OBS-500/550

Optical Broadband LED Source

Operating Manual
BN 2279/98.14
2016.01
English

BN 2279/32
BN 2279/33

Please direct all enquiries to your local Viavi sales company.
The addresses can be found at:
www.viavisolutions.com/en-us/contact-sales-expert

The description of additional features of the device can be found at:
www.viavisolutions.com/en-us/products/network-test-and-certification

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Note: Changes may be made to specifications, descriptions and delivery information.

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CONTENT

1 INTRODUCTION

OBS-500/550 Optical Broadband LED Source

The Test Set is specially designed for dispersion measurements together with the Optical-Dispersion-Modules, available for the T-BERT 8000, MTS-8000 and MTS-6000.

Battery operation from four AA batteries and the robust, shock-proof design provide long operating time in the field even under tough conditions. AC line operation via a separate AC adapter and the USB interface for remote control also ensure ease of use in the laboratory or production environment.

Operating manual update

Continuing enhancement and further development of the SmartClass 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 Viavi web site to check if additional information is available.

To download the latest operating instructions:

1. Visit the Viavi web site at **www.viavisolutions.com/en-us/products/network-test-and-certification**.
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:

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

3	**Requirement** This requirement must be met first; e.g. 3 The system is switched on
⇒ 1. 2.	**Instruction** Follow the instructions given (the numbers indicate the order in which the instructions should be followed); e.g. ⇒ Select mode.
Italics	**Result** Indicates the result of following an instruction; e.g. *The page opens.*
Bold type face	**Pages, controls, and display elements** Screen pages, controls, and display elements are indicated in **bold type**.
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

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 OBS-500/550

WARNING

Dangerous laser radiation

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

This device is a Class 1M Laser product according to IEC 60825-1:2001.

Viewing the laser output of a Class 1M Laser Product with certain optical instruments (for example: loupes, magnifiers, microscopes) may pose an eye hazard.

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.
- ! Do not expose to the beam within a distance of 100 mm.
- ! Do not view the output of a laser source using optical instruments or 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.

Battery operation

WARNING

Explosion danger

Dry batteries must not be recharged. An incorrect setting of the battery type switch in the battery compartment will charge dry batteries which may then explode.

! Set the battery type switch according to the used battery type, see „Replacing batteries", page 13.

Short-circuiting the 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 an electrical conducting object.
! Only use AA size dry batteries or rechargeable batteries.
! Make sure the batteries are inserted with the correct polarity.

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 Adapter/Charger

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/Charger or adversely affect its function and safety.

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

CAUTION

Insufficient ventilation

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

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

CAUTION

Condensation

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

! Do not operate the SNT-121A Adapter/Charger if condensation has formed.
! If condensation cannot be avoided, such as when the SNT-121A Adapter/Charger is cold and is moved to a warm room, wait until the SNT-121A 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 during shipping). Using the original packing material ensures that the device is properly protected during shipping.

Checking the package contents

Your level meter is shipped with the following accessories:

- 1 test adapter
- 4 dry batteries AA
- Carrying bag
- Operating manual

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 Viavi Sales Company. Addresses can be found at **www.viavisolutions.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", page 28).

Device overview

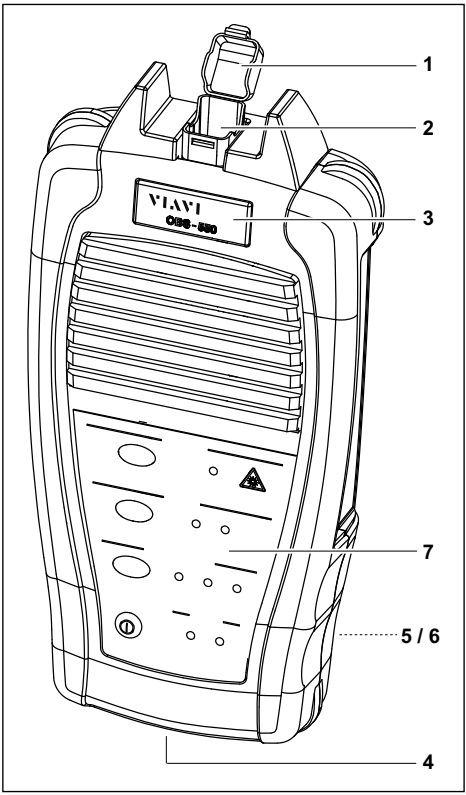


Fig. 1 Front and side view

1	Test head cover
2	Connector panel (see page 12 for details)
3	Device label
4	External power supply connector, USB control interface
5	Battery compartment (on rear of the device)
6	Battery type switch (inside the battery compartment)
7	Key pad

