

## Scanning Monochromator (MonoScan2000)



## Installation and Operation Manual

Document Number 000-10000-150-02-1006

**Offices:** **Ocean Optics, Inc.**  
830 Douglas Ave., Dunedin, FL, USA 34698  
Phone 727.733.2447  
Fax 727.733.3962  
8 a.m.– 8 p.m. (Mon-Thu), 8 a.m.– 6 p.m. (Fri) EST

**Ocean Optics B.V. (Europe)**  
Geograaf 24, 6921 EW DUIVEN, The Netherlands  
Phone 31-(0)26-3190500  
Fax 31-(0)26-3190505

---

**E-mail:** **Info@OceanOptics.com** (General sales inquiries)  
**Info@OceanOpticsBV.com** (European sales inquiries)  
**Orders@OceanOptics.com** (Questions about orders)  
**TechSupport@OceanOptics.com** (Technical support)



Ocean Optics offers the most comprehensive, innovative and high-quality line of modular spectroscopy tools in the world. Mikropack, a leading supplier of spectroscopy and thin film components, is an essential and valuable partner in this enterprise. We have partnered with Mikropack because they are committed to the same goals of innovation and quality that inspire us here at Ocean Optics. As always, Ocean Optics conducts its business in an open, honest and technically available fashion. We invite you to contact us at Ocean Optics, Inc. (see front cover for contact information) or Mikropack GmbH with any technical questions, comments, or applications inquiries. Mikropack GmbH can be contacted at the following location:

MIKROPACK GmbH  
Maybachstraße 11  
D-73760 Ostfildern  
Germany  
Tel.: +49 (0)711 34 16 96-0 • Fax.: +49 (0)711 34 16 96-85  
e-mail: [info@mikropack.de](mailto:info@mikropack.de)  
internet: [www.mikropack.de](http://www.mikropack.de)

**Copyright © 2001-2006 Ocean Optics, Inc.**

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, by any means, electronic, mechanical, photocopying, recording, or otherwise, without written permission from Ocean Optics, Inc.

This manual is sold as part of an order and subject to the condition that it shall not, by way of trade or otherwise, be lent, re-sold, hired out or otherwise circulated without the prior consent of Ocean Optics, Inc. in any form of binding or cover other than that in which it is published.

**Trademarks**

Microsoft, Windows, Windows 95, Windows 98, Windows Me, Windows NT, Windows 2000, Windows XP and Excel are either registered trademarks or trademarks of Microsoft Corporation.

**Limit of Liability**

Every effort has been made to make this manual as complete and as accurate as possible, but no warranty or fitness is implied. The information provided is on an “as is” basis. Ocean Optics, Inc. shall have neither liability nor responsibility to any person or entity with respect to any loss or damages arising from the information contained in this manual

---

# Important Safety Notices

1. Read all safety notices and operating instructions before operating this unit.
2. Inspect the item for transport damage before using the 24VDC power supply for the first time.
3. Adhere to all warning stickers on the unit and all warnings contained in this manual.

## Warranty

Mikropack GmbH warrants to the original user of this instrument that it shall be free of any defects resulting from faulty manufacture of this instrument for a period of 12 months from the original date of shipment.

**This instrument should not be used for any Clinical or Diagnostic purposes.** Data generated in these areas is not warranted in any way by Mikropack GmbH. Any defects covered by this Warranty shall be corrected either by repair or by replacement, as determined by Mikropack GmbH.

There are no warranties that extend beyond the description herein.

This Warranty is in lieu of, and excludes, any and all other warranties or representations expressed, implied, or statutory, including merchantability and fitness, as well as any and all other obligations or liabilities of Mikropack GmbH including, but not limited to, special or consequential damages. No person, firm, or corporation is authorized to assume for Mikropack GmbH. Any additional obligation or liability not expressed provided for herein except in writing duly executed by an officer of Mikropack GmbH:

MIKROPACK GmbH  
Maybachstraße 11  
D-73760 Ostfildern

Tel.: +49 (0)711 3428088 • Fax.: +49 (0)711 3428085  
e-mail: [info@mikropack.de](mailto:info@mikropack.de)

## Warranty Handling

### ► *Procedure*

Follow the procedure below to process a warranty claim:

1. Determine the problem or fault with your local distributor.
2. If a problem is evident, obtain an RMA number from your local distributor.

