

Operator Manual



LEDETECT 96

Computer controlled Microplate Reader
For In Vitro Diagnostic Use





Warning

Please read this manual carefully before connecting the instrument to power and before performing any further steps.

If you need further assistance, please contact your local supplier of this product.

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CE Conformity Declaration:

DECLARATION of CONFORMITY

We, biomed Dr. Wieser GmbH

declare under our sole responsibility that the product:

LEDETECT96 (desktop microplate 8-channel photometer for 96well microplates)

powered by the **desktop power supply:**

Type 2020 from **mascot electronics A/S**, Norway

is in conformity with the following standards

Electrical safety:

EN 61010-2-081+A1: 2004

Electromagnetic Compatibility (EMC)

EN 61000-6-3: 2007

EN 6100-6-2: 2005

The product complies with the regulations of following EU-Directives:

98/79/EG

(In-vitro-Diagnostika)

73/23/ EEC and it's modifications

(Low Voltage Directive)

89/ 336/ EEC and it's modifications

(EMC Directive)

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0.1 Notice

Every effort has been made to avoid errors in text and diagrams, however, we assume no responsibility for any errors which may appear in this publication.

It is our policy to improve products as new techniques and components become available. We therefore reserve the right to change specifications at any time.

We would appreciate any comments on this publication.

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0.2 Copyright information

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0.3 About this manual

This manual describes the installation, the use and necessary maintenance steps for Ledetect 96, Microplate Reader and Capture 96, PC software.

0.4 Warnings, Cautions and Notes

Warnings in this manual are clearly marked:



Warning

These notices highlight important information or warn the user of a potentially dangerous situation.

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Chapter 0A

User Safety

- Hazards
- Safety Precautions
- Instrument & Box Labeling
- Instrument Disinfection

0A.1 Introduction

The instrument has been designed in a way to provide maximum safety to the user. This chapter gives information and instructions on user safety when working with Ledetect 96.

This chapter also gives instructions on the disinfection procedure of the instrument.

0A.2 Hazards

0A.2.1 Mechanical Hazards

Ledetect 96 is a computer controlled device with automatically moving mechanical parts. During movement of the plate carrier mechanism, do not manually interfere this movement.

0A.2.2 Liquid Hazards

The plate mechanism of the instrument itself has a self-centring mechanism and a gentle movement for maximum user safety. However, potential hazards to personnel may exist from the liquids in microplates. Infectious clinical samples, toxic or corrosive chemicals may be present. Handle microplates carefully.

Although the **hands-off** operating feature of Ledetect 96 minimizes exposure to these agents, the potential for hazardous exposure still exists. Hand, eye and clothing protection should always be worn, where appropriate.

0A.2.3 Electrical Hazards

The same precautions must be considered when using any electrical equipment.

Do not touch any switches or outlets with wet hands. Switch the instrument off before disconnecting the AC power cord. Unplug the instrument prior to cleaning up any major liquid spills and prior to servicing any of the electrical or internal components.

Only qualified personnel should perform electrical servicing. Replace all access covers before operating the instrument.

0A.3 Safety Precautions



Warning

This instrument is for professional use. It may only be operated by trained personnel. It is advisable to wear gloves during operation of the instrument.

When working with Ledetect 96, the following instructions must be met:

0A.3.1 Mains Power Connection

The instrument is supplied with an external power supply that features autodetection of the supplied Voltage (100 – 240 VAC, 50 or 60 Hz). No further settings for different Mains Voltage Systems are required. The instrument is connected to mains power via this external power supply.

The instrument itself is a low-voltage device, running at 24V DC.

Graph 0A.1: External Power Supply



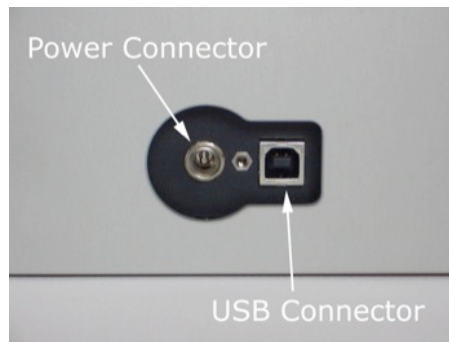
Warning

It is absolutely essential that only the original power supply is used with the reader. If required, replace only with original replacement parts.



Warning

It is required to have the external power supply tested for electrical safety every 24 months by trained personnel.

Graph 0A.2: Connection panel on Instrument rear side

Connect your country-specific mains power cord, that came in the instrument box, to the external power supply. Connect the external power supply to the power connector of the instrument. Plug the mains power cord into Mains Power.

0A.3.2 During Operation



Warning

- Do not touch the plate carrier during movement!
- Do not put your fingers into the plate carrier at any time!

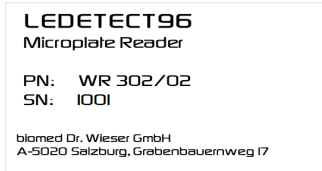
The plate carrier moves in and out automatically and opens and closes the lid by gentle mechanical force. During operation, the front lid of the instrument must be kept free from any blockage, so that it can open and close freely.

Graph 0A.3: Plate Carrier view

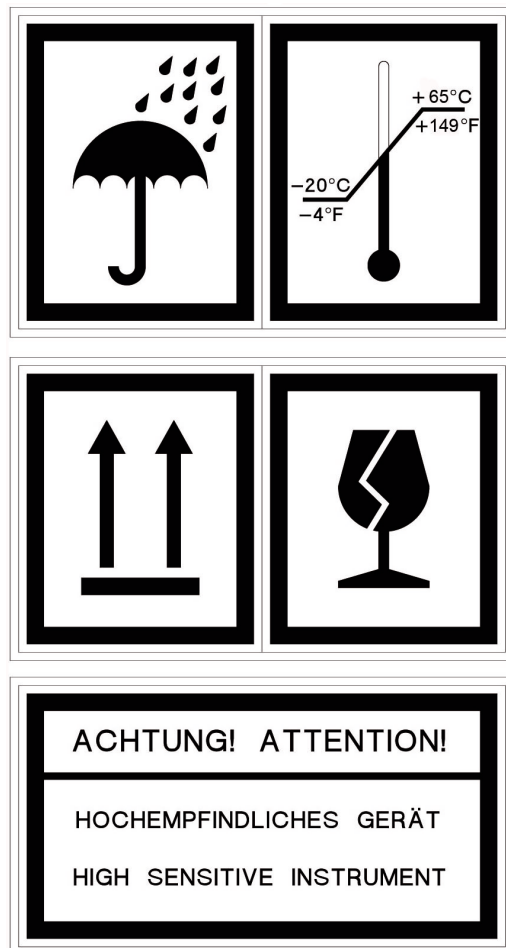
The instrument is fitted with a transport sensor, that detects if the plate carrier reaches defined positions within certain times. An error message will be displayed on the computer screen, if any error / blockage has prevented the plate carrier to reach these positions.

0A.4 Instrument & Box Labeling

The instrument has the following product identification label on the rear side:



The packaging box has the following labels:



0A.5 Instrument Disinfection

All parts of the instrument that come into contact with potentially infectious material must be treated as potentially infectious areas.



Warning

THE DISINFECTION PROCEDURE MUST BE PERFORMED BY AUTHORIZED TRAINED PERSONNEL, IN A WELL VENTILATED ROOM, WEARING DISPOSABLE GLOVES AND PROTECTIVE GLASSES AND CLOTHING.

It is very important that the instrument is thoroughly disinfected before it is removed from the laboratory or any servicing is performed on it.

Before the instrument is returned to the distributor for servicing, it must be disinfected and a disinfection certificate completed. If a disinfection certificate is not supplied, the instrument may not be accepted by the servicing center or it may be held by the customs authorities.

0A.5.1 Disinfection Solutions

If the laboratory has no specific disinfection procedure, the following procedure should be used to disinfect the instrument.

The instrument should be disinfected using one of the following solutions:

Lysetol Manufacturer: Schülke & Mayr Ges.m.b.H.

Aseptisol Manufacturer: Bode Chemie Hamburg

If neither of these solutions are available, 70% ethanol should be used as an alternative.

0A.5.2 Disinfection Procedure

Please note that the disinfectant can influence the performance of your instrument if it is applied inside the instrument. The following procedure should be used to disinfect the instrument.

