Advancing Cancer Diagnostics
Improving Lives

Aperio VERSA 8
Scanning System Service Manual

23MAN1245.C
Effective Date: *October 2016*

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

Contents

1 | Introduction

About this Guide

This Technical Support Guide has been written to provide a complete Service Manual for the Aperio VERSA 8 Scanning System.

For detailed information on the individual sections please refer to the Table of Contents.

For Ariol Scanning system conversions please read Chapter **Appendix A: Convert Ariol to Aperio** VERSA in detail to understand and apply the additional part replacement and upgrade steps before following the standard build and configuration sections.

This document is intended for the exclusive use of support personnel trained by Leica Biosystems and authorized Leica Biosystems employees. Duplication and distribution to other persons is strictly prohibited.

Please read this manual carefully before attempting to work with the Aperio VERSA scanning system as it contains important information on the proper care, handling and use of the equipment. In addition, read the manuals of any other units that form part of the system.

This Service Manual together with Leica Biosystems certified training will allow for correct configuration and calibration of the Aperio VERSA scanning system and all routine service and maintenance work.

This Service Manual assumes a measurable level of knowledge on the part of the Leica service personnel in order to understand and carry out the instructions described here in a manner that complies with Leica's quality standards:

- General experience of computers and optical microscopes. This also includes experience of Köhler illumination and changing and adjusting fluorescent lamps.
- Replacing electrical and electronic components.
- Performing setup and configuration work.

Familiarity with computer networking protocols and pathology sample slide characteristics would be an advantage when working on complex system configurations.

Although every effort has been made to ensure the accuracy of the work instructions and illustrations, some of the illustrations may differ from reality for individual system variants.

If you have any questions concerning the material contained in this manual, please contact Leica Biosystems.

Manufacturer

Aperio VERSA scanning systems are manufactured and distributed by:

Leica Biosystems Richmond, Inc.
5205 Route 12
Richmond, IL 60071
U.S.A
Tel (866)-478-3999

Product Version

The information and procedures in this document refer to the Aperio VERSA scanning systems supplied from Leica Biosystems Richmond, Inc.

Aperio VERSA Application Software v1.0.2

Intended Use

Aperio VERSA is a Research Use Only (RUO), fast microscope- based brightfield and fluorescent digital pathology scanning system. The Aperio VERSA scanning system generates pyramidal tiled TIFF images to the Leica Biosystems proprietary SCN file format.

The Aperio VERSA scanning system is for general measurement, control and laboratory use. It is intended for use as an automated scanning microscope and image generation scanning system.

All Aperio VERSA scanning system protocols are For Research Use Only and Not for use in diagnostic procedures.

Safety and Handling

Symbol Identification

Symbol	Explanation
	Warning, before use consult accompanying documentation
	Power Off indicator on powered devices with a 2-way switch
	Power On indicator on powered devices with a 2-way switch
	Power On-Off indicator on devices with a push button
	High Voltage warning, do not disassemble; - Internal PSU of computer & microscope controllers
	Surface becomes hot and should not be touched by bare hands; - Microscope Halogen Lamp house
	UV-Radiation Inside, may cause severe damage to eyes and skin; - X-Cite Fluorescent Lamp
	Optical Radiation, never look directly into the light beam; - X-Cite Fluorescent Lamp
	Pinch hazard keep fingers away from moving parts; - Microscope motorized stage & focus
	Irritant; - Microscope immersion oil

Warnings and Precautions

An Aperio VERSA scanning system should be handled with care and only operated by appropriately trained personnel. Subjecting the system to sudden or severe impact should be avoided at all times.

If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired

Keep the system hardware components away from excessive moisture, direct sunlight, and extremes of heat and cold.

Operate the equipment on a sturdy, level surface.

Never operate any of the equipment with access panels, covers, or safety equipment disabled or removed.

Never restrict the airflow into the equipment by blocking or covering any ventilation slots or air intakes. If the equipment is used within an enclosure, intake and exhaust ventilation must be provided to maintain the operating conditions described above.

Never install or use an Aperio VERSA scanning system within the zone of risk of flammable gases.

Do not disassemble any components of an internal power supply unit as they contain high voltage parts. If replacing or adjusting any external or internal hardware components always switch off the individual components and disconnect their power cords to avoid potential shock hazards.

Computer & Monitor

Provide at least 15cm (6 inches) clearance at front and back of the equipment and never restrict incoming or outgoing airflow. Do not place the equipment components so near to each other that they are subject to each other's re-circulated or preheated air.

Microscope

The system is to be installed on a level and solid table or bench ensuring any air vents on the microscope body are not obstructed.
Do not use the scanner where it is subject to direct sunlight, unusually high temperatures and humidity, dust or vibrations.

The surface of the rear external lamp house becomes hot during operation and should not be touched with bare hands.

When lowering the stage be careful not to place your hand between the bottom of the condenser and the microscope base.

Microscope base weighs approximately 25kg. Take appropriate precautions when lifting.

Fluorescent Light Source

Manufacturer's manuals supplied with the fluorescent lamp unit should be referred to in addition to the information here.

High-energy light source. Eye damage may result from directly viewing the light produced by the lamp used in this product. Never look into the light emitting end of the light guide. The light could severely damage the cornea and retina of the eye if the light is observed directly

Ultraviolet Radiation. Always make sure the light guide is properly inserted into the unit and the microscope prior to turning on power to the unit. This will minimize the risk of skin exposure to the light.

The level of UV energy supplied by the unit is sufficient to ignite flammable substances. During manual operation, the unit must not be left unattended for extended periods of time while turned on.

Warning! Hg - Lamp contains Mercury. In the rare instance in which a lamp bursting occurs the mercury content may be released follow local safety protocols for mercury spillage, including;

- All personnel should be immediately evacuated from the area to prevent inhalation of the mercury vapor.
- The area should be well ventilated for a minimum of 30 minutes.
- After the lamp housing elements have cooled, the mercury residue should be collected with the use of a special absorbing agent available from laboratory equipment suppliers.

Warning!
Do not use this device in close proximity to sources of strong electromagnetic radiation (e.g. unshielded intentional RF sources), as these may interfere with proper operation.

Electrical Compliance

Warning!
The electrical and electronic components have no protection against water entry and are designed for use indoors only. There is a danger of electrical shock if water or other liquid enters the equipment. Protect the system against water and other liquids.

Caution!
Large or rapid changes in temperature can cause condensation and damage to the electrical and optical components. Protect the microscope and accessories from large or rapid temperature changes.

Warning!
In order to maintain the required degree of protection from electric shock, any external equipment or circuit connected to the terminals must have reinforced insulation from hazardous live circuits.

Protective Conductive Terminal
This connection is critical to electrical safety.

Storage and Operating Conditions

Storage

- Ambient Temperature: -15° to 50°C (5° to 122°F)
- Humidity: 10-90% non-condensing

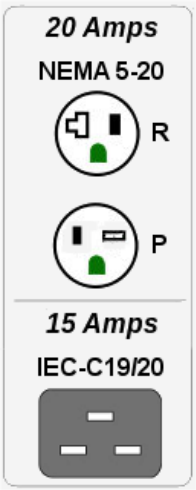
Operation

- Ambient Temperature: 18° to 28°C (64.4° to 82.4°F)
- Humidity: Less than 70% non-condensing. Maximum relative humidity 70% for temperatures up to 28ºC (82.4ºF)
- Altitude: Max. 2000 meters (6560 feet)

Aperio VERSA 200 and Aperio VERSA 8 scanning systems are supplied with a UPS device for **120V** or **230V** operation.

120V operation using the UPS supplied with scanning systems requires a 20 Amp Circuit complying with NEMA 5-20 standard.

UPS 120V (NEMA Standard);

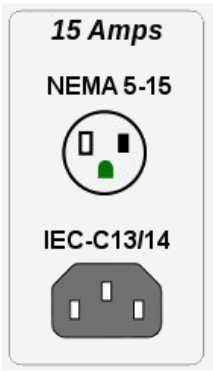


- **Rated Input Voltage Range:** 83-159V AC
- **Nominal Input Voltage:** 120V (110/120/127 VAC configurable)
- **Input Frequency:** 50/60 Hz +/- 3 Hz (auto sensing)
- **Input Connections:** NEMA 5-20P
- **Surge Protection:** 570J
- **Nominal Output Voltage:** 120V (110/120/127VAC, configurable, +/-10%)

UPS 230V (IEC Standard);

- **Rated Input Voltage Range:** 165-300V
- **Nominal Input Voltage:** 230V (220/230/240 VAC configurable)
- **Input Frequency:** 50/60 Hz +/- 3 Hz (auto sensing)
- **Input Connections:** IEC-320 C20
- **Surge Protection:** 220J
- **Nominal Output Voltage:** 230V (220/230/240 VAC, Configurable, ±10%)

All computer, microscope, and accessory components are standardized for:



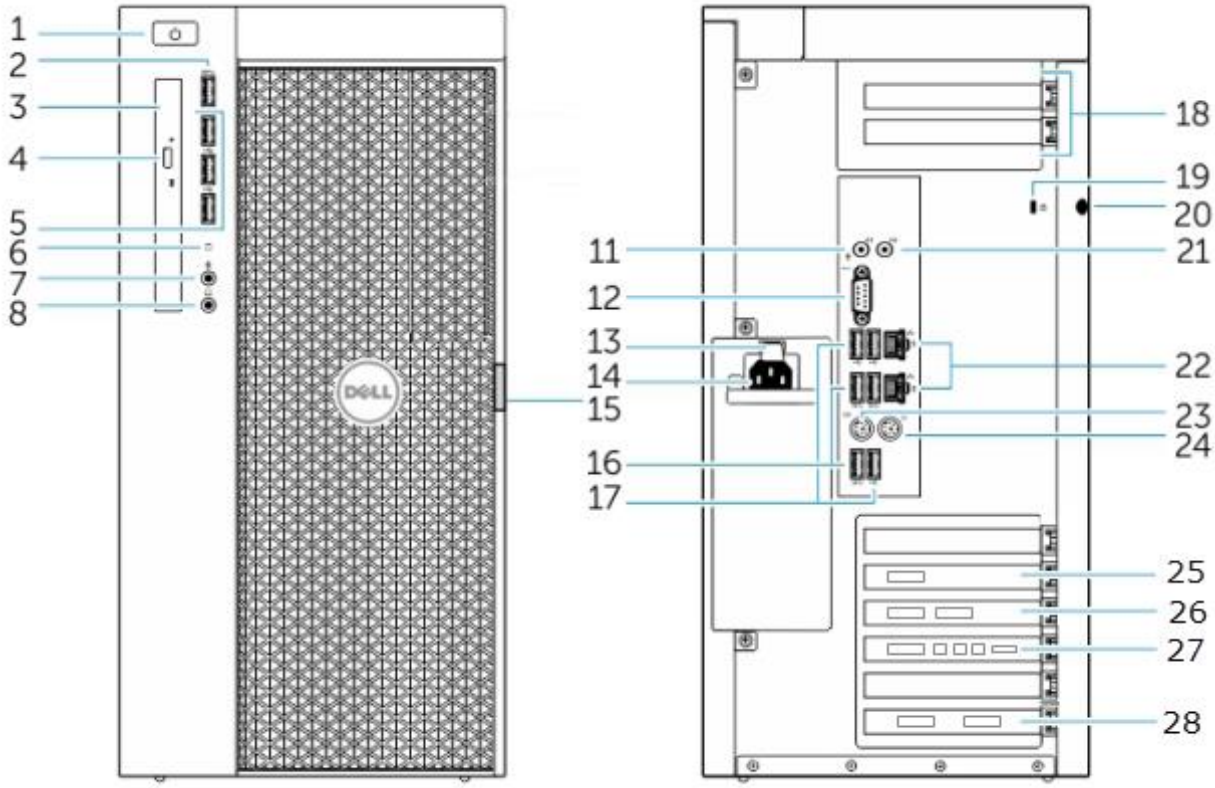
- **Nominal Input Voltage:** 100-240V AC (auto sensing)
- **Mains Supply:** ± 10% Rated Voltage
- **Input Frequency:** 50/60 Hz +/- 3 Hz (auto sensing)
- **Input Connections:** NEMA 5-15P / IEC-320 C14
- **Fuse Rating:** 16Amps (110V); 13Amps (230V)

2 | System Components

Workstation, Dell 7910: 23SYS1061

- CPU: Dell 7910 - Xeon 3.4 GHz 6 Core
- Keyboard: Dell USB
- Manual: Dell 7910
- Software Disk: Microsoft Windows 7 Ultimate
- Mouse: Dell USB laser mouse
- Cable Network 20'
- Mouse Pad

- Part #: 23SYS1061 (PC only)
  - 23CPU7910V_SPARE (incl. W7 Professional configured HDD image)
  - 23CPU7910VUL_SPARE (incl. W7 Ultimate configured HDD image)
- Dimensions: 43.1 x 21.6 x 52.5 cm
- Weight: 25kg
- Windows O/S: Windows 7, 64-bit
- Processor: Intel Xeon Processor E5-2643 v3 (6C HT, 20MB Cache, 3.4GHz Turbo)
- HDD (C:\): 2 x SATA 1TB 7200RPM – RAID1 array
- HDD (D:\): 2 x SATA 4TB 7200RPM – RAID1 array
- RAM: 128GB (8x16GB) 2133MHz DDR4 RDIMM ECC
- Video: ASUS NVidia GTX1080 Turbo 8GB
- RAID Controller: Adaptec 8405
- Cameras Supported: Point Grey Grasshopper 3, ANDOR Zyla 5.5MP
- Optical Drive: 8x DVD -/+RW Slimline



1. Power button/power light
2. USB 3.0 connector
3. Optical drive
4. Optical-drive eject button
5. USB 2.0 connectors
6. Hard-drive activity light
7. Microphone connector
8. Headphone connector
11. Line-in/microphone connector
12. Serial connector
13. Power supply unit (PSU) release latch
14. Power cable connector
15. Hard-drive access cover release latch
16. USB 3.0 connectors
17. USB 2.0 connectors
18. Expansion card slots
19. Security cable slot
20. Padlock ring
21. Line-out connector
22. Network connector
23. PS/2 Keyboard connector
24. PS/2 Mouse connector
25. ANDOR ZYLA camera USB connector
26. POINT GREY GRASSHOPPER camera USB connector
27. Graphics card connectors (monitor connection)
28. Label Imager connector

Monitor, Dell U2415: 23MON0024

Dell U2415 24” widescreen

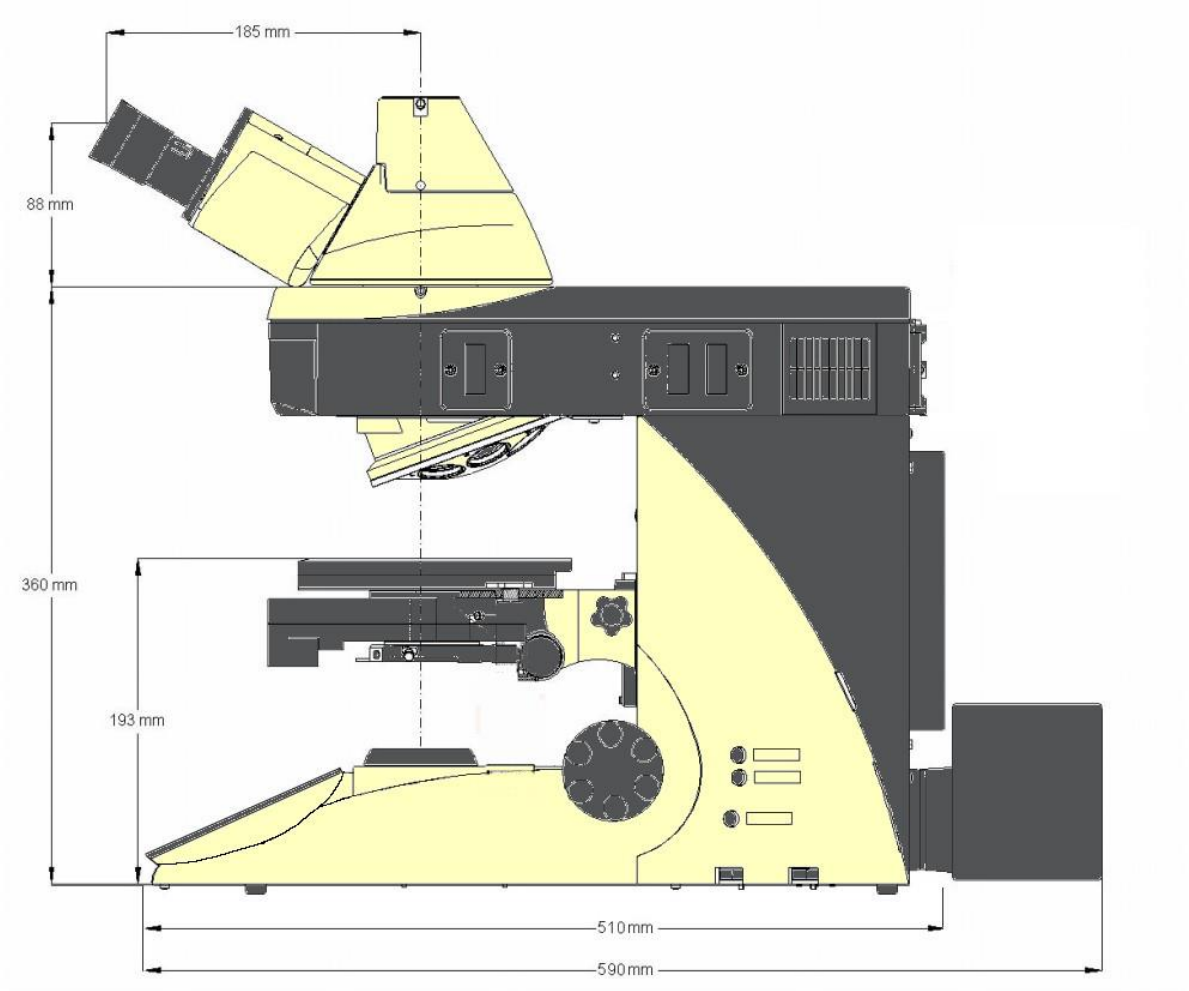
- Cable, Display Port Interface

- **Part #**: 23MON0024
- **Screen Resolution**: 1920x1200
- **Viewable Area**: 61.13 cm / 24.1 inch widescreen
- **Aspect Ratio**: 16:10
- **Brightness**: 300 cd/m2 (typical)
- **Static Contrast Ratio**: 1000:1 (typical)
- **Dynamic Contrast Ratio**: 2 Million:1 (Max)
- **Response Time**: 6 ms gray to gray (typical)
- **Pixel (Dot) Pitch**: 0.27 mm x 0.27 mm
- **Max. Colour Support**: 16.78 Million colors
- **Typical Power Consumption**: 23 W
- **Connectivity**: 2 HDMI(MHL) connector, 1 Mini Display Port, 1 Display Port (version 1.2), 1 Display Port out (MST)
- **Other Input/Output**: 1 Audio Line out, USB 3.0 Hub; 1x upstream, 5x downstream ports
- **Panel Type**: IPS LED Backlit LCD
- **Panel Size**: 51.8 x 32.4 cm / 20.41" x 12.75"
- **Weight** (panel only): 4.25 kg / 9.35 lb

User Documentation

- Software Manual – Aperio VERSA
- SW, DVD – Aperio VERSA V1.0.2
- Manuals, CD – Aperio VERSA V1.0.2

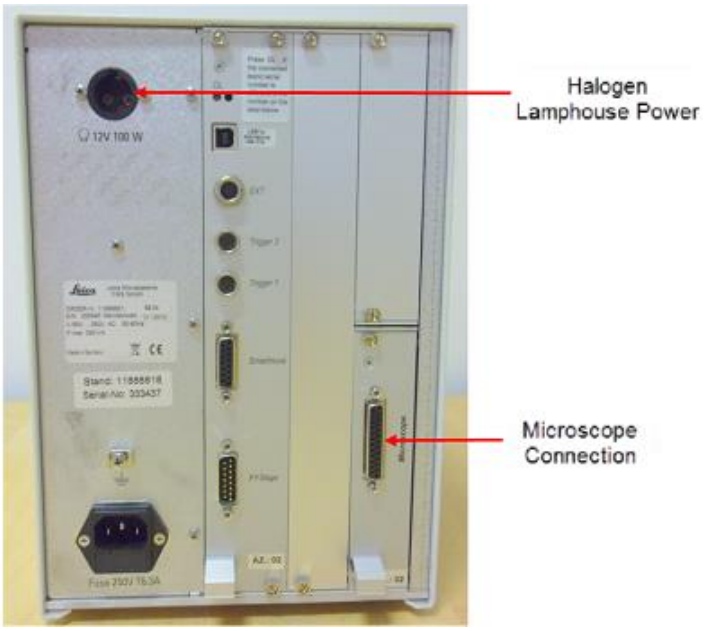
Microscope, Leica DM6000B: 23MIC1217



Fully Automated Upright Microscope with Leica Application Suite (LAS), basic package

- Leica DM6000B / M basic stand
- Motorized Z-Focus
- Coded 7x Nosepiece
- Ground plate with filter magazine
- Automated Transmitted Light Axis
- Automated 8x Fluorescence Axis
- Filters: UV-IR-Cut; UQG Hoya - LD200 Filter Blue
- Lamp Housing 106, 12V 100W, 2-lens
- Condenser BF, Condenser lens 0.5 S15 (**Note:** for Ariol MB8 conversions 0.9 S1)
- Basic docu tube BDT 25+V100/50/0, motorised.
- Eyepiece HC PLAN s 10x/22 Br. M
- Doku port motorised, coded
- STAGE-BRC7625 (stage bracket)
- Obj. HC PL FL 10x/0.30
- Cable, USB interface
- Type N Immersion liquid, 11513861, 250ml
- CTR 6000

Leica CTR6000 (Front View)



Leica CTR6000 (Rear View)

Part Numbers and & Descriptions

- 11888818 - Leica DM6000B / M basic stand
- 11888375 - Leica Application Suite (LAS), Basic Package
- 11888821 - CTR 6000 Controller
- 11888100 - Ground plate with filter magazine
- 11888815 - Leica DM6000B stand top, 8 fold fluo
- 11505168 - Dust cover for DM6000
- 11504058 - Lamp housing 106, 12V 100W, 2-lens,0.55m
- 11500974 or 11700066 - Halogen lamp 12V 100W
- 11505141 - Condenser BF
- 11501037 - Condenser Head 0.5 S15
- 11505145 - Basic docu tube MBDT 25+V100/50/0, mot
- 11505231 - Docu port, motorised, coded
- 11888095 - Cover for stand top
- 11888105 - Cover for revolving objective nosepiece
- 11990320375080 – UV-IR cut filter
- 23FIL6200 – UQG Hoya – LD200 Filter Blue
- 11507807 - Eyepiece HC PLAN s 10x/22 Br. M (2 ea.)
- 11501241 - Stage Bracket
- 11513861 - Type N Immersion Liquid, ISO 8036, 250 ml
- 23OBJ125PLFDRY- Obj. HCX PL FLUOTAR 1.25x/0.04 (11506215)
- 23OBJ005PLFDRY - Obj. HC PL FLUOTAR 5x//0.15 (11506224)
- 23OBJ010PLFDRY - Obj. HC PL FLUOTAR 10x/0.32 (11506521)
- 23OBJ020PLFDRY - Obj. HC PL FLUOTAR 20x/0.55 (11506519**)**
- 23OBJ020PAPDRY - Obj. HC PLAN APO 20x/0.80 (11506529. Optional)
- 23OBJ040PLFDRY - Obj. HC PL FLUOTAR 40x/0.80 (11506382. Optional)
- 23OBJ040PAPDRY - HC PL APO 40x/0.85 CORR* (11506294. Optional)
- 23OBJ040PAPOIL- Obj. HC PL APO 40x/1.30 OIL CS2 (11506358. Optional)
- 23OBJ063PLFDRY - Obj. HC PL FLUOTAR 63x/0.90 CORR* (11506223. Optional)
- 23OBJ063PLFOIL - Obj. HC PL FLUOTAR 63x/1.30 OIL (11506384. Optional)

Calibration Slide A: 23SLD0003

The Calibration Slide A is made for use on VERSA scanning systems and is required by the Application software for;

- Spatial Calibration
- Brightfield Calibration.

The calibration slide contains crosshairs and grid patterns for stage movement and image scale calculations.

The top grid has 32micron squares and is used with the 5x, 10x and 20x objectives.

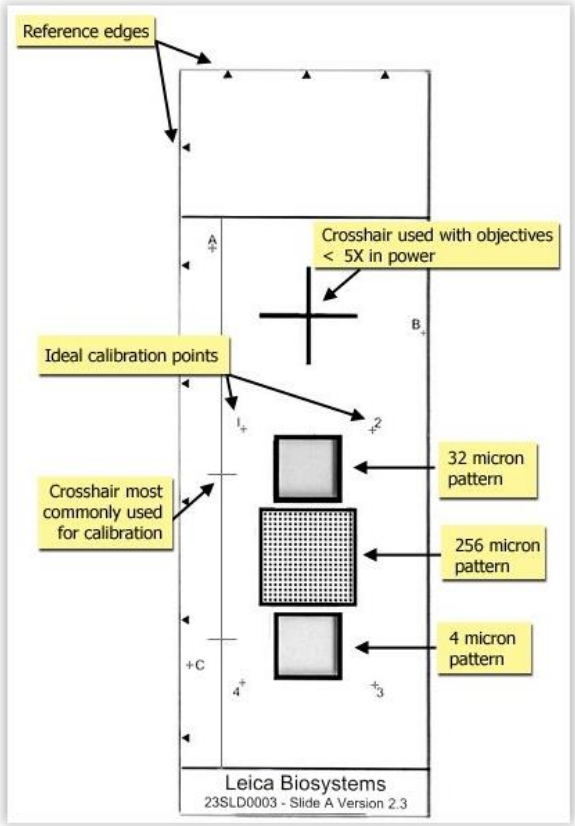
The middle grid has 256micron squares and is used for the 1.25x objective.

The bottom grid contains 4micron squares and is used for objectives of 40x and higher magnification.

There are 7 fixed reference points matching England Finder positions for coordinate conversion functions.

The fixed positions (each with a crosshair alongside) match the England Finder coordinate;

- A - C59
- B - Z50
- C - A15
- 1 - G40
- 2 - T40
- 3 - T13
- 4 - G13



Note: On VERSA 8 systems the prior stage is typically set with a Y axis limit that restricts movement to features C, 3 and 4. These are not used in the VERSA Calibration application procedures.

Motor Controller, ProScan III: 23ACON9001

- Prior Proscan III Stage and Filter wheel Controller Unit (H31XYZEF)
- Manual, Operating Instructions
- USB Cable, PC to Prior Controller

Part #: 23ACON9001
Power: Universal Mains Input 110/240 VAC 50-60Hz
Computer Interface: USB
COM Port Communications Protocol: 9600 baud
Controller Dimensions: Cube: Width, Height and Depth 177mm (ancillary box add 59mm)
Controller Weight: 3kg (1kg for ancillary box)
Connections: Stage = STAGE, ENC X & ENC Y. PC COM = USB

Stage, Prior 8 Bay: 23VMB8L

8-bay XY stage with linear encoders (HE38A)

- Size: 42.5 x 29cm
- Weight: 5kg
- Travel Range: 240mmx71mm
- <1um resolution, ± 0.7 µm repeatability
- High Precision Ball Screw, 2mm pitch
- Anti-Backlash Mechanism
- Adjustable Limit Switches
- USB Control
- Cable, 25M/25F Prior H247RA

Stage insert: 23SLH0008

- 8 slide sample holder / stage insert (H238LP)
- Fixes to XY stage using **8 Nylon** screws

Stage Encoders

- **Renishaw** Linear encoders (X and Y axis)
- TONiC T1000-30A Read-Heads
- TI0200 TONiC **Encoder Interface Connectors** with diagnostic LED
  - 0.1µm resolution
- Scale: RGSZ20-S, High stability steel tape, gold plated with polymer protection
  - Linearity 3 µm/m (+/- 30nm cyclic error)

Brightfield Color Camera: 23CAM0013

- POINT GREY Grasshopper 3 USB Camera (GS3-U3-41C6C-C)
- USB 3 Cable thumb screws
- USB 3 Point Grey Board

Grasshopper Specifications

- Chip: CMOS, 1"
- Frame Rate: 90 FPS
- Bit Depth: 24-bit Colour (3 color Bayer; 3x 8-bit RGB)
- Resolution: 2048 x 2048
- Pixel Size: 5.5 µm
- Exposure Range: 0.016 ms to 4 seconds
- Interface: USB 3.0
- Power: 5V via USB 3.0 interface
- Dimensions: 44 x 29 x 58mm
- Weight: 0.9Kg
- Validated firmware: v2.7.3.0
- Driver software: Point Grey FlyCapture2 SDK

Maintenance:

There are no user-serviceable parts within the Grasshopper camera.
Dust or dirt on the camera image visible during system calibration should be cleaned using an air-duster or soft-lens cloth. Cleaning solutions should not be used.

C-mount camera Adapter: 23ADP0205T

C-Mount: TOFRA 020-00 + 020-05 Camera Adapter

- Tofra UDPC Camera Adapter
- Tofra UDPC Base Leica

Barcode Reader / Slide Label Imager: 23VKE7

- Keyence SR-700 Barcode reader
- DM6000 Barcode/Oiler reader bracket
- Screws for bracket
- Cable Clips

Barcode reader / Label imager

- Voltage: 5V DC
- Pre-programmed with common barcode symbologies. Additional symbologies can be programmed.
- Records image of label.
- USB communication
- Driver software: Keyence Auto ID Network Navigator

Uninterruptable Power Supply: Emerson (Liebert)

- Liebert PSI2200RT3 UPS (110V (120V) or 220V (230V))
- USB data cable
- Cable, 6' 110V
- Tripp-lite power cable splitter

Part #:

23UPS2213 : PSI2200RT3 120V UPS, 1920VA

- Input : 120V
- Output 1920 Watts, 1920VA; 120V

23UPS2214 : Liebert PSI2200RT3 230V UPS, 2200VA

- Input : 230V
- Output 1980 Watts, 2200VA 230V

- Dimensions: 43.5 x 19.7 x 54.4cm
- Weight: 92.5lb / 42kg
- Batteries: Maintenance-free sealed Lead-Acid battery with suspended electrolyte (leak-proof)
- Recharge time: 5hrs to 90% rated capacity

Maintenance:

There are no user-serviceable parts within the UPS.
Battery replacement is recommended after 2-3 years or if indicated by automatic self-test when powered on.
Refer to manufacturer's instructions.

3 | Optional Components

Aperio VERSA Fluorescence Kit:

Camera: Andor Zyla 5.5 sCMOS: 23CAM014

- ANDOR ZYLA 5.5 Camera
- USB 3 Cable thumb screws
- Camera power supply
- Tofra UDPC Camera Adapter
- Tofra UDPC Base Leica

- Chip : Front Illuminated Scientific CMOS – 21.8mm diagonal
- Frame Rate: 40FPS
- Resolution: 2560 x 2160 (active pixels) – 5.5 Mega Pixel
- Pixel Size: 6.5µm
- Cooling: Air cooled to 0ºC (from up to 35ºC ambient)
- Read Noise: 1.2 @ 200 MHz / 1.45 @ 560 MHz
- Interface: USB 3.0
- Power: 12 VDC ± 5% @ 5A via external power supply
- Dimensions: 134 x 80 x 82mm
- Weight: 1.0Kg

Maintenance:

There are no user-serviceable parts within the Andor camera.
Dust or dirt on the camera image visible during system calibration should be cleaned using an air-duster or soft-lens cloth. Cleaning solutions should not be used.

Camera Adapter: 23ADP0205T

- C-Mount: TOFRA 020-00 + 020-05 Camera Adapter
- Tofra UDPC Camera Adapter
- Tofra UDPC Base Leica

23FIL6850 Chroma IR-Cut Filter, 32mm

Light Source, X-Cite 120 PC Q: 23LMP6000

- X-Cite 120 PC Q controller and power supply, 23LMP0008
  Dimensions: 30x13x21cm
  Weight: 5kg

- 120W Mercury Vapor Short Arc lamp, 23LMP0005
  >2000hr lamp life
- Liquid light guide, 23LMP0006
  2m, 0.5Kg
- Lightguide adaptor, Leica, 11504117
- Cable, RS-232 serial 9DM to 9DF
- Foot switch

Aperio VERSA can be configured to control the X-Cite 120PC external fluorescent light source via a serial RS-232 connection to the PC.
The COM port should be identified through Windows Device Manager, and then configured in the VERSA Calibration Application.

Maintenance:

There are no user-serviceable parts within the X-Cite 120PC.

Lamp replacement: The HXP120 lamp has a manufacturer's recommended lifespan of 2000 hours. If used in excess of 3000 hours this can lead to deterioration in light quality and potentially damage the unit.

Lightguide replacement: Liquid light guides have a typical useful life of 4000 hours of operation when handled properly and installed correctly.
The formation of bubbles, typically due to overheating and/or mechanical stress to the light guide, can result in a sudden reduction in illumination intensity. The risk of overheating can be reduced by ensuring the internal shutter is closed when not in use for viewing or image capture.

Network Attached Storage (NAS)

QNAP TS-831X NAS

- Part #: 23VER000NAS001 (23EHD0831 without HDD as spares item)
- Dimensions: 185.2 (H) x 298.2 (W) x 235 (D) mm / 7.29 (H) x 11.74 (W) x 9.25 (D) inch
- Weight: Gross: 8.25 kg / 18.19 lbs
- CPU: Alpine AL-314 Quad-core 1.4 GHz Cortex-A15
- HDD: 6 x 6TB 7200RPM HDD pre-installed (23DKH0039 single HDD spares item)
- RAID: RAID5 configuration – 32TB > ~ 22TB usable storage
- Connections: 2x GbE & 2x RJ45 Gigabit LAN ports, 3x USB 3.0

Maintenance:

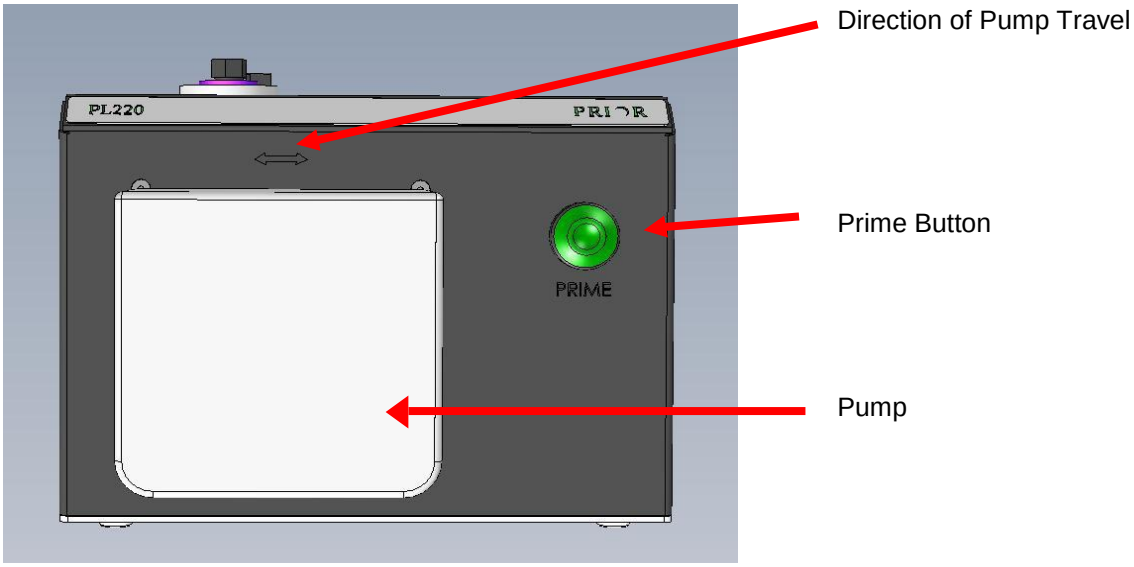
There are no user-serviceable parts within the NAS Drive.

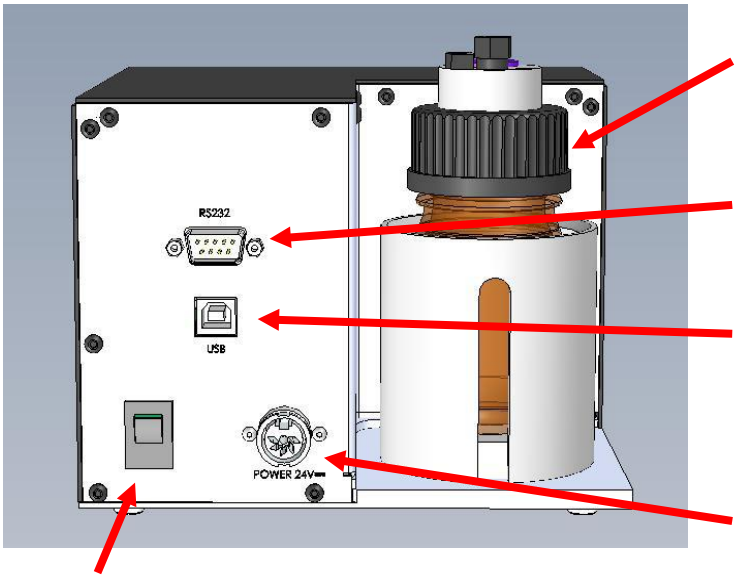
Automatic Oiling System: 23ASLOILER

Automated slide-oiling system for high magnification oil immersion objective lens scanning

Weight 6.1Kg
Dimensions: 17.4 x 13 x 25cm
Supply voltage 100v to 240v, 50Hz to 60Hz
Pump rating: Group II, Category 2, T4 temperature classification

- Mains adaptor & PSU
- PL220 Control Box, USB (virtual COM port) interface
- Oil Reservoir Bottle
- Tubing (1m x 1.6mm bore x 1.6mm wall)
- USB Cable
- Oil Dispenser Assembly



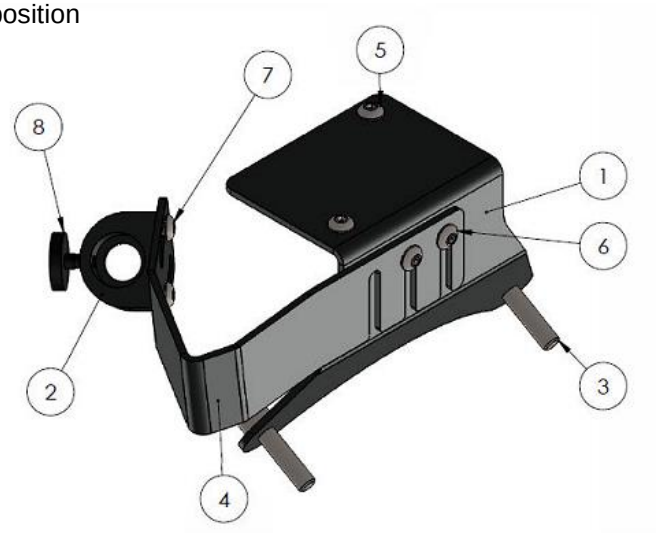


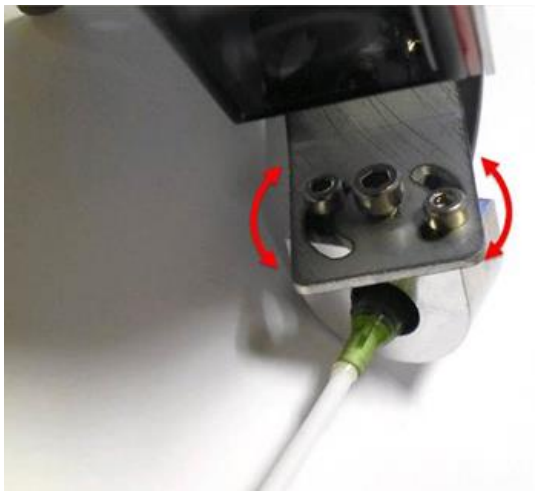
Bracket Assembly, Barcode-Oiler: 23BRA9001

Oiler & Barcode reader mounting Bracket (mounted to DM6000 IL-turret**)**

- Adjustable to achieve ideal oiling position
- Holds barcode reader / label imager in optimal position

1. Barcode reader bracket for Keyence SR-700
2. Oiler dispense tip mounting
3. 2x M4 16mm screw
4. Oiler mounting arm bracket
5. 2x M3 6mm screw
6. 2x M3 6mm screw
7. 2x M3 6mm screw
8. M3 6mm thumb screw





Oiler tip rotation adjustable.

4 | Assembly & Commissioning

Pre-Installation Considerations

Location

When preparing for the installation, it is essential to ensure there is sufficient available space for the Aperio VERSA 8 system.

It is recommended that you position the scanning system in an isolated area to minimize the effects of foot traffic or the chances it will get accidentally knocked.

The bench surface should be sturdy and as vibration-resistant as possible and away from external sources of vibration such as centrifuges or air-conditioning units.

A bench top space of 185(W) x 80(D) x 70(D)cm capable of safely supporting >85Kg is recommended.

Computer.

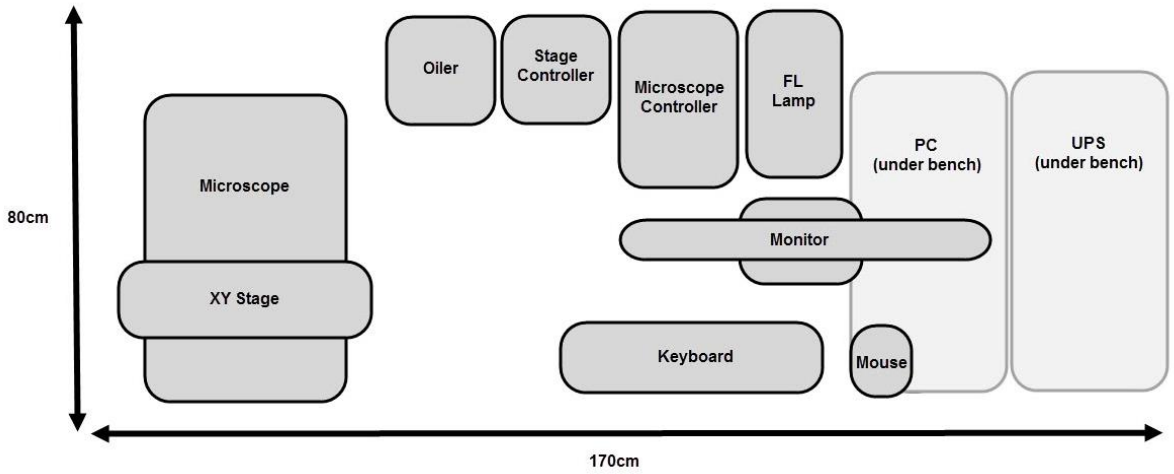
Moving the PC workstation under the bench may be more convenient if cable access is possible. If it is not possible to locate the PC under the bench, an additional 25cm bench width is necessary.

Network data ports

If data is to be stored in one or more network locations, a network data port will be required to allow Intranet communication between the Aperio VERSA scanning system and the data server. Internet access is not required; however, if available, this will allow for remote diagnostic support in the future.

Telephone

A telephone located within close proximity of the Aperio VERSA scanning system is recommended. This will allow laboratory staff to receive future customer support while viewing or interacting with the system directly.

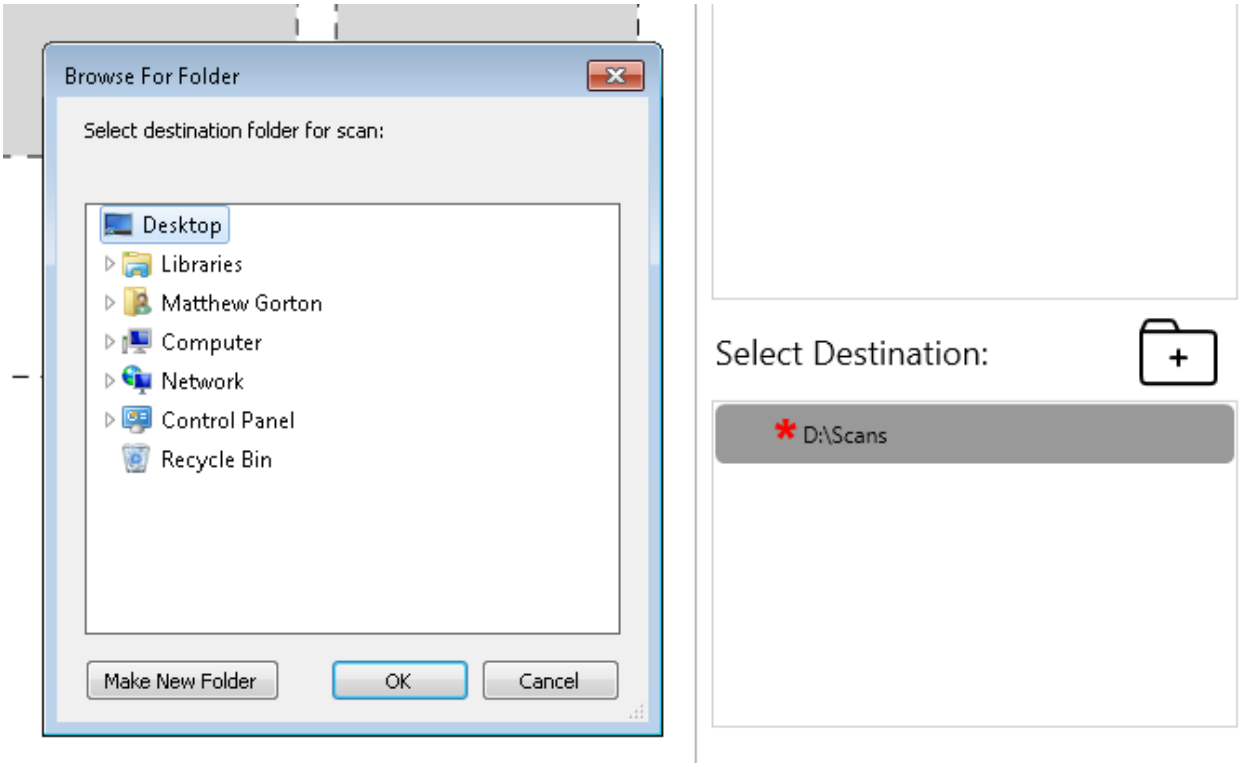


Networking

Aperio VERSA software runs under a Microsoft® Windows® environment and requires active TCP/IP protocols to export data to network locations. All Aperio VERSA scanning systems are configured, as default, to export completed data to the local attached storage:

- D:\Scans or
- E:\Scans (if storing data on optional NAS).

Up to 20 separate export locations, or destinations, can be defined at any one time via the Aperio VERSA Console software.



The data export destinations are displayed as Microsoft Windows UNC paths, e.g.

\\ServerName\SharedFolder

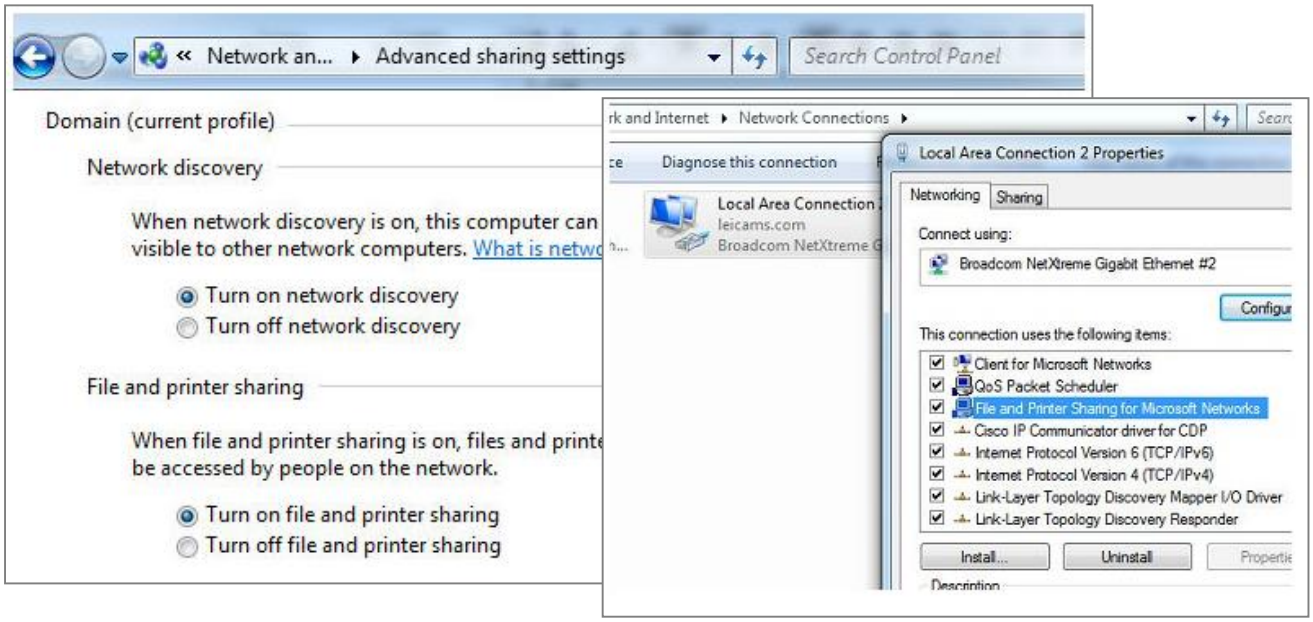
Or if a local mapped drive is used:

X:\Scans

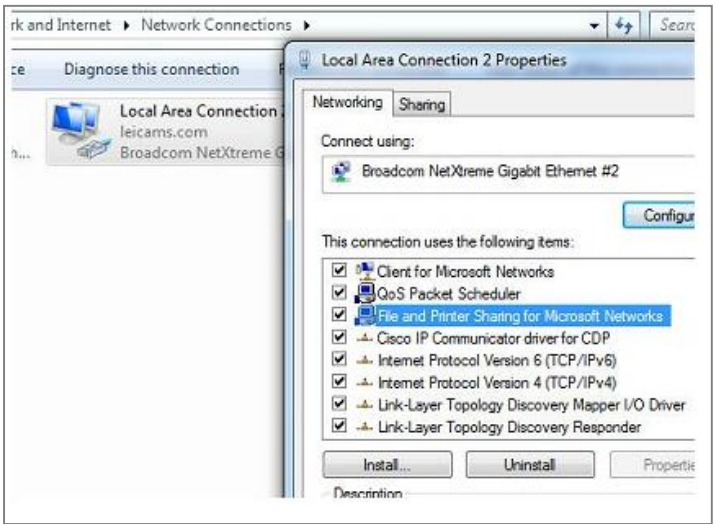
Filesharing

Aperio VERSA data export requires network file sharing to be configured on the destination folders. Windows Filesharing runs as standard when there is an active network connection on a LAN Adaptor, or if the Microsoft Loopback Adaptor has been configured for standalone system operation.

