

ORL-55 Optical Return Loss Set

Operating Manual

BN 2287/21

BN 2287/22

BN 2287/23

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2011.03
English



Please direct all enquiries to your local
JDSU sales company.

The addresses can be found at:

<http://www.jdsu.com>

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

<http://www.jdsu.com>

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1 INTRODUCTION

The ORL-55 Test Sets

The handheld Optical Return Loss Test Sets

- ORL-55/21,
- ORL-55/22 and
- ORL-55/23

measure reflections on fiber optical systems.

Therefore the Test Sets provide a laser for several wavelengths (see [„Differences between the devices“ on page 2](#)) and a Power Meter. Transmitter and receiver are coupled internally by a optical coupler.

The Test Sets are especially designed for highest performing testing of all optical signals and systems, i.e. broadband, PONs, and Gigabit Ethernet. Battery operation with four AA batteries and the robust, shock-proof and splash-proof design allow a long operation time in the field even under tough conditions. AC line operation via a separate AC adapter and the USB interface for remote control allow also comfortable use in labs or production environments.

Technical Highlights

- Auto-Zeroing function for automatic dark current adjustment
- Auto- λ function for automatic wavelength detection
- Measurement of modulated and unmodulated signals
- Universal adapter fitting APC connector systems
- Laser source with adjustable power level for customized applications
- Optical isolators guarantee high stable output power level.




Differences between the devices


All of the Return Loss Test Meters are calibrated at 1310 nm, 1550 nm and 1625 nm. Differences between the devices can be found in the provided wavelengths:

Type	Source wavelengths	Receiver diode type
2287/21	1310, 1550 nm	InGaAs
2287/22	1310, 1490, 1550 nm	InGaAs
2287/23	1310, 1550, 1625 nm	InGaAs

Symbols used in this operating manual

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

 CAUTION	Caution Follow the instructions carefully to avoid damage to the device.
 WARNING	Warning Follow the instructions carefully to avoid damage to the device or injury
 DANGER	Dange Follow the instructions carefully to avoid damage or severe injury!
 DANGER	High Voltage Follow the instructions carefully to avoid damage or severe injury! This safety instruction is given when high voltage causes the danger

 WARNING	Laser Follow the instructions carefully to avoid damage or injury! This safety instruction is given when laser radiation causes the danger. Additional information is given to specify the laser class.
!	Very important instruction Follow carefully the advice; e.g. ! Make sure that you protect yourself and others from exposure to laser light.
✓	Requirement This requirement has to be checked first; e.g. ✓ The system is switched on
⇒	Instruction Here is your input requested; e.g. ⇒ Select mode.
<i>Italics</i>	Result Result following an action; e.g. <i>The page opens.</i>
bold type face	Keys and display elements Keys and display elements are marked in bold type face .
Text in blue	Cross references Cross references are indicated in blue type. When using the PDF version, just click on the blue text to skip to the cross reference.
[Store]	Instrument keys Instrument keys are indicated within square brackets.

2 SAFETY INFORMATION

Warning symbols on the unit



CAUTION

Non-compliant usage

Non-compliant usage can be hazardous to the user or damage the device itself.

- ! Please make sure the allowable ambient conditions are not violated!
 - ! Also note the specified measurement range!
 - ! Before powering up the device, always make sure that it is in proper working order.
-

Laser safety



Dangerous laser radiation

The maximum permitted power for the ORL-55 can be 1000 times stronger than the limit specified for Laser Safety Class 1!

Laser radiation can cause irreparable damage to the retina if allowed to enter the eye.

- ! When the system or test generator is switched on, never look directly into the output or into a connected optical fiber.
- ! Please heed the normal precautions for working with lasers and consider local regulations.

This device is a Class 1 Laser product according to DIN EN 60825-1:2007.



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.
-

Battery Operation



WARNING

Explosion danger

Dry batteries can explode if you attempt to recharge them

! Make sure to select **Dry battery** as battery type when using dry batteries and the SNT-121A AC Adapter/Charger.

Short-circuit of batteries can result in overheating, explosion or ignition of the batteries and their surroundings.

! Never short-circuit the battery contacts by touching both contacts simultaneously with a metal object.

SNT-121A AC Adapter/Charger Unit

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 AC Adapter/Charger Unit or adversely affect its function and safety.

- ! The SNT-121A AC Adapter/Charger Unit must only be operated indoors.
- ! The SNT-121A AC Adapter/Charger Unit must only be operated at ambient temperatures between 0 and +40 °C.

**CAUTION****Insufficient ventilation**

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

- ! Ensure adequate ventilation when operating the SNT-121A AC Adapter/Charger Unit.

**CAUTION****Condensation**

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

- ! Do not operate the SNT-121A AC Adapter/Charger Unit if condensation has formed.
 - ! If condensation cannot be avoided, such as when the SNT-121A AC Adapter/Charger Unit is cold and is moved to a warm room, wait until the SNT-121A AC Adapter/Charger 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 in transit). Using the original packing material is your guarantee of protecting the device during transit.

Checking the package contents

Your return loss meter is shipped with the following accessories:

- 1 adapter BN 2150/00.xx
- 4 dry batteries, AA size
- Belt bag MT-1S
- Operating manual

Checking for damages in transit

After you unpack the device, check to see whether it was damaged in transit. This is particularly likely if the packaging is clearly 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 transported at a low temperature is brought into a warm room. To avoid damages, wait until no more condensation is visible on the surface before powering up the device. Do not operate the device until it has reached its guaranteed temperature range (see „Ambient temperature“ on page 71). This also applies if the device is stored at a high temperature.

Device overview

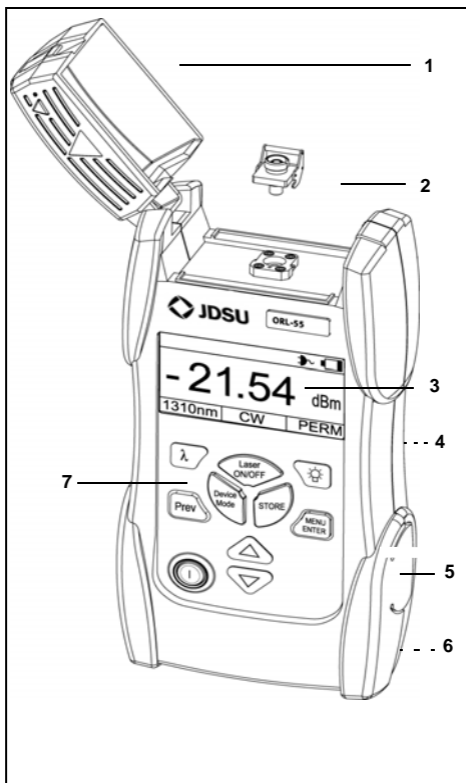


Fig. 1 ORL-55 front and side view

3 GETTING STARTED

- 1 Test head cover
- 2 Test adapter
- 3 Display
- 4 Stand (rear side)
- 5 Power supply socket, USB interface
- 6 Battery compartment (rear side)
- 7 key pad







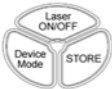
	<p>Wavelength</p> <p>Select a wavelength from the list</p>
	<p>Backlight</p> <p>Activate display backlight</p>
	<p>Previous</p> <p>Step one menu level backwards (without storing settings).</p>
	<p>MENU/ENTER</p> <ul style="list-style-type: none"> • Open menu and select menu item • store settings
	<p>Power ON/OFF</p> <p>Switch unit on and off.</p>
	<p>Up/Down</p> <ul style="list-style-type: none"> • Scroll menu up/down • Change levels, wavelenghts
	<p>Laser ON/OFF</p> <p>Switch laser on/off</p> <p>STORE</p> <p>Store displayed values</p> <p>Device mode</p> <p>Toggle between modes: Power Meter → Laser Source → Return Loss Test →...</p>

Table. 1 Device overview and key pad

Power Supply

Different power sources that can be used to operate the ORL-55:

- Four 1.5 V dry batteries (Mignon AA size, Alkaline type recommended)
- Four 1.2 V NiMH rechargeable batteries (Mignon AA size)
- The SNT-121A AC Adapter/Charger Unit
- Via USB interface in remote operation.


