



OPERATOR'S MANUAL

M² Utility **(formerly M2+LBA)**

Version 1.10

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CHAPTER 1	Introduction	3
1.1	General Information.....	3
1.2	System Requirements	3
1.3	Installation.....	4
1.3.1	M ² -200/200s-FW.....	4
CHAPTER 2	Operation	5
2.1	Initialization	5
2.2	Operation	5
2.2.1	Translation Table Control.....	5
2.2.2	ND Filter Wheel Control.....	6
2.3	Settings	7
2.3.1	Load... ..	7
2.3.2	Save... ..	8
2.3.3	Translation Table.....	8
2.3.3.1	Z Fixture.....	8
2.3.3.2	Z Lens	9
2.3.3.3	Z Camera	9
2.3.3.4	Steps / mm.....	9
2.3.4	Filter Wheel.....	9
2.3.4.1	Steps / Index	9
2.3.4.2	Home Offset.....	9
2.3.4.3	ND Filter Wheel.....	9

CHAPTER 1 Introduction

1.1 General Information

Note: *The **M² Utility** is essentially the same as the former **M²+LBA** application. It has been renamed to reflect the fact that all LBA applications have become obsolete and replaced with Spiricon's new BeamGage (BG) software. New shipments of M2-200s systems will no longer be bundled with LBA, rather with BeamGage. Cameras shipped with new M²-200s systems will be licensed to operate both with LBA-FW and with BeamGage Standard. Thus no loss of capabilities will result from this new bundling.*

The M² Utility is a software program designed to allow you to control the M² Optical Train while collecting data with either LBA-FW or BeamGage (BG) software. In order to use M² Utility with LBA or BG you must have both an M²-200/200s-FW system and a camera properly licensed for either (or both) LBA or BG. As of this writing new M²-200s systems ship with cameras licensed for both LBA and BeamGage Standard (BGS) edition. Older systems would need to be upgraded. Note: Older M2-200-FW and frame grabber systems are no longer available. They have been replaced by the newer M2-200s-FW products. You can upgrade an M2-200/200s-FW system from LBA to BeamGage, however you **can not upgrade** an older frame grabber system to BeamGage.

1.2 System Requirements

A complete M² Utility system consists of the following equipment:

1. The Spiricon M² Utility software.
2. M²-200s-FW
 - a. M²-200s Optical Train
 - b. A STEP IIB motor controller and power supply. (built into the 200s)
 - c. NOTE: The M²-200 software must be installed before using M² Utility.
3. Beam profiler software
 - a. Either a BeamGage or an LBA-FW application
4. A Pentium® style or compatible PC running a Windows XP Pro, Vista or 7 **32bit only** OS. For BeamGage compatibility the computer system must meet the hardware requirements specified in the BeamGage User Guide. For LBA-FW compatibility the computer must meet the requirements specified in the LBA User Guide.

Pentium is a registered trademark of Intel Corporation.

Windows 7, Windows Vista and Windows XP Pro are registered trademarks of Microsoft Corporation.

Note: *PC operating system, component and hardware manufacturers are constantly revising their products. Therefore Spiricon makes no guarantee that any one brand or model of Personal Computer will be compatible with any or all of the features contained in this application, either now or in the future.*

1.3 Installation

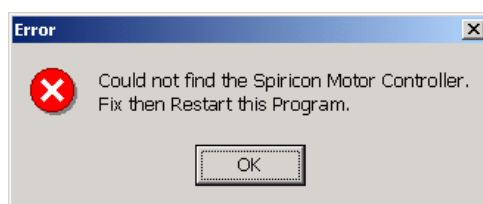
1.3.1 M²-200/200s-FW

The M² Utility software is installed as part of all M²-200 type systems. No additional steps are necessary. To run M² Utility click on the **Start** button, **Programs | Spiricon | M2-200s-FW | M2 Utility**.

CHAPTER 2 Operation

2.1 Initialization

When the M² Utility software is started it tries to find and connect to the USB motor controller. If the motor controller cannot be found, the software displays an error message and terminates.



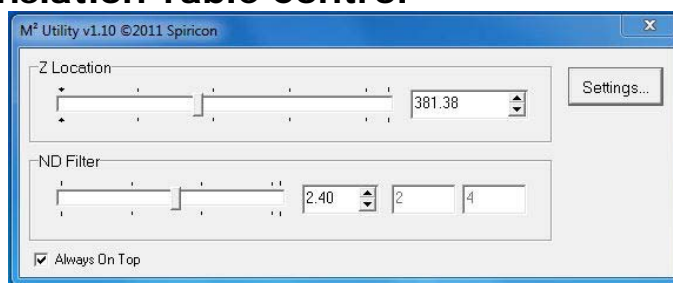
If the motor controller is not found make sure the M²-200/200s power supply is powered on, the USB cable is connected to the computer, and cables are connected and secured to the optical train.