Windows 7 Control Panel > Network & Sharing Centre > Advanced Settings allows confirmation that Network Discovery and File and Printer Sharing are active.



Whichever network adaptor(s) are being used to run the workstation, network also need the "File and printer sharing for Microsoft Networks" activated.



Built in (local) User Accounts

Aperio VERSA scanning systems ship with two local user accounts enabled; these accounts are for use in workgroup environments.

- Username: **Administrator**
- Password: admin46xx

Provides administrative functions required for operations such as software updating etc.
Recommended for any hardware configuration and Spatial (Hardware) Calibration operations

- Username: **Versa**
- Password: versa

Standard user accounts, which provide users with power user rights. This profile cannot be used to install/delete software, and has no access to administrative functions.

These logins can be removed or disabled on a Domain/Client server configuration. If the local Administrator login is disabled, then it is recommended that at least one domain user name with local administrator privileges is made available allow software updates and other administrative functions by or on request of Leica Support Representatives.

Integrating VERSA workstation onto user Domain

VERSA works under the Windows 7 operating system (Ultimate/Professional version) and can be integrated into a user domain network environment under standard procedures implemented by the user IT support.

Leica Biosystems do not expect any disruption to system operation by such integration, however, **before** any system reconfiguration is attempted;

1. All scanner hardware build, configuration and calibration is completed under the default Leica Workgroup configuration and tested for slide scanning and image saving/export operation
2. A full Acronis Image is made onto the Acronis Secure Zone or onto a separate disk location in case of unexpected issues during the reconfiguration to allow a fast recovery of a calibrated system

The NAS (Network Attached Storage) device supplied as a VERSA option can be configured for multiple TCP/IP connections additional to the default VERSA PC (secondary LAN adaptor) if connection of this direct to a Domain environment is required.

Domain User Accounts

Aperio VERSA scanning systems can be integrated into a customer network domain.

Standard users should have equivalent user rights to the manufactured local ‘Versa’ account.

Note: VERSA v1.0 required local administrator privileges to allow operation of the barcode label reader during scanning, later releases allow barcode label reader operation under standard user rights

Anti-Virus restrictions

An Aperio VERSA system is validated with **Microsoft® Security Essentials** (MSE) software which provides real-time protection against viruses, spyware, and other malicious software.
Routine system operation does not require internet access and the use of external flash (USB) sticks should be avoided to reduce the risk of PC virus infection.

If the system does not have internet access you can download the latest definitions from Microsoft on another PC and copy the files for installation;
http://www.microsoft.com/security/portal/definitions/howtomse.aspx
Follow the instructions on the page to download the correct definitions for the version of MSE installed.

Integration of the Aperio VERSA into a larger user network increases the risk of virus or malware attack, especially if general internet browsing is available. In such cases Leica Biosystems recommends that an internal, managed AV solution is installed on each workstation.

Installation of any non-Leica application should only be done after the VERSA system is tested for basic scan operation and an Acronis Image made.

The following locations are critical to scanner operation and should be excluded from virus scanning –

- C:\Aperio VERSA Logs
- C:\ProgramData\Aperio Versa\
- D:\ScannerData (and all sub-folders)

Windows Updates

Leica Biosystems validate current Windows Service Packs and updates with the release of new versions of Aperio VERSA software.

After system installation Leica Biosystems recommends before applying new Windows updates to multiple workstations that they should be tested before rolling out.

- It is not recommended to allow ‘automatic updates’ as they may interfere with unattended scanning operation.
- Updates should be installed manually when the system is not in scanning use.

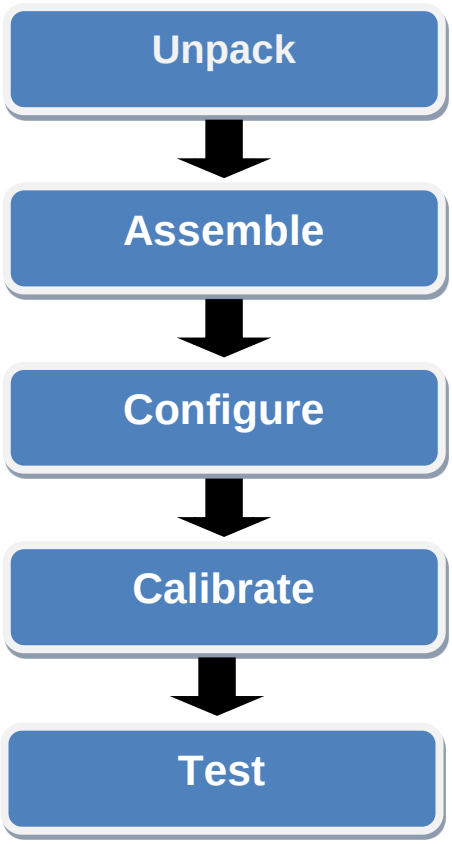
Aperio VERSA System workstations include Acronis Backup and Recovery application software to backup an image of the Operating System partition for recovery in the event of system corruption or virus.

In case of unexpected issues following Windows Updates the recommendation is to;
- Manually uninstall any updates added since the system was last confirmed working
  or
- Recover the system to the last Acronis Image weekly backup

Please contact Leica Biosystems B.U. Support for advice on Microsoft Windows service packs and updates which have been validated with Aperio VERSA software.

5 | Installation Procedure

Installation Overview



Required Tools

You will require the following to install the system:

- Set of Metric Allen Keys (4, 3, 2.5, 3 MM)
- Set of screwdrivers, 2-3mm flat and #0 & #1 Phillips (Cross) as minimum

Suggested;

- 16+GB USB stick or external USB Hard drive
- Compressed/canned air (eg. Falcon "Dust Off" or equivalent)
- >=70% alcohol for cleaning items exposed to microscope immersion oil.
- <50% acetic acid for monitor LCD screen cleaning
- Non-abrasive, lint-free swabs or lens cloths
- Customer supplied sample slides representative of their routine slide usage

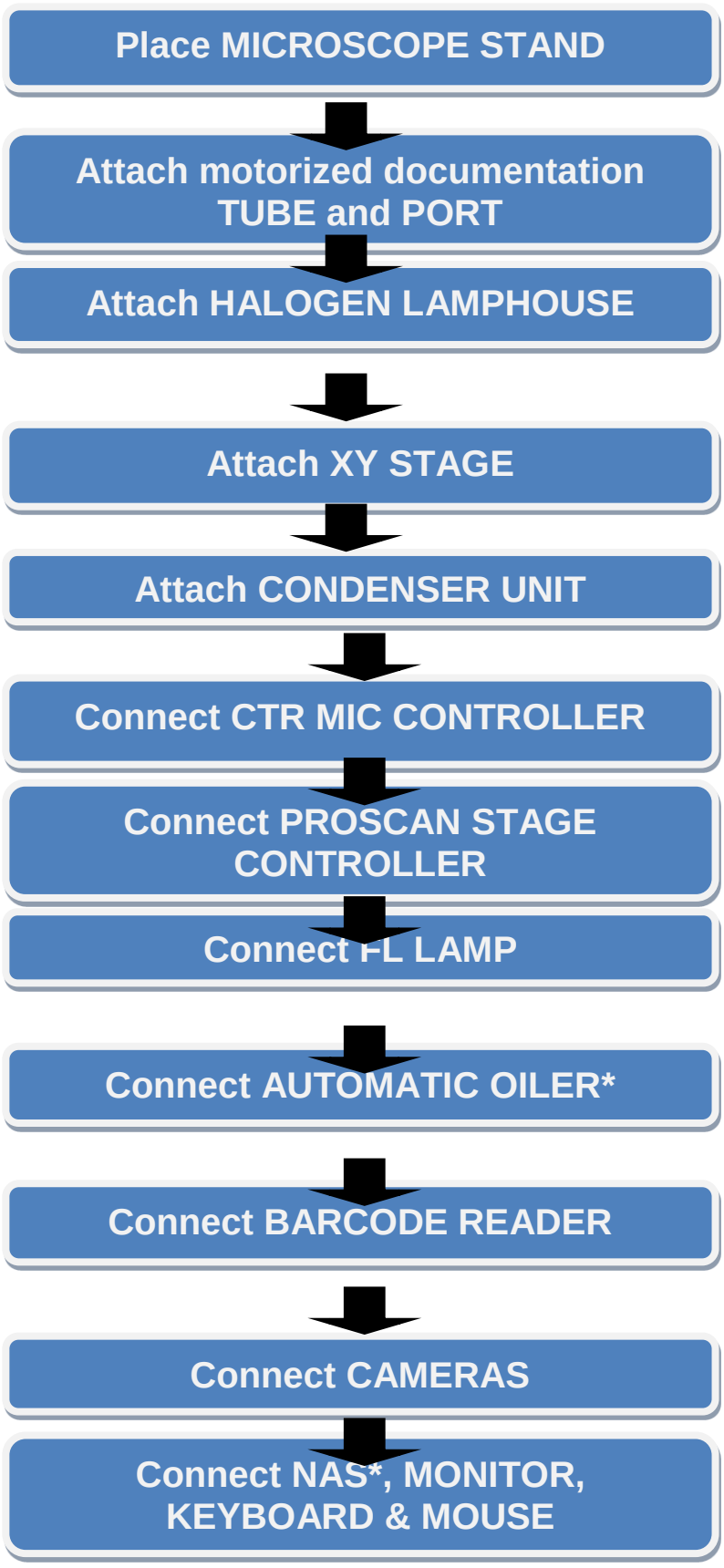
Task 1: Unpack

1. Confirm number of boxes / crates matches shipping documentation.
2. Check for damage to packaging.
3. Remove all components from packaging and compare to expected system components list.

Report any missing or incorrect components immediately.

Assembly Overview

* Product Option



Task 2: Microscope Placement

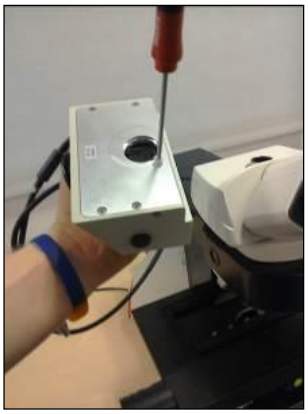
The Leica DM6000B needs to be placed on a stable bench top near to the PC, typically to the left of the monitor, keyboard and mouse.

Objective lenses and condenser should only be fitted once the microscope is in position and the stage is mounted.

1. Place **microscope stand** in the system final location.

Task 3: Microscope Assembly

1. Attach **motorized tube** to the microscope stand and connect the cable into the stand.



2. Remove the plastic transport screw from the port.

3. Attach **motorized port**.

4. Connect the cable to the EXT1 connection on the rear of the microscope stand.

5. Attach **lamp house**.

6. Connect lamp house to microscope stand.

Task 4: Install Stage

1. Check XY Stage Limit switches

Before attaching the stage onto the microscope the free movement should be checked when unpowered. It should possible to push the stage top plate along the length of both X and Y axes with a smooth, consistent movement with only minimal friction or resistance.

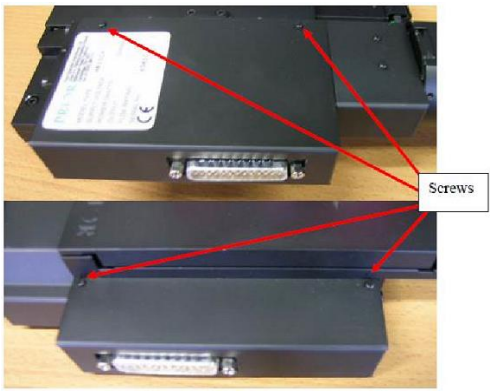
If it is not possible to push either axis, or if a variable resistance is felt along the axis, this may indicate potential mechanical damage and additional investigation should be done on stage movement and scanning operation once the hardware configuration is complete and calibration applications can be tested.

Before fitting the stage and bracket to the microscope remove the cowling plate from the stage X and Y axis limit switches for adjustment of the limit switches as necessary;

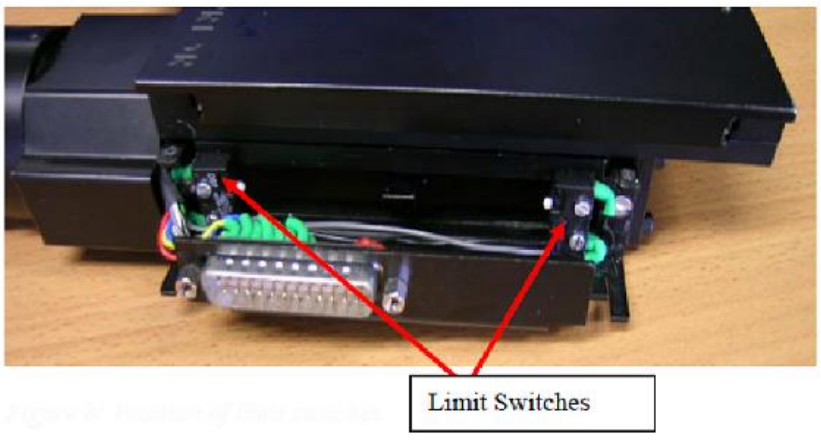
- To allow confirmation that the limits are not opened to the stage physical end-stops, as this may affect reliable limit switch response and can lead to operational errors
- To confirm the left X limit is not set more than 2mm from the end-stop as this may lead to first-slide loading variability in routine operation
- To allow fine Y limit adjustment during slide loader calibration to achieve accurate parallel alignment of the slide loader gripper arm and the calibration jig (in combination with microscope coarse positioning).

2. Y-Axis Limits

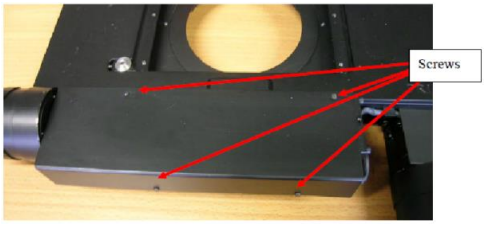
1. Ensure the stage cable is not connected to the controller
2. Unscrew the four flat head screws.
3. Lift off the drive box cover.



- Visually check whether the limit switches are fully open to the end-stops. If not do not adjust unless required during configuration and calibration.
- If the limits are on the end-stops unscrew the two flat head screws of the limit(s) to be adjusted.
- Move the switches in 1-2mm. Further repositioning may be required during configuration and calibration.

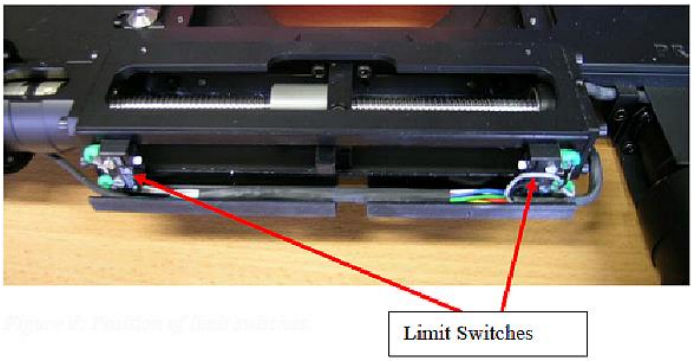


3. X-Axis Limits



1. Ensure the stage cable is not connected to the controller
2. Unscrew the four flat head screws
3. Lift off the drive box cover.

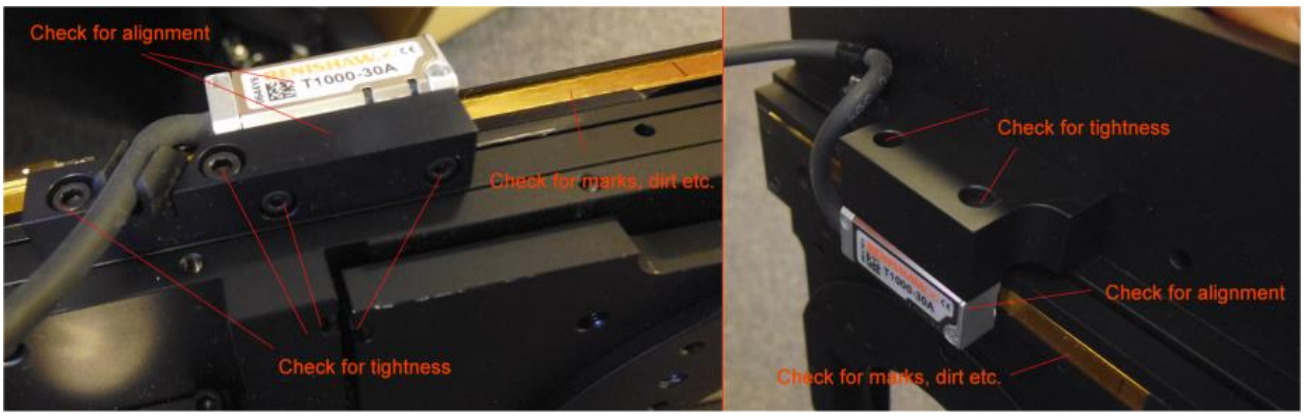
- Visually check whether the limit switches are fully open to the end-stops. If not do not adjust unless required during configuration and calibration.
- If the limits are on the end-stops unscrew the two flat head screws of the limit(s) to be adjusted.
- Move the switches in 1-2mm. Further repositioning may be required during configuration and calibration.



- Adjust the limits to the position required

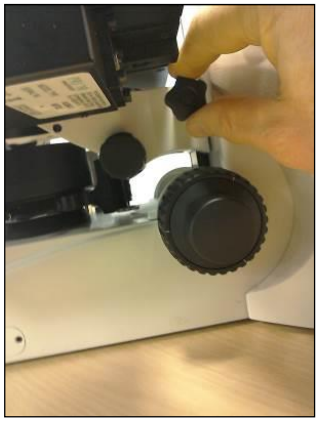
4. Check/Clean Encoders

- The stage encoders should be firmly fitted to their mounting bars and aligned to the gold reading scale so that they maintain a consistent space (2.1 +/- 0.15mm) and angle as the stage moves along each axis.
- Before fitting the stage do a visual check of the encoders for any loose screws, visual misalignment or marks or dirt on the read scale.
- If necessary, use a cotton bud carefully wipe the length of the gold tape scale on the underside of the stage using Isopropyl alcohol.



When handling the stage avoid touching the encoder read scale with your hands or any sharp objects or abrasive material.
If position or alignment of the encoder read head or scale changes carry out a Proscan Software Reset.

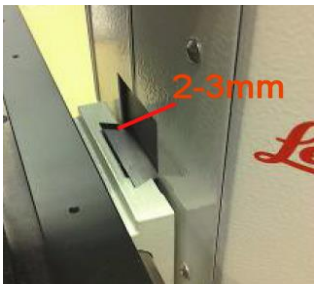
5. Mount stage



Attach **stage** to microscope stand

IMPORTANT!

To ensure that all of the objective lens focus ranges are achievable in Spatial and Brightfield Calibration it is necessary to ensure the stage mounting height is high enough not to reach the microscope absolute focus maximum of approximately 25000 (as displayed on the DM6000B LCD touchpanel).



For the VERSA 8 system the stage design means that the stage bracket should be at least 2mm above the dovetail, and before starting the Spatial Calibration procedure it is recommended to check the focus height of the Calibration slide in the VERSA Calibration application.

Using the stage controls move to the center grid pattern of the slide and bring it into focus.

- If the Z value displayed on the LCD screen is close to or greater than 24000 raise the bracket height by at least 1mm
- If the value displayed is close to or less than 23500 no expected operational problems are expected, although raising the bracket should be considered as a troubleshooting option should unexplained focus map and scan focus issues occur during system operation
- If the value displayed is close to or less than 23000 no expected operational problems are expected

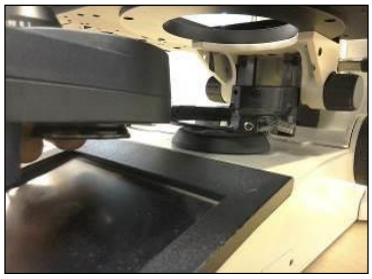
Task 5: Assemble and Install Condenser

1. Screw S15 0.5 **condenser lens** (11501037) into motorized condenser unit (11505141).
   (Note, for Ariol conversions this may be the S1 0.9 head)

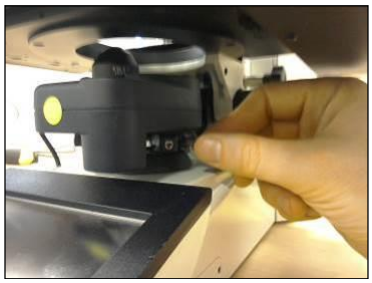
   Check the lens for any marks or dirt and be careful not to touch with your fingers. If necessary, clean with a soft lens cloth

2. Insert **motorized BF condenser unit** into condenser holder below stage.

   Lower the condenser holder using the wheel on the substage, and loosen the condenser retaining screw to insert the unit.

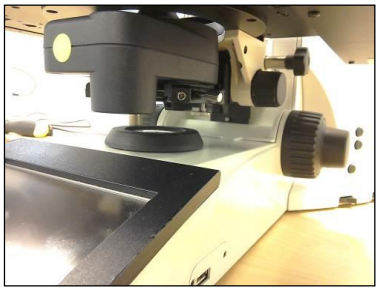


3. Tighten the motorized condenser retaining screw.



4. Connect the **condenser cable** into the microscope stand.

5. Raise the condenser to the upper limit, before lowering it by half a full rotation of the condenser height wheel.



Task 6: Attach Cables

1. Connect power cable from CTR to UPS

2. Connect USB cable from Microscope (USB1) to PC

Note: This is now the recommended default connection option on installation.
Previous instructions specified connecting the USB from the PC to the CTR unit. This is still a valid connection or troubleshooting option and is not expected to cause any routine operational problems.

3. Connect earth cable to microscope stand.

4. Connect microscope cable from CTR to microscope.

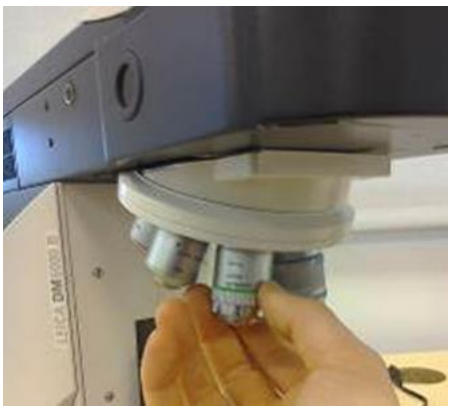
   IMPORTANT – The earth cable must also be connected from the microscope to the CTR.

Task 7: Insert Lenses and Filters

1. Switch CTR ON. The DM6000 touchpanel LCD screen will activate.

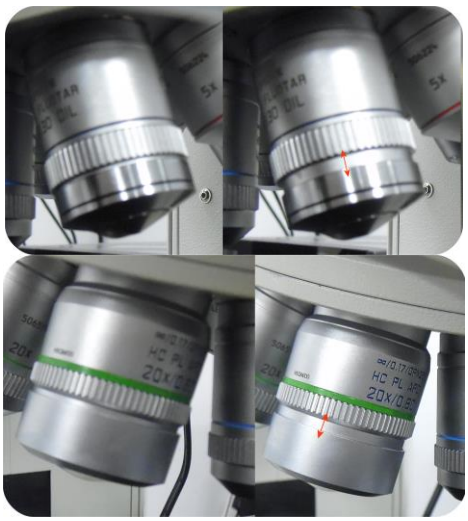
- Microsocope main display
- Light mode/Filter turret display
- Objective and phototube display
- Focus display

2. Insert **objective lenses** using the microscope LCD touch screen to determine the pre-programmed positions.



<u>Standard lens configuration</u>
Position 1: 10X
Position 2: 20X
Position 3: 40X
Position 4: –
Position 5: –
Position 6: 5X
Position 7: 1.25X

Several Leica objective lenses used on VERSA have spring-loaded locking mechanisms which move the lens tip 1-2mm from the expected position for parfocality with other objectives..



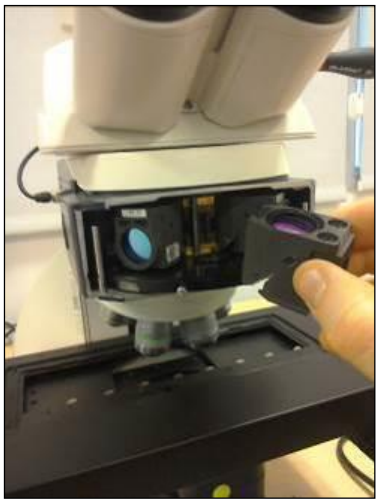
This used to be just 40x and 63x models, but includes the newer 20x PlanApo (P.No. 506529).

If the objective lenses are calibrated in the locked position this will affect optical quality and also risk slide or lens damage if they are unlocked later.

3. Before Spatial Calibration, ensure all lenses are unlocked by pushing the lens tip up and twisting anti-clockwise.
   Ensure you do not touch the lens glass directly

4. Some 40x (506294) and 63x (506223) lenses have an adjustable iris for coverslip thickness.
   These can be identified by looking at the lens information on the side with a range next to the infinity symbol (∞).
   Coverslip thickness should be set to 0.17 as default unless the customer is using non-standard coverslips on their slides.

5. Insert dichroic (fluorescent) **filters** using the microscope LCD touch screen to determine the pre-programmed positions.



When fitting fluorescent filter cubes ensure you do not touch the filter coating and that the cubes are held firmly in place by the DM6000B spring clips in the IL turret

IMPORTANT! If objectives or filters are inserted in different positions to that shown on the LCD screen, or if no lens or filter data is shown for the position, then it is essential that;

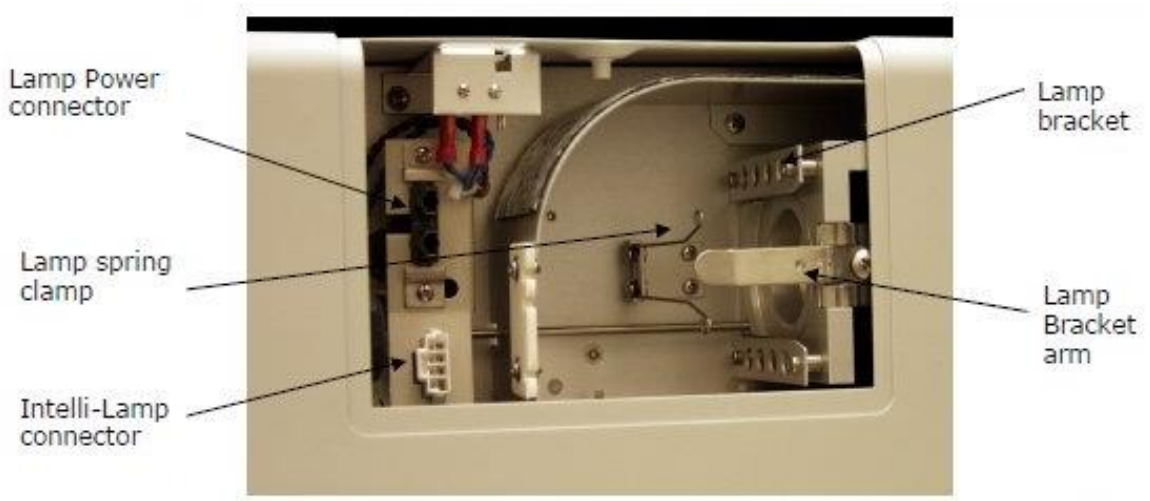
- the Leica Application Suite (LAS) configuration is updated to correctly match the physical positions and and lens magnification value or appropriate filter name
- The VERSA Calibration application is updated to corectly match the VERSA required objective name or filter name.

Task 8: Connect Proscan Controller

1. Connect—
   - Power cable from UPS to Proscan
   - USB cable from Proscan to PC
   - Stage cable from Proscan to Stage

2. Connect X and Y encoder cables from stage to Proscan.

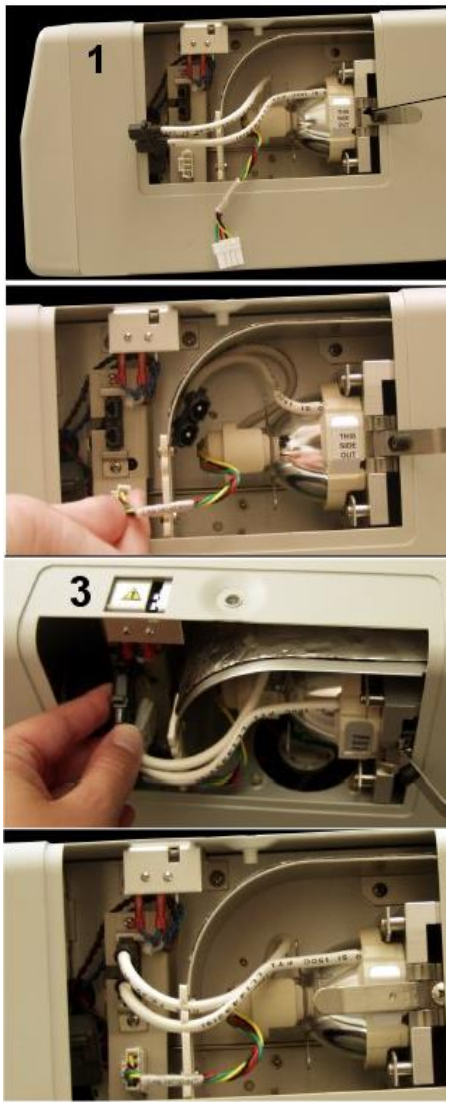
Task 9: Connect Optional X-Cite Fluorescent Lamp House



1. Open lamp house side-panel and insert lamp (bulb).

   Be sure to handle only the ceramic surfaces, do not touch the glass envelope or the inside surface of the reflector.

   (See Maintenance, lamp replacement)



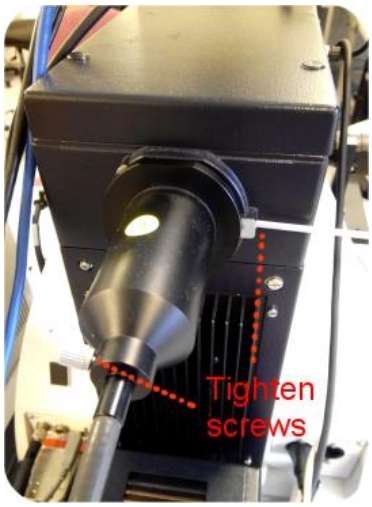
2. Connect power cable from UPS to lamp house.

3. Connect serial cable from lamp house to PC (COM1)

4. Insert wide end of light guide into lamp house **ensuring it is inserted up to the guide line.** This ensures contact with a heat sink to conduct heat away from the light guide.

   When placing the unit in its final operating position do not obstruct the air vents on the rear and underside of the X-Cite unit and do not place it on top of or immediately next to any heat-producing instrument.

5. Insert narrow end of light guide into the microscope stand using the supplied light guide adapter.



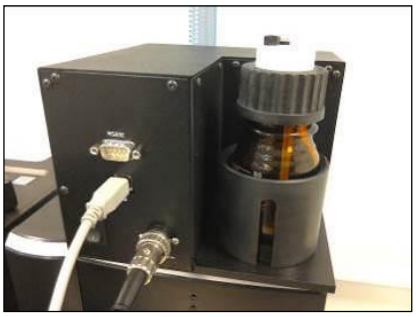
IMPORTANT!

The X-Cite lightguide is sensitive to stress and tension damage.

- Do not bend or twist it unduly and ensure the rear of the microscope has sufficient rear-clearance so the guide is not going to be in contact with the wall or pulled on by other cables
- Ensure the lightguide adaptor is mounted flush to the rear port of the microscope
- Ensure the lightguide is pushed firmly in at both the X-Cite controller and microscope adaptor ends, and both the adaptor screw are tightened to prevent movement
- See Maintenance, lightguide replacement

Task 10: Connect and Set up Optional Automatic Oiler

1. Position the oiler unit approximately level with the dispense tip final position.
   On top of the Proscan III controller is an appropriate position.



2. Connect power cable from UPS to oiler power supply

3. Connect the power supply to the Power Connector on the back of the controller

4. Connect USB cable from oiler to PC.

5. Connect oiler tip into the bracket on the barcode label imager and tighten retaining screw.

   Do not attempt to bend or rotate the bracket mounting.

6. Connect transparent oiler tubing from oil bottle lid to oiler tip.

   NOTE – It is important to minimise the distance between the pump and the dropper

7. Adjust the fine position and angle of the oiler tip so that it only just misses the largest objectives (1.25x and 20x).

   The tip of the oiler should not be allowed to touch any of the lenses as the objective turret rotates as this can lead to oil transference onto the dry lenses and potential damage by infiltration into the lens optics.

8. Open the pump mechanism and carefully feed the tubing over the rollers

9. When the mechanism is closed the tubing coming in (right-side, from the controller and bottle) is flat and the out-side tubing is not trapped.

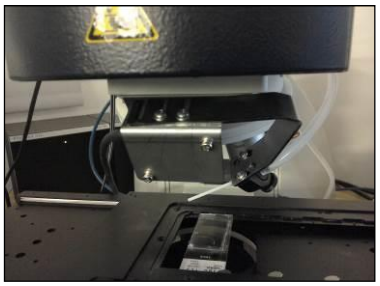
10. Use the thumbscrew to raise the pinching mechanism on the in-side tubing so it is being held firmly to prevent the tube being pulled through by the pump.

    Do not over-tighten as this may pierce the tubing resulting in leaking and unreliable flow

11. The Exit tubing should not be pinched at all as this can create a dispense lag. The mechanism should be opened.

12. Fill oiler bottle to 80ml line with appropriate microscope immersion oil
13. Place the open end of the tubing into the bottle close to the bottom of the bottle and immersed in the oil.
14. Attach oil bottle lid.
15. Place the bottle into the controller housing
16. Switch oiler ON.

17. Place a receptacle under the tip to catch any drops of oil
18. Press and hold the PRIME button until oil reaches the oiler tip, then release.
19. Make sure the tubing if securely fitted and no oil has leaked. If you see traces of oil, try to reseat the tubing.



During the Spatial Calibration the stage position to be used when the automatic oiler applies oil is calibrated

Oiler dispense settings are adjusted through a configuration step that can be adjusted during operational testing.

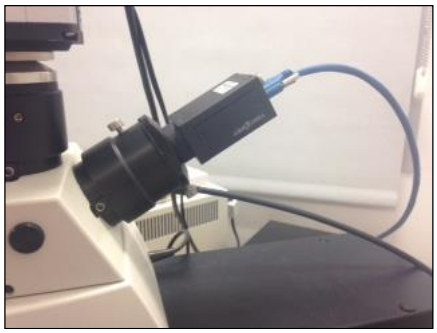
Task 11: Connect Barcode Reader / Label Imager

Connect the **label imager / barcode reader** USB communication cable and USB power cable to the lowest double-USB card on the rear of the PC.

Task 12: Install Cameras

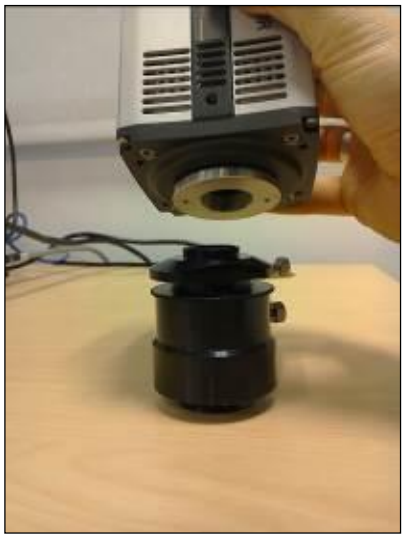
1. Attach **Point Grey camera** to one of the camera mounts (c-mounts).

2. Attach camera and c-mount to the rear microscope documentation port (orientation as shown).



3. Connect USB3 cable from the camera to the dedicated Point Grey USB card at the rear of the PC.

4. Attach **ANDOR camera** to the other c-mount.



5. Insert IR cut filter between the upper and lower parts of the mount.

6. Attach camera and c-mount to the front/top microscope documentation port (orientation as shown).

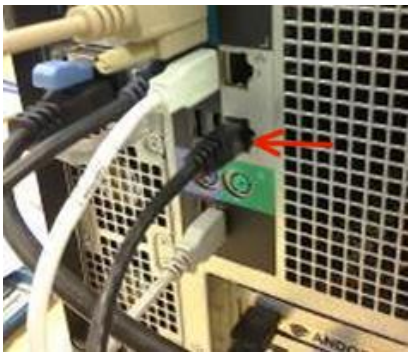
7. Connect USB3 cable from the camera to the dedicated ANDOR USB card at the rear of the PC.

8. Connect power supply to camera and to UPS.

Task 13: Connect Optional Networked Attached Storage

Connect power cable from UPS to NAS.

Connect Ethernet cable from NAS to PC Ethernet port 2.



Task 14: Connect Peripherals

- Connect power cable from UPS to monitor.

- Connect HDMI-miniHDMI cable from the monitor (HDMI) to the graphics card port (miniHDMI) on the rear of the PC.
- Connect the USB-B – USB-A (USB3) cable from the monitor (USB-B) to a USB-A (USB3) port on the rear of the PC.

- Connect the keyboard into a free USB port on the monitor.
- Connect the mouse to a free USB port on the monitor.

6 | Testing ProScan and stage interface

Overview

Before proceeding to Spatial Calibration it is useful to confirm expected ProScan III controller interface and response in the Prior Terminal interface application. Use of this for advanced diagnostics is described in Chapter **13 | Testing and Troubleshooting**.

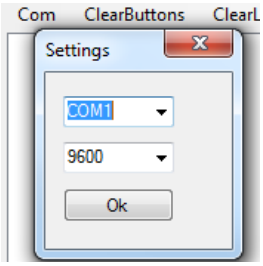
1. Power ON all components and log in as Administrator.

2. Identify the COM ports used by the Proscan Motor Controller (Stage Controller) in Device Manager (Right-click Computer > Manage > Device Manager > Ports (COM & LPT)).

3. The Proscan Communication Port is clearly labelled.

4. Open the Prior Terminal application from **Start>All Programs>Prior Scientific>Visual Basic**

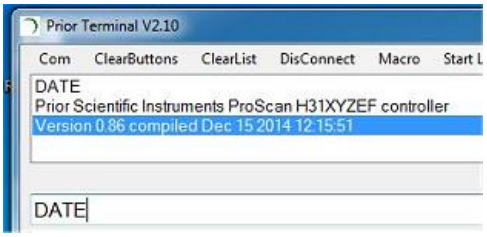
5. Select the **Com** option, all available Com Ports on the workstation will be displayed



6. Select the Com port identified for “Prior Communication Port” in Device Manager

7. Confirm Baud Rate as 9600

8. Select OK



9. Type DATE into the text panel and Enter

10. The ProScan controller firmware is displayed, expected response is Version 0.86

11. For Ariol Conversions the firmware will need to be updated as part of the conversion procedure described in the Appendix.

12. Type ? into the text panel and Enter, expected response is “STAGE=H138ENC” for a connected VERSA8 X/Y stage

13. Type encoder, expected response is 3 for active encoders

14. Select Disconnect and close

7 | Calibrating Aperio VERSA

Introduction

The Calibration Wizard in the Aperio VERSA Calibration application is used to calibrate stage movement and object size. It is necessary for the system to accurately relocate objects found during a scan and coordinate display and conversion.

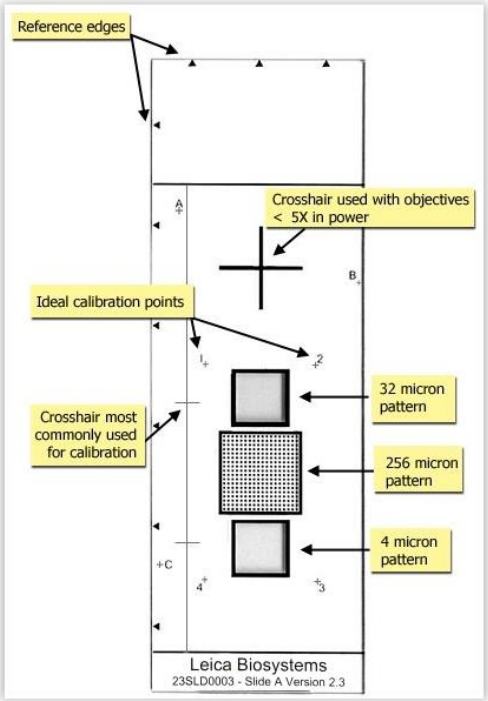
Spatial Calibration is the first step in the 2 stages of VERSA 8 calibration before scanning can occur.

Calibration type?	What is it for?	Who performs it?	How often?
Spatial (VERSA Hardware)	Accurate XYZ positional movements and image dimensions	Leica Service Engineer	When out-of-calibration
Brightfield Channel (Scan)	Consistent Brightfield image quality	System User	Daily

The frequency of calibration will vary depending on the laboratory's use of the system. It must be performed if there is any hardware change that affects the light path; for example, when an objective is removed and replaced. If the accuracy of relocation or position between objectives starts to diminish it is time to calibrate the system.

Calibration Slide A

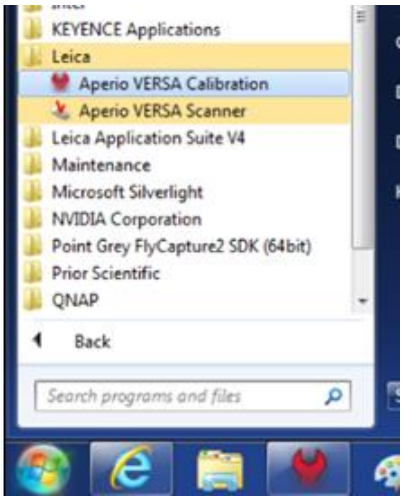
The calibration slide is supplied with the system and is used by the Calibration Wizard process. The slide has been printed with features in precise locations; calibration cannot be performed without this slide.



Task 1: Access Aperio Versa Calibration

1. Power the system components ON
   - PC & Monitor
   - Microscope CTR controller
   - ProScan II Controller & Slide Loader
   - ANDOR Camera
   - Oiler
   - X-Cite
2. Log-on as ‘Administrator’
3. Launch the Aperio VERSA Calibration application:

Start > **All Programs>Leica>Aperio VERSA Calibration**



Task 2: Verify Connections

1. When the Aperio VERSA Calibration application opens, select **Modify Configuration**.

The currently configured components and their connections to the PC are displayed.

2. Open **Device Manager:** right-click **Computer** and select **Manage**.

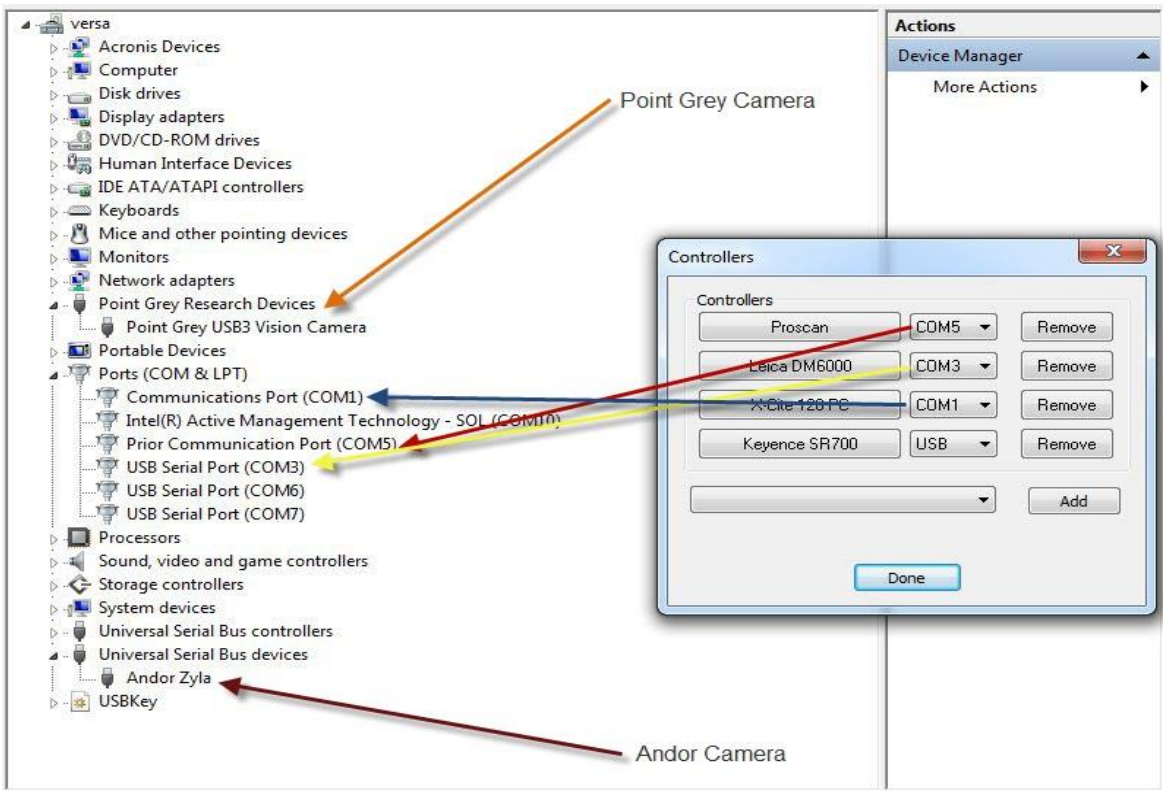
3. Expand the **COM ports** and the **USB** sections.

4. Compare Device Manager COM port and USB devices to the components and their connections in the Modify Configuration window to ensure they match.

5. Expand Point Grey Reseach Devices to confirm the Point Grey camera is connected.

6. Expand Universal Serial Bus devices to confirm the Andor camera is connected.

TIP: Remove a USB connection from a component and that component will disappear from the device manager list. Use this technique to identify a 'USB Serial Port' if it is not clear.



Task 3: Check Encoder operation

For systems with an encoded stage a check is required to ensure that the communication between encoders and stage is optimal.

1. In the Microscope Calibration application, Click the **X Y Stage** button to display the virtual joystick.

1. Using the virtual joystick drive the stage to one of the Y axis limits and then back to the other.

2. During the movement observe Encoder Interface Connectors connected to the Proscan III which will display colored lights.

3. Repeat stage movement along the X Axis

The Encoder Interface Connector colors that are displayed during movement indicate the read accuracy;

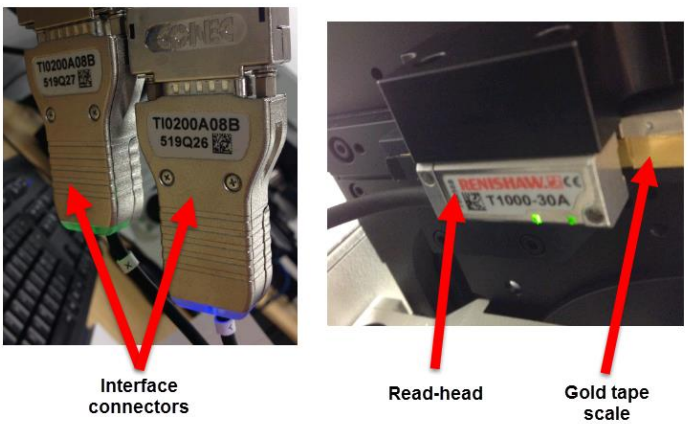
- **Purple** Over-read setup; signal level 110% to 135%
- **Blue** **Optimum** setup; signal level 90% to 110%
- **Green** **Normal** set-up: signal level 70% to 90%
- **Orange** Acceptable set-up; signal level 50% to 70%
- **Red** Poor set-up; signal may be too low for reliable operation; signal level <50%

Blue or Green are the preferred colors for general operation. Brief flashes of purple or orange do not indicate a need to reset the hardware but should be monitored to ensure they do not increase over time.

If the Encoder Interface Connector lights flash Orange or Red during movement between the X/Y stage limits this indicates reduced encoder read accuracy;

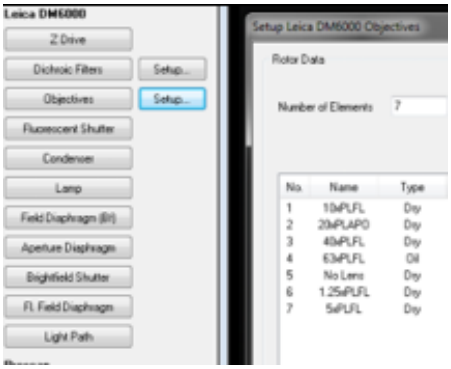
- The encoder read heads or mounting bars are loose or misaligned
  - Check hardware alignment
- The gold tape scale found underneath the stage may be need cleaning
  - Clean the encoders
- The ProScan controller has an issue reading the encoders correctly and may need reset
  - Check ProScan Reset procedure

Please note: It is normal for the cables to turn Orange/Red when resting on a stage limit.



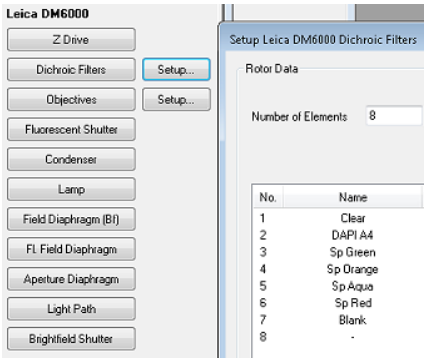
Task 4: Verify Filter and Lens Setup

1. Select the **Objective filters** - **Setup** button and check that the objective lenses and their positions in the objective turret (nosepiece) match the software configuration



2. Select the **Dichroic Filters** - **Setup** button and check that the filters and their positions in the dichroic turret match the software configuration

   Only one position is set as “Clear” in setup, other empty positions should be set as “–“, “Empty” or “Blank”.



If there is a difference between the physical position, the “Setup” configuration in VERSA Calibration and the microscope LCD touchpanel display they must be matched before any further calibration work is done.

- Right-click an objective position name to change in Calibration
- Right-click a filter position name to change in Calibration
- Run Leica Application Suite (LAS) to modify the **Nosepiece** or **IL-Turret** setup

IMPORTANT: The names of the lenses MUST be entered exactly as displayed in the ‘Objective Name’ column in this table. This is critical for the calibration and operation of the system as it links into the objective name used in the system HCT files for Brightfield Channel calibration and Scan Templates.

