# Optical Multiplexer

MPM-2000

A Mikropack Product

# Installation and Operation Manual

**Document Number 000-10000-120-02-0505**


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# 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 data 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.

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# 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.

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).

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# About This Manual

## Document Purpose and Intended Audience

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

## What's New in this Document

This version of the *Optical Multiplexer MPM-2000 Installation and Operation Manual* adds our partnership agreement.

## Document Summary

| Chapter | Description |
|---|---|
| Chapter 1: *Setup* | Contains a list of package contents and unpacking instructions. |
| Chapter 2: *MPM-2000 Specifications* | Contains operating environment specifications, as well as other physical details of the product. |
| Chapter 3: *Operating Instructions* | Provides instructions for operating Windows-based software that comes with the MPM-2000. |

## 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 MPM-2000 Fiber Optic Multiplexer is a compact instrument that can optically couple one input channel to 16 different output channels. The MPM-2000 consists of a precisely controlled DC-motor with encoder and end switch on a rotator block. The optical path couples via UV collimating lenses.

The Multiplexer features a CNC controller working in positioning mode, which eliminates step loss. The MPM-2000 is software controlled and interfaces to a PC through the RS-232 protocol. It automatically saves all calibrated positions in the memory of the controlling unit, and easy-to-use software facilitates calibration. The software enables full control of the switching order and delay time.

The MPM-2000 is ideal for applications in process industry, where you need to measure multiple locations with multiple probes but with a single spectrometer channel and/or light source. The MPM-2000 operates as a stand-alone unit and includes a sample program to guide you in setting up your application. The CD contains a driver for Windows, and you can configure the MPM-2000 in Ocean Optics OOIbase32 Platinum software.

The following sections provide instructions on unpacking and setting up your MPM-2000 Optical Multiplexer.

# Unpacking the MPM-2000

► ***Procedure***

1. Unpack the Optical Multiplexer 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 MPM-2000 Optical Multiplexer package should contain the following:

- MPM-2000 Main System
- MPM-2000 24VDC Power Supply

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**Caution**

Before using the power supply of the MPM-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.

