Aperio GT 450 Specifications

For research use only. Not for use in diagnostic procedures.

This document lists the latest specification information for the Aperio GT 450 scanner. For details on using this device, refer to the *Aperio GT 450 User's Guide.*

The Aperio GT 450 is a high performance, brightfield whole slide scanner that includes continuous loading with 450 slide-capacity across 15 racks, priority rack scanning, automated image quality check and a scan speed of ~32 seconds at 40x scanning magnification for a 15 mm x 15 mm area.

This system is intended for use by trained histotechnicians, IT professionals, and pathologists. Ensure you follow appropriate good laboratory practices and the policies and procedures required by your institution for slide preparation, processing, storage, and disposal. Use this equipment only for this purpose and in the manner described in the *Aperio GT 450 User's Guide*.

Component	Description
Scanner Administration Manager (SAM) Server	The SAM server connects to multiple Aperio GT 450 scanners and runs the SAM Client Application Software. For requirements for this server, see *"Aperio GT 450 Scanner Administration Manager (SAM) Server Specifications" on page 4.*
SAM Client Application Software	The Scanner Administration Manager (SAM) client application software enables IT implementation, PIN configuration, and service access of multiple scanners from a single desktop client location for IT professionals.
Aperio Viewing Station	The viewing station includes two calibrated monitors and a workstation with Aperio ImageScope version 12.4 or higher. For requirements for the viewing station see *"Viewing Station Specifications" on page 5.*

Aperio GT 450 Hardware Specifications

Feature	Details
Part number	23GT450
Scanner on/off switch	Located on the right side, near the back of the scanner.
Number of Aperio GT 450 scanners supported	The Scanner Administration Manager (SAM) supports up to four Aperio GT 450 scanners. Multiple SAM servers can be added to your network.
Slides accepted	The Aperio GT 450 is optimized for scanning glass slides with coverslips affixed with mounting media. • 1-inch x 3-inch (2.54 cm x 7.62 cm) glass slides. Measurements comply with ISO 8037/1. • Minimum slide size: 25 mm (wide) x 75 mm (long) • Maximum slide size: 26 mm (wide) x 76 mm (long) • Thickness: Optimized for range of 0.9 mm to 1.1 mm, excluding coverslip The coverslip/label shall not protrude beyond the edge of the glass slide. The entire coverslip and label must be adhered to the glass slide. There must be no lifted edges or parts of the coverslip/label. The outer surface of the slide must be dry. Slides are typically prepared using: • Glass coverslip with mounting media such as Eukitt • Film coverslip with integrated glue Maximum tissue thickness (including mounting media) optimized for 3-5 µm.
Coverslips accepted	Optimized for coverslip with thickness of .17 mm, made of typical coverslip material: Standard microscope cover glass or Cellulose Tri-Acetate film (microscope cover film).
Label area	25 mm x 25 mm. Handwritten/printed non-transparent, matte (paper-like reflecting) sticker. Labels shall not protrude beyond the edge of the slides or be lifted. Labels shall not be attached to the bottom of the slide, but only attached to the coverslip-side of the slide. Maximum label thickness 200 microns Minimum label size 12 mm x 25 mm There must be a minimum of 0.5 mm between each side of the barcode and the edge of the label.
Racks accepted	Optimized and recommended for use with Leica HistoCore Spectra workstation racks (stainer and coverslipper), which include the Leica Universal Rack 30-slide capacity. Sakura Prisma Stainer and Coverslipper Rack 20-slide capacity racks also accepted.
Racks provided	15 Leica Universal racks, 30-slide capacity (part number 23RACKGT450) are provided with the Aperio GT 450.
Scanning priority	By rack, up to 3 racks at a time.

