

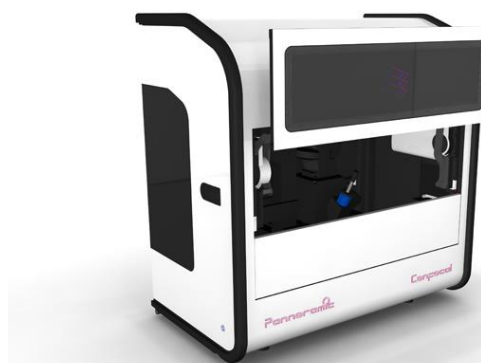
Pannoramic® digital slide scanners

Product specification sheet

September 2022

Pannoramic Confocal

Digital slide scanner
11+1 slide capacity
World-class brightfield and
fluorescent whole-slide scanning
Confocal scanning
Unique speed-up technologies
Low maintenance
Innovative imaging technology



Common characteristics:

- Wideband Multichannel RGB LED light source **for brightfield operation**
- **High-end fluorescent (FL)** illumination engine
- **3+1 physical**, software-controlled FL **filter positions** for fluorescent filters
- **Multiband FL filter** support, **45 logical fluorescent channels** for FL scanning
- High-resolution scanner **imaging optics**
- **11 slides** fully automatic loading and scanning
- **Automated Immersion System** and **Semi-automated Objective Cleaning System** with cleaner slide
- Automated **tissue detection** and automated **coverslip detection**
- **Outstanding 0.1 µm/pixel resolution** (equivalent to 97× magnification) is achieved with the w63×/1.2 NA C-Apochromat objective and 5.5 MP camera with scientific CMOS
- **Multilayer** (Z-stack) scanning up to 100 layers in fluorescent mode
- **Extended Focus** scanning
- 1D and 2D **barcode reading**
- **Scan method**: area scanning with autofocus

Acceptable **slide format** (Pannoramic Confocal):

Slide	Cover slip
Length: 75.0 to 76.0 mm Width: 25.0 to 26.0 mm Thickness: 0.9 to 1.2 mm – 45° beveled or 90° corners – Grounded or cut edges – Recommended: Colored area for placement of barcode stickers	Length: max. 50 mm Width: max. 25 mm (recommended: 24 mm) Thickness: No. 1 and 1.5 (0.13 to 0.16 mm and 0.16 to 0.19 mm, respectively)

Detailed technical specification

Pannoramic Confocal

Dimensions (width x depth x height)	
Pannoramic Confocal Unit	approx. 950 mm x 570 mm x 1000 mm
Pannoramic Confocal Control Unit	approx. 186 mm x 481 mm x 430 mm
1920x1200 Display (24") (not included)	approx. 559 mm x 204 mm x 384 mm
Lumencor Celesta Light Engine	approx. 145 mm x 340 mm x 203 mm
Weight	
Pannoramic Confocal Unit	approx. 120 kg
Pannoramic Confocal Control Unit	approx. 18 kg
Display (24") (not included)	approx. 7,1 kg
Lumencor Celesta Light Engine	approx. 8,7 kg
Ambient conditions	
Transportation / Shipment (packed)	
Permissible ambient temperature	-40 °C to +70 °C
Storage	
Permissible ambient temperature	0 °C to +60 °C
Permissible relative air humidity (non-condensing)	25- 75 %
Operation	
Permissible ambient temperature	+10 °C to +30 °C
Permissible relative air humidity	max. 75 %
Altitude of place of installation	max. 2000 m
Air pressure	75 to 106 kPa
Degree of pollution	2
Operating Data	
Category of operating environment	closed room facilities
Protection class	I
Degree of protection	IP 20
Electrical safety	under DIN EN 61010-1 (IEC 61010-1) (IEC 61010-1:2001)
Over-voltage category	II
Radio interference suppression	under EN 55011 class B
Noise immunity	uin accordance with EN 61326-2-6:2012
Power consumption of the complete device	max 200W
Fusing	2 x T 3,15 A / H, 250 V, 5 x 20 mm
Input voltage	100 to 240 V AC
Input frequency	50 / 60 Hz
Power Supply Unit	
Category of operating environment	closed room facilities
Protection class	I
Degree of protection	IP 20
Power consumption	12 V DC ±1 V (max 60 VA)
Power consumption	24 V DC ±1 V (max 120 VA)
Power consumption (Lumencor Celesta Light Engine)	24 V DC ±1 V /9.2 A
Fusing	2 x T 6 A / H, 250 V, 5 x 20 mm
Light sources	
Multichannel RGB LED light source (transmitted light operation)	3DHISTECH Wideband RGB light
Average lifetime performance of RGB LED	~30 000 h
Advanced fluorescent light source (option 1.)	Lumencor SPECTRA 6 solid state light engine
Channel switching speed	~ 10 µs
Spectral bands	380 – 740 nm

