BLACK BOX NETWORK SERVICES

Quad Laser Source

Emits 850-/1300-/1310-/1550-nm of accurate and stable power.

Customer Support Information

Order toll-free in the U.S.: Call 877-877-BBOX (outside U.S. call 724-746-5500) FREE technical support 24 hours a day, 7 days a week: Call 724-746-5500 or fax 724-746-0746 • Mailing address: Black Box Corporation, 1000 Park Drive, Lawrence, PA 15055-1018 • Web site: www.blackbox.com • E-mail: info@blackbox.com

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FEDERAL COMMUNICATIONS COMMISSION AND INDUSTRY CANADA RADIO FREQUENCY INTERFERENCE STATEMENTS

This equipment generates, uses, and can radiate radio-frequency energy, and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulation of Industry Canada.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de la classe A prescrites dans le Règlement sur le brouillage radioélectrique publié par Industrie Canada.

Normas Oficiales Mexicanas (NOM) Electrical Safety Statement INSTRUCCIONES DE SEGURIDAD

1. Todas las instrucciones de seguridad y operación deberán ser leídas antes de que el aparato eléctrico sea operado.
2. Las instrucciones de seguridad y operación deberán ser guardadas para referencia futura.
3. Todas las advertencias en el aparato eléctrico y en sus instrucciones de operación deben ser respetadas.
4. Todas las instrucciones de operación y uso deben ser seguidas.

5. El aparato eléctrico no deberá ser usado cerca del agua—por ejemplo, cerca de la tina de baño, lavabo, sótano mojado o cerca de una alberca, etc.

6. El aparato eléctrico debe ser usado únicamente con carritos o pedestales que sean recomendados por el fabricante.

7. El aparato eléctrico debe ser montado a la pared o al techo sólo como sea recomendado por el fabricante.

8. Servicio—El usuario no debe intentar dar servicio al equipo eléctrico más allá lo descrito en las instrucciones de operación. Todo otro servicio deberá ser referido a personal de servicio calificado.

9. El aparato eléctrico debe ser situado de tal manera que su posición no interfiera su uso. La colocación del aparato eléctrico sobre una cama, sofá, alfombra o superficie similar puede bloquea la ventilación, no se debe colocar en libreros o gabinetes que impidan el flujo de aire por los orificios de ventilación.

10. El equipo eléctrico deber ser situado fuera del alcance de fuentes de calor como radiadores, registros de calor, estufas u otros aparatos (incluyendo amplificadores) que producen calor.

11. El aparato eléctrico deberá ser connectado a una fuente de poder sólo del tipo descrito en el instructivo de operación, o como se indique en el aparato.

12. Precaución debe ser tomada de tal manera que la tierra fisica y la polarización del equipo no sea eliminada.

13. Los cables de la fuente de poder deben ser guiados de tal manera que no sean pisados ni pellizcados por objetos colocados sobre o contra ellos, poniendo particular atención a los contactos y receptáculos donde salen del aparato.

14. El equipo eléctrico debe ser limpiado únicamente de acuerdo a las recomendaciones del fabricante.

15. En caso de existir, una antena externa deberá ser localizada lejos de las lineas de energia.

16. El cable de corriente deberá ser desconectado del cuando el equipo no sea usado por un largo periodo de tiempo.

17. Cuidado debe ser tomado de tal manera que objectos liquidos no sean derramados sobre la cubierta u orificios de ventilación.

18. Servicio por personal calificado deberá ser provisto cuando:

    A: El cable de poder o el contacto ha sido dañado; u

    B: Objectos han caído o líquido ha sido derramado dentro del aparato; o

    C: El aparato ha sido expuesto a la lluvia; o

    D: El aparato parece no operar normalmente o muestra un cambio en su desempeño; o

    E: El aparato ha sido tirado o su cubierta ha sido dañada.