Replacing batteries

The battery compartment is at the rear side of the instrument.

Replacing the batteries

1. Pull down lid to open the battery compartment.
2. Place the new batteries or remove the used batteries with fresh ones.

Note: Take care of the correct polarity of the batteries. It is indicated by a diagram on the bottom of the battery compartment.

3. Close the battery compartment.
4. Press  to switch on.

After powering on the device you are asked in the BATTERY CHANGED menu to specify whether dry batteries or rechargeable batteries are used.

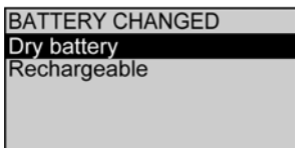



Fig. 2 Setup menu for battery type

! Please note the following advice to select the proper battery type.

Note: Date and Time must be adjusted, if the unit is disconnected from any power source for longer than one hour (see "Setting date and time", page 24).

Battery operation

Operation with dry batteries

1. Insert batteries (see “Replacing batteries”, page 10)
2. Select **Dry battery** in the BATTERY CHANGED menu and press 



WARNING

Explosion danger

Dry batteries can explode if you attempt to recharge them.

- ! Make sure to select **Dry battery** as battery type when using dry batteries and the SNT-121A AC Adapter/Charger.

Note: When using the SNT-121A additionally the ORL-55 is supplied from the SNT-121A.

Operation with rechargeable batteries




WARNING

Explosion danger

Short-circuit the batteries can result in overheating, explosion or ignition of the batteries and their surroundings.

- ! Never short-circuit the batterie contacts by touching both contacts simultaneously with a metal object.

-
1. Insert batteries (see “Replacing batteries”, page 10)
 2. Select Rechargeable in the BATTERY CHANGED menu and press 

Recharging the batteries

When using the SNT-121A, and the battery capacity is lower than 90%, the batteries are recharged (complete recharging takes about 3 hours). The instrument switches to trickle charging automatically as soon as the batteries are fully charged.

If the charge cycle does not start although the SNT-121A AC Adapter/Charger Unit is connected, please check the battery setup in the INFO menu.

Note: The battery type can not be selected using the instrument keys. To change the battery type, the battery compartment must be opened and at least one battery must be removed for more than five seconds. After replacing the battery, the ORL-55 asks for the battery type (see page 10). The battery type you choose then will be stored until you change the batteries again.

General tips on using rechargeable batteries

- Always handle rechargeable batteries with care.
- Do not drop or damage the rechargeable batteries or expose them to excessively high temperatures.
- Only recharge the batteries while they are fitted in the ORL-55 and only use the SNT-121A AC Adapter/Charger for this purpose
- Do not store the batteries for more than one or two days at very high temperatures (e.g. in a vehicle), either separately or fitted in the instrument.
- Do not leave discharged batteries in the instrument for a long time if it is not being used.
- Do not store rechargeable batteries for more than 6 months without discharging and recharging them at intervals.
- Avoid deep discharging the batteries as this can cause the cell polarity to reverse and make the battery useless.

Protect the environment

Please dispose of any unwanted dry batteries and rechargeable batteries carefully. They should therefore also be removed from the instrument if it is to be scrapped. If facilities in your country exist for collecting such waste or for recycling, please make use of them rather than throwing the batteries in the normal trash. You will often be able to return used batteries to the place where you purchase new ones. Any dry or rechargeable batteries that you purchased from JDSU can be returned to one of our Service Centers for disposal.

Operation from AC power

The ORL-55 can also be powered from the SNT-121A AC Adapter/Charger only if it is mainly to be used in one place, such as in a laboratory or test workshop. There is a socket on the side of the ORL-55 for plugging in the cable of the AC Adapter/Charger Unit.

Note: The SNT-121A AC Adapter/Charger Unit provides power even if dry or rechargeable batteries are fitted in the instrument.

Fitting the AC line plug adapter

1. Select the appropriate AC line plug adapter.
2. Slide the AC line plug adapter into the slot (see Fig. 3).
The SNT-121A AC Adapter/Charger Unit is ready for use.

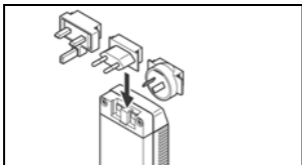


Fig. 3 SNT-121A AC Adapter/Charger Unit.

Changing 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).

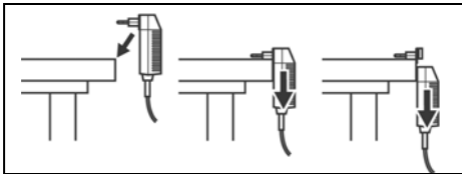


Fig. 4 SNT-121A: Changing the AC line plug adapter.

Operation from USB interface power

Although the USB interface is primarily intended for remote control, it can also be used to power the ORL-55.

To power the ORL-55 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.
- It is not possible to charge the batteries via the USB interface.
- The device is powered by the SNT-121A AC Adapter/Charger Unit, if the SNT-121A AC Adapter/Charger Unit and the USB interface are connected.

Connecting optical cables

Mounting test adapters

JDSU provides a number of test adapters for connecting the ORL-55 to the interface to be tested (connector or bare fiber).

You can connect all standard optical connector types to the instrument using these adapters. The test adapters are suitable for connectors with planar (PC) and angled end surfaces (APC).

Contact your local JDSU Sales Company for available adapter types.

To mount the JAE test adapter:

1. Open the head cover and remove the protecting cap (if still mounted).
2. Place the test adapter vertically on the optical connector with the locking lever open.
3. Close the locking lever when the test adapter is firmly seated. You will hear the locking mechanism lock.

4. Repeat the procedure if the device is fitted with two ports.
5. Fit the fiber optic cable to the test adapter or close the head cover.

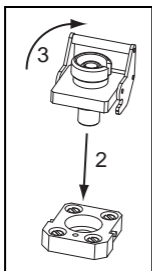


Fig. 5 Mounting the JAE test adapter

Establishing the VFL connection (optional)

The Visual Fault Locator (VFL) is equipped with a universal push pull adapter (UPP) for all standard 2.5 mm connector systems.

To establish a VFL connection:

- ⇒ Just plug the fiber equipped with a push pull connector into the VFL push pull adapter until you feel a resistance.

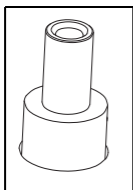


Fig. 6 VFL universal push pull adapter

4 BASIC FUNCTIONS

Power ON/OFF

To switch the device on:

⇒ Press [①] to switch on the device.

To switch the device off:

⇒ Press and hold down [①] for more than 2 sec. to switch off the device.

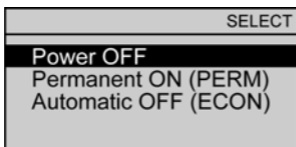
The ORL-55 has two power modes:

- **Permanent ON (PERM):**
The device is switched on permanently.
- **Automatic OFF (ECON):**
The device switches off 20 minutes after the last operation. This function is only available when the device is powered from batteries.

Changing the power mode

✓ The device is switched on.

1. Press [①] briefly (for less than 2 sec.).
The power mode EDIT menu opens:



2. Select **Permanent ON** or **Automatic OFF**.
3. Press [MENU ENTER] to set the power mode.
The menu window closes.

Note: To power off the device, you can also use the **Power OFF** command in this menu. Simply press [①] twice (the first press opens the menu, the second selects the item).

Navigating in the menus

✓ The measurement display is open.

⇒ 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]**.

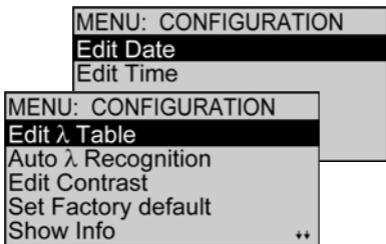
Selecting measurement mode

The ORL-55 provides three measurement modes:

- **Laser Source**
 The ORL-55 works as a laser source.
- **Power Meter**
 The ORL-55 works as a power meter
- **Return Loss Test**
 The ORL-55 works as a return loss test meter: both laser source and power meter are activated.

Selecting the mode:

⇒ Press **Device Mode** repeatedly:
 Laser Source → Power Meter → Loss Test → ...
The selected mode will be shown on top of display.



