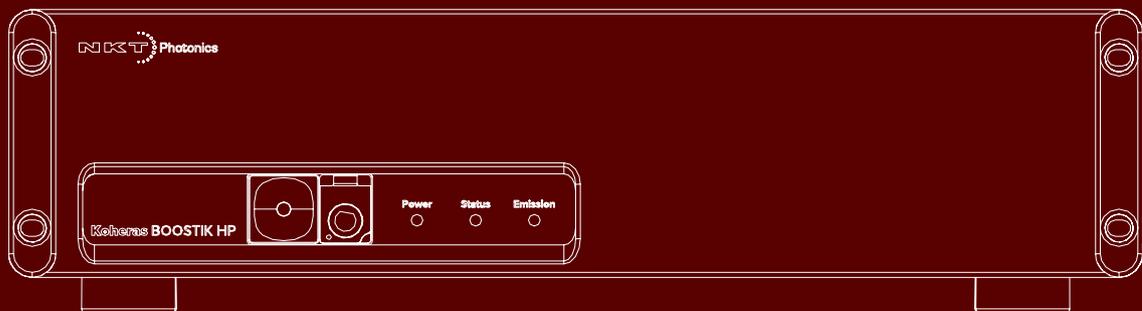


# Koheras BOOSTIK HP

Product Guide

Revision 1.3 10-2024

---



# PRODUCT GUIDE

This guide includes information for the following NKT Photonics products:

## **Koheras BOOSTIK HP**

Continuous Wave Fiber Amplifier



**CAUTION:** Do not open the laser amplifier chassis. The amplifier is equipped with warranty labels (see [Figure 43](#)) on the covers of the chassis. The warranty is void if the system is opened.

Manufactured by:

**NKT Photonics A/S**

Blokken 84, Birkerød-3460 Denmark

The information in this publication is subject to change without notice.

All company and product names mentioned within are either trademarks or registered trademarks of NKT Photonics.

Specifications are listed as metric units. Imperial units listed are conversions.

Copyright 2024 NKT Photonics A/S. All rights reserved.

# Guide Overview

This product guide is intended to provide functional, operational and installation information for the Koheras BOOSTIK HP laser amplifiers.



**WARNING:** Do not operate the laser amplifier before first reading and understanding all warnings, cautions and handling information stated within the document:

*Koheras BOOSTIK HP Safety, Handling and Regulatory Information*



**NOTE:** The paper copy of this document is included with your laser; however, it can also be downloaded from:

<https://www.nktphotonics.com/product-manuals-and-documentation/>



**WARNING:** Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

**Terminology** This guide refers to the Koheras BOOSTIK HP as the BOOSTIK HP, “the amplifier” or “the laser amplifier”. In specific cases where a distinction is required, this guide will use the actual model names. The BOOSTIK HP product line is built as a complete system including a separate seed laser source. Seed laser models can be either Koheras ADJUSTIK or a Koheras ACOUSTIK with a BASIK module. The manual may refer to them also as the “seed laser”, “laser source”, or simply “seed”. The guide also refers to both the BOOSTIK HP amplifier and seed laser together as a BOOSTIK HP system or simply “the system”.

**Target audience** This guide is for technical personnel involved in the selection, planning and deployment of lasers in laboratory and industrial settings. The guide assumes a reasonable knowledge level of lasers, photonic principles and electrical interface connectivity.

**Chapters inside** This guide includes the following chapters:

- Chapter 1 “[BOOSTIK HP Description](#)” — Describes the laser amplifier including its general operational principles, management and interfaces.
- Chapter 2 “[Mechanical Installation](#)” — Provides information on installing the laser amplifier including rack and surface mounting and environmental conditions required.
- Chapter 3 “[Connecting the BOOSTIK HP](#)” — This chapter includes information on connecting the safety interlock, AC power, and making optical connections.
- Chapter 4 “[ADJUSTIK Front Panel Operation](#)” — Provides information and procedures on how to operate the laser amplifier using the front panel of the ADJUSTIK seed laser.

- Chapter 5 “**CONTROL Interface**” — This chapter describes the CONTROL software interface including descriptions of all panels and menu items.
- **Appendices** — The multiple appendices include amplifier specifications, servicing and support contact details, a list of errors, and CONTROL software installation instructions.

**Reference documents**

A BOOSTIK HP system consists of the Koheras BOOSTIK HP amplifier and either a Koheras ADJUSTIK seed laser or a Koheras ACOUSTIK rack fitted with Koheras BASIK seed lasers. For information on operating the seed lasers refer to the following NKT Photonics documents:

**Koheras ADJUSTIK**

- *Koheras ADJUSTIK Product Guide*
- *Koheras ADJUSTIK Safety, Handling and Regulatory Information*

**Koheras ACOUSTIK**

- *Koheras ACOUSTIK Product Guide*
- *Koheras ACOUSTIK Safety, Handling and Regulatory Information*

**Added information and safety notices**

Lasers are highly dangerous devices that can cause serious injury and property damage. This guide uses the following symbols to either highlight important safety information or provide further information in relation to a specific topic.



**NOTE:** Highlights additional information related to the associated topic and/or provides links or the name of the NKT Photonics guides describing the additional information.



**CAUTION:** Alerts you to a potential hazard that could cause loss of data or damage the system or equipment.



**WARNING:** The laser safety warning alerts you to potential serious injury that may be caused when using the laser amplifier.

**Revision** This section records the document revision details.

Date	Revision	Changes
2023-02	1.0	First release
2023-06	1.1	Updated the following: <ul style="list-style-type: none"> <li>• <a href="#">Figure 6 on page 23</a></li> <li>• <a href="#">“Output polarization” on page 23</a></li> <li>• <a href="#">“Polarization ring” on page 23</a></li> </ul>
2023-10	1.2	Updated the following items in the table <a href="#">“Optical specifications” on page 69</a> : <ul style="list-style-type: none"> <li>• Y10 beam diameter</li> <li>• E15 and X15 long term stability</li> <li>• Removed the redundant Optical S/N row.</li> </ul>
2024-09	1.3	Updated the following: <ul style="list-style-type: none"> <li>• Removed WEEE label from <a href="#">“Module labels” on page 25</a> and <a href="#">Figure 5 on page 25</a>.</li> <li>• Updated optical output power in <a href="#">“BOOSTIK HP Optical outputs” on page 22</a>.</li> <li>• Updated to the latest ADJUSTIK in <a href="#">Figure 17 on page 42</a>.</li> <li>• Split BOOSTIK HP model specifications (one table) into <a href="#">“Boostik HP E15/X15 seed specifications” on page 16</a> and <a href="#">“Boostik HP Y10 seed specifications” on page 17</a>.</li> <li>• Added <a href="#">“Alignment mode” on page 55</a>.</li> </ul>

# CONTENTS

Guide Overview .....	3
TABLES .....	9
FIGURES .....	11
PROCEDURES .....	13
1 BOOSTIK HP Description .....	15
Optical output .....	15
Amplifier characteristics .....	15
Integrated systems .....	15
Amplifier features .....	17
Front and rear panels.....	18
Front panel .....	18
Rear panel .....	19
Optical outputs .....	21
Collimator .....	23
Beam diameter .....	23
Factory test report .....	23
Output polarization .....	23
Polarization ring .....	23
Safety .....	24
Managing the amplifier.....	24
Operations interface .....	24
Chassis labels.....	25
Label descriptions .....	25
Label locations .....	25
2 Mechanical Installation.....	27
Installation .....	27
Table installation .....	27
Rack installation .....	28
Location and environment .....	28
AC mains .....	29
Airflow .....	29
3 Connecting the BOOSTIK HP.....	31
Connecting the safety interlock.....	31

---

Interlock connection .....	31
Connecting a door interlock switch .....	33
External bus cable and bus defeater.....	33
Setting the External bus address .....	34
Connecting power .....	36
Connecting the optical input from a seed laser .....	37
Seed to amplifier optical connection .....	37
Before making the optical connection .....	37
Connecting a PC with CONTROL software .....	37
CONTROL software .....	37
Installing CONTROL software .....	37
Connecting the BOOSTIK HP system to a CONTROL PC .....	37
Ethernet connection .....	38
4 ADJUSTIK Front Panel Operation .....	41
Front Panel Operation (ADJUSTIK).....	41
Enable emission – front panel controls .....	42
5 CONTROL Interface .....	45
CONTROL overview .....	45
Relocating panels .....	46
Toggling the panels visible .....	47
Connecting to the BOOSTIK HP system .....	47
Device Selector .....	47
Status Panel.....	49
Status Indicators .....	49
System Info .....	50
Measurements .....	50
WL button .....	50
Emission button .....	50
Control settings .....	51
Wavelength modulation .....	51
Power/Current mode .....	55
Alignment mode .....	55
Ethernet .....	56
Watchdog .....	56

---

Clock .....	57
Front panel .....	57
View .....	58
CONTROL menu .....	60
Key Updater tool .....	60
Log Downloader .....	61
Extensions overview .....	63
Control panel.....	64
Power mode .....	64
Current mode .....	64
Application Log panel.....	65
Device Monitor .....	66
A Specifications.....	69
B Service and support Information .....	73
Servicing the amplifier.....	73
Opening the amplifier chassis .....	73
WARRANTY VOID IF REMOVED Label .....	73
Support contact details .....	74
Support website .....	74
Shipping address .....	74
Disposal .....	74
Within EU territory .....	74
Outside EU territories .....	74
C Errors .....	75
D Control Software .....	77
Installing CONTROL .....	77

# TABLES

Table 1: Boostik HP E15/X15 seed specifications .....	16
Table 2: Boostik HP Y10 seed specifications .....	17
Table 3: Front panel LED conditions.....	19
Table 4: BOOSTIK HP Optical outputs .....	22
Table 5: Module labels .....	25
Table 6: BOOSTIK HP operating and storage environment .....	28
Table 7: Power specifications .....	36
Table 8: Device Monitor parameters .....	66
Table 9: Optical specifications .....	69
Table 10: Operating and storage environment .....	70
Table 11: Electrical specifications .....	70
Table 12: Mechanical dimensions.....	70
Table 13: System errors.....	75



# FIGURES

Figure 1: Rack mounted BOOSTIK HP with ADJUSTIK seed laser .....	15
Figure 2: Rack mounted BOOSTIK HP with ACOUSTIK seed laser(s) .....	16
Figure 3: BOOSTIK HP front panel layout .....	18
Figure 4: BOOSTIK HP rear panel layout .....	19
Figure 5: ADJUSTIK BOOSTIK HP optical outputs and inputs.....	22
Figure 6: BOOSTIK HP collimator .....	23
Figure 7: Rear panel label locations .....	25
Figure 8: Top panel label locations .....	26
Figure 9: Table or shelf installation .....	27
Figure 10: Rack installation.....	28
Figure 11: Koheras BOOSTIK HP ventilation clearance.....	29
Figure 12: Interlock connected to a door switch - Laser ON .....	32
Figure 13: Interlock connected to a door switch - Laser SHUTDOWN .....	32
Figure 14: External bus cable and bus defeater .....	34
Figure 15: External bus address – multiple BOOSTIK HP amplifiers .....	35
Figure 16: Connecting AC mains .....	36
Figure 17: ADJUSTIK front panel layout.....	42
Figure 18: CONTROL navigation.....	45
Figure 19: Dragging panels to a new location in the main window .....	46
Figure 20: Dragging panels outside the main window .....	46
Figure 21: Toggling panel visibility .....	47
Figure 22: Quick connect .....	47
Figure 23: Device selector panel .....	48
Figure 24: Status Panel .....	49
Figure 25: CONTROL settings.....	51
Figure 26: Wavelength modulation - internal source .....	52
Figure 27: Wavelength modulation - external source .....	52
Figure 28: Internal generator waveform selection – type .....	53
Figure 29: Turning on wavelength modulation .....	54
Figure 30: Setting the power/current operating mode.....	55
Figure 31: Alignment mode settings .....	55
Figure 32: Ethernet settings.....	56
Figure 33: Watchdog settings .....	57
Figure 34: Setting the clock .....	57

---

Figure 35: Front panel setting .....	58
Figure 36: View settings.....	59
Figure 37: Menu items .....	60
Figure 38: Extensions Overview .....	63
Figure 39: Operating mode set to Power .....	64
Figure 40: Operating mode set to Current .....	65
Figure 41: Application Log window .....	65
Figure 42: Mechanical dimensions .....	71
Figure 43: Warranty seal.....	73

# PROCEDURES

Procedure 1: Clearing the interlock alarm (permit emission) .....	31
Procedure 2: Connecting a PC to the system using a USB cable .....	38
Procedure 3: Connecting a PC to the system using Ethernet.....	39
Procedure 4: Enable emission with ADJUSTIK front panel controls.....	42
Procedure 5: Relocating panels.....	46
Procedure 6: Using the Key Updater tool .....	61
Procedure 7: Using the Log Downloader .....	62
Procedure 8: Installing CONTROL.....	77



# 1

## BOOSTIK HP Description

The Koheras BOOSTIK HP system is a Continuous Wave (CW) laser and amplifier system. The system produces and amplifies infrared laser light that is ultra-bright and near-diffraction-limited. The amplified light is then delivered through an armored fiber to collimating optics for emission output.

The amplifier contains reliable, high-brightness diode lasers that pump a double-clad, ErYb-doped or Yb-doped optical fiber. Microprocessor controlled electronics power the diode lasers and control the fiber amplifier operation. A heat sink and fan provide the necessary cooling for reliable operation. All components of the system are housed in chassis that are both benchtop and rack mountable and include front panel controls.

**Optical output** A BOOSTIK HP emits fundamentally transverse mode (TEM<sub>00</sub>) continuous wave radiation in the 1064nm or 1550nm range. Optical power is continuously adjustable from 3 to 15 W.

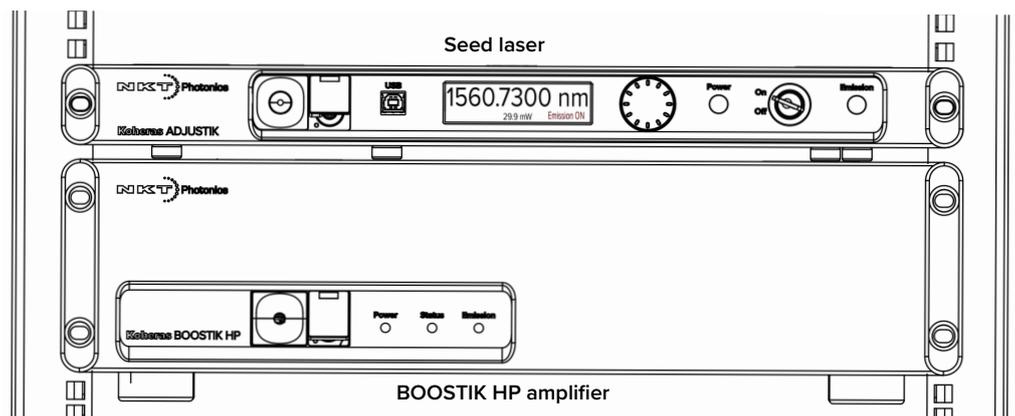
**Amplifier characteristics** With the amplifier used in a Koheras BOOSTIK HP system, the laser's optical output is defined by an ultra-narrow line width in the Hertz range and exceptionally low frequency and intensity noise. These characteristics make the laser suitable for applications such as quantum optics, computing and other phenomena like optical trapping, optical lattice, Bose-Einstein condensate, atom interferometry, and squeezing.



**NOTE:** Other applications for a BOOSTIK HP system include using it as a linear optics pump source in conjunction with second harmonic and differential frequency generation, optical parameter oscillators, and laser-based metrology.

**Integrated systems BOOSTIK HP system with Koheras ADJUSTIK**  
When integrated with a Koheras ADJUSTIK, the BOOSTIK HP system operates in a master/slave configuration. A Koheras BOOSTIK amplifier (slave) is paired with a Koheras ADJUSTIK laser (master). The Koheras ADJUSTIK functions as a seed laser source, and when combined with the amplifier, the master device (the ADJUSTIK) manages all the controls of the slave device (the BOOSTIK HP amplifier).

**Figure 1 Rack mounted BOOSTIK HP with ADJUSTIK seed laser**



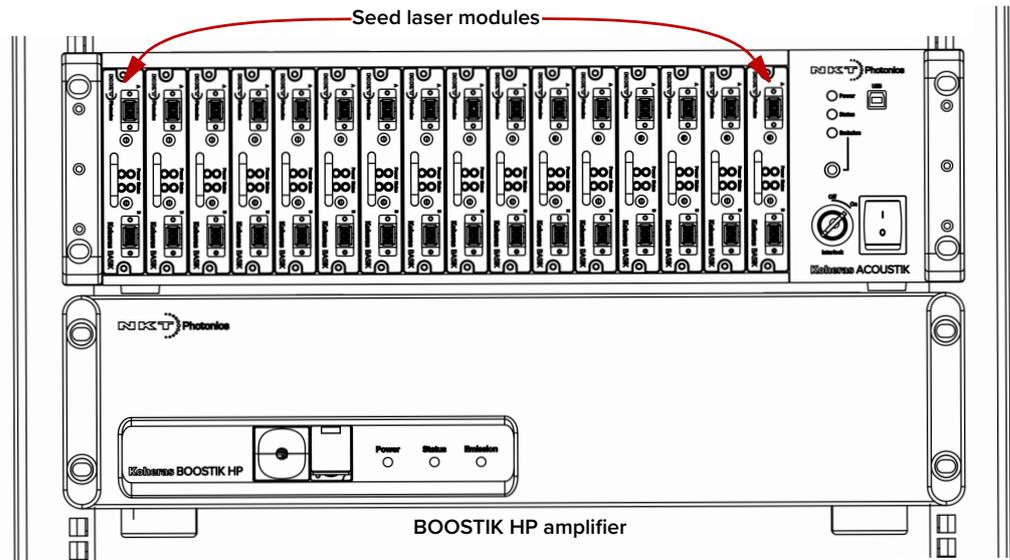
**BOOSTIK HP system with Koheras ACOUSTIK**

When the amplifier is integrated with a Koheras ACOUSTIK multi-wavelength system it can be seeded by one of a range of ultra-low phase noise single-frequency laser modules<sup>1</sup>: This gives high flexibility and freedom to select specific wavelengths and power levels required for multiple discrete applications.



**WARNING:** You must safely terminate the optical output of seed laser modules inserted in an ACOUSTIK rack which are not connected to a BOOSTIK HP amplifier.

**Figure 2 Rack mounted BOOSTIK HP with ACOUSTIK seed laser(s)**



**Wavelengths and power**

BOOSTIK HP systems are specified by two models based on the Koheras seed type used for its input; either E15 or X15 and Y10. [Table 1](#) and [Table 2](#) below list the models and their associated specifications.

**Table 1 Boostik HP E15/X15 seed specifications**

Wavelength range	1535-1540 nm	1540-1545 nm	1545-1565 nm	1565-1570 nm	1570-1580 nm
10 W	✓	✓	✓	✓	✓
15 W	✓	✓	✓	✓	✗
Std RIN	✓	✓	✓	✗	✗
Reduced RIN	✓	✓	✓	✓	✓

1. Specifically, Koheras BASIK seed laser modules.

**Table 2 Boostik HP Y10 seed specifications**

Wavelength range	1030-1050 nm	1050-1076 nm	1076-1086 nm
10 W	✓	✓	✓
15 W	✓	✓	✓
Std RIN	✓	✓	✓
Reduced RIN	x	✓	✓



**NOTE:** Documents describing other devices in a BOOSTIK HP system are listed under [“Reference documents”](#) on page 4.