Table of Contents

1. Specifications

CW Output Power — -5 dBm ±1 dB

Laser — Class I

Modulated Wavelength — 270 Hz, 1 kHz, 2 kHz

Output Wavelength — 850, 1300, 1310, 1550 nm

Spectral Width — 3 nm typical value

Stability (15 min. preheat at 77° F [25° C]) — ±0.05 d/15 min.

Connectors — FC/PC, SC/PC, ST/PC interchangeable connectors

Power — (2) AA rechargeable batteries

AC Adapter — Input: 100–240 VAC, 50/60 Hz;
Output: 6 VDC, 1 A

Temperature Tolerance — Operating: 14 to 122° F (-10 to +50° C);
Storage: -4 to 158° F (-20 to +70° C)

Humidity — Less than 90%

Size — 6.3"H x 3"W x 1.8"D (16 x 7.6 x 4.5 cm)

Weight — 0. 59 lb. (0.27 kg [including batteries])

2. Overview

2.1 Introduction

The Quad Laser Source (FOQLS) offers accurate and stable power and emits at 850-/1300-/1310-/1550-nm.

2.2 Features

- Easy-to-use, straightforward operation.
- Rechargeable batteries included.

2.3 What's Included

Your package should contain the following items. If anything is missing or damaged, contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

- Main unit (including battery)
- (2) FC, (2) SC, and (2) ST adapters
- Quality check report
- Phillips screwdriver
- 6-VDC adapter
- Carrying case
- This user manual

3. Safety Information

WARNINGS!

- *Never look directly into optical outputs or a fiber while the equipment is on. An invisible laser beam may damage your eyes.*
- *Do not short-circuit the terminal of the AC adapter/charger and the batteries. Excessive electrical current may cause personal injury from fumes, electric shock, or equipment damage.*
- *Connect the DC power cord with the equipment and wall socket properly. While inserting the DC plug, make sure there is no dust or dirt on the terminals and both plugs are fully seated. Incomplete engagement may cause fuming, electric shock, or equipment damage, and may result in personal injury.*
- *Do not operate the equipment near hot objects, in hot environments, in dusty/humid atmospheres, or when condensation is present on the equipment. This may result in electric shock, product malfunction, or poor performance.*

4. Preparing for Operation

4.1 Unpacking the Instrument

1. Keep the original packing material in case you need to return the unit.
2. Unpack the Instrument and make sure you have all the items listed in Section 2.3.
3. Check for damage in transit. If there is damage, do not attempt to operate the instrument or repair it without authorization. Doing so can cause further damage and you may lose your warranty qualification.

4.2 Power Supply

A battery indicator and a power plug icon are on the instrument's screen. When you use the 6-VDC charger, there is no battery indicator on the screen. When you do not connect the 6-VDC charger, the adapter indicator will disappear on the screen.

Figure 4-1. Power plug indicator.

Figure 4-2. Battery indicator.

When you use the battery, the battery indicator on the screen will show the remaining charge. An empty battery indicator means the power is almost out. When the battery charge is too low to supply the necessary power, the instrument will automatically switch off after several beeps. Change or recharge the batteries.

Figure 4-3. Battery indicator is full.

Figure 4-4. Battery indicator is empty.

5. Operation

5.1 Display and Controls

5.1.1 Front, Back, and Top of the Quad Laser Source

Figure 5-1 shows the back and top of the instrument. Table 5-1 describes its components.

Figure 5-1. Front, back, and top.

Table 5-1. Front, back, and top components.

Number	Component	Description
1	Top left connector	1310 nm, 1550 nm
2	Top right connector	850 nm, 1300 nm
3	LCD display	See Section 5.1.2.
4	Keypad	See Section 5.1.3.
5	Power input	Links to 6 VDC power
6	Charging signal light	Blinking red: Unit is charging. Solid green: Charging is finished.
7	Battery plate	Includes (2) AA rechargeable batteries.

5.1.2 LCD

Figure 5-2 shows the LCD. Table 5-2 describes its components.

