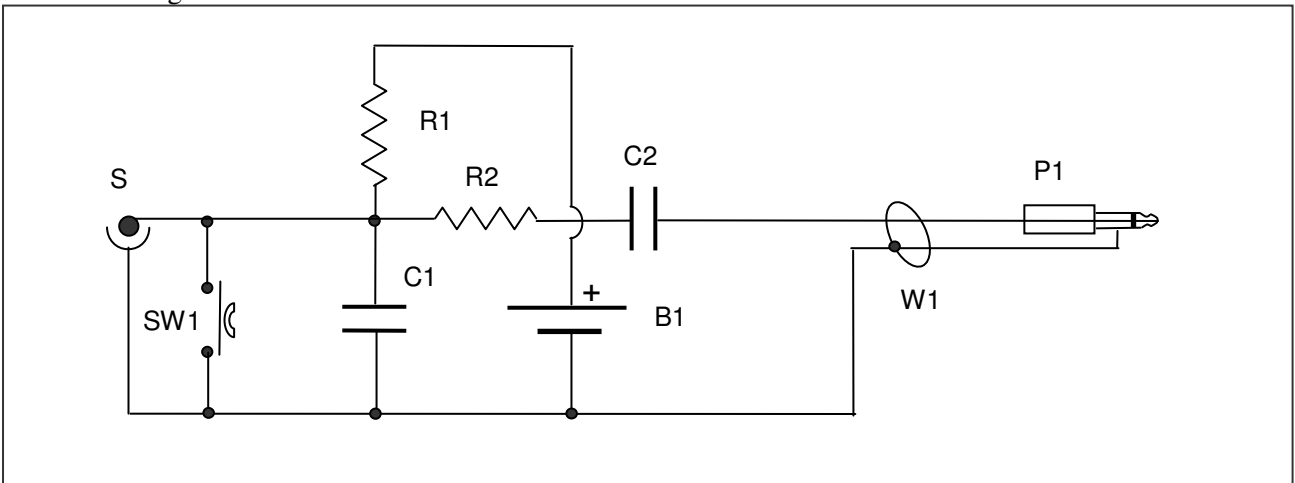


PIC 1: Measuring times through the lens.

I've found a simpler way to test the lenses.

As I stated on another document (<http://www.buonaluce.com/Anatomy>) the flash sync contact is driven by the same ring actuating the shutter leaves so the flash sync contact will be closed when the shutter is almost full open and will be opened when the shutter is closing. Using this feature it is possible to realize a very simple shutter tester taking advantage of the PC audio board. This simple tester can check the shutter at any speed and also lenses detached from camera body and bare bone shutters at their default time (1/500 of second).

Schematic diagram of the shutter tester:



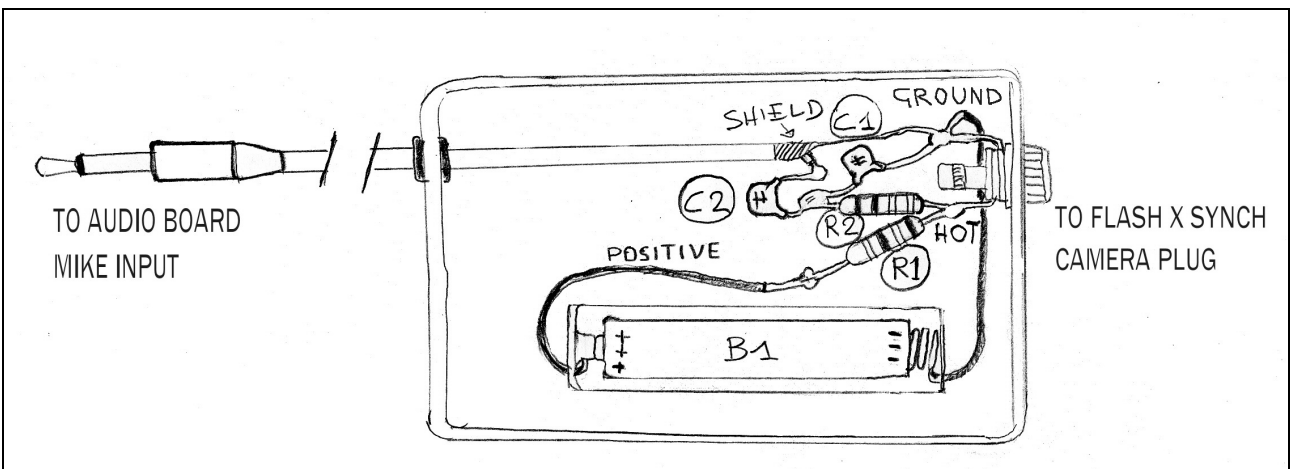
Components list

S1	Mono jack socket 3.5mm
SW1	Normally open pushbutton (optional)
C1	47 nF 50V capacitor
C2	4.7 nF 50V capacitor
R1	820 ohm 1/8 W resistor
R2	1200 ohm 1/8 W resistor
B1	1.5 Volts AAA or AA battery
P1	Mono jack plug 3.5mm
W1	Audio shielded cable

The circuit is very simple and can be assembled on a small case; by the way it doesn't require any on/off switch because it drains noticeable power only when the flash sync contact is closed.

It could be connected to the Flash X synch socket using a cable terminated with a standard PC plug on one side and a 3.5mm jack plug on the other.

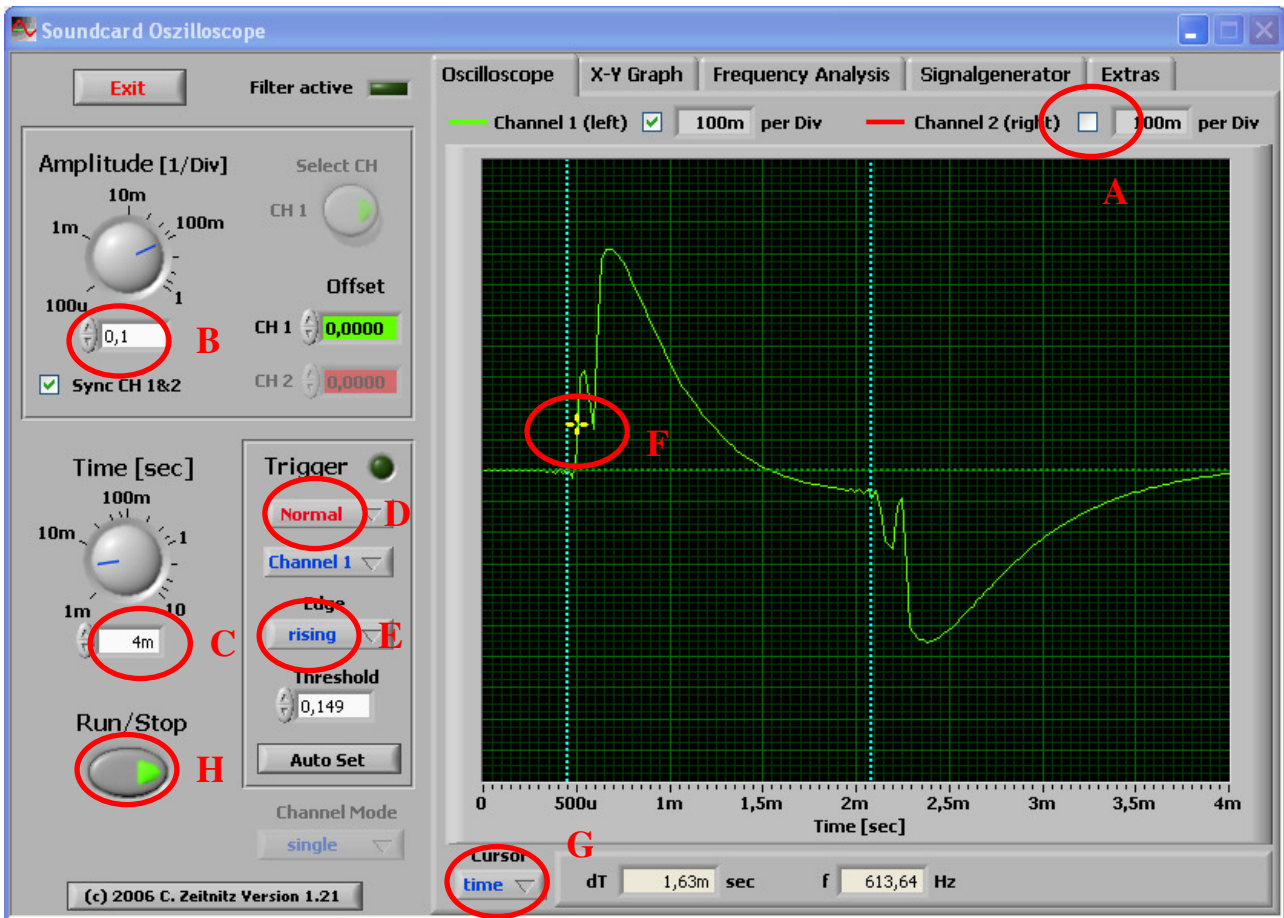
The pushbutton isn't necessary but it is very useful to verify the circuit works fine and eventually to calibrate the acquisition program.