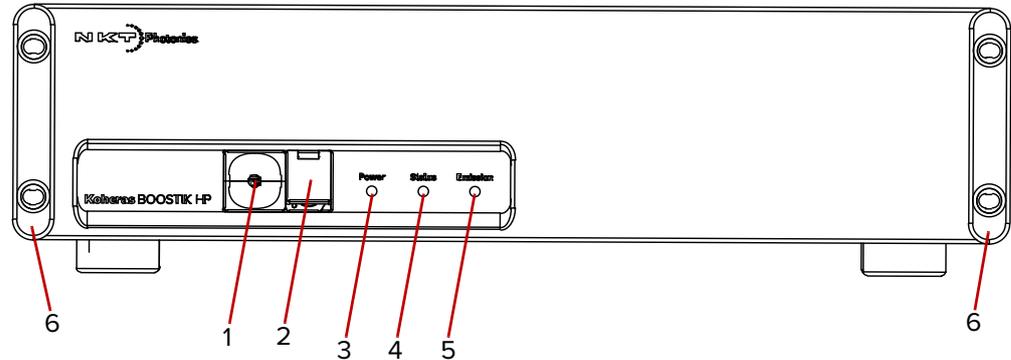
**Amplifier features** The BOOSTIK HP system includes the following key features:

- Interlock and key switch – shuts the laser off upon unauthorized or accidental access and prevents unauthorized operation.
- Back reflection detection and shutdown – upon detection of back reflection, the BOOSTIK HP system automatically shuts down to help prevent damage to internal components and potential performance degradation.
- Front panel controls and display – operation menu display with selection dial and navigation buttons (ADJUSTIK systems only).
- Enable/Disable button with emission LED indicator(s)
- Remote PC control – Command Line Interface over a serial USB connection.
- FC/APC connectors for optical input and monitor output.
- Collimator at the end of an armored fiber for primary optical output.
- 19 inch rack mounting flanges with chassis handles

## Front and rear panels

**Front panel** Figure 3 shows the front panel of a BOOSTIK HP amplifier chassis

**Figure 3 BOOSTIK HP front panel layout**



- |                                    |                                      |
|------------------------------------|--------------------------------------|
| 1 Optical output - to collimator   | 4 Status LED                         |
| 2 Optical input - FC/APC connector | 5 Emission LED                       |
| 3 Power LED                        | 6 Rack mounting flanges with handles |

### Optical output

Optical output is Class 4 emission delivered through an output fiber to a collimator. The collimator is the amplifier’s primary optical output.

### Optical input

Optical input is received from a seed laser through an FC/APC connector.

The input to a BOOSTIK HP amplifier is designed to receive light from a CW seed laser. The output of the seed can be frequency modulated within a range as specified by the output from the Kohere BASIK modules listed in [Table 1](#) and [Table 2](#).

**CAUTION:** Only connect a seed laser source as specified in [Table 1](#) and [Table 2](#). Amplitude modulated or pulsed input can result in extensive damage to the BOOSTIK HP amplifier.

**CAUTION:** Do not connect a seed laser source with a wavelength beyond the optical input wavelength range specified for your amplifier. Doing so may burn the system components.

**CAUTION:** Do not connect a seed laser source with a power level that exceeds 50 mW. Doing so may burn the system components.

### Power LED

This LED indicates when power is applied to the BOOSTIK HP amplifier – see [Table 3](#).

### Status LED

This LED indicates the status of the BOOSTIK HP amplifier – see [Table 3](#).

**Emission LED**

The emission LED indicates if emission is enabled – see [Table 3](#).

**Table 3 Front panel LED conditions**

LED	Condition	Description
Power	ON	AC mains connected and rear panel power switch set ON.
	OFF	AC mains disconnected or rear panel power switch set OFF.
Status	ON	Emission is enabled or the amplifier is capable of enabling emission.
	Blinking	The interlock is open or interrupted by an error.
Emission	ON	Emission enabled (laser amplifier output turned ON)
	Blinking	Emission is enabled in alignment mode.



**WARNING:** When the emission LED is flashing or ON, dangerous laser emissions are present. Take all proper safety precautions necessary. The *Koheras BOOSTIK HP Safety, Handling and Regulatory Information* document provides multiple safety information that should be adhered to along with applicable regional safety regulations.

**Rack mounting handles**

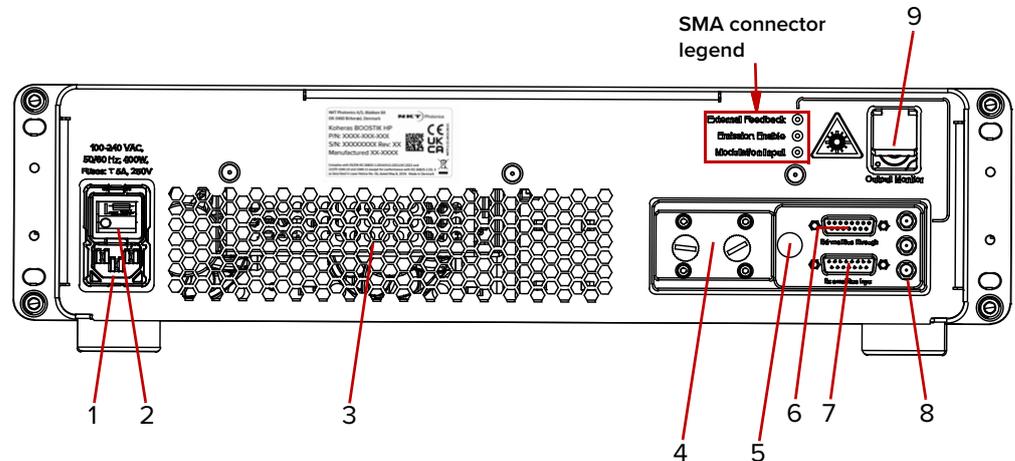
Use the handles as grips when transporting the amplifier or mounting it in a 19 inch equipment rack.



**NOTE:** When operating the BOOSTIK HP amplifier system, power must always be switched on the BOOSTIK HP before turning on power on the ADJUSTIK or ACOUSTIK seed laser(s), as described in Step 3 of [Procedure 4](#).

**Rear panel** [Figure 4](#) shows the rear panel which includes multiple connectors, a ventilation outlet, a switch controlled AC power connection, an address selector for the communication bus, and a holder for the output collimator. Connectors include ports for monitor, control signals, interlock, and connected accessories.

**Figure 4 BOOSTIK HP rear panel layout**



1 AC mains power input – C14

6 External bus through (out) – DB-15

- |                                 |                                   |
|---------------------------------|-----------------------------------|
| 2 AC mains ON/OFF switch        | 7 External bus input – DB-15      |
| 3 Cooling fan exhaust vent      | 8 SMA connectors <sup>i</sup>     |
| 4 Collimator holder             | 9 Optical monitor output – FC/APC |
| 5 External bus address selector |                                   |

i. From top to bottom: External feedback, Emission enable, Modulation input



**NOTE:** The pin assignments of the Interlock are described in: [“Connecting the BOOSTIK HP” on page 31.](#)

### AC mains input

AC inlet - standard IEC C-14 mains inlet connector - see [“Connecting power” on page 36.](#)

### AC mains ON/OFF switch

Press ( I ) to turn on the amplifier power and ( O ) to turn it off.

### Cooling fan exhaust vent

To maintain the laser amplifier’s operating temperature, cool air is drawn into the chassis from the bottom panel vent and system heated air is subsequently expelled from the exhaust vent on the rear panel. During operation, ensure to keep the areas in front of both vents clear of any obstructions that could block the free flow of air.

### Collimator holder

A receptacle that secures the collimator in place when transporting or storing the amplifier. DO NOT operate the amplifier when the collimator is placed in the holder.

### External bus address selector

This is a rotary switch which sets an offset to the External bus communication address. You can use the switch to set a bus address offset from 0x0 to 0xF. Devices on the External bus must have a unique bus address. Without setting an offset, the main module address for a standard BOOSTIK HP is 0x40 – see [“Setting the External bus address” on page 34.](#)

### External bus through

When operating without smart accessories, connect the included bus defeater to this port. The bus defeater loops back the interlock, see – [“External bus cable and bus defeater” on page 33.](#) Smart accessories can connect to the external bus for communications, power and interlock signals. In the future, should accessories become available, you can connect them to this port.

### External bus input

Connect this to the seed laser of your BOOSTIK HP system; either an ADJUSTIK or ACOUSTIK. The bus carries communication over RS-485 protocol and importantly, the interlock signal from the seed laser.



**WARNING:** DO NOT BYPASS the interlock on system’s seed laser by jumping the pins on the interlock connector. Laser regulations require that the interlock is connected to a safety door switch. When the door switch circuit is open, the laser is immediately disabled.



**NOTE:** The Koheras BOOSTIK HP system has built-in safety relay and interlock features to help ensure laser radiation is emitted only when it is expected and only when predetermined conditions are met.

The remote interlock and remote stop features render the system inoperable when a predefined condition occurs, such as the opening of a door. The internal safety relay is analogous to a beam shutter. It interrupts drive current to the diode pump lasers, and it is open each time the system is turned on. This means it will be impossible to apply current to the diode pump lasers until you specifically take action to close the circuit and reset the front panel key switch on the seed laser – see [“Connecting the safety interlock” on page 31](#).

**External Feedback**

Reserved for future use.

**Emission ON/OFF**

Reserved for future use.

**Modulation Input**

Reserved for future use.

**Monitor output**

FC/APC connector – emitting approximately 0.3% of the amplifier’s main optical output power. Emission from the monitor output is classified as CLASS 3B.

---

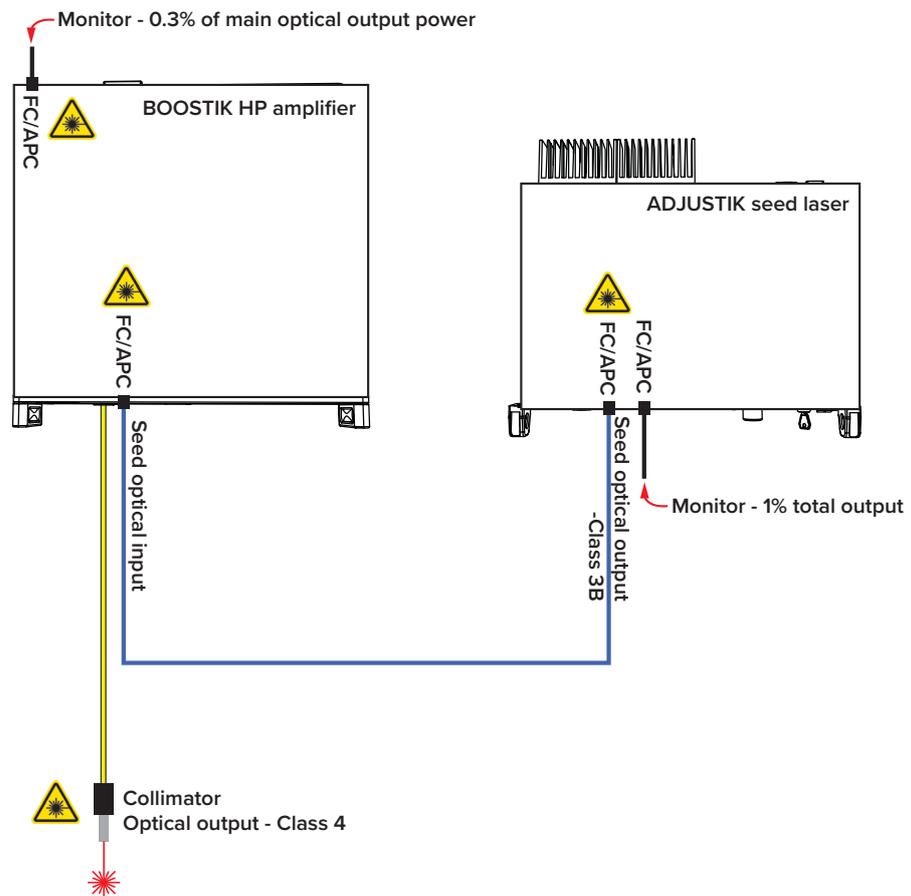
## Optical outputs

The optical outputs for BOOSTIK HP systems are listed in [Table 4](#). A diagram of optical outputs and inputs is shown in [Figure 5](#).

**Table 4 BOOSTIK HP Optical outputs**

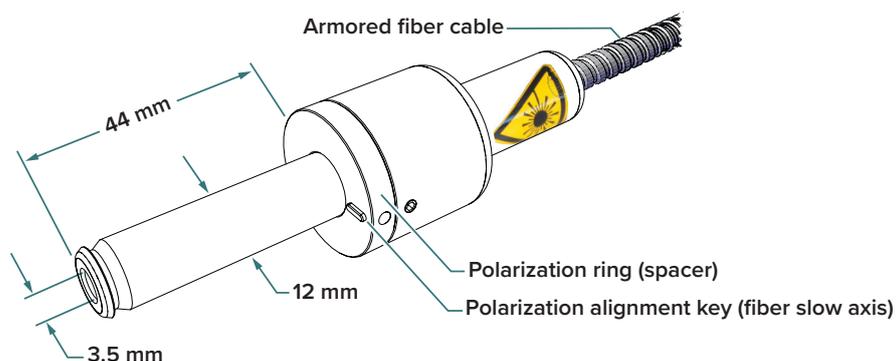
Device	Output	Connection type	Optical output power
Seed laser	Main optical output	FC/APC	10 to 40 mW
	Monitor optical output	FC/APC	1% of main optical output power
BOOSTIK HP	Main optical output	Collimator on end of armored fiber	10 or 15 W
	Monitor optical output	FC/APC	0.3% of main optical output power

**Figure 5 ADJUSTIK BOOSTIK HP optical outputs and inputs**



**Collimator** The optical output of the laser amplifier is a collimator at the end of an armored fiber cable as shown in [Figure 6](#). A collimated beam exits the collimator from a steel sleeve connector designed for insertion into a receptacle of a target optical device such as for example, a Koheras accessory, holder, or specifically engineered optical device. Once inserted, the substantial construction of the collimator maintains the output beam alignment.

**Figure 6** BOOSTIK HP collimator



**CAUTION:** Avoid scratching the collimator as this may prevent it from sliding into an input receptacle.



**NOTE:** It is recommended to fix the collimator using plastic screws instead of metal screws to minimize scratches or other damage to the collimator.

#### Collimator heat dissipation

A small fraction of the beam power is dumped within the collimator. If the thermal contact between the collimator and the mount or receptacle is inadequate, the collimator can become significantly warm. NKT Photonics recommends that you ensure there is thermal contact between the collimator and its mount/receptacle.

**Beam diameter** To maximize the output light coupling with a single mode fiber, the output beam is collimated with an achromatic lens. The beam diameter is approximately 2 mm at the collimator output aperture.

**Factory test report** Koheras BOOSTIK HP laser systems are available in multiple configurations. The system performance of each laser amplifier is described in a factory created test and measurement report. Refer to this report for the spectral performance of each individual Koheras BOOSTIK HP system.

**Output polarization** The polarization alignment key of the collimator's polarization ring shown in [Figure 6](#) is aligned with the slow axis of the fiber delivery. However, as the optical emission of the BOOSTIK HP is highly polarized at any power level, the degree of polarization may vary slightly during warm-up.

**Polarization ring** A polarization ring is always combined with the collimator as shown in [Figure 6](#). The ring has an alignment key to ensure the optical output is correctly polarized

with an accessory or other application (see the statement above under “[Output polarization](#)” above). When the collimator is inserted into an accessory input receptacle, the ring also acts as a spacer to correctly position the collimator.



**CAUTION:** Always ensure the collimator is fitted with a polarization ring when used with an NKT Photonics accessory.

---

## Safety



**WARNING:** Emission output from the BOOSTIK HP is rated as a Class 4 laser and is therefore hazardous. Before turning on your BOOSTIK HP system, ensure to read and understand all safety statements of the document:

*Koheras BOOSTIK HP Safety, Handling and Regulatory Information*

A paper copy of this document is included with your laser. If you do not have access it, you can download a copy from:

<https://www.nktphotonics.com/product-manuals-and-documentation/>

---

## Managing the amplifier

**Operations interface** The amplifier is operated either from the front panel of an ADJUSTIK seed laser or from the CONTROL software interface for both ADJUSTIK and ACOUSTIK seed lasers.

Refer to the following chapters:

- “[ADJUSTIK Front Panel Operation](#)” on [page 41](#) describes how to operate the amplifier from front panel controls when using an ADJUSTIK seed laser.
- “[CONTROL Interface](#)” on [page 45](#) describes the CONTROL software interface for an ADJUSTIK/BOOSTIK HP system.
- For instructions on integrating and managing BOOSTIK HP systems with an ACOUSTIK rack with BASIK seed lasers, contact NKT Photonics – see “[Support contact details](#)” on [page 74](#).



**NOTE:** For instructions on using CONTROL for Koheras ADJUSTIK and ACOUSTIK seed lasers, refer to the Product Guide of each laser.



**WARNING:** DO NOT OPERATE the BOOSTIK HP laser system until you are familiar with the controls and have taken all precautions necessary as described in the document:

*Koheras BOOSTIK HP Safety, Handling and Regulatory Information*

## Chassis labels

A Koheras BOOSTIK HP chassis has a number of labels on it that indicate hazards, regulatory, or manufacturing information. The labels are located as described in [Table 5](#).

**Label descriptions Table 5 Module labels**

Label	Location	Description	
Classification	Top  <a href="#">Figure 8</a>	Safety information stating the laser emission hazards and the laser’s amplifier’s class rating.	
Laser output specifications	Top  <a href="#">Figure 8</a>	Safety label showing the emission specifications of the laser.	
Manufacturing Information	Rear  <a href="#">Figure 7</a>	Lists manufacturer, part and serial number, date of manufacture, and compliances.	
Laser Aperture	Collimator	Indicates laser aperture in vicinity.	
Hazard Warning	Top and rear  <a href="#">Figure 7</a> <a href="#">Figure 8</a>	Safety information alert indicating this area of the laser amplifier is near a source of dangerous laser emissions.	

