Kentech Instruments Ltd.

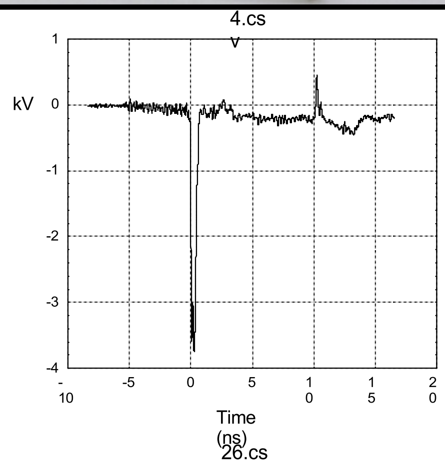
# PSP1 Mk2 Programmable Pockels Cell Driver

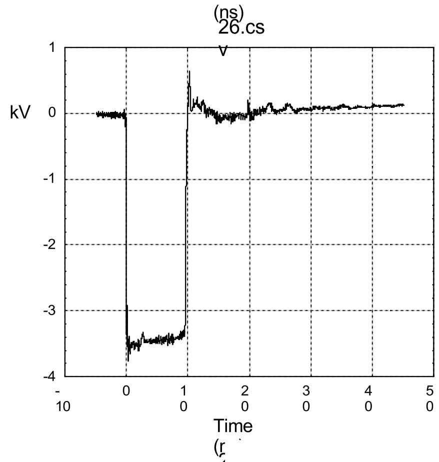

**Applications:**

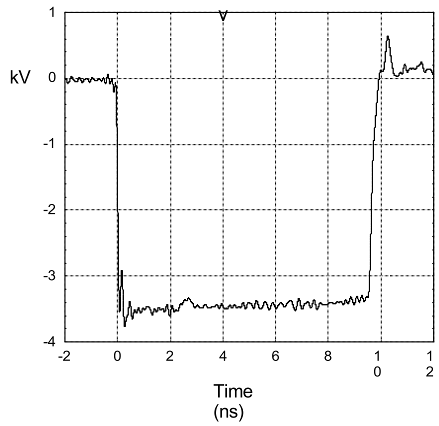
Laser pulse chopping <300 ps to 10 ns.

Pulse pickeing a variable number of pulses.

