

APERIO GT 450

DIGITAL PATHOLOGY SLIDE SCANNER

SPECIFICATIONS

(NOT for use in China)



Advancing Cancer Diagnostics
Improving Lives

Aperio GT 450 Specifications

MAN-0393, Revision L | December 2024

This manual applies to Aperio GT 450 Controller, Aperio GT 450 Console, and Aperio GT 450 SAM versions 1.4 and later.
Original Instructions.

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Customer Resources

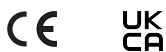
- For the latest information on Leica Biosystems Aperio products and services, please visit [LeicaBiosystems.com/Aperio](https://www.leicabiosystems.com/Aperio).

Contact Information – Leica Biosystems Imaging, Inc.

Headquarters	Customer Support
 <p>Leica Biosystems Imaging, Inc. 1360 Park Center Drive Vista, CA 92081 USA Tel: +1 (866) 478-4111 (toll free) Direct International Tel: +1 (760) 539-1100</p>	<p>Contact your local support representative with any query or service request.</p> <p>https://www.leicabiosystems.com/contact-us/</p>

Importers		
	<p>Leica Biosystems Deutschland GmbH Heidelberger Straße 17-19 69226 Nussloch, Germany</p>	<p>Leica Microsystems (UK) Limited Larch House, Woodlands Business Park Milton Keynes, England, United Kingdom, MK14 6FG</p>

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00815477020228, 00815477020464, 00815477020471, 00815477020563, 00815477020495



23GT450, 23GT450SAM, 23GT450SAMSW, 23GT450ZSTACKSW, 23GT450-R

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Notices

Important message

Service personnel and distributors who have access to protected patients' information must treat all such information as confidential in accordance with professional ethics, accreditation standards, and legal requirements.

Revision Record

Rev.	Issued	Sections Affected	Detail
L	December 2024	Aperio GT 450 Scanner Specifications Overview of recommended network configurations	<p>In the Aperio GT 450 Scanner Specifications (on page 8): Added details for Extended Focus and Manual Scan features in the "Focusing system" row. In the footnote below the General Scanner Specifications table, removed statement that indicated the optional DICOM feature pack is not supported with 20x magnification scanning, Z-stack scanning, or Auto Narrow Stripe scanning. These features are now compatible.</p> <p>Replaced the "Aperio GT 450 Recommended Network Configuration" section with the following sections: Overview of recommended network configurations (on page 17); Aperio GT 450 with DICOM C-STORE and third-party PACS support (on page 18); Aperio GT 450 with Aperio eSlide Manager integration from image file share (on page 19); Aperio GT 450 with third-party PACS support from image share (on page 20)</p>
K	October 2024	Added CE mark and UKCA mark to copyright page.	Added UKCA symbol and CE mark on page 2
		Aperio GT 450 SAM Server Specifications	Removed an erroneous statement that indicated the use of virtualized servers (VMs) was not recommended on page 14 .
		Power Specifications	Revised the Uninterruptible Power Supply (UPS) recommended rating from 2200VA to 1500VA on page 10 to provide a more commercially available and affordable option.
J	April 2024	Aperio GT 450 SAM Server Specifications	Added Microsoft Windows Server 2022 support on page 14 .

