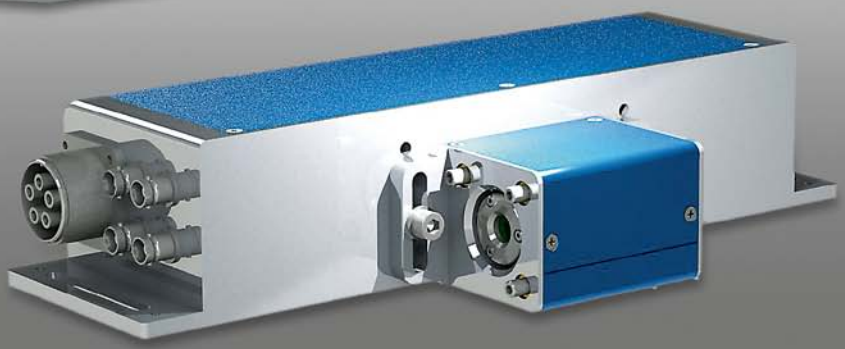
EKSMA OPTICS

Ultrafast Pulse Picking Systems



Synchronizes with lasers operating at up to **100 MHz** pulse repetition rate

Picks pulses from the train at up to **1 MHz** rate

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FP1 Pulse Picker

With **pMaster 4.0** digital synchronization and delay pulse generator

FP1 pulse picker consists of built-in driver with HV power supply and a Pockels cell attached to the unit.

This unit is able to select pulses at up to 1 kHz rate. **FP1** requires sync pulses from the laser for the driver control or can be used with **pMaster 4.0** generator. In setup with pMaster 4.0 generator can be synchronized for single pulse picking from max 20 MHz repetition rate pulse train.

FP1 pulse picker has DKDP Pockels cell and is set for quarter wave voltage operation. On special requests DKDP cell can be changed to BBO or KTP Pockels cell for half wave voltage operation.

MP1 Pulse Picker

With **pMaster 4.0H** digital synchronization and delay pulse generator with built-in HV power supply

New

MP1 pulse picker consists of built-in fast driver and a Pockels cell.

This unit is able to select pulses at up to 600 kHz rate. **MP1** requires sync pulses from the laser for the driver control or can be used with **pMaster 4.0H** generator. In setup with **pMaster 4.0H** generator can be synchronized for single pulse picking from max 30 MHz repetition rate pulse train.

MP1 pulse picker has BBO Pockels cell and is set for quarter wave voltage operation. On special requests BBO cell can be changed to KTP Pockels cell for half wave voltage operation.

UP1 Ultrafast Pulse Picker

With **pMaster 4.0H** digital synchronization and delay pulse generator with built-in HV power supply

UP1 pulse picker consists of built-in drivers in full bridge configuration and a Pockels cell attached to the unit. The **UP1** pulse picker in setup with **pMaster 4.0H** generator is able to select pulses at up to 1 MHz rate from max 100 MHz repetition rate pulse train.

UP1 comes with BBO Pockels cell (set for quarter wave voltage) or KTP Pockels cell (for half wave operation). KTP Pockels cells usage is limited by the average power of the laser beam – up to 2 W and contrast ratio is typically >1:500. While BBO Pockels cells operate at much higher power levels and feature higher contrast ratio – typically >1:1000.

Specifications

SPECIFICATIONS OF DIGITAL SYNCHRONIZATION AND DELAY PULSE GENERATOR

Model	pMaster 4.0H	pMaster 4.0
PROGRAMMABLE TIMING GENERATOR		
Channel modes	Single shot, burst, normal, duty cycle	
Control modes	Internally triggered, externally triggered and external gate	
Delay range	0 to 1000 s	
Delay accuracy	1.5 ns + 0.0001 delay	
Delay resolution	250 ps	
Delay Jitter	<400 ps RMS	
Pulse inhibit delay / output inhibit delay	120 ns / 50 ns	
TRIGGER INPUT MODULE		
Trigger input rate	DC – 5 MHz	
Trigger insertion delay	<180 ns	
Trigger jitter	<800 ps RMS	
Minimal pulse width	2 ns	
Trigger threshold	0.2 – 15 V DC	
Maximum input voltage	60 V Peak	
Input impedance	1.5 kΩ + 40 pF	
Resolution	10 mV	
EXTERNAL CLOCK INPUT MODULE		
External clock input rate	10 MHz – 100 MHz	
Minimal pulse width	100 ps	
Pulse amplitude	1 V rms (min) – 5 V rms (max)	
Input impedance	102 Ω	
PHYSICAL SPECIFICATIONS		
High voltage power supply for PC driver	Built-in	–
Dimensions W × D × H	482 × 387 × 88 mm	482 × 283 × 44 mm

SPECIFICATIONS OF PULSE PICKER UNIT

Pulse picker	FP1 - DKDP	MP1 - BBO	UP1 - BBO	UP1 - KTP
Built-in driver	operates at up to 1 kHz rep. rate	operates at up to 600 kHz rep. rate	operates at up to 1 MHz rep. rate	
Max laser repetition rate for single pulse picking	20 MHz	30 MHz	100 MHz	
HV power supply	built-in [3]	required [2]	required [1]	
Operation	quarter wave, λ/4	quarter wave, λ/4	quarter wave, λ/4	half-wave, λ/2
HV pulse duration	30 – 3000 ns	15 – 5000 ns	0 – 5000 ns	
HV pulse rise and fall time	<6.5 ns	<7 ns	<6.5 ns	
Pockels cell contrast ratio, VCR [4]	>1:2000	>1:500	>1:500	
Pockels cell transmission [5]	>97% at 1064 nm	>98 % at 1030 nm	>98 % at 1030 nm	>98 % at 1064 nm
Clear aperture	Ø11 mm	Ø3.5 mm	Ø3.5 mm	Ø5 mm [6]
Cooling	conductive heat sink	water	water	
Dimensions L × W × H	245 × 133 × 81 mm	230 × 90 × 69 mm	320 × 164 × 65 mm	

