

cFPL-A1 Fabry-Perot Laser

Operating Manual

2299/01	2299/21
2299/02	2299/22
2299/03	2299/23
2299/04	2299/24
2299/05	2299/25
2299/06	2299/26
2299/07	2299/27
2299/08	2299/28
2299/09	2299/29
2299/10	2299/30

The description of additional features of the device can be found at:

<http://www.jdsu.com/test>

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CONTENT

1	INTRODUCTION	1
	cFPL-A1 Fabry-Perot Laser	1
	Operating manual update	4
	Symbols used in this operating manual	5
2	SAFETY INFORMATION	7
	Warning symbols on the unit	7
	Proper usage	7
	Laser safety	8
	Ventilation	9
	SNT-121A AC Adapter	10
3	GETTING STARTED	11
	Power supply	15
4	BASIC OPERATION	18
	Switching the device on/off	18
	Display elements	18
	Navigating in the menus	19
	Configuring the device	20
5	OPERATION	24
	Selecting a wavelength	24
	Enabling signal modulation	24
	Setting the power level	25
	Auto-Lambda mode	26
6	MAINTENANCE	27
	Cleaning the test port	27
	Cleaning the instrument	28

7	REMOTE CONTROL	29
	Communication interface	29
	Key	29
	Parameters	30
	General specifications	37
	SNT-121A Adapter	38
8	ORDERING INFORMATION	39
	Accessories	39
	INDEX	40

1 INTRODUCTION

cFPL-A1 Fabry-Perot Laser

The cFPL-A1 Test set is specially designed for high performance testing of all systems, i.e. broadband, PONs, and Gigabit Ethernet.

AC line operation via a separate AC adapter and the USB interface for remote control ensure ease of use in the laboratory. The Compact Photonic Tools are stackable, so you can assemble individual test sets.

Common features

The cFPL-A1 provides a compact, intuitive laser source designed to enable applications ranging from simple continuity verification and insertion loss testing to integration into process automation equipment designed for alignment.

Available in two or three laser versions with the option to select from four key wavelengths: 1310, 1490, 1550, and 1625 nm. The single optical output found in the cFPL-A1 greatly simplifies the optical connections and calibrations. To compensate for downstream wavelength-dependent loss, each wavelength can be individually controlled and attenuated up to 7 dB with 0.01 dB resolution.

Innovative features

TWIN or TRIPLE Test

Enabling TWIN or TRIPLE test features on the cFPL-A1 dramatically lowers test durations by allowing simultaneous measurement of two or three wavelengths. Accessing this feature requires pairing of the cFPL-A1 with the Optical Power Meter cOPM-A1. When this feature is enabled on both units, the cOPM-A1 will automatically detect the wavelengths present and display the simultaneously measured output power (or loss) for each.

Available wavelength combinations

The cFPL-A1 family covers all the common wavelengths combinations.

The tables below list the differences between the devices:

Versions with FC/PC connector

Type BN ...	Fabry-Perot Source	Wavelengths
2299/01	Dual Wavelength	1310,1490 nm
2299/02	Dual Wavelength	1310,1550 nm
2299/03	Dual Wavelength	1310,1625 nm
2299/04	Dual Wavelength	1490,1550 nm
2299/05	Dual Wavelength	1490,1625 nm
2299/06	Dual Wavelength	1550,1625 nm
2299/07	Triple Wavelength	1310,1490,1550 nm

Type BN ...	Fabry-Perot Source	Wavelengths
2299/08	Triple Wavelength	1310,1490,1625 nm
2299/09	Triple Wavelength	1310,1550,1625 nm
2299/10	Triple Wavelength	1490,1550,1625 nm

Versions with FC/APC connector

Type BN ...	Fabry-Perot Source	Wavelengths
2299/21	Dual Wavelength	1310,1490 nm
2299/22	Dual Wavelength	1310,1550 nm
2299/23	Dual Wavelength	1310,1625 nm
2299/24	Dual Wavelength	1490,1550 nm
2299/25	Dual Wavelength	1490,1625 nm
2299/26	Dual Wavelength	1550,1625 nm
2299/27	Triple Wavelength	1310,1490,1550 nm
2299/28	Triple Wavelength	1310,1490,1625 nm
2299/29	Triple Wavelength	1310,1550,1625 nm
2299/30	Triple Wavelength	1490,1550,1625 nm

Operating manual update

Continuing enhancement and further development of the Compact Photonic family may mean that this operating manual does not cover all the latest functions of your device.

If the operating instructions about features provided by your device are missing, please visit the JDSU web site to check if additional information is available.

To download the latest operating instructions:

1. Visit the JDSU web site at **www.jdsu.com/test**.
2. Select your model from the product line.
3. Open the download area and download the operating instructions if available.