Feature	Details
Continuous loading	Continuous rack loading without interrupting scanning.
Slide loading	Automatic: up to 450 1-inch x 3-in (2.54 cm x 7.62 cm) slides.
Slide calibration	Each slide scan is automatically calibrated.
Automated image quality check	Each scan image is automatically checked for image quality during scanning.
Scanning region	≤ 23.6 mm x 58 mm
Objective lens	Custom optics by Leica Microsystems for native 40x scanning with 1 mm FOV (Field of View).
Brightfield imaging	4k Trilinear camera
Overview image resolution	13 µm/pixel for label, barcode, and tissue macro (overview image).
Label/barcode imaging	High resolution main imaging camera used to capture the label/barcode region.
Tissue finding	Automatic
Focusing system	Real-time automatic focusing (U.S. Patent 9841590B2).
Scan speed	< 32 sec/slide, 15 mm x 15 mm at 40x.
Throughput	Sustained throughput 81 slides per hour 15 mm x 15 mm (40x).
Scan output	DICOM compatible and SVS.
Scanning resolution	0.26 µm/pixel at 40x.
eSlide file format	Standard pyramid tiled TIFF with JPEG2000 image compression.
Illumination	White LED
Operating system	Linux
Barcodes supported	NW7 QR Code Data Matrix Interleaved 2 of 5 Code 39 Code 128 PDF417 MicroPDF417
Dimensions	20.8" (52.83 cm) Width x 23" (58.42 cm) Depth x 19.5" (49.53 cm) Height
Weight	140 lbs (63.5 kg)
Work surface specifications and required clearances	Standard laboratory grade work bench with at least 24" (61 cm) Width x 28" to 32" (71.12 cm to 81.28 cm) Depth x 29.25" (74.3 cm) Height, open area leveled to +/- 1.0 degrees. Ensure you leave 13 inch (33 cm) clearance on the left side of each scanner to provide access for maintenance activities, and leave 3-4 inches (8 cm-10 cm) on the right side of each scanner for access to the power switch.
Input Power	Universal AC input, power factor corrected. 100VAC 5A – 240VAC 2.5A, 50Hz/60Hz
Power consumption	+24vdc @ 10.5 amps RMS

Feature	Details
Uninterruptible Power Supply (UPS)	To protect the scanner, Leica Biosystems recommends using a UPS rated at 2200VA with power conditioning that protects connected loads from electrical surges and spikes, lightning and other power disturbances. The UPS allows the scanner to run for an additional 20-30 minutes, giving you time to safely shut it down.
Touch-screen	• 10.1" diagonal, IPS, 16:10, 1280 x 800 resolution • Viewing angles: 85/85/85/85 • Contrast ratio: 800:1
Embedded Vision Processing Unit (VPU)	The VPU is an embedded processor that runs the Aperio GT 450 controller software. Refer to the *GT 450 IT Manager and Lab Administrator Guide* for instructions on determining the version of the software included on this unit.
Operating conditions	The Aperio GT 450 is designed to be operated under the following environmental conditions: • Indoor use, MAINS supply voltage fluctuations of up to ± 10% of 100 - 120 V (Japan / US) and 220 - 240 V (Europe), and transient overvoltages (category II of IEC 60364-4-443) typically present on the MAINS supply. • 0% - 80% humidity, non-condensing • Operating temperature: 18-28° C (65-82° F)
Storage conditions	+5 to 40° C, 5 to 85% RH
Transport conditions	0 - 50° C, 10% - 95% humidity, non-condensing
System heat dissipation	Maximum 870 BTU/hr.
Maximum elevation	10,000 ft
Degree of pollution	1
Environmental	RoHS conform (Restriction of Hazardous Substances) according to Directive 2011/65/EU
Network interface	1 gigabit per second Ethernet
Bandwidth requirements	For the connection between the Aperio GT 450 and the SAM server, the required minimum bandwidth is a gigabit ethernet with a speed equal to or greater than 1 gigabits per second (Gbps) For the connection between the SAM server and the image repository (DSR), the required minimum bandwidth is 10 gigabits per second.

Routine setup and functional verification is required by a Leica Biosystems Service representative after shipping.

Aperio GT 450 Scanner Administration Manager (SAM) Server Specifications

For information on network configuration and data flow in the Aperio GT 450 system, refer to *"Aperio GT 450 Network Configuration" on page 8* and the *Aperio GT 450 IT Manager and Lab Administrator Guide*.

Feature	Details
Part Number	23GT450SAM
CPU	Intel Xeon Silver 4114 2.2G, 10C/20T, 9.6GT/s, 14M Cache, Turbo, HT (85W) DDR4-2400

Feature	Details
Hard disk space	(2) 800GB SSD SATA Mix Use 6Gbps 512n 2.5in Hot-plug Drive, Hawk-M4E,3 DWPD,4380 TBW
Memory	Memory DIMM Type and Speed Quantity: (2) 16GB 2666MT/s RDIMMs
Network card	Broadcom 57416 2 Port 10Gb Base-T + 5720 2 Port 1Gb Base-T, rNDC
Operating system	Windows Server 2016

You may purchase your own server to host the SAM application software. The server must meet or exceed the specifications listed above. Leica Biosystems does not recommend using virtualized (VM) SAM server configurations.

