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THE NEW INDUSTRY

FYLA BOREAL SERIES

User Manual

v03

2025

FYLA LASER S.L.

Ronda Guglielmo Marconi, 14

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(46980), Valencia (Spain)

support@fyla.com

WARNING_____

USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

_____

IMPORTANT_____

The information in this manual is classified as confidential and proprietary information. You are hereby notified that any dissemination, distribution or copy of this document is strictly prohibited by law.

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CONTENTS

GENERAL INFORMATION 1
Introduction 1
Important Indicators 1
Warranty 2
Boreal Specifications 3
Boreal Identification 4
Description of the Fyla Boreal System 5
USER SAFETY 6
Introduction 6
Laser Safety 6
Labels and symbols identification 7
Certification Standards 9
QUICK START 10
Unpacking the System 10
System parts 11
Setting up 12
USING THE FYLA BOREAL 13
Electrical Connections 13
Optical Connections 14
Remote Control via User interface 18
Remote control via Serial Communication 26
Operation 31
WARNINGS AND FAILURE TO FUNCTION 32
CUSTOMER SERVICE 34
Technical Support 34
Service 34

GENERAL INFORMATION

Introduction

All the instructions in this User Manual must be followed before installation and operation. Damage to persons, material or laser system can be produced from not following the steps and indications of this Manual.

FYLA cannot be held responsible for any damages which result from using or working with the system described below. The laser must be only used by qualified personnel after reading this manual carefully.

Important Indicators

WARNING_____

CONTAINS SECURITY INSTRUCTIONS. NOT FOLLOWING THEM MAY RESULT IN IRREVERSIBLE DAMAGE.

_____

IMPORTANT_____

Contains important information.

_____

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Warranty

FYLA LASER S.L., standard warranty guarantees its lasers to be free of defects for one year from the date of shipment but could be extended. Detailed information regarding the warranty for our products can be obtained through our sales team. Please consult with them the specific terms and conditions that apply to your purchase. This warranty is in lieu of all other guarantees, expressed or implied, and does not cover incidental or consequential loss. Damaged caused by the user to the laser and/or its accessories because of misuse (voluntary or accidental) of the equipment, will void the warranty.

Information in this document is subject to change without notice.

All the information and technology aspects described within this manual are covered under the patent EU international code PCT/ES2014/070382.

IMPORTANT_____

Save the shipping container and packing material for future shipping needs and keep the guarantee of your product.

_____

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Boreal Specifications

FYLA BOREAL SPECIFICATIONS*	
Spectral Range	Version from 400** – 1000 nm **Initial wavelength depends on the supercontinuum source
Output polarization	Unpolarized
Optical Output	Free space or Multimode fibre output (1 m) with FC/PC connector (FC/APC and Collimated output customizable)
Synchronization/Connections	IN – Coupling holder (Laser) IN – Power supply IN – USB port (System control)
Power Requirements	110V – 220V 50/60 Hz
Displayed Parameters (Controlled)	Min/Max wavelength selection Central wavelength/Bandwidth selection
Control modes	Remote (USB port)
Operating Temperature	20 – 30 ºC
Storage Temperature	0 – 60 ºC
Bandwidth	10 – 550 nm
Simultaneous electable bands	1
Resolution	1 nm
Insertion losses (full bandwidth)	≤ 10 % (free space output) ≤ 30 % (Multimode fibre output) ≤ 60 % (Single-mode fibre output)

*Specifications are subject to change without notice

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Boreal Identification

FYLA BOREAL SERIES IDENTIFICATION		
Series name	Version	Model
BOREAL Indicates the series of the laser	vx Indicates the version of the Boreal	Gap / F Indicates if the model is Free space or Fiber output

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Description of the Fyla Boreal System

You have purchased a FYLA Tunable Wavelength module. A FYLA BOREAL module is a bandpass filter with tunable central wavelength and tunable bandwidth. It offers the possibility to select a laser's wavelength in a range from lasers starting wavelength to 1000 nm with a bandwidth from 10 nm to 550 nm. Consequently, it offers unparalleled performance for a wide range of applications that are not even possible with other types of light sources. Fig. 1 and Fig. 2 illustrate the basic proprieties of the FYLA BOREAL module.

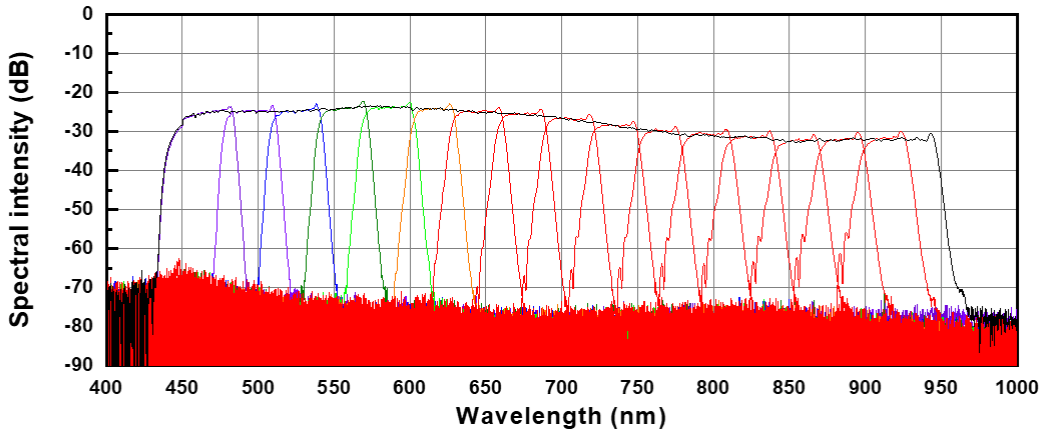

Fig 1. Supercontinuum laser emission filtered in different bands of 30 nm bandwidth and central wavelength progressively tuned with 30 nm steps.

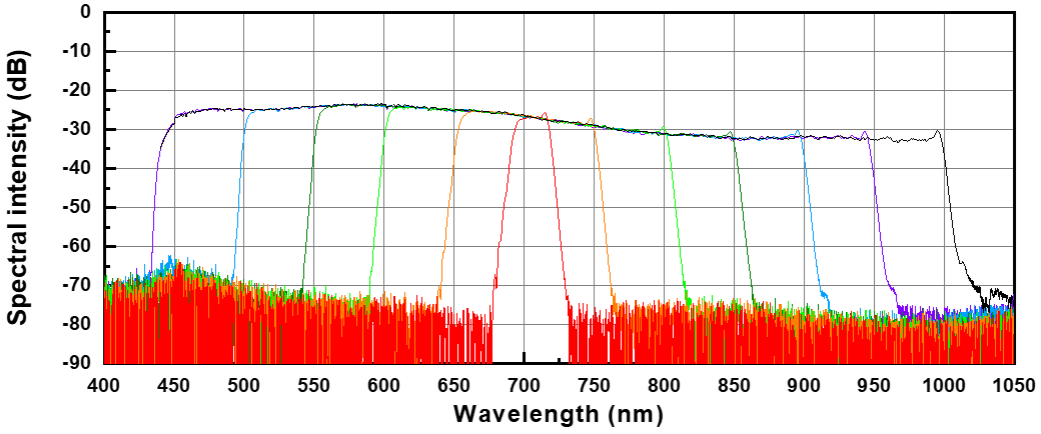

Fig 2. Supercontinuum laser emission filtered into different bands, maintaining the central wavelength while decreasing the bandwidth from 550 nm to 50 nm in 50 nm steps.

