

PCD-41

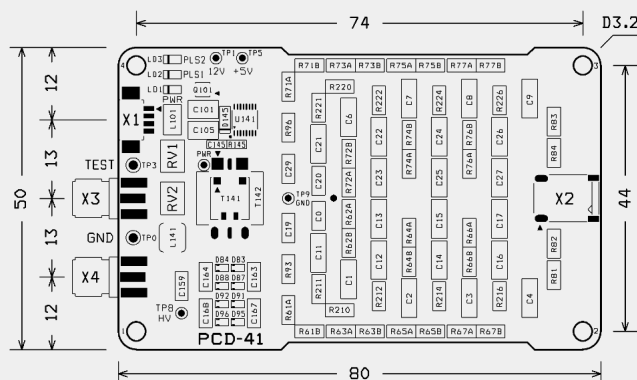
Pockels Cell Driver with quasi-rectangular high voltage pulse

Generation of high voltage quasi-rectangular pulses with nanosecond rising and falling edges. HV output duration is determined by trigger pulse duration.

Driver can be used for ultrafast optical beam modulation and deflection, control of laser regenerative amplifiers and pulse pickers.

- | | |
|---------|---|
| PCD-41 | HV pulse duration is determined by duration of trigger pulse at connector X3 |
| PCD-41T | HV pulse duration is determined by delay between rises of trigger pulses at X3 and X4 |
| PCD-41P | HV pulse duration is controlled by internal trimmer RV2 |

- Quasi-rectangular high voltage pulse;
- Nanosecond rise and fall times;
- Controlled pulse duration;
- Pulse jitter is less than 200 ps;
- Built-in pulsed high voltage source;
- Additional output signal for HV pulse amplitude measurement;
- Pulse amplitude adjustment by trimmer or external analog signal;
- Low voltage power supply 12 V.



Specifications:

Output voltage amplitude: ¹

| | |
|-------------|---------------|
| PCD-41-4800 | 3600 ÷ 4800 V |
| PCD-41-3800 | 2600 ÷ 3800 V |
| PCD-41-2800 | 1800 ÷ 2800 V |
| PCD-41-2000 | 1300 ÷ 2000 V |

Unevenness of the amplitude on the plateau

< 5 %

Output voltage pulse-to-pulse instability

< 1 %

Max pulsed current

20 A

Optimal load capacitance

4 ÷ 10 pF

HV pulse rise time ²

2 ± 1 ns

HV pulse fall time ²

2 ± 1 ns

HV pulse duration ³

2 ÷ 600 ns

Max HV pulse repetition rate ²

1000 Hz

Trigger voltage (input impedance is 50 Ω)

5 ± 0.5 V

Output pulse delay vs. trigger pulse ⁴

16 ± 3 ns

HV pulse jitter

< 0.2 ns

External power supply voltage

12 ± 4 VDC

External power supply current

500 mA

Operating temperature range

-40 ÷ +60 °C

Dimensions

80 × 50 × 15 mm

Mounting hole pattern (∅ 3.2 mm)

74 × 44 mm

Weight (OEM version)