Viewing Station Specifications

The viewing station (part number 23VS100) includes two calibrated monitors and a workstation with Aperio ImageScope version 12.4 or higher.

A viewing station is optional and is not included in the Aperio GT 450 base product. The following specifications are required for optimal image viewing.

Client Workstation

Feature	Details
CPU speed	Intel Core 2 Duo (or newer) processor, running at 3.9 GHz or faster
Hard disk space	80GB free disk space
Memory	8GB or more recommended
Network card	1 Gigabit network card or faster
Video card	24-bit color at monitor's resolution
Operating system	Windows 7 64-bit and later

Monitor

Two medical-grade monitors are recommended. For best image quality during viewing, a calibrated monitor must be used.

The two monitors included in the Aperio Viewing Station are calibrated to a Leica internal specification which is specific for stain colors and optimized for digital slide viewing by pathologists. However, if you purchase your own medical grade monitors, calibrating to sRGB standards will give an acceptable viewing experience.

Feature	Details
Display type	LCD (flat panel)
Screen resolution	1920(h) x 1200(v) pixels
Screen size	24 inch (60 cm) or larger
Color support	16.7 million colors
Color depth	24-bit
Brightness	300 cd/m^2, 180 cd/m^2 (DICOM preset)
Contrast ratio	1000:1
Calibration	A calibrated monitor must be used

Aperio GT 450 Compliance Specifications

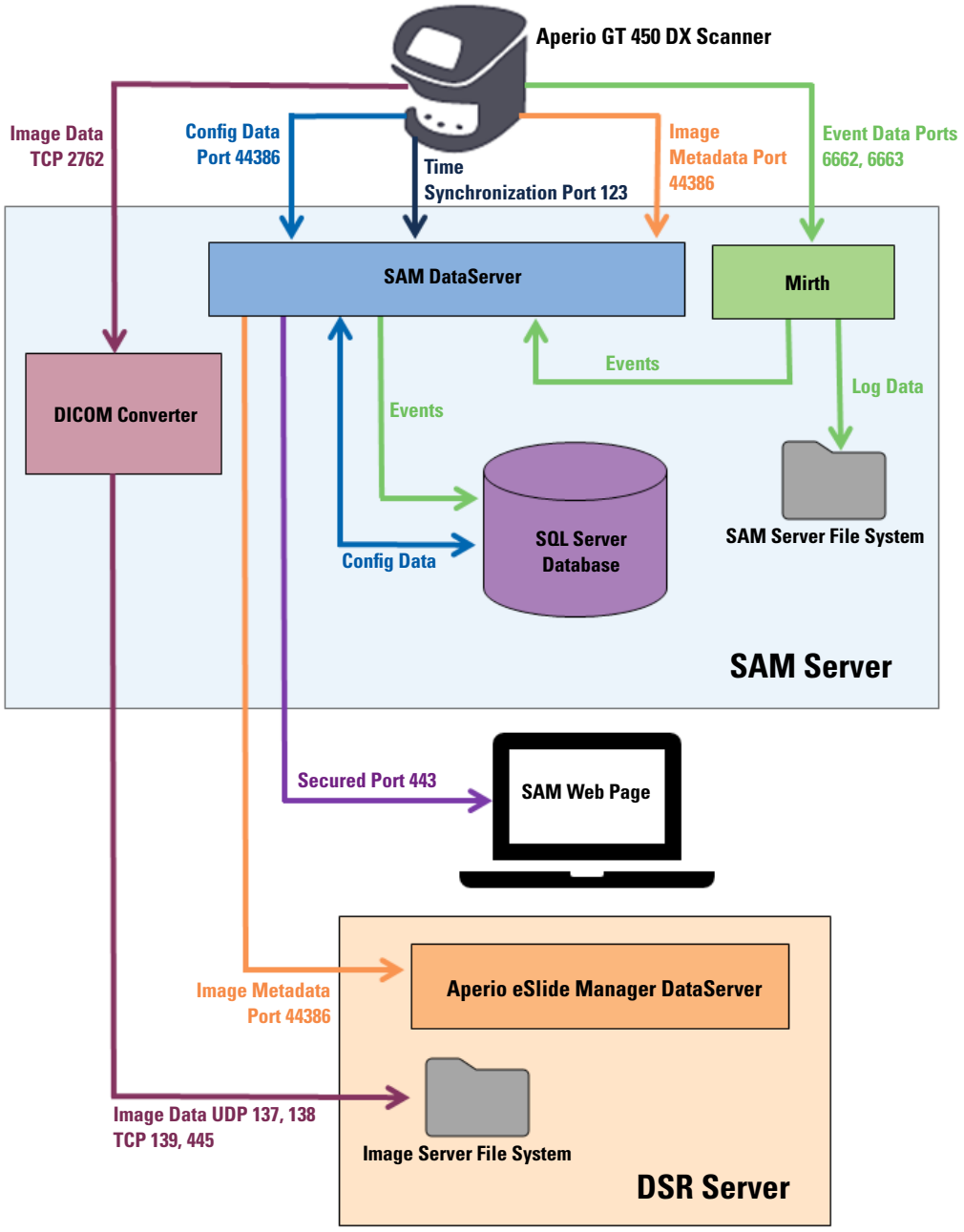
This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