**Label locations Figure 7 Rear panel label locations**

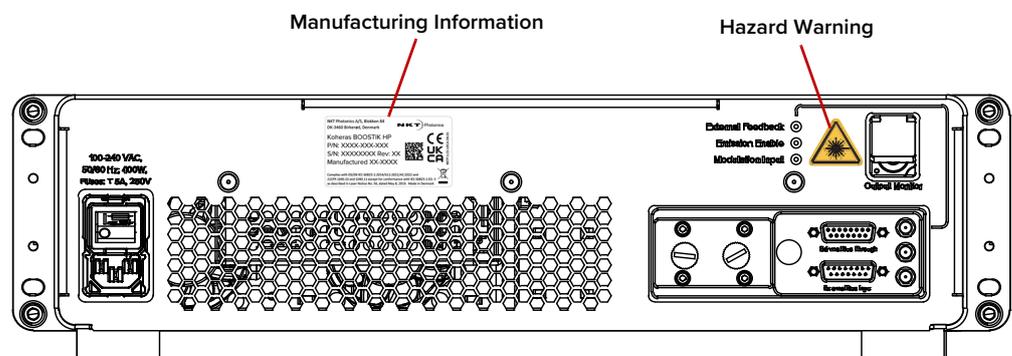
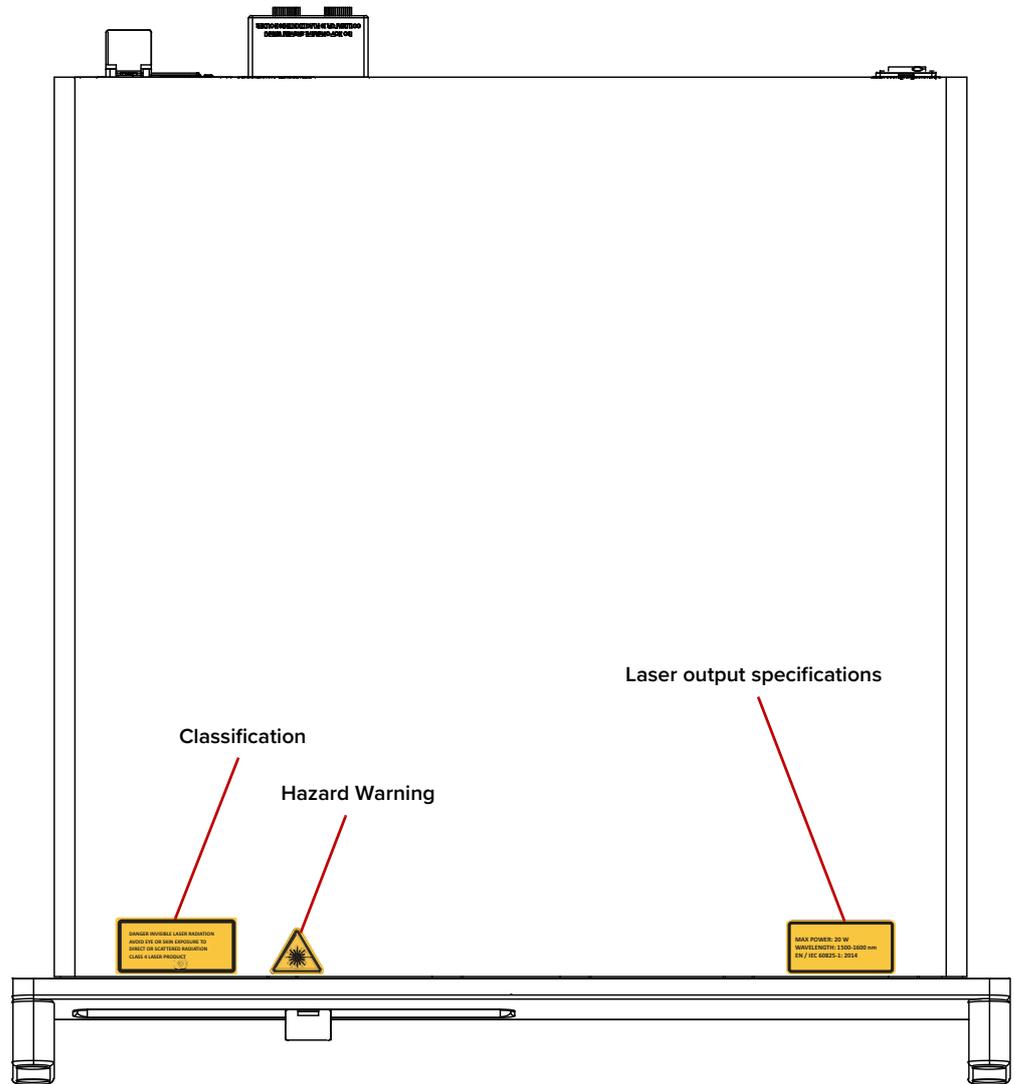


Figure 8 Top panel label locations



## 2 Mechanical Installation

This chapter provides information on how to mechanically install the laser with focus on ensuring optimal regulation of the laser's temperature.

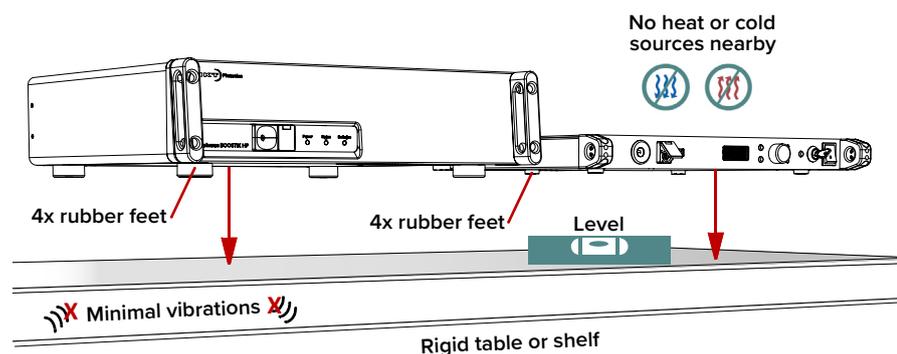


**CAUTION:** For reliable operation, the laser should not be exposed to corrosive agents or excessive moisture, heat or dust.

### Installation

**Table installation** The bottom panels of both the seed laser and amplifier chassis are equipped with soft rubber foot mounts to place the system on a shelf or table. You must ensure that the installation platform is: level, free from vibrations, and that the ambient temperature surrounding the system is stable and free from anything that could cause temperature fluctuations. Temperature changes and vibrations may affect the laser and result in abnormal operation.

**Figure 9 Table or shelf installation**



**NOTE:** Refer to [Table 6](#) for the exact specifications of the operational environment.



**NOTE:** For table or shelf installations, you can place the ADJUSTIK seed laser on top of the BOOSTIK HP amplifier.



**CAUTION:** For proper operation, DO NOT PLACE the BOOSTIK HP amplifier on top of the ADJUSTIK seed laser when stacking the two units.



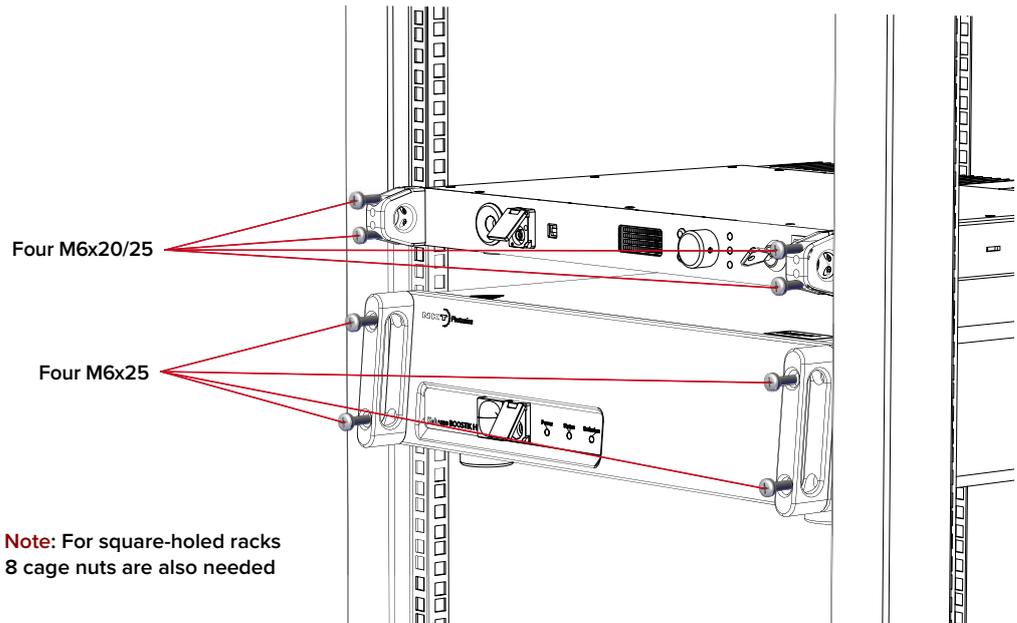
**CAUTION:** DO NOT STACK OR PLACE BOOSTIK HP amplifiers on top of other BOOSTIK HPs.

#### Air flow considerations

The air cooled chassis must have sufficient clearance at the side and back panels for unobstructed air flow. The clearance and ambient operation temperature required is listed in [Table 6](#). The surface the laser is placed on must be level and free of vibrations.

**Rack installation** You can install the BOOSTIK HP system in a standard 19 inch rack as illustrated in Figure 10. Both seed laser types and the amplifier are equipped with mounting flanges on the left and right sides of their front panels. You need eight M6x20 screws that fit through the openings of the black handles fitted to each mounting flange. For racks with standard square mounting holes, you also need eight cage nuts placed into the appropriate rack holes before you fasten the equipment.

**Figure 10 Rack installation**



**WARNING:** Always install the system in a rack, with two persons. One person holds the chassis while the other fastens it to the rack.



**WARNING:** The BOOSTIK HP amplifier is heavy, follow regional safety guidelines when lifting, carrying, and installing it.



**NOTE:** When using racks equipped with threaded or unthreaded mounting holes, confirm and obtain the mounting fasteners required before installing the system.

**Location and environment** The BOOSTIK HP is intended FOR INDOOR USE ONLY with the following environmental conditions:

**Table 6 BOOSTIK HP operating and storage environment**

Specification	
Operating Temperature	15°C to 30°C (59°F to 86°F) <sup>i</sup>
Storage Temperature	-20°C to 65°C (-4°F to 149°F)
Pollution degree rating	2

i. Module temperature of 15°C to 35°C (59°F to 95°F)

**Enclosed installations**

Should you install the system so that it is enclosed within for example, a rack cabinet, you should install fans within the cabinet or the enclosure used to ensure that heat generated by the system is adequately removed from the cabinet.

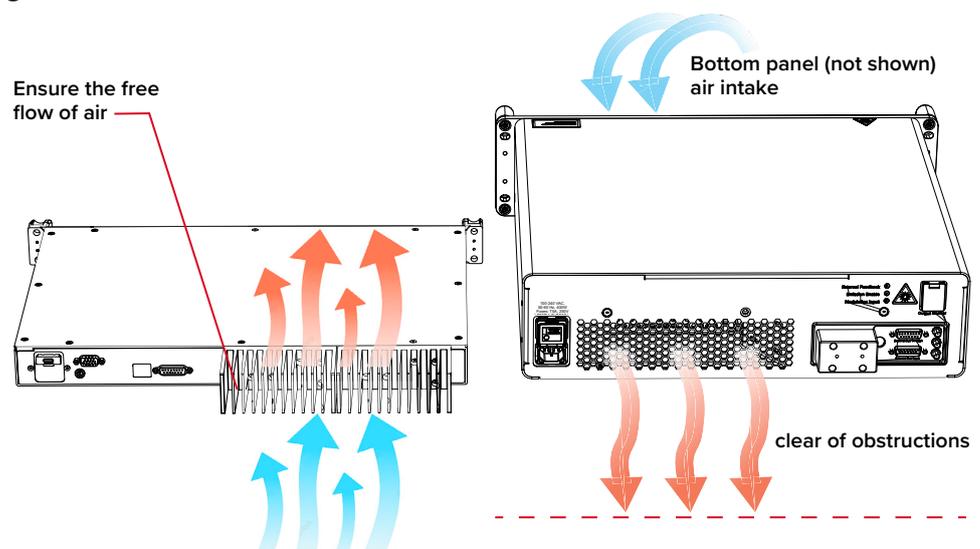
**AC mains** Ensure that access to the AC inlets of the system and the AC mains wall outlets are free of any obstructions so that the plugs on either end of the power cords are easily accessed and removed.

---

**Airflow**

When installing the BOOSTIK HP amplifier ensure that the airflow to and from the fan intake vent and exhaust vent is not obstructed. In addition, position the seed laser so that the airflow across the rear cooling fins is unimpeded.

**Figure 11 Koheras BOOSTIK HP ventilation clearance**





This chapter focuses on the electrical and optical connections to the amplifier.

For information on connecting:

- The Safety Interlock – see “[Connecting the safety interlock](#)” on page 31.
- Power – see “[Connecting power](#)” on page 36.
- Seed laser input – see “[Connecting the optical input from a seed laser](#)” on page 37.
- A PC with CONTROL software – see “[Connecting the BOOSTIK HP system to a CONTROL PC](#)” on page 37.

---

## Connecting the safety interlock

To comply with safety regulations and help provide a safe operating environment, the safety interlock of the BOOSTIK HP system must be connected to a switch activated by an access door to its operating area. The interlock circuit detects when the door switch opens and immediately disables emission.

**Interlock connection** A safety door switch circuit is connected to the LEMO interlock connector of either the ADJUSTIK or ACOUSTIK seed laser of your BOOSTIK HP system. The door switch circuit is part of the system’s interlock circuit and connected to the BOOSTIK HP amplifier through an External bus connection from the seed laser. Refer to the ADJUSTIK or ACOUSTIK product guides for specific information on connecting a safety door switch to either device.

### Interlock circuit closed – emission permitted

[Figure 12](#) shows a BOOSTIK HP system connected to a safety door switch. This is an ADJUSTIK based system and the switch connects to the LEMO connector of the ADJUSTIK. The interlock circuit of the ADJUSTIK is extended to the BOOSTIK HP amplifier through an External bus connection between the two devices. A bus defeater placed on the *External bus through* port of the BOOSTIK HP amplifier loops back the circuit.

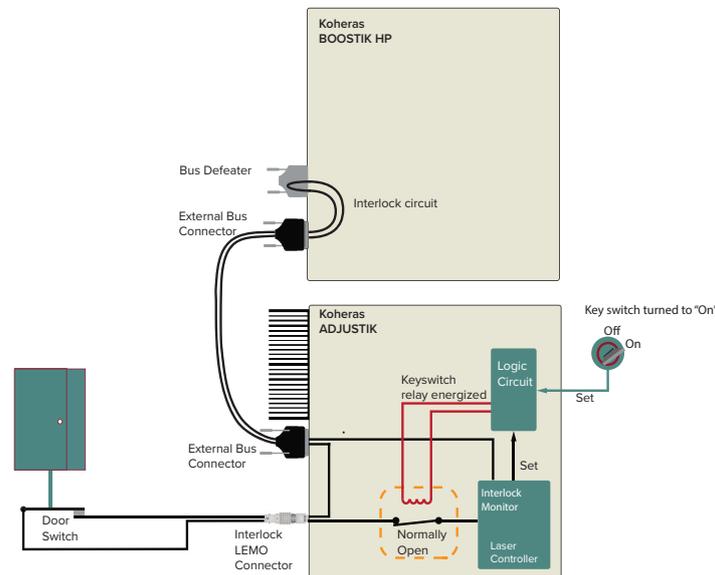
When the system is first turned on the interlock alarm is raised. To clear the alarm and permit emission perform the steps in [Procedure 1](#).

### Procedure 1 Clearing the interlock alarm (permit emission)

1. Close the interlock circuit so there are no shorts or opens.
2. Turn the front panel keyswitch from the OFF to the ON position or cycle its positions ON-OFF-ON – this resets the keyswitch relay.

3. If it is displayed, click the *Reset* button in the *Status Panel* of CONTROL management software - this resets logic control of the interlock to allow emission.

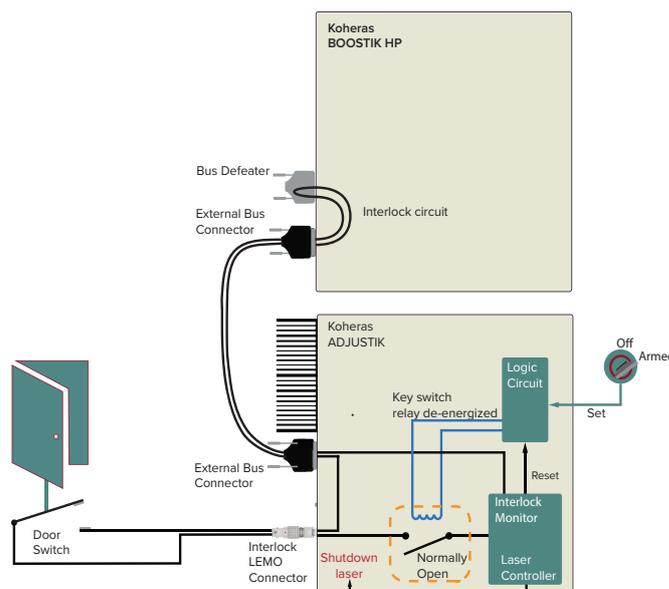
**Figure 12 Interlock connected to a door switch - Laser ON**



**Interlock circuit open – emission shutdown**

Figure 13 shows the same interlock circuit as described previously; however, in this case the door is open, thus breaking the interlock loop circuit. If the interlock loop is opened or shorted in any place along its circuit, the laser controller detects this and immediately shuts down the laser.

**Figure 13 Interlock connected to a door switch - Laser SHUTDOWN**



**NOTE:** The interlock of ACOUSTIK-based BOOSTIK HP systems is connected identically through the External bus connection from the ACOUSTIK seed laser to the BOOSTIK HP amplifier.



**WARNING:** Do not short-circuit the door switch circuit pins or the interlock pins of the External bus. Short-circuiting the interlock circumvents safety regulations and NKT Photonics does not take liability for any injuries or damage caused by doing so.



**WARNING:** The safety door switch connected to the interlock circuit must be of an approved type. Further, you must install the switch so that its operation cannot be fixed in the open state using a tool.



**WARNING:** If the interlock is bypassed using an interlock defeater, personnel may be exposed to hazardous laser radiation. To reduce the risk to personnel, the person or group responsible for operation of the laser must undertake a risk assessment and provide personnel with appropriate personal protective equipment and safety training.

### Connecting a door interlock switch

If your BOOSTIK HP system uses an ADJUSTIK seed laser, refer to the NKT Photonics document:

*Koheras ADJUSTIK Product Guide*

If your BOOSTIK HP system uses an ACOUSTIK seed laser, refer to the NKT Photonics document:

*Koheras ACOUSTIK Product Guide*

---

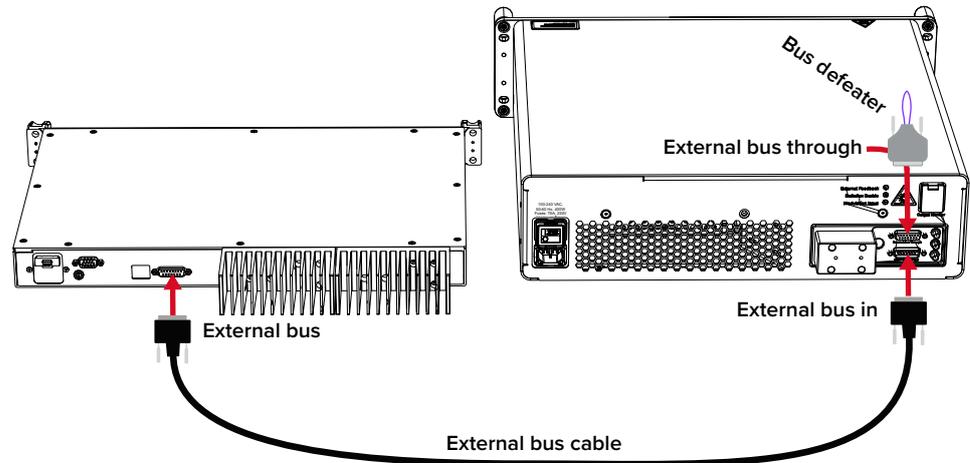
## External bus cable and bus defeater

Using the External bus cable, connect the *External bus* port of the seed laser to the *External bus in* port of the amplifier.

Connect the *External bus out* port of the amplifier to the included bus defeater (DB-15 pin dongle).



**NOTE:** If you do not place the bus defeater on the External bus out port, the interlock loop will be open and the laser cannot be enabled. See [Figure 12](#) and [Figure 13](#).