100 g

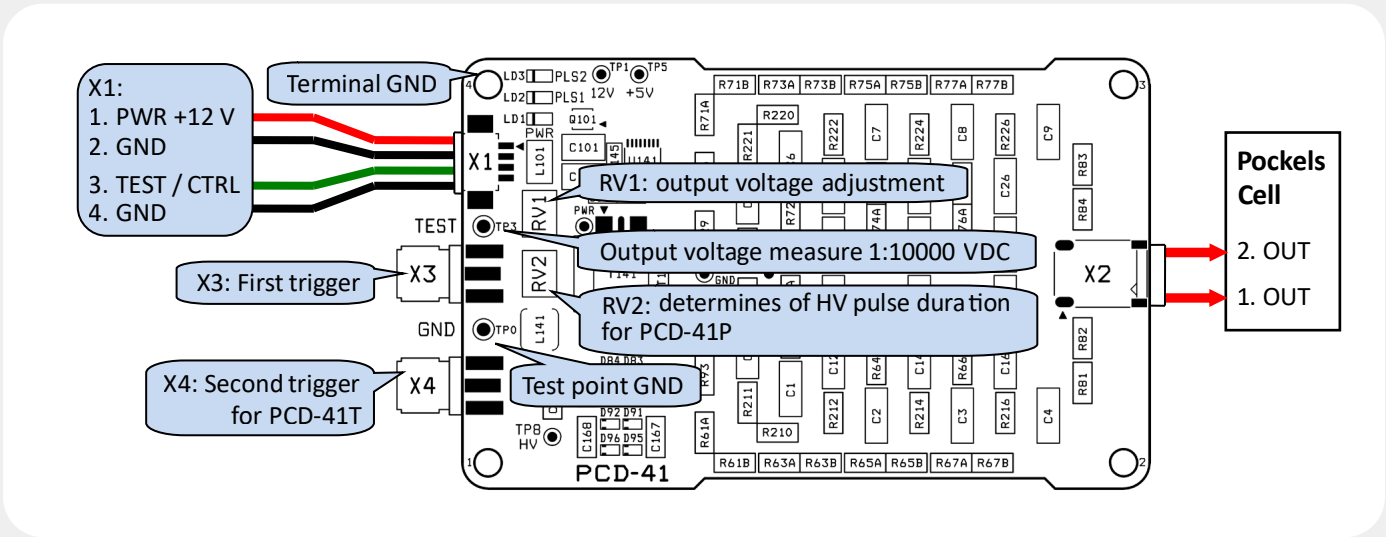
¹ HV amplitude is controlled by built-in trimmer RV1. The range of voltage corresponds to a specific driver model.

² Depends on the load impedance and output voltage amplitude.

³ Is determined by an external trigger-generator. For version PCD-41P pulse duration is 2 ÷ 10 ns (controlled by trimmer RV2).

⁴ Delay depends on the trigger pulse and HV output amplitudes. The higher the HV output amplitude, the shorter delay.

Connection diagram



Connector X1 (input) – 53261-0471 (Molex):

- 1 Pin 1 (red) Power supply + 12 V & 500 mA max;
- 2 Pin 2 (black) Power supply GND;
- 3 Pin 3 (green) Output voltage measure signal;
DC voltage scale 1:10000; ^{Note 1}
- 4 Pin 4 (black) Output voltage measure GND.

Connector J2 (output) – SM02B-BHSS (JST):

- 1 Pin 1 (HV red) First high voltage output;
- 2 Pin 2 (HV red) Second high voltage output.

Connector X3, X4 (input) – SMA-J-P-H-ST-EM1 (Samtec):

Trigger pulse input +5 V; impedance 50 Ω.

For PCD-41 HV pulse duration is determined by duration of trigger pulse on X3.

Connector X3 Input trigger pulse determines output HV pulse duration.

Connector X4 Not available.

For PCD-41T HV pulse duration is determined by delay between rises of trigger pulses on X3 and X4.

Connector X3 Rising edge of input trigger pulse initiates front of output HV pulse.

Connector X4 Rising edge of input trigger pulse initiates falling edge of output HV pulse.

Trigger pulses at X3 and X4 are fully interchangeable.

First in time pulse initiates rising edge of HV output pulse while second one initiates falling edge of HV pulse.

For PCD-41P Pulse picker. HV pulse duration is $2 \div 10$ ns and controlled by trimmer RV2.

Connector X3 Rising edge of input trigger pulse initiates front of output HV pulse.