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USER SAFETY

Introduction

The FYLA BOREAL will always be used with FYLA's ultra-broadband laser sources.

Your safe and effective use of this product is of utmost importance to us at FYLA. Please read the following laser safety information before attempting to operate the FYLA BOREAL combined with a supercontinuum source.

Laser Safety

Standard 60825-1 specifies that to classify laser products that emit at multiple wavelengths, if these are comprised in the additive spectral regions for the eye and/or for the skin, the laser product is assigned to a class when the sum of the ratios of the accessible laser emission (AE) to the AELs (Accessible emission limit) of those wavelengths is greater than unity for all lower classes but does not exceed unity for the class assigned. The company FYLA LASER, S.L. has characterized the power that the laser products emit at each wavelength range.

As an accessory to the laser, a BOREAL filter can be used to select ranges of wavelengths within the visible spectrum. The use of said filter causes the laser output to have less power than the output of the source directly.

According to the standard EN 60825-1, class 3B lasers are those that can harm the eyes during direct exposure to the beam or to specular reflections, but scattered radiation cannot harm them, and they are harmless for the skin.

Even so and considering that the FYLA BOREAL can be easily removed, it is recommended to take the same protective measures when using it as when not using it.

WARNING_____

THE LASER RADIATION EMITTED FROM THIS UNIT MAY BE HARMFUL. ALWAYS FOLLOW THESE PRECAUTIONS:

- ALWAYS WEAR PROTECTIVE GOGGLES OR EYEGLASSES APPROPRIATE FOR WORKING WITH CLASS 3B LASER LIGHT.
- AVOID DIRECT EXPOSURE TO THE BEAM.

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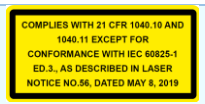
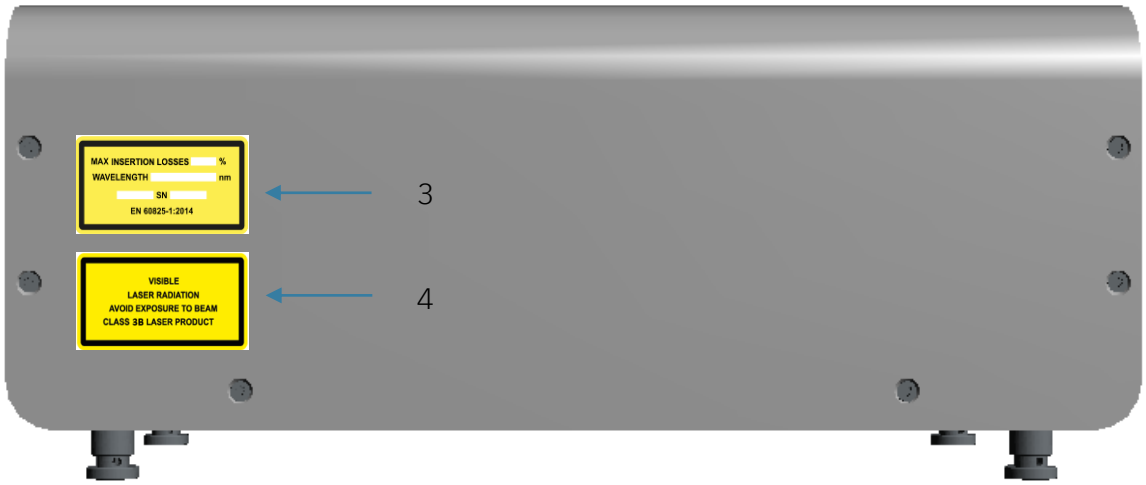
- AVOID LOOKING AT THE BEAM DIRECTLY.
- BE AWARE OF THE WARNINGS ON THE SAFETY LABELS STUCK ON THE EQUIPMENT.
- THE LASER DISPOSES OF A HARDWARE INTERLOCK CONNECTOR WHICH CAN BE ACTIVATED IN CASE OF MACHINE FAILURE TO STOP THE EMISSION.
- DO NOT OPEN THE LASER AND BOREAL SYSTEM. THERE ARE NO USER-SERVICEABLE PARTS INSIDE THE UNIT.
- THE USER WILL NEVER NEED TO OPEN THE LASER SYSTEM. UNAUTHORISED OPENING OF THE LASER WILL VOID THE WARRANTY AND MAY RESULT IN UNDERPERFORMANCE OF THE LASER AND/OR IRREPARABLE DAMAGE TO THE INTERNAL COMPONENTS.

Labels and symbols identification

The following table explains the meaning of the different labels sticked to the boreal equipment and the reference number to identify them in the following pictures. Please be aware of them and use caution when working with the laser. Please use the same labels to properly indicate the area where the laser product is used.

Labels	Explanation	Number
	Radiation warning	1
	Caution, possible risk	2
	Boreal characteristics	3
	Explanation on laser radiation class and how to avoid damage	4
	Performance standard label	*

* Only used with equipment to be sent to EEUU.



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Certification Standards

FYLA LASER, S.L declares that the device described below, due to its design and construction, as well as its manufacturing method, complies with the essential requirements of the applicable Directives, as well as the harmonized European standards of safety of laser products.

This product complies with CE standards UNE-EN 61000-3-2:2006 + A1:2010 + A2:2010, UNE-EN 61000-3-3:2009, UNE-EN 61000-6-2:2006 + ERR:2009, UNE-EN 61000-6-3:2007 + A1:2012

CE

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QUICK START

Unpacking the System

Carefully unpack the tunable module system. Compare the contents against the list below and inspect them for any signs of damage. If parts are missing or you notice any signs of damage, please contact FYLA immediately.

IMPORTANT_____

Save the shipping container and packing material for future shipping needs and to keep the guarantee of your laser unit.

_____

WARNING_____

DO NOT OPEN THE BOREAL SYSTEM. THERE ARE NO USER-SERVICEABLE PARTS INSIDE THE UNIT.

_____

WARNING_____

THE USER WILL NEVER NEED TO OPEN THE PRODUCT. UNAUTHORISED OPENING WILL VOID THE WARRANTY AND MAY RESULT IN UNDERPERFORMANCE OF THE LASER SYSTEM (LASER AND BOREAL) AND/OR IRREPARABLE DAMAGE TO THE INTERNAL COMPONENTS.

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WARNING_____

IF THE WARRANTY STICKERS OF THE EQUIPMENT SHOW SIGNS OF HAVING BEEN REMOVED OR DAMAGED IN ANY WAY, THIS WILL VOID THE WARRANTY.