**Figure 14 External bus cable and bus defeater****Setting the External bus address**

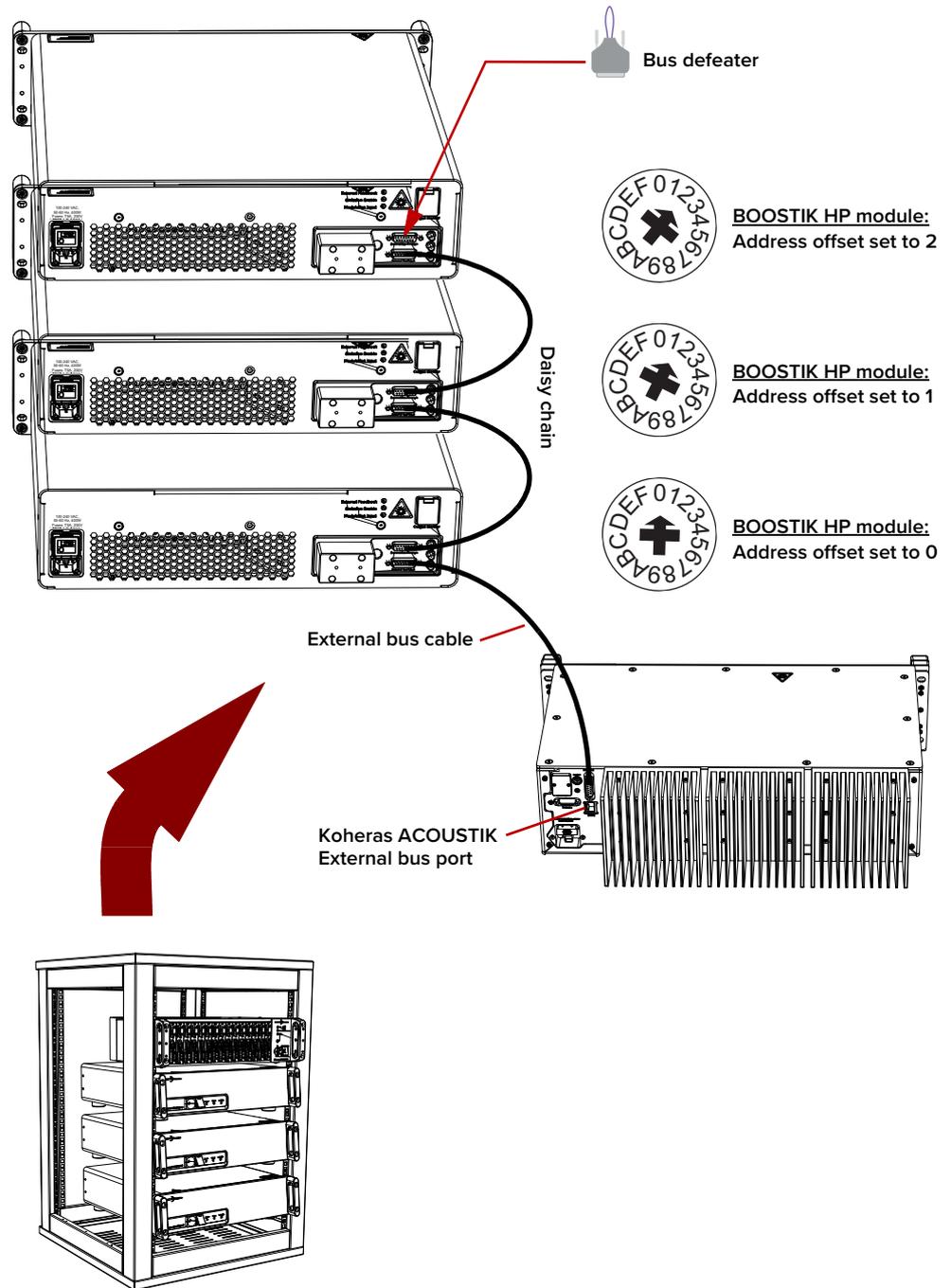
If multiple devices are connected to the same External bus in a daisy chain, set the External bus address selector dial to a unique address offset for each device. Note that for NKT Photonic devices, the bus address is typically the main board/module address plus the address offset set with the dial (if equipped).

For example, a Koheras ACOUSTIK can be filled with multiple seed lasers in its slots and each seed laser can be associated with a BOOSTIK HP amplifier. When connecting multiple BOOSTIK HP amplifiers to the same External bus (daisy chain) of the ACOUSTIK chassis, each amplifier must have a unique bus address offset. The offset is configured using the External bus address dial on the rear panel as shown in [Figure 15](#).



**WARNING:** You must safely terminate the optical output of seed laser modules inserted in an ACOUSTIK rack which are not connected to a BOOSTIK HP amplifier.

Figure 15 External bus address – multiple BOOSTIK HP amplifiers

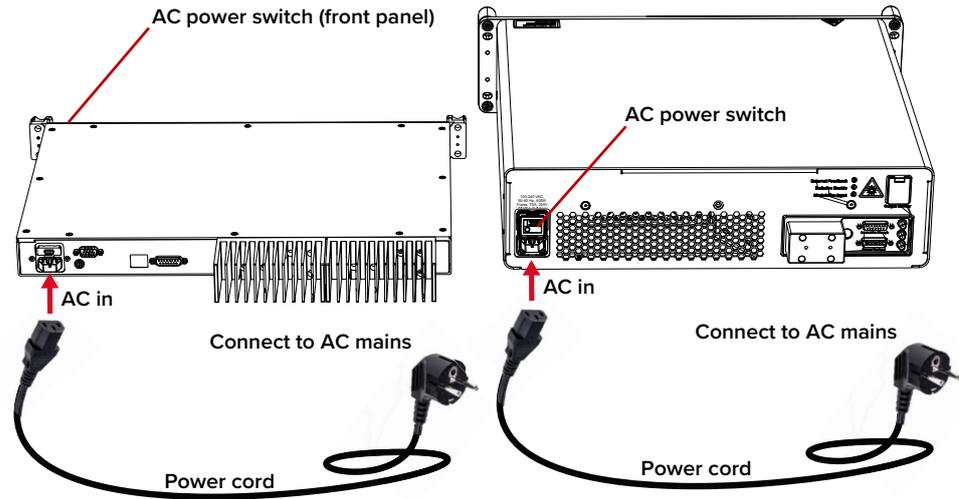


**CAUTION:** All modules on an NKT Photonics External bus must use a unique address. Bus conflict and system communication failure occurs when two or more modules on the bus have the same address. When identical modules are connected to same bus ensure to set a unique address offset on each module.

## Connecting power

Connect AC power to both the seed and amplifier through their respective rear AC input connectors. The connectors are a standard C-14 type designed for use with an AC power cord fitted with a C-13 connector. Ensure to use a power cord that conforms with regional electrical regulations. Electrical and cable specifications are listed in [Table 7](#).

**Figure 16 Connecting AC mains**



**Table 7 Power specifications**

Item	Description
AC Mains Input <sup>i</sup>	90-264 VAC @ 47-63 Hz
Power cord	The power cord must be capable to safely carry the laser’s specified AC ratings whilst maintaining a safe connection with the local AC mains outlets. The power cord used must follow local or national regulations.
AC connector (inlet)	IEC 60320 – C14
Power cord connector	The power cord must have an IEC 60320 C-13 connector for proper connection with the BOOSTIK HP AC inlet.

i. T= 20C, P=10W

## Connecting the optical input from a seed laser

**Seed to amplifier optical connection** The optical output of the seed laser is a (pigtail) fiber with an FC/APC connector. This is connected to the FC/APC optical input connector of the BOOSTIK HP amplifier.

**Before making the optical connection** Before connecting the input optical connectors, ensure to check all connector tips using a fiber microscope. Using a microscope, check for any deformities, damage, residue or other contaminants at the optical tip of each connector. Either clean the connectors or contact NKT Photonics support if replacement is necessary.



**WARNING:** Always disconnect AC mains power from the system when inspecting, cleaning or connecting optical connections.



**CAUTION:** Before connecting the output of a seed laser to the optical input of the BOOSTIK HP amplifier ensure the seed wavelength is within the permitted wavelength range of the amplifier.

---

## Connecting a PC with CONTROL software

**CONTROL software** The BOOSTIK HP system is shipped with the NKT Photonics CONTROL software installer on a USB key. You can also download the most recent CONTROL software from the following link:

<https://www.nktphotonics.com/support/>

CONTROL software is capable of controlling, configuring and monitoring the laser.

**Installing CONTROL software** After downloading the CONTROL installer software onto a PC (CONTROL PC), double-click the installer and follow the built-in wizard. Further details on installing the software is available in [Appendix D](#).

---

## Connecting the BOOSTIK HP system to a CONTROL PC

To connect the BOOSTIK HP system to a CONTROL PC use either a USB or Ethernet cable and follow the steps in:

- [Procedure 2](#) to connect the system using a USB cable.
- [Procedure 3](#) to connect the system using an Ethernet cable.

## Procedure 2 Connecting a PC to the system using a USB cable

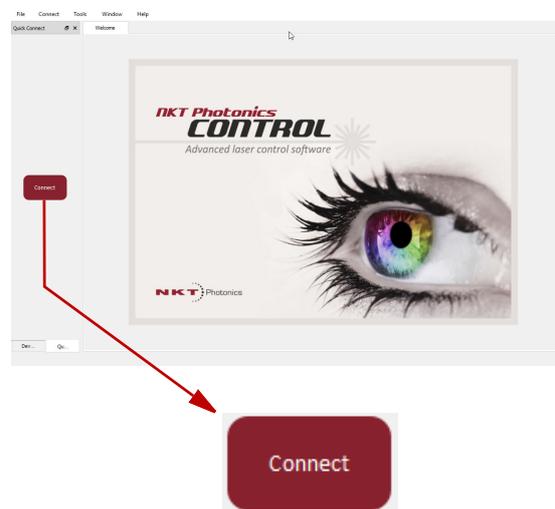
### Action

- 1 Using a USB Type A-B cable, connect a USB Type A port of the CONTROL PC to the USB Type B port of the seed laser (ADJUSTIK).
- 2 Connect power to the seed laser and amplifier – see [Connecting power on page 36](#).
- 3 If necessary, wait for the Windows device manager to install USB drivers for the connection.

- 4 Launch the CONTROL software by either:
  - clicking on Windows – Start – Programs – NKT Photonics –CONTROL
  - or –
  - clicking twice on the CONTROL shortcut on the desktop



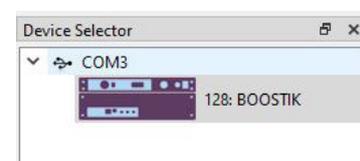
- 5 The CONTROL window opens. Click on the “Connect” button in the left side of the window.



- 6 CONTROL automatically scans for any connected lasers, amplifiers, and accessories available on both COM and configured Ethernet ports.



- 7 The CONTROL and STATUS panels for the system will open and the BOOSTIK HP with ADJUSTIK icon appears in the *Device Selector*.



**Ethernet connection** To connect the system to a PC using Ethernet, the PC and the seed laser must have their Ethernet ports connected to the same or separate IPv4 subnets. If separate subnets are used, ensure each subnet is reachable from the other.

### Procedure 3 Connecting a PC to the system using Ethernet

#### Action

- 1 Configure the IP address of the seed laser using either CONTROL connected over USB (Ethernet on page 56) or the front panel controls of the ADJUSTIK.

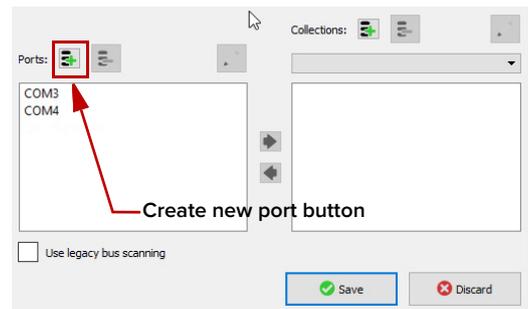
**Note:** refer to the *Koheras ADJUSTIK Product Guide* for more information on setting the IP address.

- 2 Using a CAT5 or better Ethernet cable, connect the Ethernet port of the ADJUSTIK seed directly to an Ethernet port of the CONTROL PC or to a subnet accessible by the PC.

- 3 Open CONTROL and from the Connect menu list, select *Config* to open the Port Configuration window.



- 4 In the *Port Configuration* window, click on the *Create new port* button.



- 5 The *Create new network port* window appears. Configure the port parameters as described below:

**Name** – Enter a name for the Ethernet connection (e.g. Lab-Laser-2).

**Host IP Addr.** – Select a host IP address from the drop down list of the computer’s available network adapters. Ensure to select the address assigned to the Ethernet port of the PC connected to the laser.

**System IP Addr.** – Enter an IPv4 address for the laser’s network adapter - see [System IP Address on page 56](#) .

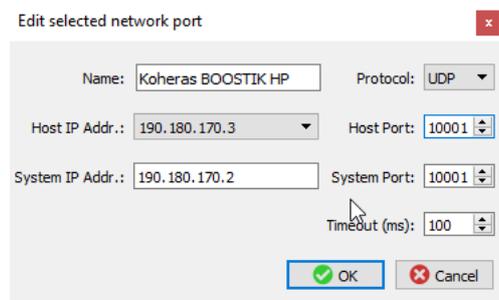
**Protocol** – Select either UDP or TCP. TCP is the default and recommended.

**Host Port** – Enter a TCP or UDP port the PC will use for communications with the laser. The default value is 10001.

**System Port** – Enter a TCP or UDP port the laser will use for communication with the CONTROL PC. The default value is 10001. **Note:** If you connect multiple lasers over IP to the same CONTROL PC, configure each laser with a unique local system port.

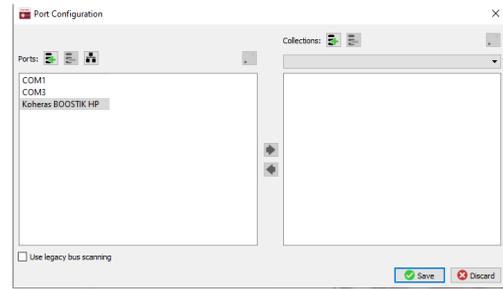
**Timeout (ms)** – Enter a timeout value in milliseconds. When CONTROL sends a request to the laser, it waits for a reply from the laser until this timeout value expires. Default value is 100 milliseconds.

Click *OK* to accept the configuration of the new *Ethernet connection* port.

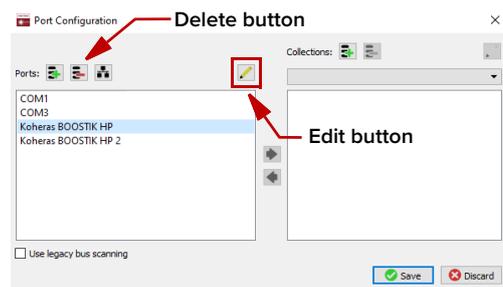


**Action**

- 7 Click the *Save* button to save the configuration of the new Ethernet connection.

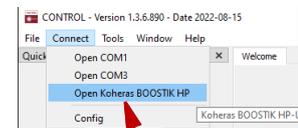


- 8 To delete or modify a configured port:
- Highlight the port and click the delete button
  - or -
  - Click the edit button
  - Click *Save* when finished.



- 9 From the *Connect* drop down menu, click on the Ethernet connection configured in step 3 to connect CONTROL to the laser.

**Note:** If CONTROL cannot access the port configured for the laser, verify that the CONTROL PC has connectivity with the laser by executing a PING test.



**Click the connection**

BOOSTIK HP/ADJUSTIK systems are controlled and operated from one of the following interfaces:

- Front panel interface (ADJUSTIK only) – described in this chapter
- CONTROL software interface – described in “CONTROL Interface” on page 45.

---

## Front Panel Operation (ADJUSTIK)

You can configure and operate an ADJUSTIK-based BOOSTIK HP system using the front panel controls of the ADJUSTIK seed laser. Figure 17 shows the front panel of the ADJUSTIK which features an LED display panel and controls you can use to configure and operate the laser amplifier. The key interfaces are described in the following:

- **LCD display panel** – displays operational parameters and a menu system where the system parameters are configured.
- **Menu and return buttons** – press the menu button to enter into menu levels, select parameter digits, and confirm the setting and return to a higher menu level.
- **Selection dial** – turn the dial to move the selection pointer among the menu items and also to modify parameter values.
- **Emission button** – enables and disables emission. (Enables emission only if the system meets safety and operational parameters.)
- **Key switch** – the key switch must be ON to enable emission. You can remove the key and store it securely to prevent unauthorized laser emission.

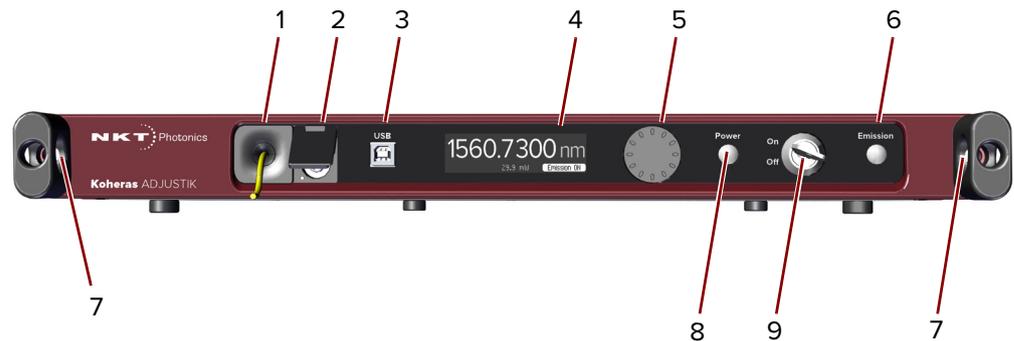


**NOTE:** For detailed information on using the ADJUSTIK and its controls, refer to the NKT Photonics document:

*Koheras ADJUSTIK Product Guide*

You can download the document from:

**NOTE:** <https://www.nktphotonics.com/product-manuals-and-documentation/>

**Figure 17 ADJUSTIK front panel layout**

- |                                      |  |
|--------------------------------------|--|
| 1 Optical output (main fiber output) | 6 Emission button                      |
| 2 Monitor optical output             | 7 Rack mounting flange and finger-grip |
| 3 USB serial connector               | 8 Power button                         |
| 4 OLED display panel                 | 9 Key switch                           |
| 5 Tuning dial and selection button   |  |

**Enable emission – front panel controls** You can enable the laser emission from the BOOSTIK HP system using the ADJUSTIK front panel controls as described in [Procedure 4](#).



**CAUTION:** DO NOT ENABLE EMISSION UNLESS THE SEED LASER IS CONNECTED and ENABLED. Enabling the amplifier emission without suitable seed laser input may DAMAGE the amplifier.



**CAUTION:** BEFORE ENABLING EMISSION, ensure the input seed wavelength is within the permitted wavelength range of the BOOSTIK HP amplifier.

#### **Procedure 4 Enable emission with ADJUSTIK front panel controls**

1. Connect the laser following the procedures in [“Connecting the BOOSTIK HP”](#) on page 31.
2. Ensure the Class 4 optical output from the collimator is safely directed and marked appropriately so that persons in the vicinity are aware of the danger.
3. Turn on power:
  - a. Set the AC mains switch (#2 of [Figure 4](#)) of the BOOSTIK HP to the ON position. The BOOSTIK HP amplifier **“Power LED”** is lit.
  - b. Press the Power button (#8 of [Figure 17](#)) on the ADJUSTIK seed laser to turn it on – it is lit WHITE when set to ON.



**NOTE:** When operating the BOOSTIK HP with the ACOUSTIK, the power sequence is the same as the BOOSTIK HP combined with the ADJUSTIK. Always turn on power on the BOOSTIK HP first, before turning on power on the seed laser.

4. Check the system wavelength and if necessary, adjust the system optical power setting using the ADJUSTIK controls and its OLED panel:
  - a. In the OLED panel, access the top level menu of the ADJUSTIK and note the output wavelength (displayed next to  $\lambda$ ).
    - The wavelength  $\lambda$  displayed should fall within the operating range of the optical input of the BOOSTIK HP amplifier.
  - b. Note the BOOSTIK HP system optical power setting (displayed next to  $P$ ).
    - The optical output power setting  $P$  of the BOOSTIK HP system (when first using the system) should be set to the minimum value.