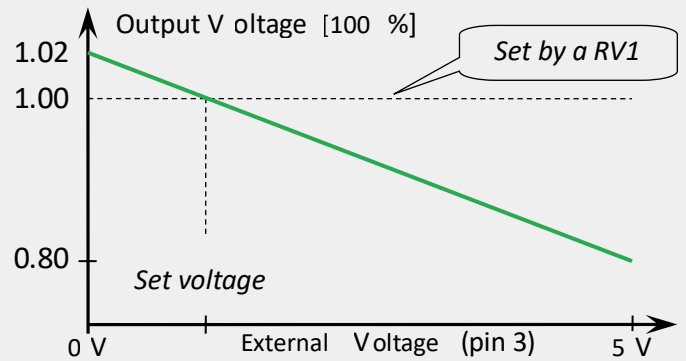
Connector X4 Not available.

Note 1

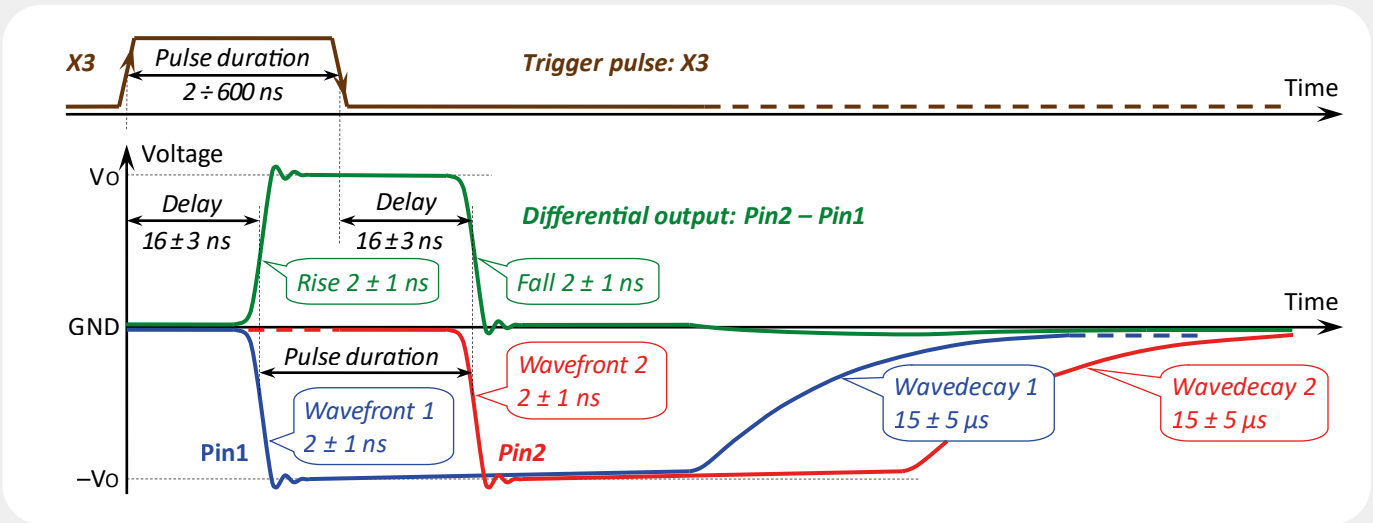
Pin 3 and **Pin 4** can be used for setting the amplitude of output voltage pulse from -20 % to +2 % (relative to value have been set by trimmer RV1).

If 0 V is set on **Pin 3** from an external source, the pulse amplitude will be ~2 % higher than the set value.