Mag.	Immersion	Product Code	Description	Objective
1.25x	Dry	11506215	HCX PL FLUOTAR 1.25x/0.04	1.25xPLFL
5x	Dry	11506224	HC PL FLUOTAR 5x//0.15	5xPLFL
10x	Dry	11506521	Obj. HC PL FLUOTAR 10x/0.32	10xPLFL
20x	Dry	11506519	Obj. HC PL FLUOTAR 20x/0.55	20xPLFL
20x	Dry	11506529	Obj. HC PLAN APO 20x/0.80	20xPLAPO
40x	Dry	11506382	Obj. HC PL FLUOTAR 40x/0.80	40xPLFL
40x	Dry	11506294	HC PL APO 40x/0.85 CORR*	40xPLAPO
40x	Oil	11506358	Obj. HC PL APO 40x/1.30 OIL CS2	40xPLAPO
63x	Dry	11506223	HC PL FLUOTAR 63x/0.90 CORR*	63xPLFL
63x	Oil	11506384	Obj. HC PL FLUOTAR 63x/1.30 OIL	63xPLFL

Task 5: Check Stage Level

For optimal image quality it is important that the stage insert is levelled when attached to the stage. This procedure checks to see if the insert is leveled on the X and Y axis and within acceptable tolerances.

The following procedure assumes that the system is using a valid micserver.xml file containing Spatial Calibration data for objective lens image dimensions for the Grasshopper camera.

- A new installation will include a manufacturing test calibration; this is acceptable
- If the stage has been re-attached since last Spatial Calibration only use 10x or 20x objectives for any level checks as these have a long working distance from the slide

1. Open the spatial calibration application and connect to hardware by clicking on one of the motorised component buttons on the left panel.
2. Open the Stage X-Y control window
3. Select “Home” and open the advanced panel to give display of X, Y and Z coordinates and the move to England Finder panel
4. Place the calibration slide onto the stage
5. Type in C59 in the England Finder Panel text box and press the "Move to England Finder" button (with the green arrow) – this moves the stage to the **A** point.
6. Move the focus slider to raise the stage until the A point comes into focus (if necessary adjust the “Lamp” intensity to prevent saturation.
7. Move to the 20x objective.
8. Set the lamp and aperture diaphragm setting to between 40% and 50% as required to get a clear live image displayed.
9. Focus on the A point and read the focus (Z) value for each point from the X/Y/Z display at the top of the stage advanced window (if Auto-focus is used then right-click above or below the red focus slide once to refresh the Z value display).
10. Type in A62 into the England Finder box and “Move to” the position. This should show the thick black reference line at the “top/left” of the slide.
11. Focus on the edge of the line and/or slide surface material. Refresh Z display and record the value.
12. 12. Move to position Z62, the “top, right” of the slide. Focus and record the Z value.
13. 13. The difference across the width of the slide (point A62 and Z62) should ideally be **less than 15 microns** and no more than 20 microns**.**
14. Type in H21 into the England Finder box and “Move to” the position. This should move close to the bottom left corner of the 256 microns grid pattern on the slide (adjust position as required to be able to determine an accurate focus value).
15. Focus on a grid pattern or slide surface material. Refresh Z display and record the value.
16. Move to position S21, close to the “lower right” corner of the grid pattern. Focus and record the Z value.
17. The difference across the width of the slide (H21 and S21) should ideally be **less than 10 microns** and no more than 15 microns**.**
18. Now look at the length of the slide, recording the focus Z position difference between A62 and H21, then Z62 and S21.
19. The Z difference between the top and bottom positions should ideally be **less than 25 microns** and no more than 30 microns.
20. The process now needs to be repeated with the slide in bay 4 or 5, and again in Bay 7 or 8 to identify if there is any variation or bowing of the insert across the stage. This would be seen with Z tilts in bays 5-8 being significantly different to those in bays 1-4.
    It is not expected that the differences or absolute values are equal in each bay, but any significant deviation should be notes as it may indicate insert distortion or damage.
21. The target focus variation is based on the slide features described here, which should approximate to a total slide variation less than 20 microns width and 40 microns length.

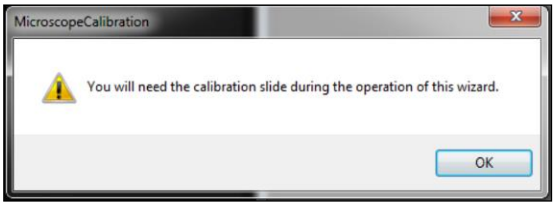
If the width or length are not within tolerance the stage insert needs to be levelled. The procedure can be found in the Service and Maintenance chapter.

Task 6: Open Calibration Wizard

1. Select the **Calibration Wizard** icon at the top-left of the screen.

The message **You will need the calibration slide during the operation of this wizard** will appear.

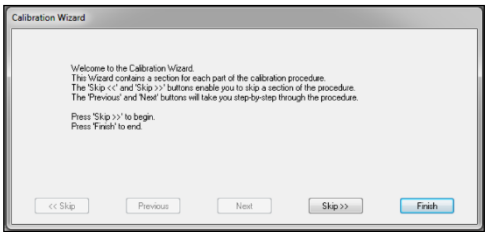
2. Select **OK**.



The software will connect to, and home, all configured hardware.

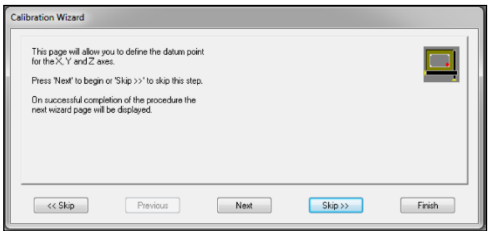
The **Welcome to the Calibration Wizard** dialog box will then appear.

3. Select **Skip**.



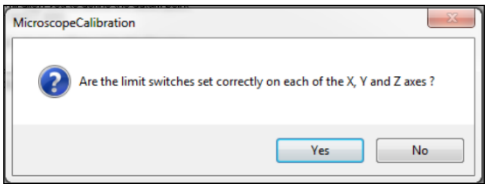
The next page will define the datum point for the X, Y, and Z axes.

4. Select **Next**.



The limits were set at manufacturing.

5. Select **Yes**.



8 | Calibrate for Dry Brightfield Scanning

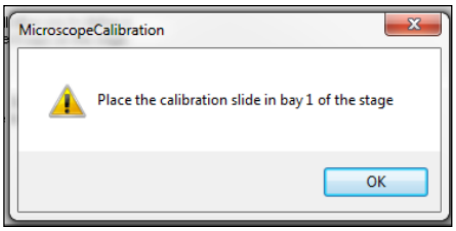
Task 1: Set Bay Datums

1. To define data for the 8 bays on the stage, click **Next**.

Please note: During Spatial Calibration always be visually aware of the position and relationship of the gripper arm, slide, stage and objective lenses.

When manually adjusting the Z height take care to avoid a collision between objective and calibration slide.

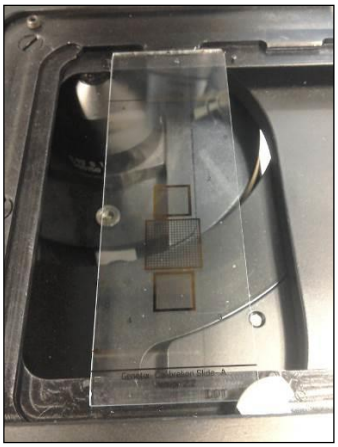
A calibration message appears.



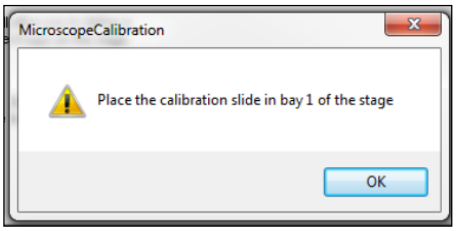
2. Remove the calibration slide from the protective case.

3. Clean the calibration slide with lens tissue or a non-particulate shedding cloth (and ethanol/acetone if required).

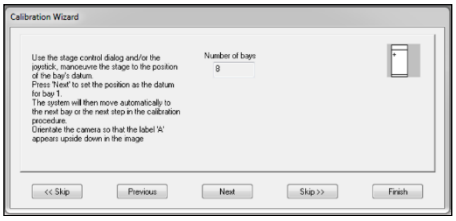
4. Place the slide into bay 1 with the text 'Leica Calibration Slide A' facing upwards and to the front – so it can be easily read.



5. Click **OK**.



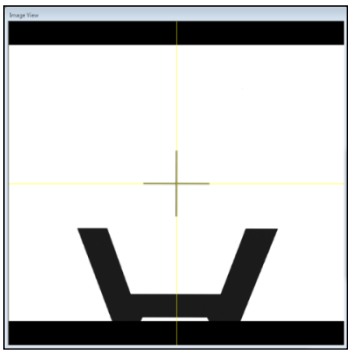
The Calibration Wizard opens.



Stage moves to the top-left of the slide (as viewed by eye).

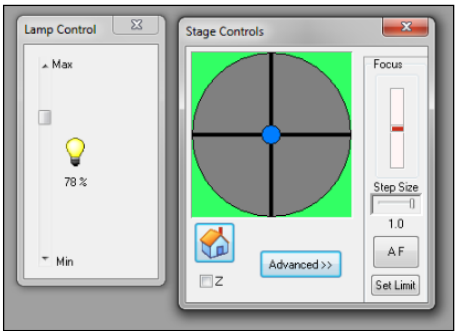
Please note: Care should be taken throughout calibration when manually adjusting the Z height in order to avoid a collision between objective and calibration slide

6. Use the stage controls to locate the A datum cross hairs.



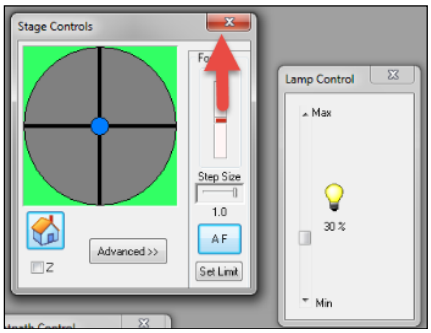
The controls required for this step open automatically:

- Stage and focus control
- Lamp control



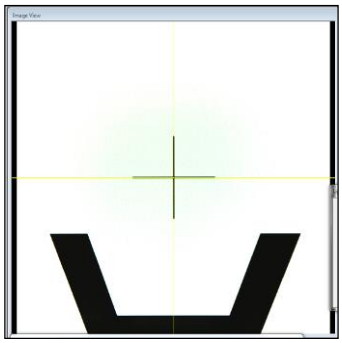
7. Set the lamp intensity to 45%

8. Drag and hold the focus slider up, until the ‘A’ datum cross hairs is visible.



The letter A in the live image should be upside-down. If it is not check the slide orientation and camera orientation discussed earlier in this manual.

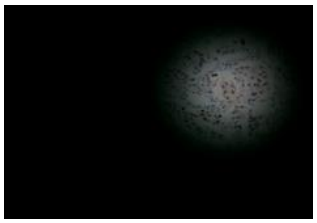
9. Focus and center on the A cross hairs as shown in the image.



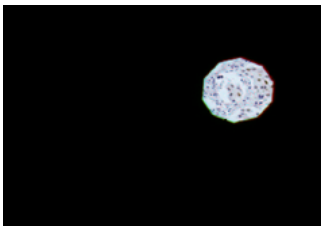
Task 2: Focus and center the condenser

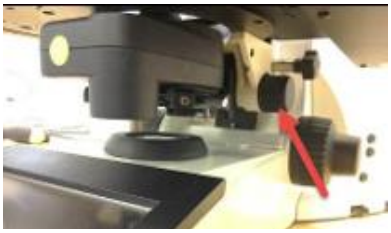
1. Open the field diaphragm controls.

2. Close the field diaphragm (0%)

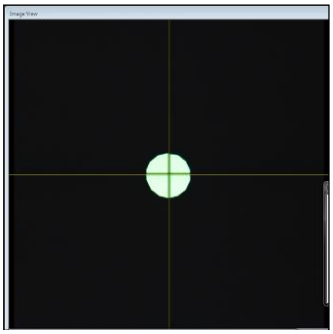


3. Focus the circle of light (raise/lower the condenser wheel until the circle of light has sharp edges)

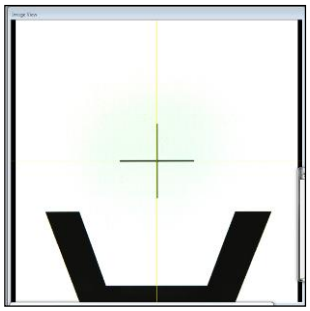




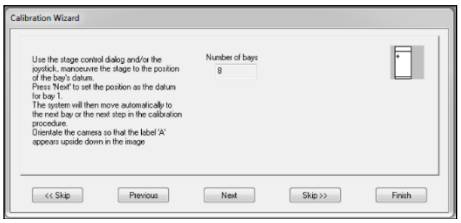
4. Centre the focused circle of light on the live image cross hairs using the condenser positional grub screws and two 3mm hex keys. The condenser is now correct for Köhler Illumination



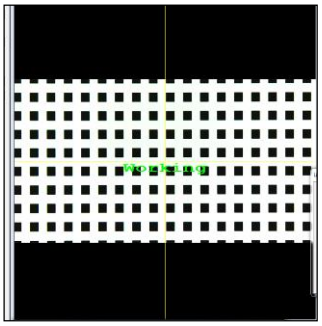
5. Open field diaphragm to 100%.
   Refocus and re-center on the cross hairs if necessary.



6. Select **Next**.

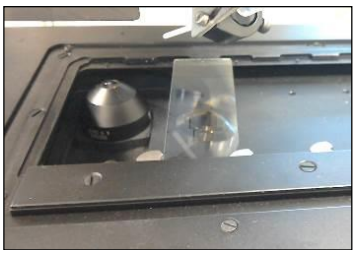


The stage will move to a calibration grid on the calibration slide, autofocus, then return to the A datum cross hairs.

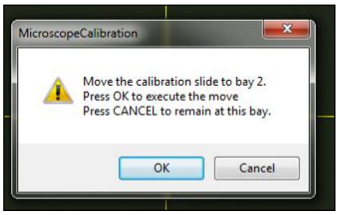


7. Remove the slide from bay 1, by hand, and move to bay 2.

Ensure that the slide is flat and aligned to the top-left corner of the bay.

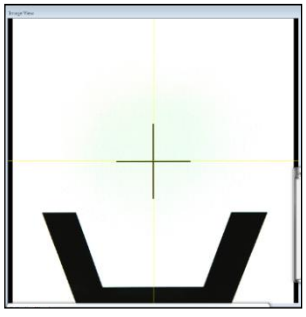


8. Select **OK**.



The stage moves to bay 2.

9. Centre and focus on the A datum cross hairs.



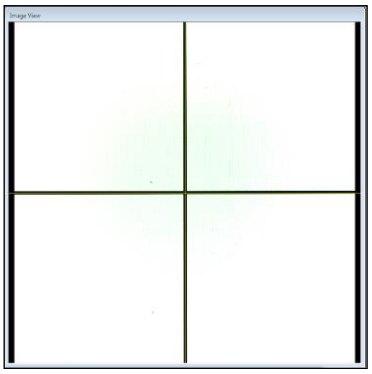
10. Select **Next** to repeat steps 16 – 18 for the remaining stage bays

Task 3: Set Rotational Alignment

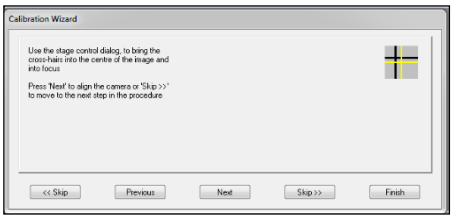
The next pages allow for alignment with cross hairs. This is for rotational alignment.

1. Select **Next**.

2. Centre and focus on the cross hairs

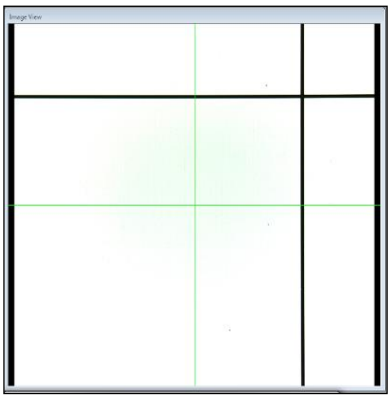


3. Select **Next**.

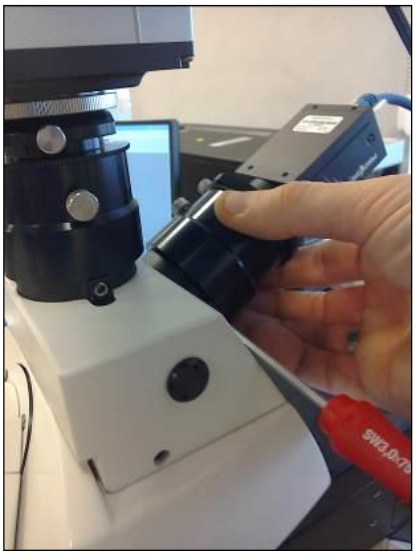


The stage will begin diagonal movements as it determines the alignment of the camera to the slide on the stage.

A low beep will be emitted and the cross will be red if the alignment is not correct.



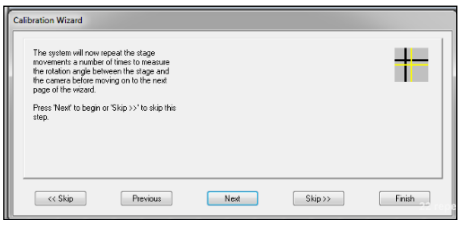
4. If the cross is red, loosen the c-mount for the camera mounted at the rear of the documentation tube and rotate the camera and c-mount until the beep tone changes to a higher pitch and the cross turns green.



5. Select **Next**.

The system will repeat the stage movements numerous times to measure the angle of rotation between the camera and the stage.

6. Select **Next**.



Task 4: Set Dry Lens Offsets

When the rotation measurement movements have ceased, the wizard moves on to the next page.

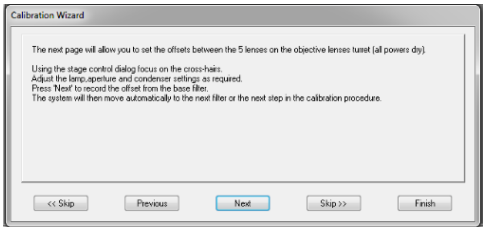
The next page allows the setting of offsets between the dry lenses (non-oil lenses) configured on the system.

Ensure all objective lenses are in their lower, unlocked position by pushing the lens tip up and twisting anti-clockwise.

The lamp settings advised in this section are an estimated value. Should the value required for focus be significantly different this could indicate;

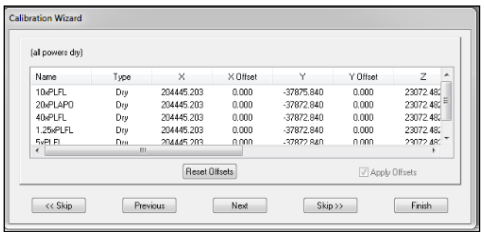
- Lamp house is not aligned
- Microscope base filters not in position
- Dichroic filter is in the light path
- Camera fault
- Condenser misalignment
- Oil on condenser or objective

1. Select **Next**.



The configured dry lenses are displayed in the dialog box.

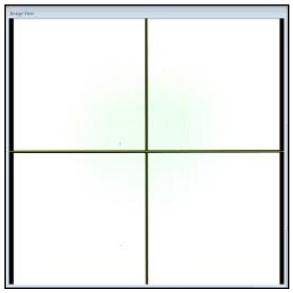
All offset measurements are taken from the base lens – **10x.**



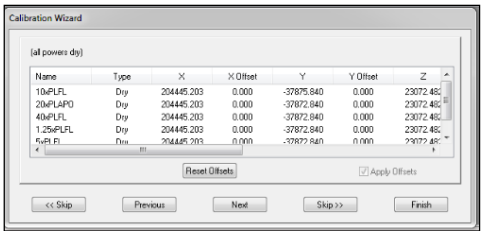
2. Set lamp to 45%

3. Set aperture diaphragm to 35%

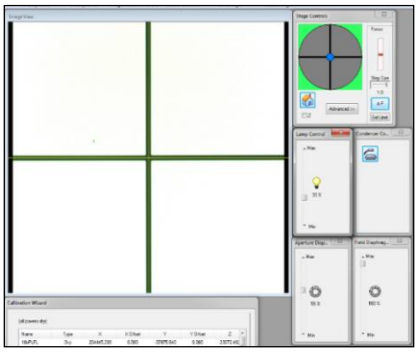
4. Centre and focus the cross hairs at 10x.



5. Select **Next**.

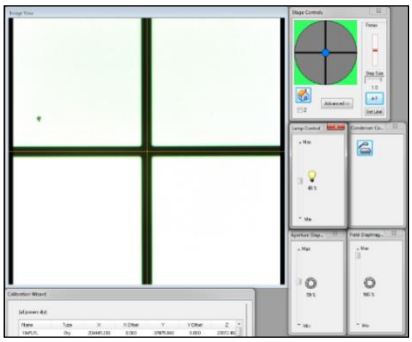


The **20x** lens moves into the light path.

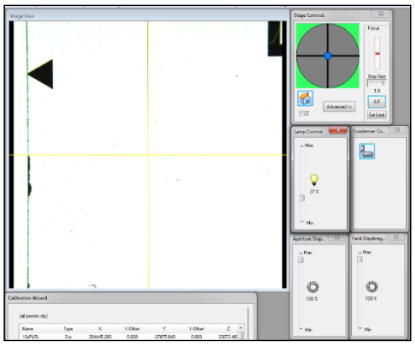


6. Set lamp to 50%
7. Set aperture diaphragm to 60%
8. Focus and centre on the cross hairs.
9. Select **Next**.

The **40x** lens (if configured) moves into the light path.

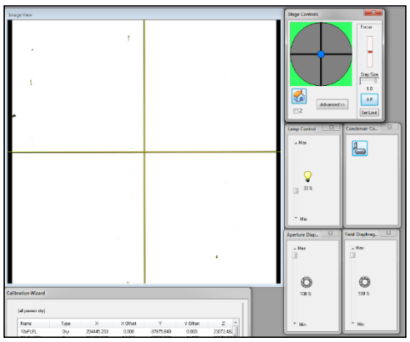


10. Set lamp to 75%
11. Set aperture diaphragm to 60%
12. Focus and centre on the cross hairs.
13. Select **Next**.



14. The **1.25x** lens moves into the light path.
15. Set lamp to 25%
16. Set aperture diaphragm to 100%
17. Ensure condenser is NOT in light path – use the condenser control toggle button to move it out if required.
18. Focus and centre on the cross hairs.
19. Select **Next**.

The **5x** lens moves into the light path.



20. Set lamp to 35%
21. Set aperture diaphragm to 100%
22. Ensure condenser is NOT in light path – use the condenser control toggle button to move it out if required.
23. Focus and centre on the cross hairs.
24. Select **Next**.

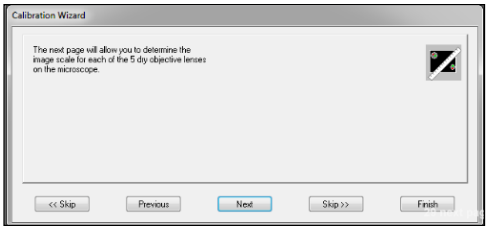
NOTE: Aperture Diaphragm values during VERSA scanning are controlled by the pre-defined HCT files. Adjusting the aperture settings for lenses in the VERSA calibration application, on the microscope LCD touchscreen or in LAS or will have no effect on brightfield scanning within the VERSA application.

Condenser Aperture Diaphragm settings set in Spatial Calibration are only for achieving a working image contrast and intensity to complete the calibration steps.

Task 5: Set Dry Lens Image Scale

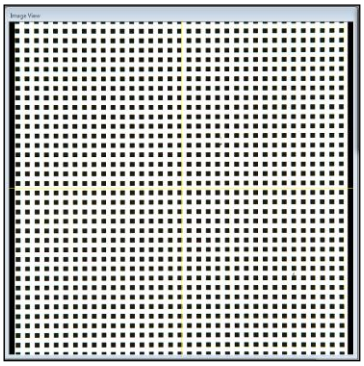
The next page determines the image scale for the dry objective lenses.

1. Select **Next**.



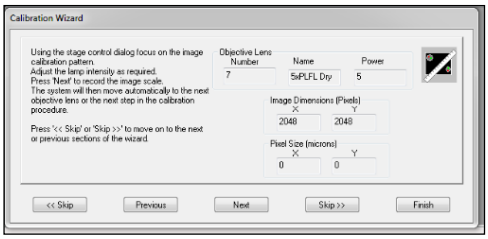
The **5x** lens remains in the light path.

2. Focus on the grid pattern.



3. Select **Next**.

   Auto focus is performed and the Pixel Size for X/Y is updated.

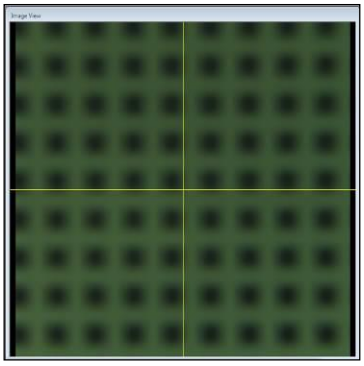


Important: For each of these steps, after auto focus, the system pauses to calculate Pixel Size. Clicking **Next** while the feature is running may interrupt the calculation or lead to a zero value being saved which may prevent accurate scanning with the objective lens in place.

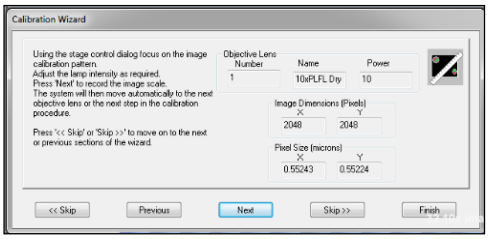
- look for the “Pixel Size” values updating
- wait for the next objective to move into place before continuing calibration.

The **10x** objective moves into the light path.

4. Focus on the grid pattern.

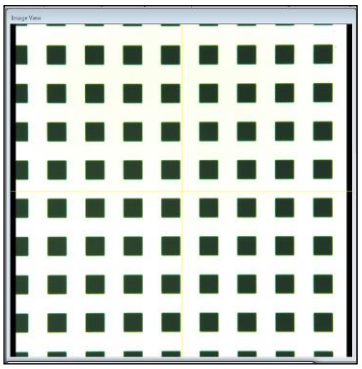


5. Select **Next**.
   Auto focus is performed and the Pixel Size for X/Y is updated. Wait for the next objective to move into place before continuing calibration.



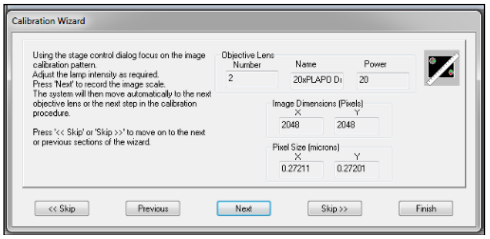
The **20x** objective moves into the light path.

6. Focus on the grid pattern.



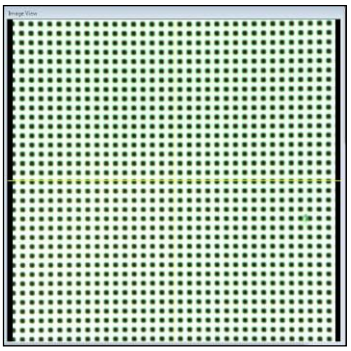
7. Select **Next**.

   Auto focus is performed and the Pixel Size for X/Y is updated. Wait for the next objective to move into place before continuing calibration.



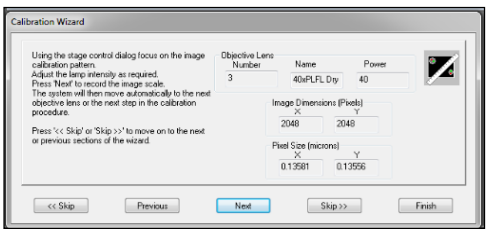
The **40x** objective moves into the light path.

8. Focus on the grid pattern.



9. Select **Next**.

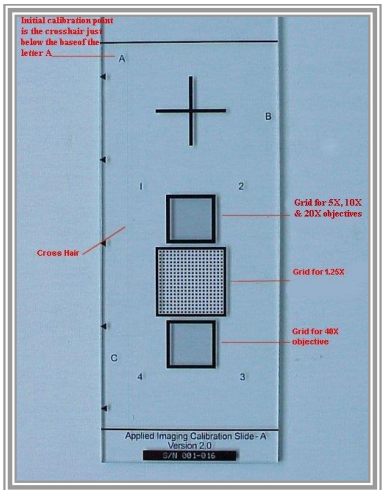
   Auto focus is performed and the Pixel Size for X/Y is updated. Wait for the next objective to move into place before continuing calibration.



10. Repeat for **1.25x** objective

Task 6: Define Ideal Coordinates

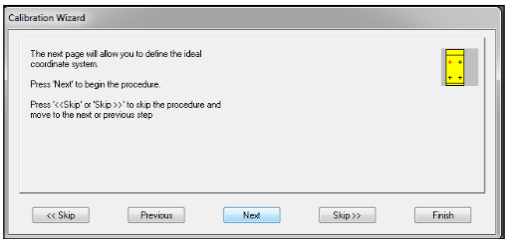
The next page defines the ideal coordinates.



There are 4 ideal coordinates / ideal calibration points on the calibration slide labeled 1, 2, 3, and 4. See calibration slide image at the start of the procedure for reference.

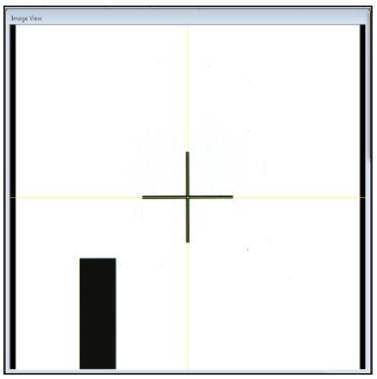
In this calibration only the 'ideal calibration point 1' is used.

1. Select **Next**.

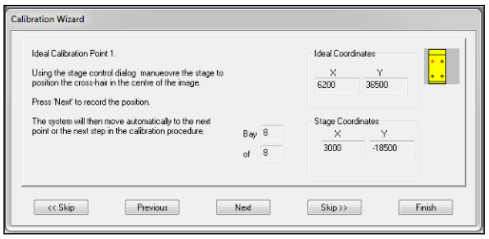


The stage automatically moves to the approximate location of ideal calibration point 1.

2. Centre and focus on the cross hairs.



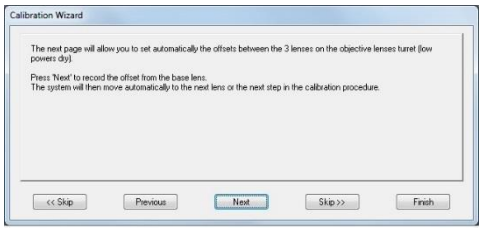
3. Select **Next**.



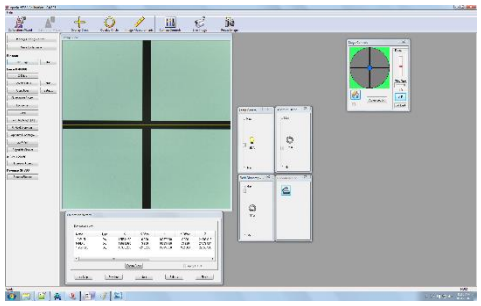
Task 7: Set Automatic Lens Offset

The next page determines the automatic Lens offsets for Low and High powered lenses.
This provides a more accurate lens offset measurement

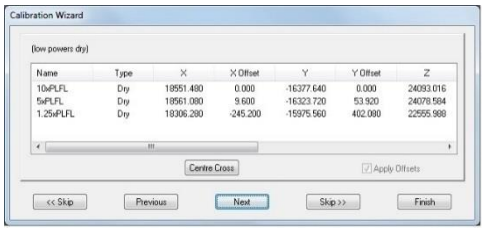
1. Select **Next**



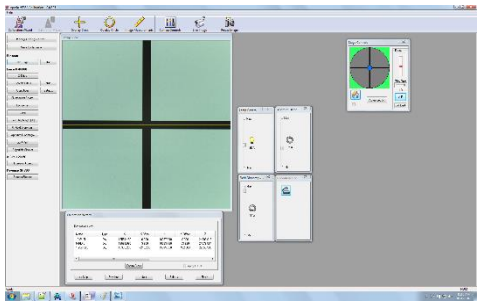
The 10x objective moves into the light path. Autofocus is performed and the cross is automatically centered.



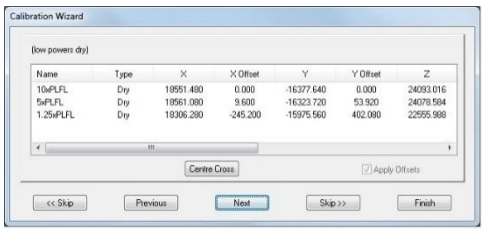
2. Select **Next**



Auto focus is performed



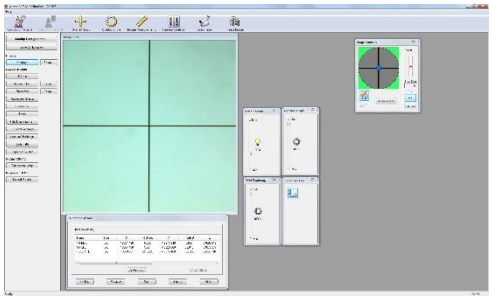
3. If successful, the 1.25X objective is moved into the light path Select **Next**



Note: If the objective setup was unsuccessful 'error code 100' is displayed, , indicating the slide feature is not being detected.
To resolve this adjust the lamp value until white saturation begins to appear over the green image.
Alternatively reduce the aperture diaphragm setting by 3% and increase the lamp.

Repeat the last step until objective setup is successful. Repeat this process for any error 100 in this section.

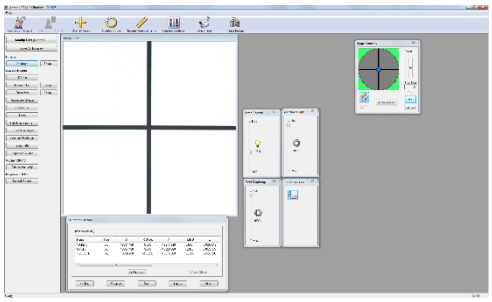
Auto focus is performed



If successful, the 5X objective is moved into the light path.

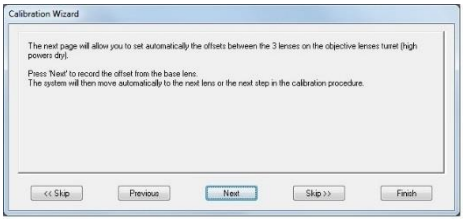
4. Select **Next**

Auto focus is performed

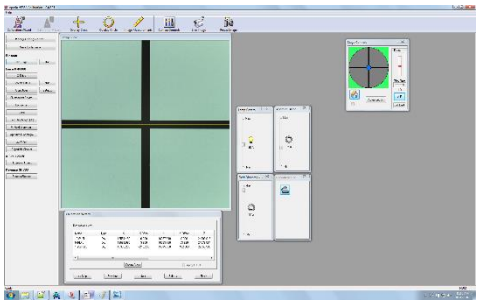


If successful, the 10X objective is moved into the light path to set the starting point for the high powered objectives

5. Select **Next**

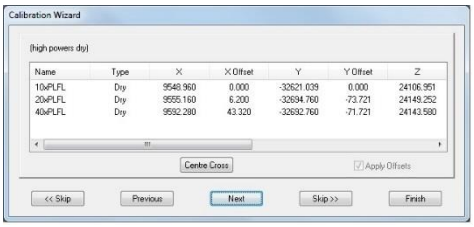


Auto focus is performed

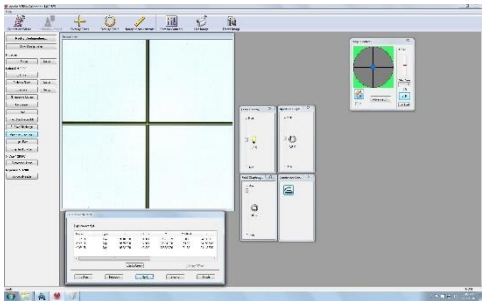


The 20X objective is moved into the light path

6. Select **Next**

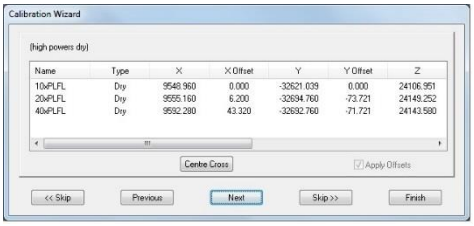


Auto focus is performed

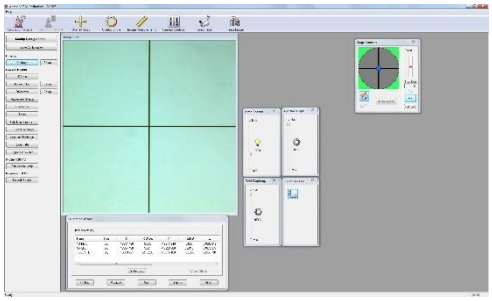


If successful, the 40X objective is moved into the light path.

7. Select **Next**



Auto focus is performed

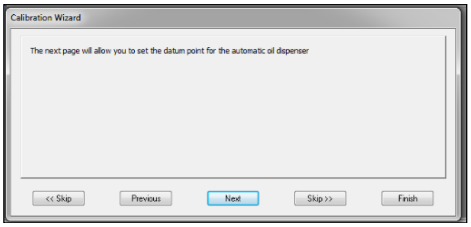


9 | Calibrate for Oil Lens Scanning

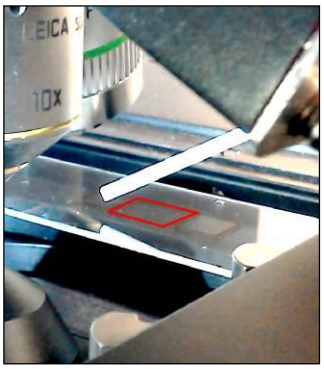
Task 1: Calibrate Stage for Oil Application

Calibrate the stage position to be used when the automatic oiler applies oil. This only appears for systems with an oiler configured

1. Select **Next**.



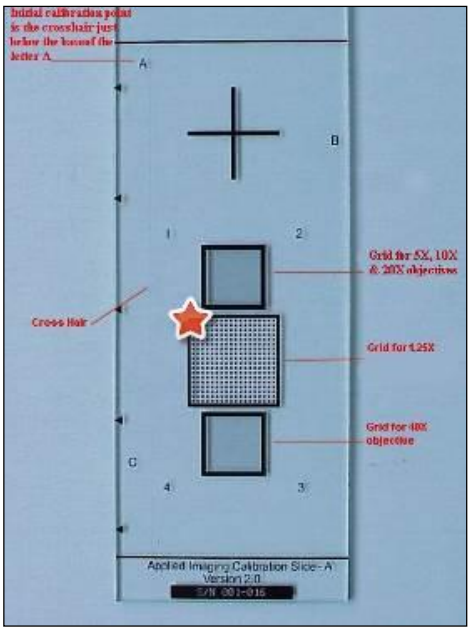
The 10x lens remains in the light path.



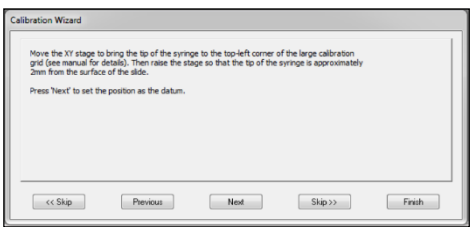
2. Move the stage so that the oiler tip is positioned directly above the top-left corner of the large calibration grid.

3. Then raise the stage / focus up so that slide is 2mm from the oiler tip.

This is to ensure oil drops are removed successfully from the oiler tip during operation.

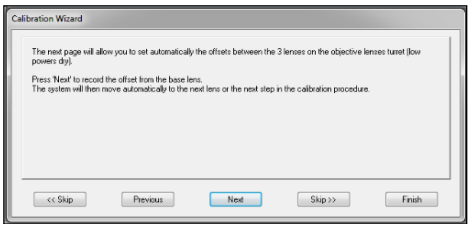


4. Select **Next**.



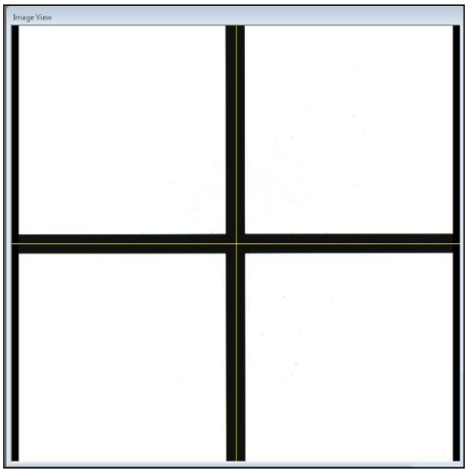
Task 2: Set Offsets between Low-magnification Dry Objective Lenses

The next page automatically sets the offsets between the low magnification dry objective lenses.



1. Select **Next**.

The **10x** lens moves into the light path.



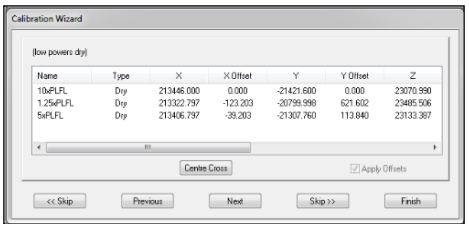
2. Focus and centre on the cross hairs.
3. Select **Next**.

The **1.25x** lens moves into the light path.

4. Focus and centre on the cross hairs.
5. Select **Next**.

The **5x** lens moves into the light path.

6. Focus and centre on the cross hairs.
7. Select **Next**.

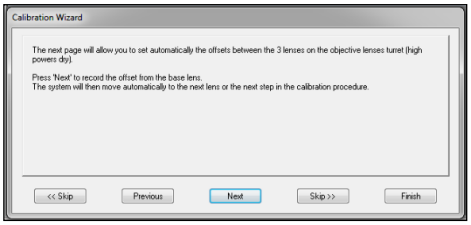


Task 3: Set Offsets between High-magnification Dry Objective Lenses

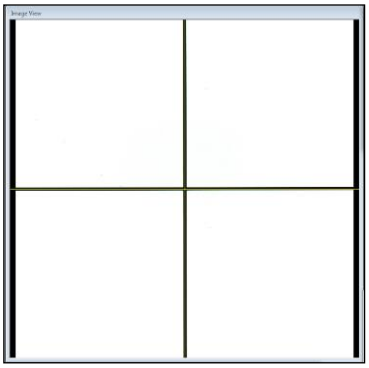
The next page automatically sets the offsets between the high magnification objective lenses.

1. Select **Next**.

   The 10x lens moves into the light path

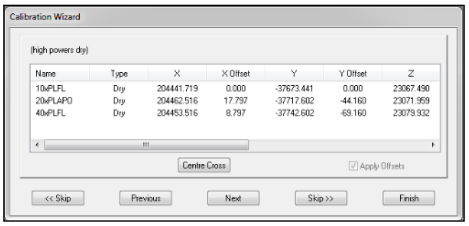


2. Focus and centre on the cross hairs.
3. Select **Next**.



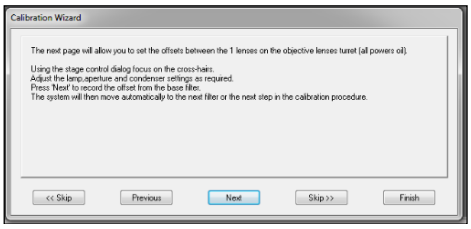
4. The **20x** lens moves into the light path.
5. Focus and centre on the cross hairs.
6. Select **Next**.

7. The **40x** lens (if configured) moves into the light path.
8. Focus and centre on the cross hairs.
9. Select **Next**.



Task 4: Set Offsets between Oil Lenses

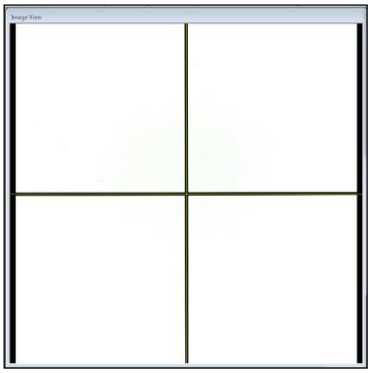
The next page allows the setting of offsets between any oil lenses configured on the system.



Oil lenses are optional.

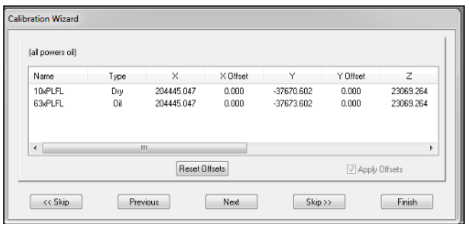
1. Select **Next**.

The **10x** moves into the light path.
All offsets are taken from this base lens.



2. Centre and focus the cross hairs at 10x. (England Finder position D35/1)

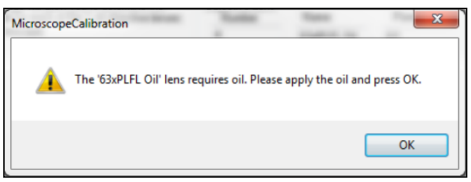
3. Select **Next**.



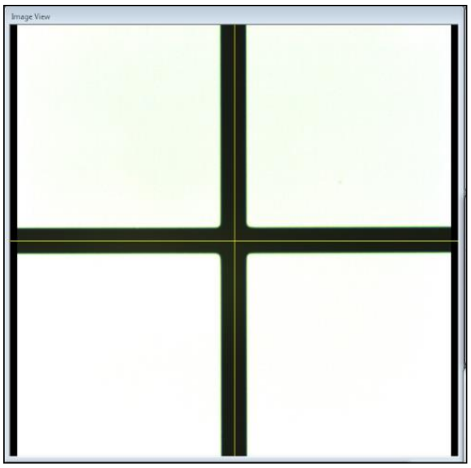
The stage lowers allowing for oil to be manually applied using an oil dropper.

4. Apply oil to the slide in the location of the light path.

5. Select **OK**.

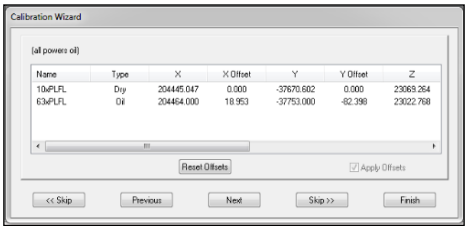


The **63x** lens moves into the light path and the stage raises until the lens contacts the oil and approximate focus point is reached.



6. Set lamp to 75%
7. Set aperture diaphragm to 80%
8. Focus and centre on the cross hairs.

9. Select **Next**.

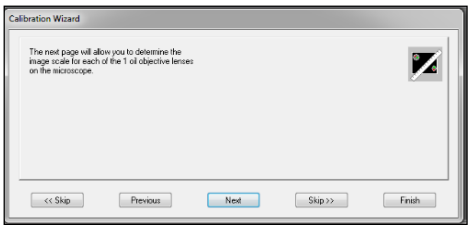


TIP: If an oil bubble is between the lens and the slide, lower the stage until the lens loses contact with the oil. Then return the stage to the focused position.

10. If a **40x** lens is configured the same process used for the **63x** is followed

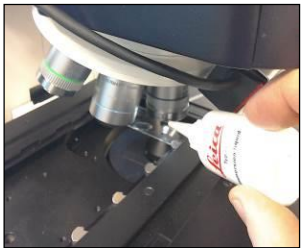
Task 5: Set Image Scale for Oil Lenses

The next page is used to determine the image scale for the oil objective lenses.



1. Select **Next**.

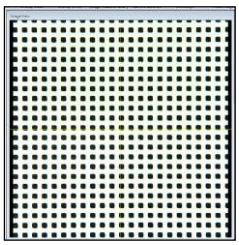
2. Apply oil to the slide in the location of the light path over the grid pattern



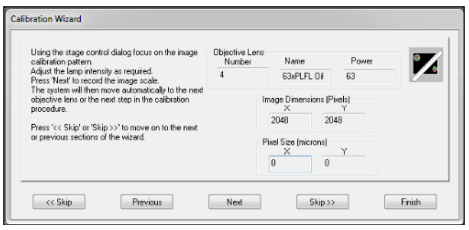
3. Click **OK**.

The **63x** objective lens moves into the light path.

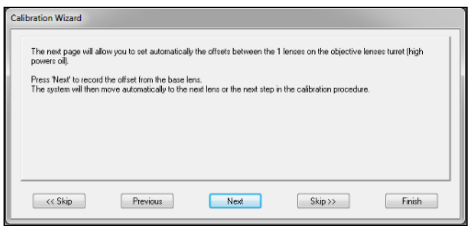
4. Focus on the grid pattern.



5. Select **Next,** after a short time the Pixel Size values will be updated.



The next page automatically sets the offsets between the base lens and the oil lenses.



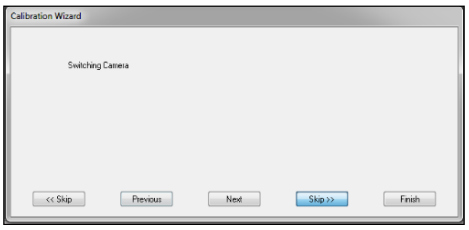
6. Select **Next** and complete this section.

The camera which will be used for brightfield scanning (Grasshopper/Point Grey) has now been calibrated. To continue the motorized documentation port switches to the camera to be used for fluorescent scanning (Zyla/ANDOR).

10 | Calibrate for Fluorescent Scanning

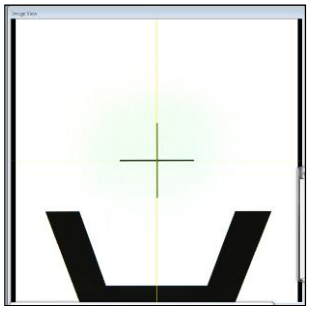
Task 1: Calibrate Stage Datums

1. Select **Next**.

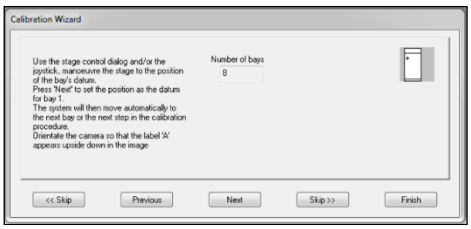


2. REMOVE OIL FROM CALIBRATION SLIDE
3. Move the calibration slide to bay 1.
4. Select **Next**.

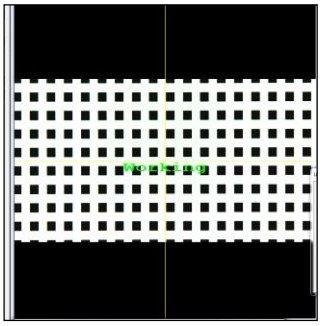
5. Refocus and re-centre on the cross hairs if necessary.



