

QBD-mini Pockels cell drivers

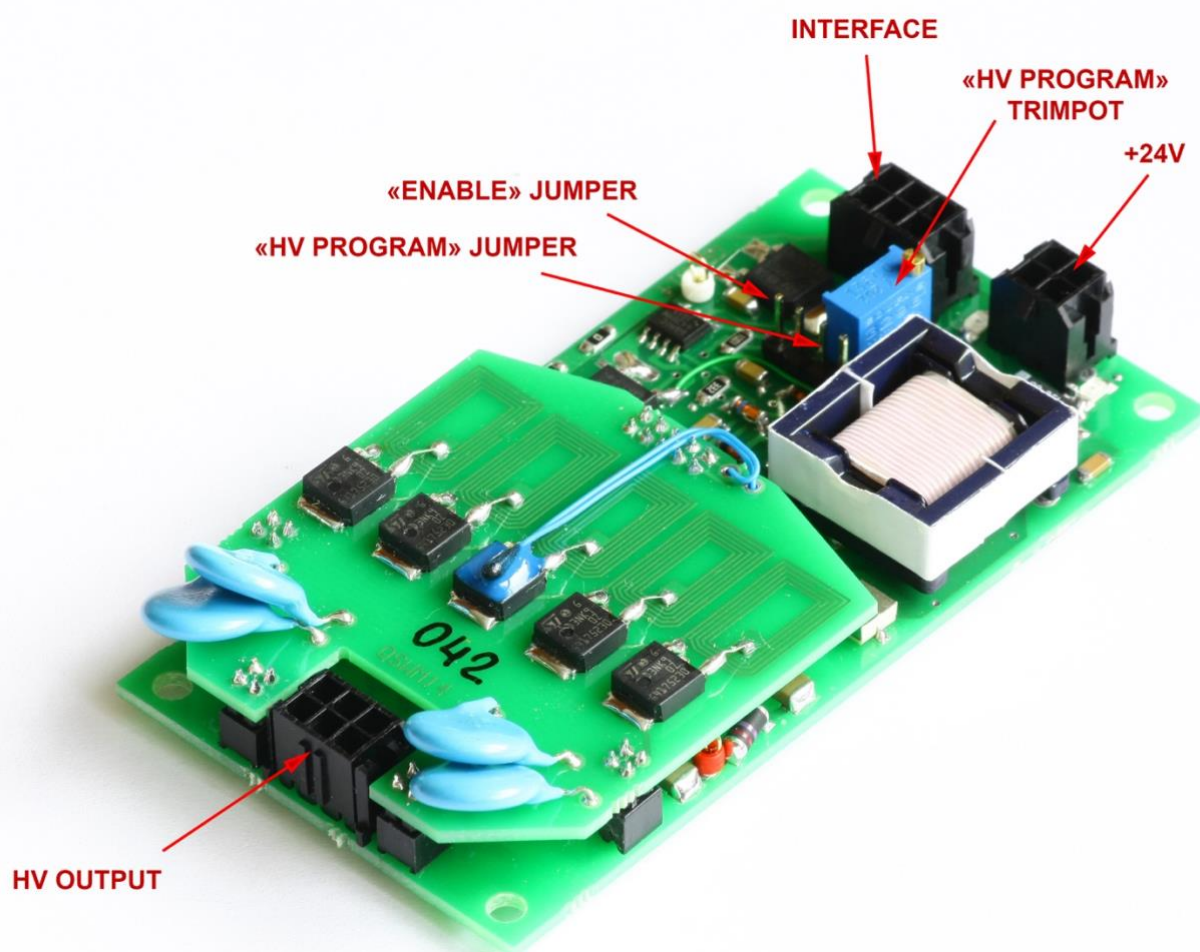
User manual

Warning! This equipment produces high voltages that can be very dangerous.
Please do not be careless around the equipment!

Warning! The output of this Pockels cell driver is bipolar (symmetrical).
Usage of non-symmetrical load or non-symmetrical probe can damage the
driver. Only differential probes should be used.