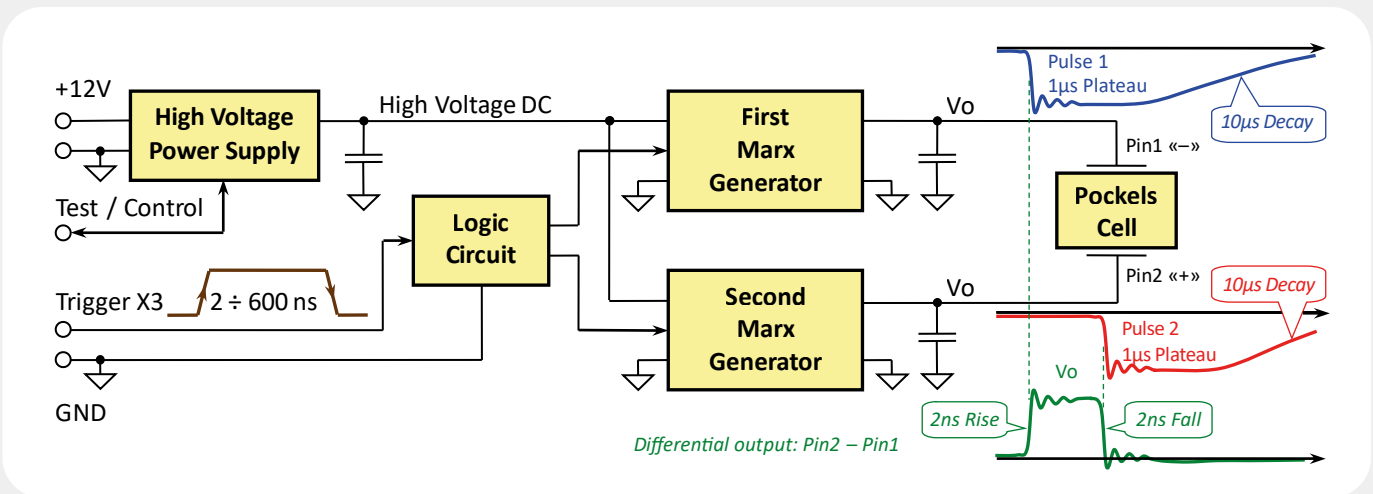
If 5 V is set on the **Pin 3**, the pulse amplitude will be lower by ~20 %. The input impedance of the **Pin 3** is 45 kΩ.



Output waveform of PCD-41 – pulse duration is determined by one trigger pulse at X3



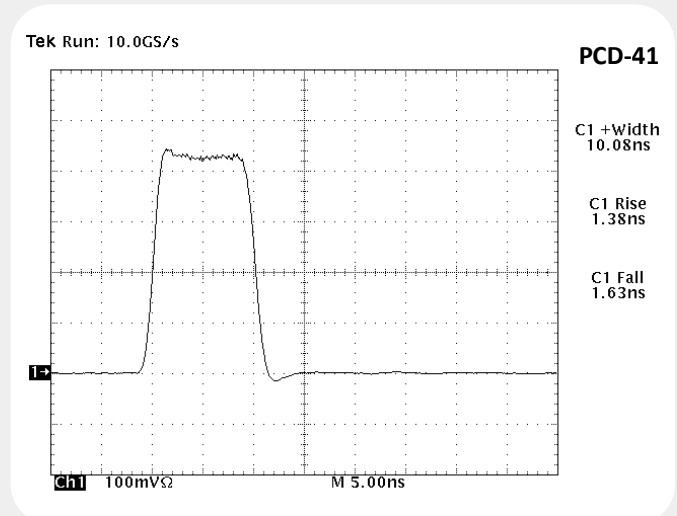
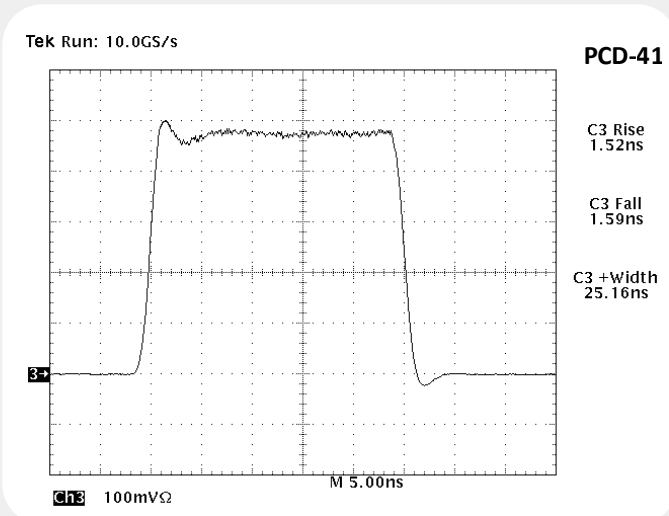
Block diagram of PCD-41 – pulse duration is determined by one trigger pulse at X3