1. Wear protective gloves, protective glasses and protective clothing.
2. Prepare an autoclaveable bag for all disposables used during the disinfection procedure and label it with autoclave tape.
3. Rinse the complete pump and tube system with the disinfectant. Fill the system with the disinfectant solution and allow a contact time of five hours.
4. Disconnect the instrument from the mains power supply.
5. Disconnect the instrument from any accessories that are used for example: printer, computer and so on. Accessories that should be shipped together with the instrument have to be included in the disinfection procedure.
6. Carefully spray the disinfectant solution (or use a disposable soft tissue paper towel soaked in the disinfectant) on all outer surfaces of the instrument.
7. After a minimum contact time of 10 minutes, repeat step 6 of this procedure.
8. After a contact time of five hours wipe the instrument using a soft paper towel and a mild detergent or distilled water to remove all traces of the disinfectant.
9. Wipe dry the outer surfaces of the instrument.
10. Pack the instrument and its accessories.
11. Disinfect your hands and clean them with a mild detergent.

Complete a disinfection certificate and attach it to the outside of the box so that it is clearly visible. See below for an example of the disinfection certificate.

I declare that the instrument in this package has never been exposed to any hazardous biological material or that it has been decontaminated or disinfected to remove or inactivate any biological material which could be dangerous to the service personnel.

Name:

Firm:

Address:

.....

.....

Country:

Signature

Chapter 1

System Introduction

- Characteristics, Specifications, Performance
- Functional Description

1.1 Introduction

Ledetect 96 is a photometer for reading 96 well microplates. It has an open design and software structure, so that reagents and kits from any manufacturer of your choice can be used. The instrument can be used for reading flat-, round and V-bottomed plates.

Ledetect 96 is computer controlled and uses the Software Package "Capture 96" for reading microplates and transferring raw OD data to the PC.

Ledetect 96 comprises an absolutely new reading technology by using LED's as light sources. These LED's are fitted within fully self-contained light-cylinders, each comprising LED, lenses, interference filter and electronics for automatical identification of the light cylinders by the instrument.

1.2 Specifications

Plate types:	96 well microplates with flat, round or UV bottom
Wavelength range:	340 – 900 nm
Measurement range:	0.000 - 4.000 OD (Abs)
Optical System:	maintenance free 8 channel optical system, self calibrating, no reference channel required
Light source:	LED, wavelength specific (life time = 1000 x Halogen Lamp)
Detectors:	Photodiodes
Accuracy:	±1% and ±0.005 OD up to 3.5 OD (any wavelength)
Precision:	± 0.5% and 0.005 OD up to 3.5 OD (any wavelength)
Linearity:	± 0.5% and 0.005 OD up to 3.5 OD (any wavelength)
Reading speed:	5 seconds (kinetic interval)
Wavelengths:	up to 6 wavelengths possible. 4 Light cylinders with standard wavalenghts (405, 450, 492 and 620nm) are supplied with the instrument.
PC-Interface:	USB 1.1 (USB 2.0 compatible)
PC Software:	Capture 96 software included, external data-reduction packages available on request
Power requirements:	100 – 240V, 50 or 60Hz (autosensing).
Power consumption:	Operational: max 20 W Standby: max 2 W

Measurement System:

- Maintenance Free due to capsulated optical cylinders
- Light sources: LED (life time = 1000 x Halogen Lamp)
- 8-channel fibre optics
- Detectors: Photodiodes
- Wavelength range: 340 – 900 nm
- Standard filters: 405, 450, 492 & 620nm
- Resolution: 0,0001 ABS
- Drift: less than 0.001 OD / hr

Power Requirements:

LEDETECT is a low voltage device, it is connected to mains power via an external power supply (supplied with instrument).

Specifications of external Power Supply:

- 100-240VAC, 50/60 Hz (autodetecting)
- CE (EN60601-1)
- UL (UL

Measures:***Instrument only (= net):***

- Dimensions: 23 x 11,5 x 36 cm (w x h x d)
- weight: 6,4 kg (14,1 lbs)

Instrument packed incl. accessories (= gross):

- Dimensions: 31 x 36 x 48 cm (w x h x d)
- weight: 8,3 kg (18,3 lbs)

Environmental:

Operation :
18 - 28°C
10 - 90% rel. Hum. (non condensing)
Storage :
40°C – 70°C
5 – 95% rel. Hum. (non condensing)

Options:

- light cylinder 340nm
- other light cylinders on request

Overvoltage Cat.: II

Pollution Degree: 2

Method of Disposal: - Contaminated Waste

Usage: - Commercial

1.3 Functional Description

Ledetect 96 comprises the following main functional units:

Measurement System

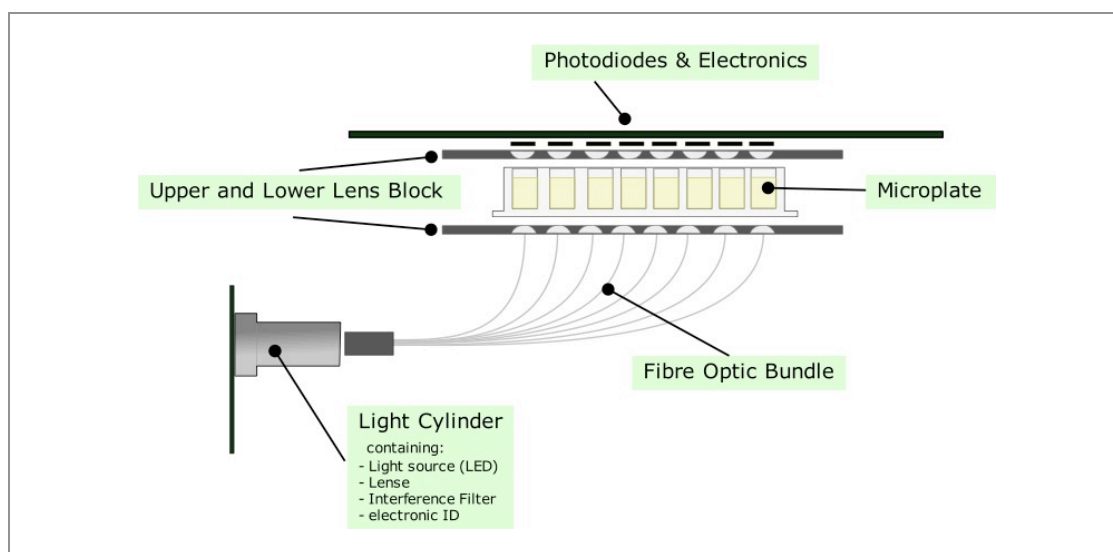
Capture 96 Software package

The following explains the functions of these units, as well as their interference with each other.

1.3.1 Measurement System

The measurement system of Ledetect 96 is based on a new and unique technology, which comprises fully integrated and enclosed light cylinders. Each light cylinder contains a LED, a filter, lenses and electronics with cylinder – ID such as wavelength, serial number etc. Every light cylinder is "custom made" for its wavelength.

Graph 1.1: Measurement system



Depending on the wavelength required for the measurement, the respective light cylinder is automatically selected.

For reading, the microplate is transported through the optical system by the plate carrier. Readings are being taken "on the go", resp. while the plate is moving.

Within the light cylinder, the light emitted by the LED is directed through a focusing lens, then through the filter with the selected wavelength and then enters the fibre optics, where the light beam is splitted into 8 separate light beams.

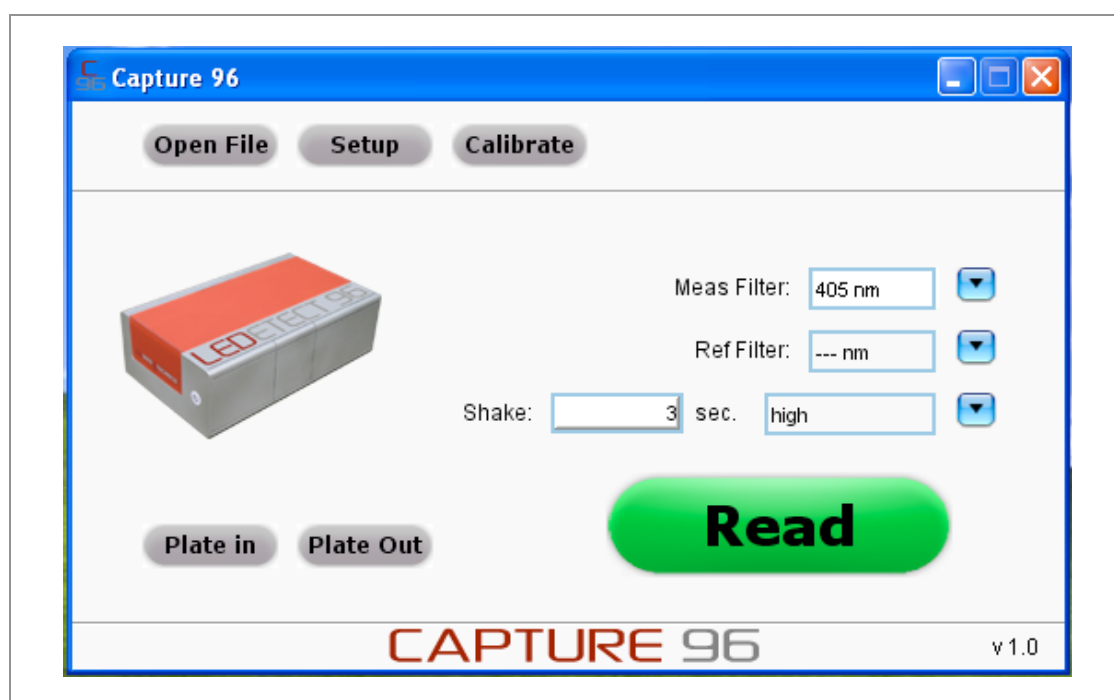
These 8 light beams pass the lower lens block, then one well each of the microplate. The transmitted light then passes the upper lens block and is detected by the photodiodes. The photodiodes transform light into an individual electrical signal. This electrical signal is then converted and used to calculate the optical density (OD, Abs) for each individual well.