Rev.	Issued	Sections Affected	Detail
I	March 2024	Environmental Specifications	Revised temperature and relative humidity specifications for operating conditions, storage conditions, and transport conditions.
		General Scanner Specifications	Revised Scan output and Focusing system specifications. Added Barcode specifications section.
		Performance Specifications	Revised Scanning resolution specifications to include details for the optional 20x scanning feature.
		Aperio GT 450 Compliance Specifications	Section revised to align with current Compliance specifications.
		Aperio GT 450 Network Configuration	Updated section to include details for the optional DICOM upgrade.
H	March 2022	"Aperio GT 450 Hardware Specifications" and "Aperio GT 450 Scanner Administration Manager (Aperio GT 450 SAM) Server Specifications"	Updated Aperio GT 450 SAM server specifications to Windows Server 2019 and updated scanner environmental specifications.
G	March 2021	"Aperio GT 450 Scanner Administration Manager (Aperio GT 450 SAM) Server Specifications"	Removed Aperio GT 450 SAM Server model number to accommodate multiple Aperio GT 450 SAM server models.
F	December 2020	"Aperio GT 450 Scanner Administration Manager (Aperio GT 450 SAM) Server Specifications"	Clarified that a VM can be used for Aperio GT 450 SAM.
E	April 2020	"Viewing Station Specifications"	Adjusted number of monitors to accommodate multiple viewing station models.
D	February 2020	"Aperio GT 450 Network Configuration"	Corrected typographical error in diagram.
C	October 2019	"Aperio GT 450 Hardware Specifications"	Corrected JPEG2000 to JPEG.
B	July 2019	Introduction and "Aperio GT 450 Hardware Specifications"	Updated scanning throughput speed.
A	June 2019	All	New document.

Cautions and Notes

- **Serious Incidents Reporting** – Any serious incident that has occurred in relation to the Aperio GT 450 shall be reported to the manufacturer and the competent authority of the member state in which the user is established.
- **Specifications and Performance** – For device specifications and performance characteristics, see this document.
- **Installation** – Aperio GT 450 must be installed by a trained Leica Biosystems Technical Services representative.
- **Repair** – Repairs may be done only by a trained Leica Biosystems Technical Services representative. After repairs are done, ask the Leica Biosystems technician to perform operation checks to determine the product is in good operating condition.
- **Accessories** – For information on using Aperio GT 450 with third-party accessories such as a Laboratory Information System (LIS) not provided by Leica Biosystems, contact your Leica Biosystems Technical Services representative.
- **Quality Control** – For information on image quality checks, see the *Aperio GT 450 User's Guide*.
- **Maintenance and Troubleshooting** – For information on maintenance and troubleshooting, see the *Aperio GT 450 User's Guide*.
- **Cybersecurity** – Be aware that workstations are susceptible to malware, viruses, data corruption, and privacy breaches. Work with your IT administrators to protect workstations by following your institution's password and security policies.

To protect workstations and servers from malware intrusion, use caution when inserting USB drives and other removable devices. Consider disabling USB ports that are not in use. If you plug in a USB drive or other removable device, you should scan the devices with an anti-malware utility. For Aperio recommendations on protecting your workstations and servers, see the *Aperio GT 450 IT Manager and Lab Administrator Guide*.

If a suspected Aperio GT 450 cybersecurity vulnerability or incident is detected, contact Leica Biosystems Technical Services for assistance.

As a system security measure, Leica Biosystems products capture and log external attempts to access system data. For more information, contact your Leica Biosystems representative.

- **Training** – This manual is not a substitute for the detailed operator training provided by Leica Biosystems or for other advanced instruction.
- **Safety** – This device is intended for indoor use only. Safety protection may be impaired if this device is used in a manner not specified by the manufacturer.



For additional information on this product, including intended use, see the primary instructions for use, *Aperio GT 450 User's Guide*.

Introduction

This document lists the latest specification information for the Aperio GT 450 scanner. For details on using this device, see 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*.

Components

Component	Description
Aperio GT 450 Scanner Administration Manager (Aperio GT 450 SAM) Server	The Aperio GT 450 SAM Client Application Software resides on a server, which is referred to in this document as the Aperio GT 450 SAM server. The Aperio GT 450 SAM server connects to multiple Aperio GT 450 scanners. For requirements for this server, see Aperio GT 450 SAM Server Specifications (on page 14) .
Aperio GT 450 SAM Client Application Software	The Aperio GT 450 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 monitor(s) and a workstation with Aperio ImageScope version 12.4 or higher. For requirements for the viewing station see Viewing Station Specifications (on page 15) .

Aperio GT 450 Scanner Specifications

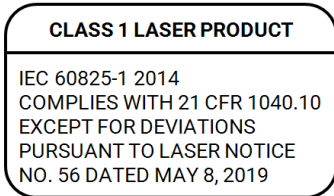
The following sections contain specifications for the Aperio GT 450.