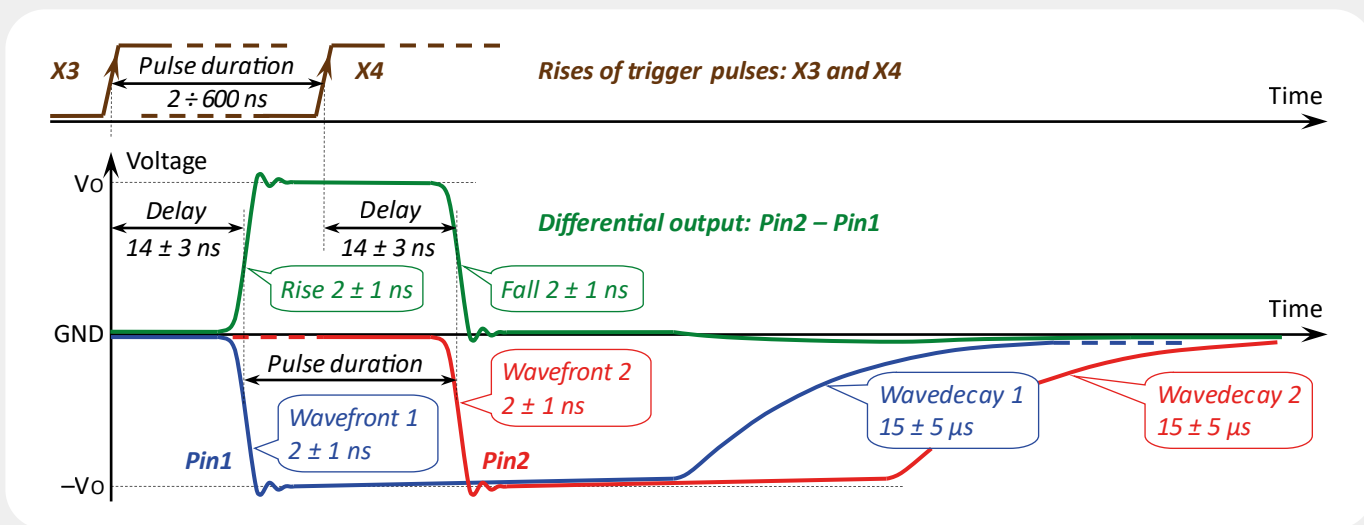
Waveforms of the transmitted light beam

Pulse voltage: $V_0 = 3800 \text{ V}$;

