AeroDIODE CCS-I Ultra Low Noise Laser Diode Drivers Instruction Manual

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Contents

Revision Sheet

ReleaseNo.	Date	Author	Revision Description
V3.0	27/03/2020	AMU	First version under AERODIODE
V3.1	10/04/2020	AMU	Added safety advice and warning
V3.2	15/05/2020	AMU	Added starting mode description
V3.3	02/01/2023	AMU	Clarifications regarding the external current control

Disclaimer

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General information

Please read this manual carefully, it describes the hazard the user might be exposed to while using the product. It also explains in details how to use the product in the safest and more efficient way possible.

The safety of any system incorporating the product is the responsibility of the assembler of the system.

Any actions taken by the user that is not clearly described in this user manual might present a risk and is the sole responsibility of said user.

This product is to be used in laboratory or industrial tasks, and only by personnel who have followed a training in laser hazard.

Definitions

Caution : A caution is advised when dealing with hazardous situations, tasks or objects, to prevent harm or death and avoid material damage or failure.

Warning : A warning is given for potentially dangerous situation for people which cause them harm or lead to death.

Note : A note is a complementary piece of advice that must be acknowledged by the user.

General warning

Caution
The compatible laser diodes used with the CCS-I can deliver up to several Watts of coherent LASER radiation. Always wear protective goggles and observe the safety instructions provided by the laser diode supplier when using the CCS-I driver with your laser diode.

WARNING
Do not try to open or remove the cover of the CCS-I module

Note
Only use the genuine power supply, and the supplied USB cable

WARNING
Avoid all chocs and strains when handling the CCS-I

WARNING
Handle the fiber-optics cable with care as it is fragile. Do not bend or pinch it.

WARNING
Any software settings or hardware tinkering that is not described in this user manual or in the usage recommendation may put the user or its environment at risk.

WARNING
the maintenance and servicing of the CCS-I should not be executed by the end user : only AERODIODE is able to maintain the CCS-I.

Safety Instructions

Wiring

Caution

- Please first connect the input pins to the board and then plug the DC Power Supply.
- Use caution when connecting the Power Supply.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the CCS-I module.
- Connect the ground completely. Electric shock may occur if the ground is not connected correctly

Operating Environment

Caution

- Do not install near any heat sources such as radiators, heat registers, stoves, or other equipment (including amplifiers) that produce heat.
- To reduce the risk of fire or electric shock, do not expose the CCS-I to rain or moisture.

WARNING
Not following the safety recommendations and the caution mentioned above can lead to eye damage.

WARNING

This product contains an OEM CLASS 4 laser. Do NOT look directly into the fiber connector when the electrical power is ON. Make sure that you wear appropriate laser safety glasses at all times while operating the product.

Contact

If you have any question about the CCS-I module, please contact AERODIODE.

Package content

The CCS-I package comes with:

- 1 CCS-I
- 1 DC Power Supply (+12V / 4A)
- 1 USB-Jack FTDI cable
- 1 USB Key with "Aerodiode Control Software Suite" & User manual in pdf
- 1 User Manual

Product Overview

ront view of the product

Display
Shows the driving current value in Ampere.

1. Pulse/CW selector
2. positions switch controls the operating mode.
3. **TTL/LVTTL:** input pulse command/trigger (50 ohms) SMA TTL/LVTTL input voltage connector. The signal must be between 0 and +3.3V on 50 ohms.
4. **Power alarm indicator:** Red LED indicates that the maximal allowed power is reached. If the red light is on, turn down the power with the 6 or 7 control.
5. **Temperature alarm indicator** Red LED indicates instabilities in temperature stabilization.
6. **Analog input for power adjustment:** BNC input voltage connector (From 0V to +5V, corresponding to 0 – 100% of the max average current set for CW operation or max peak current for pulsed operation) for peak power adjustment (50Ω input, modulation bandwidth ~100Hz).
7. **Knob for power adjustment (manual)** : Knob for peak power adjustment.
8. **Power ON indicator:** Blue LED indicates that the device is powered.

Rear panel view of the device

1. **DC power input (+12 V):** Input connector for DC power. Use only the provided DC power supply.
2. **Output fiber**: The fiber-optic feedthrough is located at the back of the device
3. **USB input**: 3.5mm input jack used to connect the CCS-I / SOM to the PC. Use the USB-to-jack cable which is supplied with your device
4. **Daisy output**: 3.5mm output jack used to chain multiple product
5. **Alarm monitor**
6. BNC output connector for alarm status (Power or Temperature) monitor. The signal is an inverse TTL, so a +5 V output voltage level corresponds to alarm OFF. 6. Interlock (optional)
   Input connector for interlock control. It must be shunt in order to have a laser emission.
7. **Back facet monitor connector (not available for SOM-std):** BNC connector for back facet monitor output. This signal gives an electric signal that corresponds to the laser optical output.