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

General Scanner Specifications

Feature	Details
Part number	23GT450
Scanner on/off switch	Located on the right side, near the back of the scanner.
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
Scan output	SVS and DICOM ¹
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.
Focusing system	Real-time automatic focusing (U.S. Patent 9841590B2). Optional Z-Stack Scanning, optional Extended Focus, and optional Manual Scan: Automatic point focusing.
Digital slide file format	Standard pyramid tiled TIFF with JPEG image compression.
Illumination	White LED
Operating system	Linux
Connections	The Aperio GT 450 has two connectors on the back panel: <ul style="list-style-type: none"> Power. The appropriate power cord for your geographical region is shipped with the scanner. The power cord plugs into the AC/DC adapter that connects to the back panel. Only use the approved power cord supplied by the manufacturer. Network. You will need to supply your own network cable.

¹To use the DICOM file format, this feature must be enabled for your scanner. See *Aperio GT 450 IT Manager and Lab Administrator's Guide* for details. Also, your IT environment must meet the requirements detailed in the *Aperio DICOM Conformance Statement*.

Feature	Details
Class 1 laser	<p>Laser Compliance. This symbol indicates that the product is a Class 1 Laser Product and is in compliance with international standards and US requirements.</p>  <p>CLASS 1 LASER PRODUCT</p> <p>IEC 60825-1 2014 COMPLIES WITH 21 CFR 1040.10 EXCEPT FOR DEVIATIONS PURSUANT TO LASER NOTICE NO. 56 DATED MAY 8, 2019</p>

Aperio GT 450 Features

Feature	Details
Scanning priority	By rack, up to 3 racks at a time.
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.
Tissue finding	Automatic
Touch-screen	<ul style="list-style-type: none"> • 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. For instructions on determining the version of the software included on this unit, see the <i>Aperio GT 450 IT Manager and Lab Administrator's Guide</i> .

Performance Specifications

Feature	Details
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).
Scanning resolution	0.26 μm /pixel at 40x. 0.52 μm /pixel at 20x.

Power Specifications

Feature	Details
Input Power	External AC/DC adapter (Power Supply Unit): 100-240V, 50/60Hz, 5A max; Instrument: 24V --- 10.5A.
Power consumption	+24VDC @ 10.5 amps RMS
Uninterruptible Power Supply (UPS)	To protect the scanner, Leica Biosystems recommends using a UPS rated at 1500VA 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 minutes (no longer than 30 minutes), giving you time to safely shut it down.

Slides and Rack Specifications

Feature	Details
Slides accepted	<p>The Aperio GT 450 is optimized for scanning glass slides with coverslips affixed with mounting media.</p> <ul style="list-style-type: none"> 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 <p>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.</p> <p>Slides are typically prepared using:</p> <ul style="list-style-type: none"> Glass coverslip with mounting media such as Eukitt Film coverslip with integrated glue <p>Maximum tissue thickness (including mounting media) optimized for 3–5 µm.</p>
Coverslips accepted	Optimized for coverslip with thickness of 0.17 mm, made of typical coverslip material: Standard microscope cover glass or Cellulose Tri-Acetate film (microscope cover film).
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.

Feature	Details
Racks provided	15 Leica Universal racks, 30-slide capacity (part number 23RACKGT450) are provided with the Aperio GT 450.
Label area	<p>25 mm x 25 mm. Handwritten/printed non-transparent, matte (paper-like reflecting) sticker.</p> <p>Labels shall not protrude beyond the edge of the slides nor be lifted.</p> <p>Labels shall not be attached to the bottom of the slide, but only attached to the coverslip-side of the slide.</p> <p>Maximum label thickness 200 microns</p> <p>Minimum label size 12 mm x 25 mm</p> <p>There must be a minimum of 0.5 mm between each side of the barcode and the edge of the label.</p>

Barcode specifications

The Aperio GT 450 supports the following barcodes:

- NW7
- QR Code
- Data Matrix*
- Interleaved 2 of 5
- Code 39
- Code 128
- PDF417
- MicroPDF417
- Aztec

*DataMatrix ECC 000-140 is not supported.