OUTPUT	Switch laser on / off.
MODE	Select device mode: • HD: High Dynamic (only OBS-550) • BB: Broadband
APPLICATION	Select device application: • PMD: Polarization Mode Dispersion • AP: Attenuation Profile • CD: Chromatic Dispersion
BATT	Displays battery status: • LOW (red) • CHARGE (yellow or green)
⏻	Press to switch the device on / off.

Connector panel

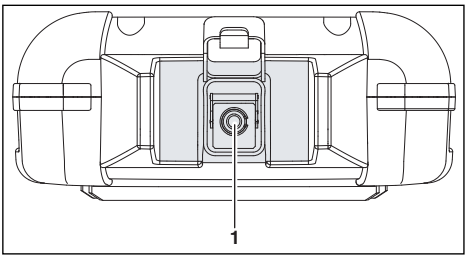


Fig. 2 OBS-550 connector panel

1	Optical connector (JAE adapter)

Power Supply

The following power sources can be used to operate the OBS-500/550:

- 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 Adapter/Charger

Battery operation

CAUTION

Dangers when handling batteries

Dry batteries must not be recharged. Therefore the battery type switch must be set according to the type of the inserted batteries, see below.

- ! Only use AA size dry or rechargeable batteries.
- ! Do not recharge dry batteries. Set the battery type switch according to the battery type of the inserted batteries, see below.
- ! Always use four batteries of the same type; i.e. do not mix rechargeable and non-rechargeable batteries.
- ! Make sure the batteries are inserted with the correct polarity.
- ! Do not replace individual batteries. Always change all four batteries at the same time.
- ! Never short-circuit the battery contacts simultaneously with an electrical conducting object.

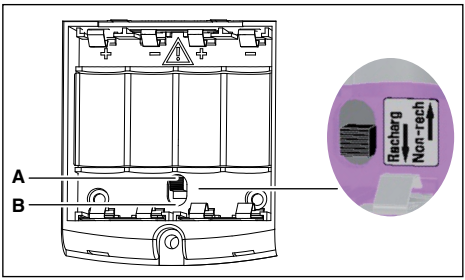
Replacing batteries

The red battery status LED indicates that battery replacement or battery charging is required.

The battery compartment is on the back of the instrument.

1. Pull down the lid to open the battery compartment.
2. Set the battery type switch to the position according to the used battery type.

Position A	labeled with **Non-rech** for dry batteries
Position B	labeled with **Recharg** for rechargeable batteries



3. Fit new batteries or remove the used batteries and replace them with fresh ones.

NOTICE: Take care to insert the batteries correctly. The correct polarity is indicated by + and – inside the battery compartment.

4. Close the battery compartment.
5. Press **[ⓘ]** to switch on.

Recharging the batteries

Rechargeable batteries can be recharged with the SNT-121A Adapter/Charger when the device is switched off. The Charge-LED lights up yellow and turns to green as soon as the batteries are fully charged. Complete recharging takes about 3 hours.

General tips on using batteries

- Always handle batteries with care.
- Do not drop or damage the batteries or expose them to excessively high temperatures.
- 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 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 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 these 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.

Operation from AC power

NOTICE: Only the SNT-121A Adapter/Charger must be used to operate the OBS-500/550 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/Charger is ready for use.

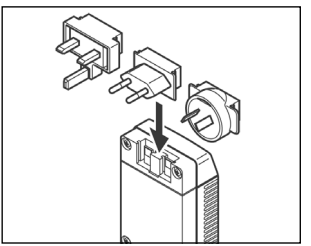


Fig. 3 SNT-121A Adapter/Charger.

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).