Symbols used in this operating manual

The following symbols, warnings and character formats are used in this operating manual:

	<p>CAUTION</p> <p>Follow the instructions carefully to avoid damage to the device.</p>
	<p>WARNING</p> <p>Follow the instructions carefully to avoid damage to the device or injury to the person.</p>
	<p>DANGER</p> <p>Follow the instructions carefully to avoid damage to the device or severe injury to the person.</p>
	<p>High Voltage</p> <p>Follow the instructions carefully to avoid damage to the device or severe injury to the person.</p> <p>This safety instruction is given if the danger is due to high voltage.</p>
	<p>Laser</p> <p>Follow the instructions carefully to avoid damage to the device or severe injury to the person.</p> <p>This safety instruction is given if the danger is due to laser radiation. Information specifying the laser class is also given.</p>
<p>!</p>	<p>Very important instruction</p> <p>Follow this instruction carefully; e.g.</p> <p>! Make sure you protect yourself and others from exposure to laser light.</p>

✓	<p>Requirement</p> <p>This requirement must be met first; e.g. ✓ The system is switched on</p>
⇒ 1. 2.	<p>Instruction</p> <p>Follow the instructions given (the numbers indicate the order in which the instructions should be followed); e.g. ⇒ Select mode.</p>
<i>Italics</i>	<p>Result</p> <p>Indicates the result of following an instruction; e.g. <i>The page opens.</i></p>
Bold type face	<p>Pages, controls, and display elements</p> <p>Screen pages, controls, and display elements are indicated in bold type.</p>
Text in blue	<p>Cross references</p> <p>Cross references are indicated in blue type. When using the PDF version, just click on the blue text to skip to the cross reference.</p>
[Store]	<p>Instrument keys</p> <p>Instrument keys are indicated within square brackets.</p>

2 SAFETY INFORMATION

Warning symbols on the unit



Warning symbols indicating a potential hazard

- ! In all cases where the unit is labeled with a warning symbol, the operating manual must be consulted to learn more about the nature of the potential hazard and any action that must be taken.
-

Proper usage

This instrument is intended for measurements on optical fiber devices and systems.

- ⇒ Please make sure the device is not operated outside the permitted ambient conditions.
- ⇒ Always make sure that the device is in proper working order before switching it on.

Laser safety



WARNING

Dangerous laser radiation

Laser radiation can cause irreparable damage to the eye and skin.

This device is a Class 1 Laser product according to DIN EN 60825-1:2001.



Observe the following instructions when working with this device and laser systems in general:

- ! Connect all optical fibers before switching on the radiation source.
 - ! Switch off the radiation source before disconnecting the optical fibers.
 - ! Never look directly into the output of a laser source or into an optical fiber connected to it.
 - ! Always cover unused ports.
 - ! Observe the normal precautions for working with laser radiation and follow any local regulations.
-

Ventilation



CAUTION

Insufficient ventilation

Insufficient ventilation can damage the device or adversely affect its function and safety.

- !** Ensure adequate ventilation when operating the device.
-

SNT-121A AC Adapter

Safety class

The SNT-121A AC Adapter/Charger Unit is protectively isolated to conform with IEC 60950.

Environmental conditions



CAUTION

Ambient temperature too high/low

Temperatures outside the operating range of 0 to +40 °C can damage the SNT-121A Adapter or adversely affect its function and safety.

- ! Only operate the SNT-121A Adapter indoors.
 - ! The SNT-121A Adapter must only be operated at ambient temperatures between 0 and +40 °C.
-



CAUTION

Insufficient ventilation

Insufficient ventilation can damage the SNT-121A Adapter or adversely affect its function and safety.

- ! Ensure adequate ventilation when operating the SNT-121A Adapter.
-



CAUTION

Condensation

Operation in the presence of condensation can damage the SNT-121A Adapter or adversely affect its function and safety.

- ! Do not operate the SNT-121A Adapter if condensation has formed.
 - ! If condensation cannot be avoided, such as when the SNT-121A Adapter is cold and is moved to a warm room, wait until the SNT-121A Adapter Unit is dry before plugging it into the AC power line.
-

3 GETTING STARTED

Unpacking the device

Packing material

We suggest that you keep the original packing material. It is designed for reuse (unless it is damaged during shipping). Using the original packing material ensures that the device is properly protected during shipping.

Checking the package contents

Your device is shipped with the following accessories:

- Operating manual
- SNT-121A AC Adapter

Checking for shipping damage

After you unpack the device, check to see if it has been damaged during shipping. This is particularly likely if the packaging is visibly damaged. If there is damage, do not attempt to operate the device. Doing so can cause further damage. In case of damage, please contact your local JDSU Sales Company. Addresses can be found at www.jdsu.com.

Recovery following storage/shipping

Condensation can occur if a device that is stored or shipped at a low temperature is brought into a warm room. To prevent damage, wait until no more condensation is visible on the surface of the device before powering it up. Do not operate the device until it has reached its specified temperature range and wait until it has cooled down if the device was stored at a high temperature (see „[Ambient temperature](#)” on page 38).