### **Important Safety Notices**

---

3. Send the equipment to the local distributor for repair. If the item is under warranty, shipping will be free-of-charge both ways.
4. Contact your distributor for repair and delivery time. If the item is out of warranty, your distributor will provide a repair cost to you. In this situation, the distributor will not proceed with the repair until you order it.

Your system will be shipped back to you free of charge with insurance (if under warranty).

---

# Table of Contents

About This Manual .....	iii
Document Purpose and Intended Audience.....	iii
Document Summary.....	iii
Product-Related Documentation .....	iii
Upgrades.....	iii
<b>Chapter 1: Setup .....</b>	<b>1</b>
Overview .....	1
Applications .....	1
Set-up.....	1
Unpacking the MonoScan2000 .....	2
Contents .....	2
Quick Start.....	2
<b>Chapter 2: Programming Information .....</b>	<b>5</b>
MonoScan-2000 Interface-DLL .....	5
Direct Serial Communication (ASCII Commands).....	7
ASCII Commands.....	7
Stored Data .....	8
End User License Agreement for Software (EULA) .....	9
<b>Appendix A: Specifications.....</b>	<b>11</b>
Operating Environment .....	11
Physical Specifications.....	11
<b>Index.....</b>	<b>13</b>



---

# About This Manual

## Document Purpose and Intended Audience

This document provides you with an installation section to get your system up and running.

## Document Summary

Chapter	Description
Chapter 1: <a href="#">Setup</a>	Contains a list of package contents and unpacking instructions.
Chapter 2: <a href="#">Programming Information</a>	Provides programming information for the MonoScan-2000 software, as well as the EULA.
Appendix A: <a href="#">Specifications</a>	Contains operating environment specifications, as well as other physical details of the product.

## Product-Related Documentation

You can access documentation for Ocean Optics products by visiting our website at <http://www.oceanoptics.com>. Select *Technical* → *Operating Instructions*, then choose the appropriate document from the available drop-down lists. Or, use the **Search by Model Number** field at the bottom of the web page.

You can also access operating instructions for Ocean Optics products on the *Software and Technical Resources* CD included with the system.

Engineering-level documentation is located on our website at *Technical* → *Engineering Docs*.

## Upgrades

Occasionally, you may find that you need Ocean Optics to make a change or an upgrade to your system. To facilitate these changes, you must first contact Customer Support and obtain a Return Merchandise Authorization (RMA) number. Please contact an Ocean Optics Application Scientist for specific instructions when returning a product.





---

# Chapter 1

# Setup

## Overview

The MonoScan-2000 is a small-bandwidth fiber optic scanning monochromator. This monochromator is specially made to achieve a high optical throughput in fluorescence and luminescence applications, resulting in an intensive spectral signal.

The unique system design makes it easily compatible with all Ocean Optics and Mikropack light sources, accessories and spectrometers. Its RS232 and USB interfaces and 12VDC power make it convenient to use, and even possible for mobile applications.

## Applications

- **Variable monochromatic lightsource:** If the MonoScan-2000 is combined to our fiber optic lightsources (e.g., HL-2000-HP, HPX-2000; DH-2000; DH-2000-BAL)
- **Single variable Wavelength detection:** If combined with a single Si-Detector
- **Programmable Fluorescence Scanner:** Two MonoScan-2000s combined can be used as a fully programmable fluorescence scanner if the unit is combined with a high-power lightsource (e.g., IHPX2000), going to the sample via fiber, detecting via fiber, then going through the second MonoScan-2000 combined with a single Si-Detector.