Barcode characters supported

- Follow the guidelines for supported characters based on the type of barcode you are using.
- For QR codes that contain language sets other than ISO-8859-1, Leica Biosystems recommends encoding the QR code in UTF-8.

Barcode string length specifications

Barcode type	Minimum barcode string length (characters)	Maximum barcode string length (characters)
Code 39, Code 128, Interleaved 2 of 5	4	64
CODABAR (NW7)	5	64
QRCODE, PDF417, Micro PDF417, Datamatrix	1	64
Aztec	1	64

Environmental Specifications

Feature	Details
Dimensions	20.8" (52.83 cm) Width x 28" (71.12 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" (71.12–81.28 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 (8–10 cm) on the right side of each scanner for access to the power switch.
Operating conditions	The Aperio GT 450 is designed to be operated under the following environmental conditions: <ul style="list-style-type: none"> • Indoor use • Overvoltage Category II • 20% to 80% relative humidity (RH), non-condensing • Operating temperature: 15° to 30°C (59° to 86°F)
Storage conditions	0° to 50°C, 25% to 95% RH, non-condensing
Transport conditions	-30° to 50°C, 25% to 95% RH, non-condensing
System heat dissipation	Maximum 870 BTU/hr.
Maximum elevation	10,000 ft
Degree of pollution	2
Environmental	RoHS conform (Restriction of Hazardous Substances) according to Directive 2011/65/EU

Network Specifications

Feature	Details
Network interface	1 gigabit per second Ethernet
Bandwidth requirements	For the connection between the Aperio GT 450 and the Aperio GT 450 SAM server, the required minimum bandwidth is a gigabit ethernet with a speed equal to or greater than 1 gigabit per second (Gbps) with no more than 60ms of latency. For the connection between the Aperio GT 450 SAM server and the image repository (DSR), the required minimum bandwidth is 10 gigabits per second and no more than 16ms of latency.

Aperio GT 450 SAM Server Specifications



The Aperio GT 450 Scanner Administration Manager (Aperio GT 450 SAM) supports multiple Aperio GT 450 scanners. Multiple Aperio GT 450 SAM servers can be added to your network.

For information on recommended network configuration and data flow for the Aperio GT 450, see [Overview of recommended network configurations \(on page 17\)](#) and the *Aperio GT 450 IT Manager and Lab Administrator's Guide*.

Feature	Details
CPU	Intel Xeon Silver 4114 2.2G, 10C/20T, 9.6GT/s, 14M Cache, Turbo, HT (85W) DDR4-2400
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	Microsoft Windows Server 2022 (recommended) Microsoft Windows Server 2019 (minimum)

You may purchase your own server or provide a virtual server to host the Aperio GT 450 SAM application software.

Viewing Station Specifications

The viewing station (part number 23VS101) uses calibrated monitor(s) 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

For best image quality during viewing, a calibrated monitor must be used.



The monitor(s) 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 monitor, 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 was evaluated against and complies to the following standards.

Feature	Details
Safety	 <p>IEC 61010-1:2010 IEC 61010-1: 2010/AMD1:2016 IEC 61010-2-101: 2018 CAN/CSA C22.2 No. 61010-1:2012/A1:2018 CAN/CSA C22.2 No. 61010-2-101:2019 UL 61010-1:2012/R2019-07 UL 61010-2-101:2019 EN 61010-1:2010/A1:2019 EN 61010-2-101:2017</p>
Electromagnetic Compatibility (EMC)	<p>EMC Directive (2014/30/EU) EN 61326-1:2013 CISPR 11: 2015 FCC Part 15 Subpart B ICES-003 Issue 6: 2016 CNS13438: 2006 KN 32: 2015-12 KN 35: 2015-12</p>
Machinery and Materials	<p>IEC 60825-1:2014 (Class 1 Laser)</p> <p>2011/65/EU - Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS 2)</p> <p>2015/863 - Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS 3)</p> <p>2006/42/EC - Machinery Directive</p> <p>2014/35/EU – Low Voltage Directive</p> 

Overview of recommended network configurations

The following three network configuration diagrams and port list describe the most common configuration scenarios for the Aperio GT 450, Aperio GT 450 SAM hosting server, Aperio eSlide Manager hosting server, image share, and third-party Picture and Archiving Communications System (PACS) with and without DICOM C-STORE image transfer support.