1.3.2 Capture 96 Software program

All above described steps are being performed fully automatic, following commands that had been sent from the PC to the reader.

These commands are being generated by Capture 96, the PC program that comes along with the reader, according to the users definitions for the individual reading.

Graph 1.2: User Interface Capture 96



A detailed description of this software is in this manual.

Chapter 2

System Setup

- Unpacking & Installation
- Software Installation
- First Start Up

2.1 Introduction

This chapter gives the instructions on all steps which need to be performed in order to unpack, install and set up the instrument properly. This chapter also gives instructions on how to install "Capture 96" – Software on your PC.

Please read this chapter carefully and make sure that all the instructions herein are being followed. Failure in doing so might cause injury to the user and / or damages to the instruments !

2.2 Unpacking

2.2.1 Contents of shipment

The instrument is shipped in one box, which contains:

Instrument:

- Microplate Reader Ledetect 96

Accessories:

- CD with User Manual and "Capture 96" Software
- External Power Adapter 100 – 240VAC, 50/60Hz
- Power Cord
- USB cable

If any of the above is missing, or if the box is remarkably damaged when you receive it, please report to the delivering forwarding agent as well as to Biolab Solutions immediately !

2.2.2 To be provided by user

- Windows (tm) based PC with one free USB port
 - Helpful option: Microsoft Excel (tm) or any other spreadsheet-program for data reduction of imported raw reading data.
- Printer (any, that connects to Windows (tm))
- Mains Power Connection 110 – 240 V / 50 or 60Hz

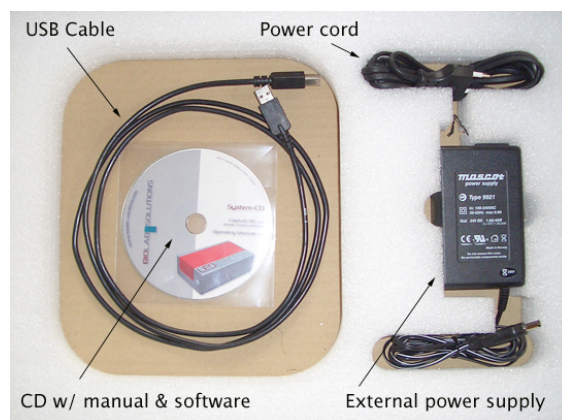
2.2.3 Unpacking

2.2.3.1 Unpacking

It is highly recommended to keep the box for a possible later use. Shipping and transporting the instrument in non-original packaging may cause severe damage to it.

After opening the box, you will find the accessories on top:

Graph 2.1: Accessories layer



Take this top packing layer out of the box to get access to the instrument.

Graph 2.2: Instrument



Take the instrument out of the box, remove the two protection - foam pieces and take the instrument out of its protection plastic bag.

Place it on a flat, leveled and dust - free surface, which is free of vibrations (no centrifuge on same table !). Place the instrument away from direct sunlight.

Please ensure, the ambient temperature during operation does not exceed 28°C / 82,5°F

Compare the Serial number printed on the respective label on the rear side of the instrument with the serial number printed on the delivery papers. If there is any difference, please report to your supplier immediately !

Graph 2.4: Instrument unpacked



2.3 Installation of "Capture 96" Software Package



Capture 96 is a Java™ based software package. This requires Java™ environment to be installed on your computer. During installation of Capture 96, the installation program will check if Java™ is already installed on your computer. If not, then the installer will automatically install Java first, before installing Capture 96.

2.3.1 Computer Requirements

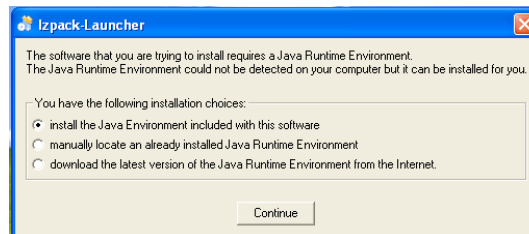
Parameter	Minimum	Recommend
Operating system	Windows 2000 or higher	
Memory RAM	256 MB	512 MB
CPU	Pentium III	Pentium IV or higher
Resolution	800 x 600	1024 x 768
Port	USB 1.1 or 2.0	USB 1.1 or 2.0

All connected Devices must be proved and listed with regulations EN 60950, UL 1950 or CSA C22.2 No. 950 for Data Processing Devices

2.3.2 Software Installation procedure

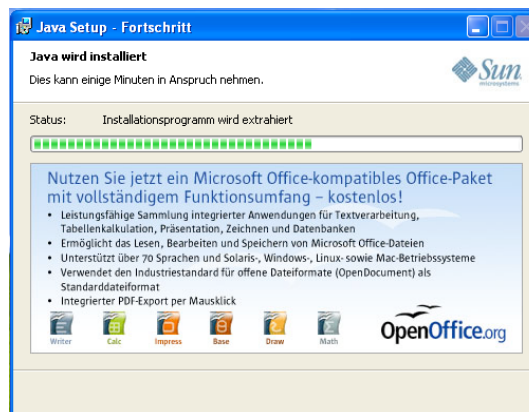
Along with the instrument, a CD is supplied, which contains the operating manual for the complete system, as well as the software package "Capture 96". For installation of the software, follow these steps:

1. Insert the installation CD Rom, which is supplied with the accessories box of the Ledetect 96 shipment, into the CD Rom drive of your PC
 - a. If your PC has "autorun" option activated, the installation wizard will be started automatically. Follow all steps as indicated (select target directory etc.)
 - b. If this option is not activated on your PC, you can manually start the installation process. Please proceed as follows:
 - i. Start Windows (tm) Explorer and select the CD drive where you have inserted the installation CD.
 - ii. Start the installation program by starting "launcher-Win32.exe" from your CD drive.
2. After a few moments the Installer is started. The installation first checks, if Java™ Environment is already installed on your computer.
 - a.) if Java™ Environment is already installed on your computer, the installer will automatically jump to point 4.
 - b.) if the installer can not find a valid installation on of Java™ Environment your computer, the following screen will be displayed:

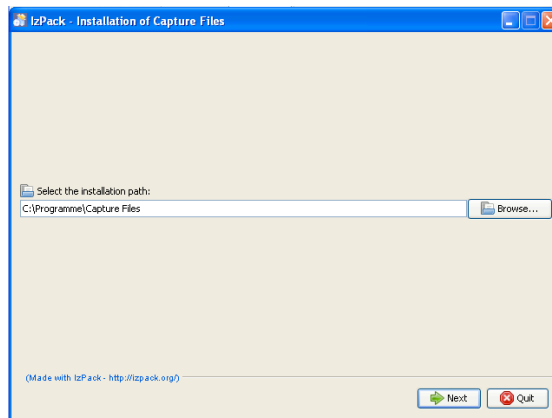


It is recommended to select "install the Java Environment included with this software". If, after the installation was completed, Java suggests to update to the latest version, then please do so.

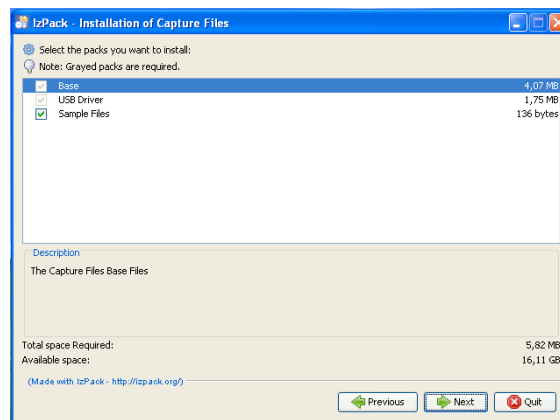
3. During the installation of Java™ Environment the following screen is displayed.