**NOTE:** The optical power  $P$  setting displayed in the OLED panel can show the setting for either the seed laser optical power or the total BOOSTIK HP system optical power. Which power setting is displayed depends on whether the two units are connected or not over the External bus cable.

Therefore, in the ADJUSTIK OLED panel:

- To view the optical power  $P$  setting of the ADJUSTIK seed laser, disconnect the External bus cable between the ADJUSTIK and the BOOSTIK HP amplifier – see [Figure 14 on page 34](#).
  - To view the optical output power  $P$  setting of the entire BOOSTIK HP system<sup>1</sup>, connect the *External bus out* port of the ADJUSTIK to the *External bus in* port of the BOOSTIK HP amplifier using the External bus cable.
- c. If the wavelength  $\lambda$  is within the input operating range of the BOOSTIK HP amplifier and the optical output power  $P$  of the BOOSTIK HP system is set to the minimum value, go to [step 5](#).
    - If the ADJUSTIK wavelength does not fall within the optical input operating range for the BOOSTIK HP amplifier, contact NKT Photonics support – see [“Support contact details” on page 74](#).
    - If you need to adjust the optical output power of the BOOSTIK HP system, go to [step c](#).
  - d. Access the *Power/current mode* menu in the ADJUSTIK OLED panel and set the operating mode to *Power* mode.
  - e. Access the *Power* menu in the ADJUSTIK OLED panel and adjust the optical output power  $P$  of the BOOSTIK HP system to the minimum output, then go to [step 5](#).
5. Ensure the ADJUSTIK output fiber and its FC/APC connector is connected to the optical input of the BOOSTIK HP (#2 of [Figure 3](#)).
  6. Turn the Key switch (#9 of [Figure 17](#)) of the ADJUSTIK to the ON position.
  7. If you encounter an error in the OLED display panel, do the following to clear it before you proceed:
    1. The optical power level setting for the collimator output of the BOOSTIK HP amplifier.

- a. Check for error notifications in the ADJUSTIK OLED panel before troubleshooting.
  - b. If there is an interlock error, rectify any opens or shorts in the interlock circuit and then cycle the key switch.
  - c. For other errors, contact NKT Photonics support, see [“Support contact details” on page 74](#).
8. Before you enable emission, double check to ensure the input seed wavelength is within the permitted input wavelength range of the BOOSTIK HP amplifier in use.



**CAUTION:** Optical input with a wavelength not supported by the BOOSTIK HP will damage the amplifier.

9. On the ADJUSTIK front panel, press the emission button and check the following:
- a. The emission button is lit white.
  - b. Ensure the optical output of the ADJUSTIK seed laser meets or exceeds the minimum threshold and is within acceptable range for the BOOSTIK HP.
  - c. Check the optical output wavelength of the ADJUSTIK seed laser and confirm it is within the range acceptable for the BOOSTIK HP input.



**CAUTION:** If the optical input from the seed laser is not within the acceptable ranges of power and wavelength for the BOOSTIK HP amplifier, immediately shut down emission.

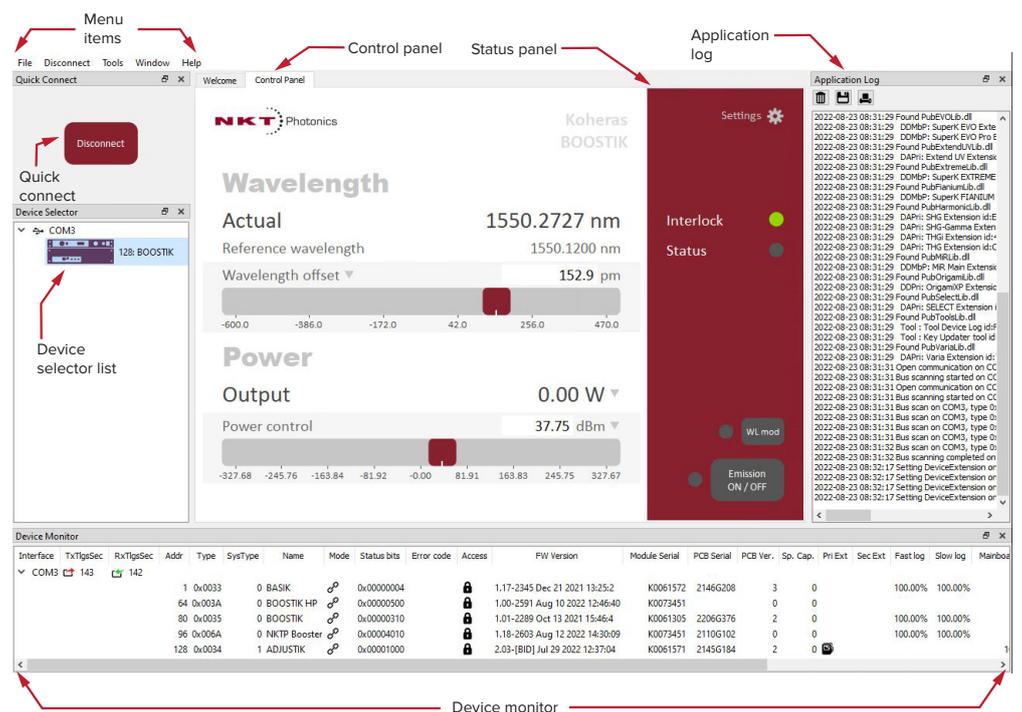
10. Access the *Power* menu in the ADJUSTIK OLED panel and adjust the output power of the BOOSTIK HP system to the level required while ensuring the beam path is safely maintained.
11. To disable emission, press the emission button again.

## CONTROL overview

The CONTROL user interface includes multiple panels and a selection of menu drop down items in the upper left corner. Using the drop down menu, you can add or remove panels. You can also reposition the panels within the main window or into separate windows. Figure 18 shows the panels and menu items; their functions are briefly described in the table below.

Panel	Function	See
Device Selector	Selectable list of connected devices (lasers and accessories) sorted by the PC port they are connected to.	Connecting the BOOSTIK HP system to a CONTROL PC on page 37.
Quick Connect	Provides a button when clicked, scans all available PC ports for connected NKT Photonics products.	Connecting to the BOOSTIK HP system on page 47
Status Panel	This panel displays the selected device status, emission control and a CONTROL settings drop down menu.	Status Panel on page 49
Menu Items	Five drop down menus with multiple functions.	CONTROL menu on page 60
Control Panel	Power and center wavelength settings and measurements.	Control panel on page 64
Application Log	This panel displays a debugging log that can be saved to a file.	Application Log panel on page 65
Device Monitor	To also help debugging issues, this panel displays multiple port and device module parameters.	Device Monitor on page 66

Figure 18 CONTROL navigation



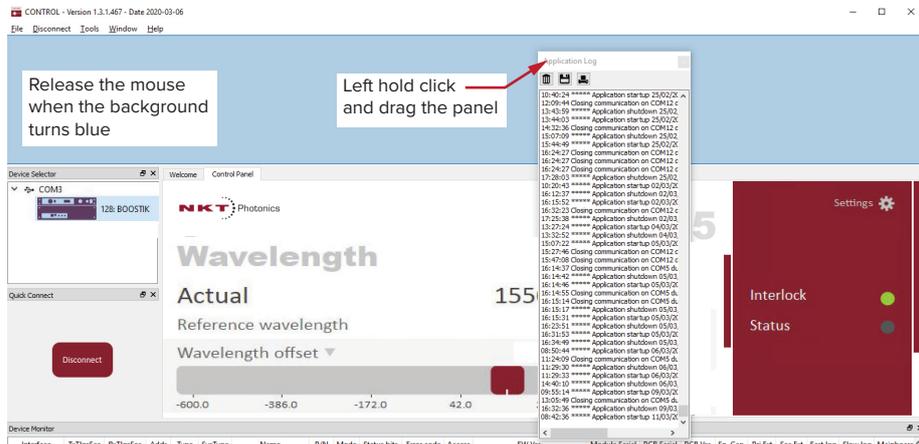
**Relocating panels** You can drag the different panels of CONTROL to any location within the main interface or into a separate floating panel. **Procedure 5** describes how to relocate a panel within the main window:

**Procedure 5 Relocating panels**

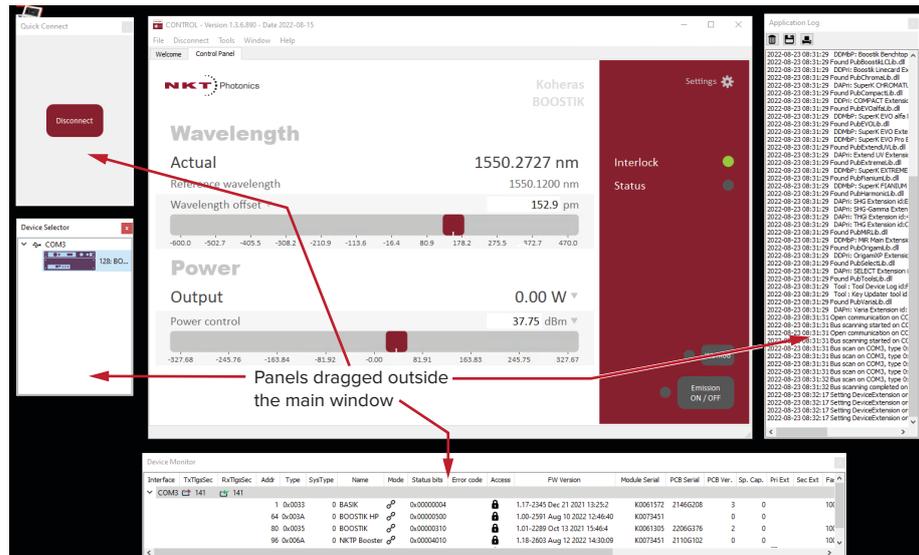
**Action**

- 1 Left click and hold the top title bar of the panel.
- 2 While holding the left mouse button down, drag the panel to another location in the main window.
- 3 In the new location, when the background turns blue, release the mouse button – see **Figure 19**
- 4 Alternatively, drag the panel out from the main window and release the mouse button. A separate window for the panel is created. (see **Figure 20**,

**Figure 19 Dragging panels to a new location in the main window**

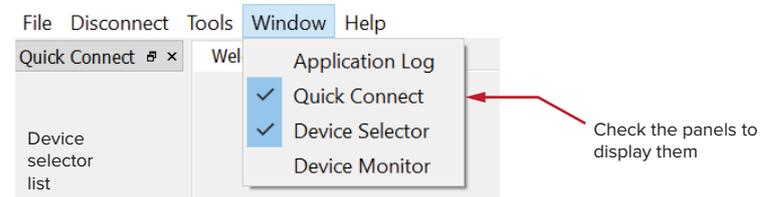


**Figure 20 Dragging panels outside the main window**



**Toggling the panels visible** Click *Menu > Window* and check or uncheck the items in the drop down menu. Checking (clicking it) an item shows the panel and unchecking the item (clicking it again) removes it from view.

**Figure 21 Toggling panel visibility**



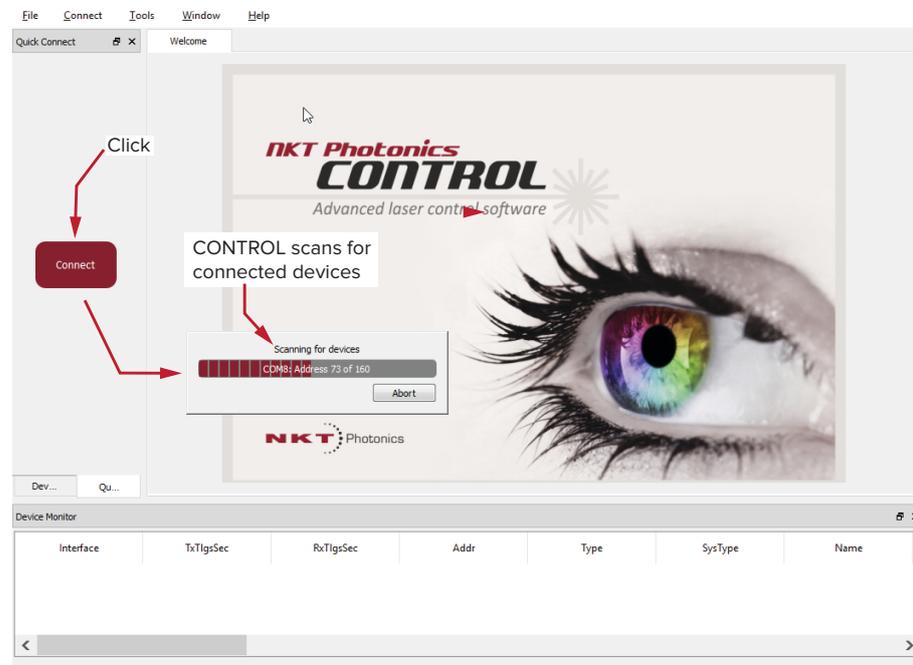
**NOTE:** You can also close the panels by clicking the X in the upper right corner of each panel.

**Connecting to the BOOSTIK HP system**

When CONTROL is launched, a “Welcome” panel is displayed as in [Figure 22](#). By default, on the left is the *Quick Connect* panel. Click the *Connect* button and CONTROL scans all available ports for NKT Photonics devices that it can connect to. Once CONTROL finishes the scan, a list of the devices is presented.

See either “[Connecting the BOOSTIK HP system to a CONTROL PC](#)” on page 37.

**Figure 22 Quick connect**



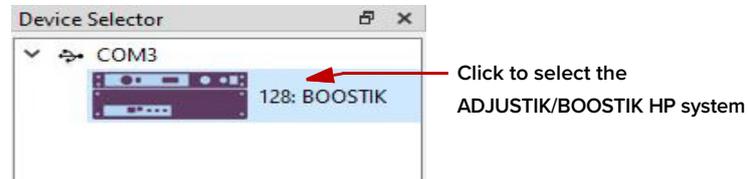
**NOTE:** Devices must already be connected to the CONTROL PC for quick connect to find them. A connected device means the seed laser USB connector is connected and a Windows COM port is assigned to it. For Ethernet connected lasers, the Ethernet parameters must already be configured or assigned by DHCP.

**Device Selector**

Once CONTROL successfully connects to a device or multiple devices, the *Device Selector* panel shows an icon for each connected device. [Figure 23](#)

shows the device selector with the icon of a connected BOOSTIK HP system. If multiple devices are detected by CONTROL, click on a particular device icon to access its controls. To modify the ICON text, see “View” on page 58.

**Figure 23 Device selector panel**

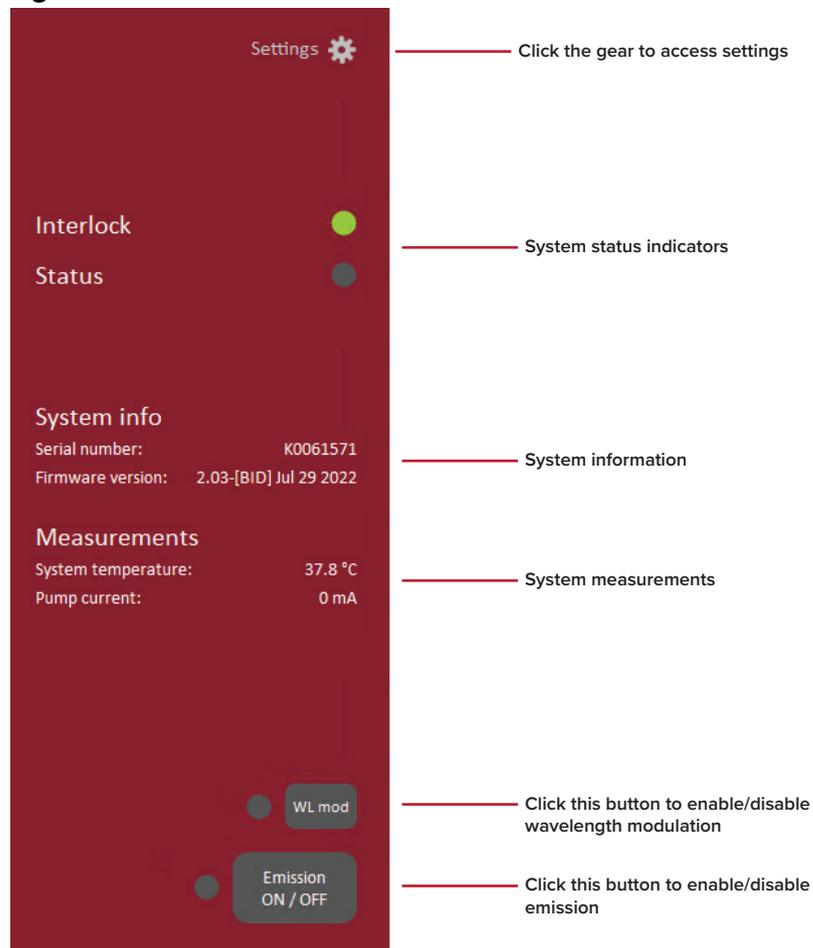


**NOTE:** The icon for an ADJUSTIK/BOOSTIK HP system is a combined icon representing the ADJUSTIK seed laser and BOOSTIK HP amplifier. When integrated in an ADJUSTIK/BOOSTIK HP system CONTROL sees the system as a single device.

## Status Panel

The Status Panel displays status indicators, error messages, emission control function and a CONTROL settings selectable from a drop down menu.

**Figure 24 Status Panel**



**Status Indicators** The panel displays the following indicators:

### Interlock

Indicates the status of the Interlock circuit and whether emission can be turned on or not. The indicator is either:

- **ON RED** – the interlock circuit is open or shorted to ground – emission not allowed
- **ON GREEN** – the interlock circuit is closed and reset – emission allowed

To clear an ON RED interlock indicator, the interlock and door switch circuit must be closed and reset. Any shorts to ground must be removed.

**Status**

Indicates the operational status of the laser. The indicator has the following states:

- ON GREEN – Emission is enabled and no faults are detected.
- ON RED – There is a fault, emission is shutdown and cannot be enabled. A fault message is displayed when this indicator turns ON RED:

Fault Message	Action
Interlock opened while emission on	a) Cycle the keyswitch to <i>Off</i> and then On b) Close the interlock loop circuit
Watchdog timeout	Reconnect CONTROL and reset the interlock by cycling the keyswitch.

See “Connecting the safety interlock” on page 31.



**NOTE:** When operating the BOOSTIK HP amplifier system, power must always be switched on the BOOSTIK HP before turning on power on the ADJUSTIK or ACOUSTIK seed laser(s), as described in Step 3 of [Procedure 4](#).

**System Info** The System Info section shows the following:

- Laser Serial Number
- Laser Firmware Revision

Note that the *System info* box must be checked in the “View” settings.

**Measurements** The system displays the following measurements:

- System temperature
- Pump current

Note that the *Measurements* box must be checked in the “View” settings.

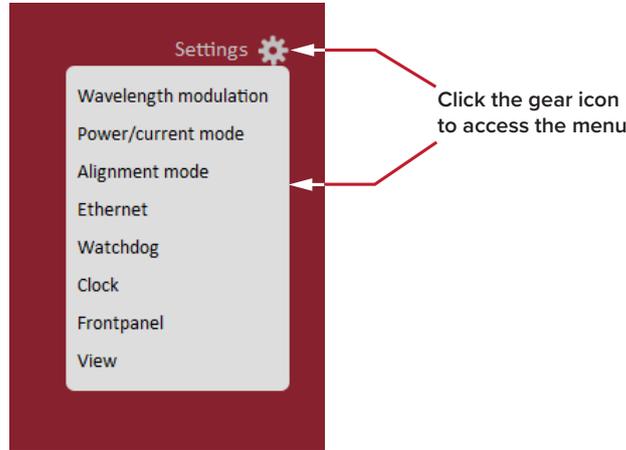
**WL button** Click the WL button to turn the wavelength modulation feature ON or OFF. Its indicator turns ON GREEN when the feature is enabled. When the feature is disabled, the indicator is OFF Grey – see “Wavelength modulation” on page 51.