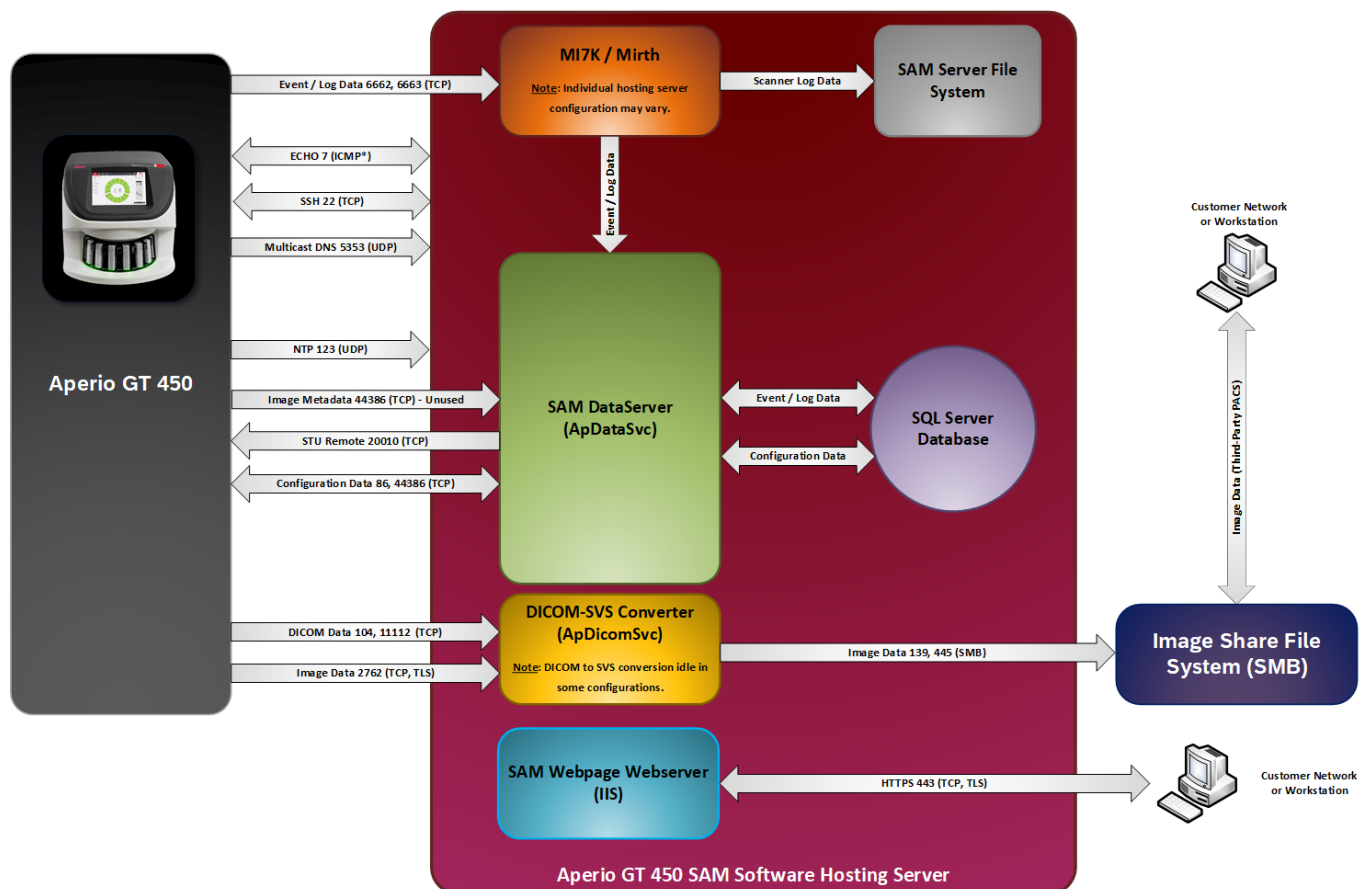
This section provides the most common configurations, and your site's configuration may differ. Work with your Leica Biosystems representative to address any questions or concerns.