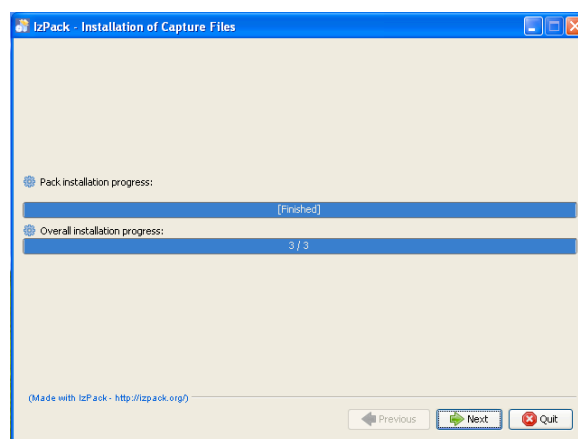
4. If Java™ Environment was already installed on your computer, or after the installation of Java™ Environment is completed, the installation of Capture 96 will automatically start:



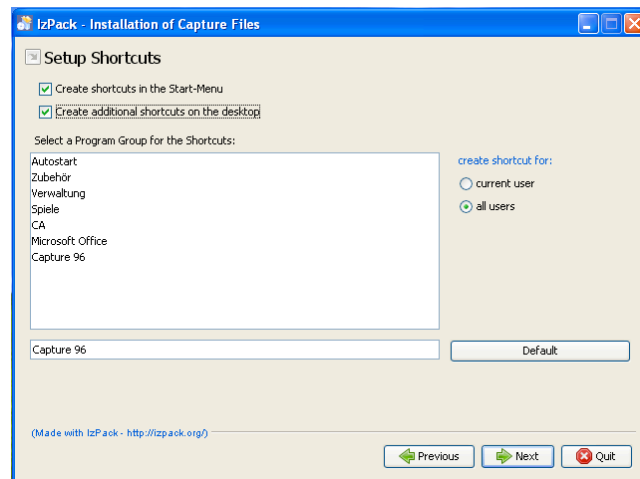
It is recommended to make no changes to the default settings. Click "Next".



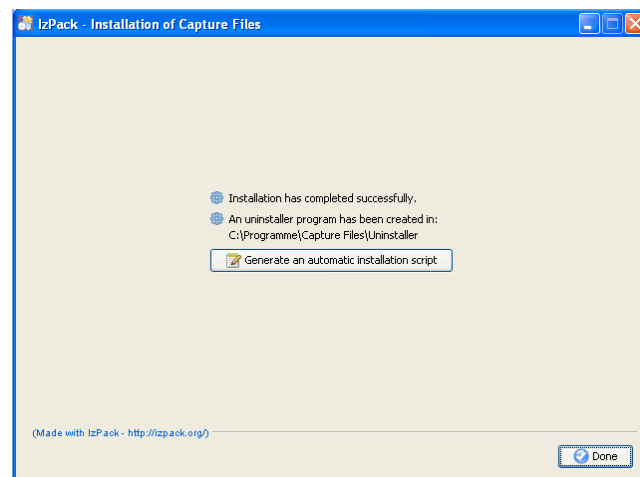
It is recommended to make no changes to the default settings. Click "Next".



Click "Next".

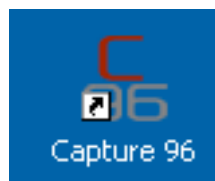


It is recommended to select "Create Additional Shortcuts on the desktop". Click "Next".



Click "Done".

Depending on your choice during the installation process, the Capture 96 program icon will now be displayed on the desktop

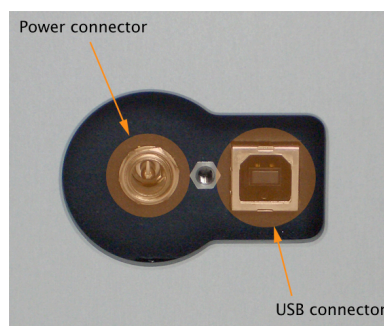


2.4 Installation of Ledetect 96

2.4.1 Power Connection

Please note: Ledetect 96 has no mains power switch. The unit is a low power device, connected to 24 VDC provided by the external power supply. It is automatically started by the PC software Capture 96, and it is automatically sent to standby once the software is being closed (can be selected or deselected in the setup of Capture 96. The power consumption during standby is not more than 2W.

Graph 2.5: Connectors on instrument rear side



Plug the power cord, which comes with the accessories box, into the external power supply. Connect the external power supply to the power connector on the instrument rear side. Now connect the mains cable with mains power.

The external power supply features autodetection of the supplied Voltage (100 – 240 VAC, 50 or 60 Hz), no further settings for different Mains Voltage Systems are required.

As soon as this final connection has been established, the instrument is in standby. This is indicated by a blinking signal of the Power indicator LED in the Standby - button.

2.4.2 Computer Connection & USB driver installation

BEFORE connecting the instrument to the PC, the software „Capture96“ should be installed. (see chapter 2.3).

After Capture 96 has been installed on your computer, use the supplied USB cable to connect the instrument with your computer.

Windows will now detect that a new USB device has been connected and will request the installation of the respective drivers. All required drivers are on the installation CD that was supplied with the instrument. Just follow the Windows dialog and let Windows find the drivers automatically.

2.5 First Power Up

2.5.1 Switching instrument On and Off

When the instrument is connected to power, it is in standby by default, indicated by a blinking LED in the standby-button.

The instrument is automatically started from standby by starting "Capture 96" software on your PC.

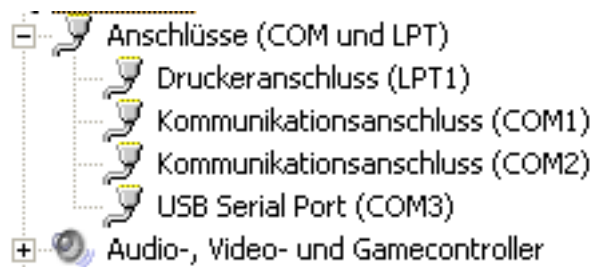
The instrument is automatically sent back to standby after closing Capture96, provided this is the chosen setting in "Setup" (see chapter 3.3.2, Setup)

The power consumption during standby is 2W.

2.5.2 Identify Com Port

Ledetect 96 has an inbuilt USB to Serial converter. This means that Windows does not detect the unit as a USB device, but as a serial device, connected to a Serial Com-Port.

BEFORE starting Capture 96, you need to identify the installed com port. This information can be found in the Device Manager of the Windows System settings of your computer:



Find the Com Port with the name "USB Serial Port" and write down the number of the port (in this example "COM3").

You will need to select this port after the first start of Capture 96 (see next chapter)

2.5.3 First start of "Capture 96" Software Package

Start "Capture 96" software package on your PC by double-clicking on the "Capture 96" – icon on the desktop of your computer.

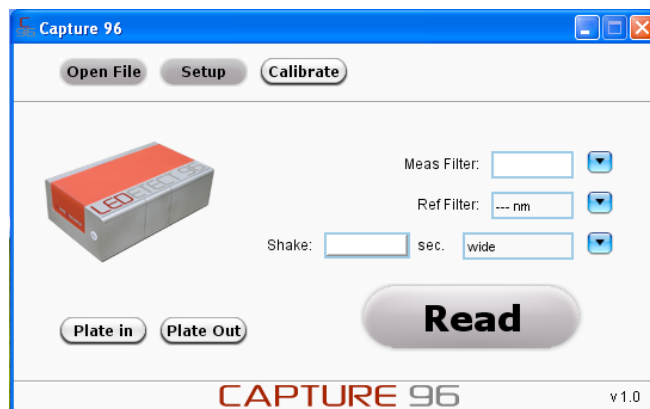
Graph 2.7: Program Icon



During the very first startup, after installation of Capture 96, the reader will not be found automatically, as the correct COM Port has not been set yet:

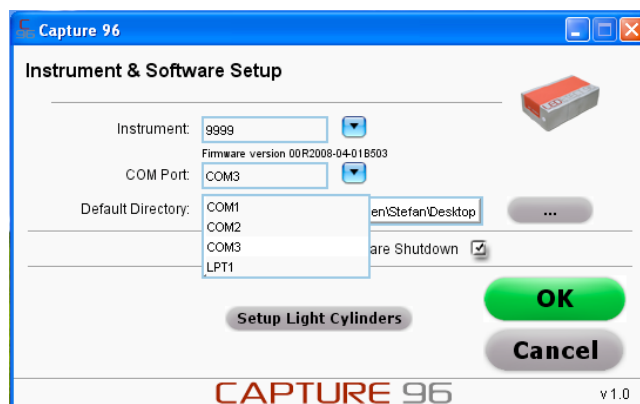


Confirm with OK, and Capture will show the following screen:



The grey "Read" button indicates, that no device was detected.