Suitable for wavelengths up to 1064 nm




**Standard specification summary:**

Output amplitude 3.5kV into 50Ω with 70 to 100% adjustment

Pulse width adjustable <300ps to 10ns, 25ps steps

Built in terminator

Trigger delay approx 31 ns

Jitter <20ps peak to peak

Remote control by RS232 or Ethernet

Adjustable trigger threshold

Local and remote control of:-

- Pulse width
- Trigger enable/disable
- Amplitude

Remote status monitoring of local control

Programmable power up configuration in EEPROM for stand alone operation`

110/240 V AC power

**Options - special order**

Low voltage unit

Positive output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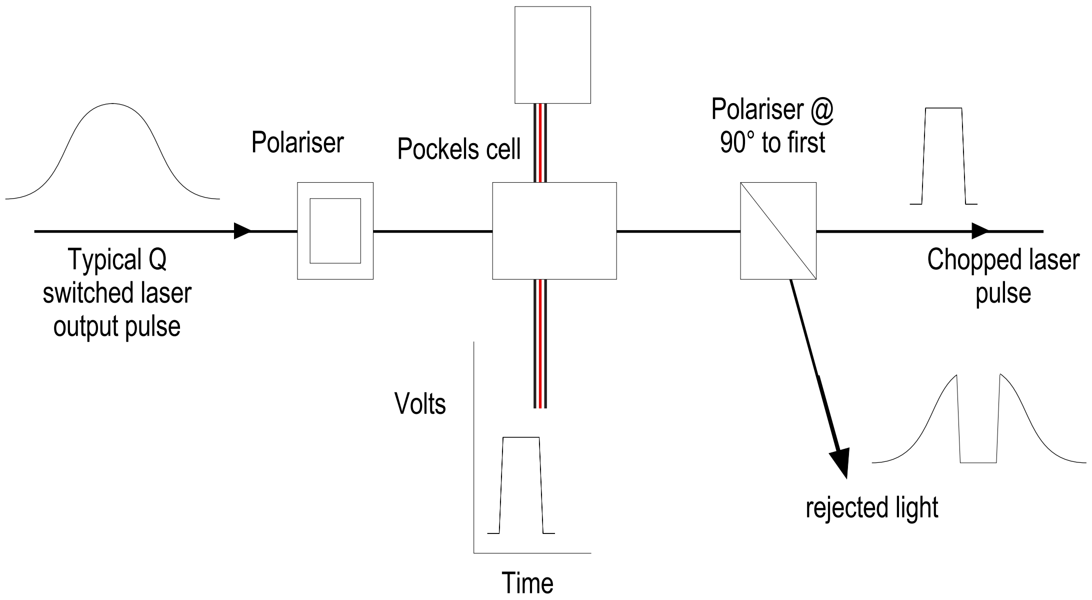
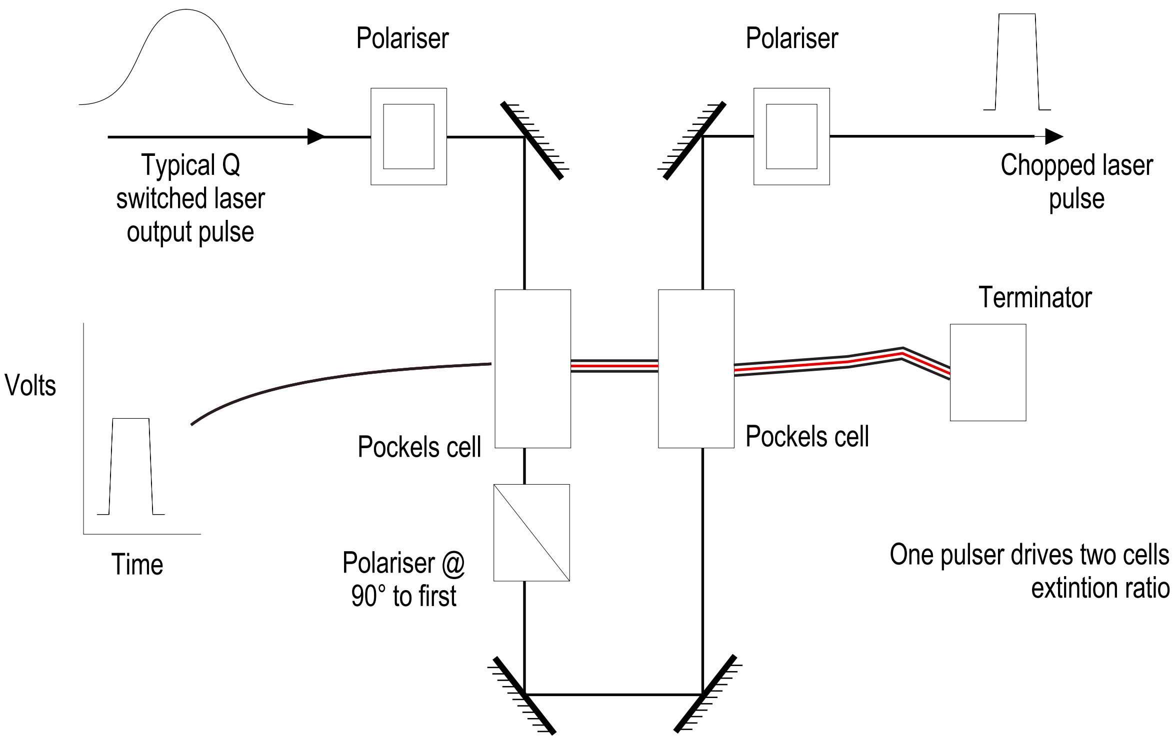
## Typical application




These schematics do not show the sin$^2$ tranmission effects of the pockels cell and polarisers but does indicate the technique.