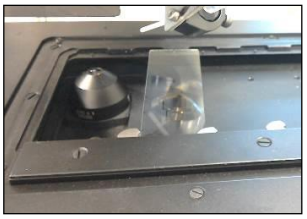
6. Select **Next**.



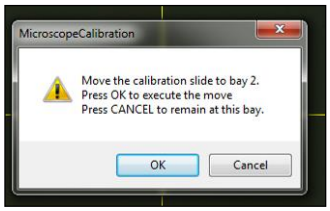
The stage will move to a calibration grid on the calibration slide, autofocus, then return to the A datum cross hairs.



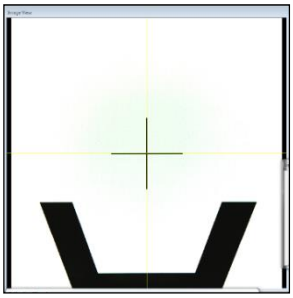
Remove the slide from bay 1, by hand, and move to bay 2. Ensure that the slide is flat and aligned to the top left corner of the bay.



7. Select **OK**.

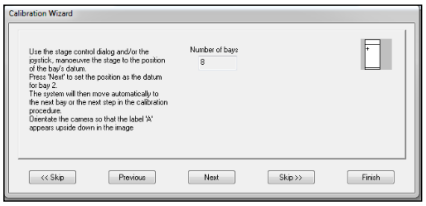


The stage moves to bay 2.

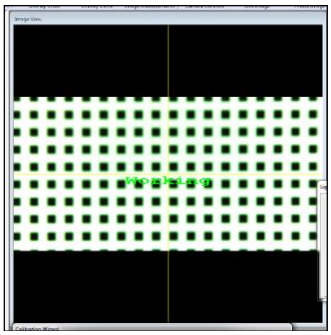


8. Centre and focus on the A datum cross hairs.

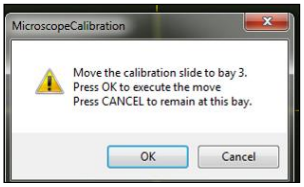
9. Select **Next**.



The stage will move to a calibration grid on the calibration slide, autofocus, then return to the A datum cross hairs.

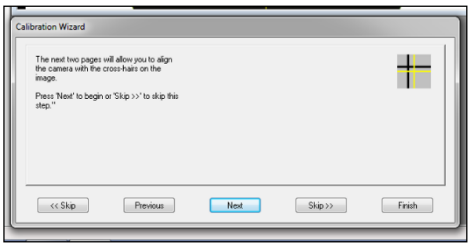


10. Repeat steps for bays 3 through 8.

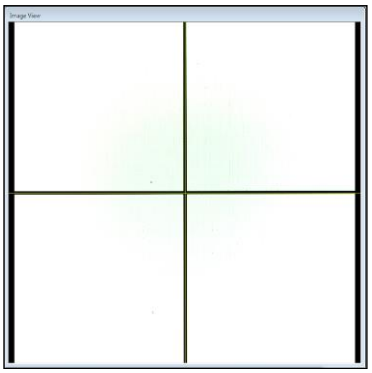


Task 2: Set Rotational Alignment

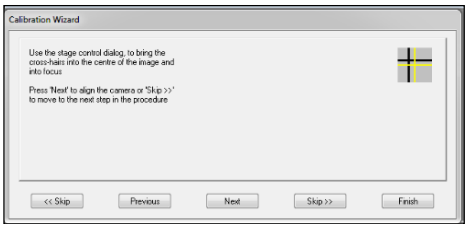
The next pages allow for alignment with cross hairs. This is for rotational alignment.



1. Select **Next**.



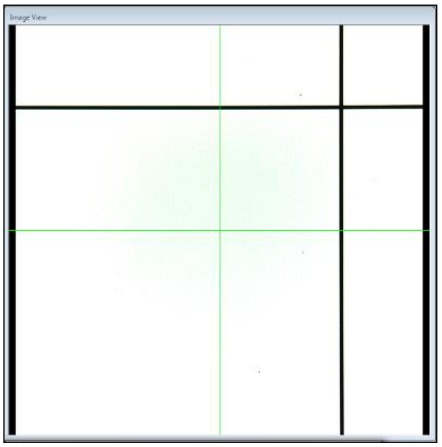
2. Centre and focus on the cross hairs.



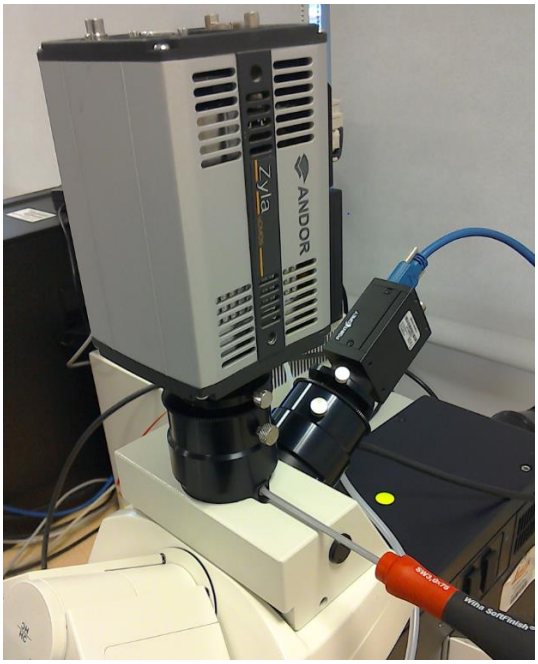
3. Select **Next**.

The stage will begin diagonal movements as it determines the alignment of the camera to the slide on the stage.

A low beep will be emitted and the cross will be red if the alignment is not correct.



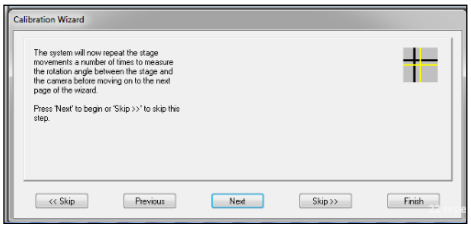
4. Loosen the c-mount for the camera mounted at the rear of the documentation tube and rotate the camera and c-mount until the beep tone changes to a higher pitch and the cross turns green.



5. Select **Next**.

The system will repeat the stage movements numerous times to measure the angle of rotation between the camera and the stage.

6. Select **Next**.

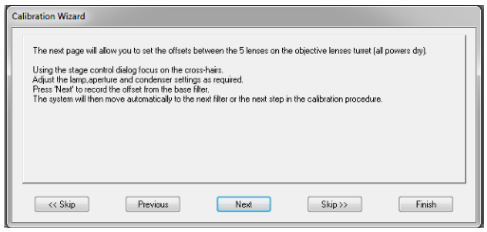


Task 3: Set Dry Lens Offsets

When the rotation measurement movements have ceased, the wizard moves on.

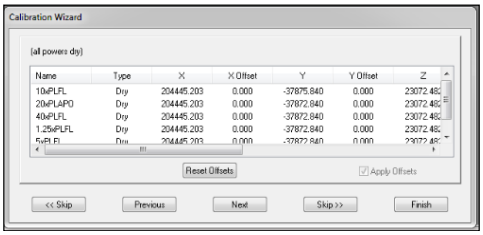
The next page allows the setting of offsets between the dry lenses (non-oil lenses) configured on the system.

1. Select **Next**.

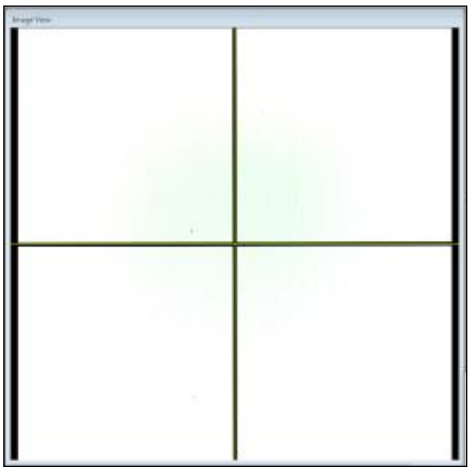


The configured dry lenses are displayed in the dialog box.

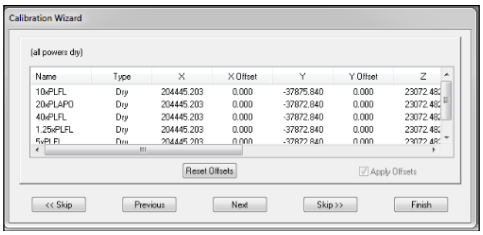
All offset measurements are taken from the base lens – **10x.**



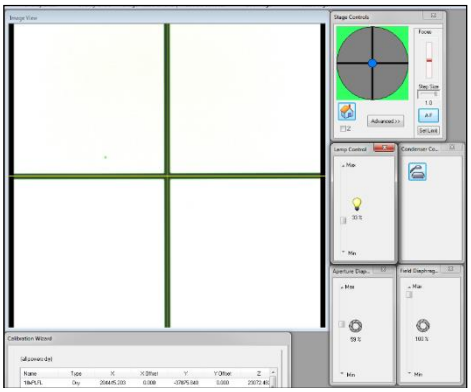
2. Set lamp to 35%
3. Set aperture diaphragm to 35%
4. Centre and focus the cross hairs at 10x.



5. Select **Next**.

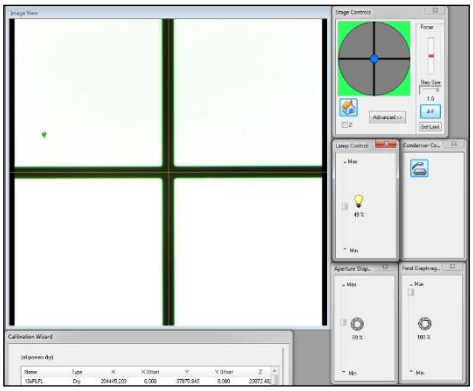


The **20x** lens moves into the light path.



6. Set lamp to 45%
7. Set aperture diaphragm to 60%
8. Focus and center on the cross hairs.
9. Select **Next**.

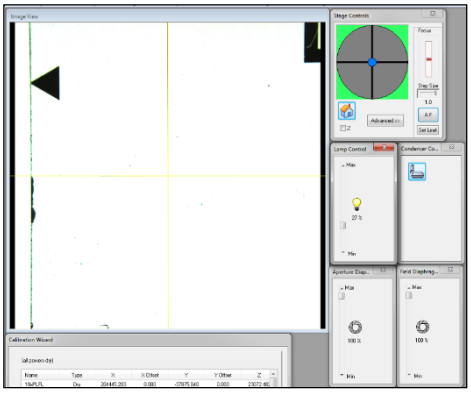
The **40x** lens (if configured) moves into the light path.



10. Set lamp to 70%.
11. Set aperture diaphragm to 60%.
12. Focus and centre on the cross hairs.
13. Select **Next**.

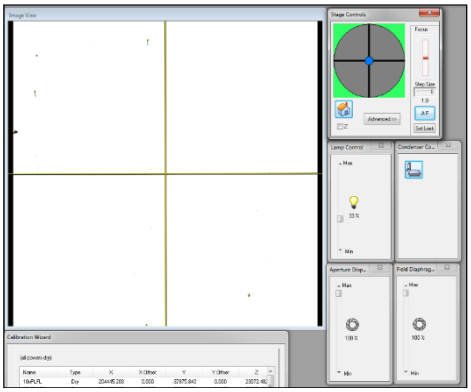
The **1.25x** lens moves into the light path.

Ensure condenser is NOT in light path – use the condenser control toggle button to move it out if required.



14. Set lamp to 25%
15. Set aperture diaphragm to 100%
16. Focus and centre on the cross hairs.
17. Select **Next**.
18. The **5x** lens moves into the light path.

    Ensure condenser is NOT in light path – use the condenser control toggle button to move it out if required.



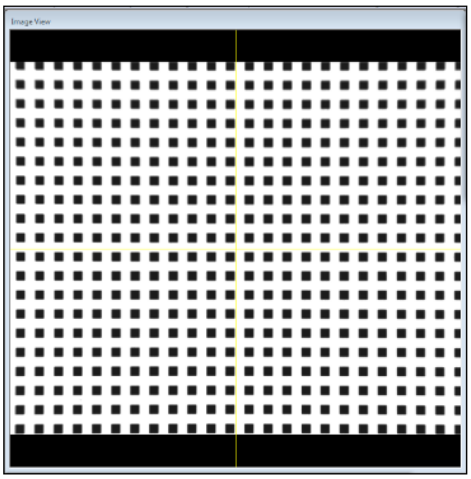
19. Set lamp to 30%

22. Set aperture diaphragm to 100%

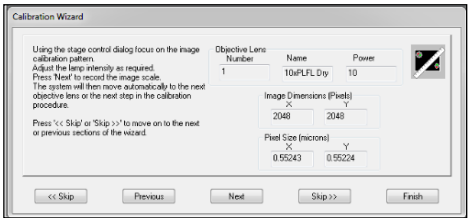
20. Focus and center on the cross hairs.
21. Select **Next**.

Task 4: Set Dry Lens Image Scale

This next page defines the image scale for the **10x** lens for this camera.

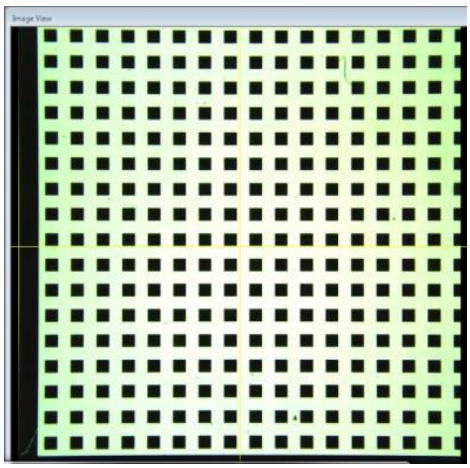


22. Focus on the grid pattern.

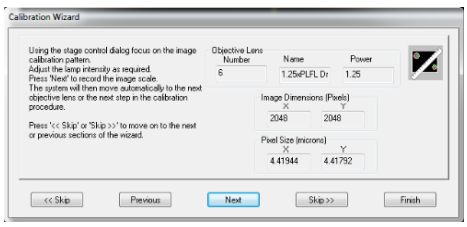


23. Select Next.

The **1.25x** objective moves into the light path.

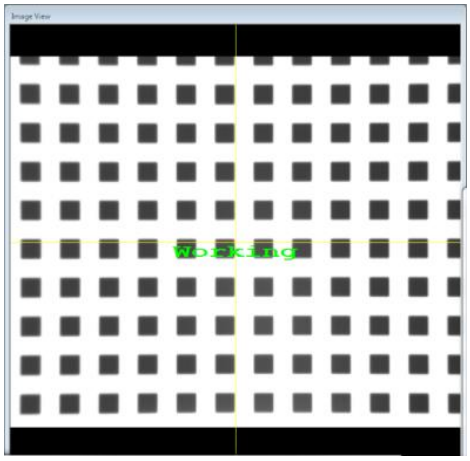


24. Focus on the grid pattern.



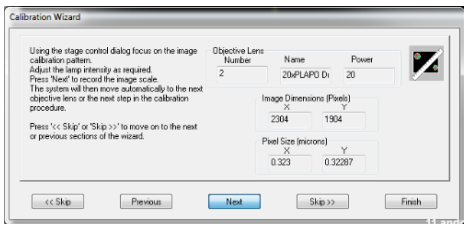
25. Select Next.

The **20x** objective moves into the light path.

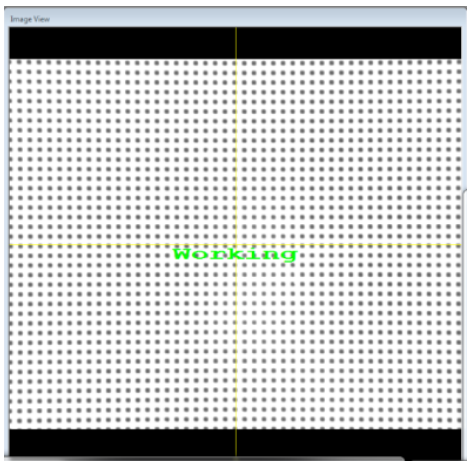


26. Focus on the grid pattern.

27. Select Next.

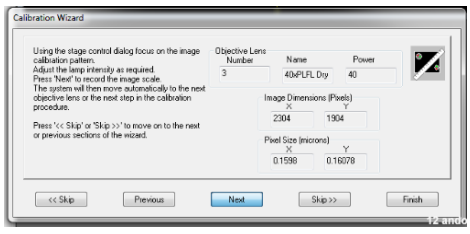


The **40x** objective moves into the light path.

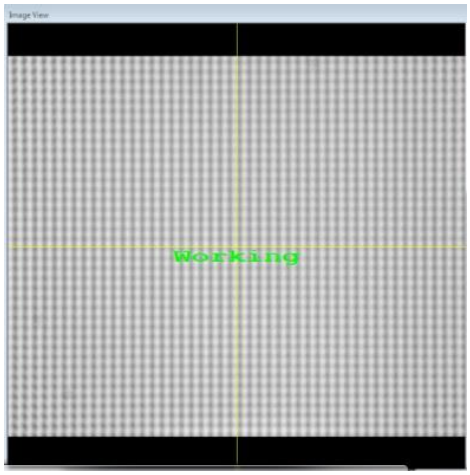


28. Focus on the grid pattern.

29. Select Next.

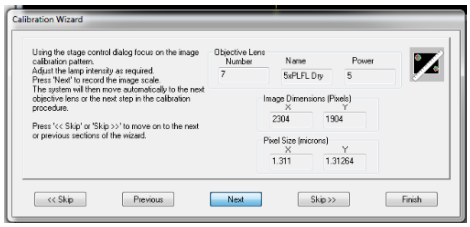


The **5x** objective moves into the light path.



30. Focus on the grid pattern.

31. Select Next.



Task 5: Define Ideal Coordinates

The next page defines the ideal coordinates

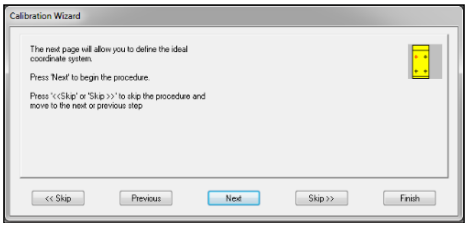
There are 4 ideal coordinates / ideal calibration points on the calibration slide labeled 1, 2, 3, and 4.

In this calibration only the ‘ideal calibration point 1’ is used.

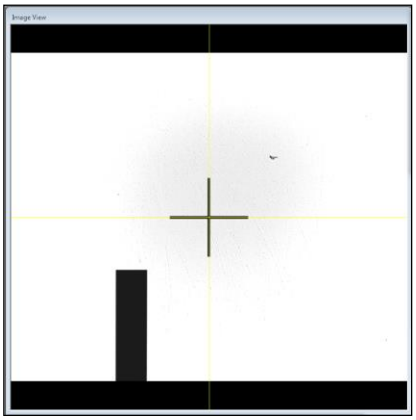
.

1. Select **Next**.

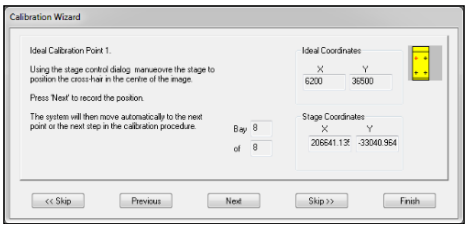
   The stage automatically moves to the approximate location of ideal calibration point 1



2. Focus and center on the cross-hair



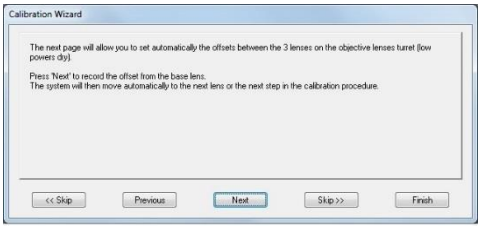
3. Select **Next**.



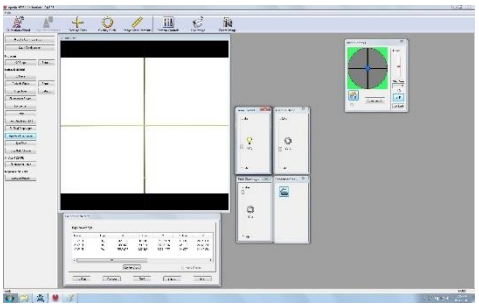
Task 6: Set Automatic Lens Offsets

The next page determines the automatic Lens offsets for Low and High powered lenses. This provides a more accurate lens offset measurement.

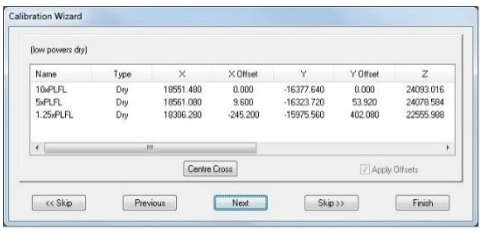
1. Select **Next**



The 10x objective moves into the light path. Autofocus is performed and the cross is automatically centered.

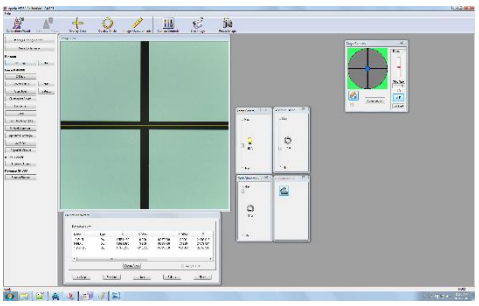


2. Select **Next**

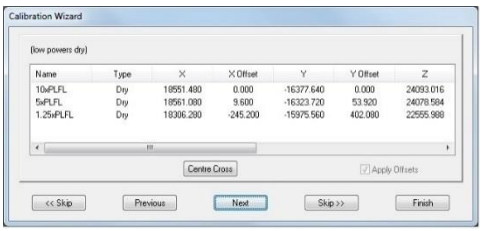


Auto focus is performed

If successful the 1.25X objective is moved into the light path.



3. Select **Next**

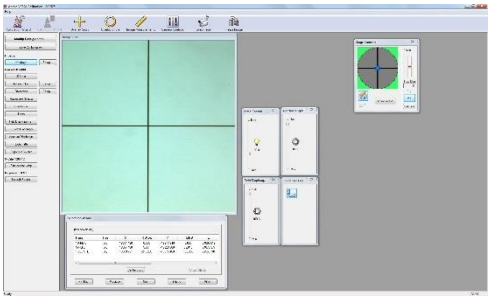


Note: If the objective setup was unsuccessful 'error code 100' is displayed, indicating the slide feature is not being detected.
To resolve this adjust the lamp value until white saturation begins to appear over the green image. Alternatively reduce the aperture diaphragm setting by 3% and increase the lamp.

Repeat the last step until objective setup is successful. Repeat this process for any error 100 in this section.

Auto focus is performed

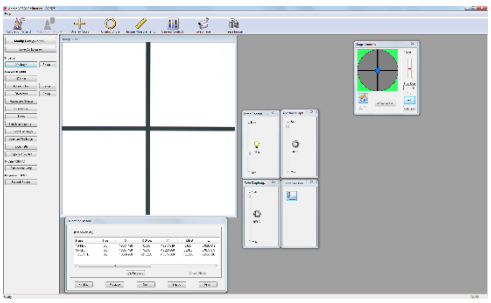
If successful the 5X objective is moved into the light path.



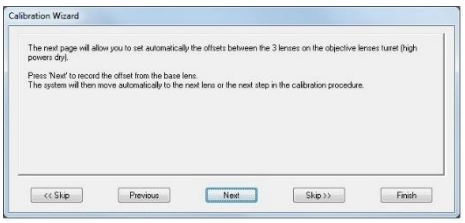
4. Select **Next**

Auto focus is performed

If successful the 10X objective is moved into the light path to set the starting point for the high powered objectives

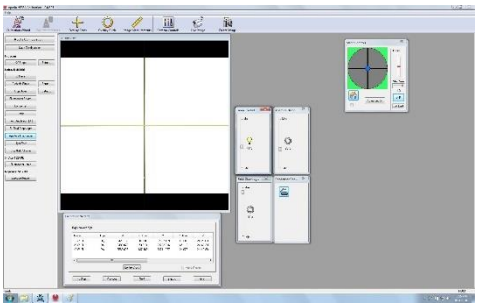


5. Select **Next**

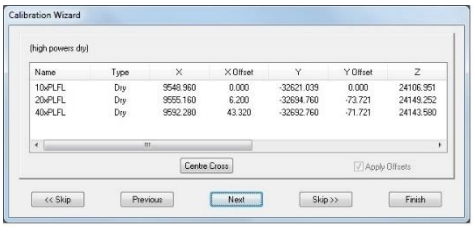


Auto focus is performed

The 20X objective is moved into the light path

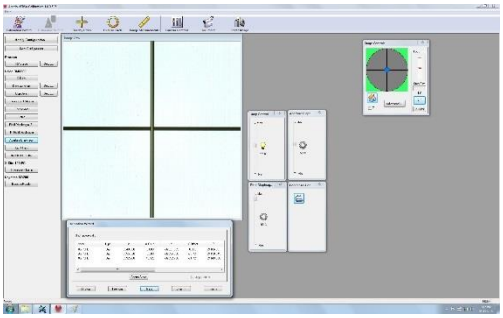


6. Select **Next**

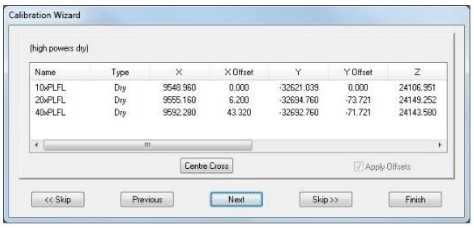


Auto focus is performed

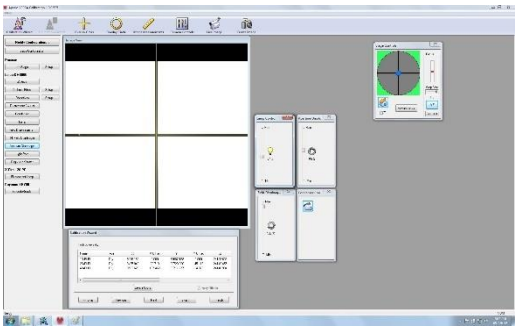
If successful the 40X objective is moved into the light path.



7. Select **Next**



Auto focus is performed



Task 7: Set Image Scale for Oil Objectives

Determine the image scale for any oil objectives that have been configured.

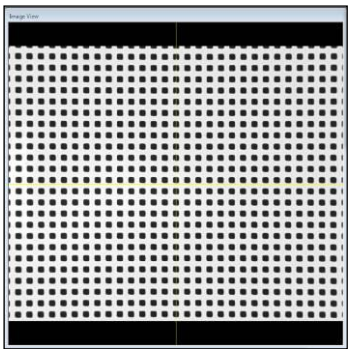
1. Select **Next**.

You are prompted to apply oil to the slide.

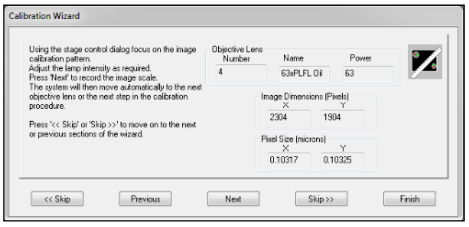
2. Apply oil manually.

3. Click **OK**.
   The objective turret moves to the oil lens

4. Focus on the grid pattern.



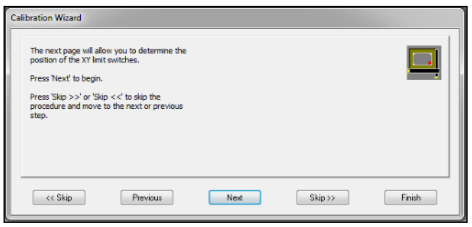
5. Select **Next**.



11 | Complete and Save Calibration

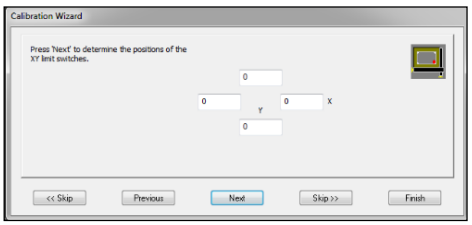
Task 1: Record Limit Switches

Record the limit switches that have not yet been recorded.



1. Select Next.

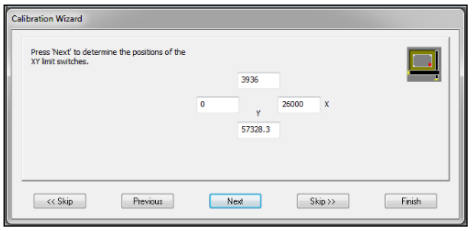
Last recorded limit positions are displayed.



2. Select Next.

The stage moves to the limits.

The XY coordinates of the current stage limits are then displayed.

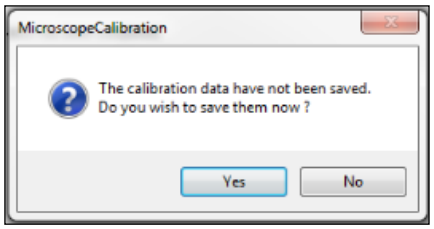


3. Select Next.

Task 2: Finish and Save Calibration

The spatial calibration process is complete.

1. Select Finish.
The calibration data has not yet been saved.



2. Select Yes to save the data now.

IMPORTANT: IF 'NO' IS SELECTED THE CALIBRATION DATA WILL BE LOST.

3. Remove the calibration slide from the stage and clean off the oil.

4. Replace the slide in the protective case.

The “Calibration Wizard” procedure includes both the Grasshopper brightfield (color) and Zyla fluorescence (monochrome) cameras and it is critical all pages for each camera are successfully completed before being able to test scanning with that camera.

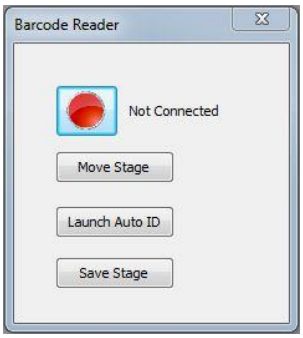
Once a full complete Spatial Calibration has been completed subsequent re-calibration can be done on specific sections as required with the following guidelines;

- The “Define X, Y and Z datums” page must be completed to home the hardware, this cannot be skipped.
- For troubleshooting brightfield scanning only the first set of camera pages need to be completed; for troubleshooting fluorescent-only scanning only the second set of camera pages should be completed.
- Skipping pages within a camera section is not recommended unless you are confident an update to those sections are not required (e.g. Skipping the camera orientation is OK if no physical change has occurred on the microscope, etc.).
- Do not skip within a page (e.g. within the objective offsets) as this may lead to incorrect data being saved.
- It is not recommended to use the Previous button to go back to a section or page, it is better to work through and save the work already done then restart the Wizard and skip forward to the page needing updated.
- Only click the “Next” buttons once. Some calibration steps take several seconds to complete and will tell you (or move on automatically) when finished – clicking Next or OK within a page can occasionally lead to data being incorrectly saved.
- Lamp, field and aperture diaphragm settings in Spatial Calibration are for getting usable image display and contrast for the calibration steps - they are not used within scan application, the BaseHCT file determine the lamp, camera exposure and diaphragm settings used in Brightfield Calibration and scanning.
- The final “Record Limit Switches” page must be completed for correct stage movement or if the stage encoders have been reset as part of any troubleshooting.

Task 3 Barcode Reader Calibration

This section shows how to calibrate the stage position so the barcode is centered for the barcode camera and details how to calibrate multiple barcode symbologies.

Note: If the user wished to have normal operation of the label reader this procedure most be completed using a barcode labelled slide – even if they do not intend to operate with barcodes. Only by recognizing and adjusting the image contrast and intensity with a real barcode label will the calibration allow good quality label images to be viewed in the VERSA scan application.

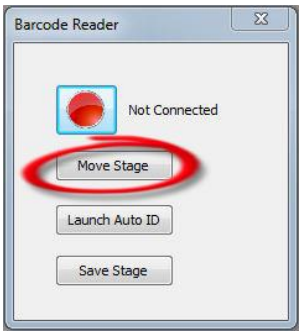


1. Open the Aperio VERSA Calibration application and connect to hardware.
2. Select the Barcode Reader button to open Label Imager window.
3. Click the circular button to disconnect barcode reader.

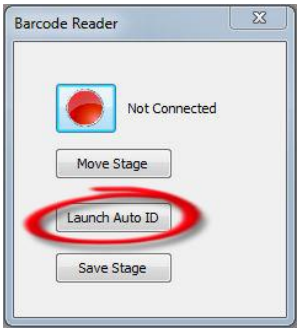
It should display Not Connected as shown.

4. Load a slide with a barcode affixed which has the symbology to be added.

5. Select Move Stage to move the stage to the default location.

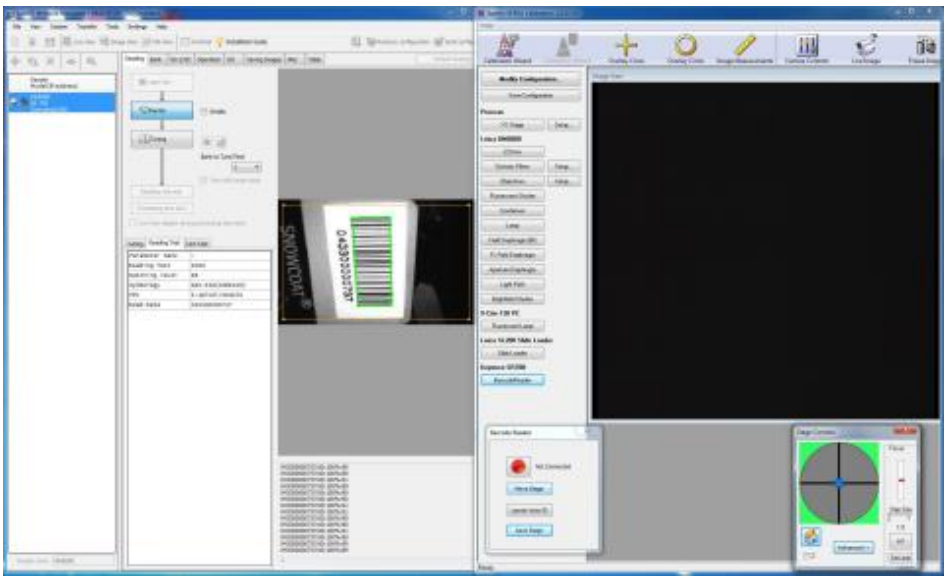


6. Select Launch AutoID to open the Keyence AutoID Network Navigator application.

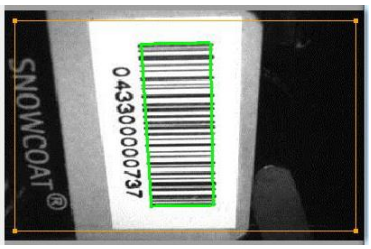


7. Arrange your screen so both the Keyence and VERSA calibration application are visible.

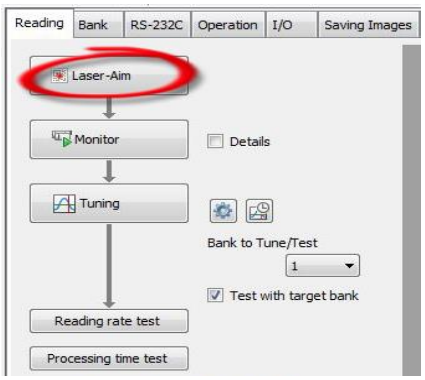
   This gives the ability to reposition the stage while getting live feedback from the Keyence software to how well the barcode is being detected



8. Use the virtual joystick to adjust the X,Y,Z position of the stage so the barcode is displayed in the centre of the Keyence viewer

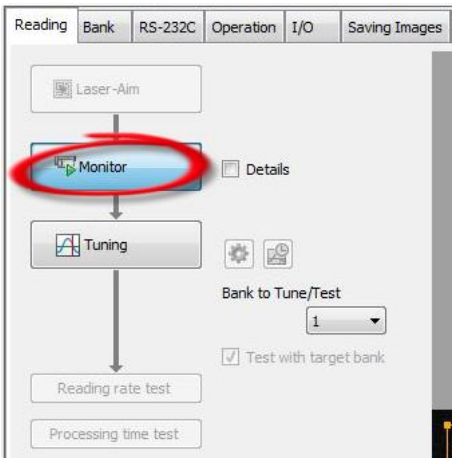


9. Select the Laser Aim in the Keyence software.
   ~



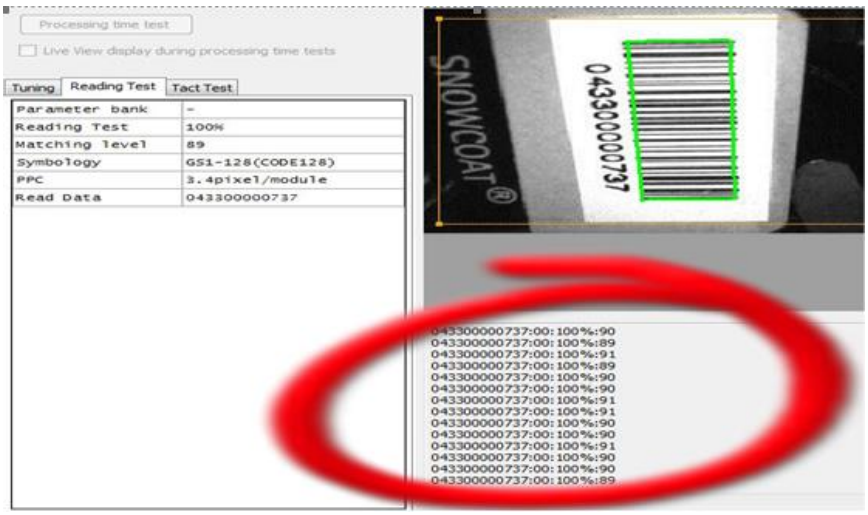
10. The laser light should be projected onto the centre of the barcode. Adjust using the virtual joystick if required.

11. Select the Monitor option

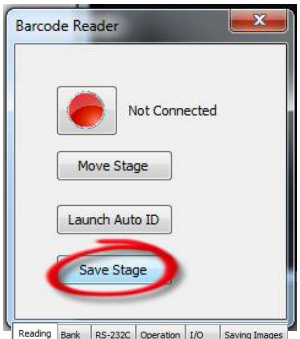


23.
24.

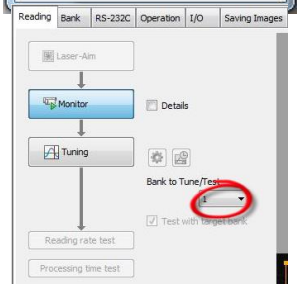
12. The read output should be more than 85. Adjust the X,Y,Z of the stage if required.



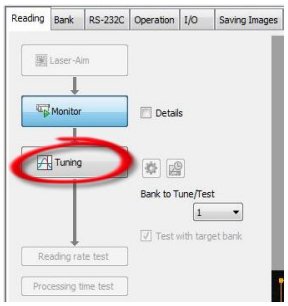
13. Save the stage position as the new default.



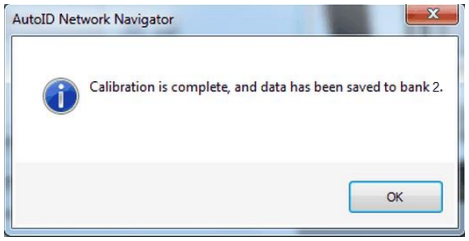
14. To store barcode symbologies, select a bank position.



15. Select Tuning



25. The image label is established and when complete, the calibration message is displayed. Select OK.



16. Click “Reading Rate Test” button to verify the reading rate for the calibrated symbology. The recommended rate is greater than 85%.

17. Click “Reading Rate Test” again to stop the test.

18. For additional symbologies select a different bank to save to and repeat the Tuning.

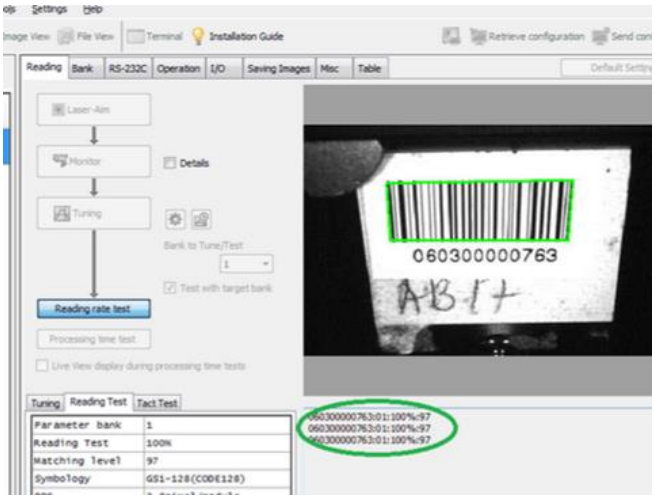
19. Select the Saving Images tab.
Confirm the JPEG Quality is set to 10 and Binning to ¼.

20. Select Send Configuration and then OK to the confirmation message.

21. Close the AutoID Network Navigator application.

22. Select No to the message.

23. Unload the slide from the stage and Exit the Aperio VERSA Calibration application.



12 | Brightfield Channel Calibration

Introduction

Before any slide scanning can be carried out it is necessary to complete an automated Brightfield Channel Calibration (Brightfield, Daily Channel or HCT Calibration). This sets appropriate microscope lamp, camera exposure and flat-field image processing settings for each of the objective lenses used in brightfield scanning.

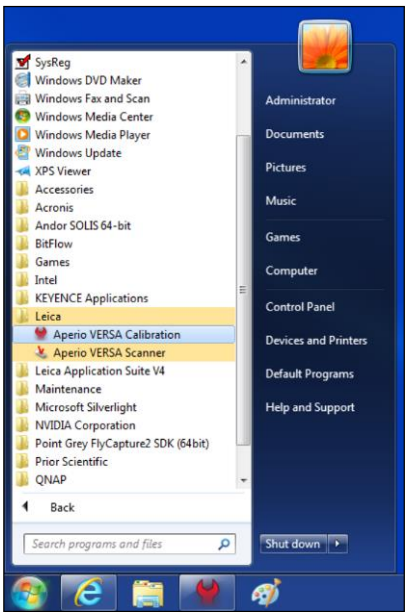
Once Brightfield Calibration is started it will run through the selected objective lenses automatically

- Each configured brightfield lens will be calibrated one or more times based on the HCT files in C:\ProgramData\Aperio Versa\BaseHCT.
  HCT files contain fixed microscope parameters including the condenser aperture setting which will influence contrast, resolution and focal depth of the image.
  As default, there are 3 HCT files for each of the 10x – 63x objective lenses giving the “Thick”, “Medium” and “Thin” channels which are available as template selection options in the scan application.
- Brightfield Calibration includes oil lenses. Oil will be dispensed automatically at the appropriate step of the calibration process.
- Brightfield Calibration records white-balance and flat-field imaging data which can change subtly during extended microscope use. It is recommended to carry out this process on a daily basis to ensure consistent image quality
- The calibration procedure can take 20-30 minutes for all lenses
- Brightfield Calibration is sensitive to changes in the microscope optical path affecting light reaching the camera; halogen lamp, optical filter positioning, condenser alignment, oil residue on the optics or slide, slide orientation and camera rotation
- The default HCT files have lamp, camera and condenser settings based on the long-working distance (“flat-top”) condenser lens (0.50 S15).
  Ariol MultiBay conversion systems using the conical condenser lens (0.9 S1) must compete the **Conical Condenser Setup**.

Task 1: Start Aperio VERSA Scanner

1. Power the system ON.
2. Log-on as ‘Administrator’.
3. Launch the Aperio VERSA Calibration application:

   Start > **All Programs** > **Leica** > **Aperio VERSA Scanner**

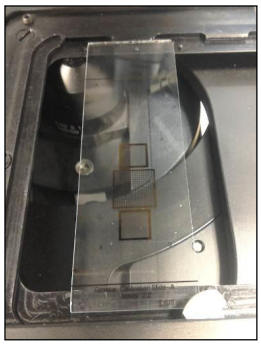


Task 2: Calibrate

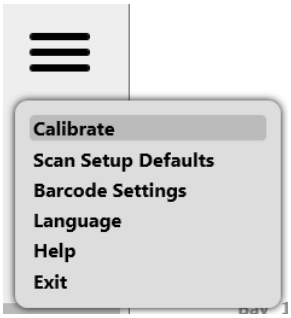
1. Remove the ‘Leica Calibration Slide A’ from the box

2. Clean the calibration slide with a non-particulate shedding cloth such as a microfiber cloth.

3. Place slide into bay 1.

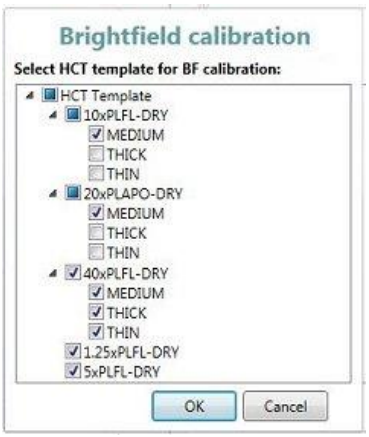


4. Select **Calibrate** from the **Scan Menu** in the **Scan** screen.



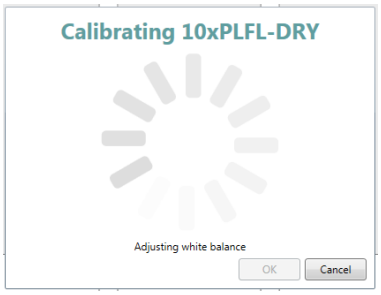
5. An HCT Template selection window opens where you can specify which lenses to calibrate in this session.

   Click **OK** to calibrate with all lenses as default, or deselect the lens and template options as required.



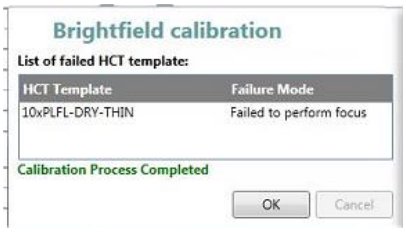
The calibration will begin automatically.

A message will remain on screen to indicate that the calibration has been completed successfully.



Should calibration for any objective lens fail an error message will be shown.

Review the **Brightfield Calibration Troubleshooting** and, if required, advanced hardware troubleshooting, before continuing with Operational testing.



13 | Testing and Troubleshooting

Introduction

If any issues or faults were observed during Brightfield Channel Calibration then **Brightfield Calibration Troubleshooting** and, if required, advanced hardware troubleshooting, should be carried out before continuing with Operational testing.

Following successful Brightfield Channel Calibration the system is ready to scan a sample slide and **Operational testing** should be done to confirm expected hardware, software and file saving functions of the VERSA system before any further reconfiguration or network integration is done.

Following successful testing an **Acronis Image backup** should be made before completing any remaining support tasks such as Domain Network integration, anti-virus software installation or commissioning the system for handover to Applications training or Customer use.

Operational Testing

Instructions for the scanning application are detailed in the Aperio VERSA Instructions for Use manual, document number 23MAN1244. This should be read to understand the main options available to the end user.

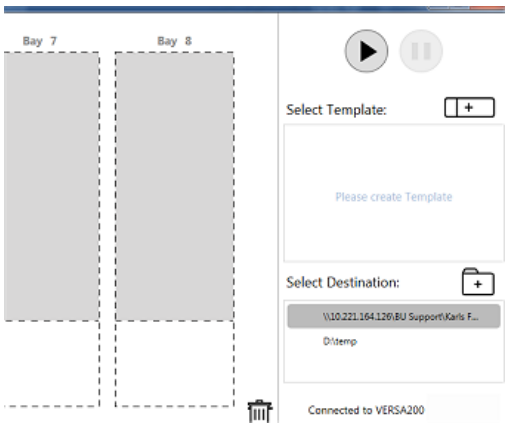
For testing purposes if a customer sample slide is not available then any slide with visible features can be used, such as the Leica Calibration Slide A.

Setting up a basic brightfield scan for operational testing requires a basic understanding of the key concepts;

- Scan Template setup to set the scan passes
- Destination folder for the final .SCN file export
- Manually selecting regions for each scan pass

If not already running start the Aperio VERSA scan console application from the **Aperio VERSA** shortcut on the desktop or from **Start>All Programs>Leica>Aperio VERSA Scanner**
Ensure all hardware devices are powered on and connected.

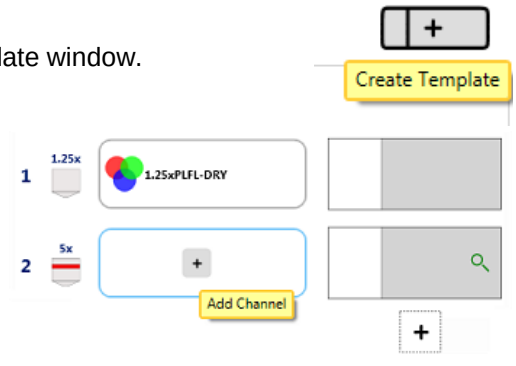
The main window displays of the 8 slide bays. To the right are the **Select Template** and the **Select Destination** panels, both need to have a selection before you can click on the slide position to test a scan.



If the template and destination displays are hidden by a scan image this means there is a previous scan waiting review which needs to be cleared, exported or set for next scan pass in the QC Review screen which can be accessed by the magnifying glass icon to the left.

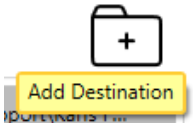
Scan Template Setup

1. Click the Create Template icon to open the Create Template window.
2. Enter “Service-Test” into the Name text box
3. A 1.25x scan pass is default in all templates, enable the review (magnifying glass) icon to the right then click the **+** icon below to add another scan pass
4. Select the 5x pass and click on the **+** “Add Channel”
5. Select the 5xPLFL-DRY pass and OK. Enable the review icon then click on the **+** icon to add another scan pass
6. Repeat for the 10x, selecting “MEDIUM” channel
7. Repeat for any additional brightfield lenses to test



Scan templates are saved as .SST files in **C:\ProgramData\Aperio Versa\SST**

Export destination



Click on the **Add Destination** icon to set an export location for the final scan.

A basic Windows “Browse for Folder” window appears showing local and network locations. The destination folder must be visible in this list to be set through the application software.