Now click the "Setup" button and Capture will show the following screen:



Click on the blue arrow at "COM Port" and select the port which you have identified under 2.5.2 (above).

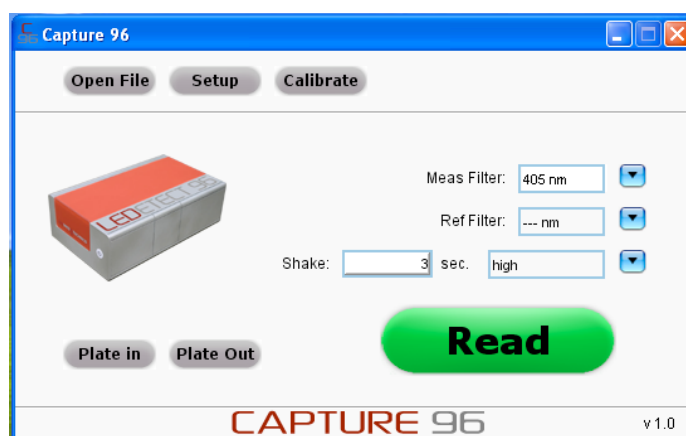
Capture will now display the following information:



Perform the following steps, one after the other:

- Click on "Close", to close that dialog.
- Click on "OK" in the "Instrument & Software Setup" Dialog of Capture 96
- Close Capture 96
- Restart Capture 96

Capture 96 will now start again, send a "wake-up" command to the reader. After a few seconds, the startup screen of Capture 96 will be displayed.



Chapter 3

Capture 96

- Use of Capture 96 PC Software

3.1 Introduction

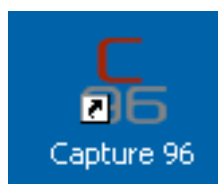
This chapter gives the instructions on how to use Capture 96, on the features of the software, on generating readings and on how to handle the data of measured plates.

3.2 First steps

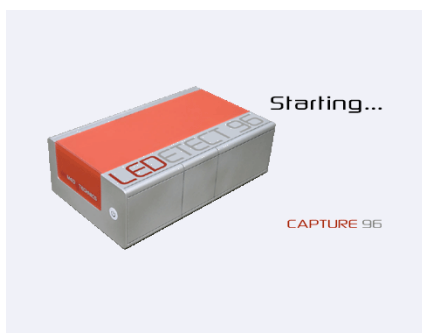
3.2.1 Starting Capture 96

Start "Capture 96" software package on your PC by clicking on the "Capture 96" – icon on the desktop of your computer.

Graph 3.1: Program Icon

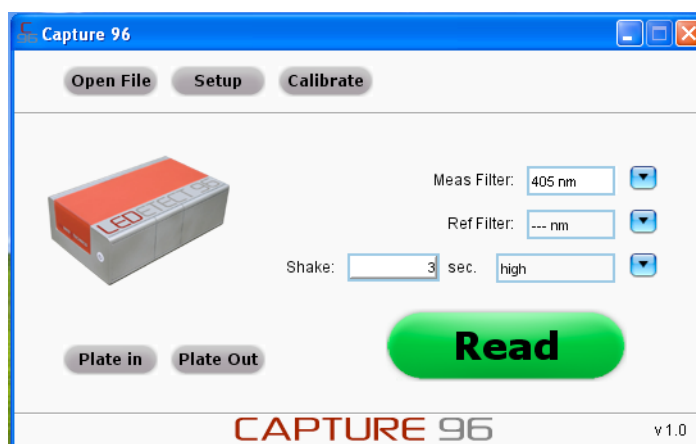


During startup, "Capture 96" will start the Java™ environment and then send a "wake-up" command to the reader.



As soon as Capture 96 is started, the Start Screen will be displayed.

Graph 3.2: Capture 96 Start Screen

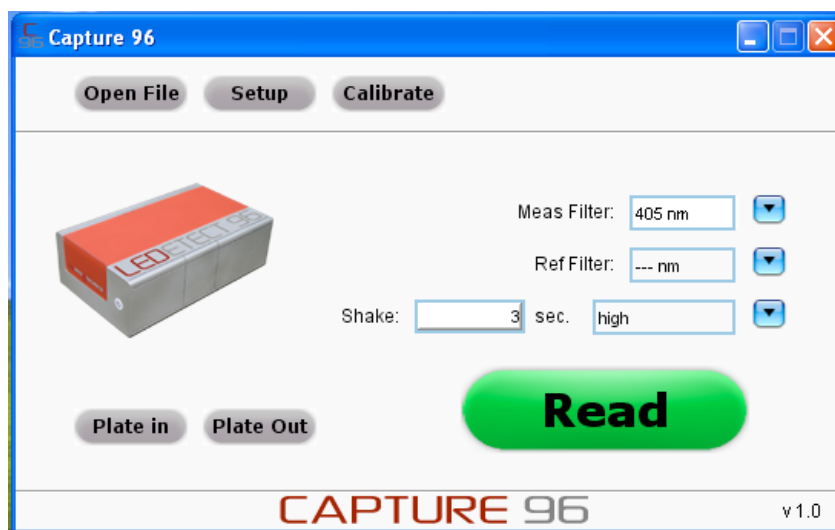


3.3 Description of Screens

3.3.1 Start Screen Buttons

The start screen of Capture 96 software shows buttons, which have the following functions:

Graph 3.3: Capture 96 Start Screen



Open File

opens a dialog to select and open previously measured plate data. Default directory is defined under "Setup" (see below). The selected set of data will be displayed in the result screen of Capture 96.

Setup

Opens the "Instrument & Software Setup" Dialog ➤ 3.3.2 Setup

Calibrate

sends an initialisation – command to the reader and calibrate plate transport, filter slider and gain of optical system. This routine is fully automated and takes appr. 8-10 seconds.

Plate In / Out

Moves plate carrier into or out of the instrument.
 ➤ for reading a plate, it is not necessary to "manually" move the plate carrier out, as this is part of the reading routine.

READ

The "Read" button is displayed green, if an instrument is connected and properly initialised. If the Read-button is displayed in grey, then either no instrument is connected, or the instrument has not been detected.

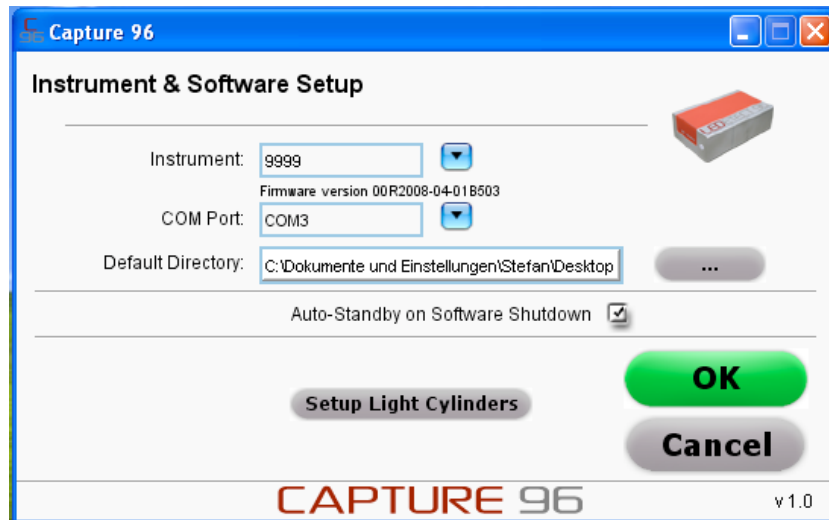
Clicking on the Read-button will start the reading process.

➤ 3.4 Plate Reading

3.3.2 Instrument & Software Setup Dialog

After clicking the "Setup" button in the start screen of Capture 96, the Setup screen is displayed:

Graph 3.4: Capture 96 Setup Screen



Instrument: Displays information on the actually connected instrument such as Serial Number and Firmware Version.

COM Port: use this setting to define the COM port where the instrument is connected to. See chapter 2.5.2 to see how to identify the right COM port.

Default Directory: Here you can select the default directory on your PC, where measured plate data are to be saved. To change the default directory, click on the "... " button.

Auto-Standby on Software Shutdown: Here you can select if the instrument should be automatically sent to standby everytime the software is being shut down. The instrument will wake up automatically once the software is started again.

