

# PicoLAS

FOCUSSING POWER TO THE POINT

## Users Manual

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PLCS-21 V3

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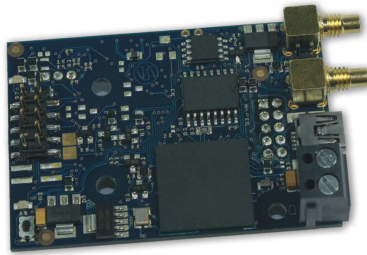
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## PLCS-21

### Providing Brains for pulsed Driver Modules



- Control of pulse current, pulse width and repetition rate
- Microcontroller supervision of all pulser activity
- Provides USB interface for communication with PC and interface for PLB-20
- Several additional failsafe mechanisms to protect your laser diodes
- Standalone Pulse-Generator capability

#### Product Description:

Many PicoLAS driver modules for pulsed lasers can be upgraded with an optional piggyback-controller. This versatile function generator allows full control of pulse width, pulse current and repetition rate.

Priority is given to provide maximum safety for the expensive laser diodes. An on-board micro-controller monitors current, voltage, temperature, pulse duration and rep-rates and cuts power to the diode if necessary.

The PLCS-21 provides a galvanically isolated USB interface. With this, the upgraded driver module can be connected to a PC. An additional interface can be used to connect the external operating unit PLB-20. This allows easy monitoring and manipulating the driver's behavior.

The piggyback controller also provides several internal trigger mechanism. This eliminates the need for an external function generator as a trigger device.

The PLCS-21 can also work as a standalone digital function generator. A square-wave signal with pulse width from 2 ns up to one second can be drawn from a coaxial 50 Ohm output.

#### Technical Data:\*

Supply voltage	+15 V (supply voltage for LDP-V is fed through PLCS)
Min. Pulse width	2 ns
Max. Pulse width	1 s
Pulse width adjustment	in steps of 1 ns (<250ns) in steps of 5ns (>250ns)
Min. Repetition rate	1 Hz
Max. Repetition rate	2.4 Mhz
Repetition Rate adj.	in steps of 1 Hz
Coaxial 50 Ohm output	Generator Voltage: 10V Maximum Load: 50 Ohm
Trigger Inputs	50 Ohm, 5V, SMC connector 500 Ohm, 5V, 2-Pin connector
Interfaces	USB 2.0, PLB-20
Dimensions	67,7 x 42,3 x 22 mm
Weight	26 g
Operating temperature	0 to +55 °C

\* Technical data is subject to change without further notice.

#### Compatible Products:

- LDP-V 50-100 V3
- LDP-V 03-100 V3
- LDP-V 240-100 V3
- LDP-AV D06-N20

The PLCS-21 automatically identifies the connected driver module. Maximum pulsewidth, output power etc. depend on the used laser diode driver. See manuals for details.

#### Optional Accessories: PLB-20



## Description of Connections

The following drawing shows all connections which are available to the user.

