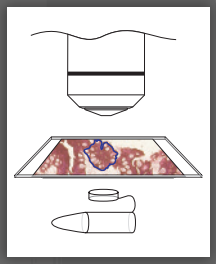
From Eye to Insight

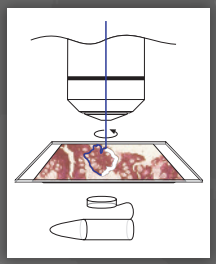
Leica
MICROSYSTEMS

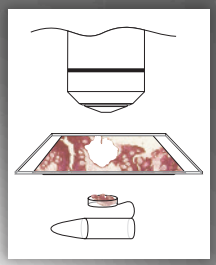
LEICA LMD6
LEICA LMD7

Laser Microdissection Systems

Dissection perfection







LEICA LASER MICRODISSECTION SYSTEMS

Laser Microdissection (LMD) is a technology for precision sample preparation. In many areas of research it is a basic prerequisite for obtaining well-defined starting material for downstream experiments. Meaningful analyses in the fields of **genomics, transcriptomics, microarrays, next generation sequencing, biochips, and proteomics** are attained using this high-precision technology.

The Leica LMD systems perform sample preparation for molecular biology analysis directly from the tissue section using a UV laser.
The development of innovative new methods and new instruments has made laser microdissection popular in additional fields such as live cell research, climate research, and cover-slip engraving for electron microscopy.
Now, more than ever, researchers are using LMD to maximize their research impact.



SUPERIOR SOLUTION

Leica Microsystems offers an extremely precise, highly selective laser microdissection method for a broad range of applications. Users of LMD use our superior systems for various applications:

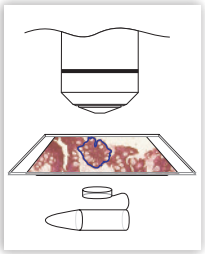
› Fast, precise isolation of ultra-pure cells and cell populations
› High quality dissectates for genomics, transcriptomics, proteomics, metabolomics, and live cell applications
› Convenient laser manipulation of live cells and other samples
› Mark and track microscopic samples or sample holders

METHOD OF CHOICE

The Leica LMD6 and 7 employ a very gentle, laser-based microscopic sample manipulation, dissection, and collection technique:

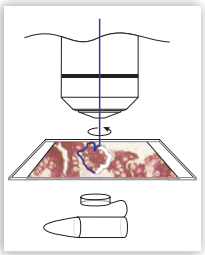
› Patented laser beam movement via optics*
› Real-time live cutting directly on the sample with a Pen-screen
› Patented specimen collection via gravity**
› Dedicated objectives for LMD
› Adjustable laser settings
› High-end, fully automated upright research microscope
› Easy-to-use LMD Software

* Patented EP 1276586, US 7035004, JP 3996773
** Patented DE 10057292, EP 1207392, JP 3641454

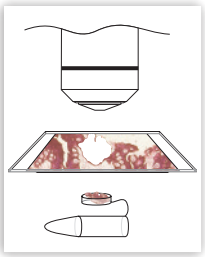


The Leica LMD process (from top to bottom):

Step 1: Define the region of interest



Step 2: Laser beam precisely steered by prisms along your definition



Step 3: Dissectate is collected by gravity

DISSECTION PERFECTION

Observe and obtain ultrapure and homogenous samples from heterogeneous starting material – contact- and contamination-free simply by gravity. The Leica LMD6/7 systems make this possible: they combine a fully automated upright high-end research microscope and a UV laser.

TWO SYSTEMS, TWO DIFFERENT LASERS

Leica offers two freely configurable laser microdissection systems: the Leica LMD6 (Fig. left) and the Leica LMD7 (Fig. right). Both systems are based on a high-end upright research microscope (Leica DM6 B). In addition to the advanced functions of this fully automated research microscope, Leica LMD systems enable you to isolate and manipulate microscopic samples in a contact- and contamination-free manner. The difference between the two systems is the laser power and flexibility. The laser settings of both systems can be adjusted to perfectly match the needs for your application.

› The LMD6 is ideal for standard laser microdissection applications, e.g. reliable single cell or tumor isolation from soft tissue sections.

› The LMD7 has a high power laser with additional options to adjust the laser pulse frequency and laser head current for dissection of hard tissues like bone, teeth, wood or plant tissue as well as chromosomes.

LASER COMPARISON

	LMD6	LMD7
Wavelength	355 nm	349 nm
Pulse frequency	80 Hz	10–5.000 Hz
Pulse length	< 4 ns	< 4 ns
Max. pulse energy	70 µJ	120 µJ





ADVANTAGES OF LASER MICRODISSECTION

Leica Laser Microdissection –

simple, intuitive, gentle, and smart sample isolation, collection, and manipulation.