Initial testing should be to a local D: drive destination or a connected NAS drive folder created in advance.

Once set the destination paths are saved in the SystemDestinations.xml file (C:\ProgramData\Aperio Versa).
Note: This file can be manually edited if necessary to set a networked shared folder (UNC path) that is accessible but may not be visible in the “Browse for Folder” window due to the network configuration.

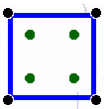
Scan with Manual Region selection

Once a template and destination are selected then click on the Cassette and slide position where your slide is contained and select the Start Scan icon.

The 1.25x scan will begin. As the test template has the Review option set for each scan pass then once the scan is complete the slide will be unloaded and an image will be displayed overlaying the Template and Destination panels.

1. Click the Magnifying glass icon to display the scan pass in the QC Review screen with the application tools to set the next scan regions

2. Hold the shift key on the keyboard and drag with the mouse cursor to draw a region around visible features on the slide for the next magnification scan



3. Once a region is drawn a number of focus map points will be shown as green dots;
   - focus points need to be over visible material for accurate mapping, drag with the left-mouse to move any that are in empty areas and may fail
   - additional focus points can be added by pressing the “P” key, they will be dropped where the mouse cursor is on-screen
   - focus points can be deleted by right-clicking on the green dot
4. Click the 5x lens icon to set the next scan pass, the image is removed from the screen. At the file level the .SDF file for the scan is moved from D**:\ScannerData\ReviewInput** into **…\ScannerInput**
5. Click the camera icon to return to the Scan console and press the start scan button again to begin the 5x scan pass

6. Once the 5x scan is completed the slide is unloaded, repeat the Review and select new region process for the 10x scan pass and re-scan
7. Repeat the review and select new region process for all remaining scan passes in the template

For each scan pass magnification, you should carry out quick visual check of the scan images looking for any signs of image distortion, shading (“tiling”) effects, color imbalance or significant out of focus areas which may indicate issues around the Spatial calibration, Brightfield Calibration or hardware setup that need further investigation or troubleshooting.

Also note any signs of focus map point failures which will be displayed in each 5x and higher magnification review image as red dots. This indicates the system could not auto-focus on the point This is not unexpected depending on the slide being used and where the focus point is, but failed focus points on areas of clear material, or multiple failed focus points which may block the scan pass completely, should be investigated.

If oil scanning is tested check the oil dispense volume and if necessary modify the dispense settings.

For any scan failures or areas of concern then the suggested troubleshooting considerations are;

1. Activate the Live Debug Window registry entry and re-start the Scan console
2. Repeat the Slide Scan looking at the live image to see if any issues are apparent
3. Repeat Brightfield Scan calibration looking at the live image to see if any issues are apparent

4. Carry out further Calibration or Hardware troubleshooting as indicated from the symptoms. This may require re-confirming all hardware and configuration checks and repeating Spatial Calibration.

Scan Template focus offset

If the customer microscope slides are significantly thicker than the Leica Calibration Slide A then focus point (or complete focus map) failures are likely to be seen when scanning at 10x or above.

Expected symptoms would be;

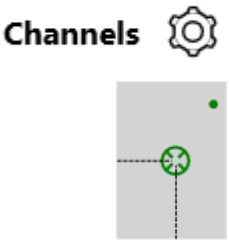
- Brightfield Calibration would pass successfully
- Test scan using the Calibration slide would pass successfully
- 1.25x and 5x brightfield scans would complete but may show off-focus images in review
- 10x and above review images show one or more red (failed) focus points
- 10x and above live window display would show focusing failing to pass through the sample layer or the sample layer coming into focus at the end of the focus range

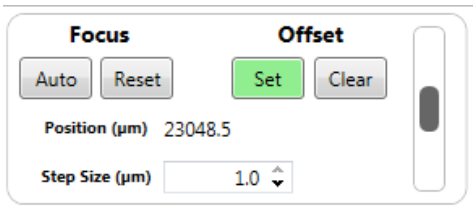
VERSA v1.02 scan templates allow setting a focus offset which modified the starting auto-focus position to compensate for any slide thickness offset, as described in the Instructions for Use manual.

Alternatively, if auto-focus issues are being seen only in one scan template or in one pass within a template it may be that the focus offset has been inappropriately applied and is preventing accurate focus mapping.

To correct or test for slide thickness or focus offset issues;

32. Start the Aperio VERSA scan console application
33. Identify a template showing auto-focus issues and right-click>Edit
34. Select the **Channels** icon to enter the Channel Settings screen
35. Move to the bay holding the sample slide and use the X/Y stage controls or drag the target circle until sample material is visible in the image display
36. Click on each scan pass magnification in the “Select Channel” panel
37. For each pass check if
    - The Offset “Set” is active (green)
    - The Sample is in approximate focus



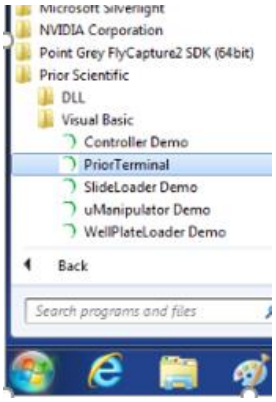


Offset Set button	Sample Focus	Indication
Inactive	Good	the channel is appropriate for auto-focus using the Spatial Calibration value
Inactive	Poor	the Channel requires an offset to be saved. Focus on the sample and press the “Set” button when it is clear
Active	Good	the template has already been modified to account for a sample slide thickness offset
Active	Poor	an inappropriate offset has been saved. “Clear” the offset or refocus and set a new one.

Prior Oiler: Change Dispense Volume

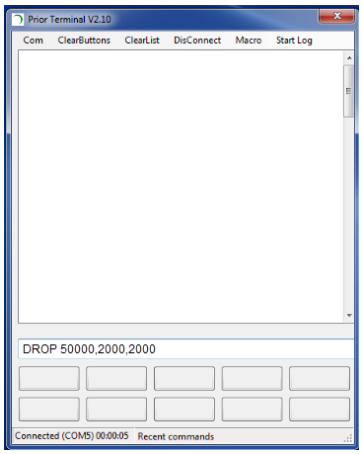
If oil objective lens scanning shows issues with the oil dispense such as insufficient oil, too much oil or oil dripping immediately following a dispense then the dispense parameters may need modification.
For other oiler issues re-check review the Oiler hardware setup and maintenance advice.

The Prior Terminal application is used to connect to and configure the oiler controller.



38. Ensure the Prior PL220 Automatic Oiler is switched ON and connected via USB to the PC.
39. Open Prior Terminal
    Start > All Programs > Prior Scientific > Visual Basic > PriorTerminal
40. Connect to the oiler USB com port using baud rate 57600
41. Type DROP and Enter to return the current oiler parameters.
    These will be displayed as a,b,c where;
    - a = Dispense (number of microsteps forward)
    - b = Backflow (number of microsteps backwards)
    - c = Priming (number of microsteps per second using PRIME button)
42. Type DROP *a,b,c* into the text box and Enter to update the parameters
43. Close Prior Terminal.

Default recommended values are 50000(a), 2000(b), 2000(c) but these may not be appropriate for the combination of oiler position, volumes and sample areas used.



Suggested modification values are;

- Dispense: Between 18000 and 50000
- Backflow: Between 9000 and 12000
- Priming: Between 6000 and 12000

A training video has been produced entitled “Aperio VERSA Automatic Oiler - Setup Calibration Programming and Best Practice” to assist in operation and troubleshooting.

If you do not have a copy of this reference video, please contact B.U. Technical Services.

NAS drive

The VERSA manufacturing configuration is for standalone operation with direct Ethernet connection between the VERSA PC and the **QNAP TS-831X** drive option.

Manufacturing configuration;

- **VERSA**: Windows 7 workgroup ("workgroup") 2nd LAN name "NAS" TCP/IP 169.254.100.101 Subnet Mask 255.255.0.0
- **NAS**: IP address 169.254.100.100 for web interface through QNAP management software and for access to NAS shared folders

Advanced NAS folder and access controls are through the QNAP Control Panel allowing creation of additional shared folders and optional setting up of user access permissions.

To allow the NAS folders to be accesses on a customer's LAN an additional IP address needs to be configured.
Requirements;

- Network cable connection from a local area network, server or additional PC into one of the remaining NAS rear network ports
- Valid IP address to set the NAS ethernet configuration (if not using a DHCP server)

Procedure;

1. Connect to web management interface; http://169.254.100.100/cgi-bin/
2. Select Control Panel to open the Control Panel window
3. Select System Settings>Network which displays the 4 internal NAS network adaptors
4. Select the Edit icon next to the Interface to add or modify
5. Select "Use static IP address" and enter the appropriate TCP/IP address and subnet mask for the LAN connection
6. Apply and close the window. The TCP/IP configuration is updated and the new address is displayed in the Network panel
7. Configuration is complete, NAS shared folder names will be visible over the network with access is controlled by local NAS security settings

Test Completion

Once operational testing is complete and all necessary hardware and scan application functions are confirmed an Acronis manual backup procedure should be performed ahead of any further work required to allow hand-over ready for end-user training or operation.

Only after this is done should further system or network reconfiguration be done;

- Integration into laboratory domain network
- Installation/activation of 3rd party software applications or anti-virus
- Restriction of user security and access permissions
- Windows Updates or security patches

Should any of these processes result in the VERSA scan application failing then the last system change should be undone and the operation re-tested.

If normal operation cannot be achieved in this was then the last Acronis Image can be recovered before proceeding with any investigation.

Should successful Brightfield Channel Calibration or Scan operational testing fail then further troubleshooting should be carried out as described in the next section.

Hardware considerations/User advice

Changes to the system hardware following installation can lead to operational failures if they are not recognized.

The following is a basic checklist that is appropriate for end-user familiarity and should be used as a quick check for first line support contact.

- Do not unscrew/rotate the camera after Spatial Calibration
- Do not loosen the stage bracket mounting to the microscope dovetail
- Do not loosen the X-Cite lightguide adaptor at the rear of the microscope and check the lightguide is firmly inserted at both ends
- Ensure the X-Cite lightguide is not twisted or compressed
- Be careful interacting with the hardware, unnecessary moving of PC, microscope or controllers may loosen cable connections or misalign components so general care should be taken around the equipment
- If using oil objectives ensure old oil is removed from the lens tips using a soft lens cloth before it hardens. Dampening with 70% ethanol can be used to remove oil that is starting to harden.
- Check for oil on the condenser lens
- If any slides break on the stage or around the system check for glass in or near the stage mechanism

The causes of potential causes of Brightfield Channel Calibration failure are an extension of this, especially the objective lenses, light filters and condenser height.
The key aspects for user checking are;

- Calibration slide upside down/inverted
- Microscope Condenser not in focus or aligned - check for Köhler Illumination
- Oil or other noticeable marks on the Calibration slide at reference positions, clean as required
- Oil on microscope objective lenses or condenser, clean as required
- Microscope objective lens in raised lock position
- Microscope rear light filters (Blue and I.R. Cut) not in the light path
- Fluorescent filter in the light path – check configuration in Calibration ad LAS

Troubleshooting Quick Reference Table

Issue	Potential Cause	Troubleshooting	Corrective Action
Brightfield Channel Calibration failure	DM6000 base filters are not in position.	Open the live debug window and observe calibration. Expected = Live image is oversaturated during calibration (White Image).	Move the base filters into the lightpath.
	Flat condenser HCT files are being used for a conical condenser. (Ariol conversions only).		See **Conical Condenser Setup**
	Lamp house is not aligned.	Open the live debug window and observe calibration. Expected = Not enough light is coming through to the live image during calibration. (Dark Green/Black image).	Unloosen and realign the lamp house so the light is flat and even on the live image. Center the blub if applicable.
	Dichroic filter is in the light path.		Remove filters in the way of the light path.
	Köhler illumination not set.		See **Adjust Köhler Illumination for Brightfield Imaging** section
	Check for Oil on the condenser or objective.		Clean condenser or objective. See **Service & Maintenance: Maintenance Checklist - Cleaning** section
	Objected lenses can be locked into a retracted state.	Open the live debug window and observe calibration. Expected = Focus range never reaches the calibration pattern. Open Micserver.xml using an XML text editor and check for large Z offsets for 20 – 63x objectives	Unlock objective lens.
	Objective offsets are incorrect.		Redo spatial calibration.
Issue	Potential Cause	Troubleshooting	Corrective Action
Image quality - Uneven image focus across the sample	Stage not level (Sloped > 15 microns width or >25 microns length over the slide).	Check to see If the stage is within tolerances (See **Stage Levelling** section) .	Level the stage (See **Stage Levelling** section)
Marks on the live image during calibration	Dirt on the camera		Clean the camera. See **Camera Servicing and Maintenance** section
Objective is colliding with the stage insert.	Incorrect Physical limits set on the stage.	In Microscope calibration application, move slowly around the stage limits with the 1.25X in place. Check the objective connects with stage insert clip	Change the physical limits on the stage. See **XY Stage and Proscan Controller: Change Y-Axis Limits** section.
Issue	Potential Cause	Troubleshooting	Corrective Action

Stage stall during scanning.	Misaligned or dirty Encoders.	1. Perform encoder test	Clean Encoders
	Proscan software error.	2. Retest encoders after cleaning. If problem persists then check of the issue still happens with the encoder cables (X/Y) disconnected from the Proscan.	Perform a Proscan reset
	Stage is damaged, substandard or worn.	3. Retest encoders after Proscan reset.	If problem persists stage replacement may be indicated, contact CVM.Support@LeicaBiosystems.com.
Issue	Potential Cause	Troubleshooting	Corrective Action
Encoders flash Red/Orange.	Dirty Encoders.	Perform encoder test	Clean Encoders
	Proscan software error.	If problem persists after cleaning …	Perform a Proscan reset
Issue	**Potential Cause**	**Troubleshooting**	**Corrective Action**
Error -25	Hardware unable to respond or move	Confirm hardware controller power and test initialization and movement	If no obvious fault contact CVM.Support@LeicaBiosystems.com
Scan Failure	Unknown	Open the live debug window and detail symptoms	If no obvious fault contact CVM.Support@LeicaBiosystems.com

Live debug Window

Default VERSA operation displays a live camera image only in the Channels setup screen. When testing for operation it is important to get a good understanding of what the camera is viewing during Brightfield Calibration, focus map and scan operations.

To do this start VERSA with its “Debug” live image window open, requiring setting the VERSA registry key **HKEY_LOCAL_MACHINE\SOFTWARE\Aperio Versa\DebugTools\DebugWindow\Visible** to “1”

Please read **Service & Maintenance> VERSA Registry settings** before any registry adjustment.

The VERSA scan application will need to be re-started to activate the live image window. This starts hidden behind the main VERSA GUI so you need to minimize this to see and click on it, this then activates a toolbar icon that can be used to display the window overlaying VERSA later.

Important!: The debug window needs to be reset to 0 once all installation, testing or support work is completed, as long-term VERSA Scan operation is not validated with this function running.

- This can lead to scan instability and potential crashing of the application
- Will noticeably increase fluorescent scanning times

Starting VERSA, Troubleshooting

When starting the VERSA application the expected response is for the microscope and stage to initialize. The stage will home and microscope lens, filter or condenser movement may be noticed.

During this initialization the connecting status is displayed until all hardware responses have been received, after which the scan console is displayed with the slide bays and template panel ready for selection.

Hardware not detected:

VERSA 1.02 requires all microscope, stage and lamp components to be powered on and ready to communicate. If any device fails to interface a Hardware Connection Error will be displayed.

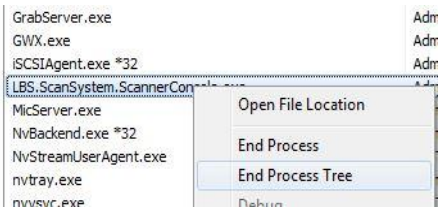
Action: Check all devices for power and cabling and try again.

Grasshopper Camera fails to connect:

The Point Grey camera must be running for VERSA to complete its initialization.

If the Scan application is started immediately after Calibration has been run or if the previous grabber service has not shutdown cleanly then “Connecting” will continue for several minutes without stage or microscope hardware response.

Action: If the application is unresponsive after a few minutes, or does not respond to a close request, then use Task Manager to close VERSA Scan (processes LBS,Scansystem.Scannerconsole.exe), confirm grabserver.exe is not still running and restart.
If Grabserver.exe or Micserver.exe do not automatically close then end these tasks also before restarting VERSA.



Action: Check Grasshopper cabling and connection. If repeated failures occur run Point Grey FlyCapture2 and check Frame Rate and connection response (see Appendix).

Crash error or long-text error panel window pens:

Crashes have been observed if missing core files or folders are detected by the scan application or if previous scan process files are not cleared correctly or corrupted.
e.g. “System.NullReferenceException: Object reference not set to an instance of an object"

Action: Check D:\ScannerData\ScannerInput\ for left-over files, move or delete and restart scan application.

Action: Confirm C:\ProgramData\Aperio Versa\HCT folder access

Repeated occurrences may be due to previous system crashes and may need follow up investigation.

VERSA 200 Fails to initialize:

The interface to the Slide Loader components requires user access to C:\ProgramData\Prior\ and the LOADER_DATA.INI file in there.

Action: Confirm the user has read-write access to this file and folder

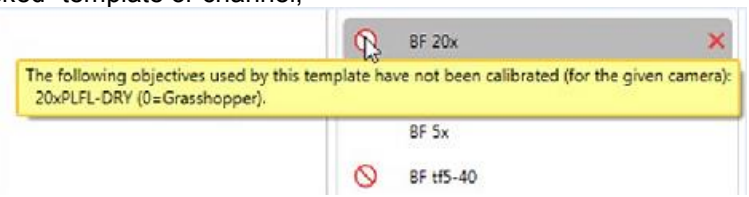
For other consistent startup errors or fail symptoms check if hardware initialization is successful in Aperio VERSA Calibration and sub-applications hardware connection (LAS, Prior Terminal, FlyCapture2).

Re-install the Aperio VERSA application software to rule out unexpected program file corruption.

Brightfield Calibration Troubleshooting

Should one or more objective lenses fail Brightfield Channel Calibration an error will be displayed at the end of the calibration process.

If there are no brightfield calibration data for an objective lens HCT channel this will also display in the templates list as a “blocked” template or channel;



As Brightfield Calibration is intended to be an automated process it can be difficult to understand where the process calibration has failed without observing the live image at the point of failure.

If the live debug window was not active was not being observed at the failure point;

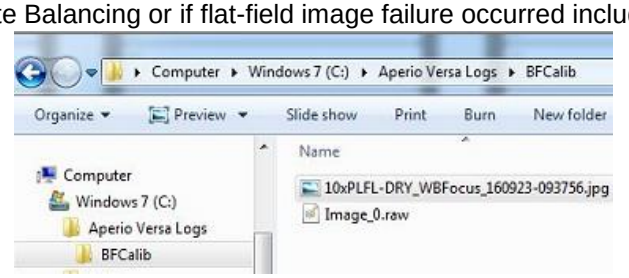
- Check the Calibration slide for marks, dirt or oil residue, clean as required
- Confirm the Live Debug Window is set to start with the VERSA scan console
- Retry Brightfield Channel Calibration as before and watch the live image window for signs of whether the failure is due to light intensity, focus or Calibration slide feature issues

Possible cause of calibration failure which should be reviewed are;

- Calibration slide upside down/inverted
- Oil or other noticeable marks on the Calibration slide at reference positions
- Oil on microscope objective lenses or condenser
- Microscope objective lens in raised lock position
- Microscope Condenser not in focus or aligned - check for Köhler Illumination
- Microscope rear light filters (Blue and I.R. Cut) not in the light path
- Fluorescent filter in the light path – check configuration in Calibration ad LAS
- Starting focus point (ZDatum) too far from Calibration slide focal plane – check Spatial Calibration
- Brightfield halogen lamp intensity change outside of HCT file tolerance – check/replace lamp
- Inappropriate HCT Files aperture diaphragm, lamp or camera exposure settings

If troubleshooting is being done indirectly then the Aperio VERSA log files should be collected.
Browse to C:\Aperio Versa Logs;

- **\BFCalib** contains images captured at any calibration fail points for focus failures at the calibration feature for image White Balancing or if flat-field image failure occurred including a date/time reference



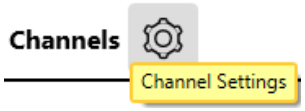
- **BFCalibration.txt** should confirm error details at the date/time of failure

```
38|        BF_CAL|    Info|Setting Hardware configuration 10xPLFL-DRY-THIN
59|        BF_CAL|    Info|Started Focusing
02|        BF_CAL|   Error|SetFocus failed. Error code: -5105
23|        BF_CAL|   Error|ComputeWbParameters failed
33|        BF_CAL|   Error|Calibration failed
```

Images and log data can be useful in determining a possible cause should immediate access to the system not be possible.

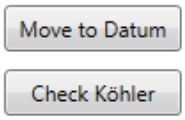
Channels screen "Troubleshooting"

The **Channel Settings** screen VERSA Scan application includes a "Troubleshooting" function which allows a quick live image check of the calibration slide orientation and condenser position without having to work through the Calibration application or microscope LCD touchpanel.
This can be useful for remote support sessions where it may not be possible to quickly confirm hardware setup



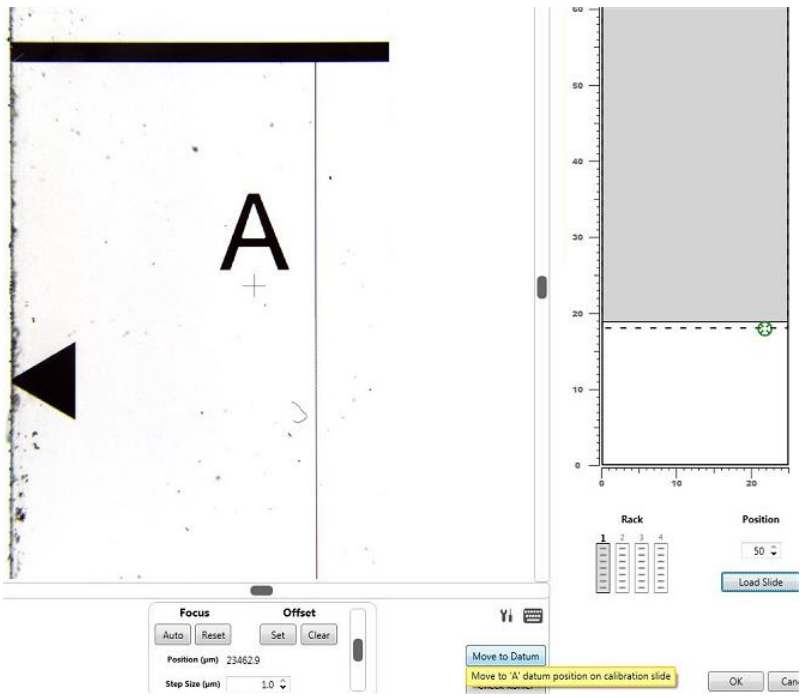
44. Right-click>Edit on an existing scan template or create a new one with at least 1.25x and 10x channels configured
45. Click on Channel Settings
46. Click on the Troubleshooting icon to expand the "Move to Datum" and "Check Köhler" options

Move to Datum



The **Move to Datum** function automatically moves the stage to the Bay Datum position set during Spatial Calibration, the "A" point used as a starting reference for all calibration and slide scanning procedures.
This allows a visual check to confirm the slide is in the correct orientation and position.

47. Use the Load Slide tools to load the Calibration slide from its cassette position
48. Select the 1.25x objective lens item in the **Select Channels** panel to the left of the window
49. Click on the **Move to Datum** button
50. Confirm the A point is visible and in focus

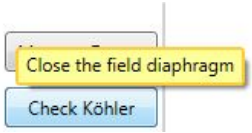


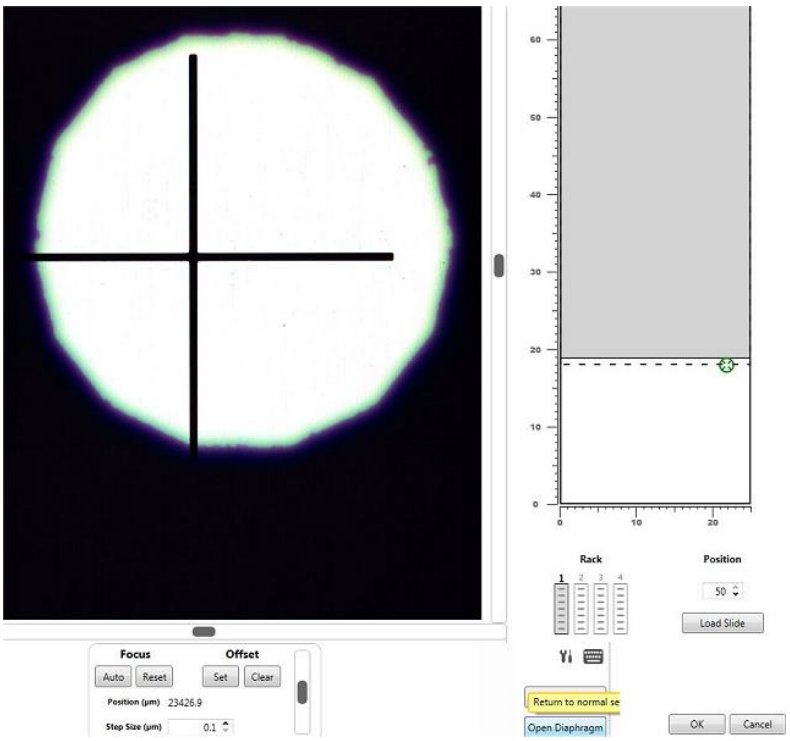
Check Köhler

Adjustment of the microscope condenser is essential to produce a high contrast image with even illumination. This ensures that any optical aberrations in the light path are not visible.

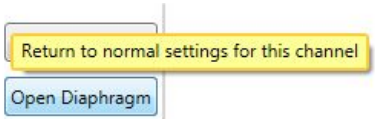
The **Check Köhler** function automatically reduces the microscope field diaphragm to a low value. This allows a visual check to confirm that sharp edges of the iris are visible, confirming that the condenser is correctly focused and centered.

51. Select the 10x objective lens item in the **Select Channels** panel to change objective
52. If necessary, adjust focus and X/Y stage position so the cross-hair is central and in focus
53. Click on the **Check Köhler** button to close the field diaphragm
54. The live image should show the cross hair in-focus, approximately central to the circle of light with the field diaphragm showing defined edges





55. If the circle is noticeably off-center or the edges defocused then the condenser is not in correct physical alignment and needs to be adjusted as described in the Spatial Calibration procedure Focus and center the condenser.
    - Focus (move) the condenser up or down to visualize the sharp edges of the closed field diaphragm
    - Adjust the condenser X/Y position using the two angled hex screws#
56. Once complete click the **Open Diaphragm** button to return to the working field diaphragm setting for the objective lens



NOTE: It is not necessary to adjust Condenser Aperture settings as these are pre-set in the HCT files. Adjusting the aperture settings for lenses in the VERSA calibration application, LAS or on the microscope LCD touchscreen will have no modification to brightfield scanning within the VERSA application.

Leica DM6000B Troubleshooting

Aperio VERSA requires good optical setup of the microscope for routine use. When looking at image quality or focusing issues the physical condition, configuration and operation of the microscope should be confirmed before looking at the camera image and application software settings.

Hardware checks;

- Oil on microscope objective lenses or condenser
- Microscope objective lens in raised lock position
- Microscope Condenser not in focus or aligned - check for Köhler Illumination
- Microscope rear light filters (Hoya LB200 Blue and I.R. Cut) not in the light path to provide the required contrast for Brightfield Scanning
- Fluorescent filter in the light path – check configuration in Calibration and LAS
- Brightfield halogen lamp intensity outside of HCT file tolerance – check/replace lamp

Confirm all microscope mechanical operations manually.

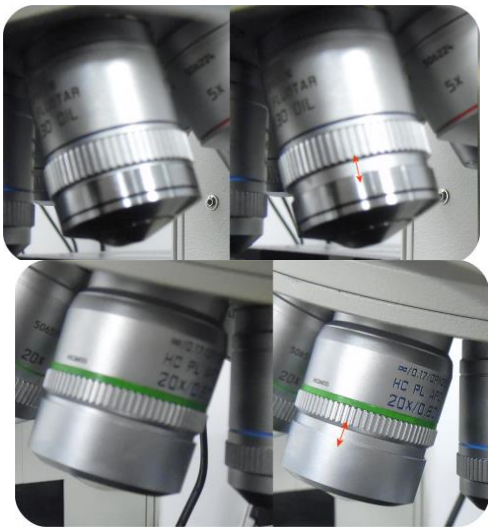
- Use the Leica Application Suite (LAS) to configure objective and filter positions for touch panel display and operation.
  Not having the objectives and filters correctly configured in LAS may lead to unexpected fluorescent shutter/condenser/lamp interactions that could directly affect Aperio VERSA functionality.
- Check Brightfield and Fluorescent illumination and light paths.
- Use representative sample slides to view using the eyepieces and confirm visual quality and resolution.

Registry modifications available

- **\DebugTools\OpenLCD** to activate the LCD touchpanel during scan.

Objective lens lock position

Several Leica objective lenses used on VERSA have spring-loaded locking mechanisms which move the lens tip 1-2mm from the working position.



Objective lenses must be calibrated and used in the released, lower position to perform at their optimum optical specifications and to maintain parfocality with the other lenses on the system – each lens will focus on a sample at a similar microscope Z value (typically within 100 microns of the 10x reference lens)

After normal (unlocked) callibration if the objective lenses are then raised into the lock position they will be unable to focus during Brightfield Channel Calibration or in routine slide scanning.

If the objective lenses are calibrated in the locked position this will affect optical quality and also risk slide or lens damage if they are unlocked later.

DM6000B Fluorescence Diaphragm adjustment

The D6000B Incident Light (IL) fluorescence used on VERSA is a motorized 8-position stand-top.

It is not normally expected to have to make any adjustments to the IL-Diaphragm Module however it should be checked for troubleshooting instances of uneven fluorescence illumination or any obscuring of the fluorescent illumination that cannot be ruled out by checking the components most likely related to fluorescence illumination (dichroic filters, X-Cite lightguide and adaptor, X-Cite lamp).

To check the IL-diaphragm alignment;

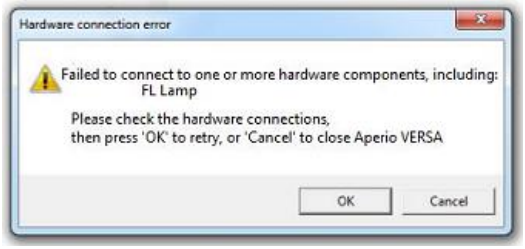
1. Open Aperio VERSA calibration and connect to hardware
2. Load a sample slide onto the stage
3. Move the DAPI Dichroic into position
4. Use the DM6000 LCD touchpanel to close the Brightfield shutter
5. Open the FL shutter
6. Flip the condenser out
7. Change the light path to 100% eye
8. Focus on the sample
9. Using the FL Field Diaphragm control move to approx. 70%, this should make the circular aperture visible down the oculars. (This control is circle full open = 100% smallest setting = 50%. Square fully open 45%, smallest setting 0%)
10. Adjust the 2 Screws located on the right of the FL lightpath to centre the aperture.

Alternatively use the VERSA scan console channels screen to load a slide and view a fluorescent image, but first it is necessary to enable the DM6000B touchpanel for manual control using the registry "OpenLCD" setting from Hkey_local_machine > SOFTWARE > Aperio Versa > Scanner > OpenLCD

X-Cite 120 PC: Operation & Troubleshooting

When configured in the Aperio VERSA Calibration application for Com1 (serial port) connection the X-Cite 120 PC fluorescence controller is controlled automatically by the VERSA scan application.

The X-Cite must be powered on before the scan application will start, if the lamp is not detected by the application a connection error message will show.



Powering on the X-Cite 120 PC starts the fluorescent lamp warm-up period, this shows as a flashing display on the front LED panel. Once the flashing is finished the lamp is at full intensity and pressing the buttons on the panel;

- “Mode” switches between lamp intensity %, number of lamp hours used and manual shutter speed
- “Start/Stop” opens/closes the internal shutter
- “Up/Down” lowers or raises the Intensity % or manual shutter speed if on that Mode display

Operation

After successful VERSA scan interface the X-Cite controller is put into a locked state, the LCD display shows the number of lamp hours used but pressing any of the controller buttons returns a “LOC” display.

During routine VERSA scan operation;

- the lamp is automatically switched off once the first brightfield-only scan batch is set
- the lamp remains on or is restarted when a scan batch containing a fluorescent pass is started
- the X-Cite lamp is switched off through the software interface at the end of each scan batch of slides where a pause (review) option is set
- the lamp is switched off when the VERSA application closes.

The lamp has a manufacturer’s recommended lifespan of 2000 hours. If used in excess of 3000-4000 hours this can lead to deterioration in light quality and potentially damage the unit.

The X-Cite 120PC liquid (gel) light guides have a typical useful life in excess of 4000 lamp hours when installed and handled properly. Replacement is recommended for every second lamp used.
The formation of bubbles due to stress or overheating is one of the most common reasons for a light guide to degrade prematurely and result in a reduction in illumination intensity and evenness.

Try and reduce unnecessary UV photon load on the liquid light guide.

- Make sure the light guide is allowed to cooled properly after use to prevent overheating
- If the system is being used intensively over a period of time (e.g. constant daytime and overnight work) rotation with a second light-guide is recommended, placing the spare guide in a cool location.
  A refrigerator can be used (NOT the freezer section)
- If the shutter is opened manually (use outside of the VERSA scanner or within the Channels and fluorescent calibration screens) close the shutter when not in actual use.

Registry modifications available

- **Scanner\Options\FLLampOverride\SwitchOffAfterBatch** set to “false” to leave the lamp on between fluorescent scan passes\batches – this is not recommended for scans where the batch may finish unattended and leaving the lamp on for > 5-10 hours.

Lamp Troubleshooting

If . . .	LED Displays	This indicates . . .	Then
The fan starts. LED display constant System alarm (beep)	“bulb”	No lamp has been detected	Re-install the lamp correctly.
After 20 - 30 sec. delay.. LED display constant System alarm (beep)	“bulb”	The lamp has failed to strike	Secure the lamp access cover. OR Replace the lamp.
LED display constant	“cool”	The lamp is too hot to strike	The lamp will automatically strike when it has cooled
LED display alternates	“end” then “bulb”	This indicates that the lamp has accumulated over 4000 hours and will not strike	Replace the lamp.

Secure access cover

- Press the START/STOP button to clear the audible alarm.
- Power down the unit
- Remove the lamp access cover and replace securely, tightening the fastening screw in place.
- Wait a few minutes and turn power on to the unit.
- If it still does not strike, replace the lamp.

Light guide troubleshooting

Deterioration of the light guide within the first is 1500 to 2000 hours of use typically due to overheating or mechanical stress. Overheating can cause the formation of bubbles in the gel matrix. To check for bubbles;

1. Disconnect the light guide from the X-Cite® and microscope adapter.
2. Hold one end towards a bright window or overhead room light - DO NOT use the X-Cite or any other focused light source for this test!
3. Look at the quartz at the other end of the light guide
   - Bubble-free: quartz end will appear as a bright, solid circle; you may also be able to see a thin circular outline at the quartz/liquid interface.
   - Bubbles at/near the quartz end: appear as dark spots, as small as 0.5mm in diameter or even as larger more defined spheres.
   - Bubbles in the middle of the light guide: may not be well-defined spots, but will appear as dark shadows.
   - In extreme cases no light will come through, even when pointing the distal end at a light source. This effect is more likely caused by mechanical damage.

Light guides with small bubbles can sometimes recover by removing from the X-Cite unit and placing undisturbed for 1-2 weeks, preferably in a cool environment or refrigerator (do not freeze).
For this to be effective, it is important to catch the bubble when it is small.

To avoid overheating or stress to the light guide.

- Always fully insert the light guide into the X-Cite unit; this ensures contact with a heat sink to conduct heat away from the light guide.
- Never obstruct the air vents on the X-Cite unit. Vents are located at the rear and underside of the unit.
- Do not remove the rubber feet on the X-Cite unit or otherwise reduce/block the space between the bottom of the unit and bench top. Removing the feet may compromise airflow through the unit.
- Ensure that the air being used to ventilate the X-Cite unit is approximately room temperature. Do not place the X-Cite unit on top of a heat-producing instrument.
- If a heated environmental chamber is being used for live cell imaging, make sure that the X-Cite unit and the light guide are located outside of the chamber.
- Do not expose the light guide to extreme temperatures (above 35°C / 95° F, below -5°C / 23° F) for extended periods of time during use, transport, or storage. This may cause degradation of the seals and allow air bubbles to form in the liquid.
- Never kink, bend, crush, or stretch the light guide This type of mechanical stress may cause bubbles to form in the liquid and/or damage the outer sheath
- Always allow adequate clearance at the rear of the X-Cite unit to prevent excessive bending.
- Place the X-Cite unit close enough to the microscope so that there is some slack in the light guide and no sharp bends.
- Never leave an end cap on the output end of the light guide when the other end is connected to the X-Cite unit. If the unit is turned on in this condition, the cap will overheat, melt, and/or permanently discolour the quartz end of the light guide.

Brightfield Scan Focus Map point failures

For 10x and higher magnification a focus map is made before the scan pass operation. Unless a one-point map is used a minimum of 3 successful focus points is required before the system will start a scan.

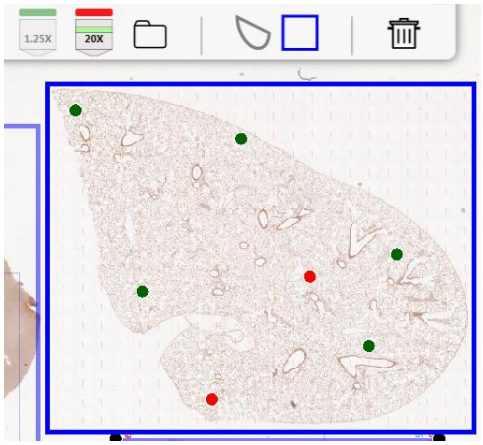
Identifying scan failures due to focus map issues must be done in the VERSA QC Review screen as no other SCN viewer application can overlay the focus map points that are stored in the accompanying .SDF file.

If the scan has been sent to its final destination then you can copy the .SCN and .SDF files back into the D:\ScannerData\ReviewInput\ folder and they will be available for review again.

Left-click on the scan region to see the focus map points from the last scan pass. Any failed points will be highlighted in red. If the entire region bounding box is red then this means there were not enough successful focus points to start the scan.
In such situations activating the Debug Live Image window and reviewing the live focusing is the first step ahead of any log or image investigation.

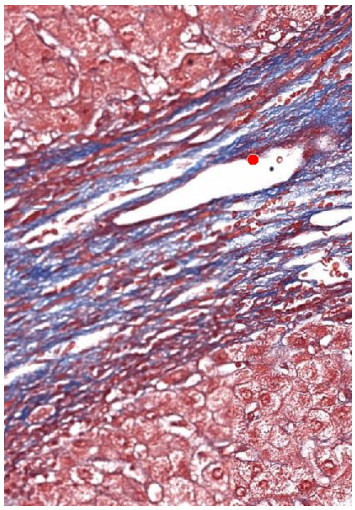
Note: Low frequency or obvious-cause failed focus points are an expected occurrence on some scans or slide and do not require detailed investigation.

Reasons for failed focus points can include;



- No material: Not enough contrast information under the point to reliably calculate a position.
  - Reposition focus point(s)
- Sample thickness: Focus map never reaches sample focal plane
  - Check Template for focus offset settings
- Sample thickness: “Rogue focus point”. See below.
- Optical artefacts: A contrast “Double-peak” effect may lead to an incorrect focus point if the material is low-contrast (e.g. fat tissue with pale, saturated areas and little staining), has air-bubbles in the mounting or if the aperture diaphragm is set too low introducing spherical aberration “halo” effects into the image.
  This can also occur if there is an additional layer of information away from the sample plane, such as coverslip marks or a defocused condenser.
  - Repeat scanning using a channel (HCT file) with a higher Aperture Diaphragm setting (e.g. THIN)

Rogue Focus Points



If a focus map point is calculated outside of the average of the other successful points, the software ignores this point. This may be due to uneven tissue sectioning (rough cut) or debris/residue around or over the sample or coverslip.

As default rouge focus point detection only activates on focus maps of 7 or more points, any rogue points are not used in calculating the starting focus map of the region.

This function I scontrolled by setting in HKEY_LOCAL_MACHINE\SOFTWARE\Aperio Versa\Scanner\Options\

- \FocusMapRogueDetectionMinPoints (default 7)
- \FocusMapRogueDetectionStandardDeviations (default 2.5)

Image Display and Artefacts

SCN Image intensity and contrast display

VERSA was developed to try an attain as close as possible true-color image display through the choice of optics, filters and camera and by the white balancing done through Brightfield Calibration. A blue filter is used in the microscope to counter the inherent orange of a halogen light source and this will exaggerate contrast on some stains, especially blue/purple.

A customer would not use such an intense blue balancing filter on a microscope for visual analysis and this will change the perceived color and contrast display; they are viewing images with exaggerated orange, but the eye-brain compensates for this.

It should therefore be appreciated that direct comparison of images from scanning systems and with what is viewed through a microscope (or from another system using different optics, cameras and filters) has risks, especially if there is an expectation of getting "exactly the same color display" as what is seen by the eyes, on a photograph or from another system.

In addition, VERSA SCN creation uses image enhancement settings to create a vibrant image color display. For some customers this may seem exaggerated to what they are used to from microscope visualization or on other imaging systems. This enhancement can be modified through the Windows registry to set a more “natural” image display which may be preferable to some users.

This is controlled via 2 registry settings in;
HKEY_LOCAL_MACHINE\SOFTWARE\Aperio Versa\ \Scanner\Grabber

- Brightness Boost: Default setting of 5
- Saturation: Default setting of 1.5

Modifying **Brightness boost** between 5 and 10 may improve image display; less than 5 becomes dark, above 15 over-saturates the image.

Saturation is the “intensity” of the color. The default 1.5 is relatively strong and contrasted. 1.0 to 1.2 is much more natural, less than 1 “flattens” the image color and is not recommended.

You need to restart the application to see the effects on subsequent scans. The exact combination will vary a little based on sample staining within this range.

SCN Image artefacts - Brightfield

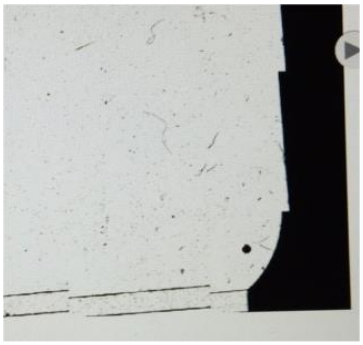
VERSA includes a calibrated Flat Field (shading correction) modifier to balance any light intensity variation inherent in the optics so that the final stitched scan images display as smooth and seamless.
These are created during Brightfield Channel Calibration for each objective (HCT) channel and saved in
C:\ProgramData\Aperio Versa\HCT\FFImages

Any marks on the Leica Calibration slide or unexpected lamp or optical variation that occur specifically during the Brightfield Channel Calibration will show as repeated overlays (image shadows or an intensity gradient) on one or more of the scan passes across multiple slides.

Camera rotation, microscope light or optical changes after Brightfield Channel Calibration, or oil or dust on objective lenses and sample slides, can also result a specific image patterning effect.

If an SCN image contains noticeable patterning or artefacts all optical components of the microscope should be checked for cleanliness and correct fitting and Brightfield Channel Calibration redone.

Camera Rotation

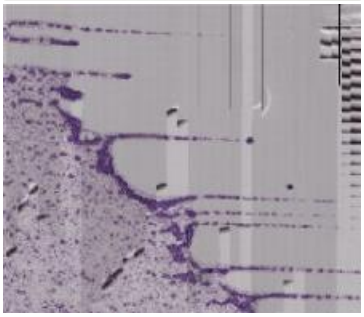


If camera rotation is not aligned correctly during Spatial Calibration or if there is hardware movement/rotation after Spatial Calibration, then an angle-stitch effect will be seen on the scan images.

If this is seen on one camera only, then check the C-mount and camera for rotation and repeat Spatial Calibration alignment for that camera only.

If this is seen on both cameras, then check the microscope phototube and repeat Spatial Calibration alignment for both cameras.

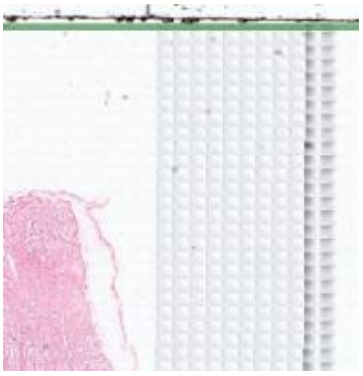
Immersion oil and debris



Insufficient oil on the slide, air bubbles or dust/debris in the oil can lead to striping, repeating patterns and false objects appearing on the scan as the software merges the moving oil image into the sample slide detail.

Check the oiler for air bubbles, confirm sufficient oil is being dispensed and ensure the slides are clean and free of dust before scanning.

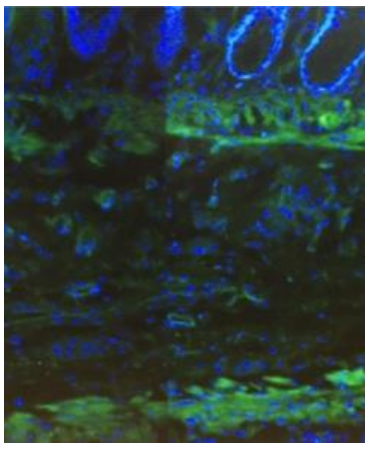
Dust and debris



Similar to oil artefacts dry dust or debris can appear as a repeating pattern or false objects as they are picked up and dragged along by the lens during scanning. This is possible only on objective lenses with a short working distance to the slide, 40x and greater.

Ensure the slides are clean and free of dust before scanning.

Fluorescence

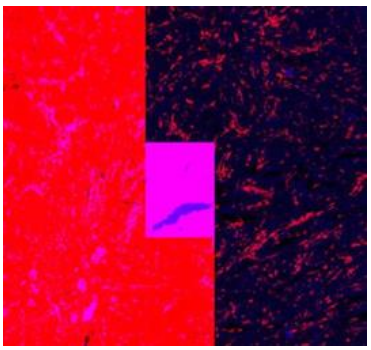


Fluorescent calibration on VERSA does not include any flat field correction and some degree of in-frame intensity variation is to be expected. High exposures will exaggerate any optical effect along with the combination of microscope hardware alignment and the interaction of the light source, filters and sample staining.

The intensity variation will be most noticeable where the frames from the subsequent or previous scan row are side by side, but this should not be confused with a stitching artefact as it is not created by the software but inherent in the image.

More extreme intensity variation within scan frames on fresh fluorescent sample slide scans could be related to an incorrect alignment of the fluorescent light guide, the lightguide adaptor, fitting of the filter cube in the microscope or an objective lens effect. These all should be checked.

Channel compilation error



A small proportion of Andor Zyla cameras have shown a data transfer effect which can result in incorrect channel layering and compilation in the SCN file. If this is indicated check USB3 connections from the camera to PC and test on an alternative USB 3 port for repeat of the effect.

Send the affected SCN image and a copy of the Aperio VERSA logs for escalated support investigation.

Software: Leica Application Suite (LAS)

Leica Application Suite (LAS) is installed on Aperio VERSA systems for the configuration and testing of the DM6000B microscope. It contains a core set of drivers and utilities for interface to Leica Microscope and Cameras. The LAS also includes multiple optional Leica licensed software modules for image acquisition and analysis with an interfaced Leica Digital camera: **these are not used with Aperio VERSA**.

“LAS Core” allows interface testing of a connected Leica DM microscope and firmware updates of the microscope and CTR electronics. No license is required for the LAS Core functionality, which allows configuration of the microscope LCD touch-panel display for correct objective lens and fluorescent filter settings.

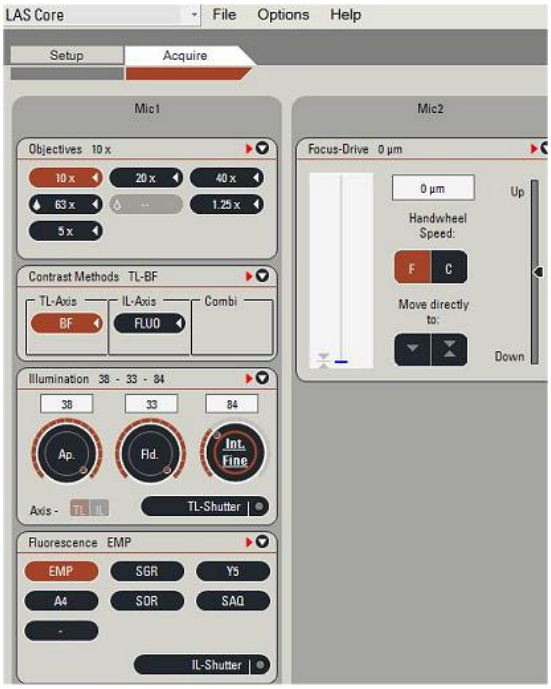
VERSA systems build with v1.02 will include LAS v4.9. Systems installed with VERSA v1.0 were configured with LAS v4.6.
It is not essential to update the LAS application to newer versions unless to specifically address some critical microscope motorization operation or to access updated firmware versions following hardware replacement.

USB Serial Driver

LAS interfaces to the microscope using a USB Serial Driver that is detected by the PC when the microscope and CTR unit is powered on.
Expanding the "Ports (Com & LPT)" section of Device Manager will display the serial port number assigned to the device which should be used for Microscope Configuration in the Versa calibration application.

Connecting to the DM microscope using LAS

1. Confirm all components are correctly connected
2. Power on the computer and log on as administrator (admin46xx)
3. Power on the Leica DM6000B
4. Run LAS from the Desktop shortcut or Start>All Programs>Leica Applications Suite v4>LAS v4.x
5. The application starts and connects to the microscope by USB cable under a virtual serial port
6. If this is the first time LAS is run select "Do not tell me about this again" in the License Registration window and close
7. The LAS Core "Acquire" panel opens
8. If configuration is correct clicking on the Objective and Fluorescence buttons will move the lenses and filters accordingly, confirming hardware operation and interface response



If connection is not automatic, is the first time LAS has been run or an error occurs then;

- Check the hardware configuration from **Start>All Programs>Leica Applications Suite v4>Configuration Hardware Configuration**
- Select **Options>Hardware Setup**
- Confirm the correct microscope model under the microscope drop down box
- Confirm connection type is selected and press (USB will work without specifying a Com Port, or select the Com Port that is identified as the "USB Serial Port" by the system Device Manager).
- Select "Test" - if you do not receive a "Connection Test successfully completed" then there is a hardware communication problem indicated.
- Once connected using the LAS Core main application the "Acquire" tab allows operation of the microscope components and "Setup" allows adding or modifying the configuration.