One pulser drives two cells for increased extintion ratio

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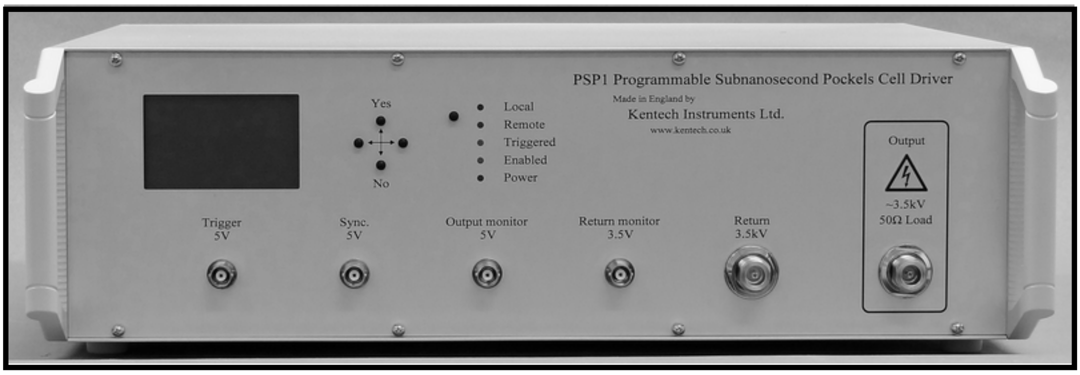


**Specification:**

- No of channels 1
- Output Amplitude approx 3.5kV* adjustable down to ~70% of max., into 50 Ω
- Polarity - negative as standard
- Pulse length <300ps to 10ns in approx 25ps steps
- Rise time ~ 150 ps
- Fall time ~200ps + Pulse length / 10
- Trigger delay approx 31 ns fixed
- Trigger requirement ≥ 2 volts into 50 Ω, <2ns risetime with adjustable threshold.
- Maximum repetition rate ≥ 100Hz
- Jitter <20ps
- Monitor output Proportional approx. x 1000 attenuation
- Trigger synch output
- Local display/control Leds indicating status
- Local/remote control switch
- **LCD and keyboard allowing local control of most functions:**
  - Trigger enable/disable
  - Pulse width setting
  - Trigger enable/disable
  - Pulse width
  - Status monitoring
- **Connectors**
  - Power input 110/240V AC
  - Pulser output
  - Trigger Sync output
  - Proportional monitor output
  - Trigger Input
  - Inhibit Input
  - Ethernet
  - RS232

* Typical figures are ~ 3.8kV

**Suitable Pockels cells**

Currently all suitable cells use KD*P crystals although there are some good reasons why RTP would be a good choice. As yet there are no fast packages for RTP cells.

For KD*P rise time increases with aperture and number of crystals.
A 6 mm single crystal cell is ~ 200ps. A 2 crystal 10 mm cell is ~ 350ps
The 2.5 mm cells are faster than our drivers.

**Fast Pulse Technology, Inc.**

1111 single crystal with 2.5 mm aperture
1112 double crystal with 2.5 mm aperture
1113 single crystal with 6 mm aperture
1071 single crystal with 10 mm aperture
1072 double crystal with 10 mm aperture
1073 single crystal with 16 mm aperture
1074 double crystal with 16 mm aperture

**Leysop Ltd.**

UPC68 single or double crystal, apertures 6mm and 8mm

The PSP1 is suitable for a double crystal device used in half wave mode at 1064nm, or a single crystal device used at half mode at 532nm.
Quarter wave requires half the votlage of half wave operation.
532nm requires about half the votlage of a 1064nm device.

Attenuators are available from **Barth Electronics, Inc.**
A 6dB type 142 attenuator is suitable for halving the voltage enabling the PSP1 to drive a double crystal cell half wave at both 532nm and 1064. Double wavelength cells are available. 142-NMFP-6B.

**Notes:**

The transmission of a suitably set up cell and crossed polarisers is given by

$$T = \sin^2(V/V_{\lambda/2} * 90°)$$

With 2 cells and 3 polarisers and the same voltage on each cell this becomes

$$T = \sin^4(V/V_{\lambda/2} * 90°)$$

where T = transmission
V = applied voltage
$V_{\lambda/2}$ = cell half wave voltage [~ 3.6kV for a double crystal KD*P cell]

KD*P is potassium dideuterium phosphate