› Laser beam movement via optics*:
- Fast, precise, and reliable laser cuts
- Real-time cutting while sample remains fixed
- Convenient documentation by time lapse movies

› Specimen collection via gravity:
- Simple, gentle, contact- and contamination-free
- Allows standard consumables for collection
- No limitation of size or shape of dissectate
- Pool unlimited amounts of dissectates

› Adjustable high-powered laser:
- Flexible for a variety of specimens and applications
- Full control of laser power, laser aperture, laser speed, laser frequency (Leica LMD7), and laser focus

› Fully integrated fluorescence:
- Specially designed fluorescence filter cubes
- Live cutting within brightfield and fluorescence

› Upright microscope:
- All benefits of a fully automated high-end research microscope
- Safer and smart dissectate collection by gravity without any additional force
- Free choice between LED or Halogen illumination

› Specially designed LMD objectives:
- Ensure the highest possible laser power
- Range of dedicated LMD objectives: 5x, 6.3x, 10x, 20x, 40x, 63x and 150x
- 1.25x for fast slide overviews
- Objectives for additional applications (other than LMD applications, e.g. 100x oil for FISH)

› Easy-to-use software:
- Simple, time-saving, and workflow-based system functionality
- Additional modules for automated pattern recognition (ADM) and automated image capture and documentation (LIF database)

› Leica camera range:
- Choose a camera specific to your application
- Attach up to two cameras (e.g. one for fluorescence, one for brightfield)

* Patented EP 1276586, US 7035004, JP 3996773

** Patented DE 10018255, JP 4236844

http://www.leica-microsystems.com/science-lab/topics/laser-microdissection/

CONSUMABLES

Leica Microsystems offers application specific consumables for laser microdissection with different types of membranes on metal frames, glass slides, and ibidi® and Petri dishes in different sizes. Whether you need slides that have no autofluorescence, use DIC contrast to view the specimen, or need a suitable surface for growing cell cultures – Leica Microsystems has **the perfect solution for your application**.

FOR DISSECTION WE RECOMMEND

› Leica MembraneSlides: glass slides with PEN or PPS membrane
› Leica FrameSlides: steel frames with PEN, PPS, PET, POL or FLUO membrane
› Leica CoverslipSlides: coverslips with PEN membrane
› All membranes are highly UV-absorbent
› DIRECTOR™ slides
› Petri dishes with PEN membrane
› ibidi® slides (e.g. 18-well) with PEN membrane*
› Membrane rings with PEN membrane*
› In addition, Leica LMD Systems support collection from plain glass slides (Draw+Scan ablation)

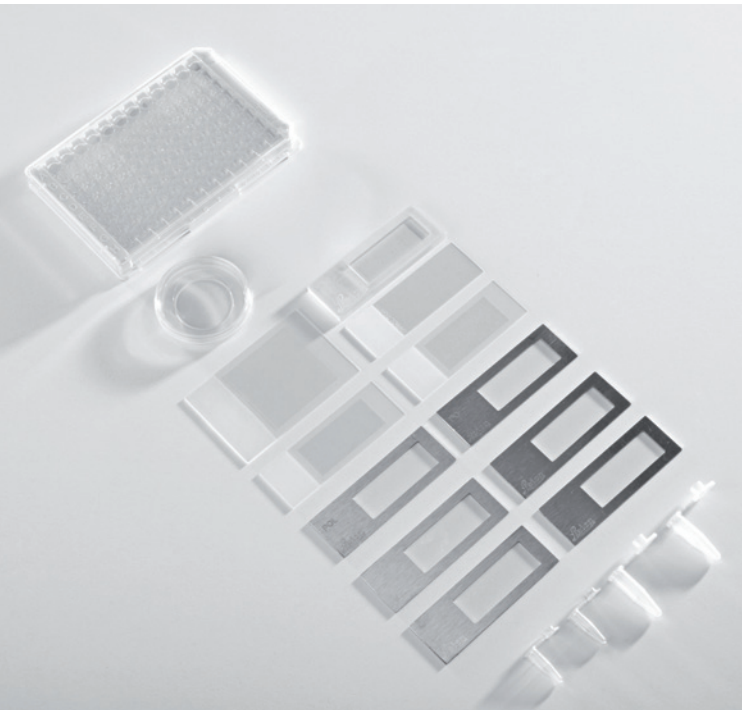
* suitable for stack dissection and collection

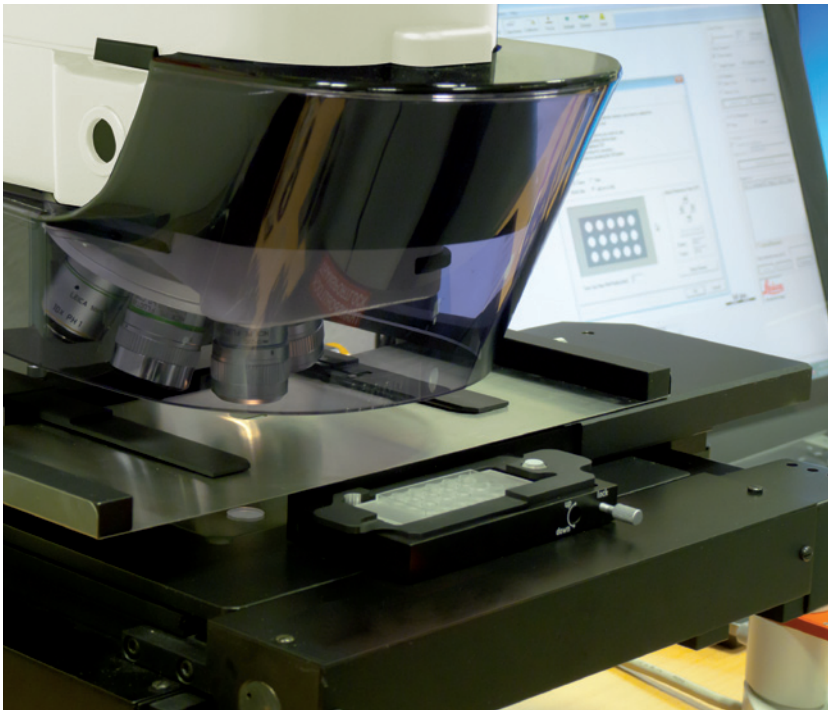
RANGE OF COLLECTION DEVICES

For motorized, scanning and LMT350 stages:
› Standard PCR tube caps 0.2 ml/0.5 ml
› 8-strip wells
› Petri dishes with or without PEN membrane