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

Edit λ-Table	Edit the wavelengths in the table and the view status (show/hide) of each entry.
Select Auto-λ	Activate/deactivate the "Automatic Wavelength Detection".
Edit Contrast	Adjust display contrast.
Set Factory Default	Set the device parameters and settings to their default values as defined by JDSU. This does not affect any stored measurement results.
Show Info	Display basic device information.
Edit Date	Adjust date.
Edit Time	Adjust time.
Firmware Update	Download the current device firmware version from the internet to the device.
Select Language	Select the language of the device texts.

Wavelengths (Power Meter)

The wavelength table (λ -Table) supports the definition of up to 30 wavelengths. The wavelengths with the attribute "shown" form a set of wavelengths which will be rotated through when the [λ] key is pressed.

The remaining wavelengths are "hidden".

E.g. if only two wavelengths have the attribute "shown", you can toggle between them with a single stroke.

To edit the λ -table:

1. Press **Edit λ -Table** in the CONFIGURATION menu.
The EDIT λ -TABLE menu opens .

4 BASIC FUNCTIONS

MENU: EDIT λ -TABLE		
1270nm	hidden	**
1290nm	hidden	
1300nm	shown	
1310nm	shown	
1330nm	hidden	**

2. Highlight the entry to be edited and press **[MENU ENTER]**.

A window opens:

MENU: EDIT λ -TABLE	
Edit	
Show	
Hide	
	1310nm

3. Press **[MENU ENTER]** again to edit the selected wavelength (**Edit** is already selected).
The value to be edited is displayed, the last cipher is highlighted:

MENU: EDIT λ -TABLE	
1310	nm

4. Press **[▲▼]** to change the value:
 - Press once to change one step at a time.
 - Hold down the key to increase the step change rate.
5. Press **[MENU ENTER]** to set the new wavelength.
The EDIT λ -TABLE window is displayed again.
6. To change the view status again press **[MENU ENTER]**.
7. Select **Show** to show the wavelength in the table
– or –
Select **Hide** to hide the wavelength in the table.
8. Press **[MENU ENTER]** to confirm the selection.

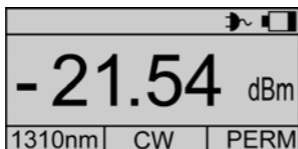
Repeat steps 2 through 7 as required.

Selecting a wavelength from the table

✓ Measurement mode is selected.

⇒ Press λ to scroll through the table.

The wavelength is shown in the left bottom display field and active immediately after selection:



Enabling Auto-Lambda mode

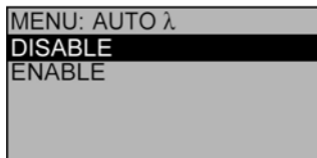
Auto- λ is a special feature developed by JDSU that allows you to identify wavelengths automatically. To do this, the signal is modulated at a certain frequency (by a light source equipped with AUTO- λ , such as a JDSU OLS-55/-56), which can be detected by a JDSU ORL-55.

Wavelengths cannot be reliably detected if:

- the receive level is too low,
- wavelength encoding cannot be detected due to interference
- you are measuring the absolute level of a system that does not have wavelength encoding that matches JDSU power sources.

To switch Auto- λ mode on/off:

1. Select **Select Auto- λ** in the CONFIGURATION menu.
The AUTO- λ menu is displayed.



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

4 BASIC FUNCTIONS

– or –

Select **DISABLE** to switch off Auto- λ .

3. Press **[MENU ENTER]** to confirm the setting.
If Auto λ mode is activated and a laser source supporting Auto- λ is connected, Auto- λ will be displayed in the bottom center display pane.

Display in Auto- λ mode

When **Auto- λ** mode is activated and different wavelengths are detected, the power levels measured at these wavelengths are displayed simultaneously.

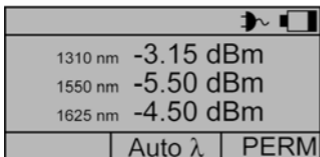
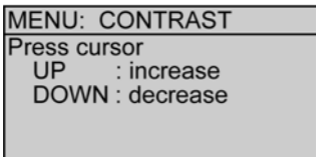


Fig. 7 Display in **Auto- λ** mode showing the detected wavelengths and their power levels.

Setting the display contrast

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

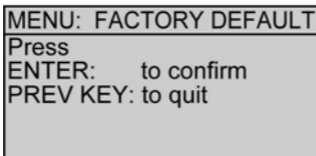


2. Press **[▲▼]** to increase/decrease the contrast.
3. Press **[MENU ENTER]** to store the value and exit from the menu.

Setting factory default values

1. Select **Set Factory default** in the CONFIGURATION menu.

The *FACTORY DEFAULT* menu opens:



2. Press **[MENU ENTER]** to set the factory defaults.
– or –
Press any key to exit from the menu without making any changes.

Note: Setting the factory default values does not affect your stored measurement results.

Switching the backlight on/off









⇒ Press [] to switch the backlight on/off.

Note: The backlight does not switch off automatically.

Showing 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.

Setting date and time

1. Select **Edit date** in the CONFIGURATION menu.
The EDIT DATE MENU opens:
2. Press [ ] to set year and press **[MENU ENTER]**.
3. Press [ ] to set month and press **[MENU ENTER]**.
4. Press [ ] to set day and press **[MENU ENTER]**.
5. Select **Edit time** in the CONFIGURATION menu.
The EDIT TIME menu opens.
6. Press [ ] to set hours and press **[MENU ENTER]**.

7. Press [▲▼] to set minutes and press [MENU ENTER].
8. Press [▲▼] to set seconds and press [MENU ENTER].

Note: Date and time must be set again if the device is without any power for more than 1 hour.

The device is without any power if

- neither the SNT-121A AC Adapter/Charger Unit is connected,
- nor a USB connection is established and
- no batteries are fitted or the batteries are discharged.

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. Go to the JDSU home page: <http://www.jdsu.com>
2. Type in the name of your device into the search field.
3. Find the appropriate firmware in the **Downloads** area.

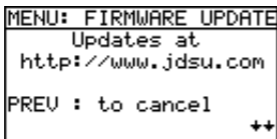
You will also find step-by-step instructions on how to update the firmware there.

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.

```

MENU: FIRMWARE UPDATE
                                     ↑↑
Press ENTER to start
! Remove all power !
! sources to stop !

```

3. Press **[MENU ENTER]** to start the update.
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:

```

MENU: SELECT LANGUAGE
English
Deutsch
Français

```

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

5 OPERATION

The ORL-55 provides three operation modes:

1. **Laser Source:** The ORL-55 works as a laser source.
2. **Power Meter:** The ORL-55 works as a power meter.
3. **Return Loss Test:** The ORL-55 works as a return loss test meter. Both laser source and power meter are activated.
4. **Visual Fault Locator (optional):** The ORL-55 switches to VFL mode. All other functions are deactivated.

To select mode 1 to 3:

- ⇒ Press [**Device Mode**] repeatedly:
 Laser Source → Power Meter → Return Loss Test →...
The selected mode will be shown on top of display.

To select VFL mode:

- ⇒ Open the MAIN menu and select **Switch to VFL Mode**.

Laser Source mode

Display in Laser Source mode

Depending on your ORL-55 model (two or three wavelengths) you will see different displays after powering on the device.



Laser Source			
OFF			
1310nm	-3.00dBm		
1550nm	-3.00dBm		
CW		PERM	

Laser OFF
 2 wavelengths
 Continuous Wave

Laser Source			
1310nm	-3.00dBm		
1550nm	-3.00dBm		
Auto λ		PERM	

Laser ON
 Auto- λ

Fig. 8 Measurement display in laser source mode.

OFF	Laser switched off.
	External power supply The ORL-55 is powered by the external AC adapter when this symbol is shown.
	Battery status This indicates the battery charge status. If it is not shown, only the AC adapter is active.
USB	Power supply via USB The device is powered via the USB interface for remote operation.
PERM ECON	Power mode <ul style="list-style-type: none"> • PERM: Device remains switched on. • ECON: Device switches off 20 minutes after the last operation.
1310nm 1310nm 1550nm	Wavelength Display of selected wavelength. Possible combinations: $\lambda_1 \rightarrow \lambda_2 \rightarrow (\lambda_1 + \lambda_2) \rightarrow \lambda_1 \rightarrow \dots$
-3.00dBm	Output power level Displayed for each selected wavelength.
CW Auto-λ	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	Power level Display of power level.