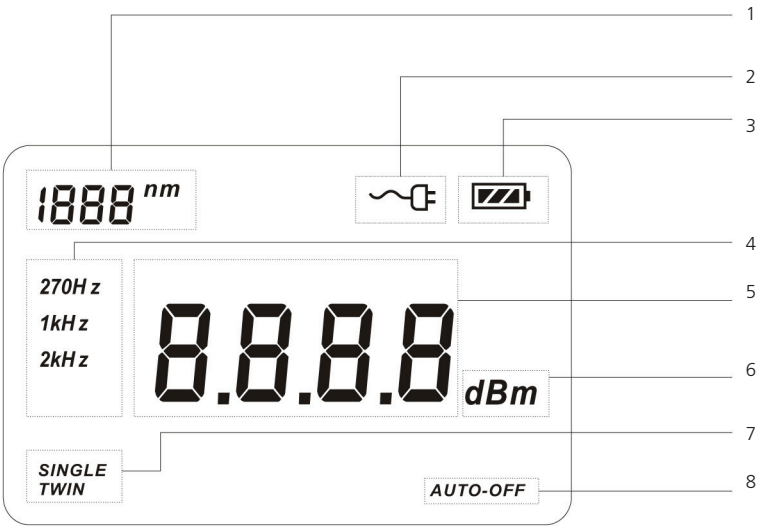

Figure 5-2. LCD.

Table 5-2. LCD components.

Number	Component
1	Wavelength
2	DC adapter
3	Battery charge
4	Modulation
5	Power
6	Measurement unit (dBm)
7	Auto-wavelength recognition
8	Auto off

5.1.3 Front (Panel Board)

Figure 5-3 shows the display and controls on the instrument. Table 5-3 describes these components.

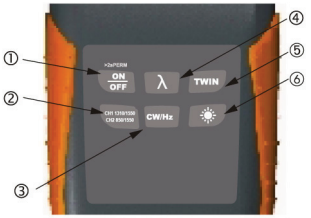

Figure 5-3. Buttons on the instrument.

Table 5-3. Buttons functions.

Number	Key	Function
1	>2s PERM ON OFF	Switches the instrument on/off. Press and hold the key while powering on to activate the instrument without Auto-Off function.
2	CH1 1310/1550 CH2 850/1550	Switch between CH1 (1310/1550) and CH2 (850/1300).
3	CW/Hz	Modulated Wavelength Shifting key: Switches between modulated wavelength and continuous wavelength.
4	λ	Wavelength Shifting key: Switches the working wavelength between 850 nm, 1300 nm, 1310 nm, and 1550 nm.
5	TWIN	SINGLE: Auto-wavelength recognition is off. TWIN: Auto-wavelength recognition is on.
6	☼	Switches backlighting on/off.

5.2 Turning the Instrument On and Off

Press the ON/OFF key briefly (see Figure 5-4).

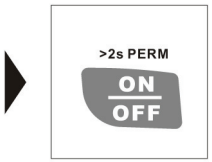

Figure 5-4. ON/OFF key.

The instrument powers on (see Figure 5-5).

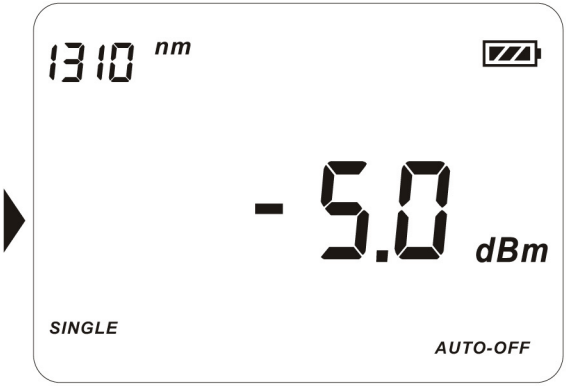

Figure 5-5. Instrument powered on.

Press the ON/OFF key briefly again. The instrument powers off.