For scanning stage only:
› 8-strip caps (suitable for 8-strip wells and 96-well plates)
› ibidi® slides
› Multi-well slides (dimensions max. 76 x 26 mm)

For LMT350 stage only:
12-strip caps
1.5 ml tube
96-PCR-well plate / 96-LCC-well plate





STAGES* AND HOLDING DEVICES FOR LMD SYSTEMS

The motorized stage

HOLDERS



Holder for 1 slide
(25 x 76 mm)
11532732

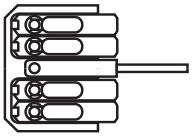


Holder for big slide
(50 x 76 mm)
11505214

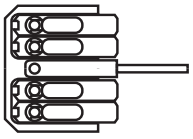


Holder for Petri dish
with PEN membrane bottom
11505257

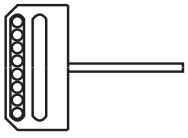
COLLECTORS



Collector with lever
for tube caps**
(4 x 0.2 ml PCR tubes)
11505131



Collector with lever
for tube caps**
(4 x 0.5 ml PCR tubes)
11505130



Collector for 8-well
strip tubes
(high volume)
11505258

** Patented DE 10057292, EP 1207392, JP 3641454

The scanning stage

HOLDERS



Holder for 3 slides
(25 x 76 mm)
11505226

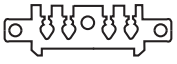


Holder for big slide
(50 x 76 mm)
and Petri dish
with PEN membrane bottom
11505227

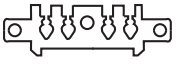


Holder for 18-well ibidi®
slides and slide stacks
11505255

COLLECTORS



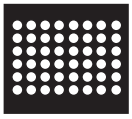
Collector for
tube caps
(4 x 0.2 ml PCR tubes)
11505229



Collector for
tube caps
(4 x 0.5 ml PCR tubes)
11505228



Universal collector
for 8-strip tubes,
8-strip caps, slides
(Multi-well slides, ibidi®,
etc.) and chamber slides
11505276



Universal collector
for 6x8-strip caps
included in
11888852

The LMT350

HOLDERS AND ADAPTER



Holder for 4 slides
(25 x 76 mm)
11505304



Adapter for
large slides
11505311

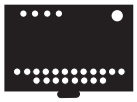


Adapter for
petri dishes
11505312



Adapter for
18-well ibidi®
slides
11505313

COLLECTORS



Multicollector
11505305



Collector for tube caps
(4 x 0.5 ml PCR tubes)
11505306



Collector for tube caps
(4 x 0.2 ml PCR tubes)
11505307



Inlay
96-PCR 11505308
96-LCC 11505310

* Patented DE 10018251, US 6907798, JP 4146642

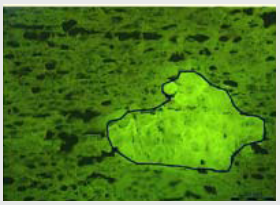
UNIQUE LASING WITHIN FLUORESCENCE

The ability to perform fluorescence imaging and laser microdissection simultaneously is becoming more important. Lasing within fluorescence using the unique patented axis- and filter-system* is one of the strengths of the Leica LMD systems. Whether you are inspecting and dissecting immunolabeled tissue sections or live cells expressing a fluorescent protein – the laser microdissection systems Leica LMD6 and Leica LMD7 make this a standard procedure. In addition, the fully automated fluorescence axis minimizes bleaching effects, accelerates your processes, and offers the exactly reproducible experiment conditions if required.

EXAMPLE

Phloem tissue and stone cells

Selection

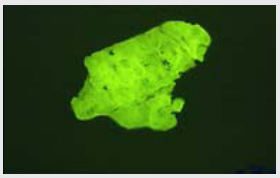


Excision

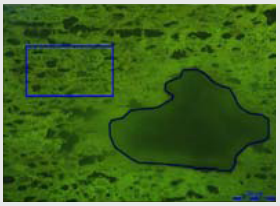


Dissectate in vessel A

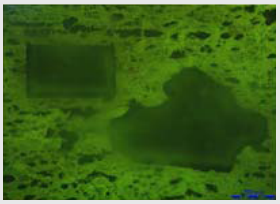
Stone cells



Selection



Excision



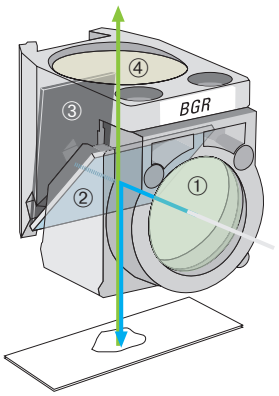
Dissectate in vessel B

Other phloem tissue



LMD FLUORESCENT FILTER SYSTEMS

The Leica's range of specialized LMD fluorescence filter systems is continuously growing. These LMD filter systems are from the ET series, are sputtered, and feature impressively steep edges of the excitation and emission spectrum.