SOURCE MAIN menu

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

MENU: SOURCE MAIN
Select Auto λ ON (OFF)
Select Modulation
Level Adjust
Configuration

Select Auto-λ ON (OFF)	Switch on/off Auto- λ (see next section).
Select Modulation	Select modulation frequency (see „Signal modulation” on page 29).
Level Adjust	Set output power level (see „Adjusting the output power level” on page 29)
Configuration	Open configuration menu for basic settings (see „Selecting measurement mode” on page 18).

All following settings refer to the SOURCE MAIN menu.

Auto-Lambda

Switching Auto- λ on/off

⇒ Press **[MENU ENTER]** to switch Auto- λ on and off (toggle function).

Note: Signal is modulated only (with 270 Hz, 1 kHz, 2 kHz), when Auto- λ is deactivated.

Signal modulation

Modulation frequencies provided by the ORL-55:

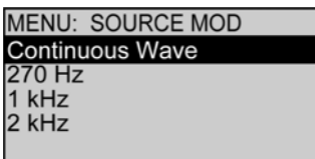
- CW (Continuous Wave): without modulation
- 270 Hz modulation
- 1 kHz modulation
- 2 kHz modulation

To select a modulation frequency

✓ Modulation can not be selected, when Auto- λ is activated. Thus, first switch off Auto- λ (see „Auto-Lambda“ on page 28).

1. Select **Select Modulation**.

The SOURCE MOD menu opens:



2. Highlight desired frequency and press **[MENU ENTER]**.

Adjusting the output power level

The output power level

- can be adjusted for each wavelength separately,
- can be adjusted while laser is switched on or off,
- is stored when changing the wavelength or when powering off.

Output power ranges

CW mode:	-3 to -10 dBm ¹⁾
	-6 to -13 dBm for 1490 nm
Modulated and Auto λ :	-6 to -13 dBm ¹⁾
	-9 to -16 dBm for 1490 nm

1) Only 1310 nm, 1550 nm and 1625 nm.

To change the output power level:

1. Select **Level Adjust**.

The display changes to EDIT mode, the first wavelength is highlighted:

		EDIT	
1310nm	-6.00dBm		
1550nm	-6.00dBm		
	CW	PERM	

2. Press [**▲▼**] to increase/decrease value:
 - press once to change value step wise
 - hold key to accelerate change speed
3. Press [**λ**] to select next wavelength.
4. Press [**MENU ENTER**] to accept settings and to leave EDIT mode.

Power Meter mode

Note: The ORL-55 provides measuring optical power levels on singlemode fibres. The test port is – in contrary to “pure” power meters – an Angled Physical Contact (APC) connector. Thus, a test signal can be connected to the ORL-55 via an APC connector only.

Display in Power Meter mode

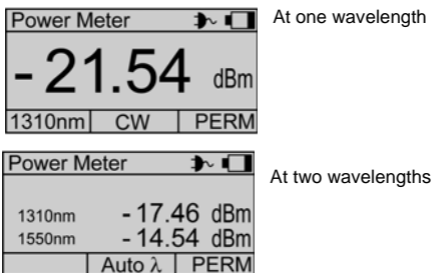


Fig. 9 Measurement display in Power Meter mode.

	External power supply The ORL-55 is powered by the external AC adapter when this symbol is shown.
	Battery status Shows actual battery status. If it is not shown, only the AC adapter is in use.
USB	Power supply via USB In remote operation the device is powered via the USB interface.
dBm	Measured power level Display of value (here in single lambda mode) and unit (dB, dBm, Watt).

PERM	Power mode <ul style="list-style-type: none"> • Perm: device remains powered on • ECON: device powers off 20 min. after last operation.
CW	Signal modulation <ul style="list-style-type: none"> • CW (Cont. Wave): without modulation • Auto-λ: Automatic wavelength detection • 270 Hz, 1 kHz, 2 kHz: modulated signal was detected.
1310nm	Wavelength Display of selected wavelength.

METER MAIN menu

⇒ Press **[MENU ENTER]** to open METER MAIN menu.

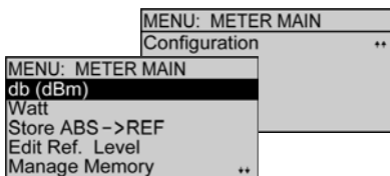


Fig. 10 METER MAIN menu.

dB (dBm)	Toggle between relative (dB) and absolute (dBm) mode. The displayed mode can be selected - thus it is the mode actually not active.
Watt	Change display unit to Watt. In the dB/dBm line dBm will be displayed when selecting Watt.
Store ABS -> REF	Store displayed level as new reference level. Display will switch to relative mode automatically (see „Setting the reference value“ on page 34).
Edit Ref. Level	Edit reference level (see „Setting the reference value“ on page 34).
Manage Memory	Display and delete stored data (see „Memory Management“ on page 39).
Configuration	Change basic settings (see „Selecting measurement mode“ on page 18).

Display absolute/relative level

Display relative level

- ✓ The menu shows **dB**. Thus, the absolute level in dBm is displayed when measuring.
- ⇒ Highlight **dB** and press **[MENU ENTER]** .
*Display will show **dB**.*

Display absolute level in dBm

- ✓ The menu shows **dBm**. Thus, the relative level in dB is displayed when measuring.
- ⇒ Highlight **dBm** and press **[MENU ENTER]** .
*Display will show **dBm**.*

Display absolute level in Watt

- ⇒ Highlight **Watt** and press **[MENU ENTER]**.
*Independent from the actually selected display mode (relative or absolute), display will change to absolute mode when selecting **Watt**. In the **dB/dBm** menu line dBm will be shown.*
- ⇒ Highlight **dBm** and press **[MENU ENTER]** if you wish to display absolute level in dBm.

Setting the reference value

The relative power display mode shows the actual measured power level relatively to a reference value. This reference value can be set by defining the actual power level as reference value and can be edited manually.

Setting the reference level

- ✓ The device is in absolute power level display mode.
- 1. Press **[MENU ENTER]** to open Main menu.
- 2. Select **ABS** → **Ref** and press **[MENU ENTER]** to store reference level.
*The actual power level is set as new reference level.
 The reference level is displayed in the top display bar.
 Reference power level display mode is activated.*

Note: The reference level must be stored for each wavelength separately and will be saved during power off.

Editing the reference level

A reference level can be also edited manually.

- 1. Select **Edit Ref. Level** in the MAIN menu.
The measurement display opens, showing EDIT in the top right corner:

REF: -18.67dBm		EDIT
1310nm	- 07.29 dB	
1490nm	- 04.36 dB	
1550nm	- 05.54 dB	
	Auto λ	PERM

2. Press [λ] to select wavelength.
3. Press [\blacktriangle \blacktriangledown] to change value
4. Press [**MENU ENTER**] to accept setting.

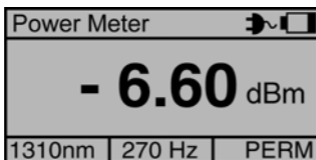
Selecting a wavelength

The sensitivity of the photo diode depends on the wavelength. To ensure a correct reading the wavelength setting of the device must match the wavelength of the incoming signal.

To select a wavelength:

⇒ Press [λ] to select a new wavelength.

Its value is shown in the lower left display pane:



↑
selected wavelength

The wavelengths which can be selected by pressing this key are an extract of those contained in the internal wavelength table (λ -Table).

See „[Selecting a wavelength from the table](#)“ on page 21 how to edit this table.

Return Loss Test mode

In the Return Loss Test mode both laser source and power meter of the ORL-55 are activated. The wavelengths of the Power Meter unit are locked to the wavelengths of the source and can be selected independently. Only relative modes is available.

Return loss measurement

In the Return Loss mode a signal is sent to the DUT from the internal laser source. The power level reflected from the DUT is measured and compared to the transmitted signal. The result of the return loss is displayed at the ORL-55.

The accuracy of the return loss measurement depends highly on the quality of the optical connection at the ORL-55.