## Set-up

The following sections provide instructions on unpacking and setting up your MonoScan-2000.

# Unpacking the MonoScan-2000

## ► Procedure

1. Unpack the MonoScan-2000 carefully. Dropping this instrument can cause permanent damage.
2. Inspect the outside of the instrument and make sure that there is no damage. Do not use the instrument if damage is present. Contact your dealer for repair or replacement information, if necessary.
3. Use this instrument in a clean laboratory environment.
4. Submit the Registration Card to for warranty and support purposes.

## Contents

Your MonoScan-2000 package should contain the following:

- MonoScan-2000 main system
- MonoScan-2000 12VDC power supply

---

### Caution

Before using the power supply of the MonoScan-2000 for the first time, inspect the item for transport damage. Be sure to adhere to all warnings on the unit and in this operational manual.

---

- Software CD (contains MonoScan-2000 software and calibration software)
- Ocean Optics Software & Technical Resources CD (contains manuals)
- RS232 connection cable

## Quick Start

### ► Procedure

1. Install the software delivered with the MonoScan-2000 (double-click on Setup.exe)
2. Connect the power supply to main connection.
3. Connect the power supply to the MonoScan-2000.

4. Connect your PC to the MonoScan-2000
5. Power-on the MonoScan-2000.

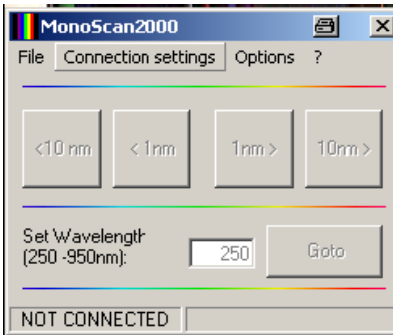


**Front Panel**

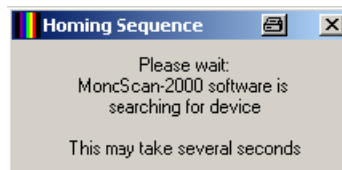


**Rear Panel**

6. Start the MonoScan-2000 software.



7. Go to the Connection settings menu and select the Comport to which the MonoScan-2000 is connected.
8. Go to Connection settings menu and select Connect to establish a connection between the PC and the MonoScan-2000 (the MonoScan-2000 will run to its internal reference and will be set to 250nm).
9. If the device is found on the chosen Comport, the following message appears:



All buttons then become enabled.

10. Set another wavelength by clicking on one of the buttons (<10nm, <1nm, 1nm >, 10nm >) or enter a wavelength and click **Goto**.
11. When the measurements are finished, close the connection between the PC and the MonoScan-2000 in the **Connection settings – Disconnect** menu.

# Programming Information

## MonoScan-2000 Interface-DLL

The following functions are exported by MonoScandrv.dll:

### **MONO\_OpenConnection**

```
long __stdcall MONO_OpenConnection(char* PortName);
```

Returns the handle value for the specified Comport as long integer.

This value has to be stored locally for all other functions.

Returns a negative value in case of error.

Portname has to be e.g. "Com1", "Com2"

### **MONO\_CloseConnection**

```
short __stdcall MONO_CloseConnection(long Handle);
```

Close the connection opened before.

Returns 1 on success else -1

long Handle: Handle of the comport returned by MONO\_OpenConnection

### **MONO\_GetDeviceData**

```
short __stdcall MONO_GetDeviceData(long Handle, unsigned short Node, long* CalibrationData, char* SerialNo);
```

Get the calibration data and the serialnumber of the device

long Handle: The handle to the comport returned by MONO\_OpenConnection

unsigned short Node: has to be 0 (zero)

long\* CalibrationData: Array of long integers, has to contain 92 elements

char\* SerialNo: The serialnumber of the Device, at least 10 characters

## **MONO\_SetWavelength**

short \_\_stdcall MONO\_SetWavelength(long Handle, unsigned short Node, short WavelengthInNm, long\* CalibrationData);

Set the MonoScan-2000 to a specified wavelength in nm.