Setup Light Cylinders: Opens the „Setup Light Cylinders“ screen.

◀ 3.3.2.1 Setup Light Cylinders

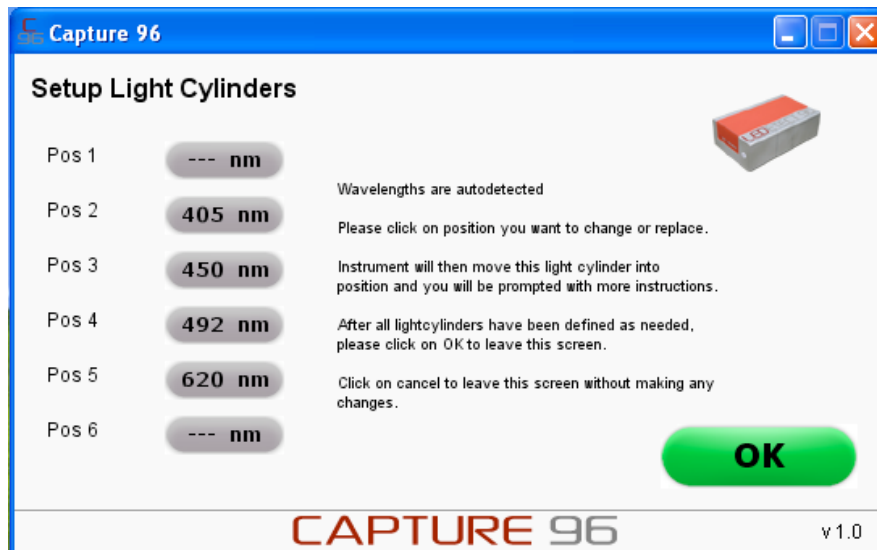
OK closes this screen, saves your changes and returns to the start screen.

Cancel closes this screen without saving your changes and returns to the start screen.

3.3.2.1 Setup Light Cylinders

After clicking the "Setup Light Cylinders" button in the setup screen of Capture 96, the Setup Light Cylinders Screen is displayed.

Graph 3.5: Capture 96 Setup Light Cylinders Screen



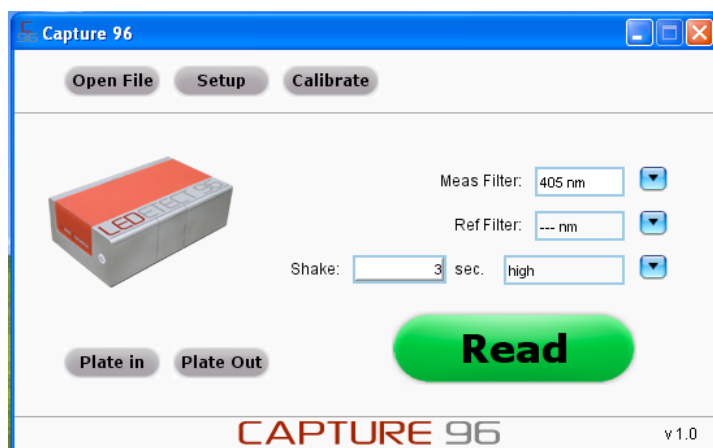
For the full description of this screen and on how to change light cylinders, please check the respective chapter in this manual

➤ 4.2.1 Procedure for changing light cylinders

3.4 Plate Reading

When Capture is started and the reader has been detected, that start screen will be displayed with a green "Read" button.

Graph 3.10: Capture 96 Start Screen

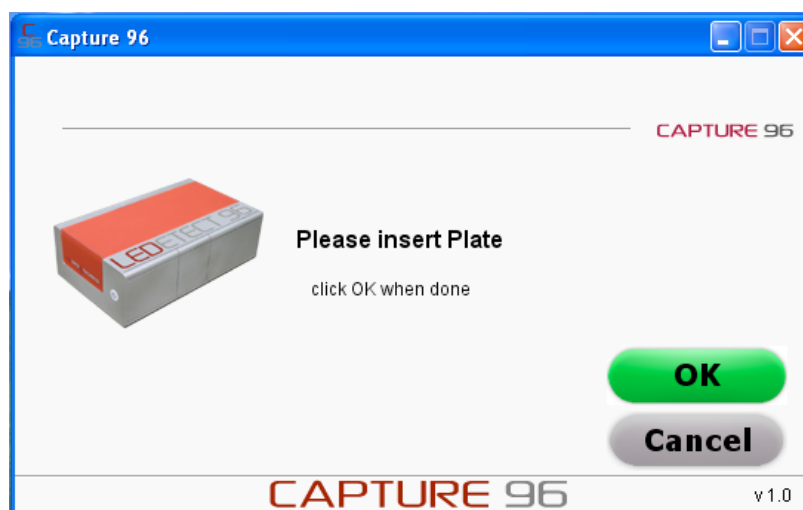


This screen always shows the settings of the last performed reading. If you want to continue to use the same settings, just click the Button „Read“.

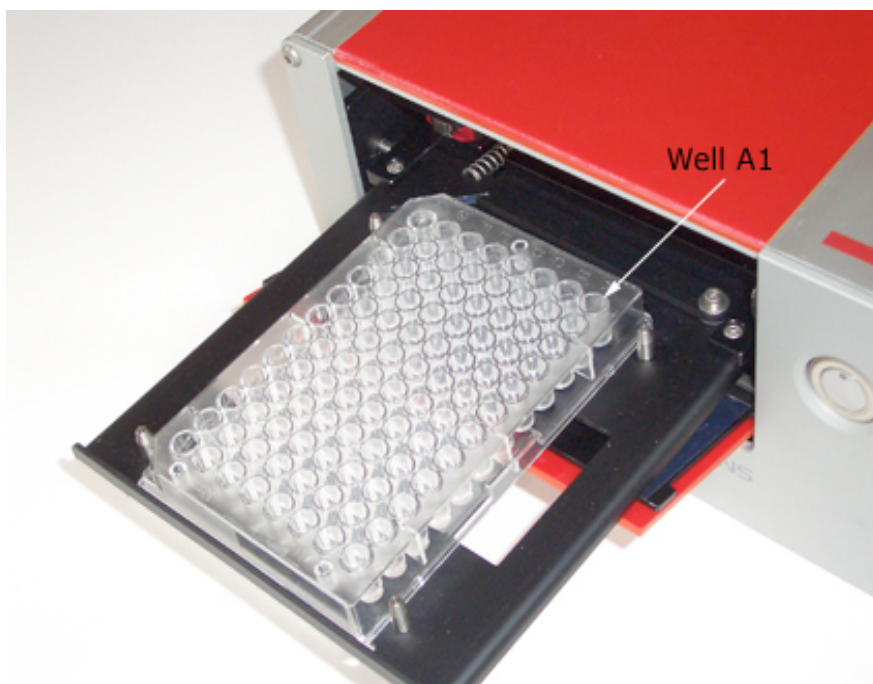
If the displayed settings need a change, select the required reading parameters from the drop-down menus:

- **Meas Filter:** select the required measurement filter
- **Ref Filter:** if the plate is to be measured in dual wavelength mode, select the required reference filter from. If the plate is to be measured in single wavelength mode, select "---nm"
- **Shake:** If the plate requires shaking before reading, insert the time in seconds for shaking, and from the drop down menu select the shaking mode. There is 4 shaking modes available: wide, low, medium, high. These modes vary in speed (frequency) and amplitude of a linear shaking movement.

Once all parameters are set as required, click on the "READ" button. The plate carrier will now be moved out of the instrument and the software will display the "Insert Plate" screen.

Graph 3.11: Insert plate Screen

Insert the plate into the plate carrier of the instrument.

Graph 3.12: Insert plate in plate carrier

Ledetect 96 features a self centering plate carrier, which means the only requirement for inserting the plate is to put it well within the 4 pins. Please take care of the plate orientation, well A1 should be positioned as shown in the above graph.