[1] *Requires two HV power supplies with max 4 kV output and maximal output power 120 W each. Optimal HV power supplies are provided in generator pMaster 4.0H.*

[2] *Requires one HV power supply with max 4 kV output and maximal output power 120 W. Optimal HV power supply is provided in generator pMaster 4.0H.*

[3] *Requires only 24 V, 15 W external power supply. Can be supplied separately by EKSMA Optics.*

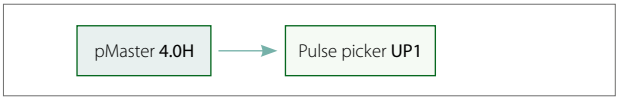
[4] *VCR – contrast ratio when voltage is applied to the cell.*

[5] *Other particular laser wavelengths or wavelength ranges are available on request.*

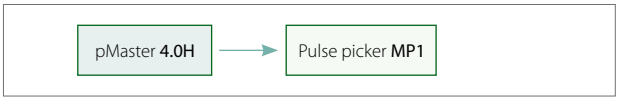
[6] *Max clear aperture for KTP Pockels cell can be up to Ø9 mm.*

Suggested Configurations
of pulse pickers and sync pulse generator pMaster

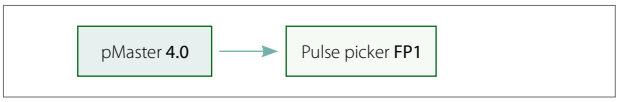
Ultrafast pulse picking at up to 1 MHz rate



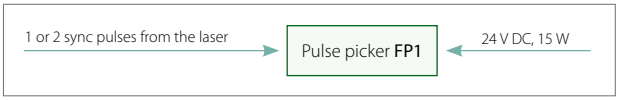
Pulse picking at up to 600 kHz rate



Pulse picking at up to 1 kHz rate

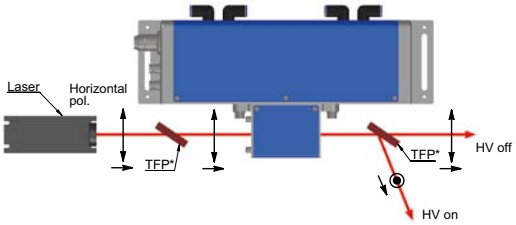


Pulse picking at up to 1 kHz rate

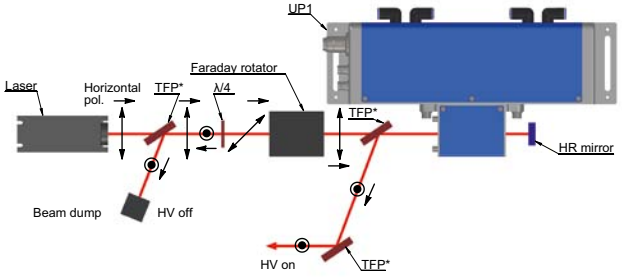


Suggested Operation Schemes

Half-wave voltage operation scheme



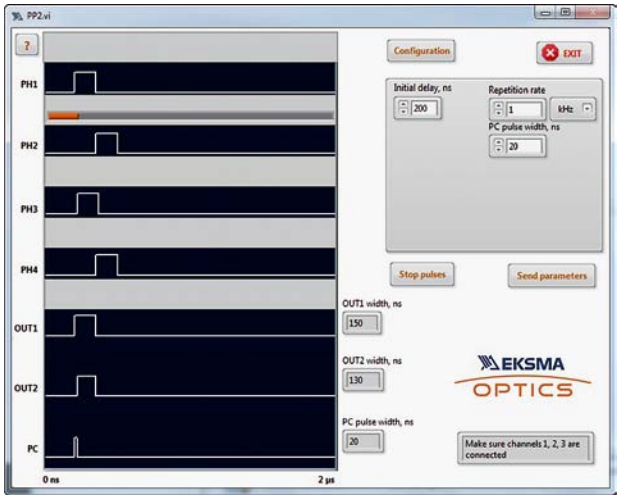
Quater-wave voltage operation scheme



TFP – Thin film polarizer, for instance our standard products: 420-1258UHT, 420-1256UHT or 420-1248UHT.

Control Software

pMaster features 4 independent programmable channel outputs and communication via USB port with LabView compatible drivers for full control over all parameters.



Ordering Information

Code	Description
pMaster 4.0	Pulse synchronization and delay generator, 4 output channels for trigger pulses
pMaster 4.0H	Pulse synchronization and delay generator, 4 output channels for trigger pulses with built-in High Voltage supply
UP1-BBO-2.5	Ultrafast pulse picker for up to 1 MHz operating rate, BBO clear aperture 2.5 mm, λ/4 operation at 1030 – 1064 nm
UP1-BBO-3.5	Ultrafast pulse picker for up to 1 MHz operating rate, BBO clear aperture 3.5 mm, λ/4 operation at 1030 – 1064 nm
UP1-KTP-5.5	Ultrafast pulse picker for up to 1 MHz operating rate, KTP clear aperture 5.5 mm, λ/2 operation at 1030 – 1064 nm
MP1-BBO-3.5	Pulse picker for up to 600 kHz operating rate, BBO clear aperture 3.5 mm, λ/4 operation at 1030 – 1064 nm
FP1-DKDP-11	Pulse picker with built in HV supply for up to 1 kHz operating rate, DKDP clear aperture 11 mm, λ/4 operation at 1064 nm

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