① Excitation filter
② Dichroic mirror
③ Leica light trap
④ Emission filter

Several newly developed fluorescence filter systems for LMD allow the unique simultaneous cutting under fluorescence:

- Leica LMD-BGR
- Leica LMD-GFP band pass
- Leica LMD-GFP long pass
- Leica LMD-Cy3
- Leica LMD-DAPI
- Leica LMD-Alexa594
- Leica LMD-CFP
- Leica LMD-GFP/Cy3
- Leica LMD-YFP
- Leica LMD-Cy5

* Patented EP 1719998, US 7485878

DEDICATED LASER MICRODISSECTION OBJECTIVES

Leica Microsystems offers a portfolio of dry objectives dedicated for Leica LMD systems. These special LMD objectives feature the highest possible UV-transmission and outstanding imaging performance – the Leica SmartCut series (5x–150x).

Objective	Mag.	NA	WD (mm)	BF, POL	FL	DIC, PH	LMD	CI	SOV
HCX PL FLUOTAR**	1.25x	0.04	3.7	+	+	–	–	–	+++
PLAN UVI	2.5X	0.07	11.7	+	+	–	+++	++	+++
PLAN**	4x	0.1	26.2	+	+	–	+	++	++
UVI	5x	0.12	11.7	+	+	–	+++	++	++
HI PLAN	6.3x	0.13	12.8	+	+	–	+++	++	++
HCX PL FLUOTAR	10x	0.3	11.0	+	+	+	+++	+	+
UVI	10x	0.25	2.9	+	+	+	+++	–	+
HCX PL FLUOTAR	20x	0.4	6.9	+	+	+	+++	+	+
HCX PL FLUOTAR	40x	0.6	3.3–1.9	+	+	+	+++	–	–
HCX PL FLUOTAR	63x	0.7	2.6–1.8	+	+	+	+++	–	–
HCX PL FLUOTAR	150x	0.9	0.25	+	+	+	+++	–	–

Mag. – magnification; NA – numerical aperture; WD – working distance; BF – brightfield; POL – polarized light; FL – fluorescence; DIC – differential interference contrast; PH – phase contrast; LMD – laser microdissection; CI – cap inspection; SOV – specimen overview; + = suitable; – = not suitable; ++ = dedicated for; +++ = most suitable

** Additionally recommended objectives

OTHER OBJECTIVES

In addition to the LMD objectives, any other Leica objectives can be used with the Leica DM6 B upright microscope for specific applications (e.g. for FISH). In the table above, the 1.25x objective is used for fast specimen overviews and the 4x objective is dedicated for cap inspection.

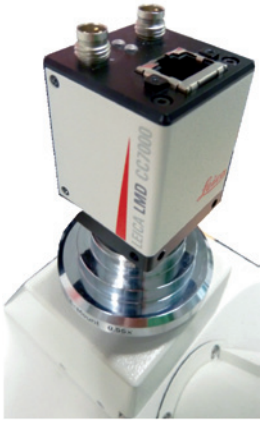


CAMERA PORTFOLIO

Transmitted light, fluorescence or both: Leica LMD systems and software support a range of digital cameras for different requirements.

Choose the new Leica LMD CC7000 digital color camera dedicated for LMD applications. The highly compact LMD color camera Leica LMD CC7000 (# 11501478) is a GigE camera with 1/3" interline progressive scan CCD sensor and 1.2 Megapixel resolution. Experience the speed of the new Leica LMD CC7000, unique for Leica LMD systems.

Leica LMD CC7000 digital color camera



Choose from the portfolio of Leica microscope cameras





Left: Leica LMD6 with one camera:
The Leica LMD CC7000 for ultra fast digital live images

Right: Leica LMD7 with two cameras:
The Leica DFC7000 T for ultra fast digital live images and the Leica DFC365 FX for demanding fluorescence.

Dual camera support allows you to combine any two cameras, thus making your system a multifunctional tool for any kind of application!

For Leica LMD6 the set-up with 2 cameras is different.

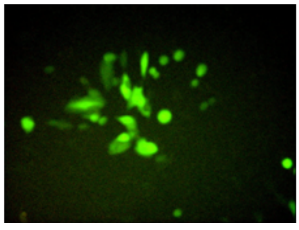


LIVE CELL CUTTING ACCESSORIES

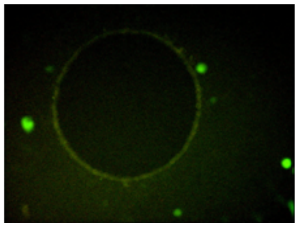
The Leica LMD systems are ideal for any kind of live cell application. With our "sandwich-technology" using membrane rings or our ibidi® slides' sterile microchambers*, live cells are easily dissected in a sterile environment. The LMD system can also be equipped with a climate chamber and full climate control. The time lapse movie function in combination with the laser beam movement by prisms makes it the perfect tool for your laser manipulation experiments. Collect cells or cell clusters via gravity, without any additional force or handling steps, directly into culture media for immediate recultivation, or, alternatively, into collectors for downstream analysis.

APPLICATION EXAMPLE: TRANSGENIC FLUORESCENT CELLS

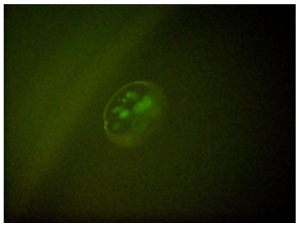
Human forensic fibroblasts infected with human cytomegalo virus, HCMV-GFP fusion protein (Courtesy of Margarete Digel and Dr. Christian Sinzger, Institute of Medical Virology, UKT University of Tübingen, Germany)