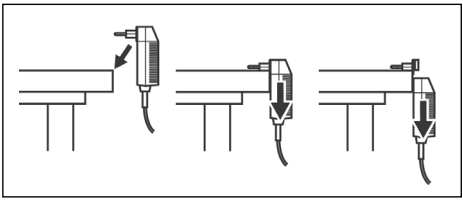


Fig. 4 SNT-121A: Changing the AC line plug adapter.

To operate the OBS-500/550 from AC power:

NOTICE: Make sure that the switch in the battery compartment is in the proper position depending on the battery type as described in „Replacing batteries”.

1. Connect the SNT-121A DC power cord to the OBS-500/550 DC power socket.
   (The socket is under the cover on the right side.)
2. Plug the SNT-121A into the AC line socket.
   The OBS-500/550 switches on automatically when powered from the SNT-121A.

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

Connecting optical cables

Mounting test adapters

Viavi provides a number of test adapters for connecting the OBS-500/550 to the interface to be tested.

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 Viavi 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.

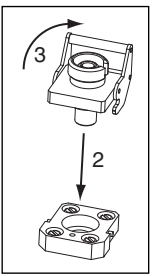


Fig. 5 Mounting the JAE test adapter

4 OPERATION

Switching the device on/off

To switch the device on:

⇒ Press **[⏻]** to switch on the device.

To switch the device off:

⇒ Press **[⏻]** to switch off the device.

Laser on / off

To switch the laser on / off:

⇒ Press **[OUTPUT]**.

Select device mode

The OBS-500/550 provides following device modes:

- HD (High Dynamic) (only OBS-550)
  In this mode the fiber amplifier (EDFA) is activated. This provides a high-power output signal with limited bandwith.
- BB (Broadband)
  In this mode the fiber amplifier (EDFA) is not activated. The entire SLED-bandwith is available.

To select a device mode:

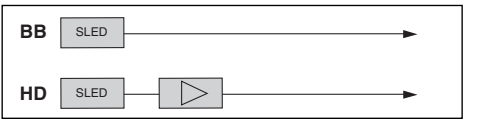
⇒ Press **[MODE]**.

Note: The OBS-500 has no function on this key.

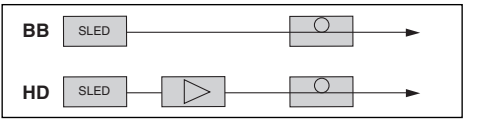
Select device application

The OBS-500/550 provides three application modes:

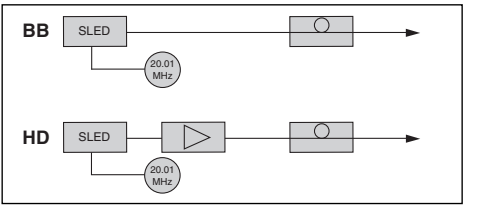
- PMD (Polarization mode dispersion)



- AP (Attenuation Profile)



- CD (Chromatic dispersion)



BB Broadband Mode

HD High Dynamic Mode (only OBS-550)

EDFA (Erbium Doped Fiber Amplifier) (only OBS-550)

Depolarizer

To select an application mode:

⇒ Press **[APPLICATION]**.

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 Viavi web site at **www.viavisolutions.com/en-us/products/network-test-and-certification**.
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. Press and hold the buttons **[OUTPUT]** + **[MODE]** + **[APPLICATION]** and then press **[ⓘ]**.
   The PMD, PA, and CD LEDs light up and the device is ready for the firmware update.
2. 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).

5 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 and disconnect it from all power sources including at least one battery and any optical radiation sources.
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.

6 REMOTE CONTROL

Communication interface

The OBS-500/550 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.viavisolutions.com/en-us/products/network-test-and-certification**.

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?
:DEV:POW
:DEV:POW?
:SYST:ERR?
:SYST:DEV:DEF

Laser Source commands

:SOUR:APPL
:SOUR:APPL?
:SOUR:MODE
:SOUR:MODE?
: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. Viavi Solutions Deutschland GmbH, OBS-500/550/01,A-0106,V03.30
***OPC?**	Returns "1" as soon as all operations in progress have been completed.
:DEV :POW	Switch from standby (battery charging) to running. **Parameter type:** <BOOLEAN>
:DEV :POW?	Returns operating status: 1 = Running; 0 = Standby
: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.