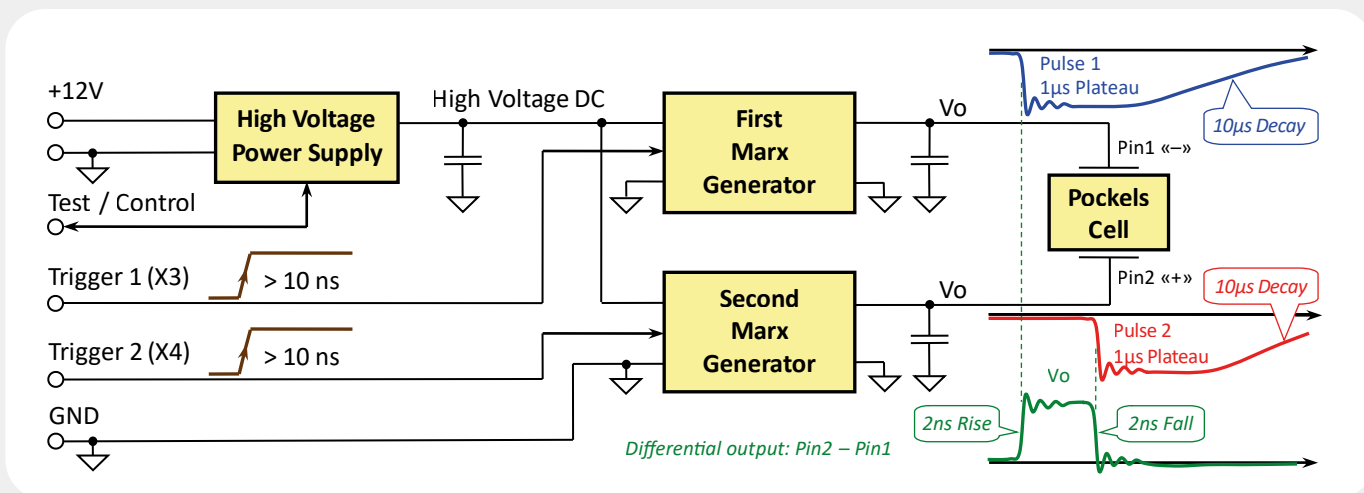
Pockels cell half-wave voltage: $V_{\lambda/2} = 3800 \text{ V}$



Output waveform of PCD-41T - pulse duration is determined by two trigger pulses at X3 and X4



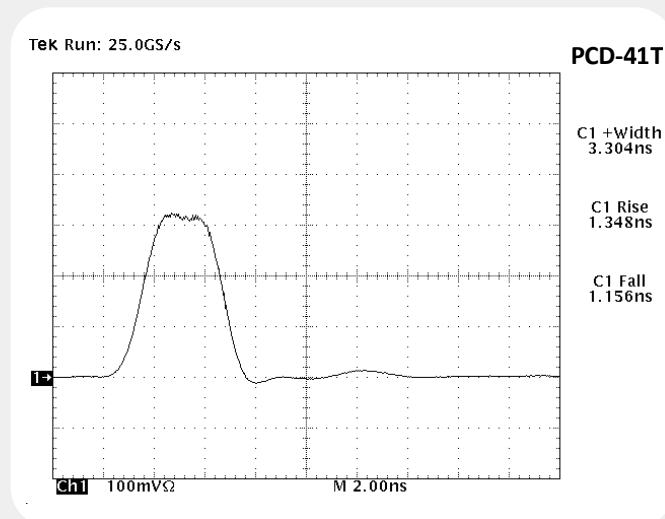
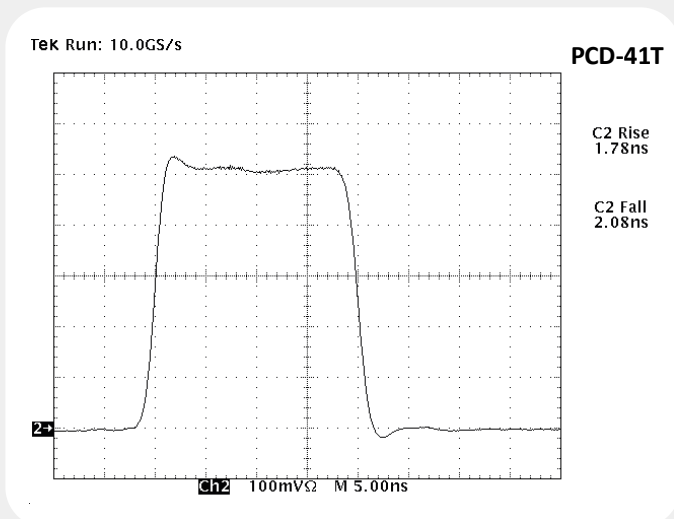
Block diagram of PCD-41T - pulse duration is determined by two trigger pulses at X3 and X4