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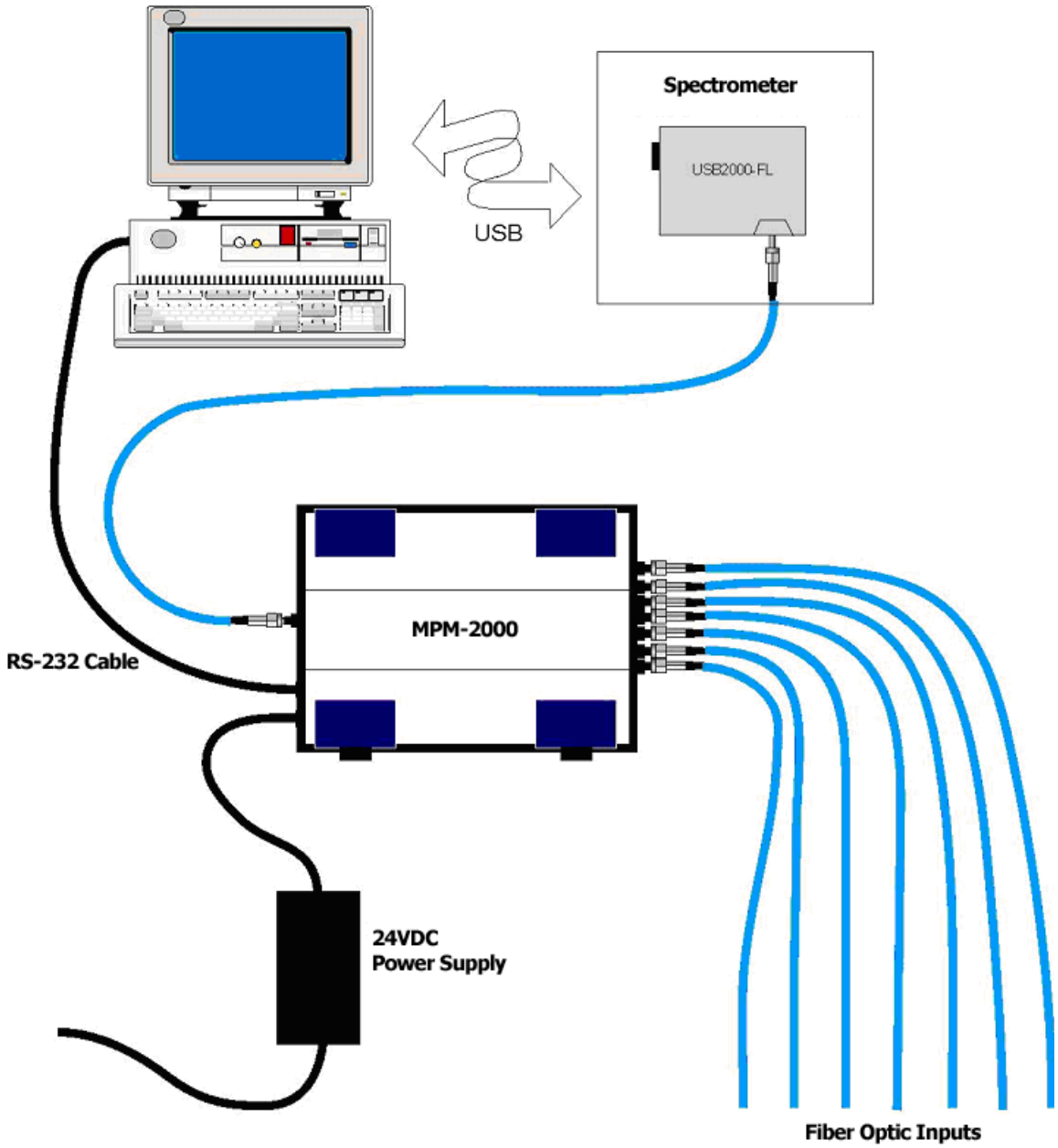
- Software CD (contains MPM-2000 software and Calibration software)
- PC-MPM-2000 Serial Cable

# Typical System Configuration



Chapter 2

# MPM-2000 Specifications

This section provides information on the operating environment and physical controls of the MPM-2000.

## Operating Environment

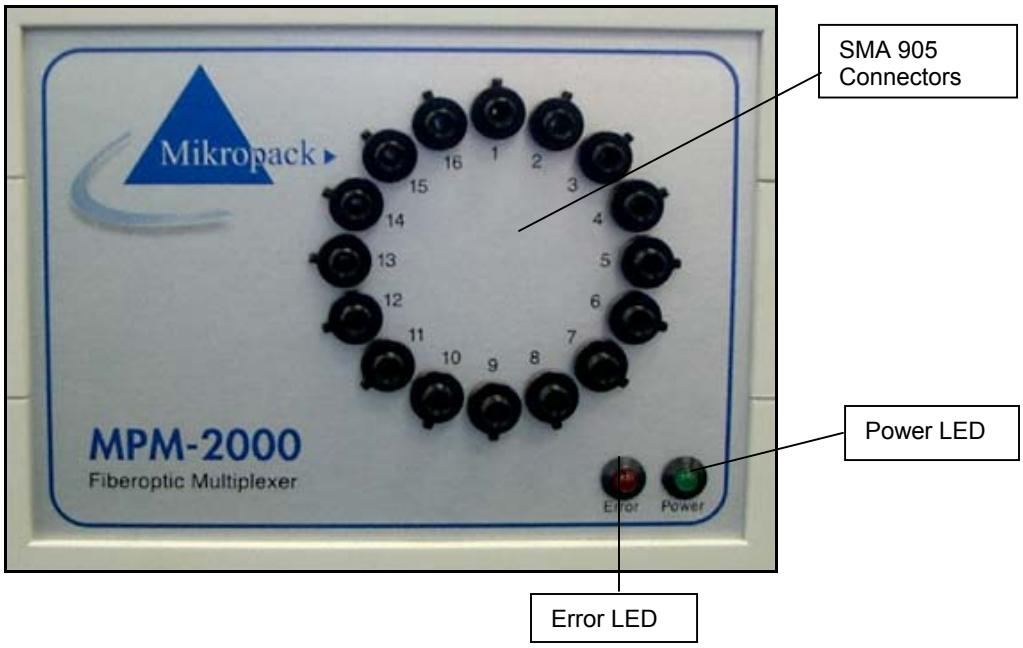
The following table provides information on optimizing the operating environment of your MPM-2000.