## Installation

Getting started

The product should be placed on a flat and level surface. The working area should be clean and secure. The product should be placed away from any heat source or flammable and explosives objects.

Software installation

The CCS-I USB cable should be unplugged during the installation. Double-click on setup.exe to run the installer and follow the instructions of the installer wizard. The CCS-I control software will be installed, as well as the driver for the USB cable. A computer restart may be required to complete the installation.

Once the software is installed, plug the USB cable into a USB port of your computer. Next, plug the 3,5 mm jack into the USB input female jack of the CCS-I.
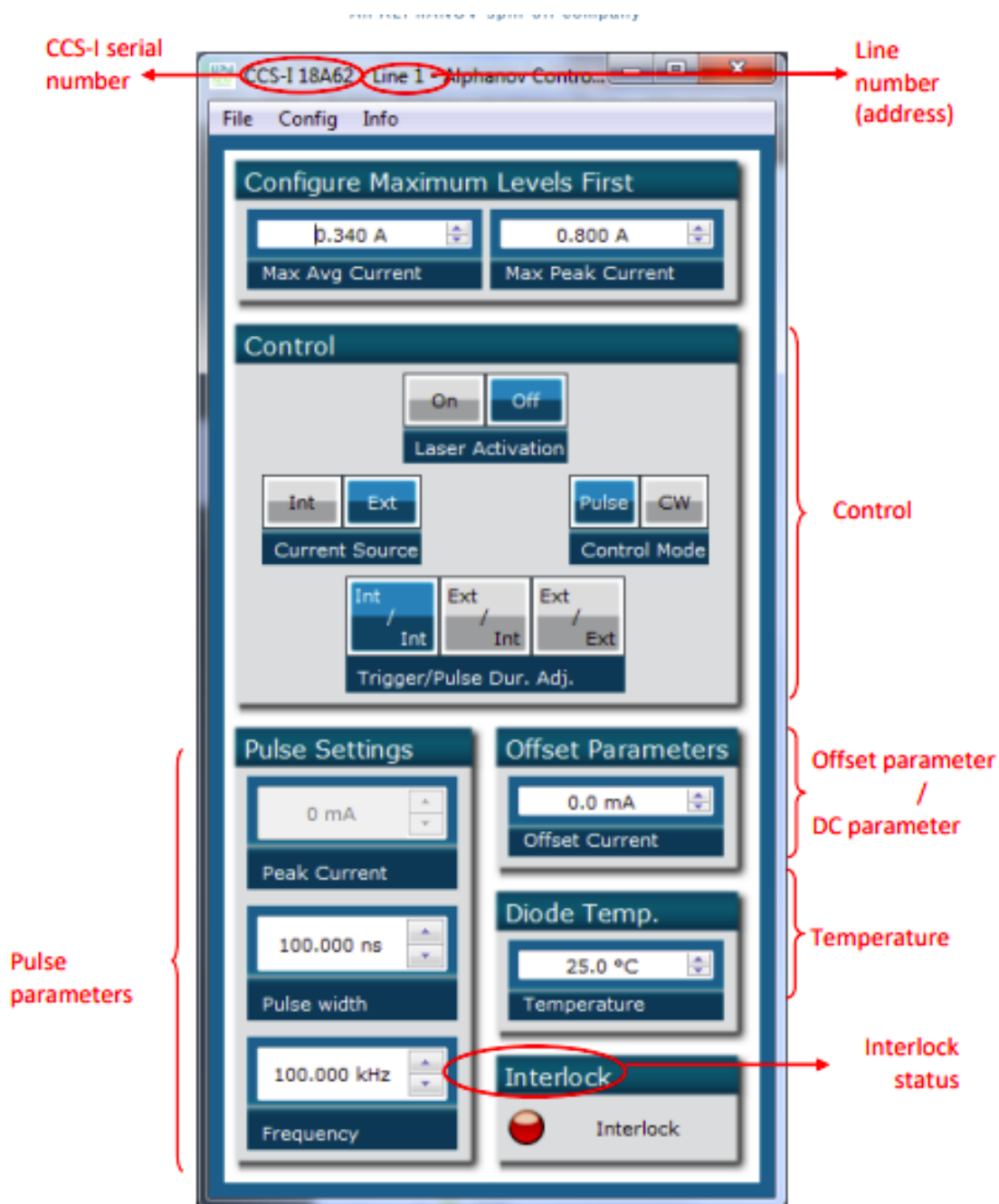
Plug-in the CCS-I power supply to turn on the CCS-I module Click on the item "Control Software" located in the Start Menu to run the CCS-I control software. A window will appear.
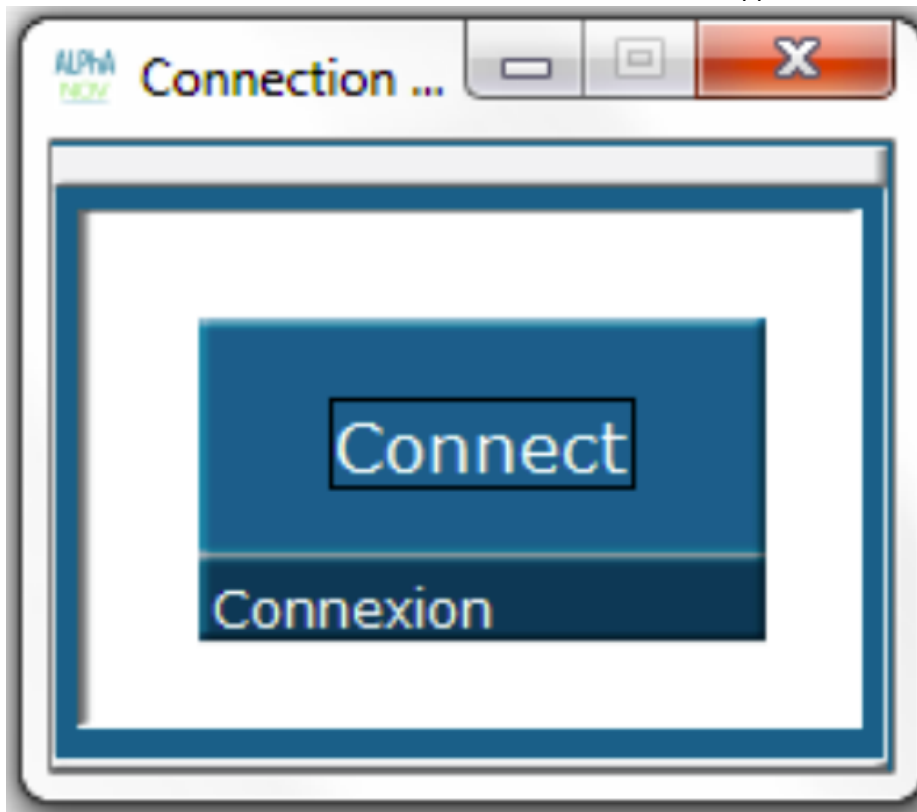
Click on Connect to start the CCS-I hardware detection. The software will automatically detect any USB-connected CCS-I.
A new window will appear for each module.

