

Ultrafast Pulse Picking Systems

pMaster 4.2

DIGITAL SYNCHRONIZATION AND DELAY PULSE GENERATOR



pMaster 4.2 is a timing generator with four output channels used for the full control of operation of high voltage Pockels cells drivers which are built-in in UP2 or MP1 pulse picking units. pMaster 4.2 also has built-in high voltage power supplies for Pockels cells drivers powering.

FEATURES

- › Synchronization with pulsed lasers emitting laser pulses at up to 100 MHz repetition rate
- › Control of ultrafast pulse picking units operating at up to 2 MHz repetition rate
- › Single shot, burst or normal operation modes
- › 4 output channels for full control of Pockels cells drivers with 100 picoseconds resolution
- › Touch screen for setting operation parameters and monitoring of HV current
- › Communication via USB port

SPECIFICATIONS of pMaster 4.2 Timing Generator

MODEL		pMaster 4.2
CONTROL MODES		Internal pulse generator, External trigger, External RF source
INTERNAL PULSE GENERATOR	Operation modes	Single shot, burst, normal
	Delay range	1.1 nanoseconds to 140 milliseconds
	Resolution	100 ps
	Accuracy	25 ps + 0.000001 × delay
	Time base	100 MHz, 0.2 ppm
	RMS jitter	< 100 ps
	Channel to channel jitter	< 30 ps
EXTERNAL SYNCHRONIZATION	Synchronization source	External trigger, SYNC IN input
	Rate	1 Hz to 20 MHz
	Min pulse width	10 ns
	Threshold	1.3 V
	Input level	LVTTL, tolerates 5 V
	Impedance	0.2 mA pulldown
EXTERNAL RF SOURCE, CLK IN INPUT	Slope	rising
	Rate	10 MHz to 100 MHz
	Min pulse width	300 ps
	Input level	0.5 V to 3.3 V
OUTPUTS	Impedance	50 Ω
	Output level	4.5 V
COMMUNICATION, POWERING AND PHYSICAL SPECIFICATIONS	Output impedance	50 Ω
	Communication	USB
	Power	230 V AC 50 Hz or 110 V AC 60 Hz
	Dimensions	482 × 387 × 88 mm
	Weight netto (including standard 2 m power cable and 1.5 m HV cable)	~ 6.6 kg

POCKELS CELLS

POCKELS CELLS DRIVERS

HV POWER SUPPLIES

Q-SWITCHING KITS

ULTRAFAST PULSE PICKING SYSTEMS

LASER DIODE DRIVERS

LASER SYNCHRONIZATION MODULES

CRYSTAL OVENS

MP1

PULSE PICKER



FEATURES

- Pulse picking rate up to 600 kHz

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 is operated by pMaster 4.2 generator which provides sync pulses for driver control and

has built-in HV power supply. MP1 can be synchronized with a laser generating pulse train with max 60 MHz repetition rate for single pulse picking task when it is in setup with pMaster 4.2 generator.

MP1 pulse picker comes with BBO or DKDP Pockels cell and it is set for quarter wave voltage operation. On special requests KTP Pockels cell can be installed for half wave voltage operation.

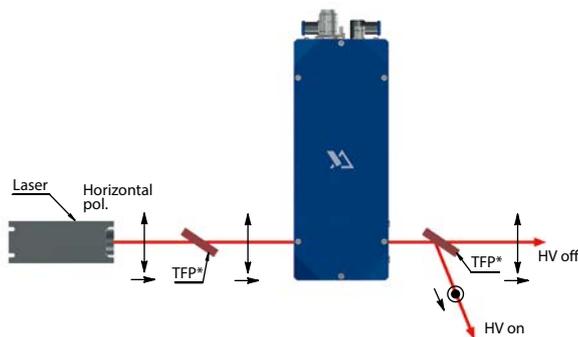
SPECIFICATIONS of MP1 Pulse Picker Units

PULSE PICKER	MP1-DKDP-11	MP1-BBO-5.8	MP1-BBO-3.5
Built-in-driver, max operating rate	up to 5 kHz	up to 250 kHz	up to 600 kHz
Max laser repetition rate for single pulse picking	40 MHz	60 MHz	
HV power supply	provided in pMaster 4.2		
Operation	quarter-wave, $\lambda/4$		
HV pulse duration	30 – 3000 ns	15 – 1250 ns	15 – 400 ns
HV pulse rise time, typical	< 9 ns	< 8 ns	< 7 ns
HV pulse fall time, typical	< 9 ns	< 8 ns	< 7 ns
Pockels cell contrast ratio, VCR	1 : 500		
Pockels cell transmission	> 97 % at 1064 nm	> 98 % at 1064 nm	
Clear aperture	Ø11 mm	Ø5.8 mm	Ø3.5 mm
Cooling	conductive	water	
Dimensions (L x W x H)	230 x 90 x 69 mm		

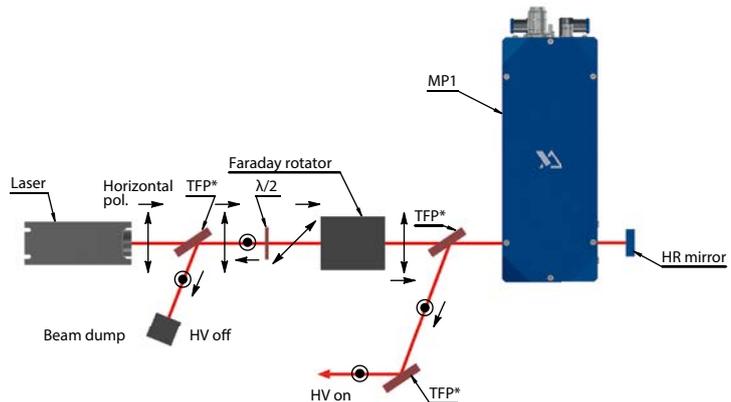
MP1 can be set for operation at standard laser wavelengths (1064 nm, 1030 nm, 800 nm) or at any specific laser wavelength in the range from 500 to 2000 nm.