| Operating Environment | The MPM-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. |

# MPM-2000 Components

The following sections describe the components located on the front and rear of the MPM-2000 unit.

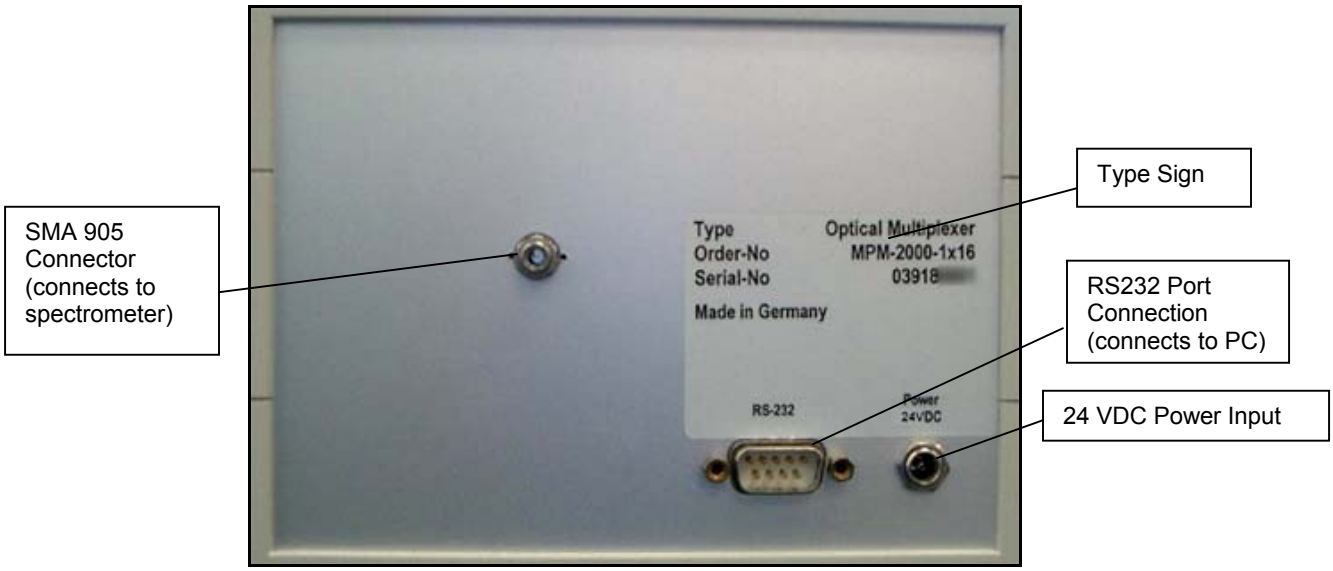
## Front Panel




**Note**

The front panel of both the 1 x 16 and 2 x 8 versions of the MPM-2000 are identical. Only the rear panel will differ (two inputs on the 2 x 8 version).