Software overview

The window is divided in four parts:

- Triggers in the Control part are used to select the operating mode
- Numeric boxes in the Pulse Parameters part are used to configure the pulse width, amplitude and repetition rate
- The Offset parameter (pulsed mode only) or the DC parameter (CW only) are used to configure the DC current (offset in pulse mode)
- The Temperature numeric box is used to set the laser diode temperature
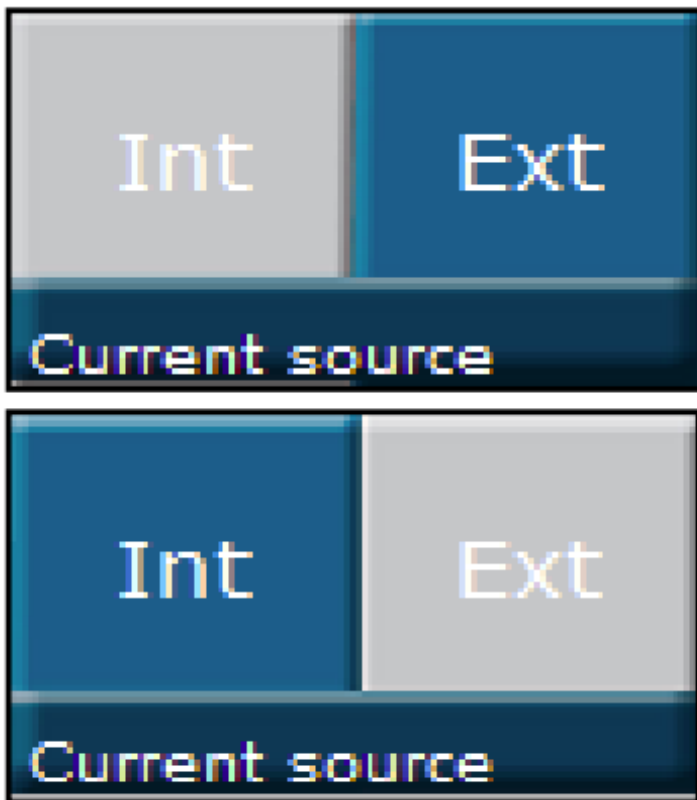- The Interlock status is ON (green) when the interlock connector is plugged.

The product serial number is written on the top left of the window. The line number (address) is on the top right.

Detailed controls

Current source

This two positions switch controls the current source.