Device overview

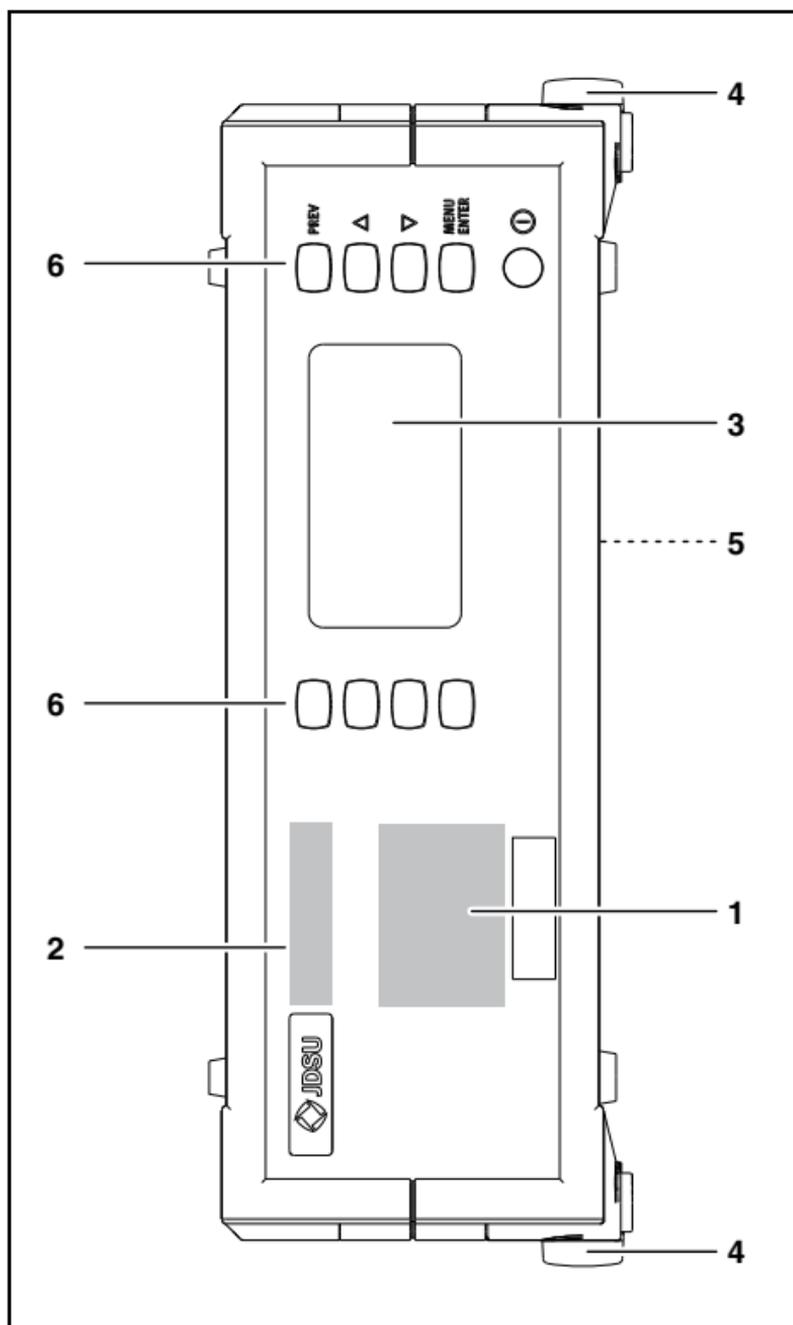


Fig. 1 Frontal view

3 GETTING STARTED

- 1 Connector panel (see [on page 15](#) for details)
- 2 Device label
- 3 Display
- 4 Stand
- 5 Power supply connector, USB control interface, reset button (on rear of the device)
- 6 Keys

λ	Press to select a wavelength.
PREV	Press to go back one menu level (without making any changes).
MENU ENTER	Press to: <ul style="list-style-type: none">• open menu and select menu item• store settings
Laser ON/OFF	Press to switch laser on and off.
CW/FMOD	Press to change modulation type: CW - 270Hz - 1kHz - 2kHz - CW - ...
LEVEL ADJUST	Press to change power level.
	Press to switch the device on and off.
	Press to: <ul style="list-style-type: none">• scroll up/down in the menus• change values in the menus

Connector panel

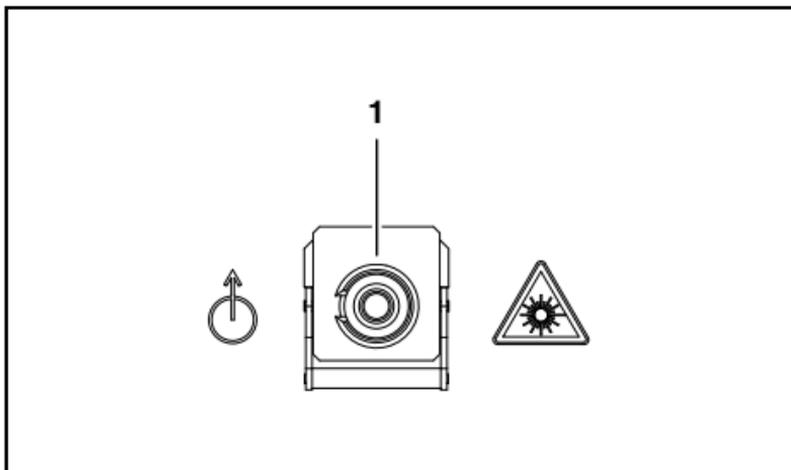


Fig. 2 cFPL-A1 connector panel

1 Optical connector

Power supply

The following power sources can be used to operate the cFPL-A1:

- the SNT-121A Adapter
- via the USB control interface

Operation from AC power

NOTICE: Only the SNT-121A Adapter must be used to operate the cFPL-A1 from AC power.

To fit the AC line plug adapter:

1. Select the appropriate AC line plug adapter.
2. Slide the AC line plug adapter into the slot.
The SNT-121A Adapter is ready for use.

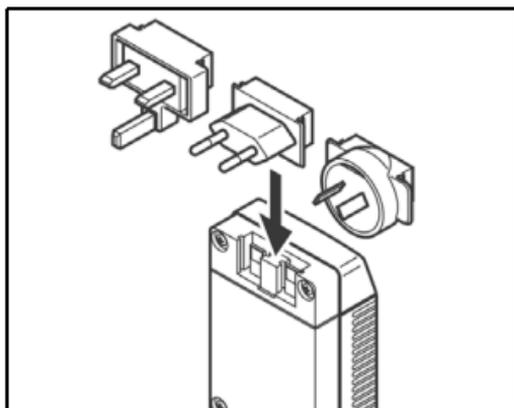


Fig. 3 SNT-121A Adapter.