Aperio GT 450 with DICOM C-STORE and third-party PACS support

The configuration shown in this section represents a typical configuration and use case where the Aperio GT 450 and Aperio GT 450 SAM software configuration transmits DICOM images direct to a customer Laboratory Information Management System (LIMS), Laboratory Information System (LIS), Vendor Neutral Archive (VNA), or third-party Picture and Archiving Communication System (PACS) using the DICOM C-STORE protocol.

This configuration is applicable only to those organizations who are using the optional DICOM upgrade. This configuration does not produce ScanScope Virtual Slide (SVS) images by default. The DICOM-SVS conversion service (ApDicomSvc) on the Aperio GT 450 SAM hosting server is idle. Image metadata is not transmitted to Aperio GT 450 SAM. For more information on the optional DICOM upgrade, including system setup details, see the *Aperio GT 450 DICOM Upgrade Guide*.

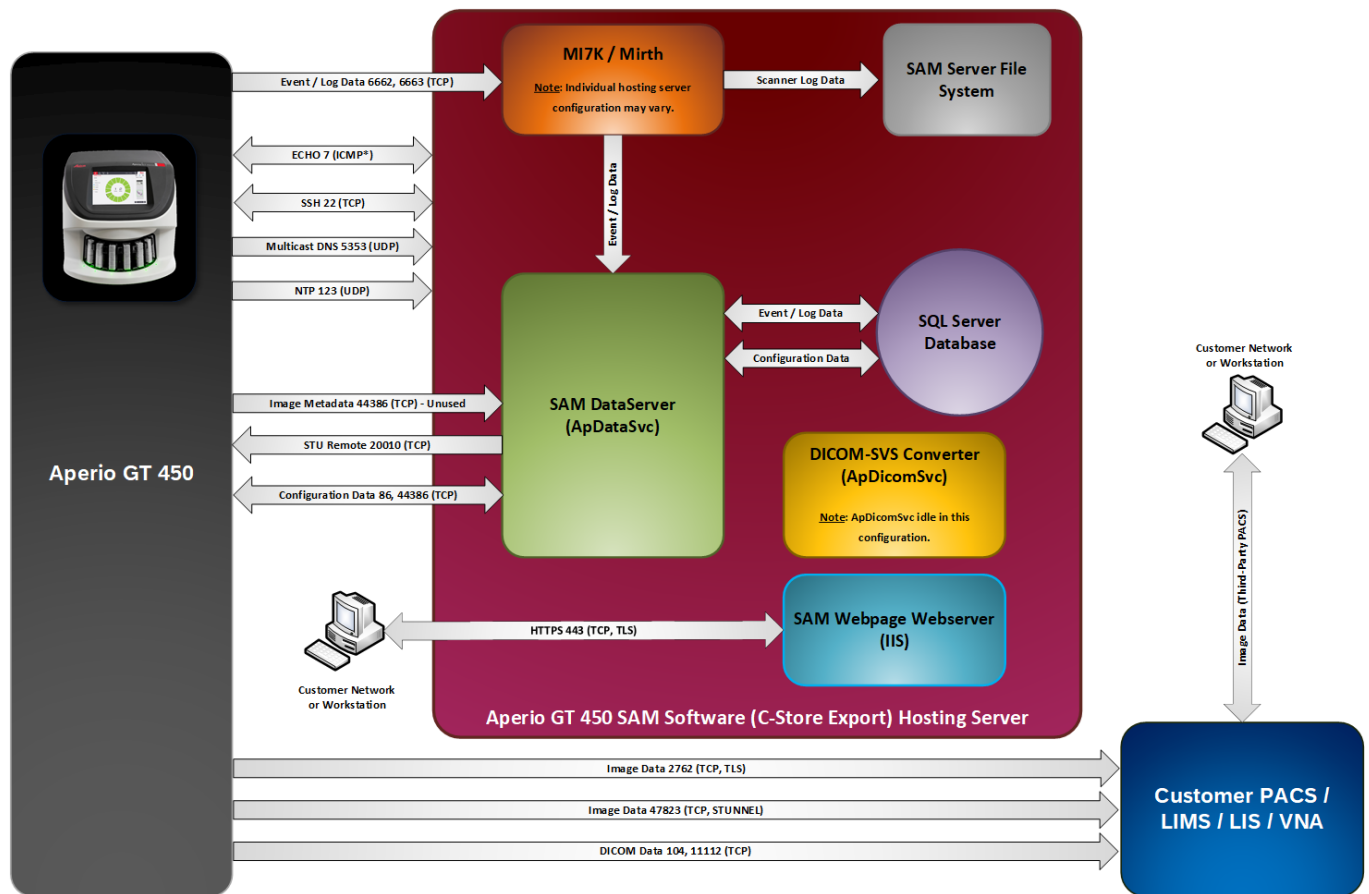
The scanner must be licensed and configured with the optional DICOM upgrade. Refer to the *Aperio GT 450 DICOM Upgrade Guide* for details. Contact your Leica Biosystems representative with any specific questions.