Returns 1 on success else a negative number.

Long Handle: Handle of the comport returned by MONO\_OpenConnection

unsigned short Node: must be 0 (zero)

short WavelengthInNm: desired wavelength in nm

long\* CalibrationData: Array filled by MONO\_GetDeviceData

## **MONO\_GetWavelength**

short \_\_stdcall MONO\_GetWavelength(long Handle, unsigned short Node, long\* CalibrationData);

returns the actual position of the MonoScan-2000 in nm.

Long Handle: Handle of the comport returned by MONO\_OpenConnection

unsigned short Node: must be 0 (zero)

long\* CalibrationData: Array filled by MONO\_GetDeviceData

## **MONO\_RunReferenceSequence**

short \_\_stdcall MONO\_RunReferenceSequence(long Handle, unsigned short Node);

MonoScan will run to its internal reference point and reset the internal position

Long Handle: Handle of the comport returned by MONO\_OpenConnection

unsigned short Node: must be 0 (zero)

## **MONO\_HomingRunActive**

short \_\_stdcall MONO\_HomingRunActive(long Handle, unsigned Node);

call this function sequentially to see if reference sequence has completed

returns 1 if reference sequence is still active else 0.

Long Handle: Handle of the comport returned by MONO\_OpenConnection

unsigned short Node: must be 0 (zero)

## **MONO\_PositionReached**

short \_\_stdcall MONO\_PositionReached(long Handle, unsigned short Node);

call this function to see if the desired position has been reached.

Returns 0 if still moving else 1

Long Handle: Handle of the comport returned by MONO\_OpenConnection

unsigned short Node: must be 0 (zero)

## MONO\_SetPosition

short \_\_stdcall MONO\_SetPosition(long Handle,unsigned short Node,long Position);

call this function to set an absolute user defined position. Wavelength is not linear to position

Returns 0 in case of error else 1

long Handle: Handle of the comport returned by MONO\_OpenConnection

unsigned short Node: must be 0 (zero)

long position: absolute position value

## MONO\_GetPosition

long \_\_stdcall MONO\_GetPosition(long Handle,unsigned short Node);

call this function to get the absolute position in steps (arbitrary unit)

long Handle: handle of the comport returned by MONO\_OpenConnection

unsigned short Node: must be 0 (zero)

# Direct Serial Communication (ASCII Commands)

If you do not want to use the DLL-functions you can directly communicate with the MonoScan2000 using ASCII commands.

### ► Procedure

The following steps are required:

1. Establish serial connection from PC to MonoScan-2000
2. Read device information such as calibration data and serial number (not necessarily needed)
3. Set an absolute position. Repeat this step as needed.
4. Close serial connection

## ASCII Commands

Command	Description	Example
GOHOSEQ	Reference run is executed. Runs to the lower endpoint (approx 200nm) and sets this position to 0 (zero)	GOHOSEQ [CR]
LA<Pos>	Sets absolute position in steps Command M starts positioning	LA-5000 [CR]M [CR]
LR<Pos>	Sets relative position in steps Command M starts positioning	LR100 [CR]M [CR]
POS	Returns actual position in steps	POS [CR]

## 2: Programming Information

Command	Description	Example
HO	Sets current position to 0 (zero). A reference run executed before will be lost	HO [CR]
GPROGSEQ	Returns the data stored in the MonoScan-2000	GPROGSEQ [CR]

### Note

All Commands have to be completed by Carriage return [CR]

## Stored Data

Stored Data	Comment
JMP1	Internal
11220001	Serial Number
0	Absolute position for 200nm (not valid)
0	
-497	
-1087	
-1665	
-2201	Absolute position for 250nm
-2750	
-3306	
...	Some data left out
-46911	Absolute Position for 1100nm (not valid)
A1	Internal
LR5000	Internal
M	Internal
delay20	Internal
gohoseq	Start reference run

Every time the MonoScan-2000 is powered-on, a reference run is performed.