_____

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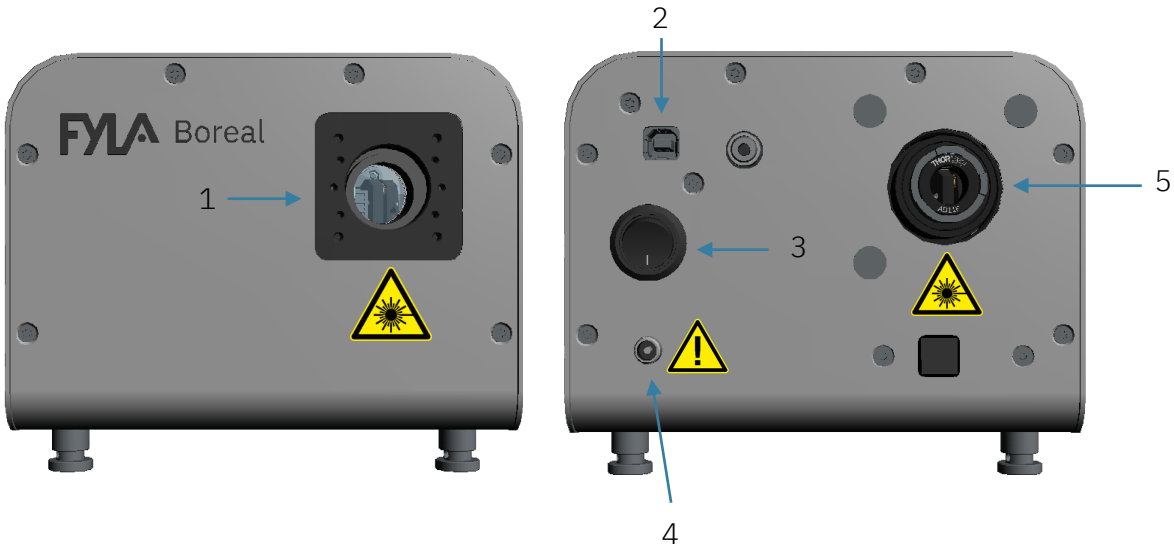
Items within a FYLA BOREAL series unit package:

- FYLA BOREAL UNIT
- AC Cable
- USB A-B Cable
- 24V Power Supply
- Specifications inspection sheet
- Fiber Output (in case you've purchased this output option)

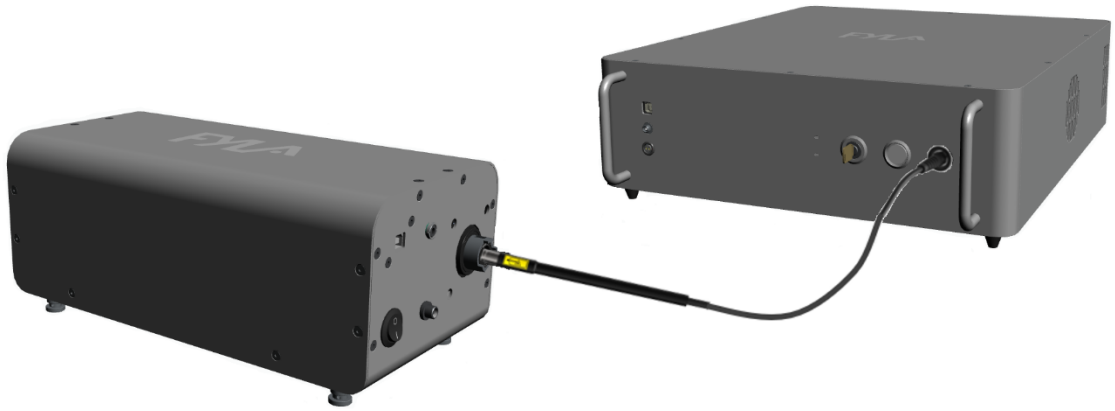
System parts



1. BOREAL OUTPUT (COULD BE FREE SPACE OR FIBER OUTPUT)
2. USB PORT
3. POWER SWITCH ON/OFF
4. JACK CONNECTOR 24 V POWER SUPPLY SOCKET
5. BOREAL INPUT (LASER ENTRANCE)

Setting up

The tunable module is configured at the factory for the line voltage and frequency appropriate for your country. If you are unsure how your unit is configured, check “AC Operating Voltages” for more details or ask FYLA through sales@fyla.com/support@fyla.com. Connect the 24 V Power Supply. Turn on AC power with the back panel ON-OFF switch and wait 30 seconds. Connect the laser output to the tunable module laser input, as shown in the figure below. Make sure that the bolt from BOREAL laser input is well screwed. To start operating the BOREAL move on to the next section.



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USING THE FYLA BOREAL

Electrical Connections

Switching ON

1. Place your FYLA BOREAL unit on your workbench, horizontally. Connect the AC cable to the 24V Power Supply. Then, connect the female JACK connector to the Rear Panel's male JACK connector.

Fig 3. 24V Power Supply JACK connector.

2. Turn ON the power switch of the rear panel to switch on the BOREAL module. Next, wait 30 seconds and the system will be getting ready for use.

Fig 4. Rear panel power switch

Switching OFF

To deactivate the BOREAL module, turn off the power switch from the rear panel and unplug the female JACK connector.

Fig 5. Rear panel power switch

Optical Connections

Optical Input

WARNING_____

THE LASER RADIATION EMITTED FROM THE SUPERCONTINUUM SOURCE MAY BE HARMFUL. PLEASE FOLLOW ALL THE SAFETY INSTRUCTIONS INDICATED IN THE SAFETY SECTION BEFORE OPERATING THE LASER + BOREAL SYSTEM.

MAKE SURE THAT THE LASER IS SWITCHED OFF WHEN CONNECTING IT TO THE BOREAL.

_____

IMPORTANT_____

The laser output must be connected to the BOREAL input before starting the operation. Make sure that the laser is switched OFF before connecting it to the BOREAL.

_____

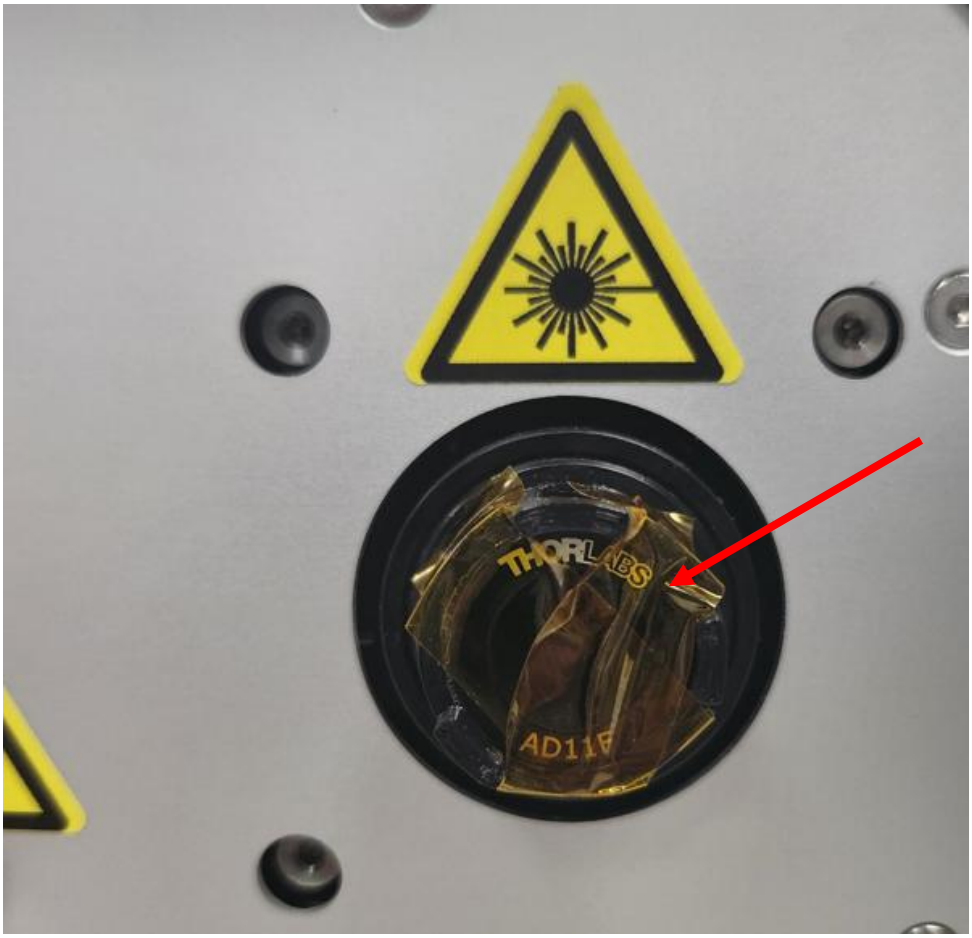
IMPORTANT_____

Follow the steps indicated below to achieve a correct Boreal functionality.