NOTES: Auto-off function:

1. *The instrument powers off automatically if no key is pressed in 10 minutes.*
2. *Press the ON/OFF key for about two seconds to power on the instrument with Auto-off function deactivated.*

5.3 Switching the Wavelengths

5.3.1 Switching the Wavelengths in Single-mode

Press the SHIFT key to get to multimode, then press the λ key to switch the wavelength between 1310 nm and 1550 nm.

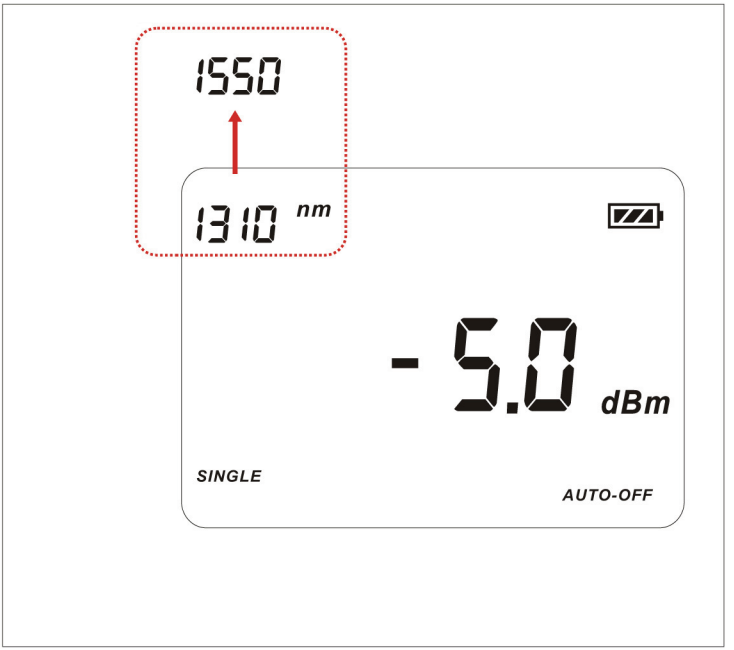

Figure 5-6. Switching the wavelength.

5.4 Frequency Output

Figure 5-7. Frequency output icon.

The instrument defaults to CW when it is switched on. When it is set to CW, there is no frequency on the display.

Press the CW/Hz key to select the output from 270 H, 1 kHz, and 2 kHz.

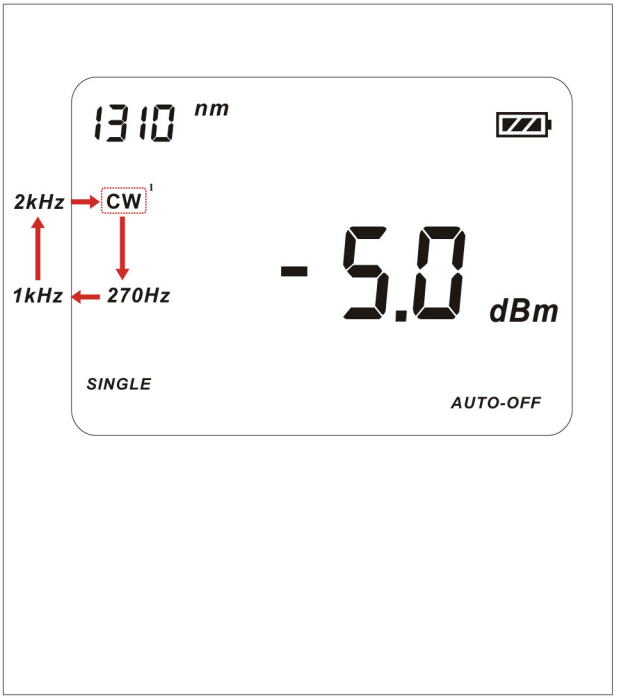

Figure 5-8. CW output selections on the LCD.