To change the AC line plug adapter:

1. Place the SNT-121A against the edge of a table or bench as shown (see Fig. 4).
2. Push the SNT-121A downwards.
3. Slide a different AC line plug adapter into the slot (see Fig. 3).

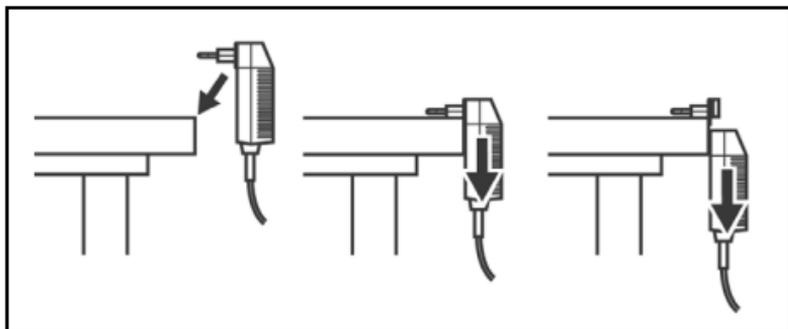


Fig. 4 SNT-121A: Changing the AC line plug adapter.

To operate the cFPL-A1 from AC power:

1. Connect the SNT-121A DC power cord to the cFPL-A1 DC power socket.
(The socket is located on the back panel.)
2. Plug the SNT-121A into the AC line socket.
The cFPL-A1 switches on automatically when powered from the SNT-121A.

Operation from USB interface power

Although the USB interface is primarily intended for remote control, it can also be used to power the cFPL-A1.

To power the cFPL-A1 via the USB interface:

⇒ Just connect a standard USB cable to any USB socket of a PC or USB hub.

Notes:

- The device can be operated manually even if it is powered via the USB interface.
- The device will be powered by the SNT-121A Adapter if the SNT-121A Adapter and the USB interface are both connected.

4 BASIC OPERATION

Switching the device on/off

To switch the device on:

⇒ Press [Ⓜ] to switch on the device.

To switch the device off:

⇒ Press and hold down [Ⓜ] for more than 2 sec. to switch off the device.

Display elements

USB		
OFF		Laser OFF
1310nm	-5.80dBm	2
1550nm	-4.61dBm	wavelengths
270Hz		modulation

USB		
1310 nm		Laser ON
1550 nm	-6.61dBm	
Auto λ		modulation

Fig. 5 cFPL-A1 operating display.

	External power supply The cFPL-A1 is powered by the external AC adapter when this symbol is shown.
USB	Power supply via USB The device is powered via the USB interface for remote operation.
1310nm	Wavelength Display of selected wavelength (displayed wavelength depends on settings and model).
CW Auto-λ 270 Hz	Signal modulation <ul style="list-style-type: none"> • CW: Continuous wave • Auto-λ: Auto wavelength detection • 270 Hz, 1 kHz, 2 kHz: modulation frequency
Center of display	Shows the measurement results or setup values.
OFF	Laser switched OFF.

Navigating in the menus

✓ The measurement display is shown.

⇒ Press [**MENU ENTER**] to open the MAIN menu.
The MAIN menu opens.

To select a menu item:

1. Press [**▲▼**] to highlight an item.
2. Press [**MENU ENTER**] to select the item.

To leave a menu without making any changes:

⇒ Press [**PREV**].

Configuring the device

This chapter describes the basic settings in the Configuration menu.

✓ The measurement display is open.

⇒ Press **[MENU ENTER]** to open the MAIN menu and select **Configuration**.

The CONFIGURATION menu opens:

```
MENU: CONFIGURATION
Edit Contrast
Show Info
Select Source Mode
Firmware Update
Select Language
```

The following table gives a short overview of the menu items. These are explained in the sections below.

Edit Contrast	Adjust display contrast.
Show Info	Display basic device information.
Select Source Mode	Enable or disable compatibility to OLS-15 signal modulation.
Firmware Update	Download the current device firmware version from the internet to the device.
Select Language	Select the language of the device texts.

Setting the display contrast

1. Select **Edit Contrast** in the CONFIGURATION menu.
The CONTRAST menu opens:

```

MENU: CONTRAST
Press arrow
UP  :  to increase
DOWN:  to decrease
  
```

2. Press [**▲▼**] to increase/decrease the contrast.
3. Press [**MENU ENTER**] to store the value and exit from the menu.

Displaying device information

- ⇒ Select **Show Info** in the CONFIGURATION menu.
The INFO menu opens and basic device information is shown: device name, family, serial number, calibration date, software version, battery type and, if applicable, date and time.

Achieving compatibility with the OLS-15

The Optical Power Source OLS-15 from JDSU (which is no longer available) is equipped with special signal modulation specifically matched to the Optical Power Meter OLP-15 (also no longer available). You can simulate this signal modulation to make the cFPL-A1 compatible with the OLS-15.

1. Select **Laser-Mode** in the CONFIGURATION menu.
The SOURCE MODE menu opens:

```

MENU: SOURCE MODE
DISABLE OLS-15 Mode
ENABLE  OLS-15 Mode
  
```

2. Select the desired mode and press **[MENU ENTER]** to accept the setting.

It is not possible to transmit several wavelengths simultaneously (multi- λ operation) in OLS-15 mode.

Updating the firmware

The latest version of the firmware can be downloaded from the internet at any time and stored in the EEPROM.