⇒ Hence take care to keep the test connection very clean.

In the case the display does not show "High" with the port open:

⇒ Clean the test connection (see „Cleaning the test port” on page 48)

⇒ Normalize the unit (see „Normalizing” on page 37).

Display in Return Loss Test mode

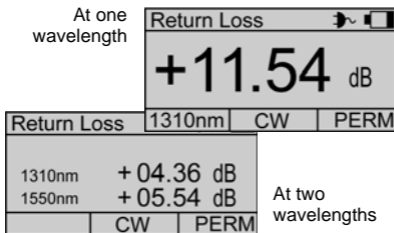


Fig. 11 Measurement display in Return Loss Test mode.

The functions are identical to relative measurement of Power Meter mode (see „Display in Power Meter mode” on page 31).

Note: Please note, that the measurement values in Return Loss Test mode are positive.

ORL MAIN menu

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

MENU: ORL-MAIN
Normalize Open Port
Manage Memory Configuration

Normalize Open Port	Stores the internal noise in ORL mode as reference value.
Manage Memory	Display and delete stored data (see „Memory Management” on page 39).
Configuration	Change basic settings (see „Device overview” on page 9).

Normalizing

To ensure a high measurement accuracy, it is required to normalize the unit from time to time. This is done with the port open, i.e. no DUT is connected.



Dangerous laser radiation!

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

! When the system or test generator is switched on, never look directly into the output or into a connected optical fiber.

To normalize the unit:

1. Disconnect DUT from test port.
The normalization can be performed only with an open test port.
2. Unmount test adapter from test port, clean fibre surface of test port and mount test adapter.
3. Switch on laser.
4. Press **[MENU ENTER]** to open the ORL MAIN menu.

5. Select **Normalize Open Port**.

The normalization will be performed and the display will switch to measurement mode.

The display shows "High".

Note: The normalization will be automatically performed for all wavelengths.

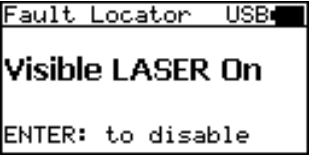
VFL mode (optional)

If the Visual Fault Locator (VFL) option is available, the MAIN menu additionally shows the item **Switch To VFL Mode**.

To enable the Visual Fault Locator:

⇒ Open the Main menu and select **Switch To VFL Mode**.

The fault locator starts flashing, all other functions are deactivated and the following is displayed:



```
Fault Locator  USB
Visible LASER On
ENTER: to disable
```

To disable the the Visual Fault Locator:

⇒ Press **[MENU ENTER]**.

The instrument reverts to the previously set measurement mode.

6 MEMORY MANAGEMENT

General information

The ORL-55 allows you to save the measured power level values in a structured data memory and recall them as required. Up to 350 results can be stored. All data is saved to a non-volatile memory (E²PROM).

Data can also be downloaded via the USB interface to a PC for further evaluation.

Two methods of recording values are available to meet individual requirements:

- Measured values stored in successive memory locations.
- Measured values stored in pre-defined memory locations.

Result memory structure

The ORL-55 is equipped with a data memory which is structured according to the typical device under test, i.e. a cable made up from several fibers. This hierarchical structure predetermines the memory locations which generally contain the following data:

- **Group** number: 001 to 350
- **Meas(urement)** number: 001 to 350
- **Wavelength**

A combination of these three values is assigned to each memory location, each value being accessible separately.

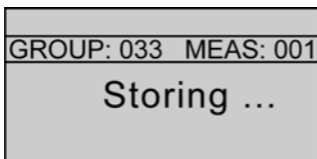
Saving results successively

Results are stored simply by pressing the **STORE** key. Each time the key is pressed, the next memory location will be used to store the current result. If the memory is initially empty, the memory starts with Group 001 and Meas 001. The Meas # then increments each time the **STORE** key is pressed (up to a maximum of 350).

This method is ideal for simple measurement sequences, e.g. when a limited number of power level values for a **single** item under test are to be recorded.

To save current results successively:

- ✓ The entire result memory is empty or the first and subsequent memory locations are empty.
 - ✓ The device is in measure mode.
1. Press the **[Store]** key to save the first result.
The display briefly indicates the first memory location, e.g. Group 033, Meas 001. "Storing ..." confirms the storing process is successful.



2. Press the **[Store]** key again every time you want to save a further result value.
The display briefly shows the memory location used. The Meas # increments each time.

If the results are to be stored starting from a different memory location, such as Group 015, Meas 005, these values must be specified in advance (see „[Selecting the store location](#)” on page 43).

If you attempt to store data at memory locations that are already occupied by the results of previous measurements, a warning will be displayed:

GROUP: 025 MEAS: 004
Overwrite Data ?
ENTER KEY: To Confirm
PREV KEY: To Quit

Fig. 12 Display if selected memory location is already occupied.

- ⇒ Press **[MENU ENTER]** to overwrite data with new data.
- ⇒ Press **[PREV]** if you do not want to overwrite existing data.

Displaying stored results

Displaying the last measurement results stored is probably the function you will use the most often. For this reason, the last memory location used will be displayed when you enter the MANAGE MEMORY menu. The Meas # is highlighted by default so you have quick access to all the measurements of a certain Group.

To display the last results stored:

- ⇒ Select **Manage Memory** in the MAIN menu.
The last results stored are displayed.
Stored results example: Group 025, Meas 004:
3 wavelengths detected, relative measurement mode with measured levels and reference values.

2004/APR/26 16:31:18		
GROUP: 025 MEAS: 004		
λ /nm	Lev./dB	Ref/dBm
1310	-13.54	+3.54
1550	-12.28	+16.80
1625	-22.47	-17.34

6 MEMORY MANAGEMENT

To select another Measurement in the current Group:

⇒ Press [▲▼] to increase/decrease the Meas #.

2004/APR/26 16:31:46		
GROUP: 025		MEAS: 005
λ /nm	Lev./dB	Ref/dBm
1310	-12.54	+3.54
1550	-17.28	+16.80
1625	-20.47	-17.34

To select another Group and Measurement:

1. Press [MENU ENTER].

The MANAGE MEMORY menu opens:

MENU: MANAGE MEMORY	
GROUP: 025	MEAS: 004
Select Group	
Clear Actual Meas	
Clear Group	
Clear All	

2. Press [MENU ENTER] to select **Select Group**.

The current Group and Meas 001 will be displayed:

2004/04/26 04:31:18 PM		
GROUP: 025		MEAS: 001
λ /nm	Lev./dB	Ref/dBm
1310	-13.54	+3.54
1550	-12.28	+16.80
1625	-22.47	-17.34

3. Press [▲▼] to increase/decrease the Group #.

4. Press [MENU ENTER].

MEAS # will be highlighted.

5. Press [▲▼] to increase/decrease the Meas #.

⇒ Press [MENU ENTER] to exit from the menu.

Selecting the store location

When you press the **[Store]** key in measurement mode, the results are stored at the active memory location. Each time you press the key, the Meas # is incremented but the Group # remains the same. You cannot select the memory location, Meas # or Group # in measurement mode.

If you do not want to overwrite existing data or if you want to set a specific Group and Meas number, you must open the **MANAGE MEMORY** menu and select the location.

The procedure is the same as for displaying a memory location (see „[Displaying stored results](#)” on page 41), as the last memory location displayed is always set as the current memory location when storing data.

To save results at a selected location:

1. Set the wavelength and measurement mode as required.
 2. Select **Manage Memory** in the MAIN menu.
 3. Press **[▲▼]** to edit the Meas # only.
Go to step 9 if you only want to edit the Meas #.
 4. Press **[MENU ENTER]**.
The MANAGE MEMORY menu opens.
 5. Press **[MENU ENTER]** again (**Select Group** is highlighted).
The current Group # and Meas 001 are displayed.
 6. Press **[▲▼]** to edit the Group #.
 7. Press **[MENU ENTER]**.
Meas # is highlighted.
 8. Press **[▲▼]** to edit the Meas #.
 9. Press **[PREV]** to exit from the menu.
- ⇒ Press **[Store]** to store the results.

Clearing the memory

You can store up to 350 data sets in the ORL-55. Each data set can contain up to 3 measurements in Auto λ mode (in conjunction with a JDSU OLS-55 light source). Each data set contains the wavelength, the relative power level and reference value or the absolute power level, and the date / time when it was stored.