- External source (BNC or manual knob)
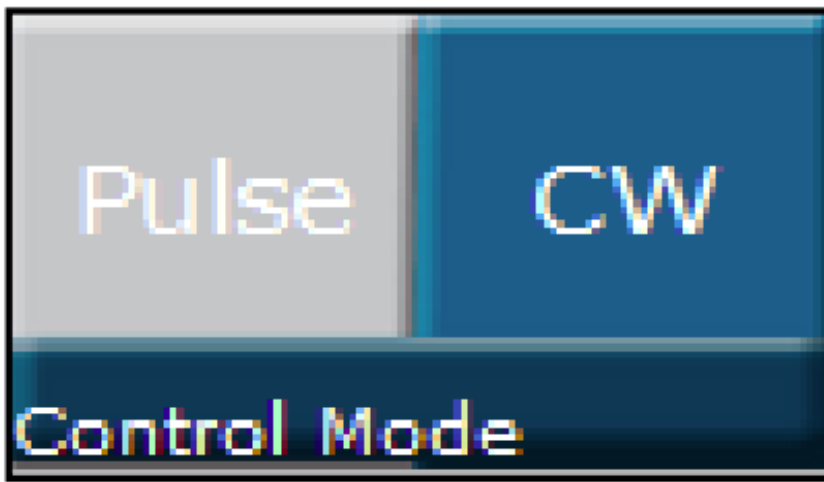- Internal source (software)

Control mode

This two positions switch controls the operating mode.

Pulsed operation
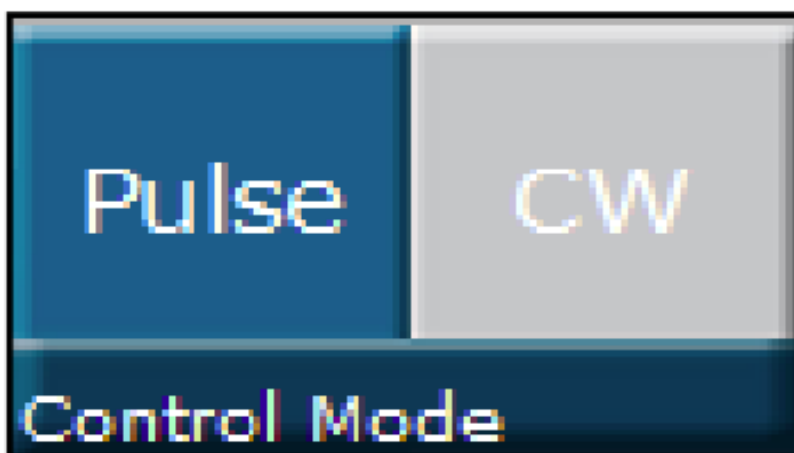
CW operation (DC current only)

Trigger and pulse width selection

This three positions switch controls the trigger and the pulse width adjustment. It is only effective in pulsed operation