Appearance, board layout



There are three Molex microfit connectors, two jumpers and one trimmer potentiometer on Pockels cell driver board. The description is below.

“ENABLE” JUMPER:

“ENABLE” JUMPER can be used instead of “ENABLE” signal (PIN4 of INTERFACE). Do not use “ENABLE” JUMPER and “ENABLE” signal at the same time.

“HV PROGRAM” JUMPER AND “HV PROGRAM” TRIMPOT:

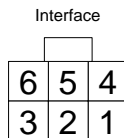
Use “HV PROGRAM” JUMPER instead of “HV PROGRAM” signal (PIN6 of INTERFACE). If jumper is on it sets output voltage accordingly to “HV PROGRAM” TRIMPOT state. Do not use “HV PROGRAM” JUMPER and “HV PROGRAM” signal at the same time.

+24V (Molex microfit 2x2):



PIN (color)	DESIGNATION	DESCRIPTION
1, 2 (red)	+24V	INPUT positive (+24VDC to turn on the Pockels cell driver)
3, 4 (black)	RETURN	Return from power supply producing +24VDC

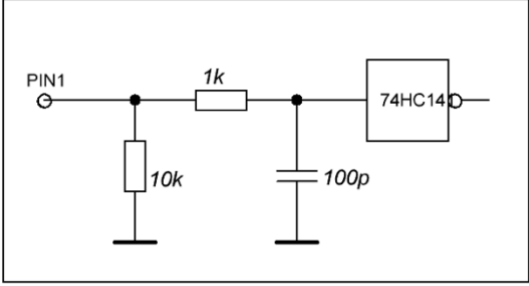
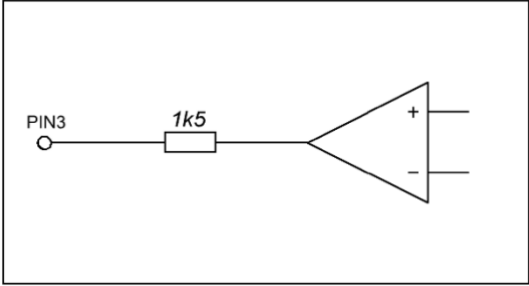
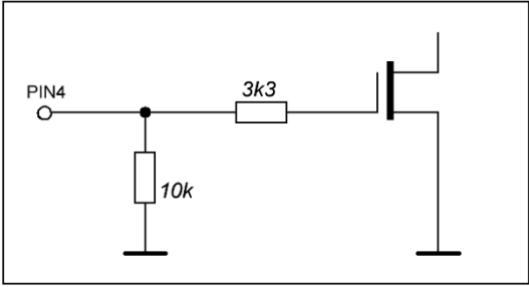
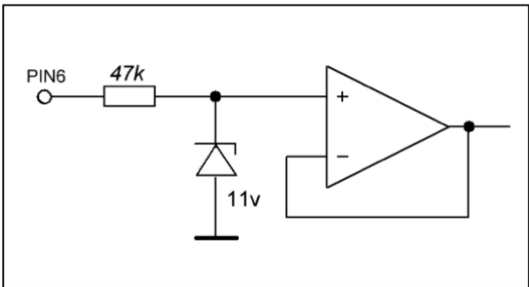
INTERFACE (Molex microfit 2x3):



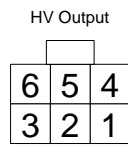
PIN (color)	DESIGNATION	DESCRIPTION
1 (orange)	Q-switch	Step from “0” or ”1” on PIN1 forms Q-Switched pulse on Pockels Cell
2, 5 (black)	Interface Return	PIN2 and PIN5 are connected to the circuit ground of all internal circuits
3 (yellow)	HV Monitor	The voltage at PIN3 is a monitor signal proportional to the measured value of high voltage output HVmax corresponds to 10V at PIN3, HVmin corresponds to approx. 4V at PIN3
4 (blue)	Enable	The high voltage output is enabled by PIN4 (“1” – enable, “0” – disable)
6 (green)	HV Program	Positive DC voltage applied to PIN6 sets up high voltage value HV HVmax corresponds to 10V at PIN6, HVmin corresponds to approx. 4V at PIN6