You do not have to clear the entire memory to free up capacity. You can clear individual Meas or Group locations to provide access to specific Meas or Group numbers.

The ORL-55 has the following memory clear functions:

- **Clear Actual Meas**
Clears the data of the selected measurement
- **Clear Group**
Clears all the measurements of the selected Group
- **Clear All**
Clears all the data in the memory.

Clearing memory data

1. Select **Manage Memory** in the MAIN menu.
The last results stored are displayed.
2. Press **[MENU ENTER]**.
The MANAGE MEMORY menu opens:

MENU: MANAGE MEMORY	
GROUP: 025	MEAS: 004
Select Group	
Clear Actual Meas	
Clear Group	
Clear All	

To clear the data from a current measurement:

1. Set the Group # and Meas # of the data you want to clear.
2. Press **[▲▼]** to select **Clear Actual Meas**.
3. Press **[MENU ENTER]** to clear the selected Measurement data.

4. Press **[PREV]** to exit from the menu.

Note: If you now store results, they will be stored at the memory location for the cleared Meas # of the last Group displayed.

To clear all the data of a Group

1. Set the Group # that you want to clear.
2. Press **[▲▼]** to select **Clear Group**.
3. Press **[MENU ENTER]** to clear all the Meas data for the selected Group #.
4. Press **[PREV]** to exit from the menu.

Note: If you now store results, they will be stored at memory location Meas 001 of the last Group displayed.

To clear the entire memory:

1. Press **[▲▼]** to select **Clear All**.
2. Press **[MENU ENTER]** to clear all memory data.
3. Press **[PREV]** to exit the menu.

Note: If you now store results, they will be stored at memory location Group 001 and Meas 001.

Reading out the result memory

The result memory can be read out in two ways:

- by reading the measurement results to a PC or
- by copying the result memory to a memory stick.

Reading out the measurement results to a PC

The OFS-355 Download Manager can be used to transfer the result memory to a PC via the USB interface. For further details see „[OFS-355 Download Manager](#)“ on page 66.

Copying the result memory to a memory stick

The result memory can be copied to a memory stick plugged into the USB port on the connector panel. This allows you to store a large amount of data in ASCII format. The OFS-355 Download Manager can then be used to transfer the result memory to a PC for further evaluation or print out. For further details see „OFS-355 Download Manager” on page 66.

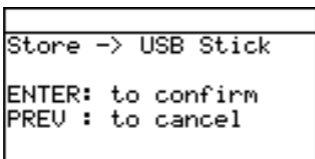
Note: With OLT-55 and ORL-55, reading out the result memory is not possible when running the units in laser source mode.

To copy the result memory to a memory stick:

1. Plug in the memory stick to the device USB port on the connector panel.

The folder structure is read.

Note: Depending on the number of folders and the USB speed this procedure may take up to 30 seconds. When completed the following message appears:



```
Store -> USB Stick
ENTER: to confirm
PREV : to cancel
```

2. Press **[MENU ENTER]** to transfer the contents of the measurement memory to the memory stick.

The contents are stored as a single file in a folder named after the unit in use.

The measurement memory can now be deleted ready to store new results.

Note: Do not remove the memory stick during the data transfer.

A new data transfer can be started at any time as long as the memory stick is plugged in.

To start a new data transfer:

1. Open the main menu and select the displayed item (menu items may vary depending on the model and operating mode).

```

MENU: MAIN
Store ABS->REF
Edit Ref. Level
Manage Memory
Store -> USB Stick
Select Thresholds ++

```

The window opens to start the transfer.

```

Store -> USB Stick

ENTER: to confirm
PREV : to cancel

```

2. Press **[MENU ENTER]** to transfer the contents of the measurement memory to the memory stick.
The contents are stored as a single file in a folder named after the unit in use (e.g. OLT-55).

7 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 or in the test adapters can adversely affect the accuracy of the measurement.

1. Switch off the device.
2. Remove the test adapter from the optical connection.
The plug end surface is now accessible.
3. Wipe off the plug end surface using a cotton bud soaked in isopropanol. This cleaning method is very effective and leaves no residues.
4. 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.
-

Parts which have become very dirty may also be cleaned carefully using alcohol.

8 REMOTE CONTROL

Communication interface

The ORL-55 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.

The OFS-355 Download Manager is quickly and easily installed (see next chapter). This automatically installs the appropriate drivers.

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:ERR?
:SYST:DEV:DEF
:SYST:LANG
:SYST:LANG?
:SYST:DATE
:SYST:DATE?
:SYST:TIME
:SYST:TIME?
:DEV:MODE
:DEV:MODE?

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?

Power Meter commands

:POW:CAL:WAV:MAX?
:POW:CAL:WAV:MIN?
:POW:CAL:WAV:TAB
:POW:CAL:WAV:TAB?
:POW:CAL:WAV
:POW:CAL:WAV?
:POW:DISP:UNIT
:POW:DISP:UNIT?
:POW:REF:STAT
:POW:REF:STAT?
:POW:REF:VAL
:POW:REF:VAL?
:POW:WAV:AUTO
:POW:WAV:AUTO?
:POW:FETC:AM:AUTO:FREQ?
:POW:FETC:AM:INT:FREQ?
:FETC:MEAS:VAL?

Return Loss commands

:SOUR:ID
:SOUR:ID?
:SOUR:STAT
:SOUR:STAT?
:RET:LOSS:NORM
:FETC:MEAS:VAL?

Memory Management commands

:MEM:FREE?
:MEM:USED?
:MEM:GROU
:MEM:GROU?
:MEM:GROU:MEAS

:MEM:GROU:MEAS?
 :MEM:ID:MEAS?
 :MEM:STOR:MEAS
 :MEM:REC:MEAS?
 :MEM:REC:ALL?
 :MEM:DEL:MEAS
 :MEM:DEL:GROU
 :MEM:DEL:ALL

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, ORL-55/01,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.)

Command string	Parameter type / Response type / Unit / Info
:SYST :ERR?	Returns the oldest error in the error queue. Response type: <NR1>, <STRING_RESPONSE_DATA> e.g. -100, "Command error"
: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
:SYST :DATE	Sets the date (yy,mm,dd). e.g. :SYST:DATE 07,11,30
:SYST :DATE?	Returns the date (yy,mm,dd). e.g. 07,11,30
:SYST :TIME	Sets the time (hh,mm,ss). e.g. :SYST:TIME 23,59,59

Command string	Parameter type / Response type / Unit / Info
:SYST :TIME?	Returns the time (hh,mm,ss). e.g. 23,59,59
:DEV:MODE	Sets the device operating mode. Parameter type: <MNEMONIC> Modes: <ul style="list-style-type: none"> • SOUR: Laser Source mode • POW: Power Meter mode • RET_LOSS: Return Loss Test mode
:DEV:MODE?	Returns the device operating mode: SOUR or POW or RET_LOSS

Laser Source commands

Command string	Parameter type / Response type / Unit / Info
: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 :SOUR :WAV :VAL?	Returns the wavelength [nm] for the specified LASER source. Parameter type: <NR1> e.g. :SYST:SOUR:WAV:VAL? 1
:SYST :SOUR :POW :MAX?	Returns the maximum power level [dBm x 100] of the specified LASER source. Parameter type: <NR1> e.g. :SYST:SOUR:POW:MAX? 2

Command string	Parameter type / Response type / Unit / Info
:SYST :SOUR :POW :MIN?	Returns the minimum power level [dBm x 100] of the specified LASER source. Parameter type: <NR1> e.g. :SYST:SOUR:POW:MIN? 2
: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
:SOUR:ID	Selects combination of LASER sources. Parameter type: <NR1> Source ID: <ul style="list-style-type: none"> • 1: LASER1 • 2: LASER2 (if present) • 4: LASER3 (if present) 2-LASER devices only: <ul style="list-style-type: none"> • 3: LASER1 and LASER2 3-LASER devices only <ul style="list-style-type: none"> • 7: LASER1, LASER2 and LASER3
:SOUR:ID?	Returns combination of LASER sources. (For ID descriptions see :SOUR:ID) 1 or 2 or 3 or 4 or 7