_____

It is very important to follow the next steps to achieve a correct connection of the laser to the BOREAL:

1. Remove the Laser's output protector and BOREAL's input protection tape. Please do not force the BOREAL's input connector when removing the tape.



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2. The Laser's Output Collimator has a special mechanical part integrated, which matches with the input of the BOREAL. Insert the laser's output into the input and match both mechanical parts (Laser's Output & BOREAL's Input).

Unmatched Connection

Matched Connection

3. Carefully tighten the screws from the BOREAL's input connector:

Optical Output

Please follow the next steps to obtain the light at the output:

The BOREAL can have different output configurations:

- Free Space Output

  Carefully remove the BOREAL's output protector and make sure that the output filer is clean

- Fiber output:

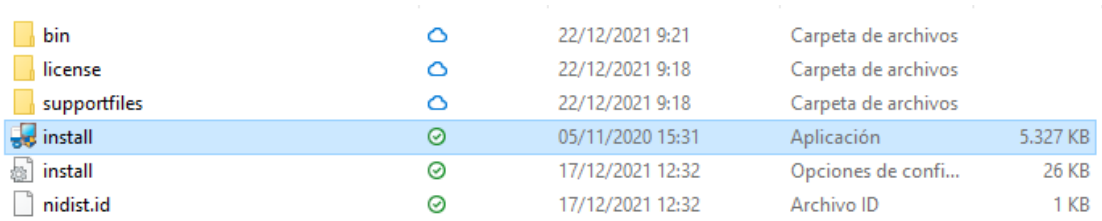
  Connect the fiber supplied by FYLA to the PAFA's output connector and tighten it carefully.

Remote Control via User interface

The FYLA BOREAL unit must be controlled using the FYLA LASER User Interface (UI) software. All the functions can be controlled by the computer. The permanent communication between UI software and the BOREAL provides you real-time subsystem information.

To achieve correct communication between software and laser please follow the next steps:

1. Start Windows 7 or higher version.
2. Download the folder sent by FYLA and copy it to your desktop.
3. Open said folder.
4. Next, open the “Installer” and “Volume” folders.
5. Click with left button one time over “install”



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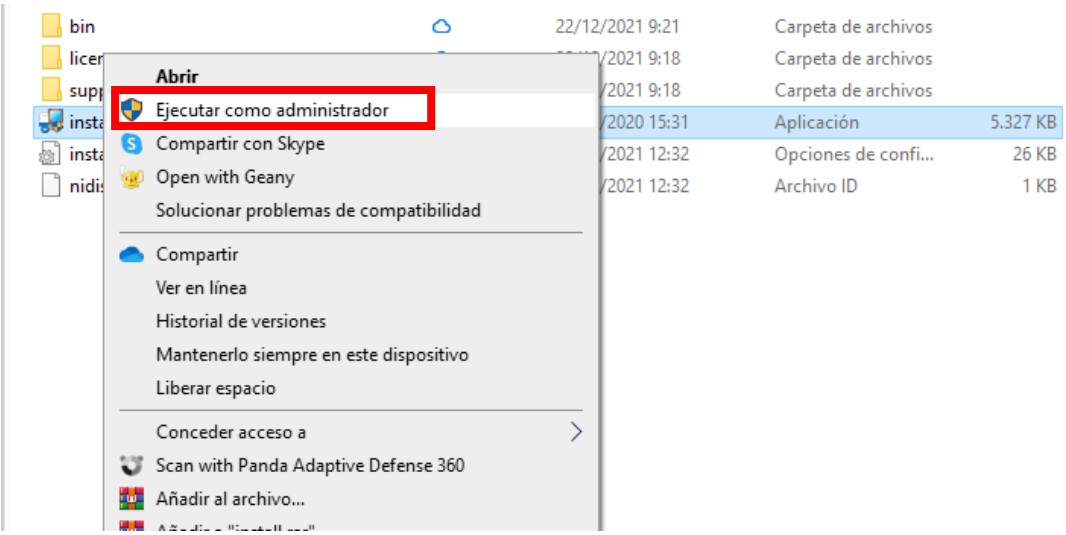
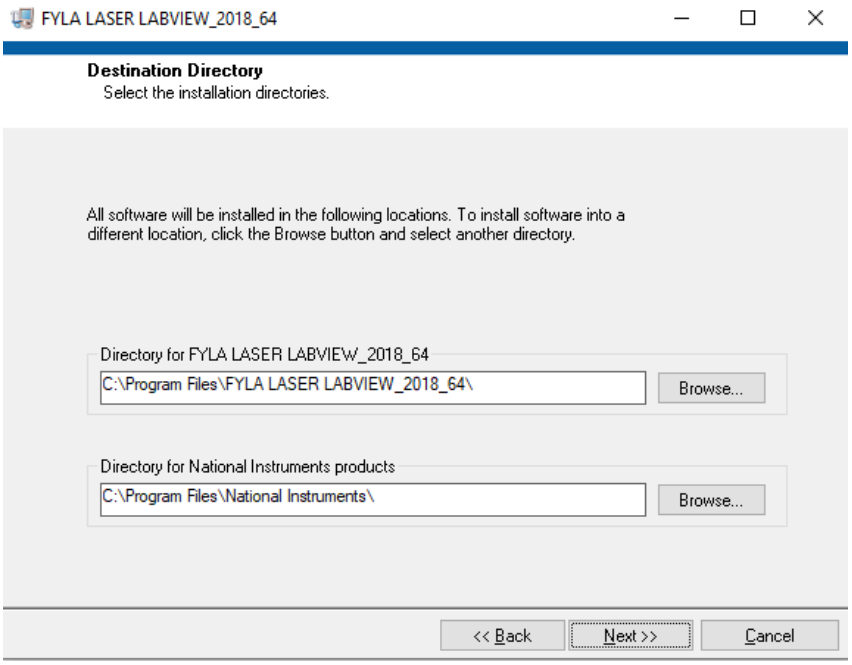
6. Click with right button one time over “install” and will appear the next photo. You will have to press the second option “Run as administrator” (red box).