Dichroic filter and objective lens configuration in LAS

VERSA Scan uses the dichroic filter cube and objective lens configuration from the VERSA Calibration application to directly control the DM6000B during its operation and to display filter selection options within the software. However, this assumes several low-level microscope responses which are dependent on the correct configuration of the Leica Application Suite (LAS).

If LAS and VERSA Calibration are configured differently (missing, additional or different components in either setup) then this can lead to incorrect scan operation in both brightfield and fluorescent scanning operation due to inappropriate microscope response.

If any changes are made to the LAS configuration it is important to re-start the DM6000 CTR controller box before running VERSA Calibration or Scan to prevent potential software freezes on first use of these components.

Configuring Objective Lenses

1. Open the **Setup** tab
2. Select Nosepiece (objectives) in the Components window.
3. Enter some or all of the lens part (article) number to sort the list, or sort the columns by magnification value for faster selection
4. Configure objectives by selecting the turret position then double-clicking on the objective in the searchable list of Leica Objective items - these will be the codes displayed on the LCD touch panel screen
5. Open the **Acquire** tab and test lens movement

Note: If an objective lens is newer that the version of LAS installed on the system then its part number may not be present in the list. This is not critical for VERSA operation, it is OK to select a lens of equivalent magnification and type.

Configuring Fluorescent Filters

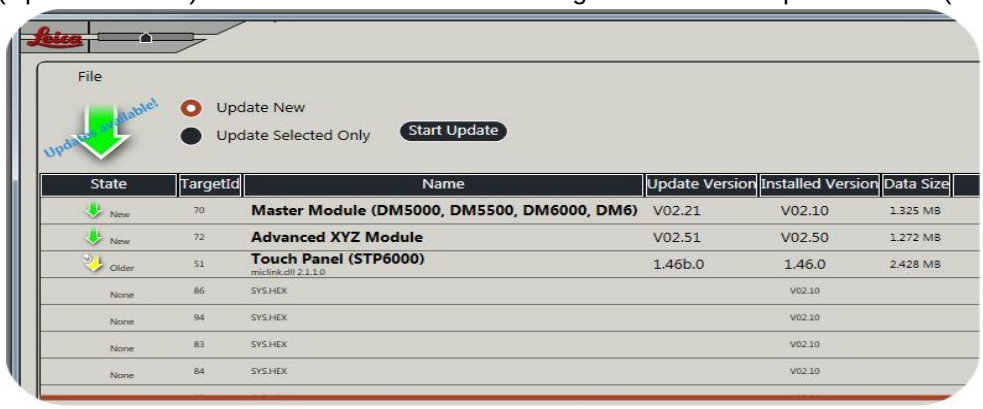
1. Open the **Setup** tab
2. Select IL-turret (dichroic filters) in the Components window.
3. Configure filters by selecting the turret position then-double clicking on the filter in the searchable list of Leica Filter items - these will be the codes displayed on the LCD touch panel screen
   - the Brightfield scanning position (default position 1) should be set as “EMP” (Empty Brightfield)
   - only one EMP should be set, other blank positions should be left as “-“ (deleted)
4. Open the **Acquire** tab and test lens movement

Note: Leica codes that are selected here are not used or displayed in the VERSA scan console. It is not critical that these names match exactly the filter in the microscope, only that the configuration is set for a filter being present in the position and the name as seen on the LCD touchpanel is recognizable to anyone using this.

Firmware Check and Update

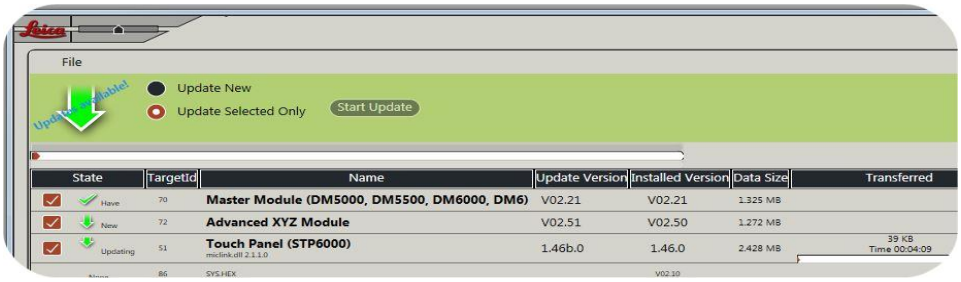
Updating the components firmware is only recommended if any problems are encountered with microscope operation or connection, if significant LAS Version changes are installed, or if replacement motorised or electronic components are fitted (e.g. LCD touchpanel, focus drive or electronics).

1. Go to Start>Programs>Leica Application Suite v4>Configuration>Hardware Configuration (>Utilities>Hardware Configuration on earlier versions)
2. Select Options>Firmware Update from the toolbar menu
3. Click "Start" (this does not initiate the update, only the display table)
4. A table is displayed showing the firmware revisions that are included with the current LAS software (Update Version) and a readout of what is running on the microscope Hardware (Installed version)



- If the installed firmware is an earlier version it may be useful to update as a troubleshooting option for any operational issues
- If the installed firmware is a later version it is not recommended to downgrade
- If the microscope shows the same version then an update can still be initiated although it is unlikely to have an effect

5. Select the “Update New” option to only update older firmware versions, or select “Update Selected only” and choose which modules to update
6. Click on “Start Update”, the firmware update progress is indicated on screen



7. Once complete close the update and Hardware Configuration windows

Updating LAS

To update the version of LAS installed on the system run the LASmenu.exe application from the LAS installer location;

57. Click on the “Install Leica Application Suite and Leica Camera Software” menu option
58. Accept the License agreement and Continue
59. At the camera option menu select only the Demo Camera v7.7
60. Select Next to the Welcome screen
61. Next to accept the default folder locations
62. Next to accept the “Complete” installation
63. Install to start the installation
64. Select Finish when the install is complete
65. If, during installation, a driver install message requests a “Trust” option please accept
66. After successful installation select Continue to return to the main LAS menu window
67. Exit to close

Software: Aperio VERSA Calibration

All objective lenses and dichroic filters specified within the system order will be set-up during in both the Leica Application Suite and the Aperio VERSA Calibration application during manufacture.

If there are any validated lenses purchased outside of the system order, they can be added in the LAS and Aperio VERSA Calibration application.

Configure a Lens

The following lenses are validated for use with the Aperio VERSA scanning system:

Mag.	Type	VERSA spares item	LMS Item*	Description	Objective Name
1.25x	Dry	23OBJ125PLFDRY	11506215	HCX PL FLUOTAR 1.25x/0.04	1.25xPLFL
5x	Dry	23OBJ005PLFDRY	11506224	HC PL FLUOTAR 5x//0.15	5xPLFL
10x	Dry	*Legacy model*	*11506505*	*Obj. HC PL FL 10x/0.30*	10xPLFL
10x	Dry	23OBJ010PLFDRY	11506521	Obj. HC PL FLUOTAR 10x/0.32	10xPLFL
20x	Dry	*Legacy model*	*11506503*	*Obj. HCX PL FL 20x/0.50*	20xPLFL
20x	Dry	23OBJ020PLFDRY	11506519	Obj. HC PL FLUOTAR 20x/0.55	20xPLFL
20x	Dry	*Legacy model*	*11506503*	*Obj. HCX PL FL 20x/0.50*	20xPLFL
20x	Dry	23OBJ020PAPDRY	11506529	Obj. HC PLAN APO 20x/0.80	20xPLAPO
40x	Dry	3OBJ040PLFDRY	11506382	Obj. HC PL FLUOTAR 40x/0.80	40xPLFL
40x	Dry	*Legacy model*	*11506294*	*HC PL APO 40x/0.85 CORR**	40xPLAPO
40x	Dry	23OBJ040PAPDRY	11506294	HC PL APO 40x/0.85 CORR*	40xPLAPO
40x	Oil	*Legacy model*	*11506358*	*Obj. HC PL APO 40x/1.30 OIL CS2*	40xPLAPO
40x	Oil	23OBJ040PAPOIL	11506358	Obj. HC PL APO 40x/1.30 OIL CS2	40xPLAPO
63x	Dry	*Legacy model*	*11506223*	*HC PL FLUOTAR 63x/0.90 CORR**	63xPLFL
63x	Dry	23OBJ063PLFDRY	11506223	HC PL FLUOTAR 63x/0.90 CORR*	63xPLFL
63x	Oil	*Legacy model*	*11506185*	*Obj. HCX PL FL 63x/1.25 Oil*	63xPLFL
63x	Oil	23OBJ063PLFOIL	11506384	Obj. HC PL FLUOTAR 63x/1.30 OIL	63xPLFL

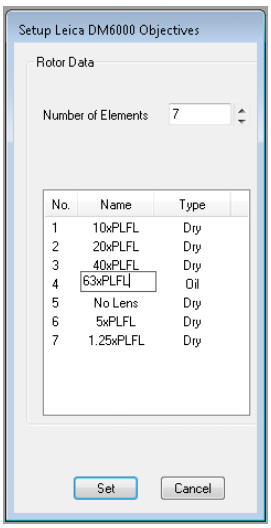
Legacy lenses were validated as part of VERSA 1.0 release and continuing use of these lenses is maintained.
* Configuration selection option within the Leica Application Suite

The labeling of the objective lens in the Aperio VERSA Calibration application is critical to the operation of the system. Ensure that the names in the 'Objective Name' column are used.

To add one of the above lenses not configured at installation:

To add a lens not configured during installation:

68. Open the Aperio VERSA Calibration application (Administrator user-rights are required)
69. Select the Objectives Setup button from the left-hand control panel
70. In the window that opens, right-click on the objective turret position into which the additional lens has been installed, in the name column
71. The text box will become active. Type the name of the additional lens using the nomenclature shown in the 'Objective Name' column
72. Select Set
73. Select Save Configuration
74. Close the application



IMPORTANT! Spatial Calibration is required following addition, position change or replacement of an objective lens. When the Aperio VERSA Scanner application is next opened, channels will be automatically created using the new lens.

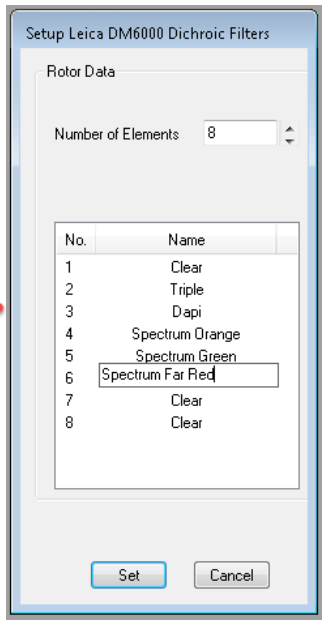
Configure a Filter

The following are typical filters supplied for use with the Aperio VERSA scanning system:

232FL4900072	Leica DM Cube DAPI
232FL4930272	Leica DM Cube Spectrum Aqua
232FL4930372	Leica DM Cube Spectrum Green
232FL4930472	Leica DM Cube Gold
232FL4930572	Leica DM Cube Spectrum Orange
232FL4930672	Leica DM Cube Spectrum Red
232FL4900972	Leica DM Cube Spectrum Far Red

To add a filter not configured during installation:

1. Open the Aperio VERSA Calibration application (Administrator user-rights are required).
2. Select the Dichroic Filters Setup button from the left-hand control panel.
3. In the window that opens, right-click on the dichroic turret position into which the additional filter has been installed, in the name column.
4. The text box will become active.Type the name of the additional lens using the nomenclature shown.
5. Select Set.
6. Select Save Configuration.
7. Close the application.



When the Aperio VERSA Scanner application is next opened, channels will be automatically created using the new filter.

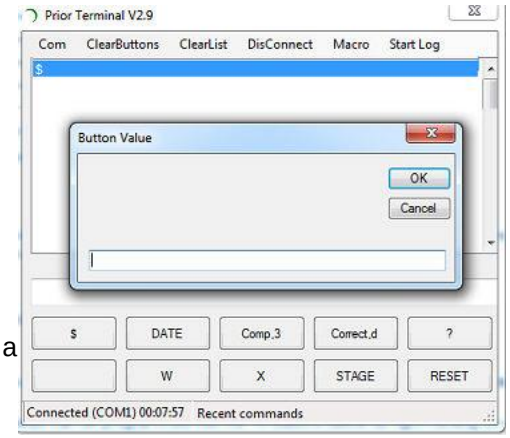
Software: Prior Terminal

Prior Terminal is a test and programming application from Prior Scientific. It is installed on VERSA systems and can be used to check interface to ProScan III stage controllers and Slide Loader components.

75. Run the Prior Terminal application from Start>Programs>Prior Scientific>Visual Basic
76. Select Com and confirm the Com port and Baud Rate
    - Baud rate for USB connection should be set to;
      - 9600 or 57600 for the ProScan
      - 9600 for Oiler
    - Slide Loader connection for “USB Serial connection”
    - ProScan Connection to the Com indicated for “Prior Communication Port”
    - Prior Oiler connection for “USB Serial connection”

If the software cannot connect to the Com port there will be an error. This indicates the incorrect Port or Baud setting has been used; a hardware fault; or if some other application is already accessing the port.

With the application running there is a text box where commands can be entered.



Proscan Controller

- ?: Interrogates the controller for connected devices
- $: Used to query the controller internal hardware positions
- DATE: Used to query the ProScan firmware version
- comp, 0: sets ProScan compatibility mode for VERSA operation
- encoder: queries the controller for connected encoders (3 as a positive response)
- encoder 1: enables connected encoders (0 as expected response)
- ERRORSTAT: returns any current controller errors (if Red light displaying on controller box)
- RESET: Used to clear the ProScan programming

Prior Oiler

- DROP: returns the current Dispense, Backflow and Priming parameters. where
  - a = Dispense (number of microsteps forward)
  - b = Backflow (number of microsteps backwards)
  - c = Priming (number of microsteps per second using PRIME button)
- DROP *a,b,c* : sets dispense volume parameters
- DROP *a* : Delivers a=number of dispense drops
- BAUD 9600: sets internal BAUD rate to 9600 if it gets reset to a different value

Frequently used commands can be programmed into the buttons below by right-clicking on each button and typing in the command. Once programmed pressing the button is the equivalent of typing in the command and pressing enter in the correct sequence.

Proscan Software Reset

The following procedure is used to reset the Proscan controller;

- After realignment or adjustment of the encoder read head or gold reading scale
- Troubleshooting encoder response
- Troubleshooting unexpected stage movement
- Troubleshooting Proscan red light or “ERRORSTAT” faults

The stage and X/Y encoder cables must be connected during the procedure.

11. Run Prior Terminal (Select Start, Prior Scientific, Visual Basic, Prior Terminal).
12. Open the COM menu and select the COM port for the Proscan.
13. For USB interface the Baud date for connection should be set to 9600 or 56700.
14. Type ? then Enter, Proscan controller information should be displayed
15. Type **comp, 0** (then Enter) to set compatibility mode
16. The expected response is **0**
17. Type **SIS** (then Enter) to set the index for the encoded stage,
18. The expected response is the stage moving in both X and Y axis to each encoder datum
19. When movement is complete the expected response is **R**
20. Type **encoder** (then Enter) to query both X and Y encoders
21. The response should be **3** (both encoders are recognised)
22. Type **encoder 1** (then Enter) to enable the encoders.
23. The expected response is **0**
24. Perform a spatial calibration in Aperio VERSA Calibration application to reset the XY homing (first page) and XY limit check (last page) steps.
    If no other hardware changes have occurred since last Spatial Calibration other steps can be skipped.

Software: Acronis Backup and Recovery

New System workstations include Acronis Backup and Recovery 11.5 application software for imaging of the Windows Operating System partition and allows for recovery in the event of O/S corruption, virus or unexpected system faults after software or configuration changes.
If a fault prevents login to the Windows operating system, the **F11 boot** option (Acronis Startup Recovery Manager) can be used to rebuild the hard disks from an image stored in the ASZ or on a connected device.

There is a pre-configured Acronis Secure Zone (ASZ) for storing the drive images, for additional data safety this is a separate Hard Drive partition from the Windows C: and D: drives.

The system is supplied with an "MFG_Final_Backup" image of the Windows partition in the Acronis Secure Zone, containing the pre-installation configuration in case of recovery to the out-of-box condition for troubleshooting or as a last resort option.

Weekly Backup

The VERSA system includes a weekly backup plan which provides additional recovery options to a recent working state.
This is defaulted to Friday evenings at 6pm, this can be checked and edited through Windows Task Scheduler for a more appropriate day or time if required. It is not recommended to disable this.

Acronis Startup Recovery Manager

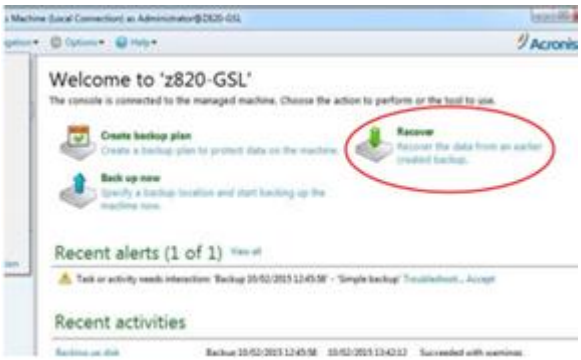
The Acronis Startup Recovery Manager (ASRM) should be activated to allow access to the Acronis Backup and Recovery options outside of the Windows environment. Once activated the **F11** key can be used when prompted (before Windows starts) to enter a boot version of Acronis with access to the ASZ.

To check this is activated run Acronis Backup 11.5 and select the **Tools** menu option.

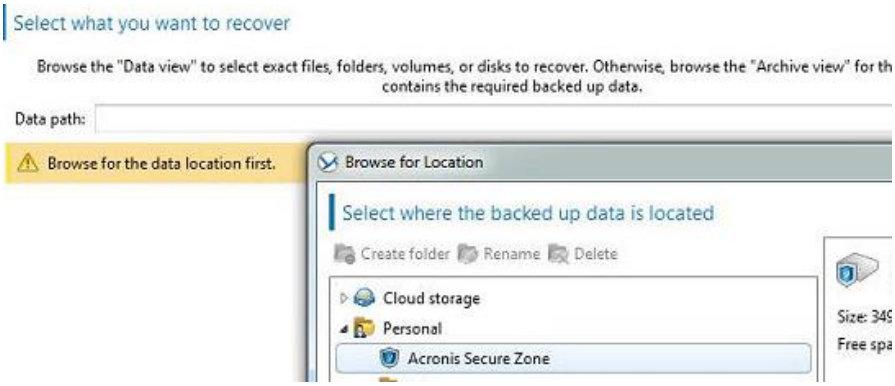
- “Deactivate Acronis Startup Recovery Manager" means the F11 prompt is currently available at boot up – this is the default system condition – it is not advised to deactivate this
- "Activate Acronis Startup Recovery Manager" means the F11 prompt is currently not available at boot up, this would indicate it has been manually deactivated or there has been a problem with the boot partition and it needs reactivating

Acronis Recovery Procedure

1. Logon as Administrator
2. Select Windows (Start)>All Programs>Acronis>Acronis 11.5 Management Console>Acronis Backup 11.5
3. From the menu select "Recover"



4. In **Recover Data** click on "Select data..."
5. Click on the "Browse..." button to the left of the Data Path box
6. In the **Browse for Location** window expand the "Personal" folder
7. Select "Acronis Secure Zone" and click OK



8. From the "All Archives" list details of each back up shown to allow choice of the appropriate backup image
9. Select the Archive name to recover and confirm disk 1s MBR and C: partition is selected (if present an NTFS partition is not essential for selection)
10. click OK
11. In **Where to Recover** confirm "Physical Machine" and "Disk 1" are selected

12. Click OK to run the recovery, after a few seconds a prompt Window requesting a system reboot will appear, select "Reboot now" to start the procedure

F11 Boot Procedure

When prompted during boot up (after the PC and RAID BIOS screens, before the Windows splash screen) press “F11” to enter the Acronis Backup and Recovery 11.5

1. Select Acronis 11.5 Management Console>Acronis Backup 11.5
2. From the menu select "Recover"
3. In Recover Data click on "Select data..."
4. Click on the "Browse..." button to the left of the Data Path box
5. In the Browse for Location window expand the "Personal" folder
6. Select "Acronis Secure Zone" and click OK
7. From the "All Archives" list details of each back up shown to allow choice of the appropriate backup image
8. Select the Archive name to recover and confirm disk 1s MBR and C: partition is selected (if present an NTFS partition is not essential for selection)
9. click OK
10. In Where to Recover confirm "Physical Machine" and "Disk 1" are selected
11. Click OK to run the recovery, after a few seconds a prompt Window requesting a system reboot will appear, select "Reboot now" to start the procedure

Note: If the VERSA is integrated into a laboratory LAN domain network and you are recovering an old image then you may need to have local I.T. support on hand to re-domain the system, update access settings or re-install software added after the last backup.

Manual Backup recommendations

Following successful installation, calibration and basic operational testing a new manual backup image should be created before any significant software application installations or Windows driver or configuration changes (including networking modification) which may unexpectedly impact VERSA function.

Thereafter an Acronis image of the Windows partition should be made before any major change is made to the system configuration in case of unexpected faults or failure.

If there is available space on a shared network drive, external USB hard drive or NAS drive then a manual backup should be made to such an external location for additional recovery options.

Acronis Manual Backup Procedure

1. Logon as Administrator
2. Select Windows (Start)>All Programs>Acronis>Acronis 11.5 Management Console>Acronis Backup 11.5
3. From the menu select "Backup Now"
4. In **What to Backup** click on "Items to backup..."
5. Ensure only "Disk1" is selected and click to expand
6. Deselect "Acronis Secure Zone" and click OK
7. In **Where to Backup** click on "Location..."
8. Expand the "Personal" folder and select "Acronis Secure Zone"
9. Type in a name for the file and select OK
10. Confirm Backup Type is showing as "Full"
11. Click OK to run the backup
12. Close the Acronis Window when finished

For “Where to Backup” an alternative location (such as local D: drive, external HDD or network location) can be selected for a duplicate backup for alternative recovery options (such as building a duplicate drive or recovery in the unlikely event of the Acronis Secure Zone becoming damaged).

Warning Message: Transfer Failures

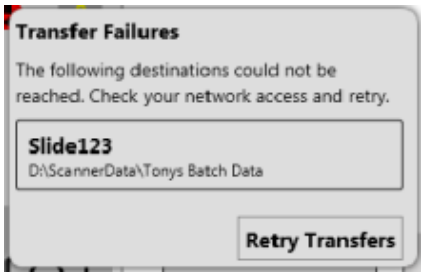
If a slide scan destination is not available, the red warning symbol will appear, indicating that the scan files cannot be written to the destination location that was set in the VERSA Scan console.

Possible causes of this are;

- Destination folder cannot be accessed
- Destination folder will not accept/create the files being exported
- Scan application is unable to create the files due to character restrictions

For network or folder access ensure the specified location is available and then select 'Retry Transfers'

- check network and access permissions
- reconnect external drive
- check for folder rename or delete



If the transfer data is no longer required, you can delete the failed transfer files from D:\ScannerData\ReviewInput to remove this warning.

If the original transfer destination is not accessible or cannot be recreated, it is not possible to modify the export location the scan through the VERSA application.

Manual workarounds to save or backup the data can be used.

1. Copy the .SCN and .SDF files to a new location using file explorer
   i. Browse to D:\ScannerData\ReviewInput
   ii. Cut the equivalently named .SCN and .SDF files
   iii. Browse to the intended final destination
   iv. Paste the files, moving them to the new folder location

2. Modify the .SDF file data for a new export location
   i. Browse to D:\ScannerData\ReviewInput
   ii. Open the .SDF file(s) in a text or .xml editor application
   iii. Locate the <DestinationDataFolder> xxx </DestinationDataFolder> line and replace the file path (xxx) with the new location.
   This can be in local drive/folder format or UNC path.
   iv. "Retry Transfer" in QC Review

3. Modify the .SDF file date for illegal barcode characters
   i. Browse to D:\ScannerData\ReviewInput
   ii. Open the .SDF file(s) in a text or .xml editor application
   iii. Locate the < SlideID_Auto> xxx </ SlideID_Auto > line and edit the slide name (xxx) so that it no longer contains any unsupported characters (< > ? / : " * \ |)
   iv. "Retry Transfer" in QC Review

Note: Moving or editing .SCN or .SDF files may not be possible for any scans that VERA is linked to in the QC Review screen. If access errors occur close the VERSA application and try again or copy the files to the required destination and then re-start VERSA Scan to delete the files within the QC Review screen.

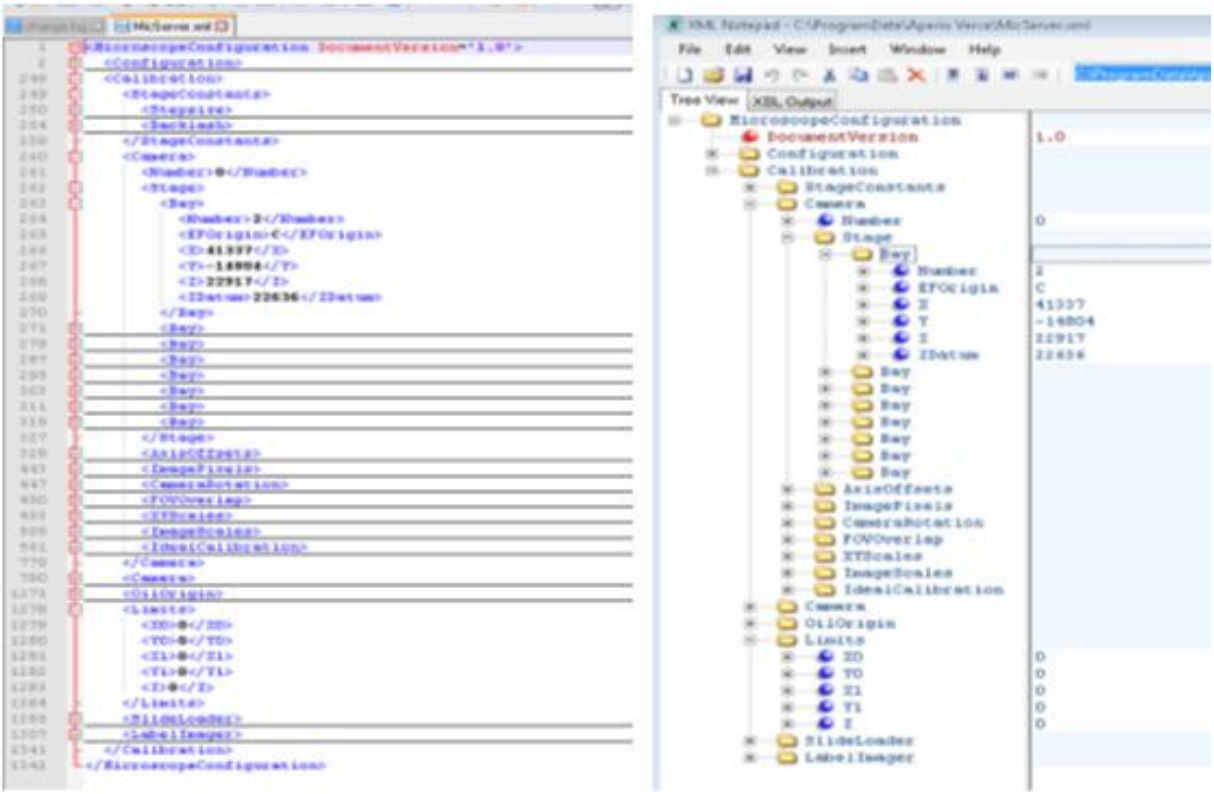
VERSA XML files

The VERSA Scan and Calibration applications save configuration, calibration, scan reference and log information as files on the workstation. The majority of these files use an XML formatting and a working knowledge of the file structure and relevance to VERSA operation is recommended.

Review or modification of the following files are known to be useful as part of issue investigation and troubleshooting, typically as part of an escalated support contact.
This will be achieved more efficiently using an XML text editor that shows the formatting and allows expanding or collapsing of the various XML sections is recommended.

- **Notepad ++:** This can be downloaded from…
  https://notepad-plus-plus.org/
- **XML Notepad:** This can be downloaded from…
  https://xmlnotepad.codeplex.com/

  Note: This installs XML Notepad v2.7. It is no longer recommended to use XML Notepad 2007 (v2.5 from Microsoft) as this has been seen to corrupt some of the XML files used by VERSA.



View of micserver.xml in Notepad++ (left_ and XMLNotepad (right)

IMPORTANT!: If you edit any of the VERSA configuration or settings files always make a copy of the original first, to recover in case of unintentional editing or saving errors which may damage the file structure.

Micserver

Location: C:\ProgramData\Aperio Versa\ MicServer.xml

Contains hardware configuration parameters and all Spatial Calibration data. The file structure is in 2 sections;

77. **Configuration**: Descriptions, interface port and positional settings for the connected hardware devices.

    Each component is in an **\Axis** sub-section with relevant drive name and data. The configuration data is created during the initial setup within the **Aperio VERSA Calibration** application.

78. **Calibration:** Where all Spatial calibration data is saved for objective lenses, camera image scales and stage positions for scanning, oiling and barcode label reading.

    The calibration data is created automatically from the stage and image readouts during the steps carried out using the Spatial Calibration wizard.

Micserver.xml is read **but not modified** by the VERSA Scan application. It does not determine microscope light or camera exposure settings used in scanning, which are set in the HCT files and scan templates. Checking the **Configuration** section of the Micserver.xml should be done in the Aperio VERSA Calibration application to confirm Controller (Hardware) devices and interface ports set and the names and positions of Dichroic filters and Objective Lenses.

Troubleshooting the **Calibration** section should be done in an XML Editor reviewing the appropriate Camera0 (Brightfield) or Camera1 (Fluorescent) section based on the issue being investigated.

- Calibration>Camera>Stage>Bay>ZDatum: The Calibration focus reference point used in scanning. On VERSA200 systems Bay1 contains the only active data.
- Calibration>Camera>AxisOffsets>Axis (Objectives)>Element: Confirms X, Y and X offsets for each objective lens in relation to the 10x objective.
- Calibration>Camera>XYScales>XYScale: Stage movement dimensions for each objective – should not be 0 for any configured lens.
- Calibration>Camera>ImageScales>ImageScale: Image dimensions for each objective – should not be 0 for any configured lens.

Focus Config

Location: C:\ProgramData\Aperio Versa\FocusConfig.xml

Contains focusing rules for each of the 10 objective lens names that can be configured on the VERSA Scan system.

For each lens there is;

- **FocusEveryN** (Default 1). Sets the refocus rule when reaching each of the focus map points in the scan area. 0 switches the function off

Refocussing during the scan compares the Z values from the original focus map and modifies it if there is a difference, accommodating potential thermal expansion of the microscope hardware due to environmental temperature fluctuations.

Setting **FocusEveryN** to 0 (switching off the scan refocus) may be useful for lenses up to 20x troubleshooting in-scan focus issues or to increase scan speeds where the VERSA system is in a stable temperature environment. It is not recommended to completely disable this function where temperature variation is expected, for fluorescent scanning, very large scans or for 40x of higher objectives where focal depth becomes more sensitive.

- **Brightfield>Focuspass** “Coarse”: Auto-focus first pass over the widest Z range to detect the sample
- **Brightfield>Focuspass** “Fine”: Auto-focus second pass for calculating optimal sample focus point
- **Fluorescent>Focuspass** “Coarse”: Auto-focus first pass over the widest Z range to detect the sample
- **Fluorescent>Focuspass** “Fine”: Auto-focus second pass for calculating optimal sample focus point

Each Focuspass contains a “RangeMultiplier” - which determines how far above and below the starting focus point the auto-focus pass moves – and StepSize – the focus step resolution used by the microscope. RangeMultiplier has been modified for troubleshooting of slide focusing errors seen in v1.0 but is not expected to be required following the introduction of template focus offsets in v1.02.

HCT Files

Location: C:\ProgramData\Aperio Versa\BaseHCT & **C:\ProgramData\Aperio Versa\HCT**

HCT files are configuration files controlling setup of hardware parameters such as microscope filter, condenser, lamp and camera settings that will determine the final image quality during scanning.

Each HCT file is linked to one of the validated microscope objective lenses on the system. As default with the VERSA application there are one each for 1.25x and 5x PLFL-DRY lenses, and 3 for each for 10x, 20x, 40x and 63x lenses, named “THIN”, “MEDIUM” and “THICK”.

The functional difference between these three variants is due to the condenser Aperture Diaphragm (A.D.) settings fixed into each file;

- THIN: Has the highest A.D. giving improved image resolution but less focal depth and contrast
- MEDIUM: Has an intermediate A.D. for a balanced resolution, focal depth and contrast
- THICK: Has the lowest A.D. giving reduced image resolution but higher focal depth and contrast

During the automated Brightfied Channel Calibration procedure the **\BaseHCT** file parameters are used for each objective lens in the calibration process. Once complete updated files are copied into the **\HCT** folder, overwriting the previous calibration files.
A comparison of the two sets of files would show differences in the Lamp intensity and Camera settings, reflecting the calibration process updating for the microscope light intensity to provide optimal image settings.

Manual edit of **\BaseHCT** files may be advised to increase A.D. settings by 3-6 for 10x – 63x objectives in the “THICK” HCT. This can reduce optical artefacts and spherical/color aberrations seen on some sample types due to a low A.D. setting. If A.D. is increased it may be necessary to lower the Camera Exposure setting to compensate for the increased light reaching the camera, otherwise Brightfield Calibration may fail due to an oversaturated image.
Update of the “MEDIUM” and “THIN” A.D. setting by a similar range maintains user template options within the scan application.

.SDF Files

Location: D:\ScannerData\ReviewInput or **\ScannerInput** during scanning. Saved to the final, user-set export destination folder once scanning is reviewed as complete.

An .SDF file is created during a VERSA Scan alongside the.SCN image file. The SDF file contains scan metadata from the Aperio VERSA system;

- **SlideID_Auto**: Scan Name as assigned by the VERSA Scanner or Barcode label reader
- **SlideID_UserAssigned**: Manual scan name as entered by the user in the scan application
- **DestinationDataFolder**: Final export destination set before the scan batch
- **OriginalSST**: The name of the scan template used
- **ScanProtocols**: Data on scan passes used in the scan including scan area, focus map details and HCT file settings used (microscope and camera hardware values)

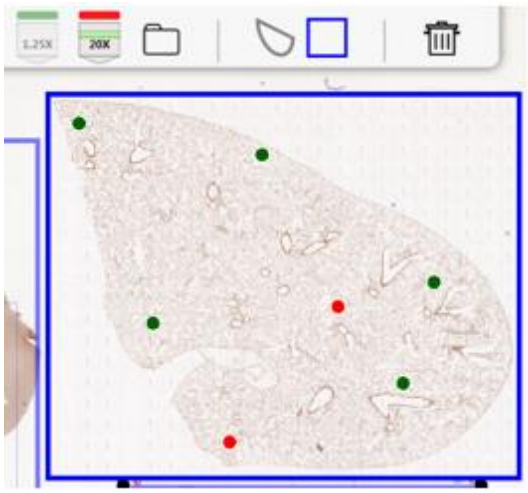
The .SDF file is of most use in determining if there were any failed focus map points during the scan, as these are overlaid onto the scan image within the VERSA QC Review screen. Troubleshooting scan failures or focus map issues must be done in the VERSA QC Review screen, as no other SCN viewer application can overlay the focus map points that are stored in the accompanying .SDF file.

If the .SCN and /SDF have already been exported to the final destination they can be copied into **D:\ScannerData\ReviewInput** to allow re-review of the last scan pass focus map for troubleshooting.

Left-click on the scan region to see the focus map points from the last scan pass. Any failed points will be highlighted in red.

If the region bounding box is red then this means there were not enough successful focus points to start the scan.

If an SCN file of a customer scan is to be sent for review as part of an escalated support, contact the associated SDF file is critical to allow all possible investigation options.



Scan Export Destination File

Location: C:\ProgramData\Aperio Versa\SystemDestinations.xml

The system destinations file contains the Scan Export destination folders configured within the VERSA scan console. This is in an XML format;

```
<Destinations>
        <Path1>D:\temp</Path1>
</Destinations>
```

Additional <Path*n*>xxxx</Path*n*> lines will be created or updated each time a new destination is modified within the Scan console.

It is possible to manually modify or add a destination path in the .xml file (the “xxxx” as shown above). This may be necessary if the destination is not showing in the windows Browse panel that VERSA uses, such as a UNC path with server name or IP address.

Diagnostic Logs

Aperio VERSA generates a rolling set of system configuration, calibration, and process and hardware event data during routine operation. In the event of unexpected operation, errors in scanning or application crashes these log files may contain relevant information useful to the Leica Support organization trying to diagnose a fault and should be included as part of any escalated support contact.

The log files can be located on the scanner in the following location: **C:\Aperio VERSA Logs**

- **\archive** and **\archives** folders containing historical logs from previous operations
- **\BFCalib** folder containing image files from failed Brightfield Channel Calibration
- Individual text files from different hardware sub-processes running during VERSA Scan operation

Logs are saved as a .txt file from each sub-process of the VERSA scanner in the format;

yyyy-mm-dd hh:mm:ss.ssss| <log file name>| <data level>|<data output>

Example…
2016-05-09 13:33:42.6900| SCAN| Trace|Capture frame 1 actual position is X=3856.194, Y=3891, Z=24351

14 | Service & Maintenance

Service & Maintenance: Maintenance Checklist

There are limited serviceable components as part of a VERSA Scanning System and no attempt should be made to open, dismantle or remove any fixed panels or components from the system without prior training or unless following written instructions from a support representative.

When carrying out routine maintenance record the system details;

- Aperio VERSA Serial No.:
- PC Model & Serial #:
- Monitor Model & Serial #:
- Camera Model & Serial #:
- Microscope Model & Serial #:
- Fluorescent Source:
- Fluorescent Filters:
- LAS Version:
- Microscope Firmware Version:
- Operating System and Windows critical update patches
- Check system BIOS. If not current, do not update unless indicated by Support.
- Check Microsoft OS Service Pack. If not current only update if indicated by Support.
- RAID Configuration: Check integrity
- Check Aperio VERSA Scanner application software version and build number
- Note HDD Free Space for both C: and D: drives
- Check TCP/IP settings and workgroup or Domain name

This information will be relevant during any Support Contact or escalation to Leica Biosystems Technical Support and will be requested if not initially provided.

The following components or operations should be reviewed for performance and condition during routine maintenance:

- Computer O/S operation
- Monitor screen display
- Keyboard function
- Mouse function
- Aperio VERSA Configuration
- Camera image
- Microscope condition and operation (see Microscope maintenance checklist)
- Fluorescence illumination components
- XY Stage movement
- Aperio VERSA Calibration Wizard (Spatial Calibration)
- Image Calibration.

Any deterioration or general wear and tear should be noted, even if apparently not affecting operation.

Computer Operation

The Aperio VERSA System works on a PC operating under a Microsoft® Windows® 7 environment. Precautions should be taken to prevent the systems being exposed to computer viruses which may compromise operation.

The Hard Disk Drive (HDD) C: Partition contains the PC Operating System, application files and drivers. Regular checks should be made to ensure that the amount of free space on the C: drive never drops below 2GB.

In routine operation refrain from copying large files to the Desktop, as this uses C: drive space and can degrade performance. This is especially important where multiple operators of the system login with different user names.

All workstations are supplied with a D: partition which is used for temporary scanning file and data storage.

Warning Message: Low Disk Space

The VERSA workstation is not intended for long-term data storage and the PC hard-disk should not be used to store completed scan data; this may impair scanner functionality.

If the free space available on the local disk (D:) drops below 200GB a yellow warning symbol appears in the left-hand column in the Scan screen. If this warning is seen check for slide scan data that has not yet been exported to the final destination or files stored in normally temporary locations that may not be getting cleared due to unexpected operation;

- D:\ScannerData\ReviewInput
- D:\ScannerData\ScannerInput & D:\ScannerData\ScannerOutput

RAID Disk Management

Aperio VERSA Scanning Stations are supplied with a 2x RAID 1 HDD configuration using the Adaptec 8405 RAID controller card;

- HDD (C:\): 2 x SATA 1TB 7200RPM – RAID1 array
- HDD (D:\): 2 x SATA 4TB 7200RPM – RAID1 array

There are no user interactions required for routine system operation. Using the RAID BIOS and **maxview Storage Manager** is intended for confirmation of normal operation or when troubleshooting any PC boot, Windows operation or disk issues.

Any errors here will typically show diagnostic, repair or rebuild options which should be escalated to Leica Biosystems Technical Support for further advice.

Should a disk show as failed it should be removed and replaced with a new HDD, allowing the new disk to be rebuilt from the remaining working member of the RAID1 array to recover redundancy

RAID BIOS

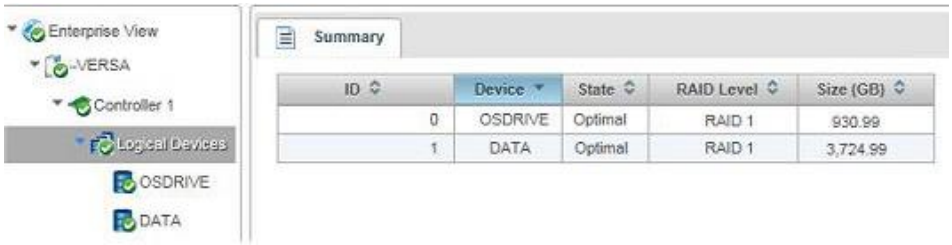
On PC boot press Ctrl-A when prompted to enter the BIOS and confirm RAID array configuration;

25. Using the keyboard controls enter “Array Configuration Utility”
26. Select “Manage Arrays”
27. Enter the VERSA configuration which should show two RAID 1 arrays;
    - OSDrive, 931GB array
    - Data, 3.2TB array
28. Array Properties should show the Status as “Optimal” with both hard disks showing as Array Members

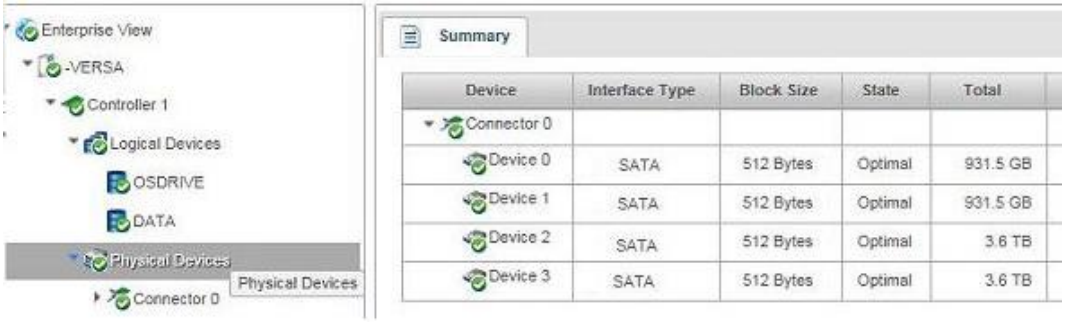
maxview Storage Manager

RAID status confirmation and diagnostics can be carried out when logged into Windows in the Adaptec maxview Storage Manager application.

1. Select Windows Start>All Programs>Adaptec>maxview Storage Manager
2. A local https:// page open through the default internet browser application, select “Continue to this website”
3. Login with the CytoVision administrator login and password
4. Expand to “Controller 1” and select Summary to review card parameters including operating temperature.
5. Expand Logical Devices>OSDrive to review the array properties
6. Expand Logical Devices>DATA to review the array properties



7. Expand “Physical Devices” to view information and events for the hard drives in the array



Disable RAID card alarm

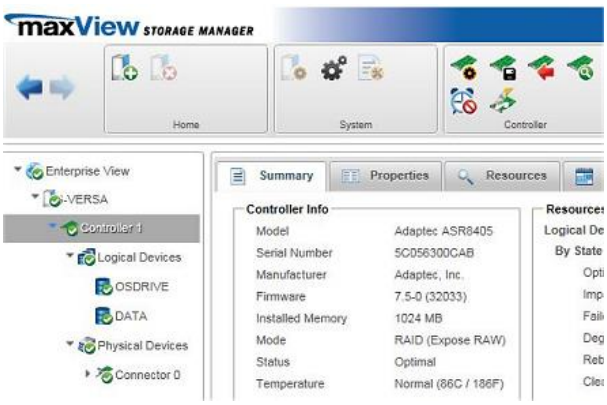
An audible alarm will sound if any errors are encountered during RAID booting. If the system operates normally under the this state it is possible to disable the alarm while troubleshooting or repair options are investigated.

To disable the alarm in the RAID BIOS go into the “Serial Select Utility”;

1. Using the keyboard controls enter “Serial Select Utility”
2. Arrow-key down to “Alarm Control” and press enter/return
3. Select “Silence” (temporary) or “Disable” (permanent) and enter/return

To disable the alarm in maxview Storage Manager

1. Expand to “Controller 1” which activates the Controller toolbar section
2. Selecting the clock (silence alarm) icon



Equipment Cleaning

The workstation keyboard, mouse and other equipment surfaces may require cleaning after extended operation or after exposure to dust or foreign matter. Lint, dust and foreign matter may block air vents and limit the airflow for the equipment and accessories.

Occasionally clean the air vents on all vented sides of the equipment and wipe the exterior surfaces of the equipment with a soft, damp cloth as necessary.

General safety precautions

- Always power down and unplug equipment before cleaning or other maintenance work.
- Never use solvents or flammable solutions to clean the equipment. Cleaning products may discolor the surface finish of the equipment.
- Wear safety glasses equipped with side shields when cleaning keyboard and air vents using an air blower or compressed air.

The Aperio VERSA system should be cleaned regularly, and the microscope optics should be kept extremely clean.

Cleaning Coated Parts - Dust and loose dirt particles can be removed with a soft brush or lint-free cotton cloth. Clinging dirt can be cleaned with a little soapy water or alcohol. Never immerse any component in water or cleaning solutions, use linen or leather cloth that is moistened with one of these substances.

Materials required

The following items are recommended for routine service and maintenance activities;

- Hex (Allen) keys; 2, 2.5, 3 & 4mm as minimum
- Screw drivers. 2-3mm flat and #0 & #1 Phillips (Cross) as minimum.
- Compressed/canned air (eg. Falcon "Dust Off" or equivalent)
- >=70% alcohol for cleaning items exposed to microscope immersion oil.
- <50% acetic acid for monitor LCD screen cleaning
- Non-abrasive, lint-free swabs or lens cloths

Oiler Servicing and Maintenance

Oiler service and maintenance should follow the same checks and processes as described in the Installation and Configuration sections of this manual.

In addition, check for dust or foreign material in the oil bottle, air-bubbles in the oil tubing and for any damage to the tubing, bracket or connectors.

Erratic or no flow of oil from the dispenser (View from top)

- Check that there are no kinks or sharp bend in the tubing.
- Check for air bubbles in tubing. If found, please Prime the pump until air bubbles have been removed.
- Check that the tubing is located inside the oil reservoir.
- Check that the tubing is not split or burst.

Camera Maintenance

There is no routine maintenance work requiring the Digital CCD camera to be removed from the microscope after installation.
Attaching the camera to the microscope and C-mount should be done carefully in a dust free environment wherever possible to reduce the chance of dust or other particles attaching to the lenses or CCD sensor.

If marks are observed on the live image, then first confirm that they are on the camera;

- Load a slide onto the microscope stage and focus so that you can see the sample displayed on a live image. This can be done in the Spatial Calibration or Scan>Channels window.
- Defocus the sample, any marks remaining in focus are in the optical path above the slide.
- Rotate the Camera & C-mount together on the phototube and observe the live image.
  - Any marks that rotate in the image must be within the microscope optics, NOT the camera
  - Any marks that stay in fixed position must be on the camera coverglass

Camera Cleaning

If there is only loose dirt on the camera, it is advisable to remove it with compressed air. This method is gentle and prevents damage to the optics. If using an aerosol can of compressed air, ensure you hold the can vertical and discharge the can first to clear any propellant that may have built up – this can attach to the sensor if sprayed directly onto the camera.

If air does not work after 3 or 4 attempts, then try a very gentle polishing of the CCD chip using a cotton-bud or swab tip with the head wrapped with a soft-lens cloth.
Always polish gently and, if possible, restrict touching the camera surface apart from the area where the marks are contained. Leaving the camera powered on with a live image on display can assist in this as the shadow of the swab tip will appear in the image display.

When removing stubborn dirt, never use abrasive materials such as paper or microfiber cloths, as they can damage the lens surfaces and lead to scratches.

An alternative is to use a piece of Scotch Magic tape (Scotch® Magic™ Tape 810) which has an adhesive that picks up material without leaving residue behind. The camera should be left switched off for approximately 30 minutes to prevent warm components modifying the tape adhesive properties.
This technique should be used with care to ensure no residue or oil from fingers or tools is transferred onto the adhesive side of the tape and that any tweezers used to remove the tape never come into contact with the camera glass.

- Measure/cut an appropriate sized amount of tape for the camera chip, remembering to add enough to one edge to be able to pull it off when finished.
- Remove the camera from the C-mount and carefully place the tape over the chip recess
- Press down using a cotton swab so the tape touches down evenly (make sure any edges that may have touched skin or other material do not contact the glass)
- Gently flatten (polish) the tape so the adhesive contacts all the surface
- Remove the tape by slowly and gently pulling the free edge off

Leica DM6000B Microscope Servicing and Maintenance

Service and maintenance of the DB6000B microscope used on VERSA is restricted to external checks and cleaning unless there is a recognizable microscope operational fault. Microscopes in warm and warm-damp climatic zones require special care in order to prevent fungus contamination.