Command string	Parameter type / Response type / Unit / Info
:SOUR :WAV :AUTO	Sets Auto- λ modulation ON/OFF. Parameter type: <BOOLEAN> <ul style="list-style-type: none"> • 0: Auto-λ OFF • 1: Auto-λ ON Default setting: OFF (0)
:SOUR :WAV :AUTO?	Returns Auto- λ modulation status. <ul style="list-style-type: none"> • 0: Auto-λ OFF • 1: Auto-λ ON
:SOUR :MOD	Sets modulation for the selected LASER source. Parameter type: <NR1> Values allowed: <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 Note: Setting fails, if more than one LASER source is selected.
:SOUR :MOD?	Returns 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> e.g. :SOUR:POW 1, -522 sets the power level for LASER1 to -5.22 dBm

Command string	Parameter type / Response type / Unit / Info
:SOUR :POW?	Returns the power level [dBm x 100] for the specified LASER source. Parameter type: <NR1> e.g. :SOUR:POW? 1
: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

Power Meter commands

Command string	Parameter type / Response type / Unit / Info
:POW :CAL :WAV :MAX?	Returns the maximum wavelength that can be set. e.g. 1650
:POW :CAL :WAV :MIN?	Returns the minimum wavelength that can be set. e.g. 780
:POW :CAL :WAV :TAB	Sets up to 30 wavelengths in the λ -Table. Parameter type: <NR1,NR1,...> e.g. :POW:CAL:WAV:TAB 820,850,980,1280,1300,1310,1480,1510,1550,1625

Command string	Parameter type / Response type / Unit / Info
:POW :CAL :WAV :TAB?	Returns the contents of the λ -Table. Response type: <NR1,NR1,...>
:POW :CAL :WAV	Selects the calibration wavelength from the λ -Table. See :SYST:CAL:WAV:TAB? for more details. Parameter type: <NR1> e.g. :POW:CAL:WAV 850
:POW :CAL :WAV?	Returns the calibration wavelength currently used by the instrument. e.g. 1310
:POW :DISP :UNIT	Selects how the power level is displayed. Parameter type: <MNEMONIC> <ul style="list-style-type: none"> • LIN: linear display of power level (μW) • LOG: logarithmic display of power level (dBm or dB)
:POW :DISP :UNIT?	Returns the power level display type: LIN or LOG
:POW :REF :STAT	Determines whether the power level reading is displayed as an absolute or a relative value. Parameter type: <BOOLEAN> <ul style="list-style-type: none"> • 0: absolute value (μW or dBm) • 1: relative value (dB) Default setting: 0

Command string	Parameter type / Response type / Unit / Info
:POW :REF :STAT?	Returns the type of power level display. Response type: <BOOLEAN> <ul style="list-style-type: none"> • 0: absolute value • 1: relative value
:POW :REF :VAL	Sets the value for the specified wavelength (to which the power level reading is referred) in relative mode. Parameter type: <NR1>,<NRf> e.g. :POW:REF:VAL 1310,-34.50 sets the reference value for 1310 nm to -34.50 dBm
:POW :REF :VAL?	Returns the value for the specified wavelength (to which the power level reading is referred) in relative mode. Parameter type: <NR1> Response type: <NRf> Unit: dBm e.g. :POW:REF:VAL? 1490
:POW :WAV :AUTO	Determines whether device recognizes Auto λ modulation frequencies which automatically sets the system calibration wavelength. Parameter type: <BOOLEAN> 0: Auto- λ recognition off 1: Auto- λ recognition on Default setting: 0
:POW :WAV :AUTO?	Returns whether Auto- λ recognition is on or off. Response type: <BOOLEAN> 0: Auto- λ detection off 1: Auto- λ detection on

Command string	Parameter type / Response type / Unit / Info
:POW :FETC :AM :AUTO :FREQ?	Returns <ul style="list-style-type: none"> • "1", if an Auto-λ modulation frequency was detected on the incoming signal. • "0" otherwise
:POW :FETC :AM :INT :FREQ?	Returns <ul style="list-style-type: none"> • "0", if the incoming signal is not modulated or Auto-λ modulation frequency is detected. • the modulation frequency [Hz] otherwise Response type: <NR1>
:FETC :MEAS :VAL?	Fetches the values measured by the device depending on its mode: POW: input power fetched Resonse type: <NR3,NR3,NR3> Response unit: <ul style="list-style-type: none"> • Absolute display (:POW:REF:STAT 0) - in dBm for :POW:DISP:UNIT LOG - in W for :POW:DISP:UNIT LIN • Relative display (:POW:REF:STAT 1) in dB RET_LOSS: Return loss fetched Response unit: dB +9.91E37 overflow -9.91E37 underflow The number of values fetched (1...3) depends on the number of wavelengths measured on the incoming signal.

Return Loss commands

Command string	Parameter type / Response type / Unit / Info
:SOUR:ID	See „:SOUR:ID” on page 51.
:SOUR:ID?	See „:SOUR:ID?” on page 51.
:SOUR:STAT	See „:SOUR:STAT” on page 52.
:SOUR:STAT?	See „:SOUR:STAT?” on page 52.
:RET :LOSS :NORM	Triggers the “Normalizing Open Port” function in Return Loss mode. Note: This operation takes a few seconds to complete.
:FETC :MEAS :VAL?	See „:FETC :MEAS :VAL?” on page 61.

ORL-55 and cORL-A1 additional remote commands

Command string	Parameter type / Response type / Unit / Info
:EXEC:REF	<reflections factor> Parameter type: integer Reflections factor in thousandth: for example 950 for 95%. For example for 95% type in :exec:ref 950

Remote command description

This command is only allowed in the RETURN LOSS MODE with LASER ON. If the unit is in a different mode, the unit will display an error message.

This command will switch the unit to user-specific reference values.

NOTICE: This will take a couple of seconds.

If the unit is set to user-specific reference values, you will see in the top line of the display

Return Loss C

Command string	Parameter type / Response type / Unit / Info
:RET:LOSS :ENA:REF	<BOOLEAN> Parameter type: BOOLEAN 0 = Switch to production reference values (JDSU calibration) 1 = Switch to user-specific reference values (The command :EXEC:REF should be executed prior to this command)
:RET:LOSS :ENA:REF?	Parameter: none Return value: BOOLEAN 0 = Production reference values(JDSU calibration) are set 1 = User-specific reference values are set

Memory Management commands

Command string	Parameter type / Response type / Unit / Info
:MEM :FREE?	Returns number of how many measurements can still be stored until memory is full.
:MEM :USED?	Returns number of measurements stored.
:MEM :GROU	Selects the group (1...350) where the measurement is stored, deleted or recalled. Parameter type: <NR1> e.g. :MEM:GROU 10
:MEM :GROU?	Returns the group where the measurement is stored, deleted or recalled. e.g. 10
:MEM :GROU :MEAS	Sets the measurement number (1...350) in the current group where the measurement is stored, deleted or recalled. Parameter type: <NR1> e.g. :MEM:GROU:MEAS 25
:MEM :GROU :MEAS?	Returns the measurement number in the current group where the measurement is stored, deleted or recalled. e.g. 25
:MEM :ID :MEAS?	Returns the current group and measurement number where the measurement is stored, deleted or recalled. e.g. 10,25

Command string	Parameter type / Response type / Unit / Info
:MEM :STOR :MEAS	Stores the current measurement under the current measurement group and number. Note: If this command is repeated immediately (i.e. with no other commands, such as :MEM:REC:MEAS? in between), the identifier increments by 1 for the next store operation.
:MEM :REC :MEAS?	Returns the measurement stored in the memory at the current group/meas value. Format for measurement: group, meas; date, time; measdata[; measdata] Format of measdata: wavelength, level, reference e.g. 1,6;2007/AUG/31;23:59:59; 1490nm,-45.69dB,-5.12dBm; 1550nm,-12.34dB,-10.00dBm
:MEM :REC :ALL?	Returns all the measurements stored in the memory. Format for each measurement: see :MEM:REC:MEAS?
:MEM :DEL :MEAS	Deletes the current measurement.
:MEM :DEL :GROU	Deletes all measurements in the specified group (1...350). e.g. :MEM:DEL:GROU 20
:MEM :DEL :ALL	Deletes all measurement results from the memory.