- Internal trigger Internal pulse width adjustment (all software)
- External trigger (SMA) Internal pulse width adjustment
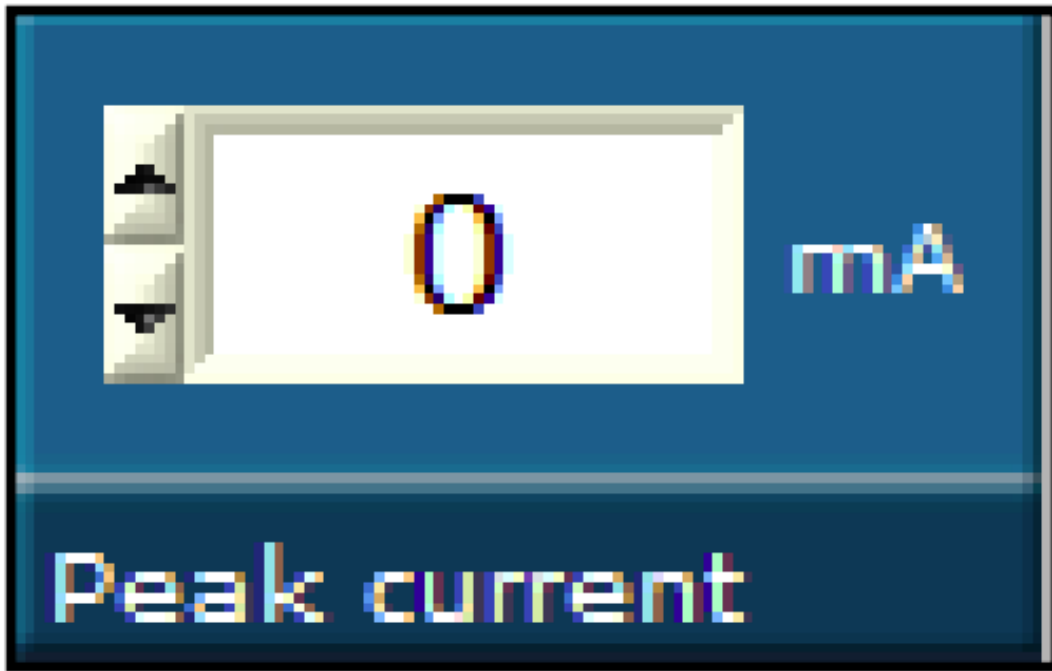- External trigger External pulse width adjustment (all from SMA)
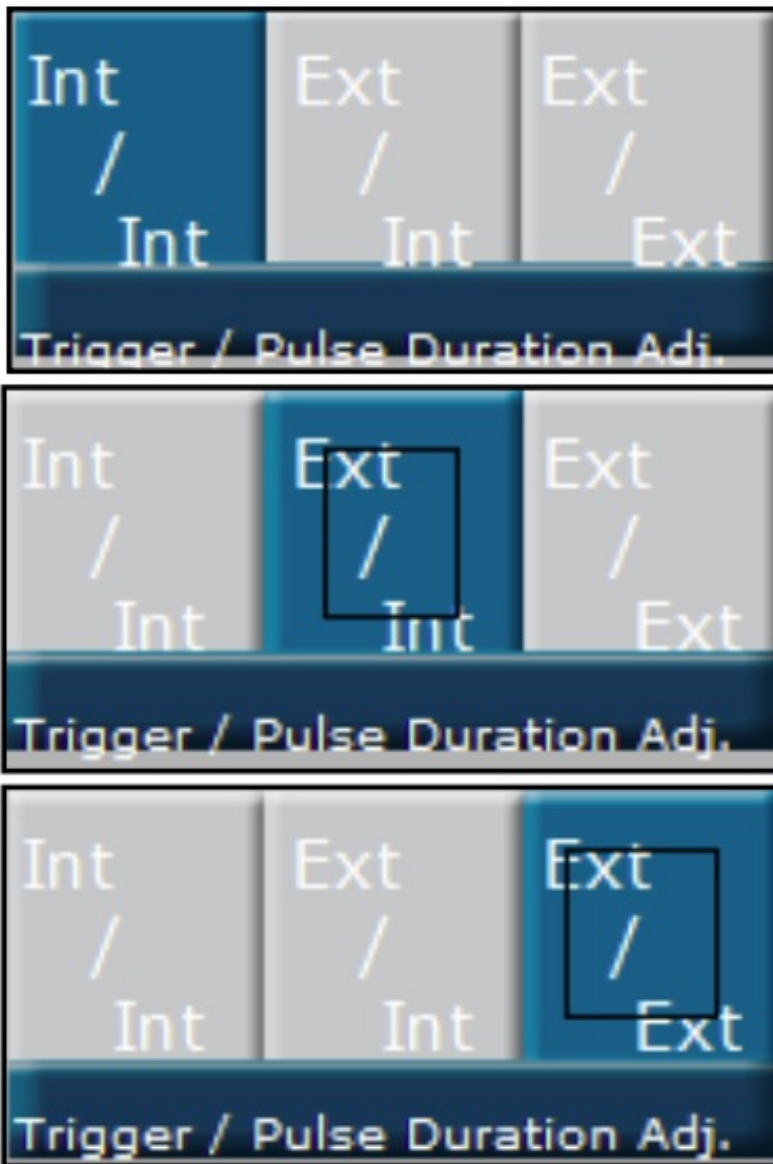
- If Int/Int is selected, the frequency and pulse width are configured from the software.
- If Ext/Int is selected, the signal is externally triggered by a digital signal on the SMA input.
  The pulse width is configured from the software. If Ext/Ext is selected, the output optical signal is generated from the digital input signal on the SMA connector.
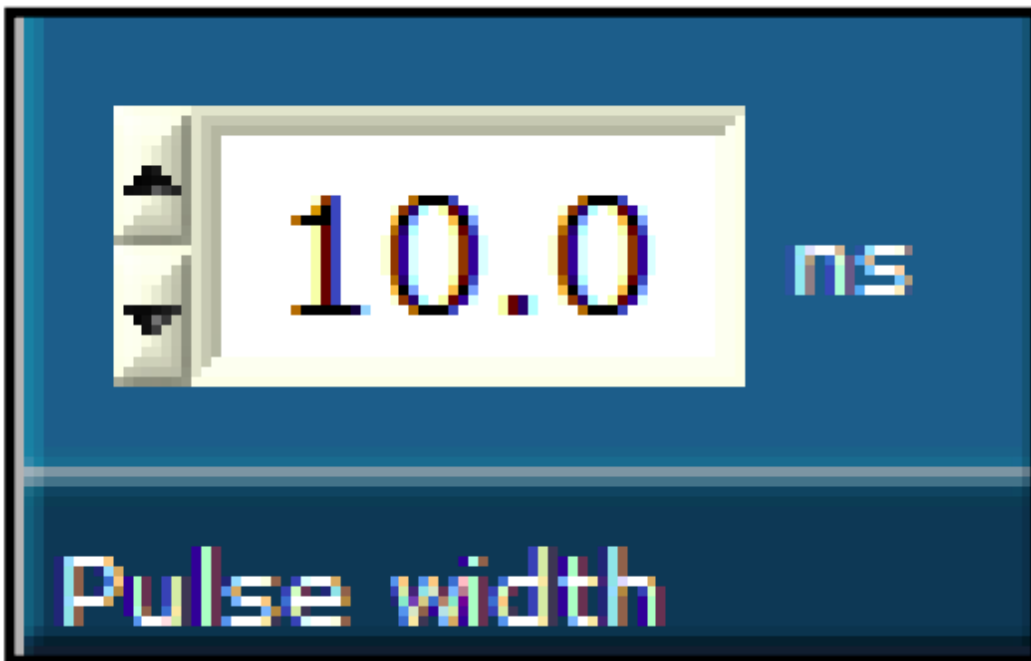
Pulse parameters