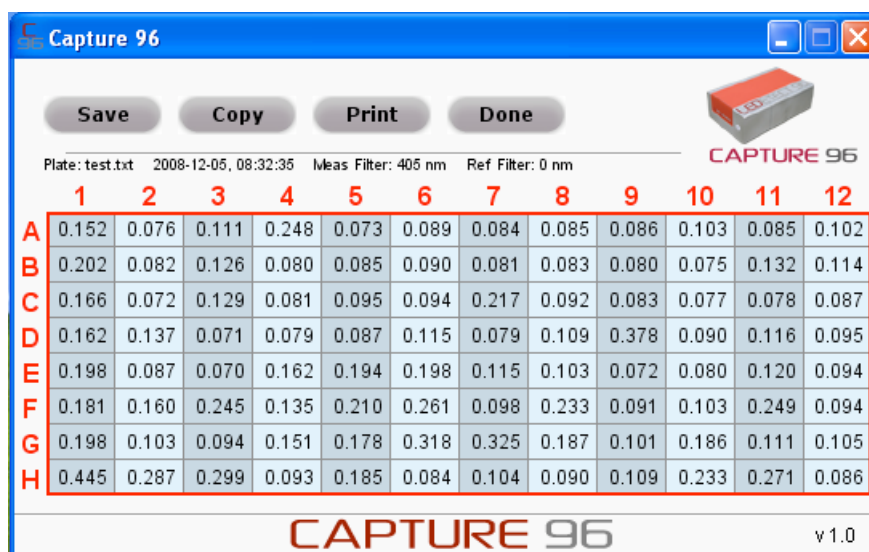
Once the plate is inserted correctly, click the "OK" button in Capture 96. The instrument will now read the plate. During the reading process, the "Reading" screen is displayed.

Graph 3.13: Reading screen



After the reading is finished, the plate carrier will be moved out of the instrument, and the measured data will be displayed in the Result screen (see next page).

Graph 3.14: Result screen



	1	2	3	4	5	6	7	8	9	10	11	12
A	0.152	0.076	0.111	0.248	0.073	0.089	0.084	0.085	0.086	0.103	0.085	0.102
B	0.202	0.082	0.126	0.080	0.085	0.090	0.081	0.083	0.080	0.075	0.132	0.114
C	0.166	0.072	0.129	0.081	0.095	0.094	0.217	0.092	0.083	0.077	0.078	0.087
D	0.162	0.137	0.071	0.079	0.087	0.115	0.079	0.109	0.378	0.090	0.116	0.095
E	0.198	0.087	0.070	0.162	0.194	0.198	0.115	0.103	0.072	0.080	0.120	0.094
F	0.181	0.160	0.245	0.135	0.210	0.261	0.098	0.233	0.091	0.103	0.249	0.094
G	0.198	0.103	0.094	0.151	0.178	0.318	0.325	0.187	0.101	0.186	0.111	0.105
H	0.445	0.287	0.299	0.093	0.185	0.084	0.104	0.090	0.109	0.233	0.271	0.086

The measured results are displayed. If the selected reading mode was dual wavelength, then the displayed results show the calculated difference of Measurement filter minus Reference filter.

The line below the four buttons shows the reading details for this plate. The filename "Plate: test.txt" will only be displayed after the plate has been saved!

Save: Opens the Windows dialog "Save as", the default directory that has been defined in setup is displayed. The saved data set will contain the 96 individual OD values for the wells, as well as Measurement time, date and used filters. The data set is stored in .txt format, which can be opened by, and imported into most available PC software packages, including spread sheet programs.

Copy: Copies the complete data set into clipboard, so that the data can be pasted into other programs, e.g, Microsoft Excel™ for further calculations. The copied data set will contain the 96 individual OD values for the wells, as well as Measurement time, date and used filters.

Graph 3.15: Screenshot of MS Excel™ after data have been pasted

	B	C	D	E	F	G	H	I	J	K	L	M	N
1													
2													
3													
4		0.151	0.076	0.116	0.26	0.071	0.089	0.083	0.093	0.099	0.097	0.088	0.103
5		0.196	0.08	0.132	0.094	0.086	0.088	0.081	0.084	0.079	0.082	0.141	0.112
6		0.165	0.071	0.128	0.079	0.094	0.094	0.207	0.123	0.08	0.077	0.078	0.087
7		0.162	0.133	0.071	0.078	0.086	0.116	0.077	0.106	0.361	0.092	0.121	0.097
8		0.184	0.086	0.07	0.167	0.189	0.209	0.194	0.098	0.079	0.079	0.121	0.093
9		0.178	0.175	0.239	0.132	0.216	0.256	0.101	0.234	0.096	0.102	0.24	0.096
10		0.205	0.104	0.12	0.149	0.183	0.32	0.327	0.185	0.101	0.183	0.11	0.1
11		0.468	0.282	0.306	0.094	0.186	0.084	0.106	0.08	0.108	0.242	0.276	0.086
12													
13													
14		Reader LEDETECT 96					Filename:						
15		Date: 05.12.2008											
16		Time: 10:18:38											
17		Meas Filter: 405 nm											
18		Ref Filter: 0 nm											
19													

Print: Prints the complete data set via the printer that is connected to the PC. The printout will contain the 96 individual OD values for the wells, as well as Measurement time, date and used filters.

Done: This button is used to exit the result screen. When selected, Capture 96 will check if the actually displayed data set has ever been saved. If not, you will be prompted with a respective reminder. If the data had already been saved, the Start screen of Capture will be displayed.

Chapter 4

Parts Replacements

- Changing Light Cylinders

4.1 Introduction

This chapter gives the instructions on how to replace components of Ledetect 96 that can be replaced / changed by the user.

4.2 Changing Light Cylinders

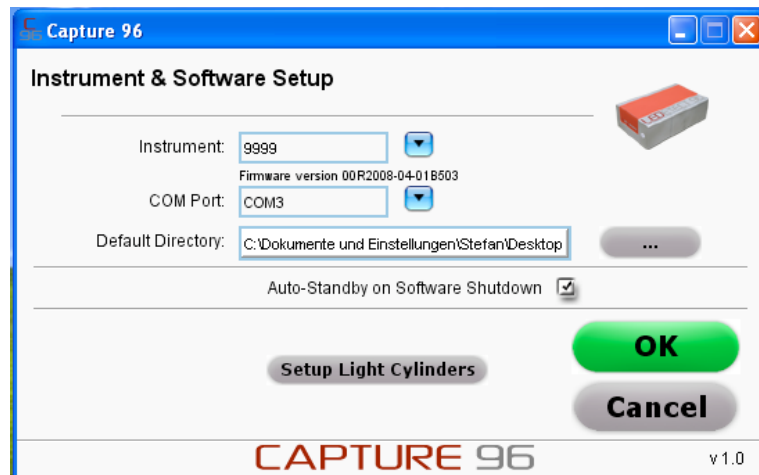
In Ledetect 96, for each wavelength the individual light source, lenses and filters are enclosed in fully integrated units, so called "Light Cylinders". There is one light cylinder for each wavelength, which can easily be replaced. Up to 6 light cylinders can be inserted.

Each light cylinder has its own digital ID, which is automatically recognised by the PC software. It never matters in which position a light cylinder is inserted, the instrument and software will automatically detect and accept the actual position of each individual light cylinder.

4.2.1 Procedure for changing light cylinders

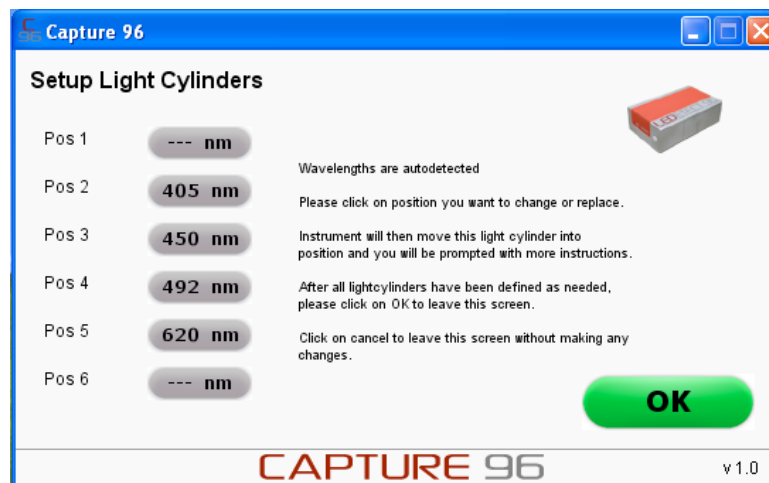
1. Start "Capture 96" software package on your PC
2. Select "Setup" in the start screen, the Setup Screen will be displayed

Graph 4.1: Capture 96 Setup Screen



3. Click the button "Setup Light Cylinders", the Setup Light Cylinders Screen will be displayed.

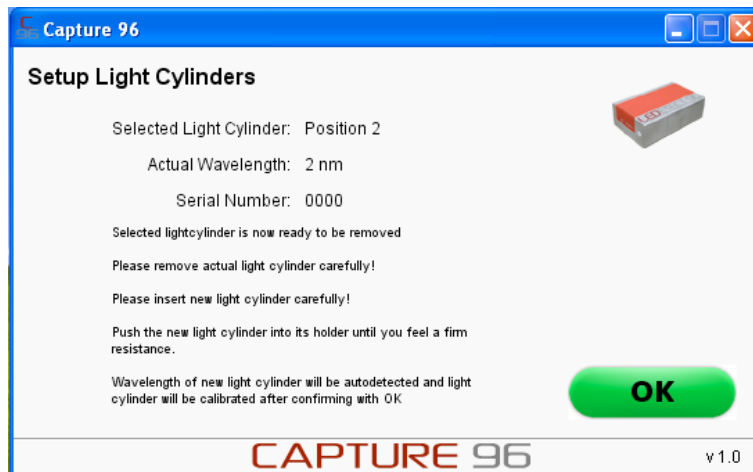
Graph 4.2: Capture 96 Setup Light Cylinders Screen



Select the wavalength that needs to be changed or replaced.