**Emission button** Click the *Emission* button to turn BOOSTIK HP emission ON or OFF. The button indicator turns ON RED when emission is enabled. When emission is disabled, the indicator is OFF Grey.

## Control settings

The CONTROL settings are accessible by clicking the gear icon  in the upper right corner of the Status panel. Clicking the gear icon displays a menu of setting items as shown in [Figure 25](#):

**Figure 25 CONTROL settings**



Setting Item	Function	See
Wavelength modulation	Displays a panel with wavelength modulation parameters you can configure.	<a href="#">Wavelength modulation on page 51</a>
Power/Current mode	Accesses a drop down menu to set the laser to operate in either power or current mode.	<a href="#">Power/Current mode on page 55</a>
Alignment mode	Displays a panel providing the option to adjust the output level for alignment purposes.	<a href="#">Alignment mode on page 55</a>
Ethernet	IP configuration parameters for the laser’s Ethernet port.	<a href="#">Ethernet on page 56</a>
Watchdog	Displays the watchdog timeout settings.	<a href="#">Watchdog on page 56</a>
Clock	Select to access the laser’s clock settings.	<a href="#">Clock on page 57</a>
Frontpanel	Various settings for the front panel OLED display and buttons.	<a href="#">Front panel on page 57</a>
View	Displays a panel with check boxes to enable/disable the display of system information within the status panel.	<a href="#">View on page 58</a>

### Wavelength modulation

You can modulate the wavelength of the laser system using either the internal function generator or an external signal. To configure wavelength modulation, select *Wavelength modulation* from the *Settings* (gear) drop-down menu. [Figure 26](#) and [Figure 27](#) shows the *Wavelength modulation* configuration panels for the two modulation sources. Within these panels you can configure multiple parameters that affect the modulation functionality.



**NOTE:** The *Settings - Wavelength modulation* menu item is only available if the laser includes the wavelength modulation feature.

### Modulation Source

The signal source used to modulate the wavelength is selectable. Click on the *Source* drop-down menu to select one of three source modes:

- **Internal** (Figure 26) – the wavelength is modulated by the internal function generator signal of the seed laser.
- **External** (Figure 27) – the wavelength is modulated by an external signal connected to the *Wavelength+/-* pins of the seed laser.



**NOTE:** For details on how to connect external modulation signals, refer to the seed laser or ACOUSTIK product guides which can be downloaded from:

<https://www.nktpotonics.com/product-manuals-and-documentation/>

Figure 26 Wavelength modulation - internal source

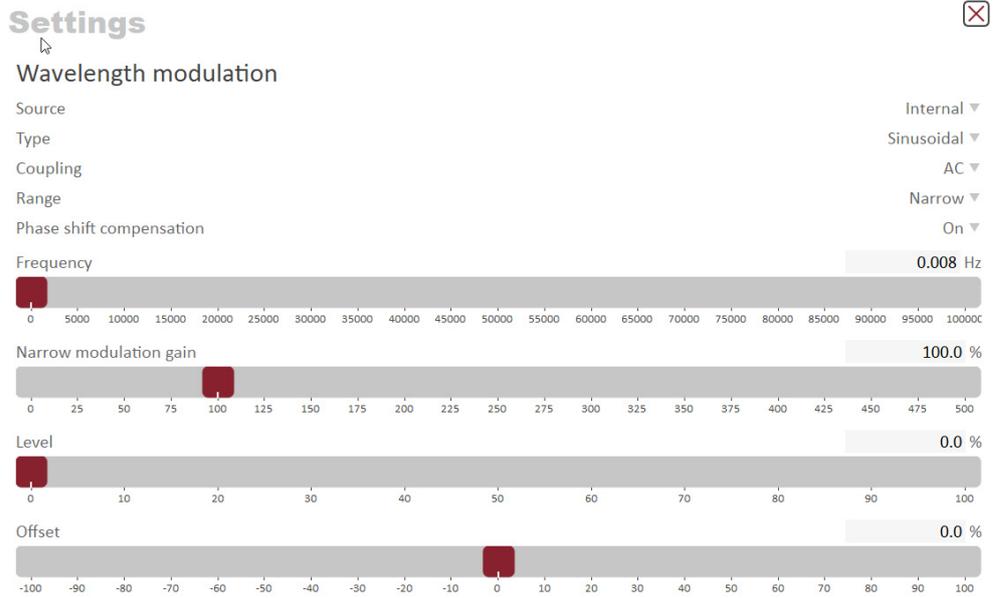
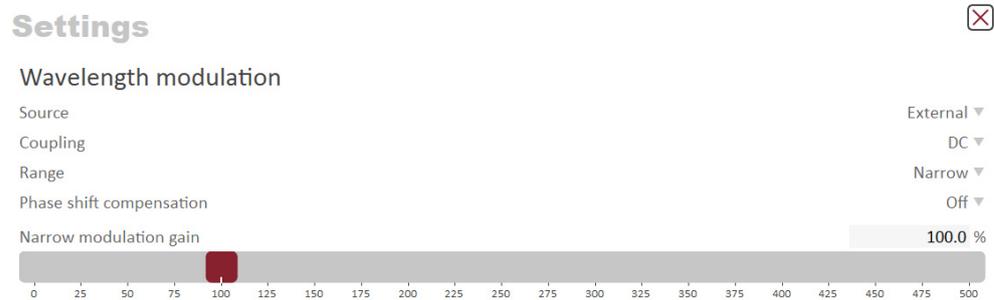


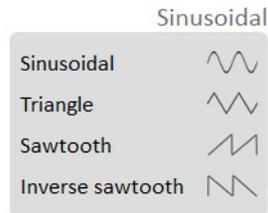
Figure 27 Wavelength modulation - external source



### Modulation Type (internal mode)

If the Modulation source is set to *Internal*, you can set the signal waveform type that is generated internally. Click the *Type* drop-down menu arrow and select either *Sinusoidal*, *Triangle*, *Sawtooth* or an *Inverse sawtooth* waveform.

**Figure 28** Internal generator waveform selection – type



### Modulation Coupling

You can select to couple the modulation signal using either AC or DC coupling. Click on the *Coupling* drop-down menu arrow and select either *AC* or *DC* coupling.



**NOTE:** For details AC or DC coupling of modulation signals, refer to seed laser or ACOUSTIK product guides which can be downloaded from:

<https://www.nktphotonics.com/product-manuals-and-documentation/>



**NOTE:** When using wavelength modulation with an X15 seed laser, and the modulation *Range* parameter is set to *Narrow*, the modulation signal will be AC-coupled, and the DC-component enters a software integrating function that tunes the wavelength up or down when the DC-voltage varies either positive or negative respectively. The speed of wavelength tuning is set with the *Integrating update interval*.

### Modulation Range

You can use the modulation *Range* drop-down menu to set the modulation range to either narrow or wide.

When set to *Narrow*, modulation depth is limited but for X15 seed lasers the low phase noise is maintained. To increase the modulation depth, change the range setting to *Wide*. When the modulation range is set to *Wide*, phase noise increases.

### Signal output

You can output the internal generator signal (internal modulation) from the wavelength modulation pins of the seed laser. To output the signal from the pins, set the Modulation type to *Internal* and the *Signal output* selector to *Enabled*. To disable the output signal, set the *Signal output* drop-down menu to *Disabled*.

When multiple seed lasers are used (in an ACOUSTIK rack), one seed laser can be set as a master signal generator with the other seed lasers configured as slaves.

1. For all the seed lasers, connect the *Wavelength+* pins together and the *Wavelength-* pins together.

2. Designate one seed laser as the master by setting it to operate in *Internal* modulation mode with *Signal output* set to *Enabled*.
3. All other seed lasers operate in slave mode by setting them to *External* modulation mode.

### Internal generator Frequency

When the modulation source is set to *Internal*, you can adjust the frequency of the internal generator signal to between 8 mHz (0.008 Hz) and 100 kHz (100,000 Hz). To adjust the frequency, use either the slider or the direct input field in the upper right corner of the slider.

### Narrow and Wide modulation gain

You can use this slider to increase the gain of an external modulation signal connected to the *Wavelength+/-* pins. Increasing the gain, directly increases the wavelength modulation achievable with the signal.

### Internal generator power Level

You can set the output power level of the internal function generator to between 0 and 100%. Use the slider or the text input field in the upper right corner of the *Level* slider to adjust the modulation level.

### Internal generator Offset

You can adjust the offset of the internal modulation signal to between -100% and +100% depending on the modulation level. For example, if the modulation level is set to 40%, the offset can be adjusted between -60% and +60%. The sum of modulation level and the absolute offset can be a maximum of 100%.

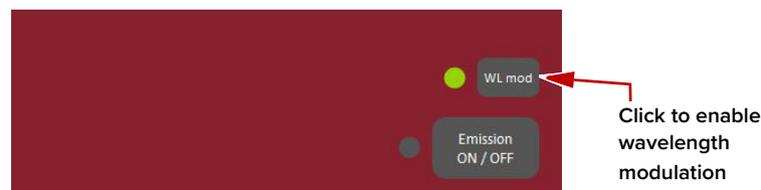
### Integrating Update Interval

You can set the update interval of the software integration function with this setting. The function is only available on X15 systems with *Coupling* configured as *DC* and *Range* set to *Narrow*.

### Turning on wavelength modulation

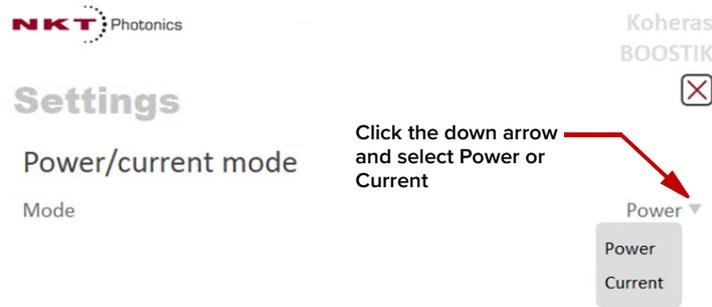
To enable wavelength modulation, in the status panel lower right click the *WL mod* button. The indicator next to the button turns ON Green. Click the button again to turn off the feature.

**Figure 29** Turning on wavelength modulation



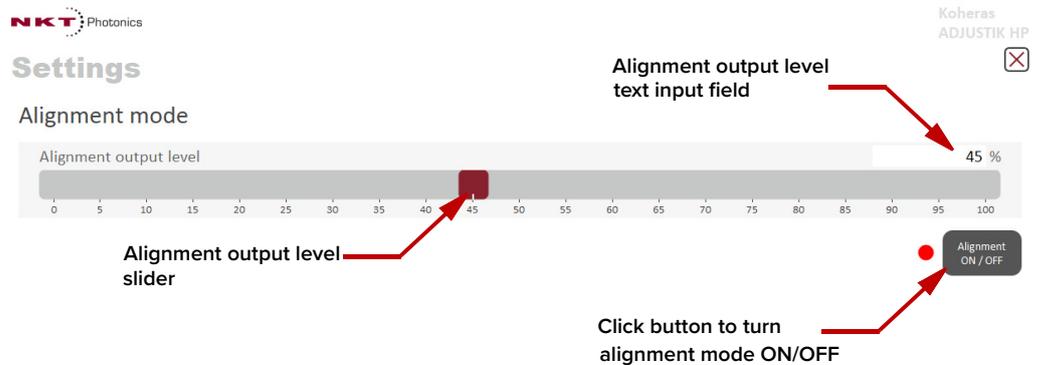
**Power/Current mode** You can configure system and its main *Control* panel to present different operating mode controls by setting its operating mode to either *Power* or *Current* mode. The modes are selected by clicking on the *Mode* arrow in the right side of the panel and selecting the laser system operating mode from the drop down menu.

**Figure 30 Setting the power/current operating mode**



**Alignment mode** To minimize the risk of damaged components, alignment mode gives you the option of optical system alignment at a lower, and thus safer, output level. As shown in [Figure 31](#) below, turning ON alignment mode allows you to set the output level at a (lower) percentage, but be aware that even at 100%, the output level will be significantly lower compared to when alignment mode is OFF.

**Figure 31 Alignment mode settings**



**NOTE:** The front panel emission LED blinks in alignment mode.



**NOTE:** Due to dependence on wavelength and inner structure, the exact output level in alignment mode varies from system to system.



**NOTE:** As a safety measure it is not possible to go directly to FULL emission in alignment mode. Turn OFF alignment mode to enable FULL emission.

## Ethernet **System IP Address**

The *System IP address* is used to configure the IP address settings for the seed laser. Ensure that the IP address of the seed laser is on the same subnet or a subnet reachable from the computer used to control it.

### **System Port**

The *System port* defines what port number the seed laser should use for reception of a TCP packet. This port number should match the *Remote Port* setting in CONTROL's Ethernet connections. Default setting is 10001.

### **Host IP Address**

You can configure the seed laser to only accept packets from a defined IP address. Use the *Host IP address* field to define what IP address the laser responds to. If the *Host IP address* is set to 000.000.000.000 (default setting), the laser responds to any IP address reachable from the connected network.

### **Host Port**

The *Host port* defines what port the laser uses for transmission of packets to the computer. If the computer port is set to 0, this means that the laser uses the same port for transmission as for reception (i.e. as configured under the *System port*). Default setting is 0. If *Local port* in CONTROL's Ethernet connection is configured differently than the *Remote port*, the CONTROL computer's port should match the *Remote port*.

### **MAC Address**

The *MAC address* for the seed laser's Ethernet frames is shown in the bottom of the Ethernet settings. The *MAC address* is not configurable but unique for every laser.

**Figure 32 Ethernet settings**



**Watchdog** The system features a watchdog for monitoring of USB or Ethernet communication. If CONTROL is disconnected from the chassis, the watchdog disables emission after the watchdog timer expires.

### **Enable Watchdog**

To turn the watchdog on, select ON from the drop-down menu next to *Enable watchdog*. To turn the watchdog off, select OFF.

**Watchdog timeout**

If CONTROL communications is disconnected for any reason, and the *Watchdog* is enabled, it starts to count down from the *Watchdog timeout* setting. When the *Watchdog timeout* count expires, emission is automatically disabled. To enable the watchdog, set the *Enable Watchdog* setting to ON and then set the *Watchdog timeout*. Range: 1 to 255 seconds

**Figure 33 Watchdog settings**



**Clock** Within the *Clock* setting menu, you can update the system date and time from the connected PC.

**Date**

Displays the system date in the format DD/MM/YYYY.

**Time**

Displays the system time in 24 hour format: HH:MM:SS.

**Set to computer clock**

Click the *Set* button to update the system time and date from the connected PC's current time and date setting.

**Figure 34 Setting the clock**



**Front panel** Using this setting, you can set the brightness level of the front panel OLED display and buttons. You can also set the units used in the display, the parameter shown on startup in the display, and set a sleep timer that dims the screen contents to a barely visible level.

**Power unit displayed**

Use this setting to display power in either milliwatts<sup>1</sup> (mW), watts<sup>2</sup> (W) or dBm.

1. ADJUSTIK variants

**Power adjust displayed**

Use this setting to select to show either a percentage of the maximum power level or the absolute value in dBm, W, or mW (depending on the power unit configured) when tuning the setpoint power. The setpoint power level is shown in a badge at the lower left of the display when set to show power and you turn the front panel dial. Select either: Absolute or Percentage.

**Wavelength type displayed**

Use this setting to display the wavelength as either an absolute wavelength or an offset from the center wavelength, select either: Absolute or Offset.

**Parameter displayed on startup**

Select the parameter that is shown in the focus position on the display screen when the laser is powered ON, select either: Wavelength or Power.

**Display brightness: 0-100%**

Sets the display screen brightness from 0 to 100 percent.

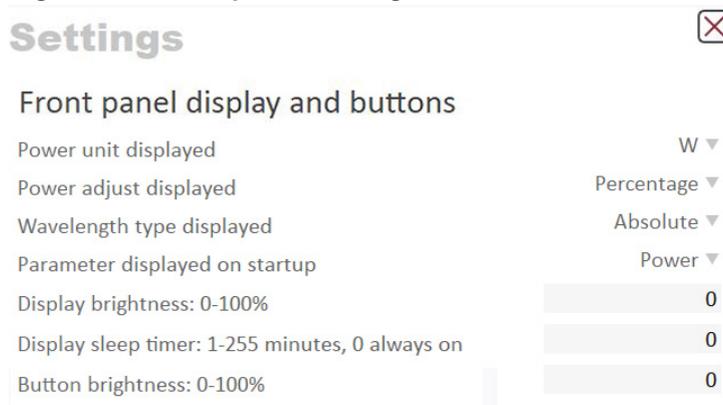
**Display sleep timer: 1-255 minutes, 0 always on**

Sets a timer that starts when no activity is detected using the front panel controls. The timers range is 1 to 255 minutes, when it expires the display screen dims its contents to a barely visible level. Setting the timer to 0 disables the timer.

**Button brightness: 0-100%**

Sets the brightness of the front panel buttons from 0 to 100 percent.

**Figure 35 Front panel setting**

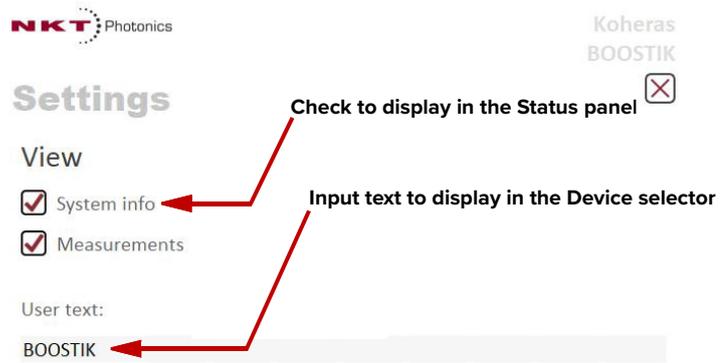


**View** The *View* settings control the display items in the status panel and the front LCD panel:

*System info* – check the box next to “System info” to toggle on displaying the system information within the status panel.

*User text* – enter a text string, of up to 240 characters. The text is shown next to the device icon in the *Device selector* panel.

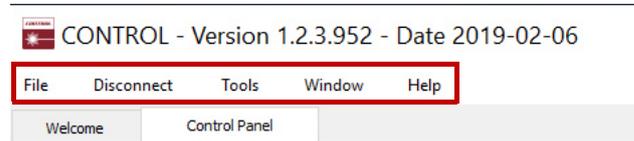
**Figure 36 View settings**



## CONTROL menu

There are five menu items at the top left of the main CONTROL window as highlighted in [Figure 37](#). Clicking on each item, reveals a drop down menu.

**Figure 37 Menu items**



Menu Item	Function	See
File	Click <i>File&gt;Exit</i> to exit the CONTROL program	N/A
Disconnect	Click <i>Disconnect&gt;Close All</i> to disconnect the currently connected device from CONTROL.	N/A
Tools	Select from one of three special tools to use with your laser. Tools available are: <ul style="list-style-type: none"> <li>• Key Updater Tool</li> <li>• Log Downloader</li> <li>• Extensions Overview</li> </ul>	<a href="#">Key Updater tool on page 60</a> <a href="#">Log Downloader on page 61</a> <a href="#">Extensions overview on page 63</a>
Window	Sets whether certain panels are visible or not.	<a href="#">Toggling the panels visible on page 47</a>
Help	Displays the current version of CONTROL and provides access to the included CONTROL user help.	N/A

**Key Updater tool** You can use the *Key Updater* tool to apply special features and corrections to modules and systems of the laser.