The pulse parameters can be modified only when the Pulsed operation is selected (see §4.1).
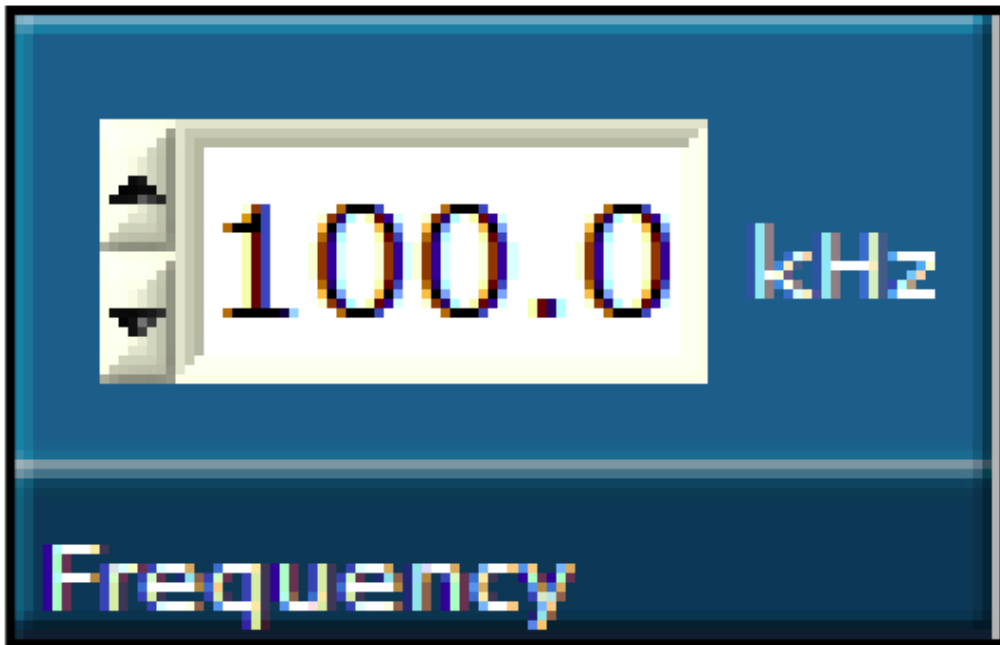
Peak current in mA This item can only be modified when the internal current source is selected

Pulse width This item can only be modified with an internal pulse width adjustment

Frequency (repetition rate) This item can only be modified when the internal trigger is active