Microscope maintenance checklist

- Check for visible damage
- Condition of electrical connections
- Check push buttons, levers and switches (Including CTR Box)
- Switch on instrument and perform electrical function test (use microscope control buttons/touch panel)
  - Lamp brightness setting
  - Diaphragm control (aperture, field diaphragm)
  - Objective nosepiece rotation,
  - Z drive travel path with handwheel
  - Fluorescence turret rotation and shutter response
  - Mot. Condenser (switch between TL & IL mode on touch panel)
  - Verify functionality of touchpanel
  - Switch off instrument
- Check lamphouse and exchange bulb if required
- Clean all glass surfaces that are accessible without disassembly
- Check and clean filter cubes (note any damage or deterioration)
- Check and clean eyepieces
- Check and clean objective lenses
- Switch on instrument and perform software (LAS) interface test
  - Check firmware versions and update if required
  - Check Objective and Filter configuration for correct names/positions in Setup tab
  - Check Objective and filter movement response in Acquire tab
  - Switch off instrument
- Ensure that the VERSA required Infra Red and Hoya LB200 blue brightfield filters are in the light path to provide the required contrast for Brightfield Scanning.
- Use representative sample slides to view using the eyepieces and confirm visual quality and resolution.
- Check Köhler illumination and reset if required
- Check phototube optics by viewing live sample image

Microscope Cleaning

To prevent dust build-up, objective lenses and glass components should be regularly cleaned with an air blower and gently wiped with cleaning paper or gauze. Immersion oil or fingerprints should be removed using isopropyl alcohol or absolute alcohol.

Caution! - Acetone, xylene or nitro-containing thinner can harm the microscope and should not be used.

Do not disassemble any internal components of the microscope such as the main body, power supply, fluorescent illuminator (headpiece) unless absolutely necessary for repair work.

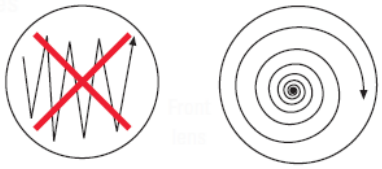
Precautions

- Wear safety glasses equipped with side shields when cleaning equipment using an air blower or compressed air.

- Absolute alcohol is flammable and must be handled carefully. Keep away from open flames and potential sources of electrical sparks such as equipment in the process of being switched on or off. Use in a well-ventilated room.

Cleaning glass surfaces and objectives

- Remove dust – Use a wound cotton sticks to manually remove dust particles. Use compressed air or bellows if required.
- Remove water-soluble dirt – Use a wound cotton stick and clean deionized water. Clean from the center towards the outside edges in concentric circles.
- Remove solvent-soluble dirt – Use a wound cotton stick and Ethanol PA or Acetone PA. Clean from the center towards the outside edges in concentric circles.



Halogen Lamp replacement

Lamp deterioration would initially display as a reduction in light intensity over several weeks or months. Failure the lamp filament at the end of its life does not always show as a complete failure to ignite, but the intensity and quality of the light would be expected to show symptoms such as an increased risk of brightfield channel calibration failure or shorter intervals of scan image quality before repeated brightfield calibration is necessary.

There are two 12V 100W lamp types that have been supplied with VERSA;

- 11500974: Osram 64625; 50hr life @ 100% power; 3600lm; 3450 K CCT
- 11700066: Philips 7724; 2000hr life @ 100% power; 2550lm; 3100 K CCT

The manufacturer's lifespan is based on 100% intensity use but the operational use is in excess of 2000 hours of VERSA operation as the lamps are not used at maximum power which increases working life.

Note: It is recommended to replace like-for-like otherwise there will be a noticeable intensity difference in the camera image as the Osram 64625 lamp is approximately 30% brighter than the Philips 7724.

This may mean needing to modify the lamp intensity and camera exposure used in the system \BaseHCT files if Brightfield Calibration fails due to the staring images being too dark or too bright.

Osram 64625 replacing Philips 7724

- Decrease HCT file lamp intensity by 5-10 value or until 70% is reached, after which
- Decrease camera exposure up to 50%

Philips 7724 replacing Osram 64625

- Increase HCT file lamp intensity by 5-10 value or until 90% is reached, after which
- Increase camera exposure up to 50%

Lamp replacement using the adjustable Leica microscope lamphouse may require light flat-field adjustment using the 2 hex screws and the focusable collector lens in the lamp. This is a visual process best done using a live image on the screen at 10x magnification, adjusting the lamp intensity until any gradient is visible.
The Grid pattern used in Spatial Calibration may help judge the intensity shift across the display.

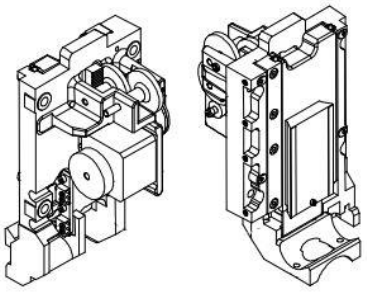
- Adjust the collector lens at the front of the lamphouse to achieve maximum intensity, this typically shows as a hot-spot of maximum intensity across the image
- Use a 3mm hex key to turn each of the two side adjustments screws in turn until the light display is central
- Defocus the collector lens to flatten the light

Microscope Hardware replacement

Unexpected or inappropriate function of several of the main DM6000B motorized or electronic components can lead to operation issues with the Aperio VERSA scanner. This may be due to wear-and-tear deterioration from long-term system operation or unexpected short-term failure.

These components are referenced in the Leica DM6000B Service Manual. For VERSA systems replacement of the entire module only would be indicated rather than further sub-component item investigation.

Z drive (focus)

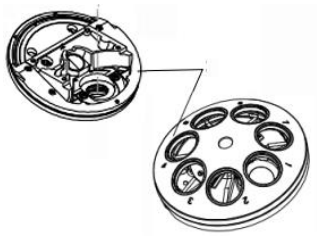


LMS Spares item: **11020530021000** Focus drive, motorized

Motor, bearing and mechanical issues within the focus drive can lead to incorrect or incomplete movement of the Z Z drive during microscope operation or upper/lower limit sensor activation errors.

Symptoms may include unreliable microscope initialization, unexpected Z display on the LCD touchpanel, slide loading (VERSA 200) faults, and slide focus inconsistency during calibration and scanning.

Objective Lens Turret (nosepiece revolver)

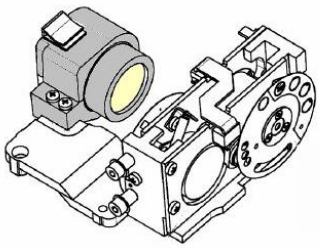


LMS Spares item: **11020422610000** Revolv.nosepiece 7-fach, M25x0,75. Mot

Turret motor, bearing and sensor issues can lead to failure of the system to move reliably to the correct objective or failure of the turret to come to a precise stop at the aligned position, introducing a variable image shift between scan passes.
When powered off, the lens turret should be able to be moved by hand with minimal but constant resistance in either direction.

There are no known checks for Z drive or lens turret faults that require microscope internal investigation.

Fluorescence (IL) Diaphragm Module lens

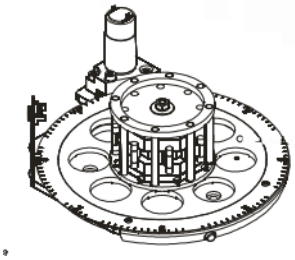


LMS Spares item: **11020530139000** Diaphragm module Flou 1 inch.

Burn marks on the internal lens within the Incident Light (IL – Fluorescence) diaphragm module can occur after long-term fluorescence use or, in the shorter-term, if the fluorescence light source is left on constantly for multiple hours without closing the light source or microscope shutter.

Such module lens damage can lead to uneven fluorescent intensity over the sample, may be visible through the microscope eye-pieces and is seen as a consistent tiling effect within the final images from multiple samples using multiple objective lenses.

IL (Dichroic) Turret



23MIC0032 LMS Spares item: **11020530044000** filter turret 8-times mot.

Motor, bearing and mechanical issues within the dichroic filter turret housing can lead to incorrect or incomplete movement of the turret during filter switching operations, over-shoot and delayed correction of the turret position.

Symptoms may include movement failure or audible mechanical resistance, initialization errors starting up the microscope LCD touchpanel or delayed movement and DM6000 errors within the VERSA log files.

Disassembly of the cover of the unit can assist in confirming suspected hardware faults in the IL-module. This is not recommended without familiarity or experience of the procedure.

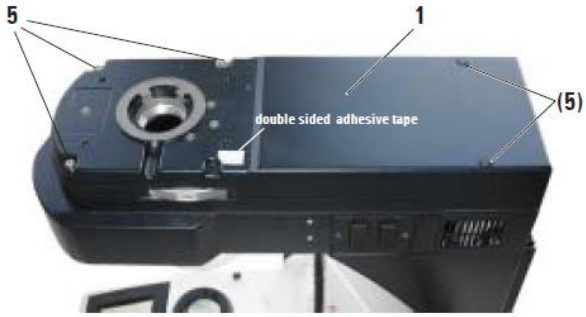
Accessing the DM6000 II-module

(Procedure from DM6000 LMS Service Manual)

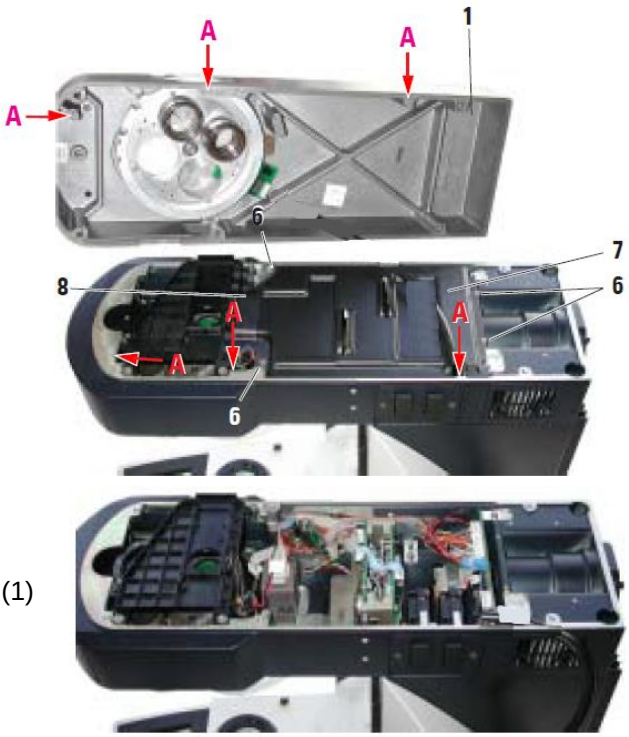
3. Unscrew the clamp screw (2) and remove the 2 protective caps (3).

4. The cover cap (4) is secured with two-sided adhesive tape only. It can be removed carefully without using any tools.

5. Unscrew 5 screws (5) and carefully lift off cap (1).



6. Unscrew 4 screws (6) and remove the cover (7) and, in the case of the 8-position incident light axis, the light guard (8).



Access to the IL-Turret and Diaphragm Module lens is now possible for visual and mechanical checks.

Further disassembly should only be done following LMS Service Training procedures taking care with all electronic cabling, optical and delicate mechanical components.

To reassemble reattach the light-guard, put on the cover (1) and screw down the main screws (5).

Press on the cover cap and screw in the clamp screw (2) before mounting the 2 cover caps.

Leica DM6000B Service Manual

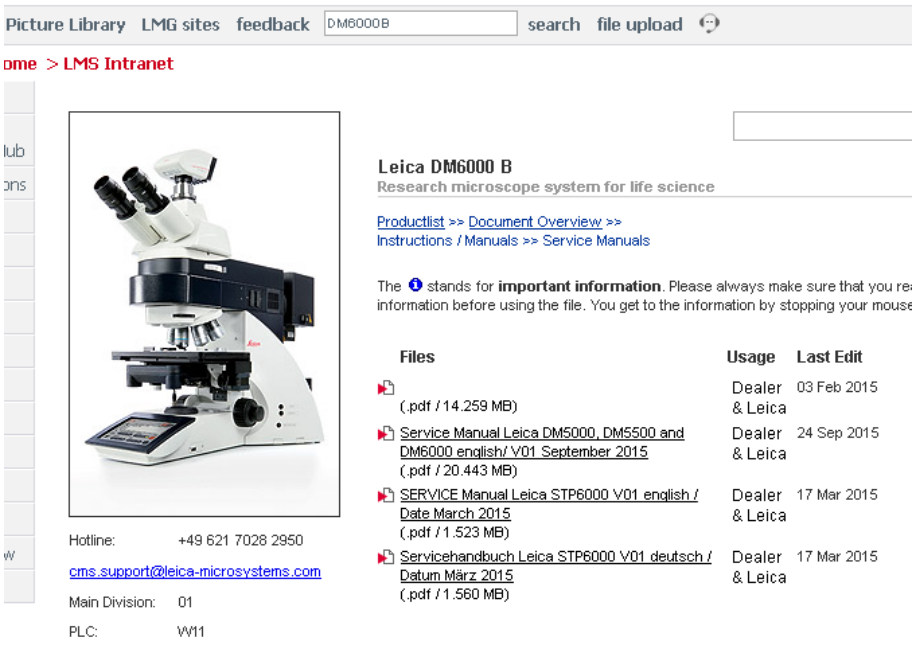
Note: Disassembly of the microscope main body or any of the sealed sub-components (including the CTR) is only recommended by engineers who have received LMS service training on microscope service and maintenance, or under specific advice of such a trained support representative.

The service manual for the Leica DM6000B and the CTR6000 can be found in the Shareinfo Service Database.

- **Shareinfo Home**: https://shareinfo.leica-microsystems.com/home.nsf
- >Service>Product Service Information
- Select CMS Service Documentation DB (R)
- Scroll down to DM6000B (CM Products (production stopped, service current) – Equipment
- Select DM6000B and click on Instructions/Manuals>Service Manuals

Through the ShareInfo LBS Intranet https://shareinfo.leica-microsystems.com/lbs.nsf

- Type DM6000B into the search window
- Click the Products>Service Database option
- Select either of the DM6000B options and click on Instructions/Manuals>Service Manuals



Stage Maintenance

The microscope stage, bracket and condenser holder should be visually checked on for signs of damage, wear, foreign material or immersion oil spillage.

When powered off it should possible to push the stage top plate along the length of both X and Y axes with a smooth, consistent movement with only minimal friction or resistance.

Clean the stage with a soft, damp cloth to remove dust and debris. Should immersion oil require further cleaning wipe using commercially available absolute alcohol.

Precautions

- Beware of glass fragments on the stage from broken or chipped microscope slides. Use a fine brush to dislodge before cleaning and dispose of any glass pieces appropriately.
  If using compressed air wear safety goggles with side shields.

- Absolute alcohol is flammable and must be handled carefully. Keep away from open flames and potential sources of electrical sparks such as equipment in the process of being switched on or off. Use in a well-ventilated room.

Clean the Lead Screw

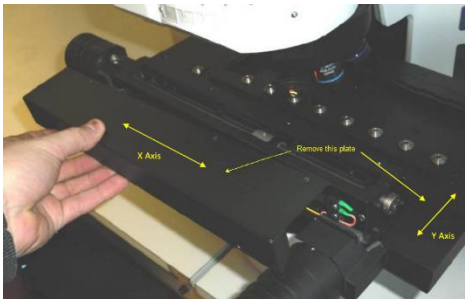
For stages approaching or over 2 years old; where there are visible signs of oil infiltration; where erratic movement, jamming or mechanical resistance is observed.

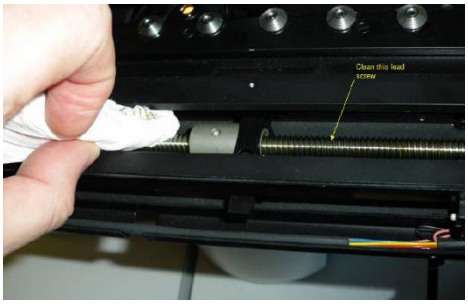
Materials required

- >=70% alcohol for cleaning items exposed to microscope immersion oil.
- Castrol (BP) Moly Grease, SDS no. 452715, for Stage axis lubrication.

The Prior stages used on VERSA are not designed for dry running. If the lead screws are cleaned to remove dust or debris this will also remove the lubricant grease and this should be replaced, Castrol (BP) Moly Grease (Molybdenum based lubricant) is advised for this.

1. Remove the screws holding the X/Y plate(s)
2. Remove the plate(s)
3. Place particulate-free cleaning paper around a cotton swab/cotton bud and soak in 70% ethanol
4. Place cleaning paper against the lead screw
5. Use the Aperio VERSA Calibration Application to exercise the stage through the full range of motion for the relevant axis (left-right / backward-forward)
6. Add a small amount of Moly grease across the screw
7. Repeat the axis exercise movement
8. Replace the axis plate(s) and test when complete





Check axis limits

During any service or maintenance activities where the axis covers are removed the axis limits should be checked to ensure the screws holding the limits are tight.

This process is described in the installation: Check XY stage limit switches.

Note: On VERSA 8 systems the X limit switches affect the ability to scan to the far left of Bay1 and the far right of Bay8, so should not be adjusted so they prevent reaching these slide edges.

The Y axis limits affect the ability to scan to the end of the slide (rear end) or up to the slide frosting typical of most microscope slides. The front Y limit should not be opened too far into the slide frosting as this can lead to objective lenses reaching or impacting with the slide holder spring grips and may lead to objective lens damage.

Stage Levelling

It is critical for VERSA scanning reliability and image quality that the stage insert and slide holder be as level and flat as possible. If there is any extreme tilt of the slide in the stage holder this will lead to an increased risk of focusing errors during scanning and potentially failed scans.

It is recommended to try and achieve a focus gradient on the loaded calibration slide of;

- Less than 20 microns across the total width of the slide (edge to edge)
- Less than 40 microns across the total length of the slide

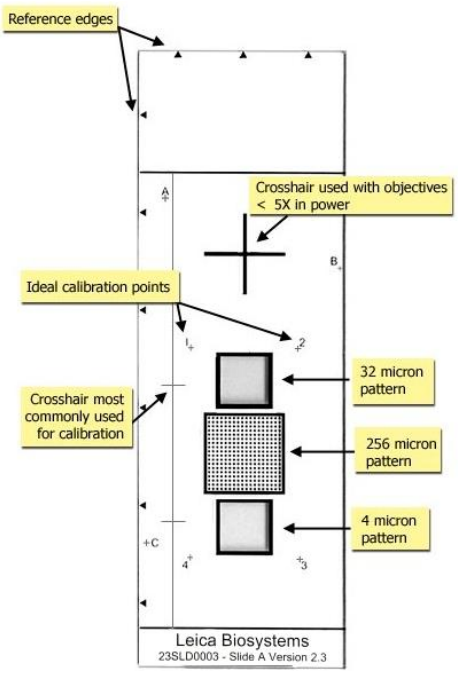
To do this requires access to the focus display of the microscope and stage controls to allow moving across the slide to positions which can be easily re-located to allow check and re-check of focus height during any adjustment of the stage level. Stage levelling should not be done using a sample slide as the absolute flatness of the sample is unlikely to be completely guaranteed.

The Aperio VERSA (Spatial) Calibration application allows all this using the Leica Calibration slide A fixed reference positions, “Move to England Finder” option for fast relocation, and display of the absolute X, Y and Z stage positions on screen.

Slide Positions

A - C59
B - Z50
C - A15

1 - G40
2 - T40
3 - T13
4 - G13



Note: On a VERSA 8 system the default Y axis limit is set to prevent stage movement that may lead to objective lenses impacting with the spring grips holding the slides. This prevents movement to Ideal Calibration positions 3 & 4 .

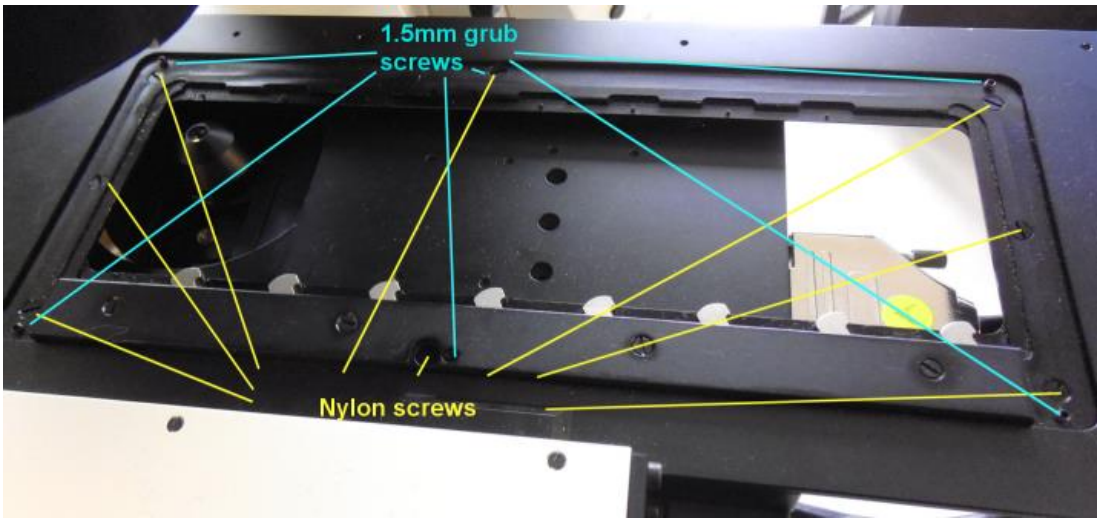
The procedure below is a suggested workflow, although with experience alternative procedures may be used.

1. Open the spatial calibration application and connect to hardware by clicking on one of the motorised component buttons on the left panel
2. Open the Stage X-Y control window
3. Select “Home” and open the advanced panel to give display of X, Y and Z coordinates and the move to England Finder panel

4. Place the calibration slide into bay 1 and type in C59 in the England Finder Panel text box
5. Press the "Move to England Finder" button (with the green arrow) – moving the stage to the **A** point
6. Move the focus slider to raise the stage until the A point comes into focus (if necessary adjust the “Lamp” intensity to prevent saturation
7. Move to the 20x objective and set the lamp and aperture diaphragm setting to between 40% and 50% as required to get a clear live image displayed
8. Focus on the A point and read the focus (Z) value for each point from the X/Y/Z display at the top of the stage advanced window (if Auto-focus is used then right-click above or below the red focus slide once to refresh the Z value display)

Insert adjustment

The 6-position adjustment options of the 8 slide insert allow for good control of stage level.
It is important not to over/under-adjust the two central positions in relation to the side screws otherwise there is a risk of introducing a bend in the insert across the X axis which would show as a tilt in one direction across bays 1-3 and an opposite tilt for bays 5 - 8.



1. Type in A62 into the England Finder box and “Move to” the position. This should show the thick black reference line at the “top/left” of the slide.
2. Focus on the edge of the line and/or slide surface material. Refresh Z display and record the value.
3. Move to position Z62, the “top, right” of the slide. Focus and record the Z value.
4. The difference across the width of the slide (A62 and Z62) should be **less than 15 microns**.
   If a clear tilting of the stage is seen by comparing the values (>30 microns) then left-right tilt needs to be adjusted, with the positions then re-checked for flatness;
   - tightening the Nylon screw on the top corner that has the lowest focus value
   - slightly raising the grub screw on the top corner that has the highest focus value
   - Repeat the move between A62 – Z62 and check focus, if they are still more than 30 microns apart repeat the process again.
5. Type in H21 into the England Finder box and “Move to” the position. This should move close to the bottom left corner of the 256 microns grid pattern on the slide (adjust position as required to be able to determine an accurate focus value).
6. Focus on a grid pattern or slide surface material. Refresh Z display and record the value.
7. Move to position S21, near the “lower right” corner of the grid pattern. Focus and record the Z value.
8. The difference across the width of the slide (H21 and S21) should be less than 10 microns.
   If a clear tilting of the stage is seen by comparing the values (>20 microns) then tilt needs to be adjusted with the positions then re-checked for flatness;
   - tightening the Nylon screw on the bottom corner that has the lowest focus value
   - slightly raising the grub screw on the bottom corner that has the highest focus value
   - Repeat the move between H21 and S21 and check focus, if they are still more than 20 microns apart repeat the process again.

9. Now look at the length of the slide, recording the focus Z position difference between A62 and H21, then Z62 and S21.
10. The Z difference between the top and bottom positions should **less than 25 microns**.
    If a clear tilting of the stage is seen by comparing the values (>40 microns) then then front-back tilt needs to be adjusted with the positions then re-checked for flatness;
    - tightening the Nylon screws on the insert edge that has the lowest focus value and/or
    - slightly raising the grub screw on the edge that has the highest focus value
    - Repeat the move between the positons and check focus, if they are still more than 40 microns apart repeat the process again.
11. The process now needs to be repeated with the slide in bay 4 or 5, and again in Bay 7 or 8 to identify if there is any variation or bowing of the insert across the stage. This would be seen with Z tilts in bays 5-8 being significantly different to those in bays 1-4.
    The Nylon and grub screws in the centre of the insert can be adjusted to compensate for bowing/raising of the insert in the middle bays, otherwise they should be used in the same way as the four corner screws.
12. Open the spatial calibration application and connect to hardware by clicking on one of the motorised component buttons on the left panel.
13. Open the Stage X-Y control window
14. Select “Home” and open the advanced panel to give display of X, Y and Z coordinates and the move to England Finder panel
15. Place the calibration slide onto bay 1 of the stage
16. Type in C59 in the England Finder Panel text box and press the "Move to England Finder" button (with the green arrow) – this moves the stage to the **A** point.
17. Move the focus slider to raise the stage until the A point comes into focus (if necessary adjust the “Lamp” intensity to prevent saturation.
18. Move to the 20x objective.
19. Set the lamp and aperture diaphragm setting to between 40% and 50% as required to get a clear live image displayed.
20. Focus on the A point and read the focus (Z) value for each point from the X/Y/Z display at the top of the stage advanced window (if Auto-focus is used then right-click above or below the red focus slide once to refresh the Z value display).
21. The target focus variation is based on the slide features described here, which should approximate to a total slide variation less than 20 microns width and 40 microns length.
    It is not expected that the differences or absolute values are equal in each bay, but any significant deviation should be notes as it may indicate insert distortion or damage.

If further changes to the insert screws are required in either axis then it is recommended you identify whether a change will help return the insert to "zero" adjustment compared to the stage base. e.g. if the stage X axis need to be raised on the left or lowered on the right always try the lowering, as this reduces the chance of progressively raising all the screws until the insert is "floating" over the base!

The nylon screws should be tightened and a final check made. Do not over-tighten as this may damage the material and make future modification difficult.

If any significant adjustment has been made, the bay datum should be reset again in Spatial Calibration

Uninterruptible Power Supply (UPS): Battery replacement

UPS Batteries are a consumable item with a supplier guarantee for 2 years of use. After this time - or if the LCD panel indicated battery replacement - the UPS battery packs should be replaced following manufacturer guidelines – this is not a standard Leica support activity.

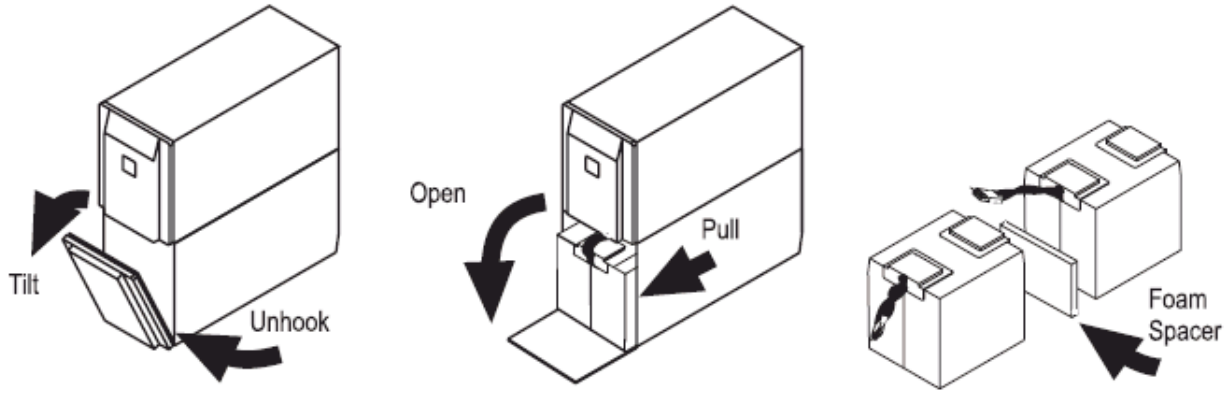
Liebert PSI2200RT3 (VERSA systems October 2016 -)

There are no current Leica procedures for battery replacement for the Liebert (Emerson) PSI2200RT3.

APC Smart SMT2200 (VERSA systems - October 2016)

The APC RBC55 battery pack is available as a Leica spare item, part number 23GSLUPSRBC55

Follow the steps pictured below to change the battery.



Once installed, allow the unit to charge for five hours.
The Smart-UPS will charge whether it is on or off, and will charge whether there is a load present or not.

In situations where the power quality is poor, it is recommended that the unit be shut down during this charging period.

A Smart-UPS that is powered on may switch to battery operation, which would prolong the time needed to fully recharge the battery.

In order for the replaced battery LED to be cleared, it is necessary to run a valid self-test. For a self-test to be considered valid, the battery must have at least 75% charge (4 bars on the LCD display). The self-test is initiated when the Smart UPS is switched on after the charging period.

Note: If the UPS is used significantly beyond normal battery life (not recommended) the packs may expand in the unit and become difficult to remove. If this is seen then a new UPS purchase is recommended.

X-Cite Maintenance

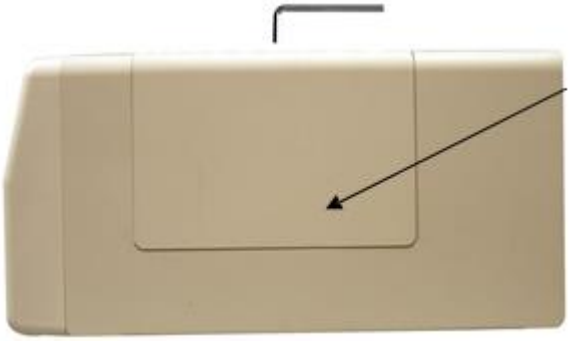
There are no serviceable components in the X-Cite 120PC.

Maintenance recommendations are to ensure the placement of the unit meets installation recommendations for position, air-ventilation and light-guide protection. Lamp and Lightguide replacement guidelines are based on the number of hours following recommended X-Cite operation and troubleshooting.

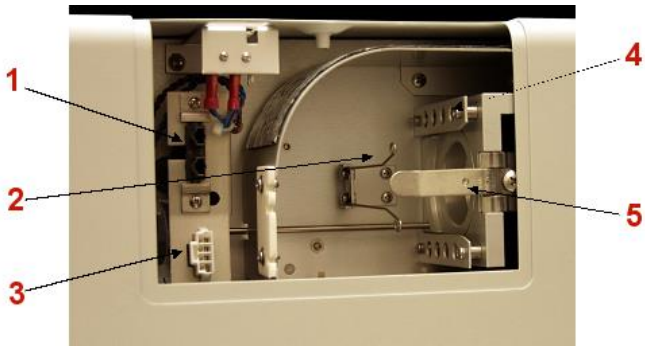
X-Cite Lamp replacement

The X-Cite lamp is only recommended for use up to 2000 hours' life. It is normal for the output to decline over the first several hundred hours of use and then stabilize at a level ~70% of the initial output for the remainder of the lamp life.
Although lamp failure after 2000 hours is unlikely, extended use after this time may display as increased deterioration in light intensity, background noise and illumination unevenness.
If the hour display on the LCD panel is in excess of 3000 hours then replacement of the lamp should be planned. If the lamp accumulates over 4000 hours then "end" and "bulb" will alternate on the LCD and the lamp will not strike, the lamp must be replaced at this time.

- Be sure the AC power cord is disconnected from the unit.
- Using a 3mm hex key, remove the lamp access panel from the unit cover



Lamp access cover



1. Lamp Power Connector
2. Lamp Spring Clamp
3. Intelli-lamp connector
4. Lamp Bracket
5. Lamp Bracket arm

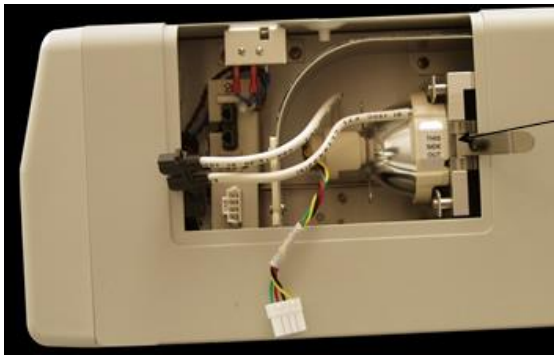
1. Carefully remove the lamp module from its container, holding only the ceramic components.

   The lamp module's operational life can be significantly shortened if handled incorrectly. Be sure only to handle the ceramic surfaces. Do not touch the bulb's glass envelope or the inside surface of the reflector as skin oils can cause the lamp module to fail prematurely.

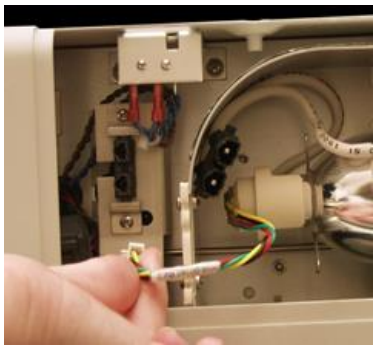
2. Open the lamp bracket arm by pulling towards you and to the right

3. Position the lamp so that the 2 leading edges of the ceramic mount slide into the groove of the lamp bracket. The middle of the lamp should be in position to fit into the spring clamp

   Close the clamp



4. Connect the 4-pin intelli-lamp sensor connector to the socket inside the lamp-housing.



5. Attach the 2 pin power connector to it socket inside the lamp-housing

6. Ensure the leads and connectors are secured in their alignment grooves before replacing the side access panel and screw

If the lamp module has been installed incorrectly “bulb” will be displayed on the LCD panel and a continuous beep alarm will be heard after the 90 second warm-up cycle.

X-Cite light guide replacement

It is recommended to replace the X-Cite light guide for every second lamp replacement. This should give a typical life of at least 4000-6000 hours of use.

The most common cause of lightguide deterioration is overheating due to sustained use with limited cooling-down time, or physical stress to the guide, as described in the operation and troubleshooting section.

It is usually time to replace a light guide when:

- Illumination is low and replacing the lamp does not improve brightness
- Dark or uneven areas become visible in the field of view (a bubble is blocking part of the light)
- A section of the light guide becomes noticeably warmer than the rest of the guide (a bubble is blocking transmission of light, forcing the light guide to absorb the energy)
- It is 2-3 years old OR has been in use for 4000-6000 hours, when handled properly in a well maintained unit.

To replace the light guide, ensure the unit is powered off and that the protective caps are removed from both ends of the new light guide before inserting into the unit and microscope adaptor.

1. Remove the old light guide. Firmly grip the flexible strain relief near the light guide retainer and pull out firmly. Never grip the light guide by any other part other than the flexible strain relief portion.
2. Insert the light guide into the light guide retainer located on the back panel of the unit. Push the light guide in until it seats with a second positive "click".

VERSA Registry settings

The VERSA Scan application uses multiple Windows Registry settings during its operation. The list below contain the editable settings that can be adjusted to modify system functionality as part of fault investigation or troubleshooting.
Please note that not all entries can be modified or have support-relevant descriptions and may vary between application versions without supporting documentation.

The registry editor window is in a Computer file explorer format. All VERSA application entries are in
HKEY_LOCAL_MACHINE\SOFTWARE\Aperio Versa

To start Windows Registry Editor;

- Open a run menu using the Windows Key - “R” and type in regedit. Click OK
- Click the Windows Start icon and type regedit into the text box. Select **regedit.exe**
- Navigate to the location of the key in the left panel
- Right-click the registry key name in the left panel and Export to save a backup .reg file
- Right click the value name in right panel and select **Modify** (or double-click)
- Update the “Value data:” and OK

Warning! Serious application or system problems might occur if you modify the registry incorrectly using Registry Editor.

- Only modify known VERSA related keys unless following advanced support advice.
- Before you edit the registry, export the keys in the registry that you plan to edit.
  - Right-click on the registry folder and select “Export”
  - Browse to a location to save the file to
  - Enter a file name, maintaining the (*.reg) format
  - click Save
- Ensure there is a recent Acronis backup image in case of unexpected problems that cannot be resolved by restoring the registry export.

\DebugTools

- **\DebugWindow\Visible**: (Default 0) Set to 1 to enable the Live Debug Image window in Scan
- **\OpenLCD**: (must be manually created) Set to 1 to view DM6000 LCD touchpanel during scanning
- **ForceDiagnosticImages** (string, must be manually created). Set to 1 for force Brightfield calibration diagnostic images to be created even if there is no calibration lens failure

\ScanFileCreator

Contains 2 strings for the Image compression ratio for SCN output. Default = 95 (%)

- **JpegQualityGrey**: Compression rating for the Andor Zyla camera
- **JpegQualityRgb**: Compression rating for the Point Grey Grasshopper camera

\Scanner

- **\Grabber**: Contains the 2 modifiable keys that affect image display;
  ..\Brightness Boost (Default 5)
  ..\Saturation (Default 1.5)
- **\Options**: Contains hardware parameter settings
  ..\FLLampOverride (Key name SwitchOffAfterBatch) (Default true) Set to false to keep the X-Cite lamp on between scan batches

\Stitcher

- **\Options**: contains image output settings
  ..\ShowStitchCalculations (Default 0) Set to 1 to overlay X, Y, Z and frame data on the SCN file

..\DebugTools\DebugWindow\Visible

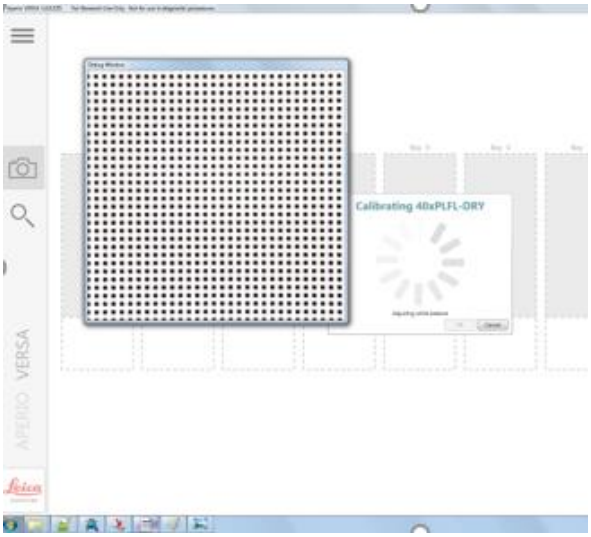
Location: Hkey_local_machine > SOFTWARE > Aperio Versa > DebugTools > Debug Window > Visible
Setting: 0 OFF; 1 ON

When switched on the live window appears behind the VERSA application after initialization. Minimize the application to access the display, the win live image of the camera currently in use.

This is useful for troubleshooting the following;

- Auto calibration failures
- Focus failures
- Image quality issues
- Scanning concerns
- Unexplained scanning failures

Please note: The live window should be switched off after troubleshooting is complete as it can cause VERSA scan delays or intermittent crashing during scanning.



..\Stitcher\ Options\ShowStitchCalculations

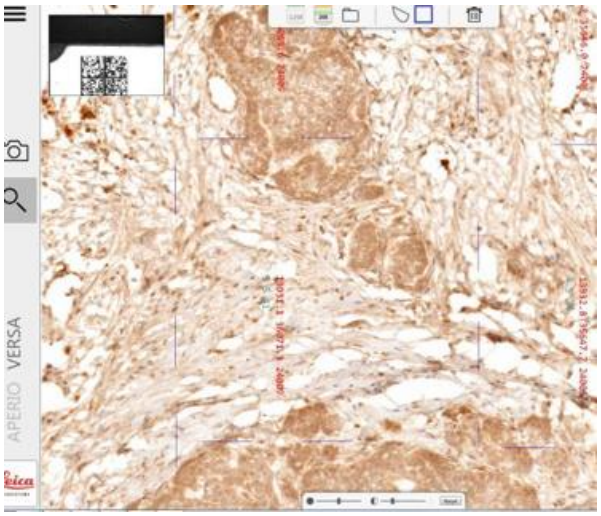
Location: Hkey_local_machine > SOFTWARE > Aperio Versa > Stitcher > Options > ShowStitchCalculations
Setting: 0 OFF; 1 ON

Debug output to SCN file. When on, debug information is written to the SCN file on completion of a scan.

Blue grid lines show the approximate boundary of a single frame.
Red numerical output = stage X and Y, microscope Z positions
Blue numerical output = X Grid position for scan area, Y grid position for scan area, frame number

This is useful for troubleshooting the following;

- Stage tilt
- Focus failures
- Image quality issues
- SL200 stage insert issues (Slides not sitting flat on the insert)
- Microscope Z drive problems
- Focus mapping issues



..\Scanner\ OpenLCD\

Location: Registry > Hkey_local_machine > SOFTWARE > Aperio Versa > Scanner > OpenLCD
Setting: Must be manually created. 0 = LCD locked 1 = LCD unlocked

Used if viewing or interacting with the DM6000 LCD panel during scanning is required for testing or troubleshooting; especially for focus readout, lamp intensity, aperture and field diaphragm positions.

..\Scanner\ Options\FlLampOverride

Location: Hkey_local_machine > SOFTWARE > Aperio Versa > Scanner > Options > FlLampOverride
Key name “SwitchOffAfterBatch”
Setting: Default is true, the X-Cite switches off at the end of every batch or review pass; set to false to leave on during the VERSA session (this has immediate effect, no need to restart VERSA)

Please note: If this option is preferable to the customer for routine operation they must be informed that the lamp needs to be switched off if there is expected to be a long delay (>5 hours) after the scan batch finishes before the application is closed or the next scan initiated.

The X-Cite unit must not be manually powered off while the VERSA application is running.

- If the system is attended (daytime) then the VERSA application should be closed, which switches the lamp off automatically
- If the system is unattended (night-time) the registry setting should be modified back to false after the last batch is started before the user leaves

Shortcuts can be created on the desktop to easily switch the option ON/OFF

To make these go into the registry editor (regedit) and;

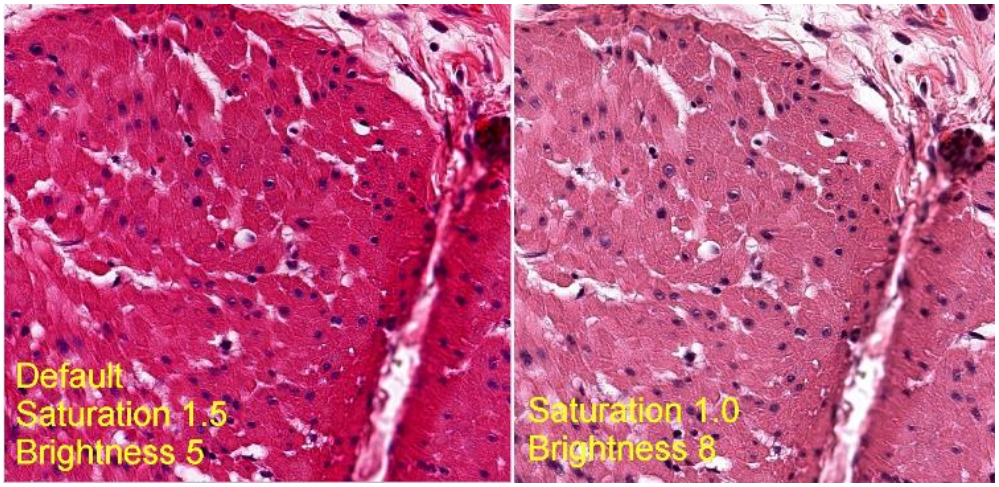
7. Set the “SwitchOffAfterBatch” value to true
8. Right-click on the FLLampOverride key (folder) on the left and “Export”
9. Save as a .reg file to the Desktop with the name “Switch Lamp Off”
10. Go back to the registry editor and set the “SwitchOffAfterBatch” value to false
11. Right-click on the FLLampOverride key (folder) on the left and “Export”
12. Save as a .reg file to the Desktop with the name “Leave Lamp On”
13. At any time during VERSA operation, the user can double-click on the appropriate .reg file and agree to the registry modification therein, this can be done regardless of the current state of the setting, so no need to go into the registry editor at all.

..\Scanner\ Grabber\BrightnessBoost

Location: Hkey_local_machine > SOFTWARE > Aperio Versa > Scanner > Grabber > BrightnessBoost
Setting: Default is 5.0. Between 5 and 10 suggested. <5 gives dark images, >15 over-saturates.

..\Scanner\ Grabber\Saturation

Location: Hkey_local_machine > SOFTWARE > Aperio Versa > Scanner > Grabber > Saturation
Setting: Default is 1.5. Lowering towards 1.0 gives less color intensity, more “natural” to some users.



\ScanFileCreator

Location: HKEY_LOCAL_MACHINE > SOFTWARE > Aperio Versa > ScanFileCreator
Setting: (strings) **JpegQualityGrey** & **JpegQualityRgb**, numerical value for image compression

Contains 2 strings for the Image compression ratio for SCN output. Default = 95 (%). As an example of compression effect, for a brightfield SCN file of 150Mb in size (approx. 15x15mm scan area at 10x);

- 92% = 107Mb
- 90% = 100Mb
- 85% = 85Mb

Reduction of the compression ratio below 90% will give a noticeable compromise of image resolution, especially if using zoom functions within display software to go above 1x display.

Spare Parts		
Item	**Leica Part Number**	**Comment**
DELL 7910 Versa Pro Service PC	23CPU7910V_SPARE	Windows 7 Pro
DELL 7910 Versa Ultimate Service PC	23CPU7910VUL_SPARE	Windows 7 Ultimate
Subsystem: Platform - Dell 7910 Workstation	23SYS1061	No HDD image
HDD - 1TB SATA-3G Entpr 7200rpm 32	23DKH0023	Unformatted HDD
HDD – 4TB SATA	23DKH0038	Unformatted HDD
ASUS NVidia GTX1080 Turbo (Graphics card)	23BDG0040	Replaces 23BDG0035
Subsystem: Monitor - 24" Wide Screen	23MON0024	
Calibration Slide A version 2.3	23SLD0003	
Board, RAID Adaptec 8405	23BDI0035	
Subsystem: Leica DM6000B for VERSA	23MIC6006	Inc. 1.25 & 5x, UQG, oil
Subsystem: Leica DM6000B	23MIC1217	Microscope body, no fil
CTR 6000	23MIC8821	Microscope controller
FILTER TURRET, DM6000 B (internal)	23MIC0032	(11020530044000)
Filter, UV-IR-Cut	11990320375080	DM6000 internal
UQG Hoya - LD200 Filter Blue	23FIL6200	DM6000 internal
Chroma IR-Cut Filter, 32mm	23FIL6850	(Zyla C-mount)
Lamp housing 106, 12V 100W, 2-lens,0.55m	11504058	Adjustable
Halogen lamp 12V 100W (Osram 64625)	11500974	50hr / 3600lm
Halogen lamp 12V 100W (Philips 7724)	11700066	2000hr / 2550lm
Condenser head 0.5 S15	11501037	
Eyepiece HC PLAN s 10x/22 Br. M	11507807	
Camera Point Gray Grasshopper	23CAM0013	
USB3 Point Grey Board	23BDI0034	
C-Mount Adapter Tofra 1x	23ADP0205T	
Camera, Andor Zyla USB	23CAM0014	
Motor controller, Prior Proscan III VERSA	23CON9001	
PL-200 Slide Loader (PL200L)	23VPL200L	VERSA 200
Sample holder, 1x3 slide for SL200	23ASLSP016	PL200 stage
SL200 Slide Loader Service Kit	23ASLSP017	VERSA 200
Special Plastic Grease (SPG)	23ASLSP023	PL200 Y axis belt
Y and Z Axis Drive Belts (2 belts)	23ASLSP018	PL200 tower
Y-Axis Flexible PCB	23ASLSP019	PL200 tower
Y or Z Single-Axis PCB	23ASLSP021	PL200 tower
Y/Z tower assembly, no cover	23ASLSP008	PL200 tower
Magnet Block	23ASLSP009	PL200 stage
Gripper assembly, replacement kit	23ASLSP022	VERSA 200
Y-Axis Lubricant – Special Plastic Grease (SPG)	23ASLSP023	VERSA 200
Z-Axis Lubricant – LG2 (Linear Guide)	23ASLSP024	VERSA 200
Y / Z-Axis Encoder	23ASLSP026	PL200 tower
XY stage (With encoders) - VERSA 200	23STG9072	VERSA 200
XY stage (with encoders & slide holder) VERSA 200	23STG9172	VERSA 200

MB8 Stage Cover, Versa branded	23COVMB8V	VERSA8
XY stage (With encoders) - VERSA 8	23VMB8L	VERSA8
Slide Holder	23SLH0008	VERSA8 stage insert
Type N Immersion liquid, ISO 8036, 20 ml	11513860	Leica microscope oil
PL-220 Automatic Oiler (PL220L)	23ASLOILER	
Bracket Assy, Barcode Oiler, Versa	23BRA9001	
Tubing, SL200	23ASLSP011	Oiler
Bottle	23ASLSP012	Oiler
Dispensing bottle top	23ASLSP013	Oiler
Dispensing Tip (2 parts)	23ASLSP014	Oiler
Power supply	23ASLSP015	Oiler
Keyence Barcode sub-system	23VKE7	SR-700 reader & cable
Keyence SR-700 Barcode Scanner	23SCN6700	Reader only
USB Cable, Extension for Barcode Reader	23USB1001	
QNAP NAS drive TS-831X	23EHD0831	No HDD included
Hard Disk, SATA 6 TB 7200RPM (NAS)	23DKH0039	Unformatted HDD
Lamp house, X-Cite 120 PC Fluorescence - Leica	23LMP6000	Complete X-Cite unit
X-Cite Basic Unit	23LMP0008	X-Cite controller
X-Cite Fluorescent lamp	23LMP0005	Lamp (bulb)
X-Cite Fiber Optic Cable	23LMP0006	Lightguide
Lightguide coupler 1"	11504117	Lightguide Adapter
Liebert PSI2200RT3 UPS - 110V	23UPS2213	Replaces 23UPS2207
Liebert PSI2200RT3 UPS - 220V	23UPS2214	Replaces 23UPS2208
Replacement Battery for APC SMT2200 UPS	23GSLUPSRBC55	APC UPS only
Surge Protector, Con IEC C14 male to C13	23PSU0021	

Objective lens options

- 23OBJ125PLFDRY (11506215)Obj. HCX PL FL 1.25x/0.04
- 23OBJ005PLFDRY (11506224)Obj. HCX PL FL 5x/0.15
- 23OBJ010PLFDRY (11506521) Obj. HC PL FLUOTAR 10x/0.32 Replaces 11506505
- 23OBJ020PLFDRY (11506519) Obj. HC PL FLUOTAR 20x/0.55 Replaces 11506503
- 23OBJ020PAPDRY (11506529) Obj. HC PLAN APO 20x/0.80 Replaces 11506166
- 23OBJ040PLFDRY (11506382) Obj. HC PL FLUOTAR 40x/0.80 Replaces 11506144
- 23OBJ040PAPDRY (11506294)Obj. HC PL APO 40x/0.85 CORR
- 23OBJ040PAPOIL (11506358)Obj. HC PL APO 40x/1.3 Oil CS2
- 23OBJ063PLFOIL (11506384) Obj. HC PL FLUOTAR 63x/1.30 OIL Replaces 11506185
- 23OBJ063PLFDRY (11506223)Obj. HCX PL FL 63x/0.9 CORR

Fluorescent filter options

- 232FL4900072 Leica DM 91024 DAPI
- 232FL4900972 Leica DM 91024 Cy5
- 232FL4930172 Leica DM 91024 Blue
- 232FL4930272 Leica DM 91024 Aqua
- 232FL4930372 Leica DM 91024 Green#1 (avoids Aqua)
- 232FL4930472 Leica DM 91024 Gold
- 232FL4930572 Leica DM 91024 Orange
- 232FL4930672 Leica DM 91024 Red
- 232FL4930872 Leica DM 91024 Green#2 (avoids Gold)
- 232FL4931172 Leica DM 91024 Narrow Red (avoid O/Gold)

System Warranty

Aperio VERSA is supplied with a system warranty which includes any applicable Aperio VERSA application software updates released after installation. Warranty is based on reasonable use.