To use the *Key Updater* tool follow [Procedure 6](#).

### Procedure 6 Using the Key Updater tool

**Action**

- 1 Enter a key code in the field “Enter key code”.

**NOTE:** Key codes are generated by NKT Photonics.

- 2 In the list of modules, check the box on the right of each applicable module.

- 3 Click “Apply”

**i** **NOTE:** Certain keys generate a new locally generated key code. Locally generated keys are usually required during a support session and are emailed back to the NKT Photonics support personnel.

**Log Downloader** If your laser requires support from NKT Photonics, our support engineers may request you send them log files collected by the laser. You can use the *Log Downloader* tool to save log files from the laser to your CONTROL PC.

CONTROL automatically downloads log files from modules of any connected devices. The log files are stored in a local database of the CONTROL PC. However, certain modules, including the Koheras BOOSTIK HP mainboard, do not support automatic download of log files. For these modules, you can use the *Log Downloader* tool to put the device into dedicated log download mode by enabling a collect log function.

**i** **NOTE:** Log files in some modules may not be available in some early models. If the logging function is unable to function contact NKT Photonics support for more information about your system – see “Support contact details” on page 74.

**i** **NOTE:** When the collect log function is enabled, it temporarily disables automatic log collection from all other devices. The CONTROL interface turns gray, and communication with the laser and log collection with all other modules is disabled.

To download log files use the *Log Downloader* as described in [Procedure 7](#).

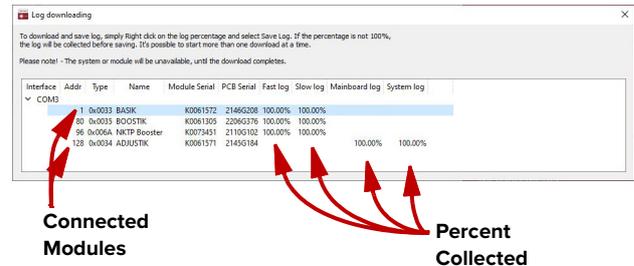
### Procedure 7 Using the Log Downloader

#### Action

- 1 Click the *Tools* menu and click on *Log Download* to start the Log Downloader tool.

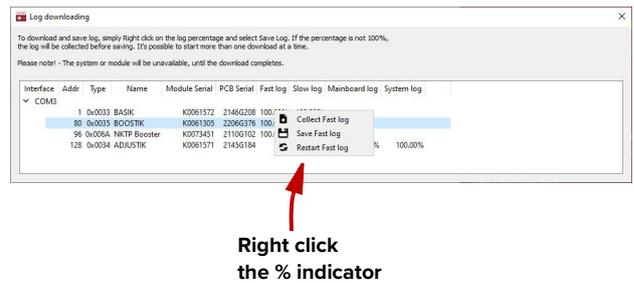


- 2 The tool displays all connected modules with log capability. To decrease the download time of the module log files, CONTROL continuously collects module log data and stores this log data in a local database on the PC. Logs are collected from each module and each has a percentage indicator that shows the percentage (%) collected of the module's total log data.

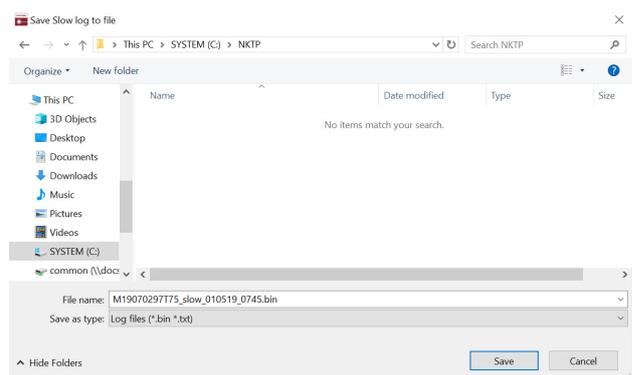


- 3 To download and save a log file to the CONTROL PC, right click the percentage indicator and select either:

- **Save log** – Immediately saves the file onto the CONTROL PC. If the percentage shows less than 100%, the log is first collected. See Collect log below.
- **Collect log** – Starts a dedicated log collection mode that disables all other CONTROL activity.



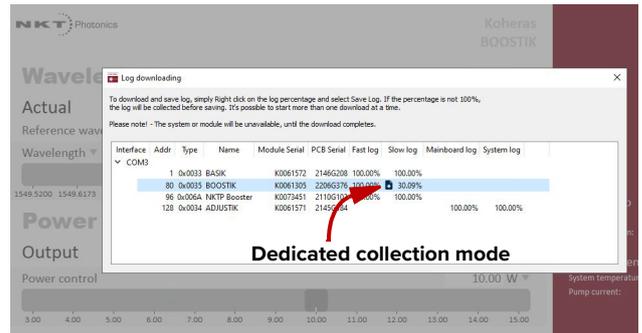
- 4 If you select *Save log*, a dialog box prompts for a filename and folder to store the log in.



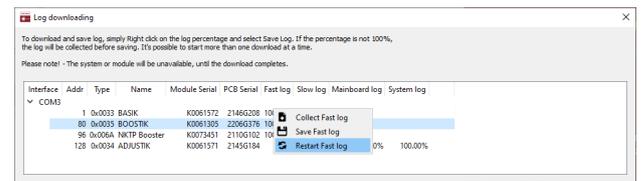
Action

- 5 If you select *Collect* log, the log is retrieved and saved in dedicated mode. The CONTROL panel turns grey and all other functions are disabled.

When the log collection is finished, all other CONTROL functions are accessible again.



- 6 Select *Restart* to clear out all collected log data and restart log data collection.

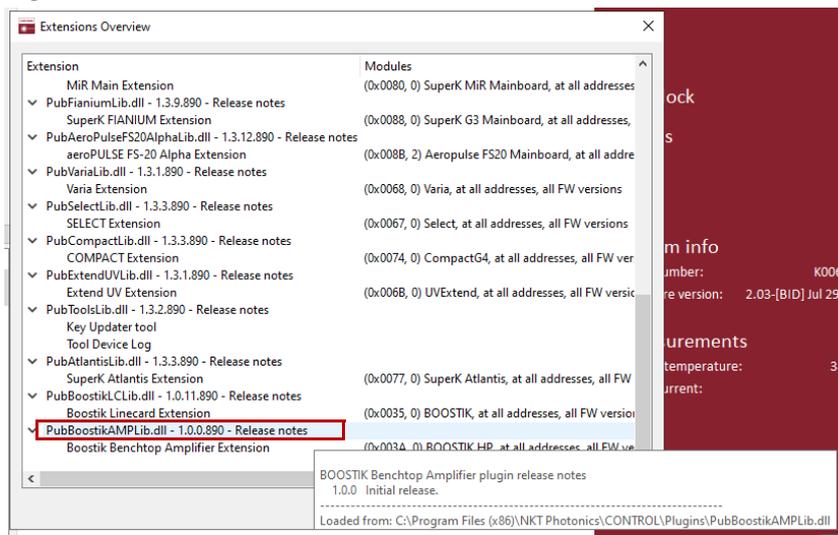


**Extensions overview** This tool is used to view the installed extensions (plugins) that are included with CONTROL. The extensions are found in the following folder:

C:\Program Files (x86)\NKT Photonics\NKTP CONTROL\Plugins

To view the extensions, click the *Tools* menu and then click on *Extensions Overview*. The *Extensions Overview* window is launched as shown in Figure 38.

**Figure 38 Extensions Overview**



**NOTE:** To show a short description of the release notes as seen in Figure 38, hover the mouse pointer over the “Release notes” text.

The BoostikAMPLib.dll details highlighted in Figure 38 shows the version of the .dll file (1.0.0.890), the included extensions (Koheras BOOSTIK HP Extension) and which module types they support.



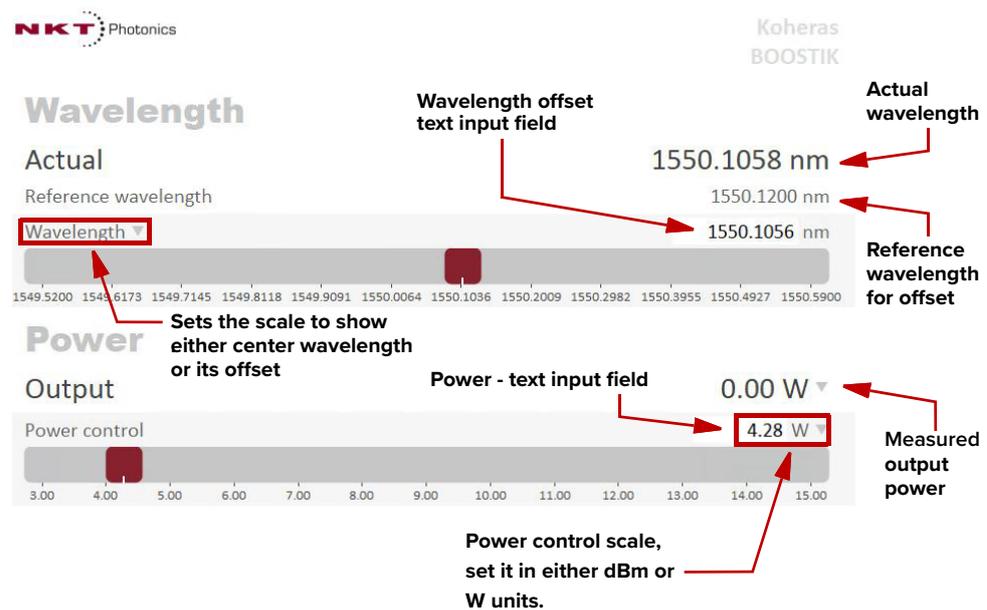
**NOTE:** Multiple extensions for a wide range of NKT Photonics devices are typically installed when using the default installation of CONTROL.

## Control panel

The main Control Panel displays the one or two sliders that can set the system output power and center wavelength. When operating in *Power* mode both a center wavelength and power controls are presented. When operating in *Current* mode only the center wavelength control is available. To configure the laser system to operate in *Power* or *Current* operating mode – see “[Control settings](#)” on page 51.

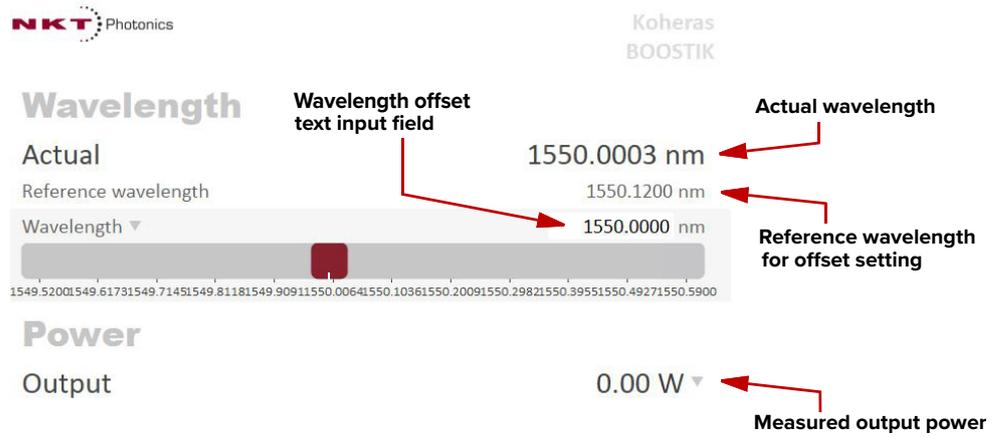
**Power mode** When set to the *Power* operating mode (Figure 39), an optical output power slider is presented and sets the amplifier’s output power level. The slider and measurement can be optionally scaled in either W or dBm. The panel also includes a center *Wavelength* control which is scaled in nanometers. Wavelength control can also optionally be set as *Wavelength offset* from a reference wavelength and when set thus it is scaled in picometers.

**Figure 39 Operating mode set to Power**



**Current mode** When set to *Current* operating mode (Figure 40), the current in the fiber pump is kept at a constant level. Only the center wavelength (or its offset) control is available in the control panel menu.

Figure 40 Operating mode set to Current



### Application Log panel

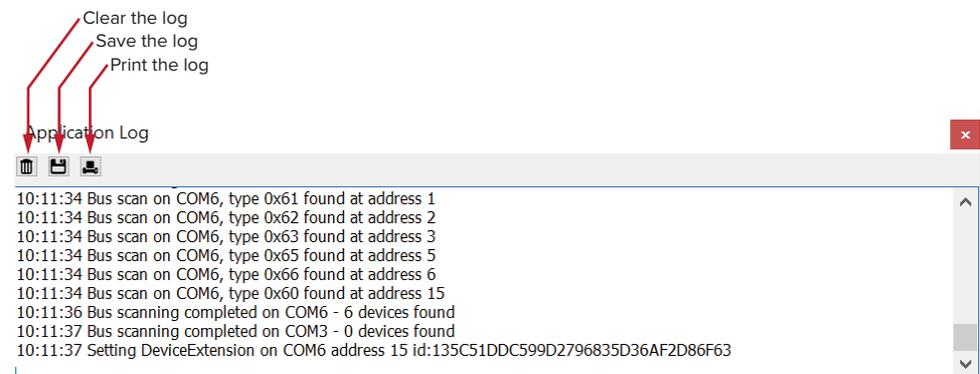
The *Application Log* panel displays and logs the communication of status messages. You can use the log to debug connection issues between CONTROL and NKT Photonics devices.

The panel displays and timestamps the following types of log messages:

- Port Scans
- Discovered Devices
- Closed Communication Ports

The panel includes three buttons in the upper left corner. You can use the buttons to clear, save or print the log. Click on the cross in the upper right corner of the Application Log window to close the Application Log.

Figure 41 Application Log window



## Device Monitor

The device monitor provides a live display of transmit and receive parameters of the laser's communication ports and any connected device modules.

The display parameter values are continuously updated and can be used to help debug issues with connected devices. The parameters are described in [Table 8](#).

**Table 8 Device Monitor parameters**

Parameter	Description
Interface	The PC port interface the device(s) is connected to. Click the “greater than” symbol to the left of the port to display the connected device(s) parameters.
TxTlgsSec	The number of telegrams per second being transmitted to the connected device.
RxTlgsSec	The number of telegrams received per second from the connected device.
Addr	The address of the connected module.
Type	The type of the connected module; read from the module.
SysType	The system type, default 0 – can be used to describe system variants and is read from the module.
Name	The name of the connected device module.
P/N	The device module part number.
Mode	The mode or status of the connected module: <i>connected</i> , <i>disconnected</i> , or <i>disabled</i> .
Status bits	The actual status bits read from the connected module.
Error code	The actual error code read from the connected module.
Access	Protected/Locked status of the module.
FW Ver.	The device module's firmware release date.
Module Serial	The serial number of the device module.
PCB Serial	The device module's printed circuit board serial number.
PCB Ver.	The version of the device module's printed circuit board.
Sp. Cap.	The module speed capability in bits per second as read from the module – values: 0=(default) 115200, 1=230400, 2=460800, 3=921600
Pri Ext	Primary extension/GUI loaded for this module. Hover over the icon to list more details – Note that there can only be 1 primary.
Fast Log	0%-100% collected. Note only if the module has a fast log and only internal modules have fast and slow logs.
Slow Log	0%-100% collected. Note only if the module has a slow log.
Mainboard Log	0%-100% collected. Note only if the module has a main log. Only main boards have main and system logs.
System Log	0%-100% collected. Note only if the module has a system log. Only main boards have main and system logs.
Timeout	Time in milliseconds since the last telegram was received from the device module.

---

Parameter	Description
Nack	Total number of negative acknowledgments received from the device module.
CRC	Total number of received telegrams with CRC failures.
COM	Total number of communication errors with framing or protocol errors. Hover over the icon to list more details.
Busy	Total number of busy responses from the module. Busy responses occur when a module receives a message but cannot process it due to its current work load.

---



# A Specifications

**Table 9 Optical specifications**

	Seed type		
	X15	E15	Y10
<b>Operating wavelength [nm]<sup>i</sup></b>	1535 - 1580	1535 - 1580	1030 - 1086
<b>Laser emission</b>	CW - inherently single frequency	CW - inherently single frequency	CW - inherently single frequency
<b>Beam quality (M2)</b>	M2 < 1.1 @ 15 W output	M2 < 1.1 @ 15 W output	M2 < 1.1 @ 15 W output
<b>Output power [W]</b>	10 or 15	10 or 15	10 or 15
<b>Output power regulation [W]</b>	3 - 15	3 - 15	3 - 15
<b>Input power [mW]</b>	1 - 50	1 - 50	10 - 50
<b>Linewidth (kHz)<sup>ii</sup></b>	< 0.1	< 0.1	< 20
<b>Max. phase noise [dB((rad/√Hz)/m)]</b>	-90 @ 10 Hz -110 @ 100 kHz -130 @ 20 kHz	-90 @ 10 Hz -110 @ 100 kHz -130 @ 20 kHz	Not applicable
<b>Peak RIN (MHz)</b>	~ 0.7	~ 0.7	~ 1.5
<b>RIN level @ peak [dBc/Hz]<sup>iii</sup></b>	< -100 @ peak < -135 @ 10 MHz	< -100 @ peak < -135 @ 10 MHz	< -105 @ peak < -140 @ 10 MHz
<b>Long term stability (RMS, 1h) [%]<sup>iv</sup></b>	< ± 1%	< ± 1%	< ± 2%
<b>Optical S/N (50 pm res.) (dB)</b>	> 50 dB (wavelength dependent)	> 50 dB (wavelength dependent)	> 50 dB (wavelength dependent)
<b>Polarization</b>	Linear (PM)	Linear (PM)	Linear (PM)
<b>PER</b>	> 20 dB	> 20 dB	> 20 dB
<b>Min. thermal wavelength tuning range [pm]</b>	+/- 125	+/- 350	+/- 240
<b>Total thermal wavelength tuning range [pm]</b>	350	1000	680
<b>Fast wavelength modulation range [GHz]</b>	0.5	8	10
<b>Fast wavelength modulation [KHz]</b>	< 20	< 20	< 20
<b>Optical input (from seed)</b>	FC/APC	FC/APC	FC/APC
<b>Optical output termination</b>	Collimator	Collimator	Collimator
<b>Output cable length [m]</b>	1.5	1.5	1.5
<b>Typical beam diameter [mm]</b>	~ 2	~ 2	< 1.3
<b>Output isolation [dB]</b>	> 35	> 35	> 30

- i. The center wavelength is selectable within the specified range. Contact NKT Photonics for options outside the range.
- ii. Lorentzian
- iii. Shot-noise limited > 5 MHz
- iv. After 30 min warm up

**Table 10 Operating and storage environment**

**All Chassis Models**

<b>Operating Temperature</b>	15°C to 30°C (59°F to 86°F) <sup>i</sup>
<b>Storage Temperature</b>	-20°C to 65°C (-4°F to 149°F)

i. Module temperature of 15°C to 35°C (59°F to 95°F)

**Table 11 Electrical specifications**

**All Chassis Models**

<b>AC Supply Voltage</b>	90-264 VAC@47-64Hz
<b>Maximum Power Consumption<sup>i</sup></b>	400 W