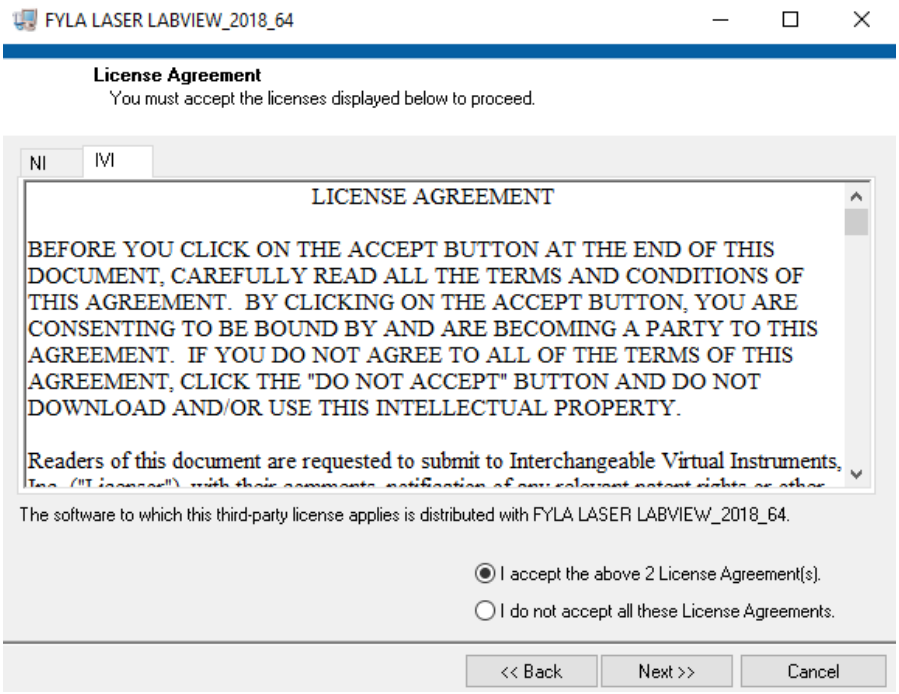


7. After that, will appear a window. You will have to press the left option (where it says: YES)

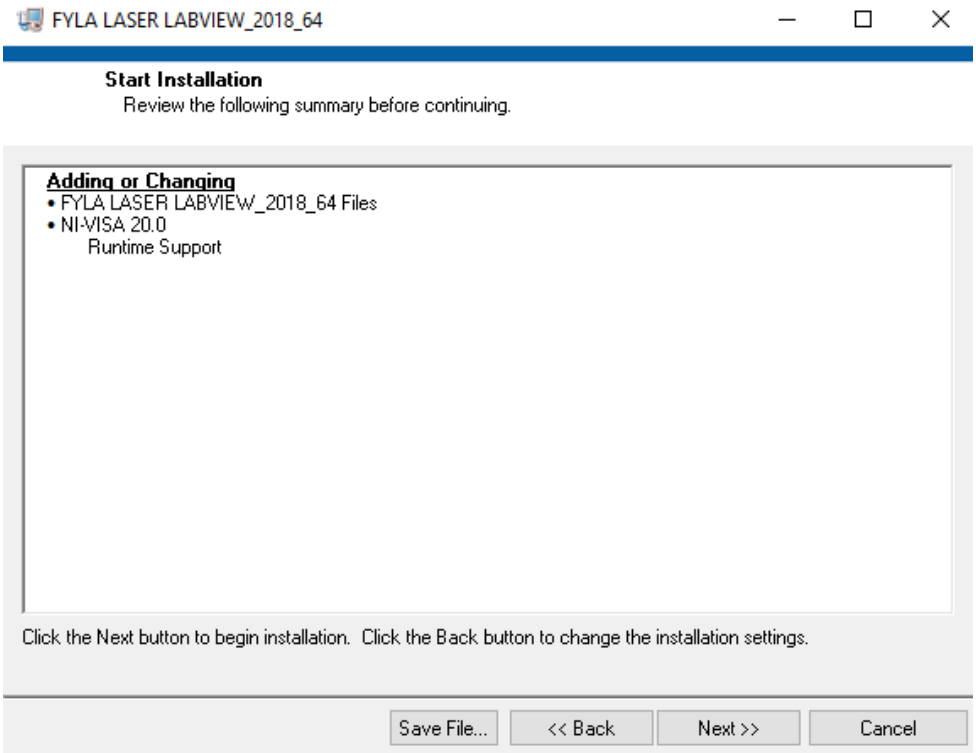
8. Then, select the destination directory and press “Next”



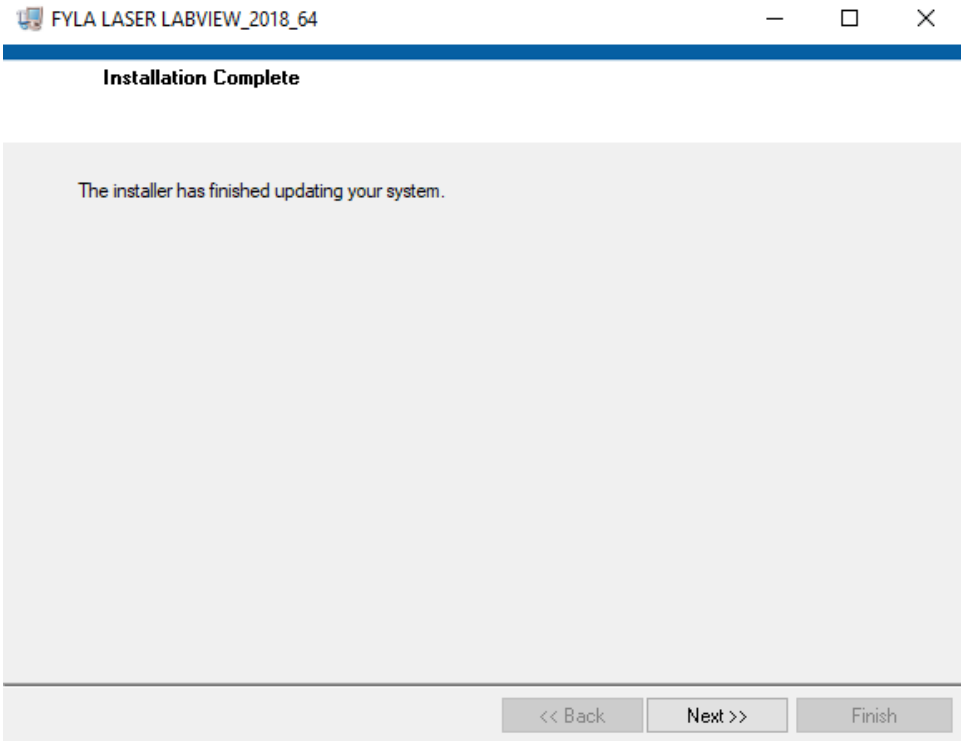
9. You will have to accept and press “Next”



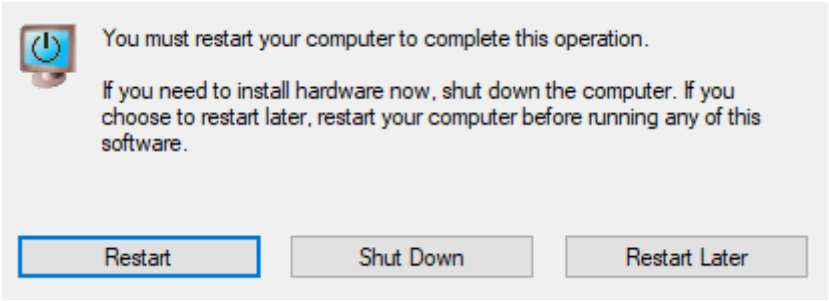
10. It will show the next photo and press “Next”