Layout sketch

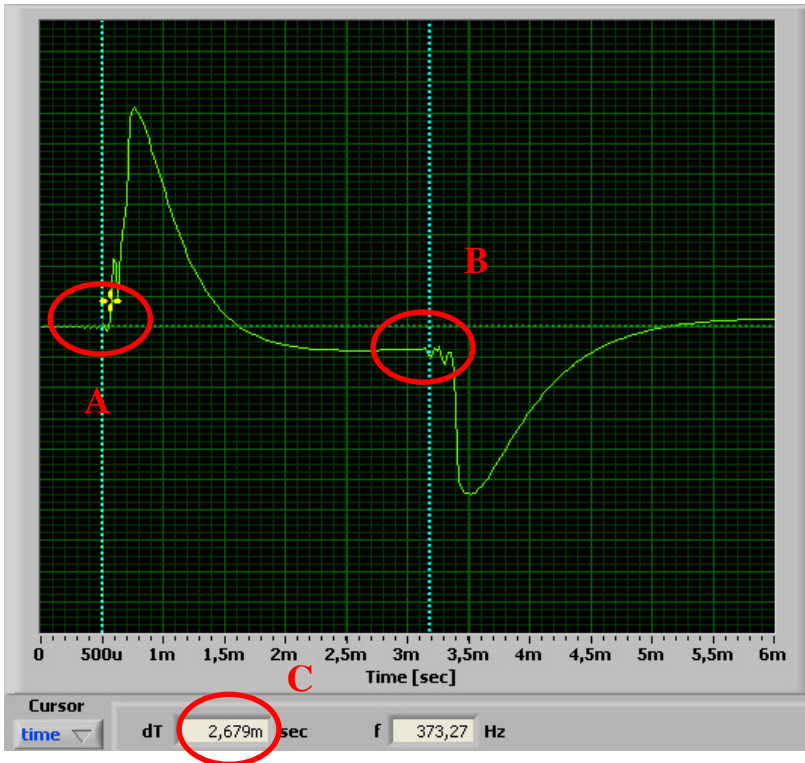
As acquisition program I use the excellent [Soundcard Oscilloscope](http://www.zeitnitz.de/Christian/Scope/Scope_en.html) by Christian Zeitnitz available at: http://www.zeitnitz.de/Christian/Scope/Scope_en.html but any other acquisition application capable of measuring time intervals should be useful.

The objective is measure the time between the pulses generated when flash sync contact closes and opens. On below the two pulses are showed.