The values which can be entered in these numerical boxes are limited. The limits mainly depend on various parameters such as the wavelength and the maximum allowed optical power.
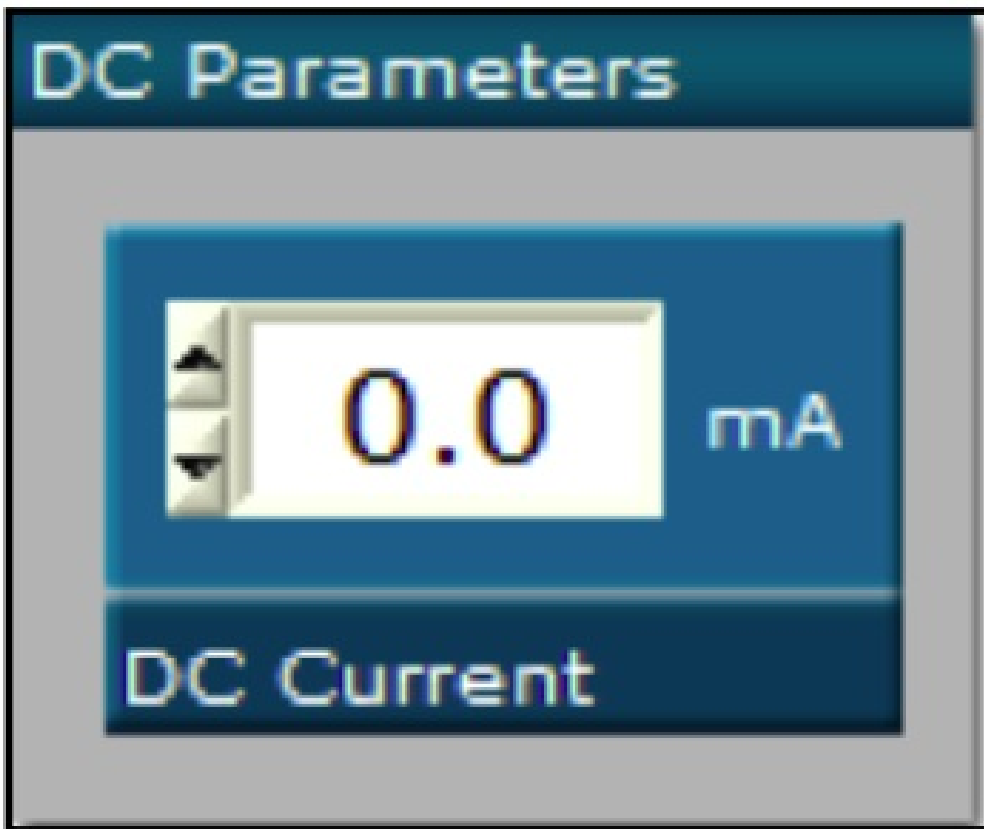
Offset/DC current
This item is settable in pulsed and CW operation. It rules the continuous current flowing through the laser diode.

Offset current This is the offset current which can be superimposed to the pulsed current in pulsed operation.
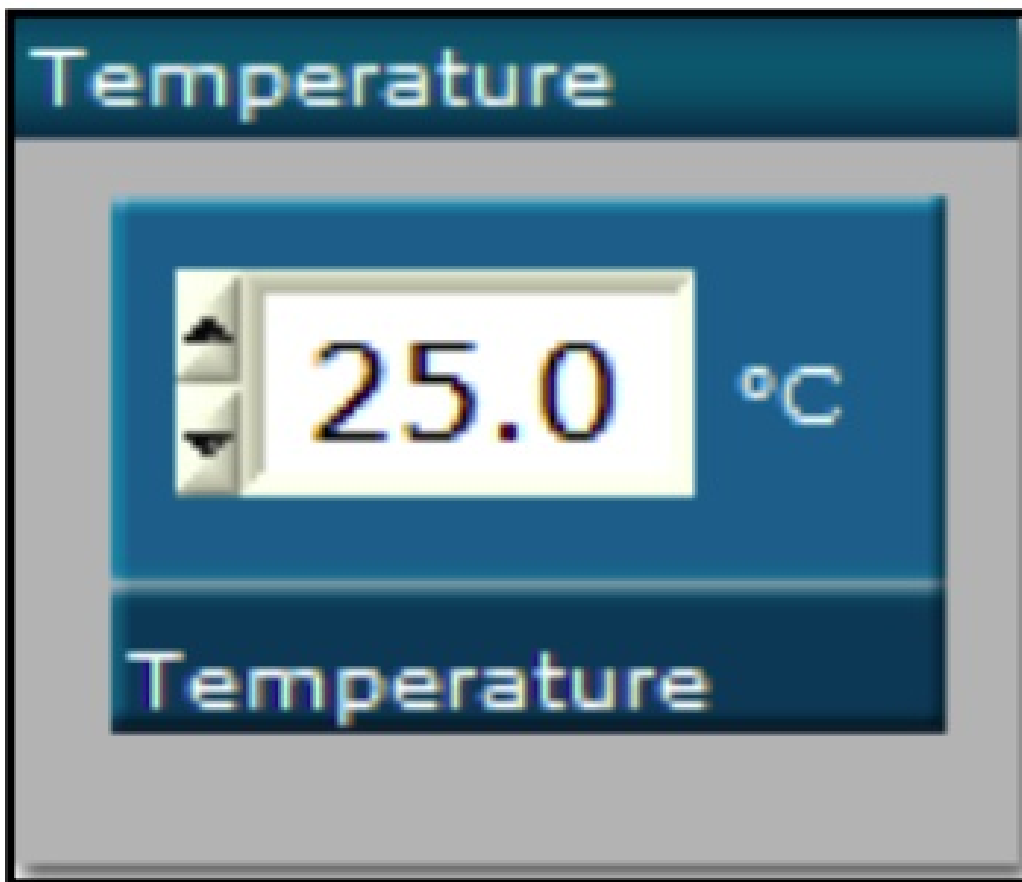