Power consumption of Lumencor Spectra 6 light engine	120 W,
Average lifetime of Lumencor Spectra 6 Light Engine	> 20 000 h
High-end fluorescent light source (option 2.)	Lumencor Celesta Light Engine
Channel switching speed	7 multimode laser sources (class 4 lasers) ~ 10 µs
Spectral bands	405 – 749 nm
Nominal center wavelengths	405, 446, 477, 520, 546, 638, 749 +/- 2 nm
Power consumption of Lumencor Celesta light engine	max. 3.6 W per channel
Software	
Pannoramic Confocal Control Software (Pannoramic Scanner Software 3.1.1)	included by the Pannoramic Confocal System
Slide Viewer – Digital Microscopy Software Application for research purposes	included by the Pannoramic Confocal System
Slide capacity & loading	
Slide capacity	11+1 (slide tray for 12 slides, the last one is the cleaner slide)
Wet slide handling	Yes
Slide loading	Automatic
Available objectives	
Plan-Apochromat 20x/0.8 NA objective	1 st objective, (default)
C-Apochromat w40x/1.2 NA objective	2 nd objective, (default)
C-Apochromat w63x/1.2 NA objective	1 st or 2 nd objective, (optional)
Plan-Apochromat 10x/0.3 NA objective	1 st or 2 nd objective, (optional, only for fluorescent mode)
Number of supported objectives	2 (dual)
Motorized objective changer	Yes
Identification of slides / Barcode reading	
<p>Identification of slides via preview camera (VRmC-8+ Pro): Storage of barcode area as image and interpretation of barcode label as character string; the following 1D and 2D barcode types can be interpreted:</p> <p>1D barcodes:</p> <ul style="list-style-type: none"> • Code39 (ASCII encoding) • Code128 (UCC/EAN128) (ASCII encoding) • Code 16K • Interleaved 2 of 5 • Standard 2 of 5 • IATA 2 of 5 • Matrix 2 of 5 • Telepen • Code93 (ASCII encoding) • Code 11 • MSI • Codabar • Patch Code • Pharmacode • EAN-13 (Numeric encoding) • EAN-8 (Numeric encoding) • UPC-A (Numeric encoding) • UPC-E <p>2D barcodes:</p> <ul style="list-style-type: none"> • Aztec 	

<ul style="list-style-type: none"> • Data Matrix (Numeric encoding, Alpha encoding, AlphaNumericPunc encoding, AlphaNumeric encoding, ASCII encoding, ISO8 encoding) • Micro QR • Maxicode (Encoding mode 2, 3, 4, 5, 6) • MicroPDF417 (Standard encoding type) • PDF417 (Standard encoding type) • QR (QR code Model 1, 2 encoding) 	
Recognition of tissue area	
Via the USB preview camera (VRmC-8+ Pro) with automatic threshold tissue detection	automatic
Exclusion of cover glass	automatic
Remove of specks from digitization	user selectable
Scan inside marker (selectable)	yes
Multiple tissue areas selectable / recognized automated	yes
Separate scanning	yes
Pre-scan function	for fluorescence sample detection
Image digitization	
5.5 MP Scientific CMOS digital imaging camera (for brightfield and fluorescence) - default	5.5 MP camera with scientific CMOS
Technical data:	
Pixel size	6.5 µm x 6.5 µm
Resolution	2560 x 2160 pixel
Dynamic range A/D ⁴	16 bit
Dynamic range (typ.)	27000:1, up to 88.6 dB
Quantum efficiency	>60% @ peak
Spectral range	370 nm ... 1100 nm
DSNU (Dark Signal Non-Uniformity)	<1.0 ms e ⁻
PRNU (Photo Response Non-Uniformity)	<0.5 %
Cooling	Peltier element with forced air (fan)
Operating temperature	+10 °C ... +40 °C
Operating humidity range	10% ... 80% (with no condensation)
Connection type	Dual CameraLink
Digital slide image resolution:	
Pixel resolution with 10x objective and C-mount adapter 1.0x	0.65 [µm/px] / 15x
Pixel resolution with 20x objective and C-mount adapter 1.0x	0.33 [µm/px] / 31x
Pixel resolution with 40x objective and C-mount adapter 1.0x	0.16 [µm/px] / 62x
Pixel resolution with 63x objective and C-mount adapter 1.0x	0.10 [µm/px] / 97x
5.3 MP Scientific CMOS digital imaging camera (for brightfield and fluorescence) - optional	5.3 MP camera with scientific CMOS
Technical data:	
Pixel size	6.5 µm x 6.5 µm
Resolution	2304 x 2304 pixel
Dynamic range A/D ⁴	16 bit
Dynamic range (typ.)	21400:1
Quantum efficiency	80% @ peak
Spectral range	325 nm ... 1100 nm
DSNU (Dark Signal Non-Uniformity)	0.3 ms e ⁻
PRNU (Photo Response Non-Uniformity)	0.063 %
Cooling	Peltier element with forced air (fan)
Operating temperature	0 °C ... +40 °C
Operating humidity range	30% ... 80% (with no condensation)