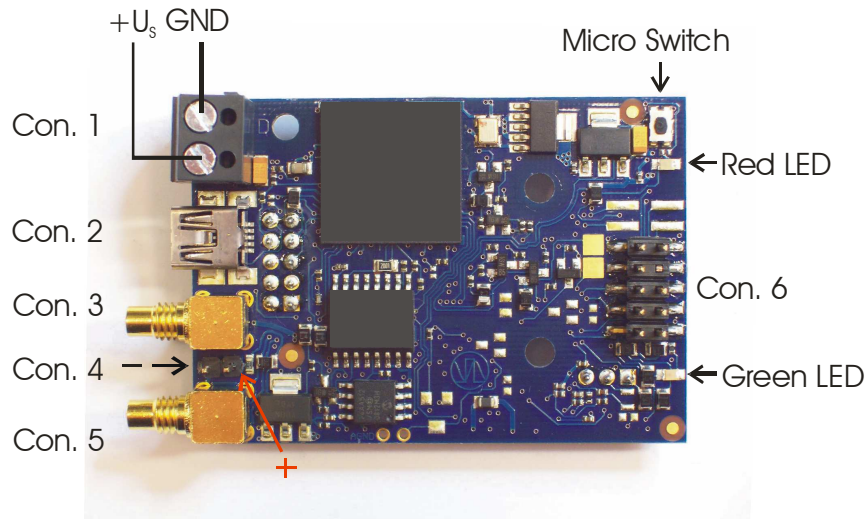


Figure 1: Connectors of the PLCS-21

Connector 1	Supply Voltage
Connector 2	Mini USB Connector
Connector 3	SMC Connector, 50 Ohm pulse output
Connector 4	2-Pin Connector, 500 Ohm trigger input
Connector 5	SMC Connector, 50 Ohm trigger input
Connector 6	Connector for PLB-20

The connectors on the bottom side of the device allow connecting the PLCS-21 to a PicoLAS laser diode driver, they must not be used for any other purpose.

## ***Operation Modes of the PLCS-21***

The PLCS-21 can work in two different operation modes. If connected to a PicoLAS laser diode driver, it works as a control unit for the driver. Pulse current, pulse width, repetition rate and different trigger modes can be set up. A Microcontroller supervises all important parameters of the driver, e.g. temperature, current etc. Two trigger inputs allow synchronisation to an external source.

If the PLCS-21 is not connected to another PicoLAS laser diode driver, it works as a digital function generator. Connector 3 serves as a 50 Ohm output. If connected to a 50 Ohm load, a square-wave signal of 5 V can be generated by the PLCS-21 at the load. The trigger inputs (Connectors 4 and 5) can be used in this mode as well.

In either modes two different user interfaces are available. The Mini USB receptacle allows the connection to a PC. A simple VT100 communication software (e.g. HyperTerminal) on the PC can then be used for manipulating the devices parameters. Another possibility to control the PLCS-21 is to use the PicoLAS operating unit PLB-20. This unit can be connected to the PLCS-21 by using connector 6.

### ***Using the PLCS-21 as a control unit for a laser diode driver***

The PLCS-21 must be mounted on the laser diode driver by using the two connectors on its bottom side and three screws M3 x 8mm. PLCS-21 and the diode driver are both powered by a single 15 V power supply via connector 1. Provided that a PLB-20 or a PC with appropriate software is connected to the unit, it is now ready for use.

Sometimes it may be useful to generate laser pulses not continuously but synchronous to an arbitrary external trigger signal. Either connector 4 or 5 can be used for this purpose. Figure 2 shows the schematic of both inputs. Note that they are galvanically isolated from the supply voltage. For trigger levels see the electrical characteristics on page 7.

**Important:** Never use both trigger inputs at the same time. Correct operation is not ensured if both inputs are connected to a source. Furthermore, a signal fed into one input may result in a current flowing out of the other input. This might damage your trigger source.

Connector 3 must **never** be connected to any cable if the PLCS-21 is mounted on a diode driver. Anything else can result in deformed laser pulses. Though monitored by the PLCS-21 the power being fed into a laser diode may exceed the adjusted value and can, in some cases, destroy your diode. Perfect operation is guaranteed only if connector 3 is left unconnected.

### ***Using the PLCS-21 as a digital function generator***

The PLCS-21 will automatically work in this mode if it is not connected to a laser diode driver. Only in this case a cable may be attached to connector 3. Figure 3 shows the schematic of output circuit. The output amplifier will generate a square-wave signal with an amplitude of 10V. If a 50 Ohm load is attached to connector 3, this will result in a signal level of 5V at the load. Unlike the trigger inputs the output circuit is not galvanically isolated from the power supply. To obtain a well-formed signal a load of 50 Ohm is recommended. Refer to the electrical characteristics on page 7 for further details. The trigger inputs connector 4 and 5 can be used in the same way as described above.

**Important:** Never use both trigger inputs at the same time. Correct operation is not ensured if both inputs are connected to a source. Furthermore, a signal fed into one input may result in a current flowing out of the other input. This might damage your trigger source.