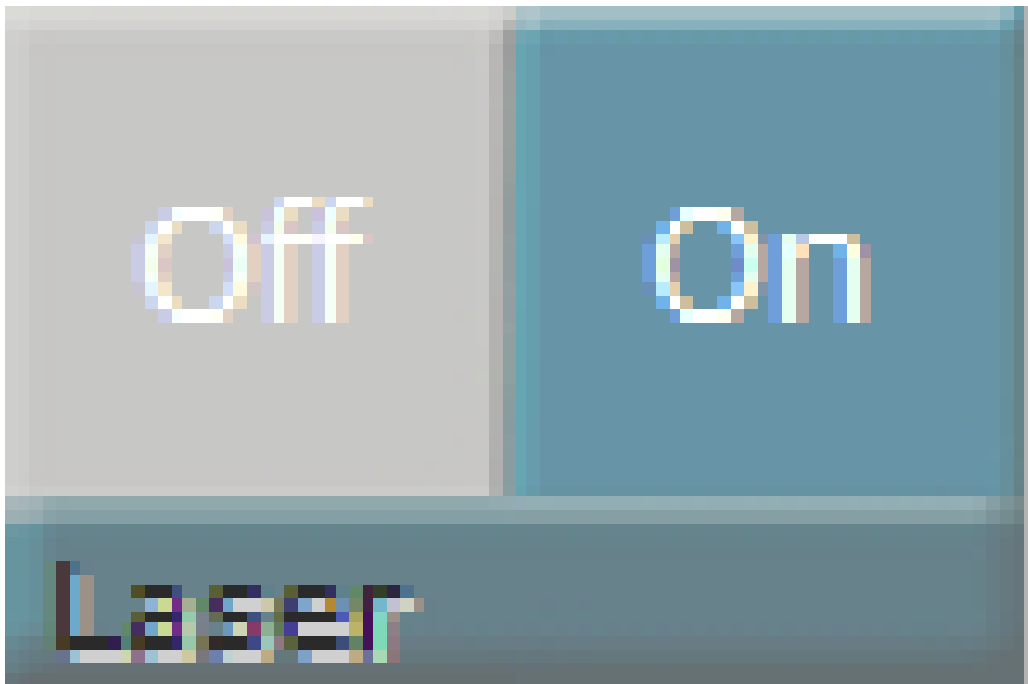DC current In CW operation, this item sets the DC current amplitude

Temperature
This item configures the internal temperature of the laser diode (on the range 13°C/29°C)

Laser enable
Enables/Disables the laser emission

Menu bar

- **File**

  - **Load parameters**

    Click on this item to load a .txt file which contains the operating parameters.

  - **Save parameters**

    Click on this item to save the current parameters into a .txt file. This file can be loaded using the "Load parameters" menu item.

  - **Exit**

    Close the window. A confirmation is asked before shutting down the software: the laser state can be either active or inactive after the software is stopped.

- **Config**

  - General config : Restricted access to internal configuration parameters. Please use only this when asked by AERODIODE.

  - **Starting mode :**

    The user can select a starting mode from 4 possible modes which set the product configuration at power on (password protected function) :

Warning : one starting mode allows to configurate the product with some direct lasing at power on for special OEM integration. This configuration is password protected and this password mustn't be shared with people who are not trained on the laser safety issues associated with Class IV laser emission. Contact us to get this password.

- Low alarms : the module starts with no laser emission, current level is 0 mA, alarms are set at low levels (100 mA average, 500mA peak current)

- Zero current : the module starts with no laser emission, current level is 0 mA, Alarms are set at the same current levels as previously saved by user.

- Previous (default mode) : the module starts with no laser emission, current level and Alarms levels are the

same as previously set and saved by the user.

- Previous OEM : the module starts in exactly the same configuration as it has been previously set and saved by user. If laser was on, the laser is on when the power supply is applied.

Save

Click on this menu item to save the current operating parameters into the CCS-I internal memory. These parameters will be saved as default parameters in the flash memory and will be retrieved by the CCS-I module at the next power on (even if the CCS-I module is not connected to the PC). Please note that if the laser state is active and parameters saved into memory, the lasing will be effective after a shutdown.

- **Info**

  Displays information about the current version and the internal parameters.
- **Help**

  Load this help file

Documents / Resources

AeroDIODE CCS-I Ultra Low Noise Laser Diode Drivers [pdf] Instruction Manual
CCS-I, CCS-I Ultra Low Noise Laser Diode Drivers, Ultra Low Noise Laser Diode Drivers, Low Noise Laser Diode Drivers, Noise Laser Diode Drivers, Laser Diode Drivers, Diode Drivers, Drivers

References

- **Your solution for laser diodes and photonics systems | AeroDIODE**
- **Your solution for laser diodes and photonics systems | AeroDIODE**
- **User Manual**