11. Finally, press “Next”



12. Choose the action you want



13. When the computer has been restarted, open again the first downloaded folder and enter in the “FYLA LASER” folder.

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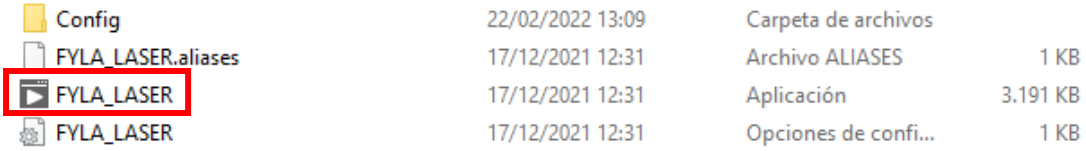
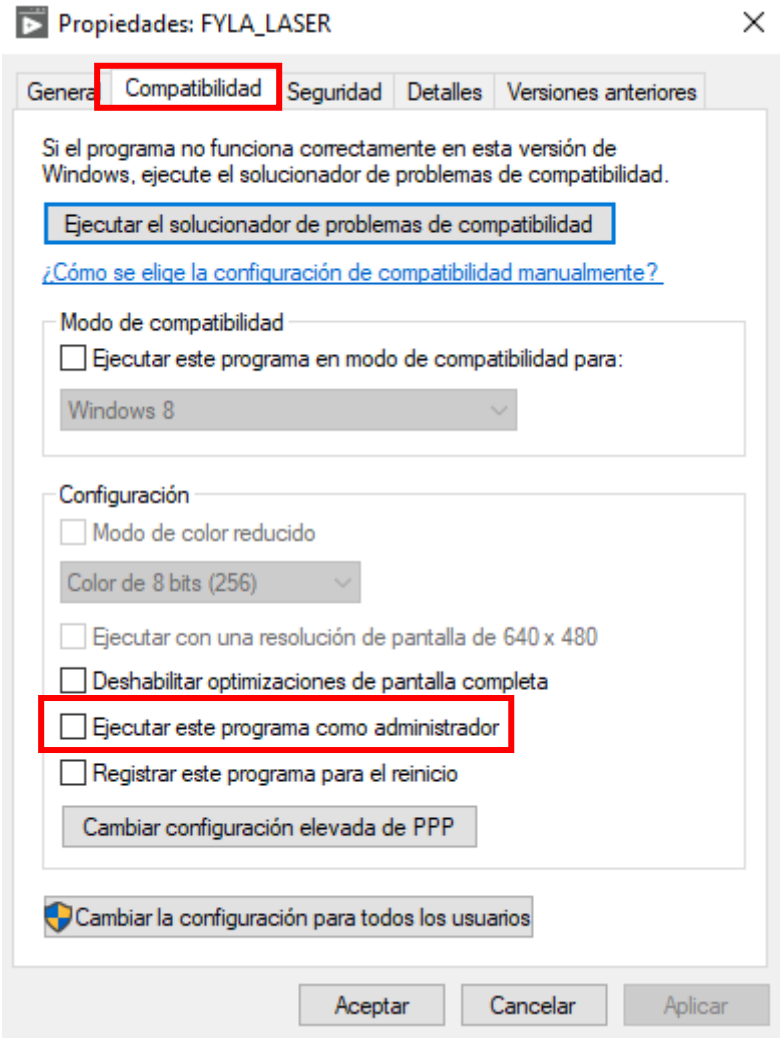
fyla@fyla.com

14. Finally, you will have to open “FYLA_LASER” and run as administrator.



15. Press right click on the “FYLA_LASER” and select the last option “Properties”

16. It will show next window and select “Compatibility”. Then, click on “Run this program as an administrator”



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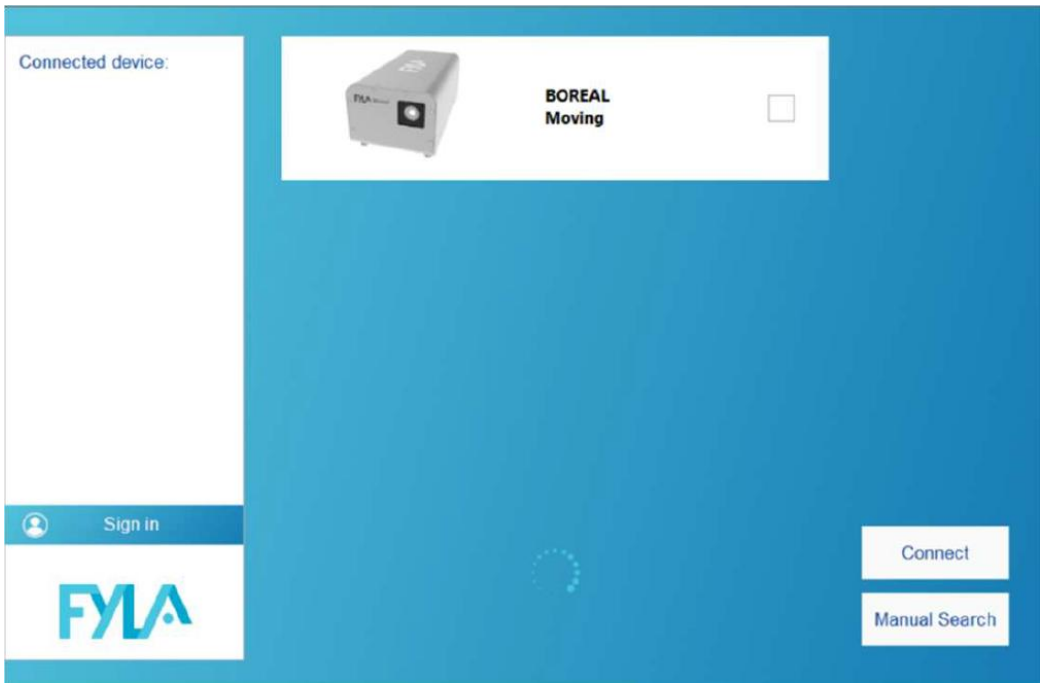
17. When the file is opened, it will show a window and it will have to select the left option. Then, the UI Interface will open.

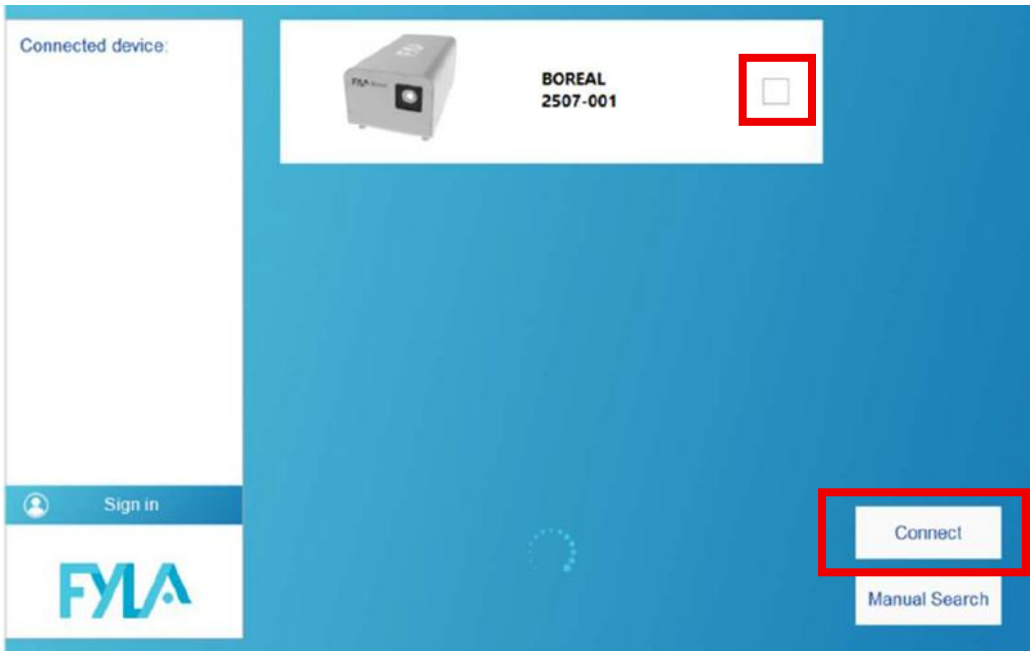
18. Connect the USB cable provided by FYLA to your PC and to the product. The USB port works in VCP (Virtual COM Port) mode. If your computer does not recognize the device automatically, please install the drivers from the next link:

    http://www.ftdichip.com/Drivers/VCP.htm

19. Turn on the Boreal as previously explained and the following screen will appear:



20. When the state of the BOREAL changes from “Moving” to the serial number corresponding to your product, first click the selector box and then the “Connect” button and the user screen will be shown (see next figures). In case you want to select COM port, use the “Manual Search” function.