To find the latest firmware version:

1. Visit the JDSU web site at **www.jdsu.com/test_and_measurement**.
2. Select your model from the product line.
3. Open the download area and download the latest firmware.

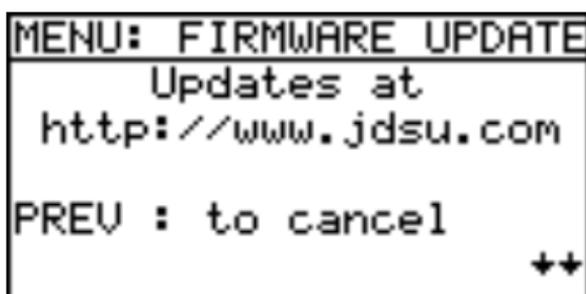
You will also find step-by-step instructions on how to update the firmware there.

After downloading the firmware to your PC follow the steps below to install the firmware into your device.

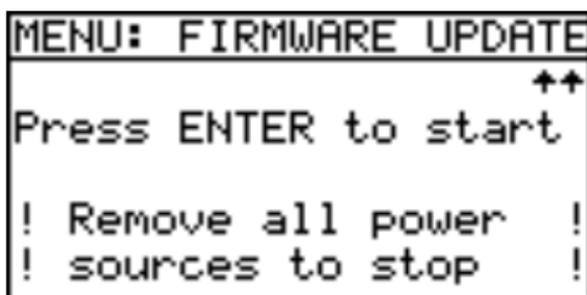
To install the firmware into the device:

1. Select **Firmware Update** in the CONFIGURATION menu.

The FIRMWARE UPDATE menu opens:



2. Press **[▼]** to open the next window.
– or –
Press **[PREV]** to cancel.

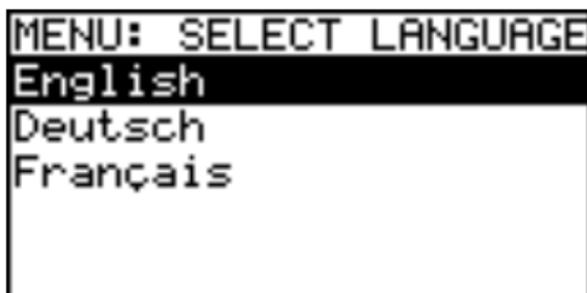


3. Press **[MENU ENTER]** to start the update.
– or –
Press **[PREV]** to cancel.
4. Connect the device to the PC via the USB interface.

Note: Once the update has been started it cannot be stopped by pressing any of the keys.
To stop the update you must disconnect the device from all power sources (adapter/charger, batteries, USB connection).

Selecting a language

1. Select **Select Language** in the CONFIGURATION menu.
The SELECT LANGUAGE menu opens:



2. Press **[▲▼]** to highlight the language you want and press **[MENU ENTER]** to select it.

5 OPERATION

Selecting a wavelength

Depending on your cFPL-A1 version up to three wavelengths can be selected separately or together.

To select a wavelength:

⇒ Press [λ] to skip through the available wavelengths:

With two wavelengths:

$\lambda_1 \rightarrow \lambda_2 \rightarrow \lambda_1 + \lambda_2 \rightarrow \lambda_1...$

With three wavelengths:

$\lambda_1 \rightarrow \lambda_2 \rightarrow \lambda_3 \rightarrow \lambda_1 + \lambda_2 + \lambda_3 \rightarrow \lambda_1...$)

Enabling signal modulation

The modulation frequencies provided by the cFPL-A1 are:

- CW: continuous wave
- 270 Hz modulation
- 1 kHz modulation
- 2 kHz modulation

To select a modulation frequency:

✓ Modulation cannot be changed manually when Auto- λ is activated. You first must disable Auto- λ (see [on page 26](#)).

⇒ Press [CW/FMOD] to skip through the available modulation modes:

CW \rightarrow 270kHz \rightarrow 1kHz \rightarrow 2kHz \rightarrow CW...

Setting the power level

The power level

- can be set for each wavelength separately
- can be set for each port separately
- can be set in laser off and laser on modes
- will be stored when changing the wavelength, toggling the port, and during power off.

Power level ranges

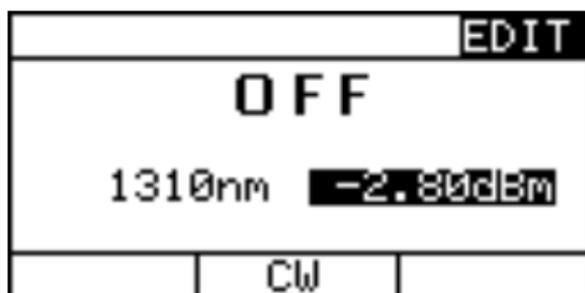
CW mode: 0 to -7 dBm

Modulated and Auto- λ : -3 to -10 dBm

To set the power level:

1. Press **[Level Adjust]**

The display changes to EDIT mode and the first wavelength is highlighted.



2. Press **[▲▼]** to increase or decrease the power level:
 - press once to change the level in 0.01 dBm steps
 - hold down the key to accelerate the step rate.
3. Press **[λ]** to select the next wavelength.
4. Press **[MENU ENTER]** to set the power level and to exit from EDIT mode.

Auto-Lambda mode

Auto- λ is a special feature developed by JDSU that allows you to identify wavelengths automatically. To do this, the signal is modulated at a certain frequency, which can be detected by an Auto- λ equipped power meter, such as the JDSU OLP-55 series.