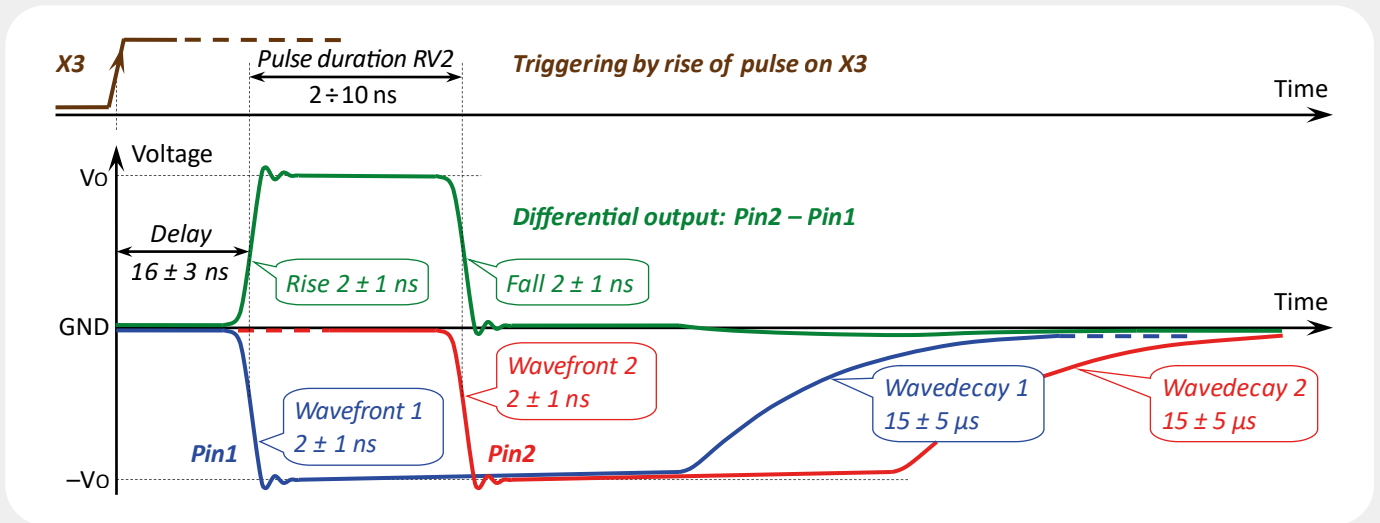
Waveforms of the transmitted light beam

Pulse voltage: $V_0 = 3800 \text{ V}$;

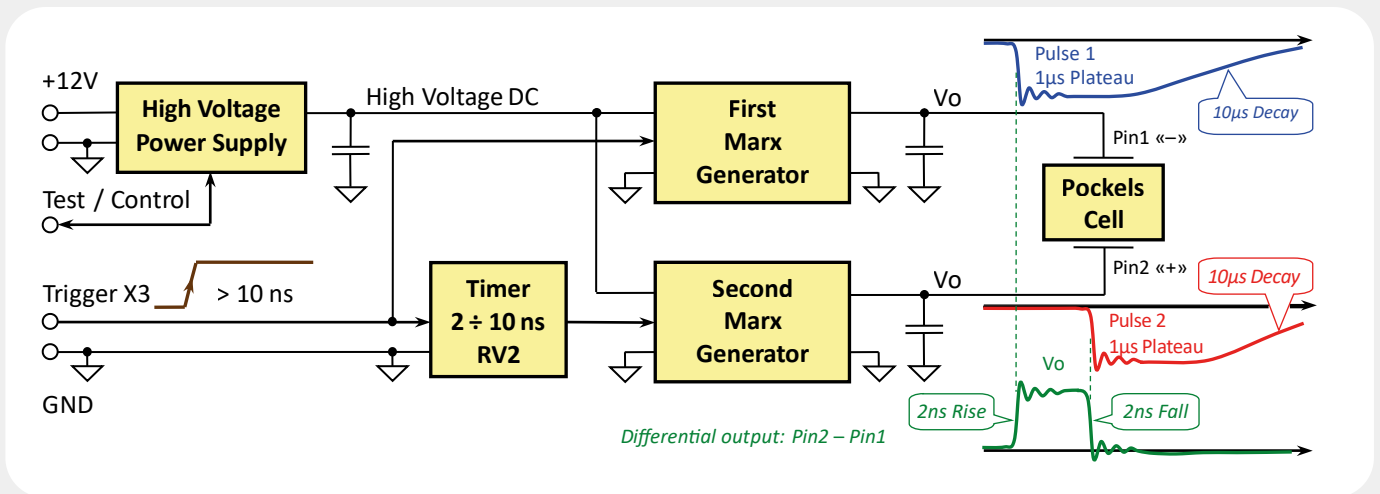
Pockels cell half-wave voltage: $V_{\lambda/2} = 3800 \text{ V}$