# Rear Panel


SMA 905 Connector (connects to spectrometer)
Type Sign
RS232 Port Connection (connects to PC)
24 VDC Power Input
Type Optical Multiplexer
Order-No MPM-2000-1x16
Serial-No 03918
Made in Germany
RS-232
Power 24VDC

Chapter 3

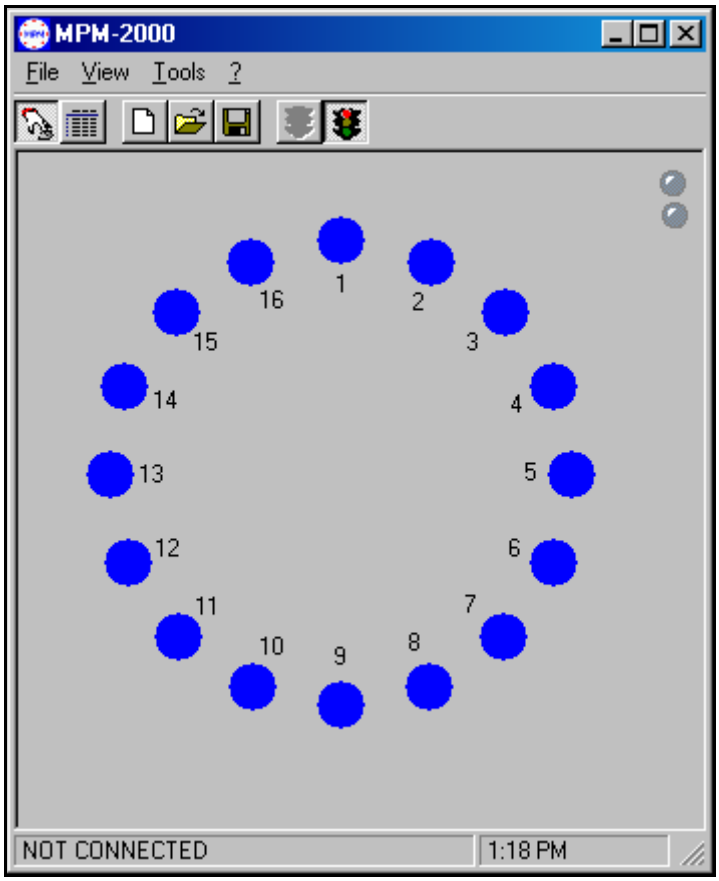
# Operating Instructions

## Operating Software

The MPM-2000 comes with easy-to-use Windows-based software that allows you to control the MPM-2000 Optical Multiplexer manually or create sequence programs (scripts) with preconfigured channel settings and delay times. The graphical software interface allows you to choose from three modes of operation:

- *Channel Mode*
- *Program Mode*
- *Small Mode*

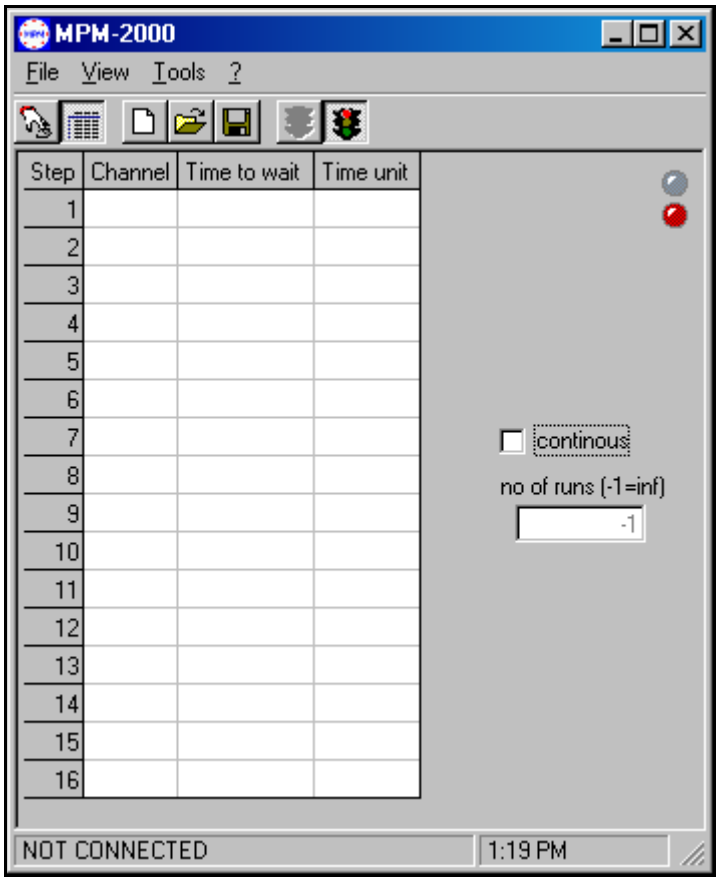
# Channel Mode




Channel Mode allows you to change the active channel on the MPM-2000. You can click on any of the blue buttons associated with the SMA 905 Connectors on the front of the MPM-2000 to activate that channel.

Once you activate a channel, the button for that channel turns red until you activate another channel.

# Program Mode




Program Mode allows you to create or change sequence programs used by the MPM-2000. The Program Mode interface contains the following items:

| Item | Description |
|---|---|
| Step Column | Identifies the individual step number in the sequence program |
| Channel | Identifies the channel that the MPM-2000 will switch to in this step |
| Time to wait | Identifies the delay time before the MPM-2000 proceeds to the next step |
| Time unit | Defines the unit of time for the Time to wait column |
| Continuous | When checked, instructs the software to run the sequence program a specified number of times (specified in the *no of runs* box) |
| No of runs | Specifies the number of times the software will execute the sequence program (a value of –1 instructs the software to run the program until manually stopped) |

# Small Mode

Small Mode provides all functionality of the software in a condensed menu bar. When using another software package, the Always on Top feature of Small Mode eliminates the need to consistently switch back and forth between applications. This mode is only accessible via the **View** Menu.

The Small Mode screen contains the following options:

| Item | Function |
|---|---|
| | Load an existing program sequence |
| | Activate the loaded program sequence |
| | Stop the currently running program sequence |
| | Enable continuous mode |
| | Specifies the number of times the program sequence will execute (if continuous mode is active) |
| | Increase the active channel on the MPM-2000 by one (+ 1 channel) |
| | Decrease the active channel on the MPM-2000 by one (- 1 channel) |
| | Specify a channel on the MPM-2000 |
| | Switch to the channel specified in the text box to the left of this button |
| | Exit Small Mode and return to Channel Mode |

# Main Toolbar

The Main Toolbar is only visible in Channel Mode and Program Mode. It contains the following buttons and features:

| Button | Function |
|---|---|
| | Switch to Channel Mode |
| | Switch to Program Mode |
| | Open new program sequence |
| | Open an existing program sequence |
| | Save the current program sequence |
| | Start the currently loaded program sequence |
| | Stop the currently running program sequence |

# Menu Options

The MPM-2000 software menu bar has four options:

- *File Menu*
- *View Menu*
- *Tools Menu*
- **?** (help)

The sections that follow detail each of these options.

## File Menu

The File Menu contains the following options:

| Menu Option | Description |
|---|---|
| New | Clear the program grid and open a new program sequence |
| Open | Open an existing program sequence |
| Save | Save the program sequence that you are currently editing |
| Save As | Save the program sequence that you are currently editing with a new filename |
| Options | Opens the Options dialog box |
| Exit | Exits the MPM-2000 software |

## View Menu

The View Menu allows you to toggle between the three different application modes. You can only access Small Mode using this option.