# End User License Agreement for Software (EULA)

This End-User License Agreement ("EULA") is a legal agreement between you (either an individual or a single entity) and Mikropack GmbH ("Mikropack") for the Mikropack MonoScandrv software, which includes computer software and may include associated media, printed materials, and "online" or electronic documentation ("SOFTWARE"). By installing, copying, or otherwise using the SOFTWARE, you agree to be bound by the terms of this EULA. If you do not agree to the terms of this EULA, do not install, copy or use the SOFTWARE.

The SOFTWARE is protected by copyright laws and international copyright treaties, as well as other intellectual property laws and treaties. The SOFTWARE is licensed, not sold.

## 1. License to Use

Mikropack grants you a non-exclusive and non-transferable license for the internal use only of the SOFTWARE and any error corrections provided by Mikropack.

## 2. Restrictions

SOFTWARE is confidential and copyrighted. Title to SOFTWARE and all associated intellectual property rights is retained by Mikropack and/or its licensors. You may not make copies of SOFTWARE, other than a single copy of SOFTWARE for archival purposes. Unless enforcement is prohibited by applicable law, you may not modify, decompile, or reverse engineer SOFTWARE.

No right, title or interest in or to any trademark, service mark, logo or trade name of Mikropack or its licensors is granted under this EULA.

## 3. Limited Warranty

Mikropack warrants to you that for a period of six (6) months from the date of shipping, as evidenced by a copy of the receipt, the media on which SOFTWARE is furnished (if any) will be free of defects in materials and workmanship under normal use. Except for the foregoing, SOFTWARE is provided "AS IS". Your exclusive remedy and Mikropack's entire liability under this limited warranty will be at Mikropack's option to replace SOFTWARE media or refund the fee paid for SOFTWARE

## 4. Disclaimer of Warranty

Unless specified in this EULA, all express or implied conditions, representations and warranties, including any implied warranty of merchantability, fitness for a particular purpose or noninfringement are disclaimed, except to the extent that these disclaimer are held to be legally invalid.

## 5. Limitation of Liability

To the extent not prohibited by law, in no event will Mikropack or its licensors be liable for any lost revenue, profit or data, or for special, indirect, consequential, incidental or punitive damages, however caused regardless of the theory of liability, arising out of or related to the use of or inability to use SOFTWARE, even if Mikropack has been advised of the possibility of such damages. In no event will Mikropack's liability to you, whether in contract, tort (including negligence), or otherwise, exceed the amount paid by you for Software under this EULA. The foregoing limitations will apply even if the above stated warranty fails of its essential purpose.



---

## Appendix A

# Specifications

This section provides information on the operating environment and physical specifications of the MonoScan-2000.

## Operating Environment

The following table provides information on optimizing the operating environment of your MonoScan-2000.