OFS-355 Download Manager

The OFS-355 Download Manager is a free download offered by JDSU which allows you to easily transfer stored measurement data to a PC, to enhance the performance of your SMART optical handheld devices, and to speed up production of your test reports.

To download the OFS-355 Download Manager:

1. Go to the JDSU web site: www.jdsu.com
2. Type OFS-355 in the search box.
3. Select OFS-355 from the search results list.
The OFS-355 information page opens.
4. Select the download tab.
5. Click on the download link to download the software and follow the instructions given.

OFS-355 Download Manager function overview

- Stored measurement data can be transferred to a PC and displayed as an Excel table for later evaluation.



Fig. 13 Main menu of the OFS-355 Download Manager.

- A complete acceptance report can be created quickly and easily.



Fig. 14 Acceptance report

- The OFS-355 Download Manager allows remote control of a device connected to the PC. You can use this to measure the signal power level at intervals (and at several wavelengths) and transfer the data to the PC immediately. The data can be displayed as an incremental table or as a live graph.

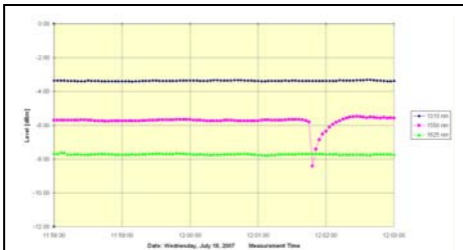


Fig. 15 Data displayed as a graph

- When certain pre-defined actions occur, e-mails can be sent to report the measurement results.

9 SPECIFICATIONS

Laser Source

Laser safety	IEC 60825-1:2007
Laser classification	CLASS 1 LASER PRODUCT
Selectable wavelengths ¹⁾	
BN 2287/21	1310/1550 nm
BN 2287/22	1310/1490/1550 nm
BN 2287/23	1310/1550/1625 nm
Spectral width (RMS)	< 5 nm
Outputs	single
Output power ²⁾	
CW	
1310, 1550, 1625 nm	-3.00 to -10 dBm
1490 nm	-6 to -13 dBm
Modulation, Auto λ	
1310, 1550, 1625 nm	-6.00 to -13 dBm
1490 nm	-9 to -16 dBm
Resolution power	0.01 dB
Signal stability ³⁾	
- short time	± 0.02 dB (within 15 min.)
- long time	± 0.20 dB (within 8 h)
Operating modes	Continuous wave (CW); Modulation 270 Hz, 1 kHz, 2 kHz; Auto- λ ⁴⁾

1) typ. ± 20 nm

2) CW signal, $T = 23$ °C ± 3 K, incl. connector, depends on quality of connector (for $\lambda = 1490$ nm: 3 dB less).

3) Temperature range: -10 °C to +55 °C, $\Delta T = \pm 0.3$ K

4) Signal coding for automatic wavelength detection. Only available with JDSU ORL-55 or OLP-55.

Power Meter

Adjustable wavelength range	1260 nm to 1650 nm, in 1 nm steps
Calibrated wavelengths	1310 nm, 1550 nm, 1625 nm
Photo diode	InGaAs
Display range ¹⁾	-70 dBm to +6 dBm
Resolution ²⁾	0.01 dB, 0.001 μ W
Max. permitted level	+6 dBm
Intrinsic uncertainty ³⁾	± 0.4 dB
Overall measurement uncertainty ⁴⁾	-60 to 0 dBm: ± 0.5 dB ± 3 nW

1) -50 dBm to +6 dBm in Multi- λ mode.

2) For levels < -60 dBm: 0.1 dB

3) Under reference conditions: -20 dBm (CW), 1310 nm ± 1 nm, 23 °C ± 3 K, 45 to 75% relative humidity, 9 to 50 μ m test fiber with DIN connector.

4) At 23 °C ± 3 K, at the calibrated wavelengths.

Return Loss Test

Selectable wavelengths¹⁾

- BN 2287/21 1310/1550 nm
- BN 2287/22 1310/1490/1550 nm
- BN 2287/23 1310/1550/1625 nm

Spectral width (RMS)	< 5 nm
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Measurement range	0 dB to +60 dB
-------------------	----------------

Display range	0 dB to +70 dB
---------------	----------------

Measurement accuracy²⁾

- 0 to +50 dB ± 0.7 dB
- +50 to +60 dB ± 0.9 dB

Resolution	0.01 dB
------------	---------

1) typ. ± 20 nm

2) Under reference conditions: 20 °C ± 3 K, 45% to 75% rel. humidity, in Single- λ mode.

General specifications

Wavelength detection ¹⁾	Automatic switching and displaying up to three wavelengths simultaneously
Reference level	Transfer of measured value or entry of any reference level in the range -80 to +30 dBm, one Reference Level for each wavelength
Modulation detection ²⁾	270 Hz, 1 kHz, 2 kHz
Warm up time	15 min.
Optical adapter system	Interchangeable adapter, series BN 2150/00.xx
Fiber type	9/125
Connector type	APC (Angled Physical Contact)

- 1) Only together with JDSU OLS-55 Optical Light Sources. Only works when power difference is < 20 dB.
- 2) From -50 dBm (1260 to 1625 nm).

Display

Display type	Graphical display, 128 x 64 dots, b/w. backlight function (can be disabled)
--------------	---

Memory

Memory capacity	1000 measurement results, 350 data sets
Data readout/ Remote control	via USB interface

Power supply

Dry batteries	4 x AA, 1.5 V
Rechargeable batteries	NiMH, 4 x AA, 1.2 V, internal recharge
Operating time with dry/rechargeable batteries ¹⁾	typ. 65 h (without backlight)
AC line operation	with separate SNT-121A AC Adapter/ Charger Unit
Power saving mode	auto power-off after appr. 20 min (can be disabled)

1) In Return Loss Test mode with one wavelength.

Electromagnetic compatibility (EMC)	IEC 61321
Recommended calibration interval	3 years

Ambient temperature

Nominal range of use	-10 to +55 °C
Storage and transport	-40 to +70 °C
SNT-121A AC Adapter/ Charger Unit	0 to +40 °C

Air humidity

Relative humidity up to +30 °C	5 to 95%
Absolute humidity > +30 °C	1 to 29 g/m ³

Occasional condensation is tolerable as a limit condition.

Dimensions and weight

Dimensions (w x h x d)	95 x 60 x 195 mm
Weight	approx. 500 g (including batteries)

SNT-121A AC Adapter/Charger Unit

Nominal line voltage range	100 to 240 VAC
Nominal line frequency range	47 to 63 Hz
Power consumption	max. 8.5 W
Temperature range	0 to +40°C

Condensation – even occasional – is not tolerable.

Visual Fault Locator (optional)

For devices with Visual Fault Locator only.

Laser safety	IEC 60825-1:2001
Laser classification	CLASS 2 LASER PRODUCT
Wavelength	635 nm
Output power	< 1 mW
Blink frequency	approx. 5 Hz
Optical connector	universal push pull adapter (UPP) for all standard 2.5 mm connector systems

10 ORDERING INFORMATION

1310/1550 nm	BN 2287/21
1310/1490/1550 nm	BN 2287/22
1310/1550/1625 nm	BN 2287/23

Calibration report	BN 2286/90.01
--------------------	---------------

Accessories

Optical adapters	BN 2150/00.xx
OCK-10 Optical cleaning kit	BN 2229/90.21
Cleaning tape for optical connectors	BN 2229/90.07

Spare tape for optical cleaning tape	BN 2229/90.08
--------------------------------------	---------------

NiMH cells (AA size, 1.2 V)	BN 2237/90.02
SNT-121A AC Adapter/Charger Unit (worldwide compatible)	BN 2277/90.01
USB adapter cable	K 804

MT-1S belt bag for 1 instrument	BN 2277/90.02
MT-2S Soft case for 2 instruments	BN 2126/03
MT-3S Soft case for 3 instruments	BN 2126/04
MK-3S Hard case for 3 instruments	BN 2093/31

OFS-355 Optical Fiber Assistant Software

Free available software for documentation. Can be downloaded from www.jdsu.com.

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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

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。