## Tools Menu

The Tools Menu contains the following options:

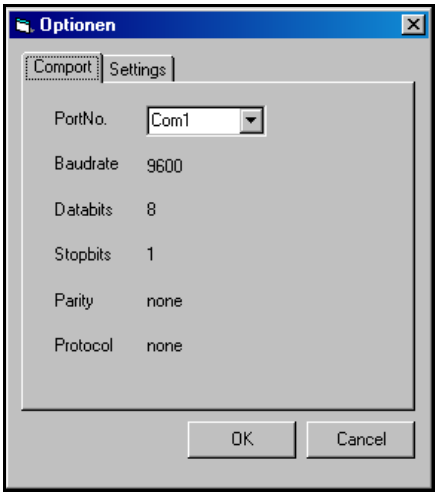
| Menu Option | Description |
|---|---|
| Connect | Connects to the MPM-2000 |
| Disconnect | Disconnects from the MPM-2000 |
| Options | Opens the Options dialog box |

# Options Dialog Box

The Options dialog box is accessible from the File Menu or Tools Menu. It contains the following two tabs:

- *Comport Tab*
- *Settings Tab*

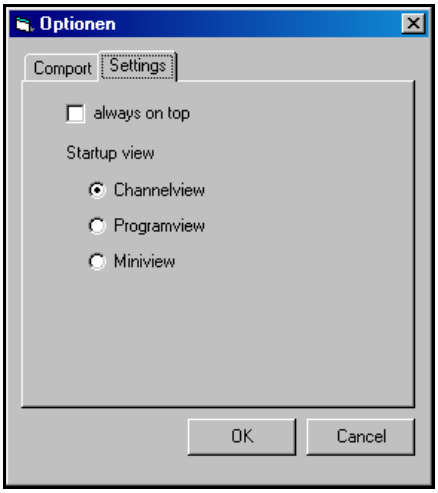
## Comport Tab




Select the COM port on the PC that you will use to communicate to the MPM-2000, and then click the **OK** button.

You must ensure that this option is correct before the MPM-2000 will communicate with the PC.

## Settings Tab




Click the **Always On Top** check box to position the software window above any other running applications, and then click the **OK** button to save your changes.

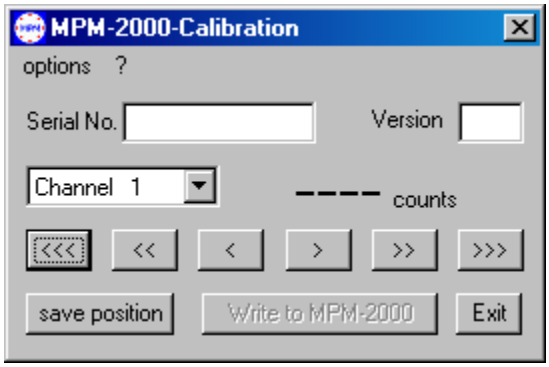
To specify the default mode that the MPM-2000 software will enter upon startup, select one of the three radio button options under the **Startup View** section of the **Settings** tab, and then click the **OK** button.

# Calibrating the MPM-2000

**Caution**

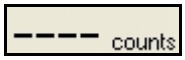
Do not execute this software unless MPM-2000 calibration is required. If used when not needed, this software can alter the correct settings of the MPM-2000 and require you to service or re-calibrate the unit.

The MPM-2000 comes with software that allows you to calibrate the unit to ensure proper operation.



To launch the calibration software, you must execute the MPM-2000-Calibration.exe file from a command line or the **Start | Run** option from the Windows toolbar.

The MPM-2000-Calibration software contains the following options:

| Option | Description |
|---|---|
| | Displays the serial number of the multiplexer |
| | Displays the Version of the MPM-2000-Calibration software |
| | Specifies the active channel number. Select a different channel from the drop-down menu to switch to that channel |
|  | Displays the intensity of light (when used with an Ocean Optics spectrometer) |
| | Change the sampled wavelength position for the chosen channel. Each button represents large (<<< >>>), medium (<< >>), and small steps (< >), respectively. |
| | Saves the actual multiplexer position in the software |
| | Writes the saved multiplexer positions to the memory of the MPM-2000 |
| | Exits the program (saved values will be lost unless saved) |