Laser Source commands

Command string	Parameter type / Response type / Unit / Info
:SOUR :APPL	Sets the device application. Parameter type: <MNEMONIC> **Applications:** • PMD: Polarization mode dispersion • AP: Attenuation profile • CD: Chromatic dispersion
:SOUR :APPL?	Returns the device application: PMD, AP or CD
:SOUR :MODE	(only OBS-550) Sets the device mode. Parameter type: <MNEMONIC> **Applications:** • HD: High Dynamic • BB: Broadband
:SOUR :MODE?	(only OBS-550) Returns the device mode: HD or BB
:SOUR :STAT	Sets state of the LASER ON/OFF. **Parameter type:** <BOOLEAN> • 0: LASER OFF • 1: LASER ON
:SOUR :STAT?	Returns the state of the LASER. • 0: LASER OFF • 1: LASER ON

7 SPECIFICATIONS

Technical data

Laser safety	IEC 60825-1:2001
Laser classification	CLASS 1M LASER PRODUCT
Spectral power density (PMD application):	
- BB mode (1460 nm...1640 nm)	> -46 dBm / 0.1 nm
- HD mode (1530 nm...1610 nm)[1)]	> -30 dBm / 0.1 nm
Polarization extinction ratio:	
- PMD application	> 15 dB
- CD / AP application	< 0.22 dB (< 5%)
Settling time after “Laser ON”	< 10 s

1) only OBS-550

General specifications

Optical connector

Connector type	PC
Optical adapter system	Interchangeable adapter from BN 2150/00.xx range
Connectable fiber type	SMF 9/125 µm

Power supply

Dry batteries	4 x AA, 1.5 V
Rechargeable batteries	NiMH, 4 x AA, 1.2 V, internal battery charging
Operating time dry/rechargeable batteries	BB mode: 2.5 h HD mode: 2 h
AC line operation	with separate SNT-121A Adapter/Charger
Battery charging time	2.5 h

Electromagnetic compatibility (EMC)	IEC 61326-1:2005 Class B
Recommended calibration interval	3 years

Ambient temperature

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

Dimensions and weight

Dimensions (w x h x d)	125 x 50 x 260 mm
Weight	600 g (including batteries)

SNT-121A Adapter/Charger

Power supply type	FW 75550/12
Nominal line voltage range	100 to 240 VAC
Nominal line frequency range	47 to 63 Hz
Power consumption	max. 8.5 W
Output	12 V ⎓ / 1.25 A
Temperature range	0 to +40°C

Condensation – even occasional – is not tolerable.

8 ORDERING INFORMATION

Optical Broadband LED Source

OBS-500	**BN 2279/33**
OBS-550	**BN 2279/32**

Accessories

Universal optical adapter

JAE type	
- ST	BN 2150/00.32
- DIN 47256	BN 2150/00.50
- FC-PC, FC-APC	BN 2150/00.51
- SC-PC, SC-APC	BN 2150/00.58
- LC	BN 2150/00.59

Cleaning materials, power supplies

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
NiMH rechargeable batteries, Mignon AA, 1.2 V (4 batteries required)	BN 2237/90.02
SNT-121A Adapter/Charger (worldwide compatible)	BN 2277/90.01
USB connection cable	K804

Bags

Carrying bag for OBS-500/550	BN 2279/90.10
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 4 instruments	BN 2093/31

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Viavi Environmental Management Program

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

Environmental management is an integral part of Viavi'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 Viavi is essential in regard to environmental policy and enhances cooperation between ourselves and our business partners.

The Viavi Environmental Management Program considers:

Product design and manufacture
Environmental restrictions and requirements are taken into account during planning and manufacture of Viavi products. This attention ranges form 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
Viavi 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
Viavi encourages our customers and suppliers who take this responsibility seriously to join Viavi 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 Viavi 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 Viavi Environmental Management Program, please contact us at:

If you would like specific information about the Viavi Environmental Management Program, please contact us at **www.viavisolutions.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	O	O	O	O	O
内部配线 (Internal wiring)	O	O	O	O	O	O
显示器 (Display)	O	O	O	O	O	O
键盘 (Keyboard)	O	O	O	O	O	O
塑料外壳零件 (Plastic case parts)	O	O	O	O	O	O
配件 (Accessories)	O	O	O	O	O	O

O：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。

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