Aperio GT 450 with third-party PACS support from image share

The configuration shown in this section represents a typical configuration and use case where the Aperio GT 450 interface with an image share monitored by a third-party PACS, LIS, or LIMS using an instance of Aperio GT 450 SAM with no Aperio eSlide Manager.

This configuration exports SVS or DICOM images to the image share, depending on your Aperio GT 450 SAM hosting server configuration. Enabling DICOM export is applicable only to those organizations that are using the optional DICOM upgrade. Image metadata is not transmitted to Aperio GT 450 SAM.



Aperio GT 450 Network Configuration Ports

The table below provides a list and description of the ports used with the Aperio GT 450 configurations.

Port Number	Protocol	Use by SAM /Aperio GT 450 / DSR	Source	Destination	Description
7	ICMP	Internet Control Message Protocol (ICMP)	SAM	Aperio GT 450	ICMP echo requests from SAM to the Aperio GT 450 (when configured.)
7	ICMP	Internet Control Message Protocol (ICMP)	Any	SAM	ICMP echo requests from external systems to Scanner Administration Manager (SAM, when configured.)
22	TCP	Secure Shell Connections	SAM	Aperio GT 450	SSH service provides remote command and file transfer services on the Aperio GT 450. The Aperio GT 450 firewall only permits SSH traffic from SAM (when configured.)
80	TCP	Hypertext Transfer Protocol (HTTP)	Any	DSR / Image Share	Display of unencrypted web pages. Only in use in certain configurations.
82	TCP	ImageServer service used for image viewing.	Any	DSR / Image Share	Only in use with instances of Electronic Slide Manager (eSM.)
84	TCP	Digital slide conferencing.	Any	DSR / Image Share	Only in use with instances of Electronic Slide Manager (eSM.)
86	TCP	DICOM Data Tool (Image Metadata)	Any	DSR / Image Share	DataServer API. SAM DataServer sends image metadata to eSlide Manager DataServer. Connections encrypted via TLS.