Connection type	USB 3.0
Digital slide image resolution:	
Pixel resolution with 10x objective and C-mount adapter 1.0x	0.65 [$\mu\text{m}/\text{px}$] / 15x
Pixel resolution with 20x objective and C-mount adapter 1.0x	0.33 [$\mu\text{m}/\text{px}$] / 31x
Pixel resolution with 40x objective and C-mount adapter 1.0x	0.16 [$\mu\text{m}/\text{px}$] / 62x
Pixel resolution with 63x objective and C-mount adapter 1.0x	0.10 [$\mu\text{m}/\text{px}$] / 97x
Scanning speed	
Brightfield mode: 0.325 μm / pixel (15 mm x 15 mm, 5.5MP Scientific CMOS)	13 min
Fluorescent mode: 0.325 μm / pixel (15 mm x 15 mm, 5.5MP Scientific CMOS, 3 fluorescent channel, 20 ms exposure time)	30 min
Fluorescent scan option	
Number of recordable fluorescent channels	45
Fluorescent filter positions	3 (with BF mode) or 4 (without BF mode)
Fluorescent filter selection	Automatic
Multiband filter support	Yes
Software-aided flat-field correction compensation method	Yes
Digital slide properties	
Digital slide format	.MRXS
Image type	.JPG, .BMP, .PNG, .JPGXR
Slide export	.MRXS, .TIFF
Control Unit and required system resources	
CPU	Intel Xeon Gold 6240 18 Cores / 36 Thread or similar
RAM	96 GB DDR4
Hard Disk (SSD) for OS	256 GB
Hard Disk (HDD) for data	2x 1TB SATA III
Graphics Output	1x DVI (1920x1200), 2x DisplayPort (4096x2304)
Ports	4x USB 3.0 6x USB 2.0 10/100/1000 Ethernet
Input units	keyboard, mouse
Operating System	Windows 10 Pro (64)
System management	Intel® vPro™ technology, DeskView
Green technology	manageability suite
Digital Slide Storage	
Scan to local network (Slide Server not included)	Yes
Scan to cloud infrastructure (Slide Server not included)	Yes
Scan to local Hard Drive	Yes
Scanner features	
Scanning with selectable magnification	Yes
Scan progress indication on the preview image	Yes
Live image view	Yes
Show image during scanning	Yes
Auto focusing in live view mode	Yes
Manual focusing in live view mode	Yes
Navigation on the preview image	Yes
Selectable focus frequency	Yes
Adjustable image quality	Yes
Multiple image encoding	Yes

Multilayer Scan (Z-stack) (optional)	Yes
Number of layers	1-99
Adjustable layer distance	0.2 μm - 2 μm
Multilayer (Z-stack) per FL channel	Yes
Extended Focus (sharpest image for each FOV) (optional)	Yes
Multiple Scanning profiles	Yes
Multiple Color Profiles & Color Schemes	Yes: 1 to 5 + Custom
Image compensation	Yes, multiple
Point Spread Function (PSF) measurement tool	Yes
Deconvolution	Yes
Barcode parsing	Yes
<ul style="list-style-type: none"> - Digital slide name - Output folder name - Scan profile auto selection 	
Scan Quality Control	Brightfield, Fluorescent Prescan, Darkfield
Preview types	Yes
Event Call Handling	
External Application Call	Yes
<ul style="list-style-type: none"> - Slide scan finished - Scan error occurred 	
Message Call	Yes
<ul style="list-style-type: none"> - Slide scan finished - Slide scan stopped - Scan error occurred - Scanning warning 	