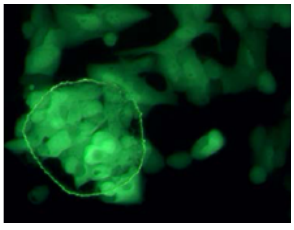
Before microdissection



After microdissection



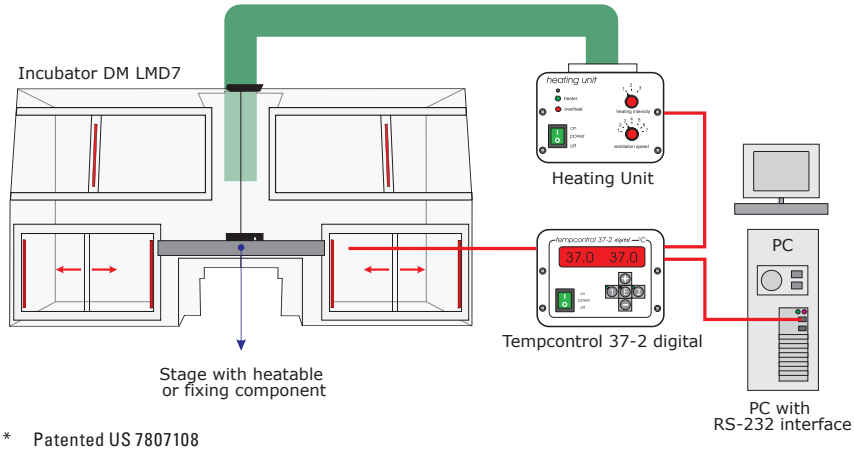
Infection of microdissected fibroblasts



4 days after recultivation

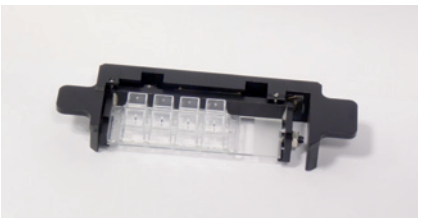
Classical selection of infected cells followed by dilution series takes 2 months.

Leica LMD climate chamber with environmental control



Patented** universal holder with different slides suitable for live cell applications





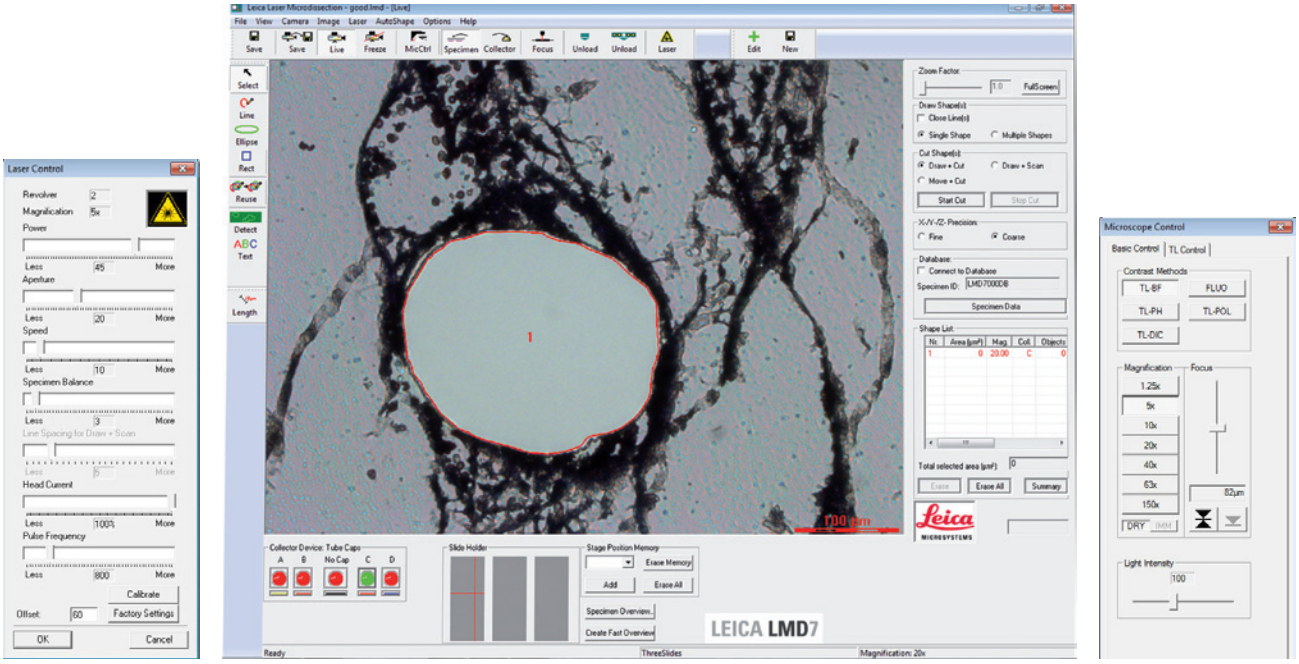
* Patented US 7807108

** Patented DE 102009029078

EASY-TO-USE SOFTWARE

Leica LMD Software offers the functions necessary for perfect Laser Microdissection or Laser Manipulation. With full control of all laser settings you can adjust the laser to your specimen, independent of shape or size.

Improve your experiments with the different drawing tools and cutting modes.
Enjoy the intuitive user interface and the speed of the system and fully automated fluorescence, DIC, PH and POL.