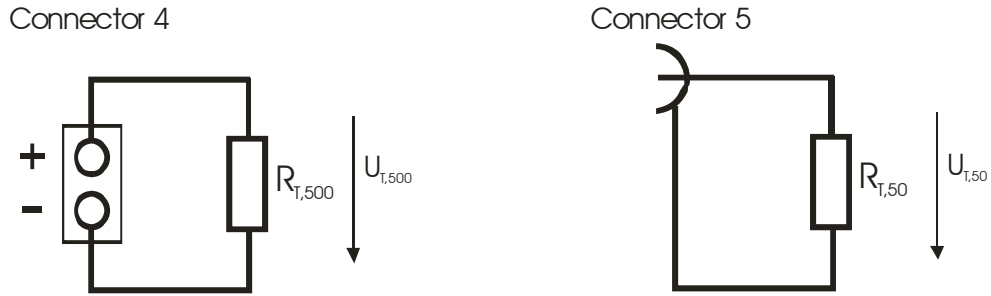


Figure 2: Trigger input circuits

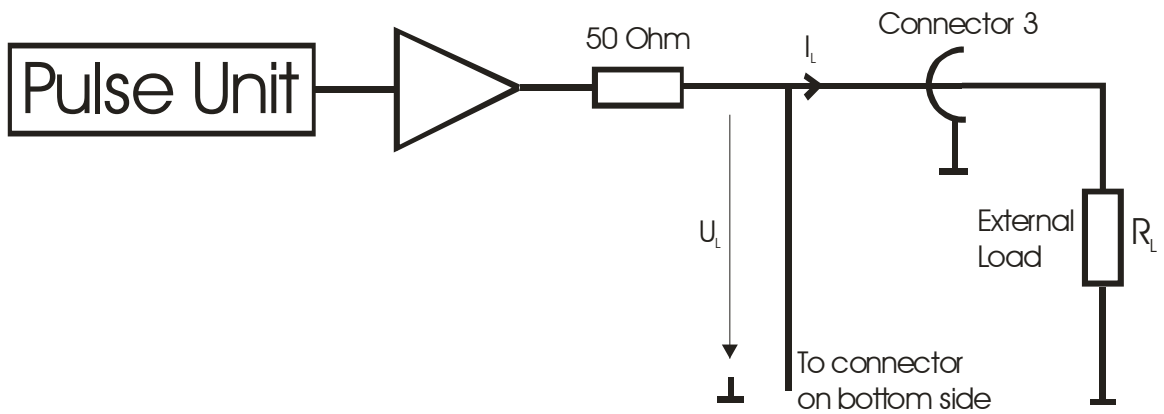


Figure 3: Pulse output circuit

## *Absolute Maximum Ratings*

Parameter (see figures)	Symbol	
Ambient operating temperature		0°C to +55°C
Supply voltage	$U_S$	-0.3V to +15.5V
Trigger voltage on connector 5	$U_{T,50}$	-6V to +6V
Trigger voltage on connector 4	$U_{T,500}$	-6V to +6V
Load current on connector 3	$I_L$	170mA

## *Electrical Characteristics*

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply current		$U_S=15V$ , no cable/device connected to PLCS-21		175		mA
Load resistance (con. 3)	$R_L$		10	50		Ohm
Output voltage (con. 3)	$U_L$	$R_L=50$ Ohm	4.85	5	5.15	V
Input resistance (con. 5)	$R_{T,50}$		48	50	52	Ohm
Input resistance (con. 4)	$R_{T,500}$		485		515	Ohm
Low Level input Voltage (con. 5)	$U_{T,50}$	$U_S=15V$			0.5	V
High Level input Voltage (con. 5)	$U_{T,50}$	$U_S=15V$	0.6	2.3	3.4	V
Low Level input Voltage (con. 4)	$U_{T,500}$	$U_S=15V$			0.5	V
High Level input Voltage (con. 4)	$U_{T,500}$	$U_S=15V$	0.9	3.5	4.7	V