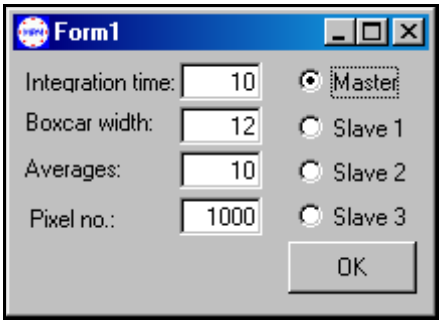
# MPM-2000-Calibration Options Menu

The Options Menu contains the following items:

| Option | Description |
|---|---|
| Use with OOI Spectrometer | Check this box if you want to use an Ocean Optics spectrometer for the calibration process |
| Spectrometer Settings | Select the type of spectrometer (if using an Ocean Optics spectrometer) |
| Acquisition Parameter | Change the acquisition parameters (if using an Ocean Optics spectrometer) |
| COMport | Select the COM port on which the MPM-2000 will communicate |

## Acquisition Parameter Options

Select the Acquisition Parameter option from the Options menu to view the Acquisition Parameters Options dialog box:




| Option | Description |
|---|---|
| Integration time: | Sets the integration time in OOIBase32 (when using an Ocean Optics spectrometer) |
| Boxcar width: | Sets the boxcar width in OOIBase32 (when using an Ocean Optics spectrometer) |
| Averages: | Specifies the number of scans that OOIBase32 will average (when using an Ocean Optics spectrometer) |
| Pixel no.: | Specifies the pixel number to sample (when using an Ocean Optics spectrometer) |
| Master | Applies the displayed options to the Master spectrometer channel (when selected) |
| Slave 1 | Applies the displayed options to the Slave 1 spectrometer channel (when selected and available) |
| Slave 2 | Applies the displayed options to the Slave 2 spectrometer channel (when selected and available) |
| Slave 3 | Applies the displayed options to the Slave 3 spectrometer channel (when selected and available) |

When using an Ocean Optics spectrometer, you can enter the acquisition parameters directly into this dialog box. Click the **OK** button when you have set the parameters you wish to use for your experiment.

## Comport Options

Select the Comport option from the Options menu to view the **Comport Options** dialog box:

Select the COM port you wish to use from the drop-down menu, and then click the **OK** button to enable the COM port change.

# Performing Calibration

### ► *Procedure*

Follow the steps below to perform a calibration on the MPM-2000:

1. Establish the connection between the MPM-2000 and the PC, ensuring that the MPM-2000 is connected to the power supply.

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**Note:**

Go to Step 5 if you are not using an Ocean Optics spectrometer

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2. Open the MPM-2000-Calibration software.
3. Open the Options Menu and check the **Use with OOI Spectrometer** option.
4. Select the correct spectrometer and A/D Converter from the **Select Spectrometer** option.
5. Tweak the acquisition parameters to your environment, ensuring that the spectrometer is not saturated.
6. Activate Channel 1 on the MPM-2000.
7. Optimize the transmission by modifying the position of the multiplexer until the best transmission is obtained.
8. Save the position for Channel 1 in the software.
9. Activate the next channel, if needed. Otherwise, proceed to Step 11.
10. Repeat Steps 5-8 until all desired channels are optimized.

11. Click the **Write to MPM** button to save the data to the multiplexer. After writing the data to the MPM-2000, the calibration completes.

12. Close the program with **Exit** command from the Options menu.

# MPM-2000.drv

The MPM-2000.DRV is an interface DLL for use with Visual Basic or C/C++. It allows you to integrate the MPM-2000 in your own custom application.

The MPM-2000.DRV package contains a sample program written in Visual Basic® and a sample program written in Visual C++®.

For further details on how to use the MPM-2000.drv, consult the online documentation included with the MPM-2000.DRV.

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