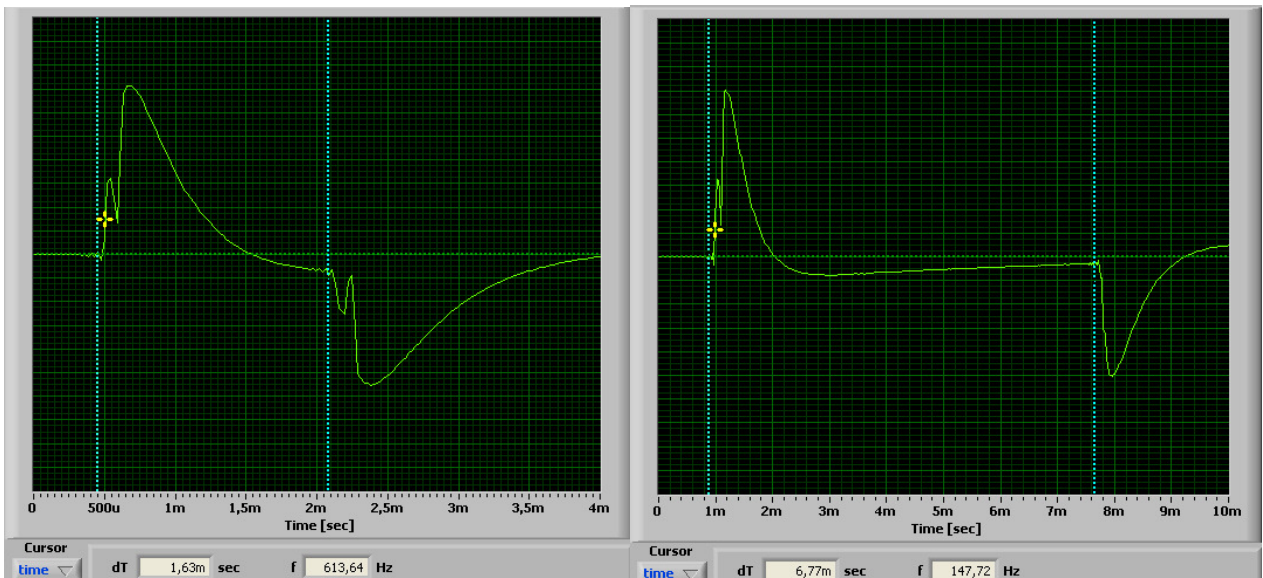


The settings to check a shutter should be (refer to the picture above):

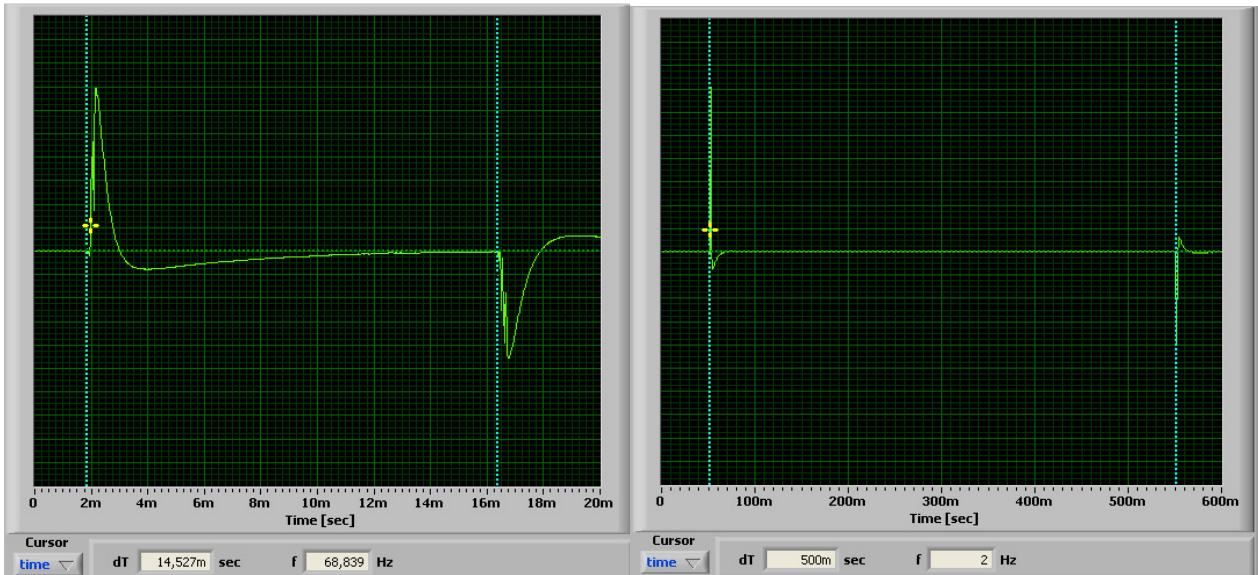
- A. Deselect channel 2 (depending on your audio board, sometime the signal is on channel 2)
- B. Set 0.1 Volts division (depending on your sound board, keep the waveform doesn't overcome the window, adjust the microphone input level on the control panel)
- C. Time base 4 ms is good to check 1/500, 6 ms for 1/250, 10 for 1/125, 10 ms for 1/60 time, to check 1/30, 1/15 select 100 ms, for times less than 1/15 1 sec and more should be use but look next setting..
- D. Select Normal trigger for times shorter than 1/8 and Single for 1/8 or slower in order to avoid the trigger synchronizes on the closing pulse, when Single trigger is selected every new acquisition must be armed pushing Run/Stop Button (H on the picture).
- E. Select Rising edge.
- F. Drag the trigger cross to the position showed; that should be done every time the time base control (B) has been changed.
- G. Select Time cursor mode, the two blue vertical dotted lines will appear; they could be used to measure the times.
- H. Not used when the trigger mode is normal; on single mode it must be pushed to run before shooting the shutter.



