

This paragraph describes the pulse picker setup for thinning out a 1 kHz pulse train to the desired frequency in a range of 0Hz...1kHz using the external trigger. The external trigger signal, that leads the optical pulse by 0.5...3 μ s, is essential for proper OG88-1 pulse picker operation in this mode.

The event timing pattern is shown in the Fig. 1. When the external trigger pulse ('External trigger') is supplied onto the input of the control unit, it starts generating the pulse 'Delay Start', whose front determines the zero reference point for all delay channels (Delay 1, 2, 3). The frequency of 'Delay Start' pulses is set by dividing the frequency of the 'External trigger' pulses in a built-in frequency divider of the control unit (Divider 1 or 2).

The pulses 'Pulse 1 start' and 'Pulse 1 stop' are generated by the control unit after the 'Delay Start' signal. The pulse 'Pulse 1 start' starts the front of the HV pulse that is generated by the HV generator **OG88-1**. The delay between the pulses 'Pulse 1 start' and 'Pulse 1 stop' determines the duration of the HV pulse (100-1000 ns).

The delay of 'Pulse 1 start' to 'Delay Start' can be adjusted so that the optical pulse will be inside the HV pulse.

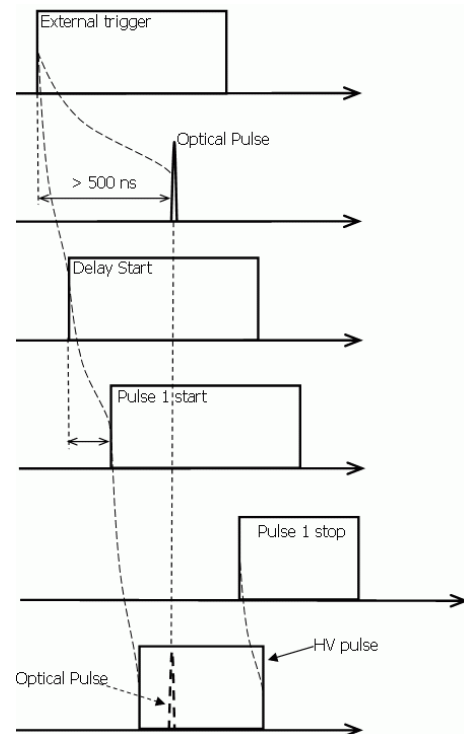


Figure 1. Event timing pattern (picking a single pulse from a 1 kHz pulse train)

1 OPTICAL PART OF PULSE PICKER ALIGNMENT

Please refer to paragraphs 7.1.1-7.1.5 of the manual that will guide you through the installation process.

2 ELECTRICAL PART OF PULSE PICKER ALIGNMENT

1. Turn on the control unit using switch and "Power" button on the front panel.
2. Please set the following parameters:

- In the menu section "Divider 1":

√Divider enabled

Divider 1 clock

External trigger

Clock phase

Positive edge

Divider 1 prescaler

÷1

Divisor 1

÷2

Phase 1A

00001

Phase 1B

00001

- In the menu section "Delay channels" → "Triggering":

Triggering signal

Divider 1 out 0

Triggering polarity

Positive edge

Trigger synchro

None

Delay clock

PT oscillator

Interlock enabled

- In the menu section "Monitor outputs":

Monitor out 1

Delay Start

Monitor out 2

Pulse 1 Start
Monitor out 3
Ext. trigger

- In the menu section "Input signals" → "External trigger" please set the parameters that correspond to the specification of your "External trigger" pulse.
3. Supply the external trigger pulse ('External trigger') onto the BNC input labeled "External trigger" on the back panel of the control unit. The trigger pulse must lead the optical pulse by 0.5...3 μs and must be rigidly correlated with the optical pulse (jitter less than 200 ps).
 4. In the menu section "Input signals" → "External trigger" keep changing the "Trigger threshold" value until the LEDs 'Pulses' and 'Trigger' on the control unit front panel turn green.
 5. Set up the fast photodetector at the output of the pulse picker system after the polarizer number 2 ('Pol. 2' in Fig. 4). Set up the $\lambda/2$ waveplate onto the side of the Pockels cell. Supply the signal from the photodetector to the "Channel 1" input of the oscilloscope. Adjust the $\lambda/2$ waveplate so that the optical pulse becomes represented in the oscilloscope.
 6. Supply the signal from 'Out 1' output from the front panel of the control unit to the input "Channel 2" of the oscilloscope. Synchronize the oscilloscope by the "Channel 2".
 7. Achieve minimal jitter of the optical pulse on the oscilloscope display by changing the value "Trigger threshold" in the menu section "Input signals" → "External trigger".
 8. Supply the signal from 'Out 2' output on the front panel of the control unit to the "Channel 2" input of the oscilloscope (remove the cable from 'Out 1' first). Synchronize the oscilloscope by the "Channel 2".
 9. Set the following parameters:

- In the menu section "Delay channels" → "Delay 1":

Coarse delay 1

00.01 μ s

Fine delay 1

10.00 ns

Pulse duration

0.50 μ s

Tail adjustment

10.00 ns

High voltage 1

530.0 V

**√High voltage 1 on
Enable subsample**

- In the menu section "Delay channels" → "Delay 2":

High voltage 2 on

10. In the menu section "Delay channels" → "Delay 1" adjust "Coarse delay 1" so that 'Pulse 1 start' pulse ("Channel 2" of the oscilloscope) was leading the optical pulse ("Channel 1" of the oscilloscope) by 300-400 ns.

11. Connect the control unit and the Pockels cell shutter OG88-1 (see Fig. 13)

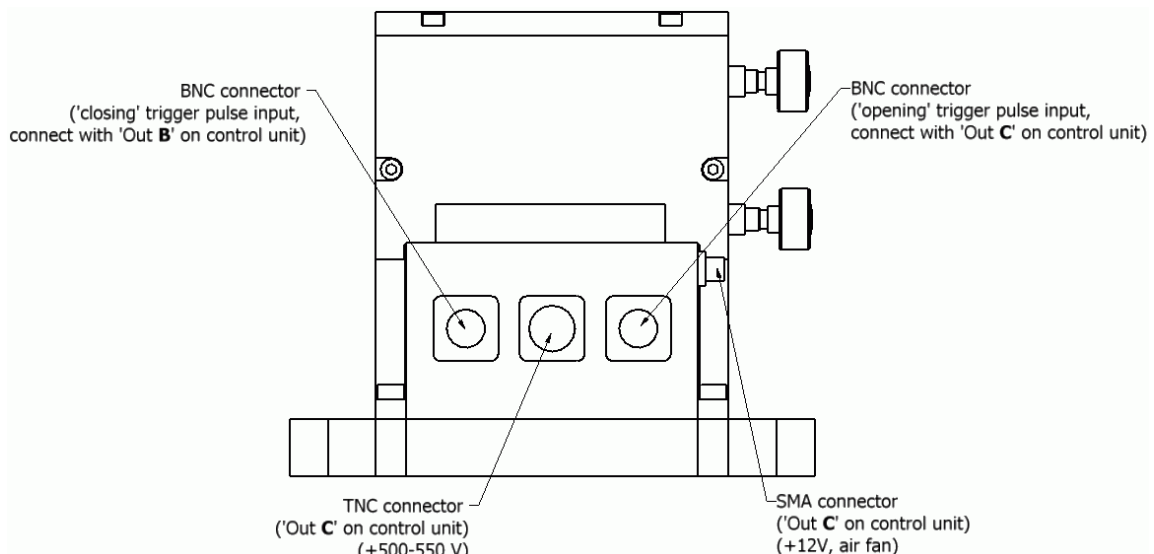


Figure 13. Connectors on the Pockels Cell (OG88-1).

12. Press the button 'Output On/Off' on the front panel of the control unit. LED 'Output' should turn green.
13. Increase 'Coarse delay 1' in the menu section "Delay channels" → "Delay 1" until you see a decrease in amplitude of the optical pulse at "Channel 1" of the oscilloscope.
14. Remove the $\lambda/2$ waveplate that has been earlier installed on the side of the Pockels cell.
15. By changing 'Coarse delay 1' in the menu section "Delay channels" → "Delay 1" achieve maximum signal amplitude at "Channel 1" of the oscilloscope.
16. As necessary (in case of small jitter of the optical pulse in respect to the 'Pulse 1 start' pulse) the duration of the HV pulse can be decreased to 100 ns in the menu section "Delay channels" → "Delay 1" → "Pulse duration".
17. The repetition rate of the picked pulses is adjusted by dividing the optical pulses repetition rate in the menu "Divider 1" by 'Divider 1 prescaler' and 'Divisor 1' values.