Output waveform of PCD-41P – pulse duration is controlled by trimmer RV2



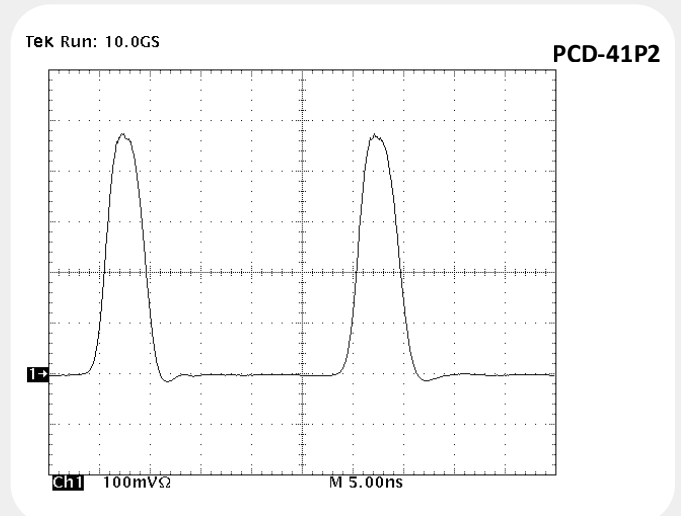
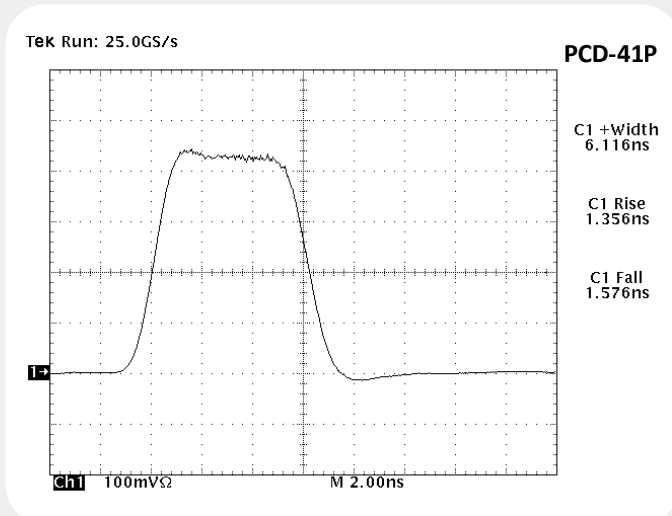
Block diagram of PCD-41P – pulse duration is controlled by trimmer RV2



Waveforms of the transmitted light beam

Pulse voltage: $V_0 = 3800 \text{ V}$;

Pockels cell half-wave voltage: $V_{\lambda/2} = 3800 \text{ V}$





Leading the Light

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