To measure be sure the Run/Stop is in Run state, select the time base, then drag the trigger crosses at the position on the picture and shoot. Drag the left blue cursor to the pulse start point (A), the right to the beginning of the decay pulse (B), now on the dial C there is the time delta (on the picture 2,679m sec means 2,679 ms) refer to table 1 for equivalence between times, milliseconds and correction factors. Observe the picture above, the pulses start with a little instability due to the contact bounces when it is engaged and released.



The pictures above show sample at 1/500 and 1/125.

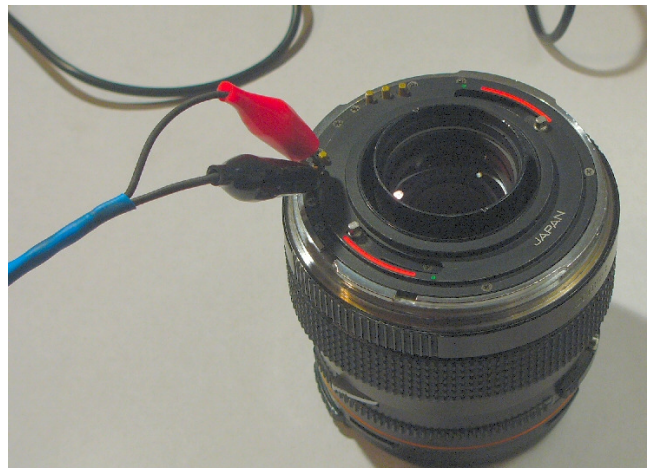
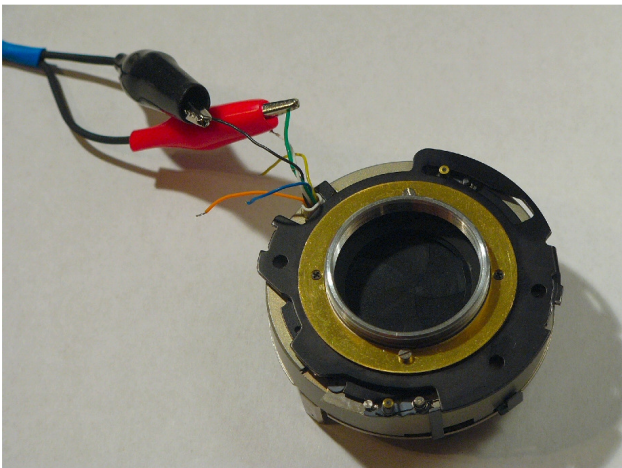


The pictures above show sample at 1/60 and 1/2

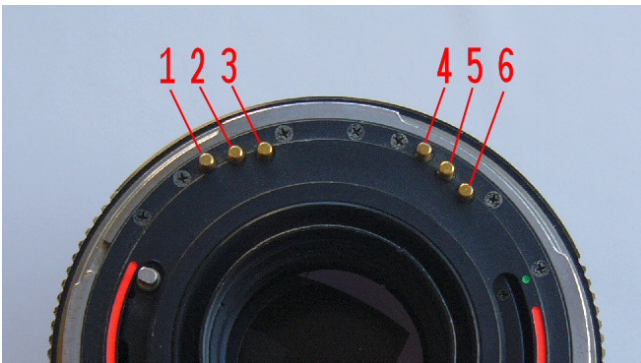
Time 1/	Corrected ms	Std ms
1	1000	1000.00
2	500	500.00
4	250	250.00
8	125	125.00
15	64	66.67
30	31	33.33
60	14,50	16.67
125	5,50	8.00
250	2,70	4.00
500	1,50	2.00

Tab 1: Times to milliseconds equivalence. On the second column the corrected times due to the shutter design, remember that the measured time is the flash sync time not the shutter open time which is larger. The corrected times are valid between 1/500 and 1/15 because at lower speeds the differences are irrelevant.

Using a cable terminating with crocodile clips it is possible to test a lens without the camera body or a bare bone shutter at their default time.



In a bare bone shutter the black wire is the ground and the green one is the flash sync contact
In a detached lens pin 1 is the ground contact, pin 2 the flash sync contact (refer to the picture below).



On a detached lens cock the shutter rotating the two pins counter clock wise till they reach the green dots, to shot push with a nail tip the pin shows on the picture below and at the same time rotate the pins clockwise.



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