The software must also find and read the current settings file. This could be the current M²-200 setup file or the current M² Utility settings file. If the file is not found, the software displays an error message and then allows you to select a settings file. Each optical train has its own unique settings file. Be sure you select the settings file associated with the M² optical train you are using. If you have any problems, use the file from your M²-200/200s installation CD with a file name of the form ~<serial_number-fl-wavelength>.m2-scor-cfg (or .cfg if an older frame grabber model). See the M² Setup section of your M²-200 Operator's manual for more information.

If the USB motor controller is found, the software initializes the table to known positions. The software first homes the filter wheel then changes the wheel to the last filter setting. Every time the filter is changed it is remembered and will be restored the next time the software is started. The software then homes the translation table and moves the table to the last position. As with the filter, the last table position is remembered and the table is restored to that position the next time the software is started.

2.2 Operation

2.2.1 Translation Table Control



The translation table controls the distance the beam will travel from the lens to the camera. With the proper setup, the beam will be visible well before, through, and well after the artificial waist created by the lens.

The translation table can be moved in three ways:

- The Z Location slide control represents the scope of travel allowed by the translation table. Move the mouse pointer on top of the Z Location slide bar, click and hold the left mouse button, then move the slide bar to the desired location. The edit control to the right is updated to indicate the position where the table will move. The table will start to move when you release the mouse button.
- Type a location into the Z Location edit control and hit the Enter key. The table will start to move when Enter is pressed.
- Or, click on the edit spin control. One click changes the value by 50. Click and hold changes the value continuously by 50 until release of the mouse button or the limit is reached. The table will start to move upon release of the mouse button.

The mouse pointer will change to a pointer with an hourglass, and the edit control will be disabled, while the table is moving. Click once on the slide bar to stop the table movement. The mouse pointer will change back to just an arrow, and the edit control will be enabled, when the table is stopped or reaches the specified location.

2.2.2 ND Filter Wheel Control

The ND Filter Wheel controls the amount of attenuation in the beam path. The ND Filter Wheel is positioned in the beam path.

The ND Filter Wheel can be controlled in three ways:

- The ND Filter slide control represents all of the ND filter combinations between blocking the beam and no attenuation. To increase attenuation or block the beam, slide the control bar to the left. To reduce or remove attenuation, slide the control bar to the right. The edit control to the right is updated to indicate the ND filter combination that will be rotated into the beam path – a value of 100 is used to indicate the beam is blocked. The filter wheels will start to move when you release the mouse button.
- Type a filter value into the ND Filter edit control and hit the Enter key. The filter wheels will start to move when Enter is pressed.
- Or, click on the edit spin control. One click, up or down, will change the value by the next minimum available ND step value. The exact step increment may vary from M²d model to model.

The mouse pointer will change to a pointer with an hourglass, and the edit control will be disabled, while the filter wheels are moving. The mouse pointer will change back

to just an arrow, and the edit control will be enabled, when the filter wheels reach the specified position.

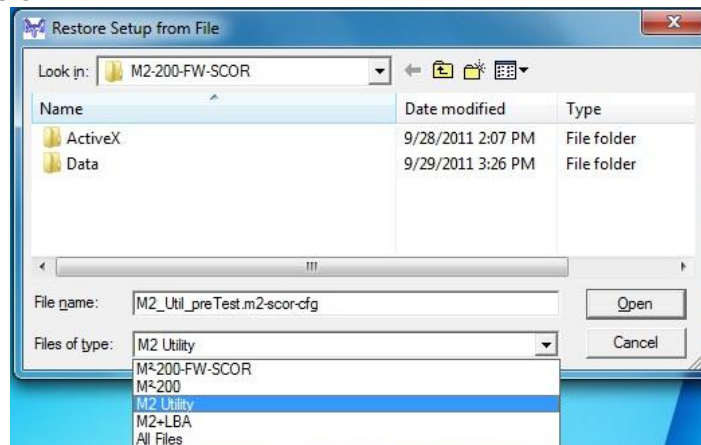
The other two controls indicate the logical position of the driven wheel A, and the following wheel B.