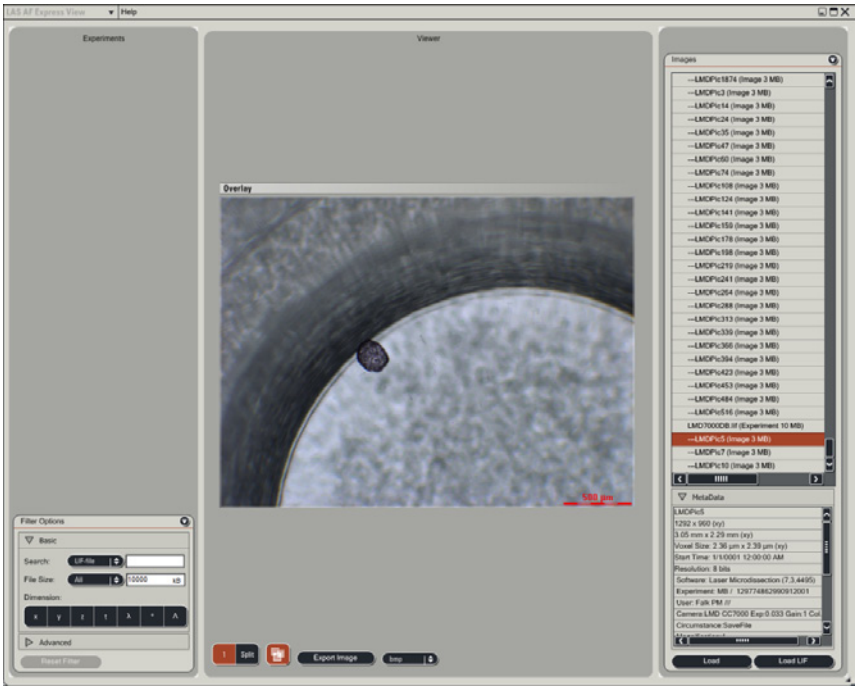
FEATURES ARE ALREADY INCLUDED IN THE LMD CORE SOFTWARE, FOR EXAMPLE:

- Full microscope control including illumination method, camera control, specimen and collector holders
- Full control of all laser settings for adjustment to any type of sample
- Specimen overview images for optimal orientation and navigation
- Time lapse movie function for application recordings, the sample stays fixed even during laser applications
- Different cutting modes and drawing tools to either dissect and pool or separate specimens of different sizes and shapes
- Annotation and length measure tool for documentation
- Image capture function for documentation
- Save and restore application settings to ensure quick and easy experiment starts

SOFTWARE MODULES

RETAIN ALL INFORMATION: LEICA LMD DATABASE

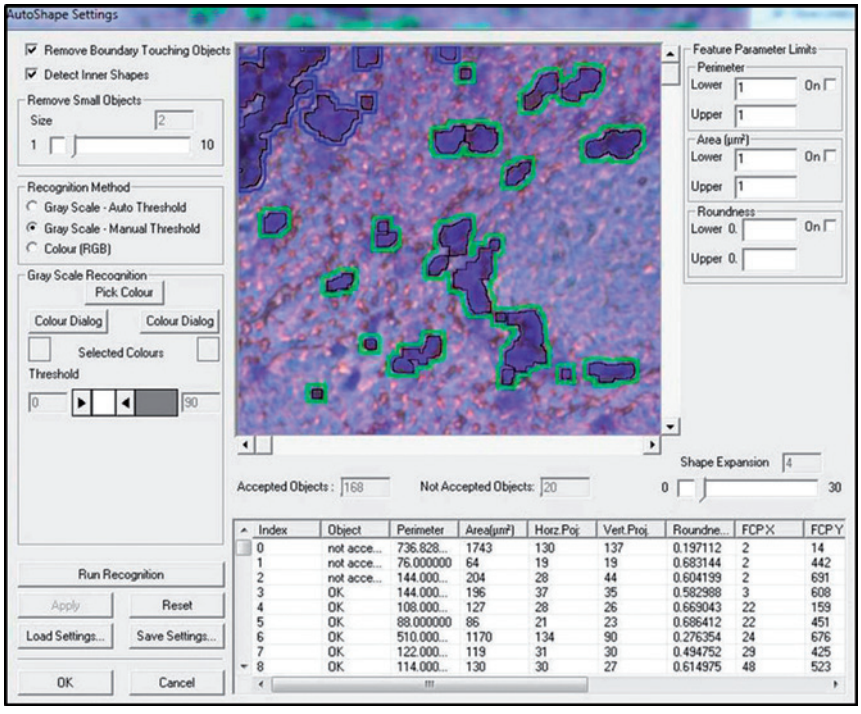
- Automated storage of images prior to cut, after cut, and after cap inspection
- Full access to all experiment parameters
- Shared database LIF-file format for image access and processing with Leica LAS AF (Leica Application Suite, Advanced Fluorescence)
- Image export to current image file formats (JPG, TIF, …)