To activate Auto- λ :

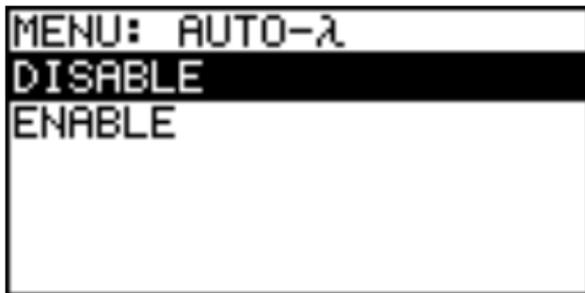
1. Press **[MENU ENTER]**.

The Main menu opens.



2. Select **Select Auto- λ** and press **[MENU ENTER]**.

The AUTO- λ menu opens.



3. Select **ENABLE** to switch on Auto- λ

– or –

select **DISABLE** to switch off Auto- λ

and press **[MENU ENTER]** to accept the setting.

The window closes, the MAIN menu opens.

4. Press **[PREV]** to leave the menu.

Note: Signal modulation (270 Hz, 1 kHz, 2 kHz) cannot be selected when Auto- λ is enabled.

6 MAINTENANCE



Dangerous voltage and invisible laser radiation



Maintenance or cleaning of the device when it is connected up or operating may damage the device or injure you.

WARNING

! Make sure that the device is switched off and disconnected from all power sources and optical radiation sources before maintenance or cleaning.

Cleaning the test port

It is a good idea to check that the optical connections are clean and to clean them if necessary before starting measurements. Even very small dust particles on the end surfaces of the plugs can adversely affect the accuracy of the measurement.

1. Switch off the device.
2. Wipe off the plug end surface using cleaning sticks soaked in isopropanol. This cleaning method is very effective and leaves no residues.
3. Blow out the test adapter with clean compressed air (available in spray cans, e.g. Anti Dust Spray).

Note: Cover the optical connections with the dust cap whenever they are not in use. This prevents them from getting dirty.

Cleaning the instrument

If the instrument gets dirty through use, you can clean it using a soft cloth moistened with a mild solution of detergent.



CAUTION

Water and cleaning fluids

The device may be damaged or destroyed if water or cleaning fluids get inside it.

- !** Make sure that water or cleaning fluids do not get inside the instrument.
-

7 REMOTE CONTROL

Communication interface

The cFPL-A1 is equipped with a USB interface for remote control via a PC. The driver files needed on the PC for this can be download from www.jdsu.com/test_and_measurement.

Key

The following table lists the parameter types used in remote control.

<NR1>	Integer value. Examples: 23, 90, 0
<NR2>	Real number. Examples: 23.45, 1.30
<NR3>	Exponential number. Examples: 4.3E-3, -8.9456E8, 123E-5
<NRf>	<NR1> <NR2> <NR3>
<BOOLEAN>	Boolean value. Examples: 0, 1, OFF, ON
<MNEMONIC>	Short form. The valid short forms are listed with the corresponding commands.
<STRING_RESPONSE_DATA>	IEEE4888.2, 8.7.1

Parameters

Overview

Utility commands

*IDN?
*OPC?
:SYST:PERM:POW
:DISP:CONT
:DISP:CONT?
:SYST:LANG
:SYST:LANG?
:SYST:DATE
:SYST:DATE?
:SYST:TIME
:SYST:TIME?

Laser Source commands

:SYST:SOUR:NUMB?
:SYST:SOUR:WAV:VAL?
:SYST:SOUR:POW:MAX?
:SYST:SOUR:POW:MIN?
:SYST:SOUR:MODE
:SYST:SOUR:MODE?
:SOUR:ID
:SOUR:ID?
:SOUR:WAV:AUTO
:SOUR:WAV:AUTO?
:SOUR:MOD
:SOUR:MOD?
:SOUR:POW
:SOUR:POW?
:SOUR:STAT
:SOUR:STAT?

Utility commands

Command string	Parameter type / Response type / Unit / Info
*IDN?	Returns the unique identification of the device. Response type: <STRING_RESPONSE_DATA> e.g. JDSU Germany GmbH, cFPL-A1/01,A-0106,V03.30
*OPC?	Returns "1" as soon as all operations in progress have been completed.
:SYST :PERM :POW	Ensures the device is switched on permanently i.e. that it does not switch off after 20 minutes.
:DISP :CONT	Sets the display contrast. Parameter type: <NR1> Range: 0...15 (0: min, 15: max.)
:DISP :CONT?	Returns the display contrast. Range: 0...15 (0: min, 15: max.)
:SYST :ERR?	Returns the oldest error in the error queue. Response type: <NR1>, <STRING_RESPONSE_DATA> e.g. -100, "Command error"

7 REMOTE CONTROL

Command string	Parameter type / Response type / Unit / Info
:SYST :DEV :DEF	Sets the device parameters to their default values.
:SYST :LANG	Sets the language. Parameter type: <MNEMONIC> <ul style="list-style-type: none">• EN: English• DE: German• FR: French
:SYST :LANG?	Returns the current language. EN or DE or FR

Laser Source commands

Command string	Parameter type / Response type / Unit / Info
:SYST :PORT :NUMB?	Returns number of optical connectors. Response type: <NR1> Range: 1...3
:SYST :SOUR :NUMB?	Returns the number of LASER sources for the specified optical connector. Response type: <NR1> Range: 1...3 e.g. :SYST:SOUR:NUMB? 1
:SYST :WAV :VAL?	Returns the wavelength [nm] for the specified LASER source. Parameter type: <NR1> e.g. :SYST:WAV:VAL? 1,3 returns the wavelength [nm] of the 3 rd LASER source of the 1 st optical connector.
:SYST :POW :MAX?	Returns the maximum power level [dBm x 100] of the specified LASER source. Parameter type: <NR1,NR1> e.g. :SYST:POW:MAX? 1,3 returns the maximum power level [dBm x 100] of the 3 rd LASER source of the 1 st optical connector.