SUGGESTED OPERATION SCHEMES

Single pass (half-wave) operation scheme



Double pass (quarter-wave) operation scheme



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

ORDERING INFORMATION

CODE	DESCRIPTION
pMaster 4.2	Pulse synchronization and delay generator, 4 output channels for trigger pulses with built-in High Voltage supply
MP1-DKDP-11	Ultrafast pulse picker for up to 5 kHz operating rate, DKDP clear aperture Ø11 mm, $\lambda/4$ operation at 1064 nm
MP1-BBO-5.8	Ultrafast pulse picker for up to 250 kHz operation, BBO clear aperture Ø5.8 mm, $\lambda/4$ operation at 1064 nm
MP1-BBO-3.5	Ultrafast pulse picker for up to 600 kHz operation, BBO clear aperture Ø3.5 mm, $\lambda/4$ operation at 1064 nm

UP2

ULTRAFAST PULSE PICKER



FEATURES

- Pulse picking rate up to 2 MHz

UP2 pulse picker consists of built-in drivers in full bridge configuration, Pockels cell, high contrast ratio polarizers, beam dump and other optical components necessary for pulse picking application. The UP2 pulse picker in setup with pMaster 4.2 generator is able to select pulses at up to 2 MHz rate from max

100 MHz repetition rate pulse train. UP2 comes with BBO or KTP Pockels cell which are set for quarter wave or half wave voltage operation depending on the laser wavelength and required minimal clear aperture of the Pockels cell.

KTP Pockels cell's 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 of UP2 Pulse Picker Units

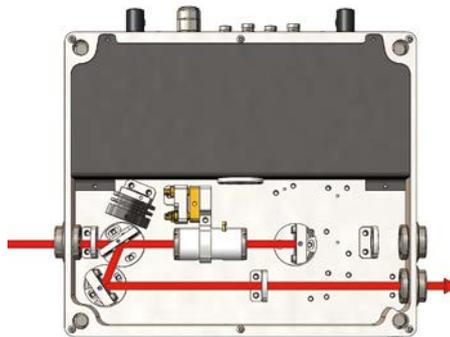
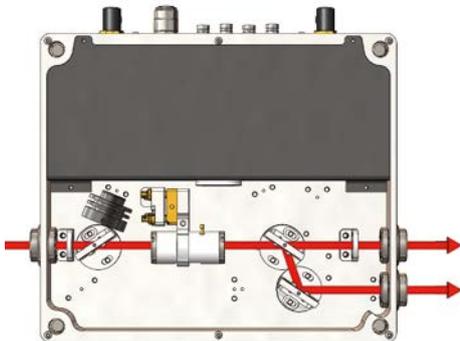
PULSE PICKER	UP2-BBO-3.5	UP2-BBO-2.5	UP2-PCK-5.5	UP2-PCK-3.5
Built-in-driver, max operating rate	up to 1 MHz	up to 2 MHz	up to 1 MHz	up to 2 MHz
Max laser repetition rate for single pulse picking	100 MHz			
HV power supply	provided in pMaster 4.2			
Operation	quarter-wave, $\lambda/4$		half-wave, $\lambda/2$	
HV pulse duration	0 – 5000 ns			
HV pulse rise time, typical	< 7 ns			
HV pulse fall time, typical	< 7 ns			
Pockels cell contrast ratio, VCR	1 : 500			
Pockels cell transmission	> 98 % at 1064 nm			
Clear aperture	Ø3.5 mm	Ø2.5 mm	Ø5.5 mm	Ø3.5 mm
Cooling	water			
Dimensions (L x W x H)	240 x 275 x 59 mm			

UP2 can be set for operation at standard laser wavelengths (1064 nm, 1030 nm, 800 nm) or at any specific laser wavelength in the range from 500 to 2000 nm.

SUGGESTED OPERATION SCHEMES

Single pass (half-wave) operation scheme

Double pass (quarter-wave) operation scheme



Note. Additional components – Faraday rotator, $\lambda/2$ waveplate and polarizer are required for safe operation of the laser when pulse picker is used in double pass configuration. See suggested scheme at page 28.

ORDERING INFORMATION

CODE	DESCRIPTION
pMaster 4.2	Pulse synchronization and delay generator, 4 output channels for trigger pulses with built-in High Voltage supply
UP2-BBO-3.5	Ultrafast pulse picker for up to 1 MHz operation, BBO clear aperture Ø3.5 mm, $\lambda/4$ operation at 1064 nm
UP2-BBO-2.5	Ultrafast pulse picker for up to 2 MHz operation, BBO clear aperture Ø2.5 mm, $\lambda/4$ operation at 1064 nm
UP2-KTP-5.5	Ultrafast pulse picker for up to 1 MHz operation, KTP clear aperture Ø5.5 mm, $\lambda/2$ operation at 1064 nm
UP2-KTP-3.5	Ultrafast pulse picker for up to 2 MHz operation, KTP clear aperture Ø3.5 mm, $\lambda/2$ operation at 1064 nm