Port Number	Protocol	Use by SAM /Aperio GT 450 / DSR	Source	Destination	Description
86	TCP	DICOM Data Tool (Image Metadata)	Aperio GT 450	SAM	Heartbeat verification from Aperio GT 450 to SAM.
104	TCP	DICOM Data Tool	Aperio GT 450	SAM	DICOM TLS SCP for receiving image data from the GT 450.
123	UDP	Network Time Protocol (NTP) synchronization.	Aperio GT 450	SAM	Aperio GT 450 Network Time Protocol Daemon (NTPD) synchronization.
137	UDP	SAM requires UDP access to this port for image data transmission.	Any	DSR / Image Share	NETBIOS service discovery.
138	UDP	SAM requires UDP access to this port for image data transmission.	Any	DSR / Image Share	NETBIOS service discovery.
139	TCP	SAM requires TCP access to this port for image data transmission.	Any	DSR / Image Share	TCP image transmission, encrypted using TLS 1.2 or greater for transmission from the scanner to the hosting server and SMB3 from the hosting server to image share.
443	TCP	Secure Hypertext Transfer Protocol (HTTPS)	Any	DSR / Image Share	HTTPS access to eSlide Manager (eSM) hosting server webpage webserver (IIS.) Connections encrypted via TLS.
443	TCP	Secure Hypertext Transfer Protocol (HTTPS)	SAM	Aperio GT 450	HTTPS access to GT 450 console from SAMused to collect logs and Saved Scan Data (SSD.) Connections encrypted via TLS.

Port Number	Protocol	Use by SAM /Aperio GT 450 / DSR	Source	Destination	Description
443	TCP	Secure Hypertext Transfer Protocol (HTTPS)	Any	SAM	HTTPS access to Scanner Administration Manager (SAM) hosting server webpage webserver (IIS.) Connections encrypted via TLS.
445	TCP	Used by SAM for image data transfer.	Any	DSR / Image Share	TCP image transmission, encrypted using TLS 1.2 or greater for transmission from the scanner to the hosting server and SMB3 from the hosting server to image share.
1433	TCP	Microsoft SQL services.	Aperio GT 450	SAM	SQL server data traffic.
2762	TCP	Digital Imaging and Communications in Medicine (DICOM) Transport Layer Security (TLS.) Used by SAM for image data transfer.	Aperio GT 450	SAM	DICOM TLS SCP for receiving image data from the Aperio GT 450.
5353	UDP	Multicast DNS	Aperio GT 450	SAM	Resolves hostnames on networks without dedicated domain name services (DNS.)
5671	AMQPS	Events from Aperio iQC Services	Aperio iQC	SAM	Message bus installation for receiving event data from Aperio iQC.
6662	TCP	Used by MI7K for status logging and messaging between the SAM server and connected GT 450 scanners.	Aperio GT 450	SAM	Aperio GT 450 sends device logging data to SAM. No sensitive data transferred via this port.
6663	TCP	Used by MI7K for status logging and messaging between the SAM server and connected GT 450 scanners.	Aperio GT 450	SAM	Aperio GT 450 sends device logging data to SAM. No sensitive data transferred via this port.
10000	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.

Port Number	Protocol	Use by SAM /Aperio GT 450 / DSR	Source	Destination	Description
10001	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.
10002	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.
10003	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.
10004	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.
10005	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.
10006	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.
10010	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.
11112	TCP	DICOM Data Tool II	Aperio GT 450	SAM	DICOM TLS SCP for receiving image data from the GT 450.
20000	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.
20001	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.
20002	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.

Port Number	Protocol	Use by SAM /Aperio GT 450 / DSR	Source	Destination	Description
20003	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.
20004	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.
20005	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.
20006	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.
20010	TCP	Interactive Connectivity Establishment (ICE)	SAM	Aperio GT 450	Remote troubleshooting utility (Scanner Test Utility, STU,) log collection tool.
44386	TCP	Used by SAM for image metadata and GT 450 configuration data transfer.	Any	DSR	DataServer API. SAMDataServer sends image metadata to eSlide Manager DataServer. Connections encrypted via TLS.
44386	TCP	Used by SAM for image metadata and GT 450 configuration data transfer.	Aperio GT 450	SAM	Aperio GT 450 sends a call to the SAMDataServer to request configuration data. The SAMDataServer returns the configuration data to the Aperio GT 450. Connections encrypted via TLS.
47823	TCP	STUNNEL default port for image transmission. (Use dependent on device and hosting server softwar configuration.)	Aperio GT 450	SAM	Used for third-party secure image transmission. (Requires specific version and configuration of SAM and device software.) (This configuration requires the optional DICOM upgrade package.)