“0” means logical 0 low level (0V), “1” means logical 1 high level (5V)

INTERFACE CIRCUITS

Q-Switch	 <p>The circuit diagram for the Q-Switch shows a signal input labeled PIN1. This input is connected to a node that branches to a 10k resistor connected to ground and a 1k resistor connected to the input of a 74HC14 hex inverters. The output of the 74HC14 is connected to another node that branches to a 100pF capacitor connected to ground and the output terminal of the circuit.</p>
HV Monitor	 <p>The circuit diagram for the HV Monitor shows a signal input labeled PIN3. This input is connected through a 1k5 resistor to the non-inverting input (+) of an operational amplifier. The inverting input (-) of the op-amp is connected to ground.</p>
Enable	 <p>The circuit diagram for the Enable signal shows a signal input labeled PIN4. This input is connected to a node that branches to a 10k resistor connected to ground and a 3k3 resistor connected to the base of an NPN transistor. The emitter of the transistor is connected to ground, and the collector is connected to an output terminal.</p>
HV Program	 <p>The circuit diagram for the HV Program shows a signal input labeled PIN6. This input is connected through a 47k resistor to the non-inverting input (+) of an operational amplifier. The inverting input (-) of the op-amp is connected to a 11V reference voltage. The output of the op-amp is connected to an output terminal.</p>

HV OUTPUT (Molex microfit 2x3):



QBD-mini, UP-modification			QBD-mini, DN-modification		
PIN (color)	DESIGNATION	DESCRIPTION	PIN (color)	DESIGNATION	DESCRIPTION
1 (blue)	Negative	HV Negative	1 (red)	Positive	HV Positive
2-5	N/C		2-5	N/C	
6 (red)	Positive	HV Positive	6 (blue)	Negative	HV Negative

Safety

Warning! This equipment produces high voltages that can be very dangerous. Don't be careless around this equipment.

- To provide safety the QBD-series Pockels cell driver module is designed to be powered with supply voltage +24VDC, which must be galvanically separated from mains.
- It is the user's responsibility to ensure that personnel are prevented from accidentally contacting the QBD-series Pockels cell driver module, especially the high voltage connector and cable. **Casual contact could be fatal.** Output cables must have good isolation for output voltage and low capacitance.
- After shut down, do not touch the load until it has been discharged. Use an appropriate measurement device to check for complete discharge.
- Disconnect the QBD-series Pockels cell driver module from DC power supply before changing electrical or mechanical connections.

Operations (Manual control)

1. Connect +24VDC power supply, pulse generator and Pockels cell
2. Set up "*HV PROGRAM*" JUMPER
3. Turn on +24VDC power supply
4. Set up "*ENABLE*" JUMPER
5. Use "*HV PROGRAM*" TRIMPOT to set up required output voltage
6. Send driving pulses from pulse generator to *PIN1* of *INTERFACE*
7. To power down the driver, turn off +24VDC power supply or remove "*ENABLE*" JUMPER

Operations (Automatic control)

1. Connect +24V, *INTERFACE* and *HV OUTPUT* connectors to the board.
2. Remove "*HV PROGRAM*" JUMPER, remove "*ENABLE*" JUMPER
3. *DISABLE* the high voltage output
4. Apply +24VDC to the Pockels cell driver
5. Set up the desired output voltage by applying the corresponding DC voltage to *PIN6* of *INTERFACE* (*HV PROGRAM*)
6. *ENABLE* high voltage output
7. Send driving pulses to *PIN1* of *INTERFACE*
8. To power down the driver, remove +24VDC power or *DISABLE* high voltage output

Part number table

Part Number	HVmax	HVmin
QBD-mini-4016-DN QBD-mini-4016-UP	4000	1600
QBD-mini-3012-DN QBD-mini-3012-UP	3000	1200
QBD-mini-2008-DN QBD-mini-2008-UP	2000	800
QBD-mini-1004-DN QBD-mini-1004-UP	1000	400

Suffics “DN” means pull-down scheme (=normally on), “UP” – push-up scheme (= normally off).

Other modifications are available on request.