7 REMOTE CONTROL

Command string	Parameter type / Response type / Unit / Info
:SYST :POW :MIN?	Returns the minimum power level [dBm x 100] of the specified LASER source. Parameter type: <NR1> e.g. :SYST:POW:MIN? 1,3 returns the minimum power level [dBm x 100] of the 3 rd LASER source of the 1 st optical connector.
:SYST :SOUR :MODE	Emulates the LASER source modulation of the former ACTERNA device OLS-15. Parameter type: <MNEMONIC> <ul style="list-style-type: none">• OLS_15: "out of date" modulation• OLS_55: "up to date" modulation Default setting: OLS_55
:SYST :SOUR :MODE?	Returns the current type of LASER source modulation: OLS_15 or OLS_55
:PORT	Selects the port. Parameter type: <NR1> <ul style="list-style-type: none">• 1: Optical connector 1• 2: Optical connector 2 (OLS-56 only)
:PORT?	Returns the selected port: 1 or 2. Single port devices always return 1.

Command string	Parameter type / Response type / Unit / Info
:SOUR	<p>Selects combination of LASER sources.</p> <p>Parameter type: <NR1></p> <p>Source:</p> <ul style="list-style-type: none"> • 1: LASER1 • 2: LASER2 (if present) • 4: LASER3 (if present) <p>2-LASER devices only:</p> <ul style="list-style-type: none"> • 3: LASER1 and LASER2 <p>3-LASER devices only</p> <ul style="list-style-type: none"> • 7: LASER1, LASER2 and LASER3
:SOUR?	<p>Returns combination of LASER sources.</p> <p>(For descriptions see :SOUR)</p> <p>1 or 2 or 3 or 4 or 7</p>
:WAV :AUTO	<p>Sets Auto-λ modulation ON/OFF.</p> <p>Parameter type: <BOOLEAN></p> <ul style="list-style-type: none"> • 0: Auto-λ OFF • 1: Auto-λ ON <p>Default setting: OFF (0)</p>
:WAV :AUTO?	<p>Returns Auto-λ modulation status.</p> <ul style="list-style-type: none"> • 0: Auto-λ OFF • 1: Auto-λ ON
:SOUR :MOD	<p>Sets the modulation for the selected LASER source.</p> <p>Parameter type: <NR1></p> <p>Values allowed:</p> <ul style="list-style-type: none"> • 0: CW (continuous wave) • 270: mod. freq. 270 Hz • 1000: mod. freq. 1000 Hz • 2000: mod. freq. 2000 Hz <p>Note: Setting will fail, if more than one LASER source is selected.</p>

7 REMOTE CONTROL

Command string	Parameter type / Response type / Unit / Info
:SOUR :MOD?	Returns the current modulation. <ul style="list-style-type: none">• 0: CW (continuous wave)• 270: mod. freq. 270 Hz• 1000: mod. freq. 1000 Hz• 2000: mod. freq. 2000 Hz• AUTO: Auto-λ modulation is ON.
:SOUR :POW	Sets the power level for the specified LASER source. Parameter type: <NR1,NR1,NR1> e.g. :SOUR:POW 1,3,-522 sets the power level for LASER3 at optical connector 1to -5.22 dBm
:SOUR :POW?	Returns the power level [dBm x 100] for the specified LASER source. Parameter type: <NR1,NR1> e.g. :SOUR:POW? 1,3
:SOUR :STAT	Sets state of the LASER ON/OFF. Parameter type: <BOOLEAN> <ul style="list-style-type: none">• 0: LASER OFF• 1: LASER ON
:SOUR :STAT?	Returns the state of the LASER. <ul style="list-style-type: none">• 0: LASER OFF• 1: LASER ON

Specifications

General specifications

Laser safety	IEC 60825-1:2001
Laser classification	Class 1 Laser Product
Peak wavelength	1310, 1490, 1550, 1625 nm
Wavelength accuracy	±20 nm
Spectral width	< 5 nm
Fibre type	SMF –28
Maximum output power	0 dBm
Attenuation range	7 dB
Attenuation resolution	0.01 dB
Modulation	CW, 270 Hz, 1 kHz, 2 kHz
Stability	±0.02 dB (15 min) / ±0.2 dB (8 hr)
Connector type	FC/PC or FC/APC
Recalibration period	1 year
Warm-up time	15 min

Display

Display type	Graphical display, 64 x 128 pixels, monochrome backlight function
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Connectors

Connector type	
- BN 2279/0x	PC
- BN 2279/2x	APC

Power supply

AC line operation	with separate SNT-121A Adapter
USB operation	directly from USB, no SNT-121A Adapter required
Power consumption ¹⁾	0.5 W

1) When connected to the AC power plug

Ambient temperature

Nominal range of use	-10 to +55 °C
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Air humidity

Humidity	Non-condensing
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Dimensions and weight

Dimensions (w x h x d)	250 x 88 x 210 mm
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Weight	1.6 kg
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SNT-121A Adapter

Power supply type	FW 75550/12
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Nominal line voltage range	100 to 240 VAC
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Nominal line frequency range	47 to 63 Hz
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Power consumption	max. 8.5 W
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Output	12 V $\overline{\text{DC}}$ / 1.25 A
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Temperature range	0 to +40 °C
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Condensation – even occasional – is not tolerable.