2.3 Settings

Click the **Settings...** button to display the Settings dialog. The Settings dialog contains the calibration and configuration information about a specific M² optical train.

Most of the values in this dialog can be changed. Be very sure that any changes made exactly match the physical setup of the specific M² optical train in use.

2.3.1 Load...



Click the **Load...** button to load optical train settings from a different settings file. You can load table settings from an:

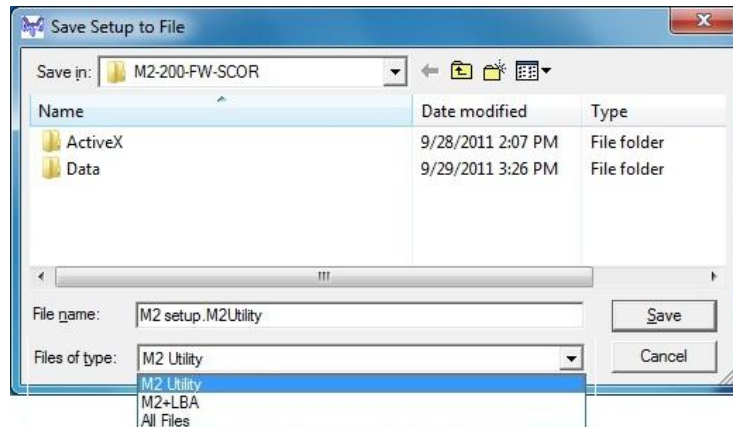
1. M²–200, **.cfg** (only applicable with obsolete LBA frame grabber systems)

2. M2-200/200s-FW, **.m2-scor-cfg** (applicable with FW LBA and BG systems)
3. M² Utility, **.M2Utility** (applicable only to this new utility version)
4. M²+LBA, **.M2+LBA** (applicable only to this and previous utility versions)

The selected settings file will become the default settings file and will automatically be loaded the next time you start M² Utility.

The filter wheel and table will be reinitialized after you click OK when you load a new settings file.

2.3.2 Save...



Click the **Save...** button to save the table settings to a file. You can save the table settings to an **.M2Utility** or a legacy **.M2+LBA** settings file. This is a special file type that strips off all M2-200/200s parameters and saves only the optical train settings.

NOTE: Repeating, only the M²-200 Optical Train settings get saved to an **.M2Utility** or a legacy **.M2+LBA** settings file. This type of setup file can not be loaded and used with your M²-200/200s system. In other words, this utility program is not designed to modify M2-200/200s setup files.

The last saved settings file will become the default settings file and will automatically be loaded the next time you start M² Utility.

2.3.3 Translation Table

Refer to your M²-200 operator's manual for more details on just what these parameters represent based on the type of Optical Train you are using.

2.3.3.1 Z Fixture

This is the distance that the beam travels from the M² optical train faceplate at the lens opening to the M² optical train faceplate at the camera opening. For an M²-200 this is the maximum table distance, for an M²-200s this is the minimum table distance.

This value typically will never need to be changed.

2.3.3.2 Z Lens

This is the distance from the middle of the lens to the M² optical train faceplate.

This value will need to be changed if you reposition the lens some additional distance from the M² optical train faceplate.

2.3.3.3 Z Camera

This is the distance from the M² optical train faceplate to the camera imager.

This value may need to be changed if you change cameras or mount your camera further from the faceplate.

2.3.3.4 Steps / mm

This is the number of motor steps per mm of travel for the mirror translation system.

This value cannot be changed.

2.3.4 Filter Wheel

2.3.4.1 Steps / Index

The number of motor steps between ND filter index positions.

This value cannot be changed.

2.3.4.2 Home Offset

The number of motor steps from the filter wheel home position to centering the filter onto the optical axis of the system.

This value typically will never need to be changed.

2.3.4.3 ND Filter Wheel

This list contains a catalog of the ND filter values for each of the two A and B filter wheels. The Position is the index location for each filter.

The programming of these values can vary depending upon wavelength. ND values are nominally set at 632 or 532nm wavelengths however some may be

calibrated at 1064nm. An entry of 100 represents a shutter position. Zero (0) is an open position. Values set to 99 are “Do Not Use” positions. Only one (1) 100 shutter position is allowed and it is normally in the ‘A’ or driven wheel.

These values will need to be changed if you change the filters in either wheel. Be sure you enter the correct value for each filter or the M²-200 software may produce bad results or become inoperable.