This device has been evaluated against and conforms to the following standards:

Feature	Details
Safety	 IEC 61010-1:2010 + AMD1:2016 EN 61010-1:2010 CS/CAN-C22.2 No. 61010-1:2012 + U1:2015-07 + U2:2016-04 UL 61010-1:2012 + R:2015-07 + R:2016-04 IEC 61010-2:81:2015 CSA/CAN-C22.2 No. 61010-2-081:2015 EN 61010-2:081:2015 Supplemented by UL 61010-2-081:2015
EMC	EN 61326 (Emissions) VCCI CISPR 32 KN 32 FCC/IC

Aperio GT 450 Network Configuration

This section contains information on how the Aperio GT 450 fits into your network for optimized scanning and image viewing performance. For more details on this topic, see the *Aperio GT 450 IT Manager and Lab Administrator Guide*.



Data Type	Description	Port
Image Data	The Scanner sends DICOM image data to the DICOM Converter. The data is sent using TLS encryption. Configure the communication between the scanner and the DICOM converter using the Hostname and Port settings on the Images configuration page.	TCP 2762
	The DICOM Converter sends the image data (either as a converted SVS file, or as raw DICOM data) to the Image File System on the DSR Server. The data is sent using SMB3 Encryption. Configure the communication between the DICOM converter and the DSR using the File Location setting on the Images page.	UDP 137, 138 TCP 139, 445
Scanner Configuration Data	The scanner sends a call to the SAM DataServer to request configuration data. The SAM DataServer returns the configuration data to the scanner. The data is sent using TLS Encryption. Communication between the scanner and the SAM DataServer is configured on the scanner.	44386
	The SAM DataServer stores the configuration data on the SQL Server Database on the SAM Server.	
	The SAM DataServer displays the configuration data through the SAM web page.	
Time Synchronization	Timeclock synchronization between SAM and Multiple Scanners is maintained using network time protocol.	UDP 123
Image Metadata	The Scanner sends Image Metadata to the SAM DataServer. The data is sent using TLS encryption. Communication between the scanner and the SAM DataServer is configured on the scanner.	44386
	The SAM DataServer sends image metadata to the Aperio eSlide Manager DataServer located on the DSR. The data is sent using TLS encryption. Configure the communication between the SAM DataServer and the scanner using the Hostname and Port settings on the DSR page.	
Messaging and Event Data	The scanner sends logs and event data to the Mirth Connect Server. No sensitive data is transferred. Configure the communication between the scanner and the Mirth Connect Server on the Event Handling configuration page.	6662, 6663
	The Mirth Connect Server copies critical event and error data to the SAM DataServer then the SAM DataServer sends this data to the SQL database. This is the data reported out via the SAM Event Logs.	
	The SAM DataServer displays the event data through the SAM web page.	
	Mirth Connect Server processes the Log data and appends the Event Log, which resides on the file system. The communication between Mirth and the Event Log is configured within the Mirth Application setup. It is not accessible through the SAM.	

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Customer Resources

- For the latest information on Leica Biosystems Aperio products and services, please visit www.LeicaBiosystems.com/Aperio.

Disclaimers

- This manual is not a substitute for the detailed operator training provided by Leica Biosystems Imaging or for other advanced instruction. Leica Biosystems Imaging Field Representatives should be contacted immediately for assistance in the event of any instrument malfunction. Installation of hardware should only be performed by a certified Leica Biosystems Imaging Service Engineer.

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