At this point, the BOREAL is at its home position* and in READY state. When the laser is ON, light from λ_{min} to λ_{max} will be seen at the output. To change the band values, move to the next step.

*HOME position does not necessarily have to be that of the example picture.

21. To select a band, follow the next steps:

    a. First set min or max lambda values.

    b. Second, press Enter or click the blank space of the interface to send the command to the BOREAL.

The BOREAL will start to move and will show the message “MOVING”. Once the band is set, the “READY” message will be shown.

The UI also allows to change the band values through the central wavelength / bandwidth setting. Write the desired values in the Central λ and Bandwidth fields or move the marker to the position of those values and press the bars symbol to the right.

WARNING_____

IN CASE THERE IS NO LIGHT AT THE OUTPUT WHEN THE SOFTWARE INDICATES THAT THE COLOUR SCALE IS ACTIVE, PLEASE TURN OFF IMMEDIATELY THE LASER AND CONTACT FYLA AT SALES@FYLA.COM / SUPPORT@FYLA.COM

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Remote control via Serial Communication

The FYLA BOREAL can be controlled remotely via serial communication (RS232), using the USB connector in the front Panel. Please follow the next steps to achieve the communication:

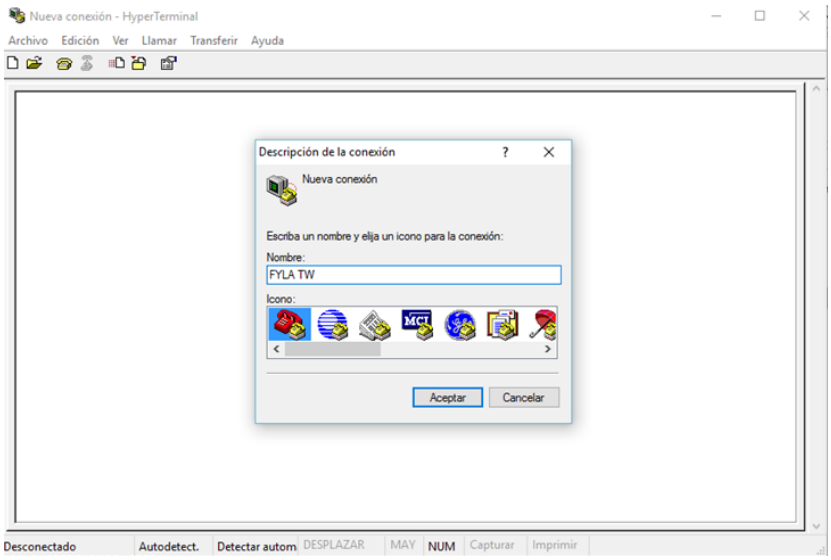
1. Connect the USB AB cable between the PC and the BOREAL after it is ready to be used.
2. Check the number of the COM port: Control panel / Device Manager

3. Open Windows HyperTerminal and create a new connection. The name of the connection in this example is “FYLA TW” but you can choose another name.

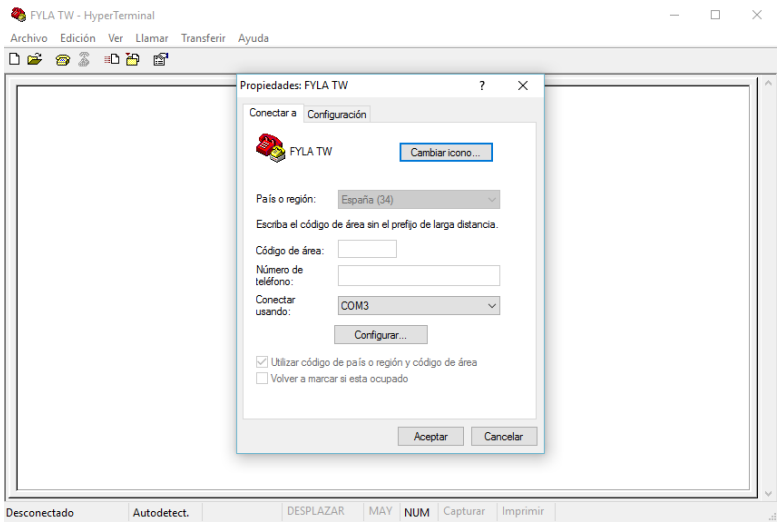
   The USB port works in VCP (Virtual COM Port) mode. If your computer does not recognize the device automatically, you can install the driver from this link:

   VCP Drivers - FTDI (ftdichip.com)

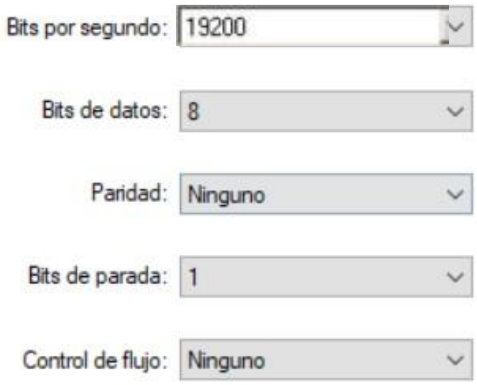
   Communication can be performed with any program of Terminal for RS232. In this case, we are using Windows HyperTerminal.



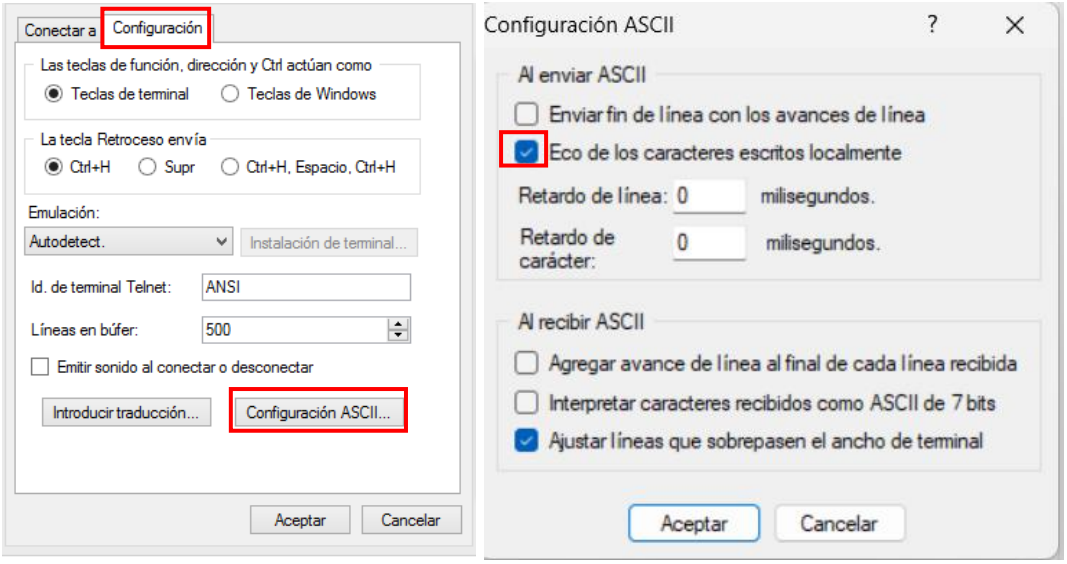
4. Select the detected COM port of the BOREAL.