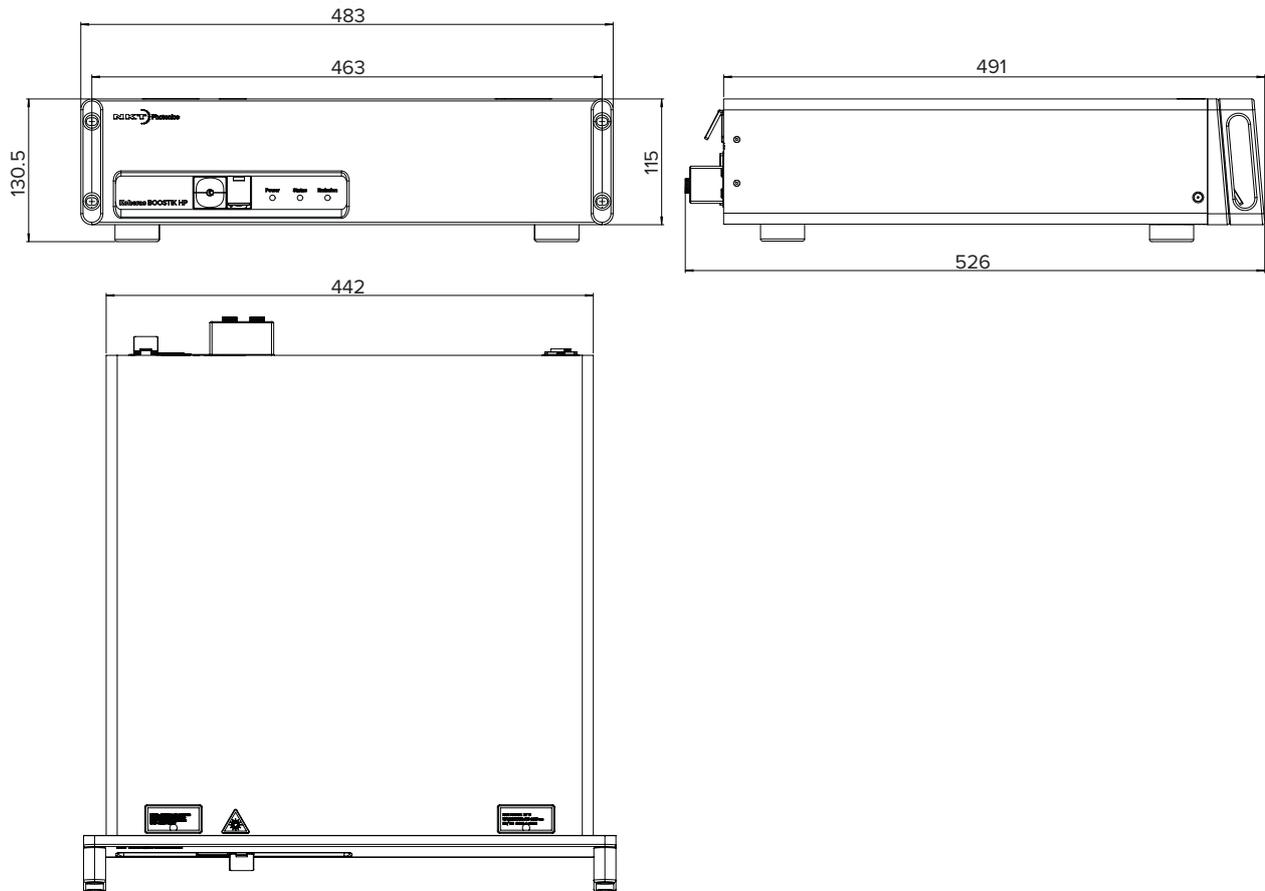
i. Dependant on the amplifier ratings, contact NKT Photonics support.

**Table 12 Mechanical dimensions**

**All chassis models**

<b>Size (H x W x D)</b>	130.5 x 442 x 526 mm (5.14 x 17.40 x 20.71 in)
<b>Weight</b>	16.3 kg (35.9 lb)

**Figure 42 Mechanical dimensions**





## B Service and support Information

### Servicing the amplifier

The amplifier has no user serviceable components. In case of malfunction, contact NKT Photonics using the support channels in section “[Support contact details](#)”.



**CAUTION:** Do not open the amplifier chassis. The amplifier is equipped with warranty labels (see [Figure 43](#)) on the covers of its chassis. The warranty is void if the system is opened.

**Figure 43 Warranty seal**



**CAUTION:** The amplifier contains electro-static discharge (ESD) sensitive components. To avoid permanent ESD damage, use ESD protection precautions when handling the amplifier. Always connect the amplifier’s earth point to a ground earth within your facility.

**Opening the amplifier chassis** There are no user serviceable components inside the amplifier chassis. Should your amplifier malfunction, and it cannot be serviced on site, it must be shipped to the NKT Photonics office in Birkerød, Denmark.

**WARRANTY VOID IF REMOVED Label** The unit is sealed with a label “WARRANTY VOID IF REMOVED”. It is strictly prohibited to remove the chassis cover

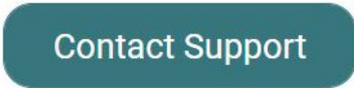
## Support contact details

If you need help or have questions regarding your Koheras BOOSTIK HP amplifier or its accessories, contact NKT Photonics through our support website below:

**Support website** 1. Go to:

<https://www.nktphotonics.com/support/>

2. Scroll down and click or press:



Contact Support

3. Select the type of help required, fill in the form, and click or press *Submit*.

**Shipping address** NKT Photonics A/S  
Blokken 84  
DK-3460 Birkerød  
Denmark

---

## Disposal

**Within EU territory** NKT Photonics follows the European directive on Waste of Electrical and Electronic Equipment or WEEE. The WEEE symbol affixed to the rear of the product and as shown within this document means that upon retirement of the equipment it must not be mixed with general waste.

For proper treatment, recovery, and recycling, please contact our support team to arrange returning the product to us. The product will be accepted and disposed of according to WEEE regulation.

**Outside EU territories** The WEEE symbol is only valid within the European Union. To discard this product please contact your local authorities or dealer and ask for the correct method of disposal.

# C Errors

**Table 13 System errors**

Error code	Description
0	No error
1	Reserved
2	Interlock off
3	Voltage out of range
4	Memory problem
5	Watchdog timeout
6	Faulty emission LED
7	Board temperature out of range
8	Module disabled
9	Fan error
16	Faulty power LED
17	Faulty status LED
20	ADC failure
21	Module initialization error
24	Submodule firmware upload needed
25	Submodule not reachable
26	Submodule request not acknowledged
27	Timeout during emission on sequence
30	Temperature out of range
50	Input wavelength out of range
60	Input power low



# D Control Software

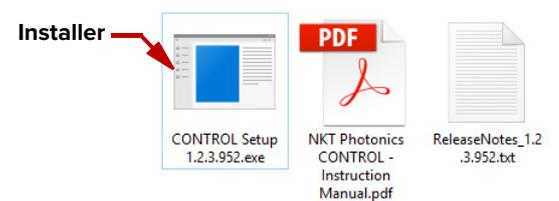
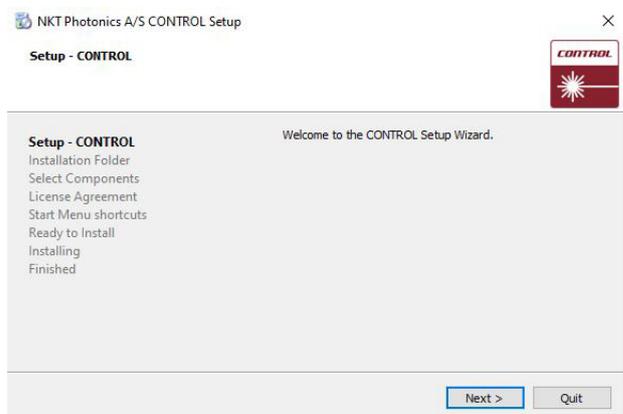
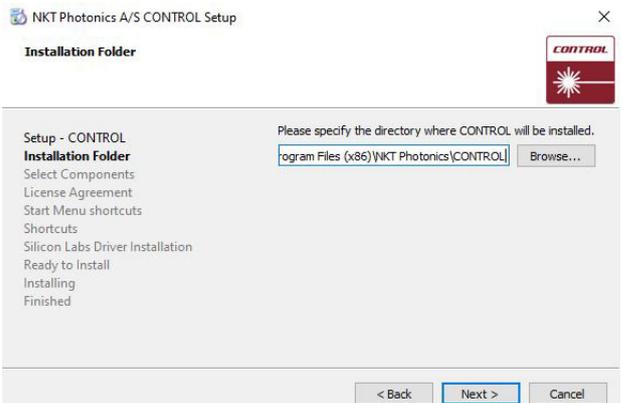
## Installing CONTROL

Download the software from:

<https://www.nktphotonics.com/support/>

Follow the steps in [Procedure 8](#).

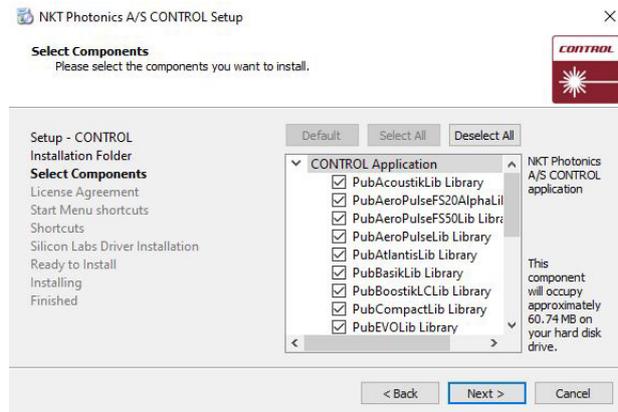
### Procedure 8 Installing CONTROL

	Action
<p>1 On the PC, launch the installer package and then double-click the installer icon.</p>	 <p>The screenshot shows a file explorer window with three files: 'CONTROL Setup 1.2.3.952.exe' (highlighted with a red arrow and labeled 'Installer'), 'NKT Photonics CONTROL - Instruction Manual.pdf', and 'ReleaseNotes_1.2.3.952.txt'.</p>
<p>2 The installation wizard appears.</p> <p>Click <i>Next</i> to continue.</p>	 <p>The screenshot shows the 'Setup - CONTROL' window. The title bar reads 'NKT Photonics A/S CONTROL Setup'. The window contains a list of steps: 'Installation Folder', 'Select Components', 'License Agreement', 'Start Menu shortcuts', 'Ready to Install', 'Installing', and 'Finished'. The 'Ready to Install' step is currently selected. A 'Next &gt;' button is highlighted at the bottom right.</p>
<p>3 Accept to use the default installation directory or select another directory by clicking the <i>Browse</i> button.</p> <p>Click <i>Next</i> to continue.</p>	 <p>The screenshot shows the 'Installation Folder' step of the installation wizard. The title bar reads 'NKT Photonics A/S CONTROL Setup'. The window contains a list of steps: 'Setup - CONTROL', 'Installation Folder', 'Select Components', 'License Agreement', 'Start Menu shortcuts', 'Shortcuts', 'Silicon Labs Driver Installation', 'Ready to Install', 'Installing', and 'Finished'. The 'Installation Folder' step is currently selected. A text box contains the path 'Program Files (x86)\NKT Photonics\CONTROL' and a 'Browse...' button is next to it. 'Next &gt;' and 'Cancel' buttons are at the bottom.</p>

**Action**

- 4 Uncheck the components you do not require. By default, all components are installed.

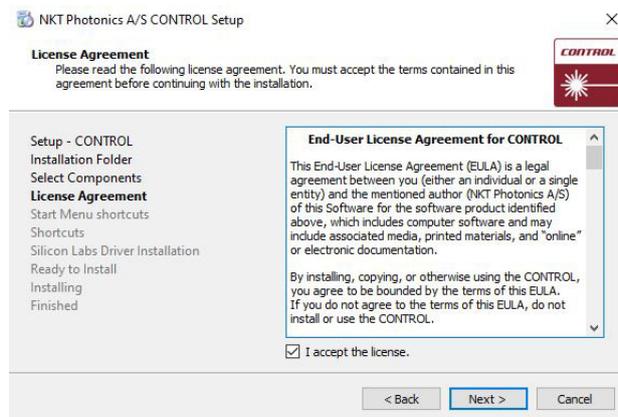
Click *Next* to continue.



- 5 Read the End-User License Agreement, and check "I accept the license." box.

Not checking the box ends the installation wizard.

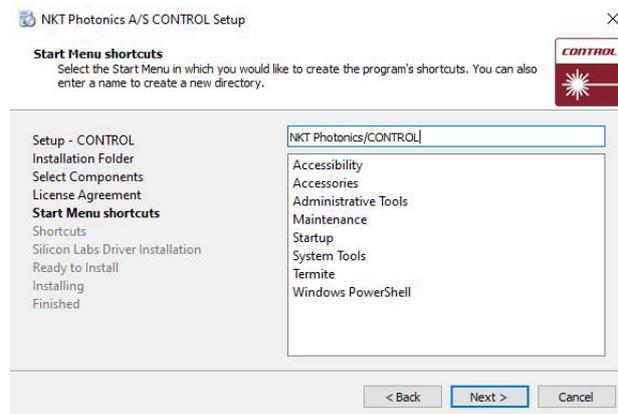
Click *Next* to continue.



- 6 The wizard creates a start menu folder with program short-cuts.

Use the default name or enter a new name for the folder.

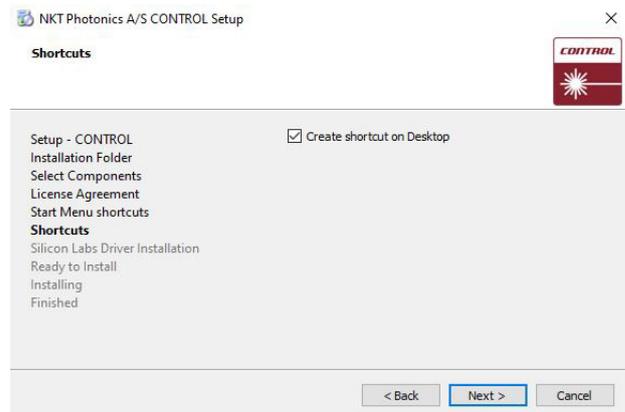
Click *Next* to continue.



**Action**

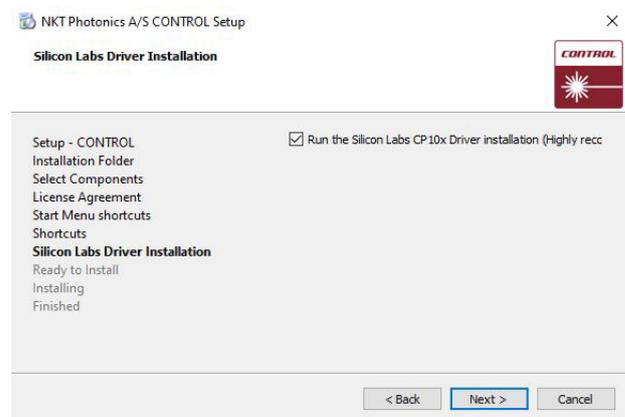
- 7 Check the box to create a desktop shortcut to access Control.

Click *Next* to continue



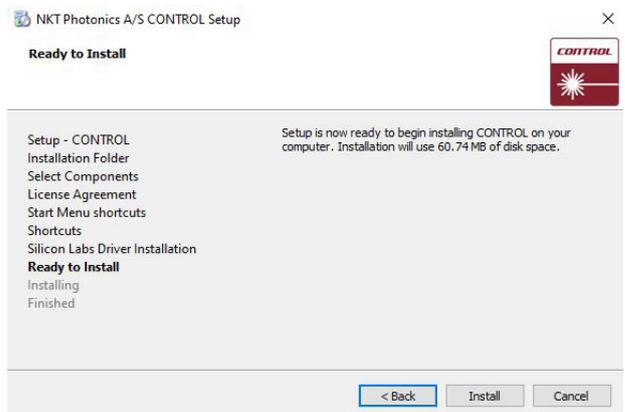
- 8 Check the 'Run the Silicon Labs CP10x driver installation' box and click *Next*.

**Note:** If you do not have the driver installed USB connectivity will fail.



- 9 Click *Install* to install CONTROL software on your PC.

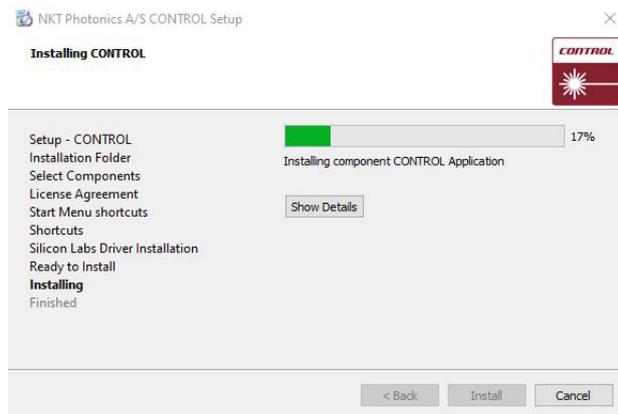
Click *Cancel* if you want to abort the installation.



**Action**

10 The wizard displays a progress meter for the installation.

**Note:** a normal install should only take a few seconds.

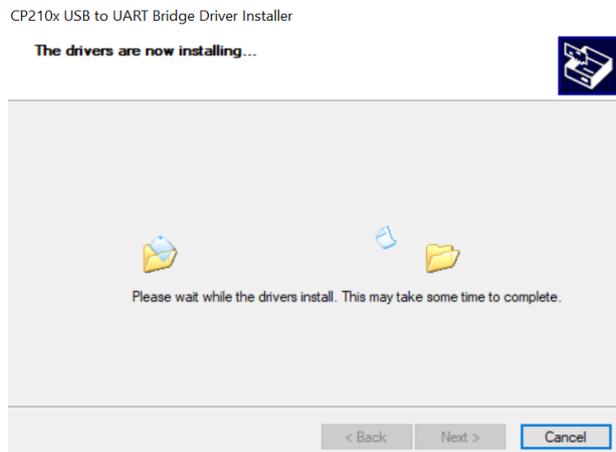


11 Click *Next* to install the UART drivers for the PC USB port.



12 The drivers are installed.

**Note:** Depending on your computer this occurs so fast you may not see this.



**Action**

13 The Silicon Labs drivers is installed successfully.

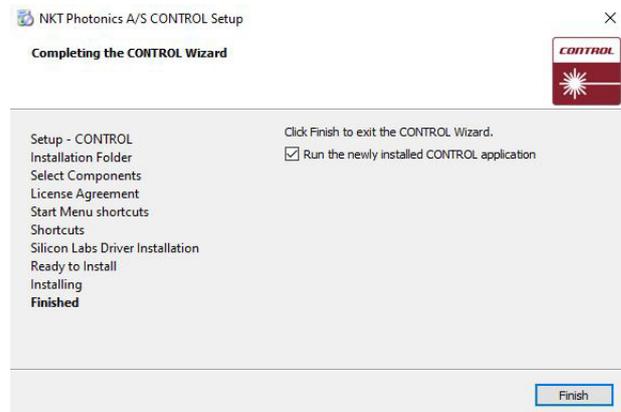
Click *Finish* to end the driver installation.



14 CONTROL is now installed.

Check the Run box to launch CONTROL when the *Finish* button is clicked.

Click *Finish* to end the installation wizard.







Item:  
Customer Revision:  
NKT Photonics Revision:  
Release Date:

800-636-01  
1.3  
3-0  
10-2024

**NKT Photonics A/S**  
Blokken 84, Birkerød-3460 Denmark

 [support@nktphotonics.com](mailto:support@nktphotonics.com)

The information in this publication is subject to change without notice.  
All company and product names mentioned within are either trademarks or registered trademarks of NKT Photonics.  
Specifications are listed as metric units. Imperial units listed are conversions.

Copyright 2024 NKT Photonics A/S. All rights reserved.