8 ORDERING INFORMATION

cFPL-A1, Fabry-Perot Laser

The available wavelengths combinations and the product codes (BN) are listed in a table starting on [page 2](#).

Calibration report

BN 299/90.01

Accessories

Cleaning materials

OCK-10

Optical connector cleaning kit

BN 2229/90.21

Cleaning tape for optical connectors

BN 2229/90.07

Spare optical cleaning tape

BN 2229/90.08

INDEX

- A**
 - AC line plug adapter 15
 - Auto Lambda 26
- C**
 - Cleaning
 - Instrument 28
 - optical connections 27
 - Test port 27
 - Common features 1
 - Condensation 12
 - Connector panel 15
 - Contrast 21
- D**
 - Damages during shipping 11
 - Default 21
 - Device information 21
 - Device overview 13
 - Display contrast 21
 - Display elements 18
- F**
 - Factory default 21
 - Firmware update 22
- I**
 - Information about device 21
- L**
 - Laser safety 8
- M**
 - Menu
 - Auto Lambda 26
 - Menu navigation 19
- N**
 - NAN 29
 - Navigating in the menus 19
 - Not A Number 29
- O**
 - On/Off 18
 - Operation from AC power 15
 - Overview 13
- P**
 - Package contents 11
 - Packing material 11
 - Power mode 18
 - Proper usage 7
- R**
 - Recovery 12
 - Remote commands
 - Utility 31
- S**
 - Shipping damage 11
- U**
 - Updating the firmware 22
- V**
 - Ventilation 9
- W**
 - wavelength combinations 2

JDSU Environmental Management Program

Superb performance and high quality have always characterized JDSU datacom and telecom measurement technology products. In this same world-class tradition, JDSU has an established, proactive program of environmental management.

Environmental management is an integral part of JDSU's business philosophy and strategy requiring the development of long-term, productive solutions to problems in the key areas of economics, technology, and ecology.

A systematic environmental management program at JDSU is essential in regard to environmental policy and enhances cooperation between ourselves and our business partners.

The JDSU Environmental Management Program considers:

Product design and manufacture

Environmental restrictions and requirements are taken into account during planning and manufacture of JDSU products. This attention ranges from the raw materials and finished components selected for use and the manufacturing processes employed, through to the use of energy in the factory, and right on up to the final stages in the life of a product, including dismantling.

Hazardous materials

JDSU avoids or uses with care any hazardous or dangerous material in the manufacturing process or the end product. If the use of a dangerous material cannot be avoided, it is identified in product documentation and clearly labeled on the product itself.

Packaging materials

Preference is given to reusable or biodegradable single-substance packaging materials whenever possible.

Environmental management partnerships

JDSU encourages our customers and suppliers who take this responsibility seriously to join JDSU in establishing their own environmental management programs.

Recycling used products

This product complies with the European Union Waste Electrical and Electronic Equipment directive (WEEE), 2002/96/EC. This product should not be disposed of as unsorted municipal waste and should be collected separately and disposed according to your national regulations.

In the European Union, all equipment purchased from JDSU after 2005-08-13 can be returned for disposal at the end of its useful life. Measuring systems affected by this can be recognized by the symbol on the right of a crossed-out trash can and a black bar. This symbol can be found either on the device or in the accompanying documents.



Contact your local Technical Assistance Center (TAC) for return and collection services available to you. If you would like specific information about the JDSU Environmental Management Program, please contact us at:

If you would like specific information about the JDSU Environmental Management Program, please contact us at www.jdsu.com/test

The following pages provide with respect to Chinese Requirements information with regard to the location of restricted hazardous substances within this equipment.

As measuring equipment this equipment is excluded from the European regulations for the restriction of hazardous substances (RoHS).

"中国RoHS"

《电子信息产品污染控制管理办法》（信息产业部，第39号）

附录 (Additional Information required for the Chinese Market only)

本附录按照"中国RoHS"的要求说明了有关电子信息产品环保使用期限的情况，并列出了产品中含有的有毒、有害物质的种类和所在部件。本附录适用于产品主体和所有配件。

环保使用期限：



本标识标注于产品主体之上，表明该产品或其配件含有有毒、有害物质（详情见下表）。

其中的数字代表在正常操作条件下至少在产品生产日期之后数年内该产品或其配件内含有的有毒、有害物质不会变异或泄漏。该期限不适用于诸如电池等易耗品。

有关正常操作条件，请参见产品用户手册。

产品生产日期请参见产品的原始校准证书。

有毒、有害物质的类型和所在部件

元器件 (Component)	有毒、有害物质和元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR ⁶⁺)	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
产品主体 (Main Product)						
印刷电路板组件 (PCB Assemblies)	X	○	○	○	○	○
内部配线 (Internal wiring)	○	○	○	○	○	○
显示器 (Display)	○	○	○	○	○	○
键盘 (Keyboard)	○	○	○	○	○	○
塑料外壳零件 (Plastic case parts)	○	○	○	○	○	○
配件 (Accessories)	○	○	○	○	○	○

○：代表该部分中所有均质材料含有的该有毒、有害物质含量低于SJ/T11363-2006标准的限值。
X：代表该部分中所有均质材料含有的该有毒、有害物质含量高于SJ/T11363-2006标准的限值。