SPEED UP YOUR LMD APPLICATION: ADM (AUTO DETECTION MODE*) FOR PATTERN RECOGNITION

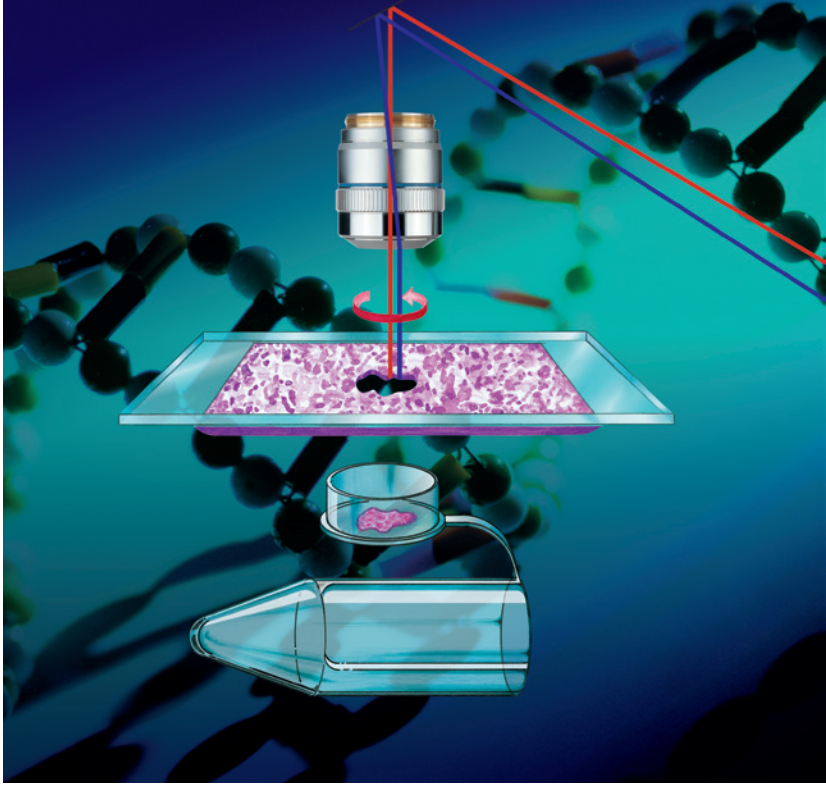
- Automated marking of cutting lines to avoid time-consuming manual selection
- Fully integrated solution for automated pattern recognition
- Easy-to-use interface
- Works well with any kind of specimen (transmitted light and fluorescence)
- Option to save and restore different settings
- Smart autofocus for best performance in different field of views

* Patented EP 1676116



SUMMARY

Maximize your impact with a Leica LMD system



MAIN APPLICATION FIELDS FOR LEICA LASER MICRODISSECTION SYSTEMS

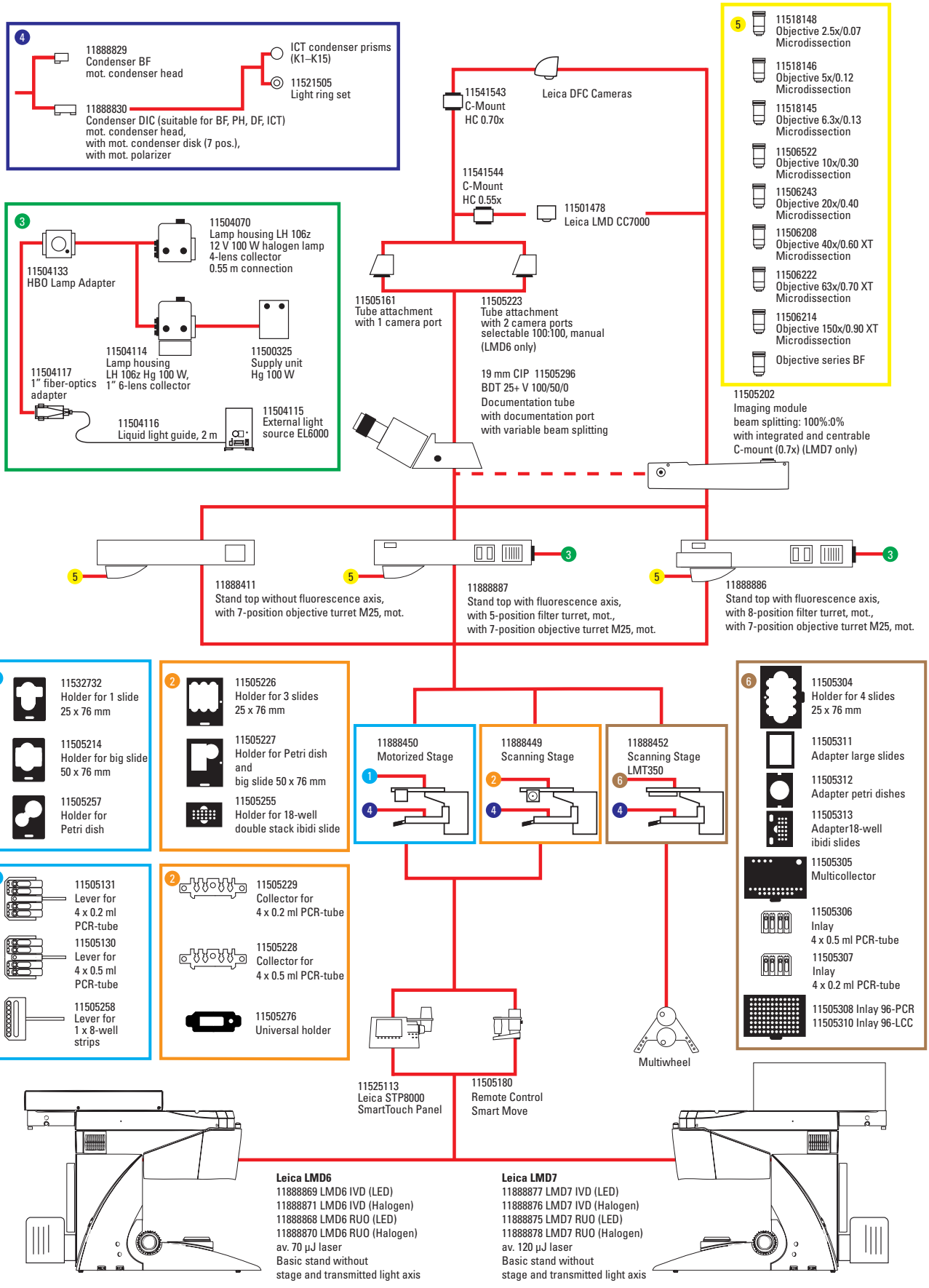
› Cancer research
› Pathology
› Molecular biology research
› Neuroscience research
› Developmental research
› Plant research
› Forensic research
› Physiology research
› Clinical research
› Pharmaceutical research
› … almost anywhere