As soon as one of the buttons has been clicked, Capture 96 will switch to the actual screen to for changing a light cylinder.

Graph 4.3: Change light cylinder screen



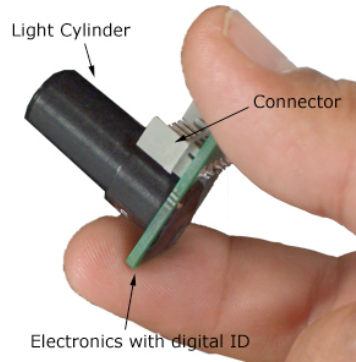
At the same time, the respective filter will be moved to the light cylinder access-position, which is in the filter compartment at the right hand side of the instrument. Carefully open the filter compartment lid and proceed as described on the followig page.

Graph 4.4: Open Filter compartment lid



A removed light cylinder has this geometry. This picture should give you an idea as to what the best way to grab it would be:

Graph 4.5: Light Cylinder geometry



All three components: cylinder, connector and electronics are firmly fixed together. The female part of the connector is firmly fixed onto the light cylinder slider inside the instrument. The connector actually is the holding force, which holds the cylinder in place inside the slider.

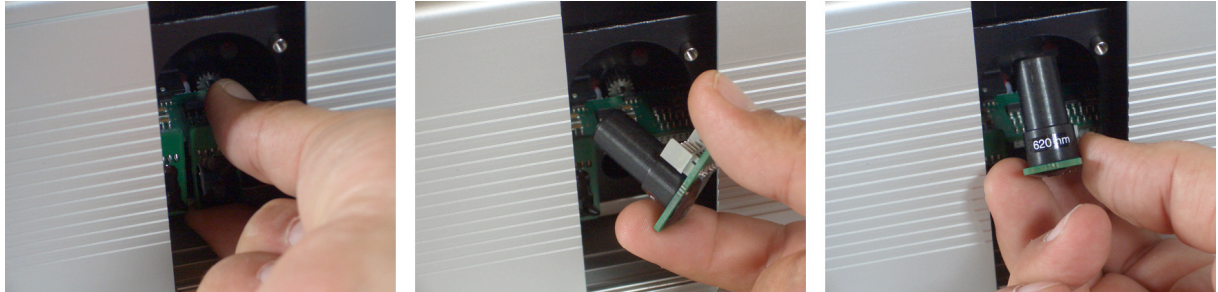
Once the filter compartment lid has been opened, you have access to the light cylinder with exactly the wavelength that has been selected.

Graph 4.6: Light Cylinder in replacement position



To remove the light cylinder, carefully grab the light cylinder at the electronic board and remove it by gently pulling it out of the slider

Graph 4.7: Remove Light cylinder

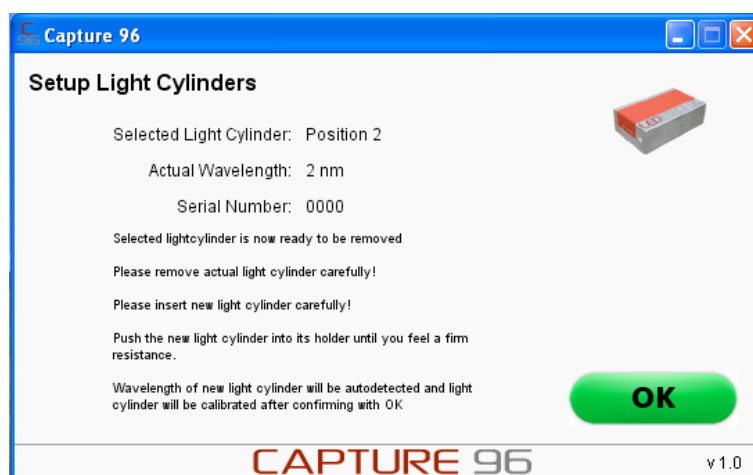


Each light cylinder is labelled with the wavelength it represents.

In order to insert the new light cylinder, please follow the same steps, in the reverse order:

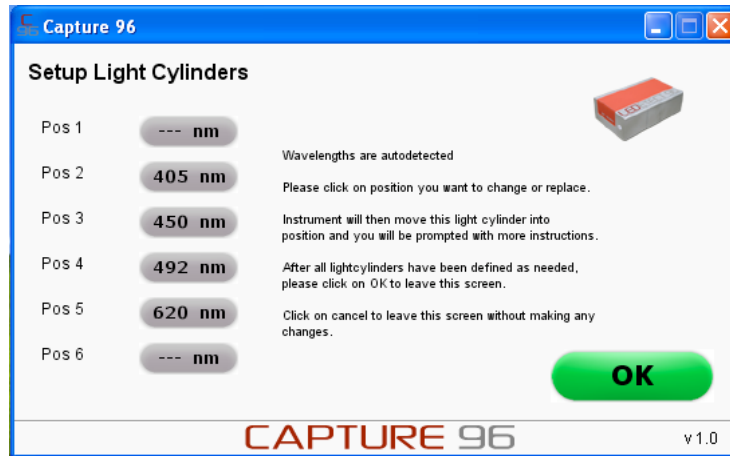
- 1.) Insert the new light cylinder into the slider.
 - ➔ take care that the connector is in top position
 - ➔ gently push the light cylinder into the slider, until you feel a slight resistance -> the male connector now touches the female connector
 - ➔ Now push the light cylinder further inside until you feel a firm resistance.
- 2.) Close the Filter compartment lid
- 3.) In Capture 96 click on OK

Graph 4.8: Change light cylinder screen



Please note that the new wavelength will only be detected after the OK button has been clicked. The software will return to the the Setup Light Cylinders Screen.

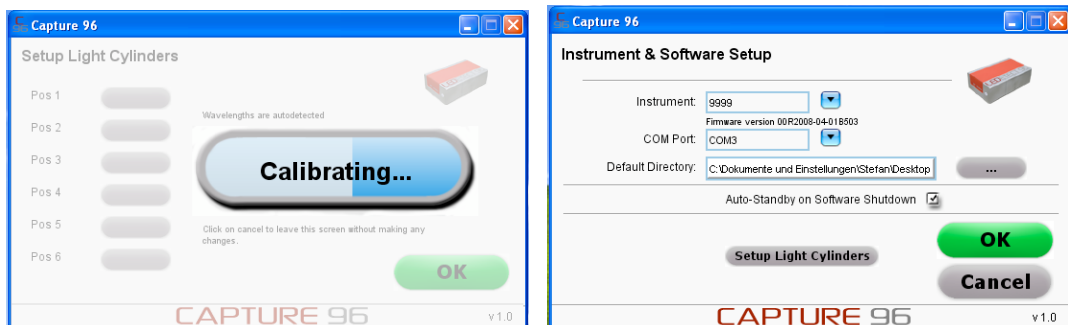
Graph 4.9: Capture 96 Setup Light Cylinders Screen



In this screen, you will now see the new wavelength on the position where you have inserted the light cylinder.

You can now either change / replace further light cylinders, or leave the light cylinder setup by clicking the OK button.

Clicking OK will start a calibration of the optical system and then bring the software back to the Setup screen.



Click on „OK“ to return to the Start screen of Cpture 96.

Chapter 5

Maintenance

- Regular Maintenance / Cleaning

5.1 Introduction

This chapter gives the instructions on regular maintenance of the instrument.

5.2 Regular Maintenance / Cleaning

From the technical point of view, Ledetect 96 is a maintenance free instrument, if treated with normal care as usual in laboratories.

You should, however, take care that the unit is kept in a clean place and that liquid spills that may get onto the unit for whatever reason, are being removed immediately.

It is essential that only Microplates without any remainings of liquid on the bottom of the plate (as this would be common after incubating the plate in a waterbath) are being inserted into the instrument. Drops on the bottom of the instrument might drop onto the optics of the instrument and cause blockage of the light beam.

It is recommended to clean the outside of the instrument once per week with a soft cloth and a soft detergent or disinfectant.