5.5 Auto-wavelength Recognition

Figure 5-9. Twin key.

Press the Twin key to turn the auto-wavelength recognition feature on and off.

5.6 Switching Backlighting of the LCD On and Off

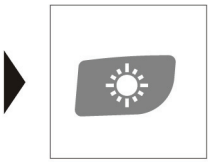

Figure 5-10. Backlighting key.

Press the backlighting key to switch the backlighting of the LCD on and off.

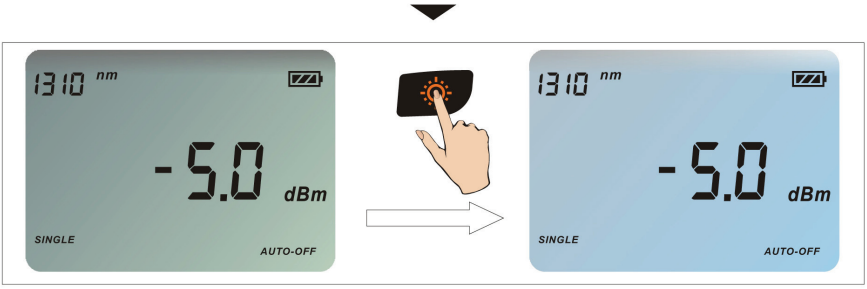

Figure 5-11. Pressing the backlighting key.

5.7 Connecting to an Optical Power Meter

The Quad Laser Source works with optical power meters to measure the loss of optical fiber accurately.

Figure 5-12. Optical power meter (part number FOPM-210) connected to the Quad Laser Source (FOQLS).

6. Maintenance

- Disconnect the DC adapter/charger and cover the protective dust cap once you finish using it.
- Clean the connector and the instrument when they get dirty from use. We recommend using optical cleaning pads and anhydrous alcohol. Be careful not to get the detergent inside the instrument.

7. Troubleshooting

7.1 Problems/Solutions

Table 7-1. Troubleshooting.

Malfunction	Possible Cause	Recommended Solution	Remarks
Failure to turn on/off	No power input	Plug in battery or AC	DIY
	Battery exhausted	Charge battery	DIY
	Reverse-installed battery	Re-install battery	DIY
		Still doesn't work	Return
ON and OFF disorder	Low battery	Charge battery or use AC power supply	DIY
Inaccurate measurement	Contaminated connector	Swab the dust using a thin cotton swab saturated with alcohol	DIY
	Connected or unfitted	Re-install the connector	DIY
Error display	Humid environment	Try later when it is not too humid	DIY
	Magnetic field environment	Stay far away from a magnetic field	DIY
	Metal dust environment	May cause damage on mainboard	Return
ON and OFF failure	Keypad short circuit	Replace keypad	Return

7.2 Contacting Black Box

If you determine that your Quad Laser Source is malfunctioning, do not attempt to alter or repair the unit. It contains no user-serviceable parts. Contact Black Box Technical Support at 724-746-5500 or info@blackbox.com.

Before you do, make a record of the history of the problem. We will be able to provide more efficient and accurate assistance if you have a complete description, including:

- the nature and duration of the problem.
- when the problem occurs.

- the components involved in the problem.
- any particular application that, when used, appears to create the problem or make it worse.

7.3 Shipping and Packaging

If you need to transport or ship your Quad Laser Source:

- Package it carefully. We recommend that you use the original container.
- If you are returning the unit, make sure you include everything you received with it. Before you ship for return or repair, contact Black Box to get a Return Authorization (RA) number.

Black Box Tech Support: FREE! Live. 24/7.

Great tech support is just 30 seconds away at
724-746-5500 or blackbox.com.

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NETWORK SERVICES

About Black Box

Black Box provides an extensive range of networking and infrastructure products. You'll find everything from cabinets and racks and power and surge protection products to media converters and Ethernet switches all supported by free, live 24/7 Tech support available in 30 seconds or less.

FOQLS, version 1