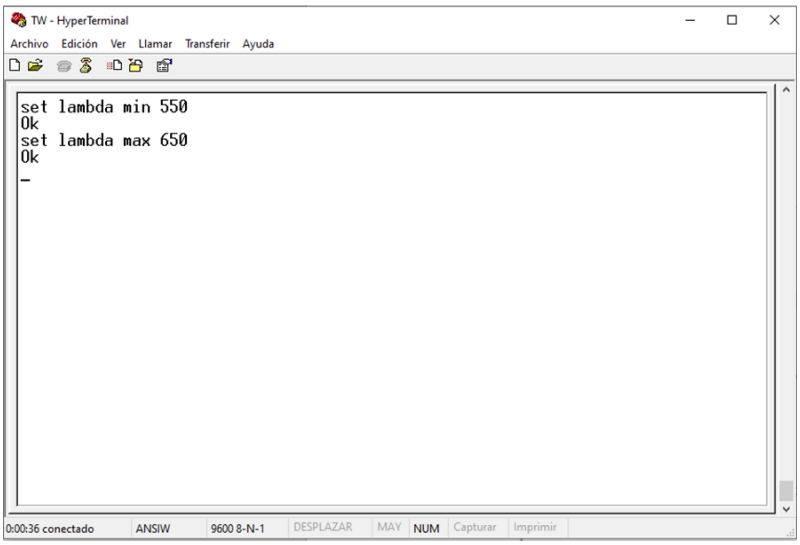
5. Next, introduce the port configuration and click Accept.



6. At this point we should be connected to the BOREAL. In case of not visualizing the introduced commands go to: File/Proprieties/Configuration/ASCII Configuration and mark the case near Eco of characters.



7. Now, the introduced commands should be visualized. Next, write a command and press your keyboard Enter. Example: <set lambda min 550><enter>;<set lambda max 650><enter>. If the introduced command is accepted the BOREAL will answer with “Ok” via serial communication.



Commands List

Command	Parameter	Description
Set lambda min xxx	Wavelength in nm	Sets the shortest wavelength of the bandwidth to the indicated value. The value formed by three characters must be withing the allowed range, depending on BOREAL version.
Set lambda max xxx	Wavelength in nm	Sets the longest wavelength of the bandwidth to the indicated value. The value formed by three characters must be withing the allowed range, depending on BOREAL version.
Set lambda xxxxxx	Wavelengths in nm	Sets at the same time the longest and shortest wavelengths of the bandwidth to the indicated values. The value, formed by six characters, must indicate firstly the longest and then the shortest. Example: 620550
move m1 xxxxx	Motor 1 position in steps	Sets the position of the motor 1 (that changes minimum wavelength) to the indicated value. The value must be withing the allowed range depending on your BOREAL

move m2 xxxxx	Motor 2 position in steps	Sets the position of the motor 2 (that changes maximum wavelength) to the indicated value. The value must be withing the allowed range depending on your BOREAL
ps1	-	Shows general information (list below this table)
Home	-	Activates the system to change from the actual bandwidth to the default bandwidth (initial position when turning the system on)

PS1 returns:

- 001: Device status.
- 002: Motor 1 position.
- 003: Motor 2 position.
- 004: Motor 3 position.
- 005: Lambda max.
- 006: Lambda min.
- 007: Interlock status.
- 008: Shutter status
- 009: HOME position Motor 1
- 010: HOME position Motor 2
- 011: Monitor error

Operation

WARNING_____

THE LASER RADIATION EMITTED FROM THIS UNIT MAY BE HARMFUL. PLEASE FOLLOW ALL THE SAFETY INSTRUCTIONS INDICATED IN THE SAFETY SECTION BEFORE OPERATING THE LASER AND BOREAL UNIT.

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After achieving all the electrical connections according to the previous instructions, please follow the next steps to operate the BOREAL:

1. Connect the supercontinuum output to the BOREAL input
2. When the BOREAL shows “READY” in the UI, turn on the power switch of the Supercontinuum laser.
3. Start the Supercontinuum emission as indicated in the laser user manual
4. Select the desired band changing the λ_{min} and λ_{max} parameters or Central λ and Bandwidth parameters.
5. Switch ON the Shutter in case you’ve purchased a BOREAL with this option

At this point you must be able to see a white light at the BOREAL output.

FYLA Laser S.L.
Ronda Guglielmo Marconi, 14, Parque Tecnológico 46980, Paterna, Valencia (Spain)
fyla@fyla.com

WARNINGS AND FAILURE TO FUNCTION

WARNING_____

THE LASER RADIATION EMITTED FROM THE LASER UNIT MAY BE HARMFUL. PLEASE FOLLOW ALL THE SAFETY INSTRUCTIONS FROM THE PAGE 8 BEFORE OPERATING THE LASER.

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WARNING_____

WHEN USING YOUR ICEBLINK SERIES LASER, AVOID OPTICAL BACK REFLECTIONS TO THE SYSTEM. THE SYSTEM IS PROTECTED AGAINST INCIDENTAL LOW POWER BACK REFLECTIONS. OPTICAL BACK REFLECTIONS OF > 50 MW AVG. POWER MAY ALTER THE CORRECT OPERATION OF THE LASER, AND EVEN DAMAGE IT IRREVERSIBLY. TO AVOID THIS, SIMPLY TILT SLIGHTLY REFLECTIVE OPTICAL COMPONENTS IN YOUR SETUPS SO THAT DIRECT BACK REFLECTIONS ARE ELIMINATED.

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WARNING_____

DO NOT FORCE THE FIBER TERMINATION ASSEMBLY.

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WARNING_____

THE INTERLOCK CONNECTION MUST SUPPORT 24V/10A.

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WARNING_____

AVOID LOCATIONS WHERE THE LASER IS EXPOSED TO EXTREME TEMPERATURES AND HIGH HUMIDITY.

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WARNING_____

AVOID LOCATIONS WHERE THE LASER IS EXPOSED TO MECHANICAL VIBRATIONS.

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WARNING_____

IN CASE OF LASER MALFUNCTION, FOR YOUR SELF-PROTECTION, DISCONNECT THE INTERLOCK CONNECTOR.

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CUSTOMER SERVICE

Technical Support

Information and advice about the operation of any FYLA product are available from our technical support engineers. For the quickest response, ask for "Technical Support" at support@fyla.com, votgon@fyla.com and ogarcia@fyla.com including the model and serial number of your product.

Hours: 9:00 to 13:00 and 15:00 to 18:00, Monday to Thursday, Friday 9:00 to 14:30 GMT +1 (excluding holidays).

Phone: (+34) 607971021

for e-mail inquiries, we typically respond within one business day.

Service

In the event that your device malfunctions or becomes damaged, please contact FYLA for a return authorization number and instructions on shipping the unit back for evaluation and repair/replacement.