MAIN APPLICATIONS FOR LEICA LASER MICRODISSECTION SYSTEMS

› Extraction of homogeneous samples from heterogeneous starting material for genomic, transcriptomic, proteomic, and metabolite analysis
› Live cell cloning, manipulation, and re-culturing
› Ablation and damage of live cells, tissues, and embryos monitored by time-lapse movies
› Thrombosis inducement
› TEM sample selection before resin embedding
› Engraving coverslips for CLEM application
› NanoSIMS support
› … your own unique application

BENEFIT FROM MORE THAN 10 YEARS OF EXPERIENCE

› Third generation of proven Leica LMD systems
› Workflow-based, easy-to-use, powerful software
› Large, fast growing library of scientific publications
› Knowledgeable, experienced Leica support personnel


4
11888829
Condenser BF
mot. condenser head
ICT condenser prisms
(K1–K15)
11521505
Light ring set
11888830
Condenser DIC (suitable for BF, PH, DF, ICT)
mot. condenser head,
with mot. condenser disk (7 pos.),
with mot. polarizer
3
11504133
HBO Lamp Adapter
11504070
Lamp housing LH 106z
12 V 100 W halogen lamp
4-lens collector
0.55 m connection
11504114
Lamp housing
LH 106z Hg 100 W,
1" 6-lens collector
11500325
Supply unit
Hg 100 W
11504117
1" fiber-optics
adapter
11504116
Liquid light guide, 2 m
11504115
External light
source EL6000
11541543
C-Mount
HC 0.70x
Leica DFC Cameras
11541544
C-Mount
HC 0.55x
11501478
Leica LMD CC7000
11505161
Tube attachment
with 1 camera port
11505223
Tube attachment
with 2 camera ports
selectable 100:100, manual
(LMD6 only)
19 mm CIP 11505296
BDT 25+ V 100/50/0
Documentation tube
with documentation port
with variable beam splitting
5
11518148
Objective 2.5x/0.07
Microdissection
11518146
Objective 5x/0.12
Microdissection
11518145
Objective 6.3x/0.13
Microdissection
11506522
Objective 10x/0.30
Microdissection
11506243
Objective 20x/0.40
Microdissection
11506208
Objective 40x/0.60 XT
Microdissection
11506222
Objective 63x/0.70 XT
Microdissection
11506214
Objective 150x/0.90 XT
Microdissection
Objective series BF
11505202
Imaging module
beam splitting: 100%:0%
with integrated and centrable
C-mount (0.7x) (LMD7 only)
11888411
Stand top without fluorescence axis,
with 7-position objective turret M25, mot.
11888887
Stand top with fluorescence axis,
with 5-position filter turret, mot.,
with 7-position objective turret M25, mot.
11888886
Stand top with fluorescence axis,
with 8-position filter turret, mot.,
with 7-position objective turret M25, mot.
1
11532732
Holder for 1 slide
25 x 76 mm
11505214
Holder for big slide
50 x 76 mm
11505257
Holder for
Petri dish
2
11505226
Holder for 3 slides
25 x 76 mm
11505227
Holder for Petri dish
and
big slide 50 x 76 mm
11505255
Holder for 18-well
double stack ibidi slide
11888450
Motorized Stage
11888449
Scanning Stage
11888452
Scanning Stage
LMT350
6
11505304
Holder for 4 slides
25 x 76 mm
11505311
Adapter large slides
11505312
Adapter petri dishes
11505313
Adapter18-well
ibidi slides
11505305
Multicollector
11505306
Inlay
4 x 0.5 ml PCR-tube
11505307
Inlay
4 x 0.2 ml PCR-tube
11505308 Inlay 96-PCR
11505310 Inlay 96-LCC
11505131
Lever for
4 x 0.2 ml
PCR-tube
11505130
Lever for
4 x 0.5 ml
PCR-tube
11505258
Lever for
1 x 8-well
strips
11505229
Collector for
4 x 0.2 ml PCR-tube
11505228
Collector for
4 x 0.5 ml PCR-tube
11505276
Universal holder
11525113
Leica STP8000
SmartTouch Panel
11505180
Remote Control
Smart Move
Multiwheel
Leica LMD6
11888869 LMD6 IVD (LED)
11888871 LMD6 IVD (Halogen)
11888868 LMD6 RUO (LED)
11888870 LMD6 RUO (Halogen)
av. 70 µJ laser
Basic stand without
stage and transmitted light axis
Leica LMD7
11888877 LMD7 IVD (LED)
11888876 LMD7 IVD (Halogen)
11888875 LMD7 RUO (LED)
11888878 LMD7 RUO (Halogen)
av. 120 µJ laser
Basic stand without
stage and transmitted light axis

Leica
MICROSYSTEMS

The Leica LMD6/7 microscopes comply with the Council Directive 98/79/EEC concerning *in vitro* diagnostics.
They also conform to the Council Directives 2006/95/EG concerning electrical apparatus and 2004/108/EG concerning electro-magnetic compatibility for use in an industrial environment.

CONNECT
WITH US!

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http://www.leica-microsystems.com/products/light-microscopes/life-science-research/laser-microdissection/

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