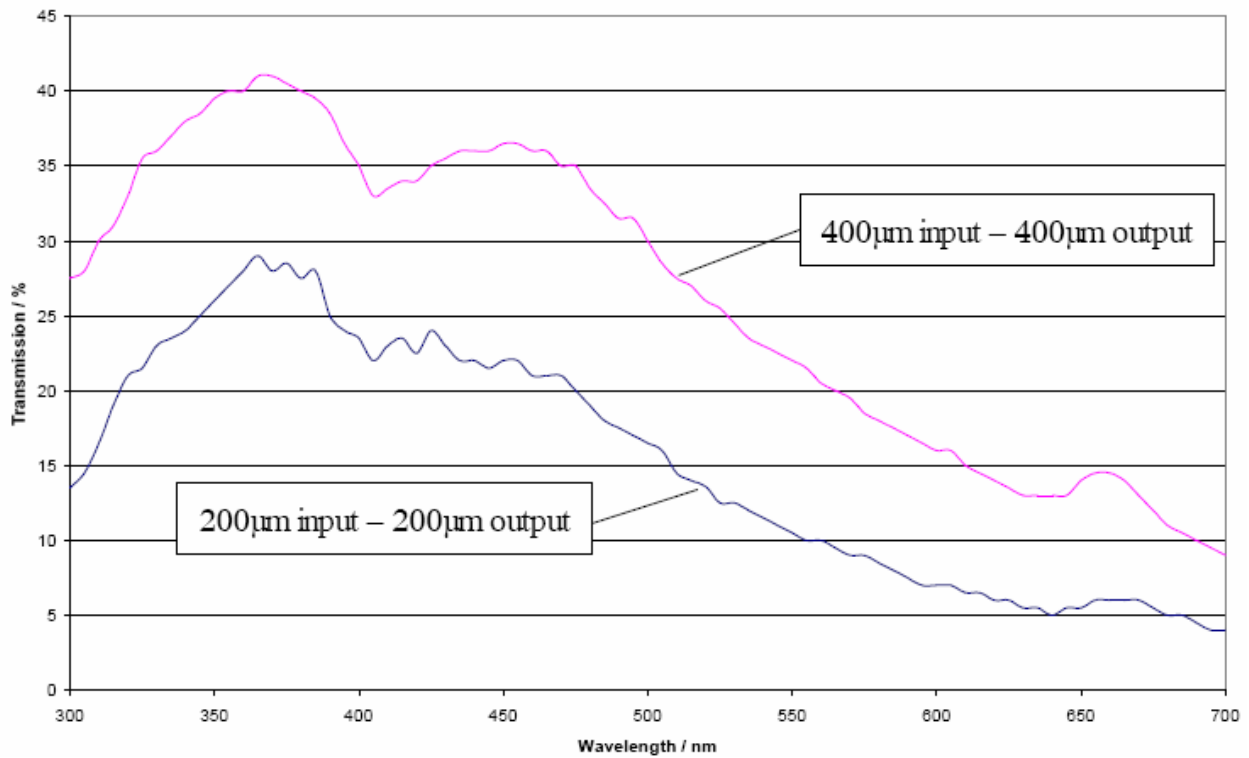
Operating Environment	The MonoScan-2000 Unit . . .
Moisture	Is designed for operation in dry rooms only.
Ventilation	Should be situated so that its location or position does not interfere with proper ventilation.
Heat	Should be situated away from any device that emits excessive heat.
Object and Liquid Entry	Should be positioned so that objects do not fall on top of the unit. Additionally, ensure that no liquids are spilled into the enclosure through openings.
Power Sources	The unit should be connected to a power supply only of the type described in the operating instructions or as marked on the unit.

## Physical Specifications

Specification	Value
Wavelength range	300 – 700 nm
FWHM	4 – 9 nm (400 –1000 fiber)
Holographic grating	1250 l/mm, Blaze 350nm
Accuracy	<0.5nm
Repeatability	0.2nm
Transition speed (wavelength-to-wavelength)	Approximately 3s 300-700nm 1nm step ~ 15ms
Dispersion	Approximately 10nm/mm

**A: Specifications**

Specification	Value
Optical throughput (1000µm fiber)	>50% @ 350nm, >30%@500nm
Interface	RS-232 (Optional USB)
Connectors	SMA 905
Power Requirements	12 VDC max. 1,2A (WT-24V-E), 400 mA
Dimensions (LxWxH)	148 x 112 x 132 mm
Weight	1.2 kg
Temperature range	5°C – 35°C



**Transmission Graph**

---

# Index

## A

applications, 1  
ASCII commands, 7

## D

document  
  audience, ii  
  purpose, ii  
  summary, ii

## E

EULA, 9

## O

operating environment, 11

## P

package contents, 2  
product-related documentation, ii  
programming information, 5

## S

setup, 1  
set-up, 1  
specifications, 11

## U

unpacking procedure, 1  
upgrades, ii

## W

warranty, A