Leica Biosystems warranty components

- Andor camera and framegrabber card
- PointGrey camera and framegrabber card
- Prior Proscan controller, stage and oiler components
- RAID controller and hard disks
- Microscope and fluorescent illumination components
- UPS, Liebert PSI2200RT3

Dell warranty (36 months from Leica Biosystems original purchase)
PC and Monitor components are covered under a 3-year Dell ProSupport Next Business Day onsite warranty.

- PC motherboard, power supply, memory, processor and fans
- Video card (nVidia GTX 980 / ASUS NVidia GTX1080 Turbo)
- DVD drive, Keyboard & Mouse
- Monitor

This is an international Dell warranty which requires a Service Tag transfer to register the components with local territory Dell support to ensure no delays are encountered when any support is required.

Dell Warranty Transfer process

- Browse to http://www.dell.com/support/assets-transfer
- Enter the Dell Service Tag of the PC or monitor into the window at the bottom of the page
- If multiple tags (max 5) are to be entered select “Add another product” or select Continue
- In “Previous Owner Details” enter “Leica Biosystems Richmond” as the company name, “Illinois” as the State and “60071” as the Zipcode
- Select Continue to “New Owner Details”
- Select “Commercial/Office” as Intended Use
- Enter Company Name, e-mail, address and telephone details
- Continue to review the information; “Edit Details” to modify or Submit to complete

This process can take up to 2 weeks, it is recommended this is done during or immediately after the customer installation once the system has been successfully commissioned.

System Consumables

Consumable replacement is an end-user responsibility unless specifically included in an extended warranty or support contract agreement, or if failure/deterioration is confirmed by Leica as atypical for age or use.
Use of such items significantly beyond their expected life, or if deterioration becomes apparent, can lead to image quality issues and may compromise hardware function.

- Microscope immersion oil: Replace as required by use. It is the user responsibility that only oil compatible with the microscope objectives is used. Mixing of different types of microscope immersion oil should be avoided unless miscibility is independently confirmed.
- Fluorescent filers: No minimum lifespan. Check glass filters for signs of burn marks
- Halogen (Brightfield) Lamp: 12V 100W. Typical life 2000 - 3000 hours at routine application use
- X-Cite PC120 lamp: >2000 hours at routine application use
- X-Cite light guide: Typical life 4000 - 6000 hours at routine application use
- UPS battery pack: 2 year supplier guarantee

Fluorescent items such as dichroic filters and X-Cite light-guides show increased deterioration with extended heat-energy build up and should be protected from fluorescent excitation when not in active scanning use.

Disposal & Environmental Protection

Aperio VERSA Scanning System: Brightfield Illumination

There are no known risks associated with disposal the Aperio VERSA scanning system or its accessory components at the end of its working life.

Leica Biosystems Richmond Inc., manages Aperio VERSA WEEE compliance.

Aperio VERSA Scanning System: Fluorescent Illumination

WARNING!: Hg - Fluorescent lamp contains Mercury; manage in accordance with local or national rules & regulations for disposal of hazardous materials.

Appendix A: Convert Ariol to Aperio VERSA

Introduction

An Ariol to Aperio VERSA conversion consists of;

- Replacement of the Ariol PC Workstation new VERSA components
- Removal of JAI Ariol camera, C-mount and DM6000 manual Phototube (documentation port/tube)
- Removal of the Prior Transmission Filterwheel from the rear of the DM6000 microscope
- Replacement of non-encoded Prior stage with new encoded stage components
- Replacement of internal DM6000 ND filters with VERSA specification I.R. and Hoya Blue filters
- Replacement of DM6000 halogen (brightfield) lamp
- Replacement of Ariol UPS battery pack
- Update of ProScan III controller and DM6000 firmware as required

Other than part removal and replacement the Aperio VERSA installation, build, configuration and calibration procedure is as documented in the standard VERSA Service Manual Chapters 1 – 12.

Note: Multibay systems with a conical (0.9 S1) condenser require replacement of the Base HCT files as described in the conversion procedure before Brightfield Channel Calibration is carried out.

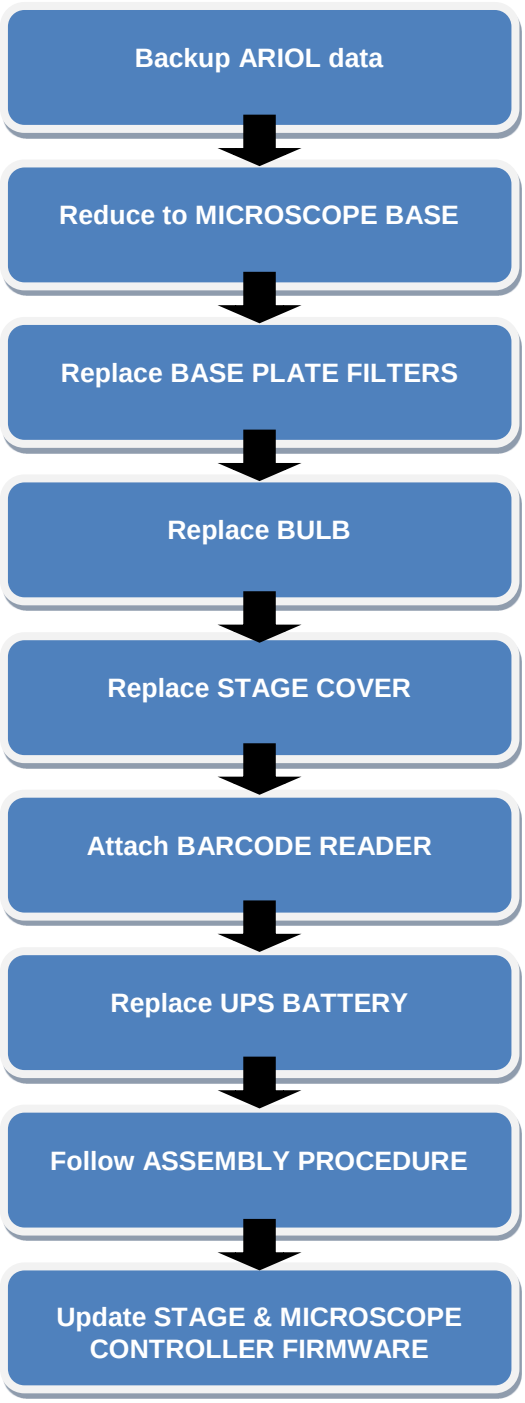
If the customer wishes to retain the Ariol workstation or additional review stations to be able to review existing Ariol scan data the workstation should be moved to a separate area and its networking maintained, this may require discussion with the customer network personnel.

It is recommended that existing Ariol Scan data is Archived and/or Exported into SCN format using the Ariol Scan Exporter application in advance of the Aperio VERSA conversion.

Recovered Ariol components which are no longer in use should be returned to the manufacturing unit at Leica Biosystems Richmond.
To obtain a delivery note for return contact LBSRichmondInstrumentation@leicabiosystems.com with;

- Return Goods Authorisation (RGA) code (created by local SU Customer Care) or
- A Mobile Services notification number raised on the conversion/installation job

Overview: Convert Ariol Multi-Bay 8 to Aperio VERSA 8

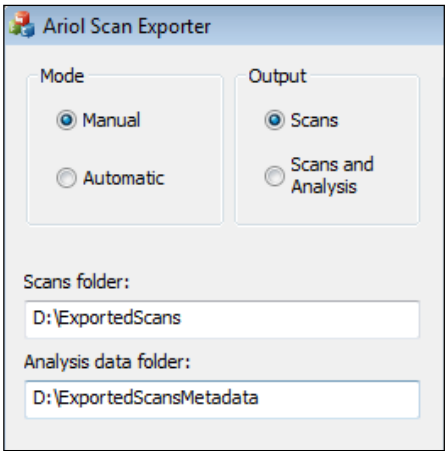


Task 1: Back up Ariol Data

Ensure all Ariol data is—

- Archived
- Exported to .SCN format using the Ariol Scan Exporter application
- Retained on the original PC as a stand-alone review station.

ANY REMAINING ARIOL REVIEW STATIONS SHOULD NOT BE ASSOCIATED WITH APERIO VERSA OR DATA ORIGINATING FROM AN APERIO VERSA SCANNING SYSTEM.



Task 2: Remove Ariol Components

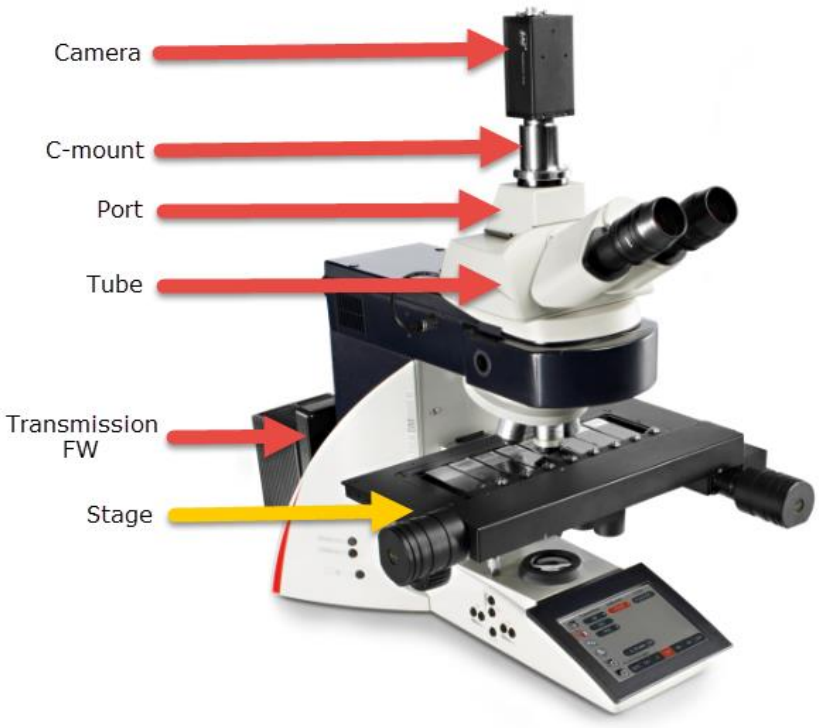
1. Shutdown and power OFF all Ariol system components.

2. Remove all cabling.

3. Remove the following Ariol system components

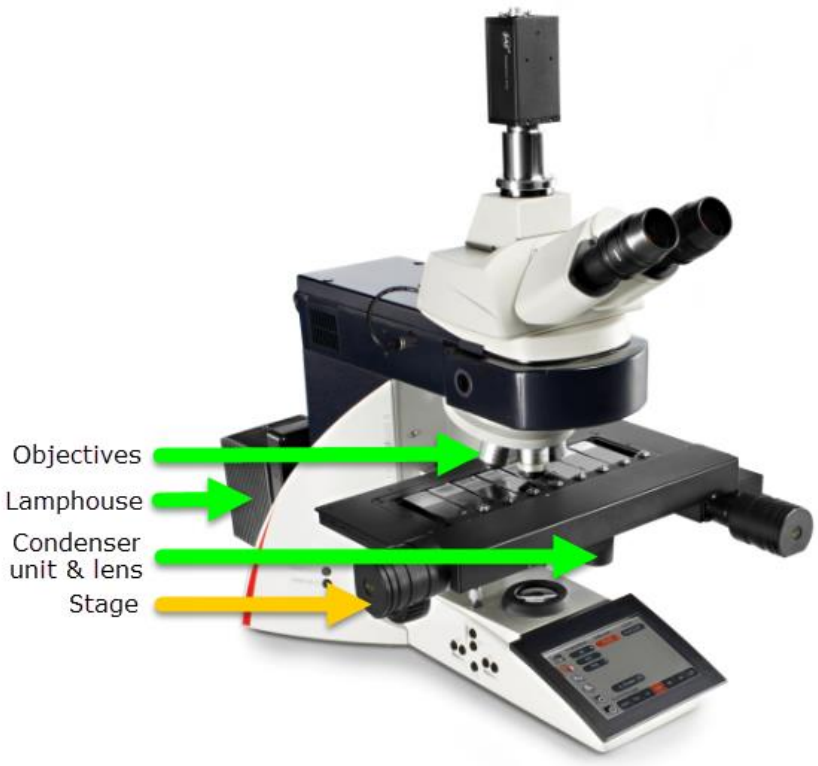
- Microscope documentation port
- Microscope documentation tube
- Camera
- Camera C-mount
- PC and peripherals
- Transmission filter wheel
- Stage (converting to encoded stage)

Please note: The Ariol joystick cannot be used to control the Aperio VERSA stage

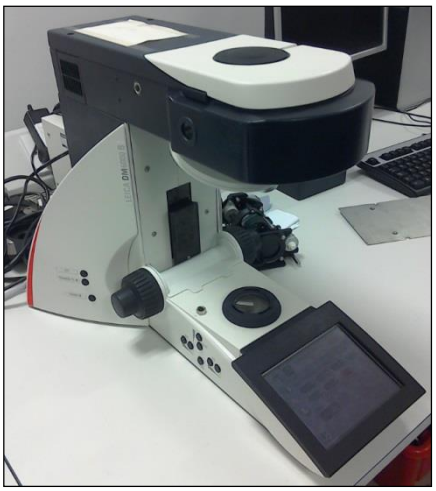


4. Remove and retain for assembly of the Aperio VERSA scanning system—

- Objective lenses
- Stage (if converting to non-encoded stage Aperio VERSA 8 system)
- Condenser unit and lens
- CTR
- Proscan stage controller
- X-Cite and Halogen lamp house

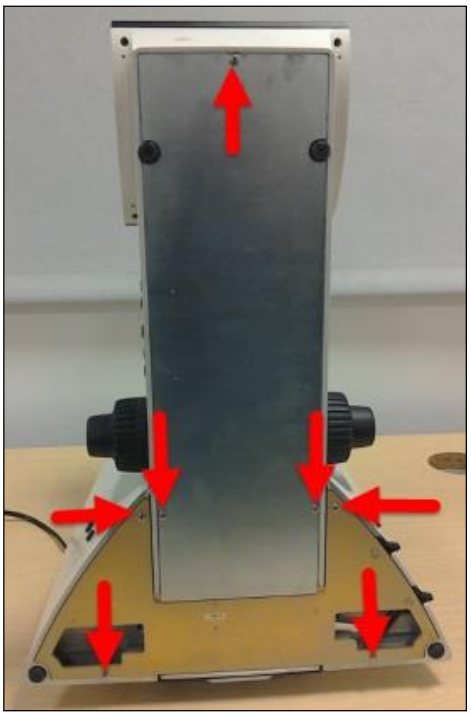


All components should be removed from the Ariol system until only the microscope base / stand remains.

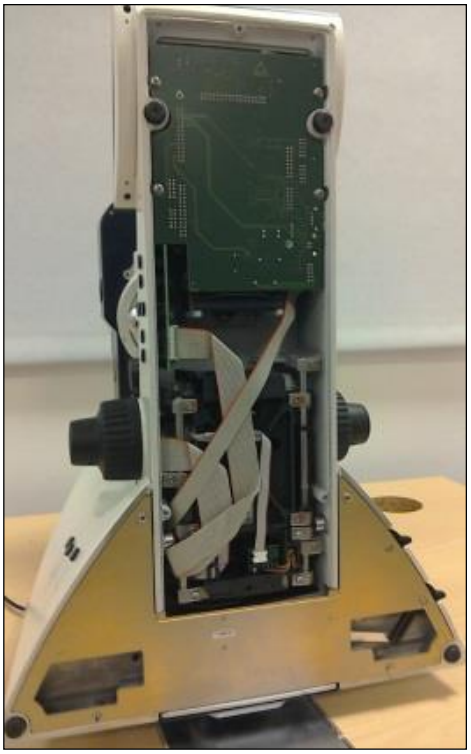


Task 3: Replace Base Plate Filters

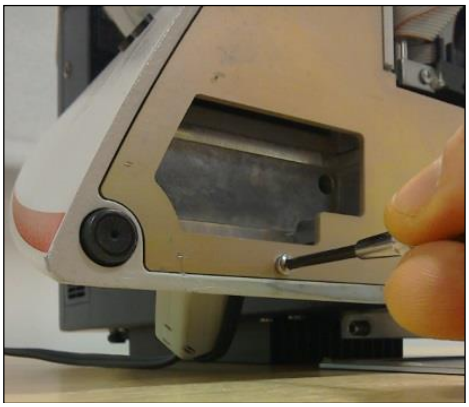
1. Remove the 7 screws in the base plates as shown.



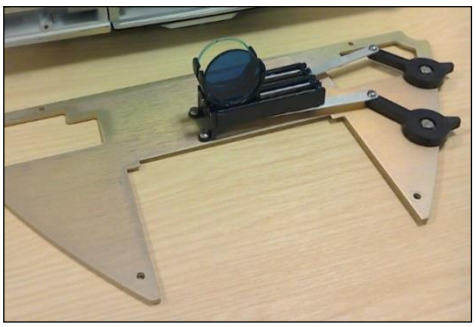
2. Remove the silver colored plate first.



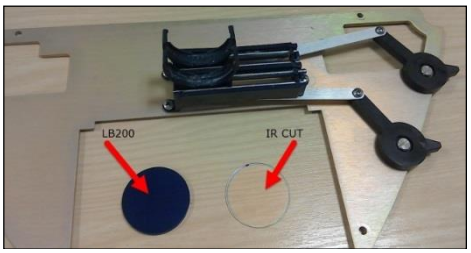
3. Remove the copper colored plate second.



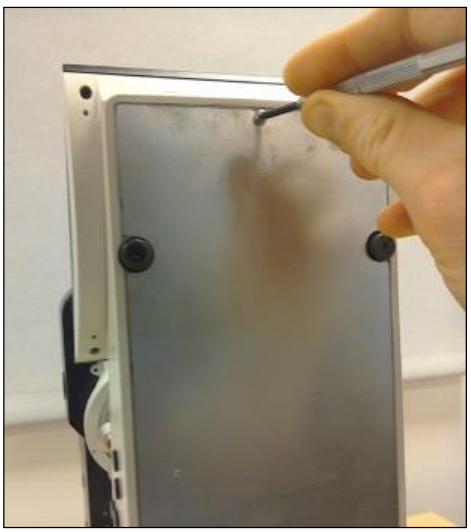
4. Remove the existing ND2 and ND4 filters from the filter holders (a small knife may be required if the filters are held in position with adhesive).



5. Insert the LB200 (blue) filter into front position, and the IR filter into the rear position. The filters should not require fixing with adhesive unless the system is to be moved).



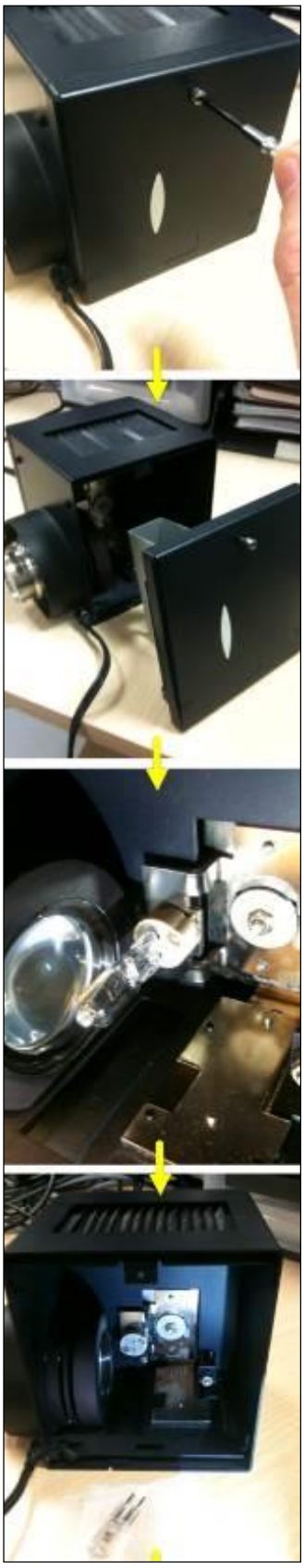
6. Replace the two base plates and fixing screws.



Ensure the microscope is not inverted in this process.

Task 4: Replace Bulb

1. Remove the lamp house side cover by loosening the screw.



2. Slide the cover out horizontally to access the interior.

3. Ensure the lamp house is not connected to a power source and the lamp has been given sufficient time to cool down.

4. Hold the bulb between finger and thumb using lens tissue and pull out horizontally.

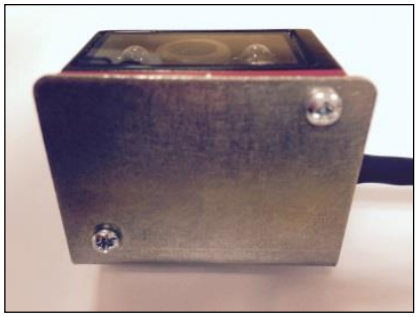
5. Insert the new bulb by following the above procedure in reverse. It is important that lens paper is used to hold the new bulb and that skin does not come into contact.

6. Replace the lamp house.

7. Dispose of the old bulb

Task 5: Attach Bar Code Reader

1. Attach the barcode reader to the bracket using the 2 screws.

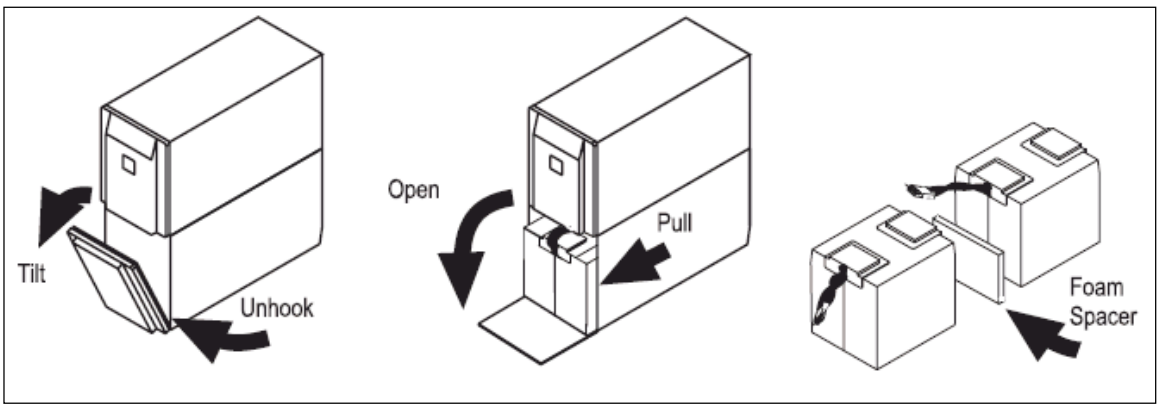


2. Remove the 2 short screws from the nosepiece cover.

3. Attach the bracket and reader to the nosepiece cover using the longer screws provided.

Task 6: Replace the Uninterruptible Power Supply (UPS) Battery

APC SMART 2200 (See Maintenance)



Task 7: Assemble the Aperio VERSA 8

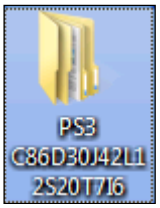
Refer to Chapter **5 | Installation Procedure** in this guide.

Task 8: Update the Proscan III Stage Controller Firmware

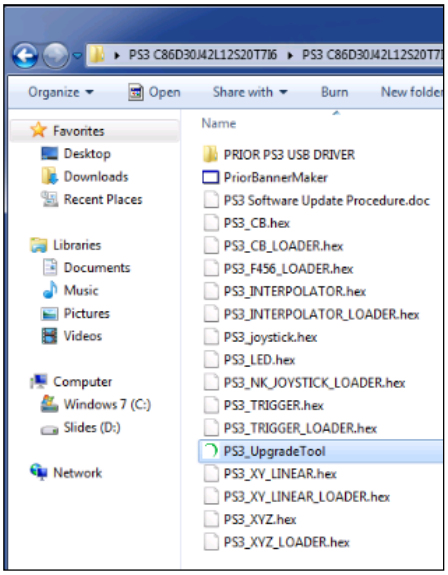
If the existing Proscan stage controller is being re-used the firmware should be upgraded.

1. Switch the Proscan power switch to ON.

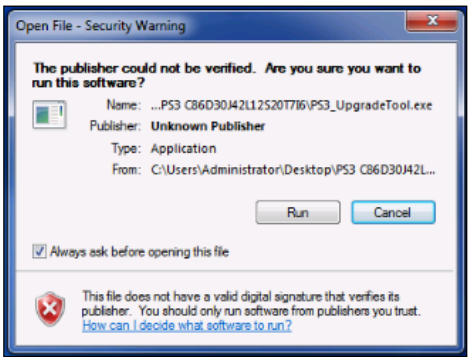
2. Double-click the zipped folder on the desktop named 'PS3C86D30J42L12S20T7I6.zip'.



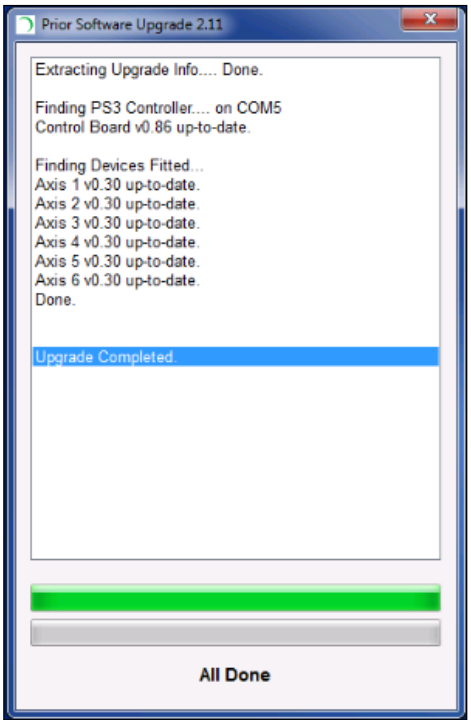
3. Double-click on the 'PS3_UpgradeTool' application.



4. Select **Run** when the security-warning message appears.



The upgrade tool application will proceed to update the Proscan firmware.



When complete, the message **All Done** will appear at the bottom of the window.

5. Close the upgrade tool window.

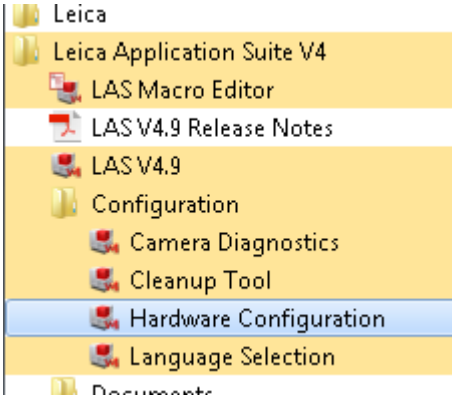
Task 9: Update the Microscope Firmware

For normal operation of Aperio VERSA, the USB1 connection should be used on the rear of the DM6000B microscope. This is the only connection option that will work for the LAS firmware update procedure.

Note: The CTR USB connection can be used for routine VERSA operation (this was the default configuration the original VERSA release). This is still a valid alternative connection option or for troubleshooting.

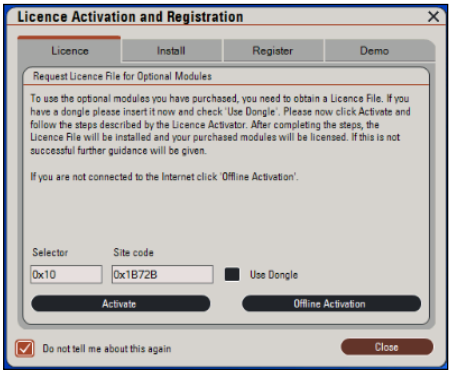
1. Switch CTR power ON.

2. Open the ‘Leica Hardware Configuration’ application,
   Start > All Programs > Leica Application Suite V4 > Configuration > Hardware Configuration

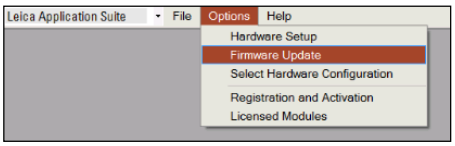


3. If this is the first time LAS is run select "Do not tell me about this again" then select Close on the license activation and registration window that appears

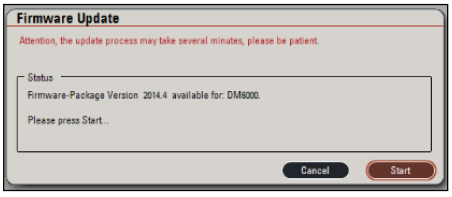
   Leica Application Suite will open



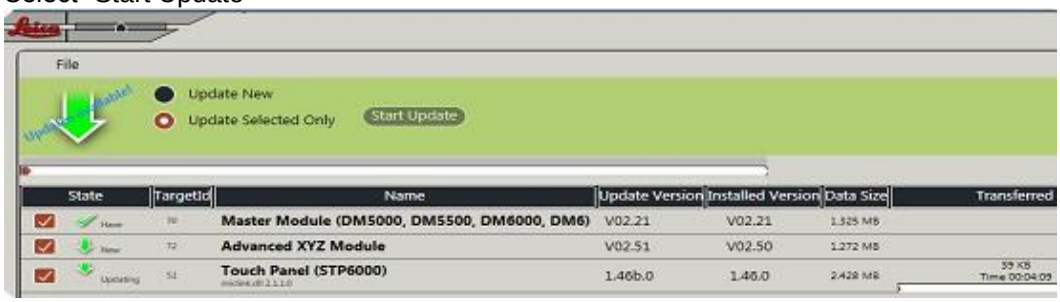
4. Select **Options > Firmware Update** from the main menu bar



5. Select **Start** when the firmware update window appears
   Note: this does not initiate the update



6. A table is displayed showing the firmware revisions that are included with the current LAS software (Update Version) and a readout of what is running on the microscope Hardware (Installed version)
7. 

8. Select the “Update New” option to update older firmware versions
9. Select “Start Update”


10. Once complete close the update and Hardware Configuration windows

Task 10: Conical Condenser Setup

Ariol Multibay systems were supplied with the Leica “conical” Condenser head 0.90 S1 (11505150). This lens has increased numerical aperture and optical properties of the lens compared to the standard VERSA “flat-top” Condenser head 0.50 S15 (11501037) supplied with new systems.

For existing Ariol MultiBay conversions using a DM6000B conical condenser, modified HCT files are required which have a reduced numerical aperture settings for each objective lens, otherwise the light intensities used during Brightfield Channel Calibration will be sub-optimal and may lead to calibration failure.

The following procedure is required to replace the HCT files.

1. Open Windows file explorer (Computer) then Organise > Folder and search options > Select View tab > Select Show hidden files, folders.
2. Go to C:\ProgramData\Aperio Versa\BaseHCT and delete all HCT files
3. Open C:\ProgramData\Aperio Versa\BaseHCT\0.9condenser
4. Copy all HCT files into C:\ProgramData\Aperio Versa\BaseHCT

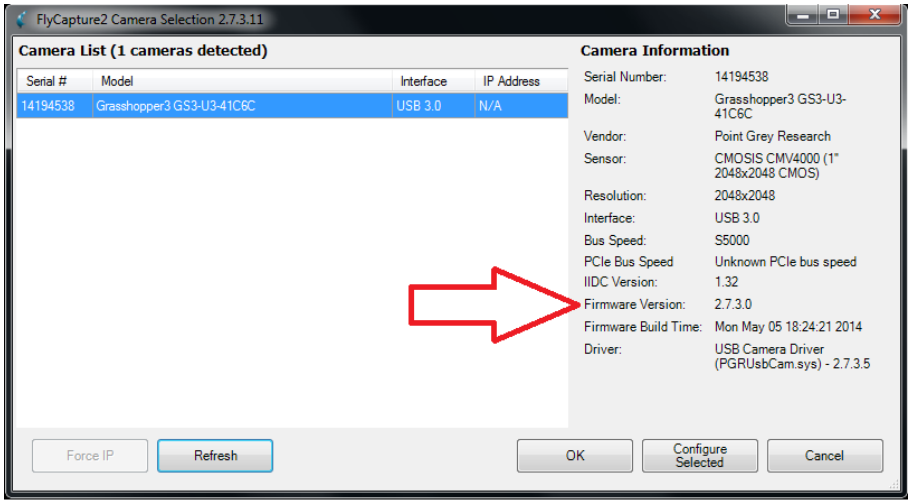
Appendix B: Point Grey Configuration update

Overview

This section contains the reference information for TSB 16-1A (February 2016) required as a configuration check and update procedure for the Point Grey Grasshopper camera supplied on early VERSA systems.

There is no requirement to apply this procedure during system installation of new VERSA systems but the information is applicable for troubleshooting potential Grasshopper faults where • opening Aperio VERSA Scanner software consistently causes the system to hang or when opening Aperio VERSA Calibration software displays an error message and fails to connect to the hardware.

14. Press the Windows Start – All Programs - Point Grey FlyCapture2 SDK (64bit) – Point Grey FlyCapture2.
15. Check the firmware version, if it is v2.7.3.0 the skip to the PC reboot step.

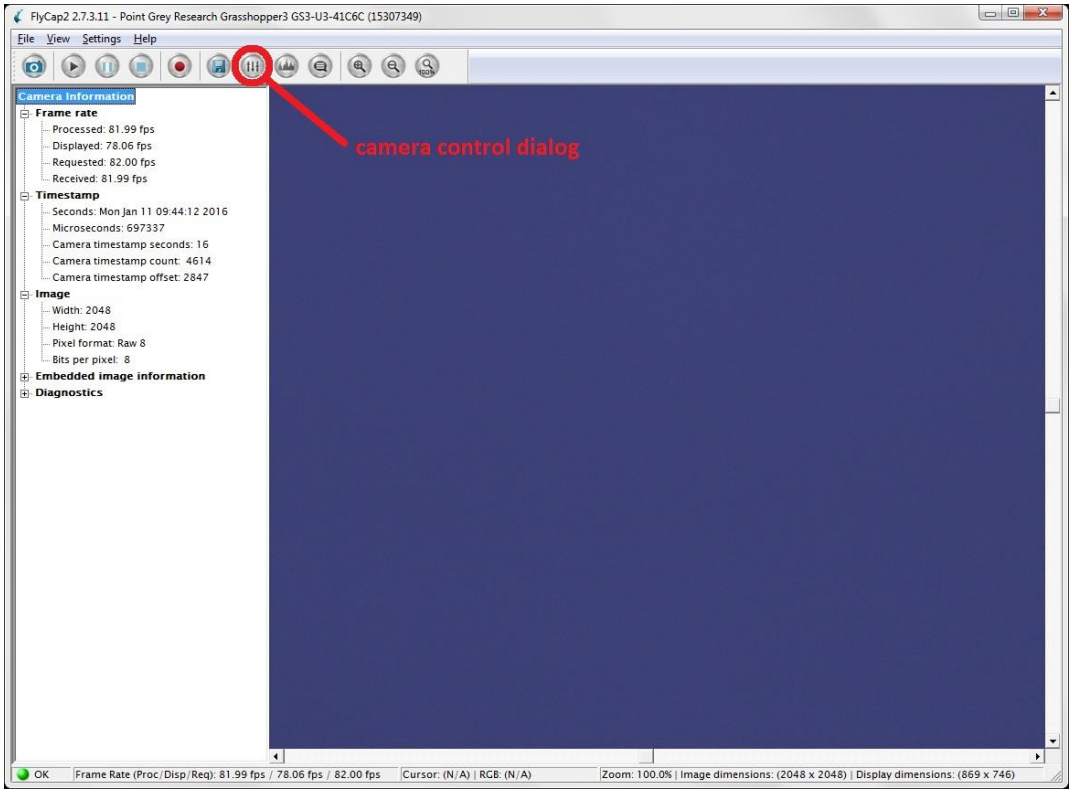


16. For all versions other than v2.7.3.0, contact CVM support cvm.support@leicabiosystems.com for a copy of v2.7.3.0 firmware (.ez2 file) if you do not have it.
17. To update the firmware from the Windows Start button select;
    All Programs>Point Grey FlyCapture2 SDK (64bit)>Utilities>UpdatorGUI3
18. In the Camera list at the top of the screen you should see your “Grasshopper 3” camera selected. Half way down the page, in the “Operation” section, hit the “Open” button
19. Browse to the folder containing the file “gs3-u3-2.07.3-00.ez2” and select to open
20. Now hit the “Update” button and wait for the install to complete. Quit the application.

IT IS CRITICAL the camera is initialized correctly before running the FlyCapture2

21. Reboot the PC with the camera USB cable disconnected.
22. Connect the camera USB cable to the PC. The camera has now been initialized correctly for setup.
23. Press the Windows Start – All Programs - Point Grey FlyCapture2 SDK (64bit) – Point Grey FlyCapture2.

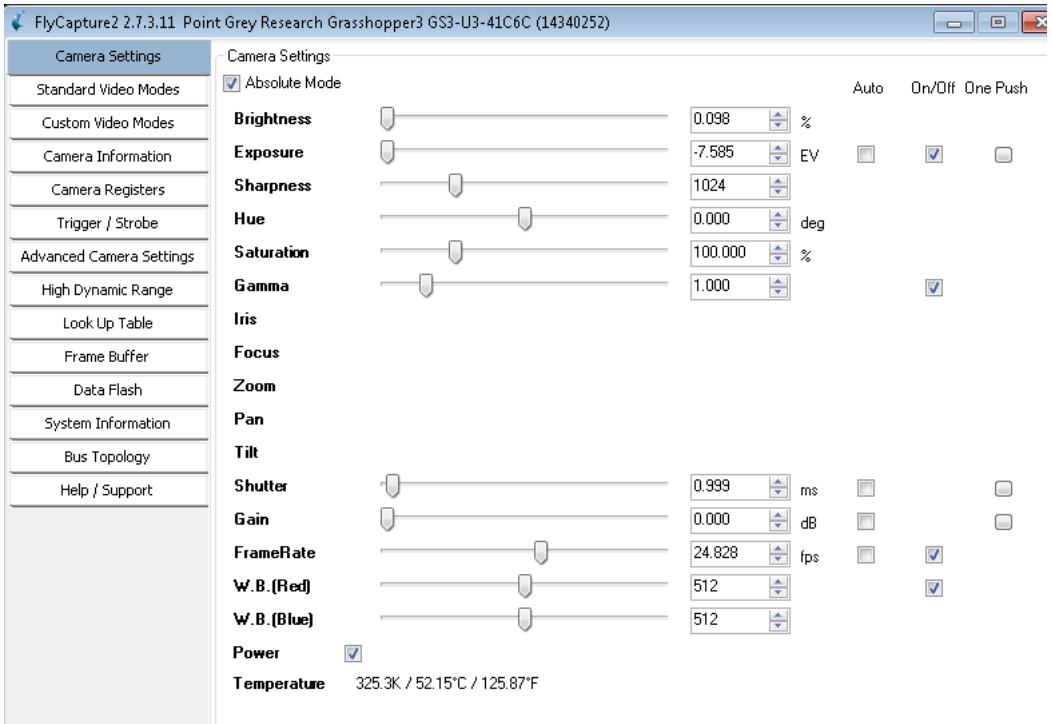
24. Press the “OK” button in the camera selection screen to display the Camera information screen.



(Figure 1) Main screen highlighting the camera control dialog button

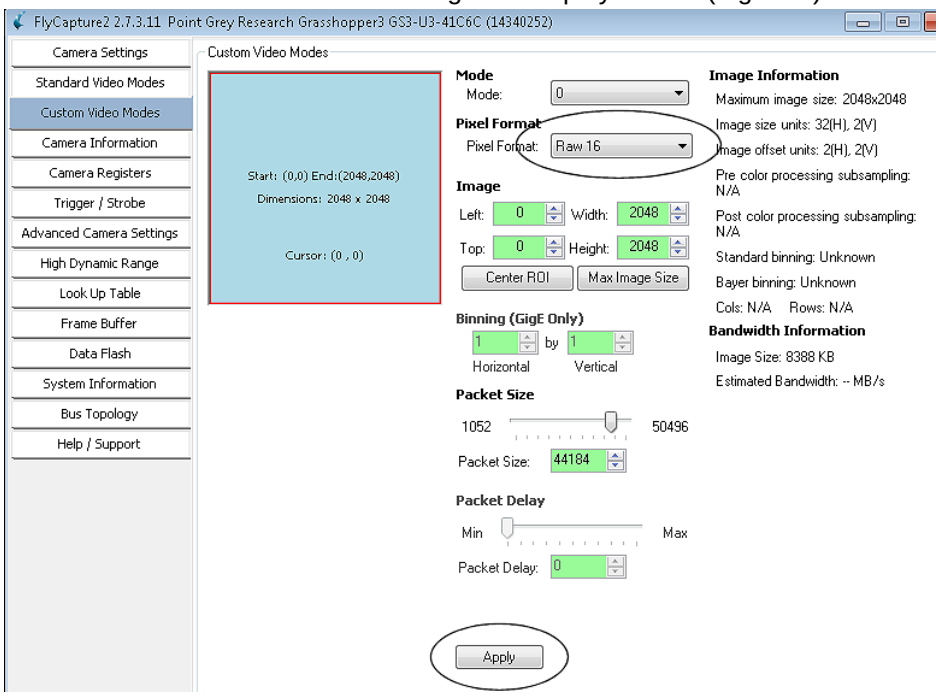
25. Press the Camera Control Dialog button highlighted in figure 1.

26. Figure 2 is displayed with the expected check-boxes.



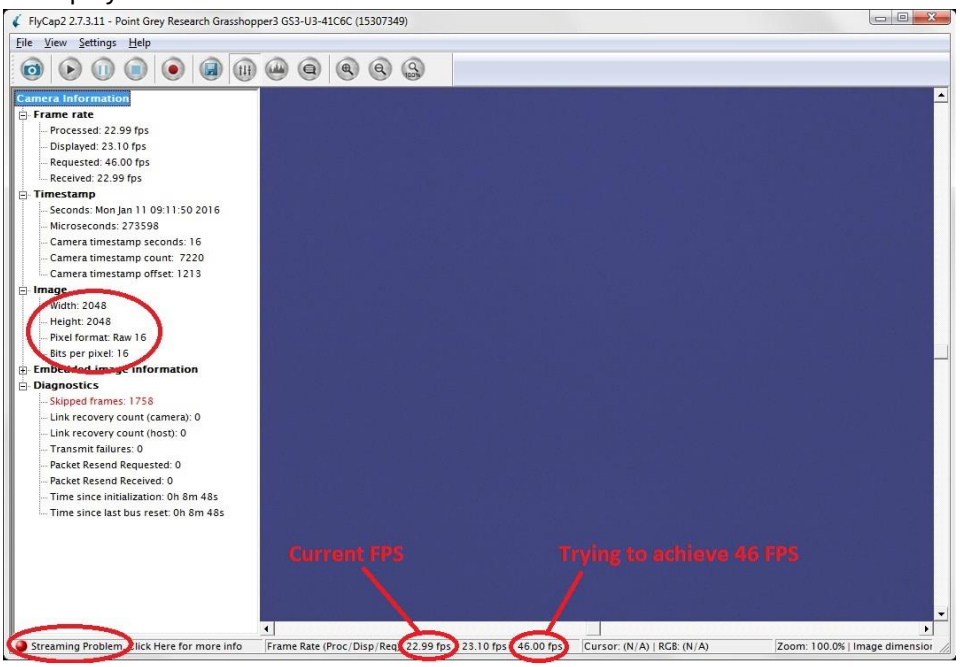
(*Figure 2) Camera Control Dialog – default camera settings tab page.*

27. Press the Custom Video Modes button to change the display screen (Figure 3).



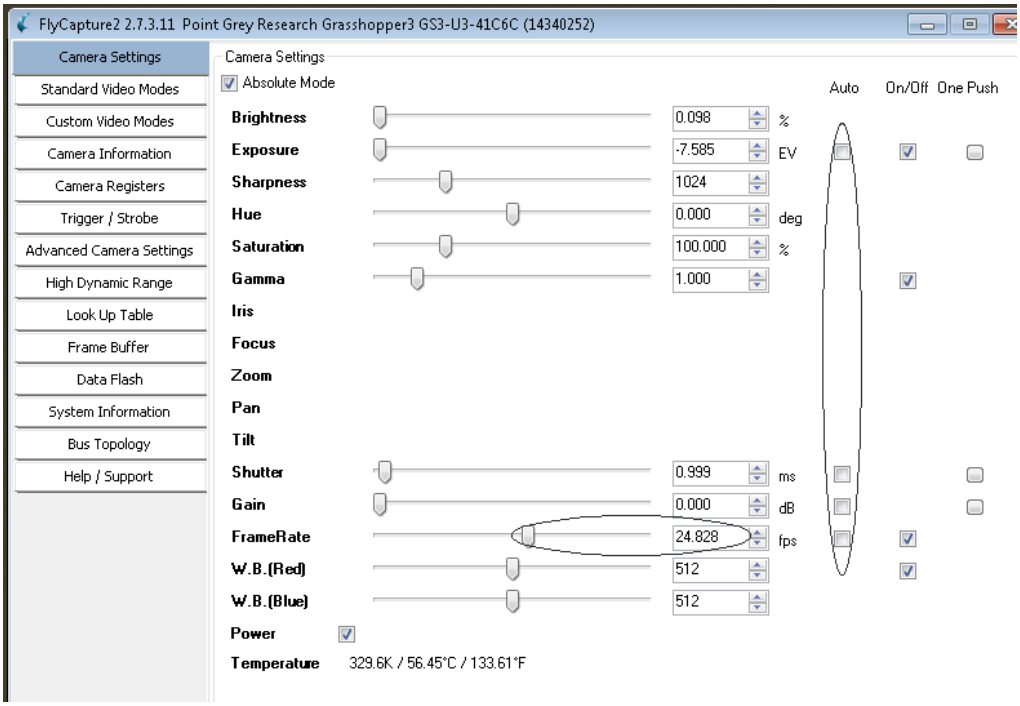
(Figure 3) *Custom Video Modes tab page highlighting Pixel Format and Apply button*

28. Press drop down box labelled “Pixel Format”, select “Raw 16” and then confirm the other options as seen in the screen in Figure 3.
29. Press the “Apply” button at the bottom of the screen. The main screen behind will be as seen in Figure 4. If there are streaming problems due the camera trying to achieve the maximum frame rate setting this will be displayed as red as shown.



(Figure 4) showing Pixel Format and Frame Rate streaming problem

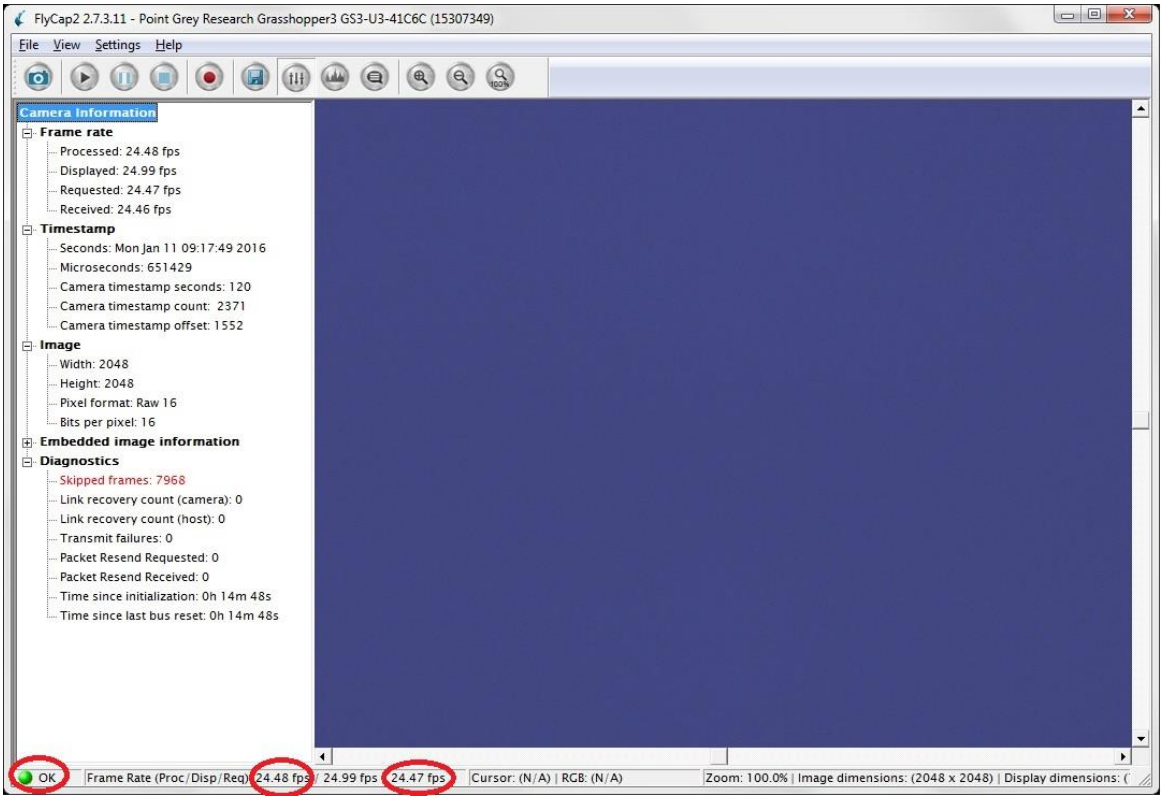
30. Press the “Camera Settings” button on the Camera Control dialog and the screen will appear as in figure 5.



(Figure 5) Auto check boxes disabled, frame rate reduced to approx 25 FPS

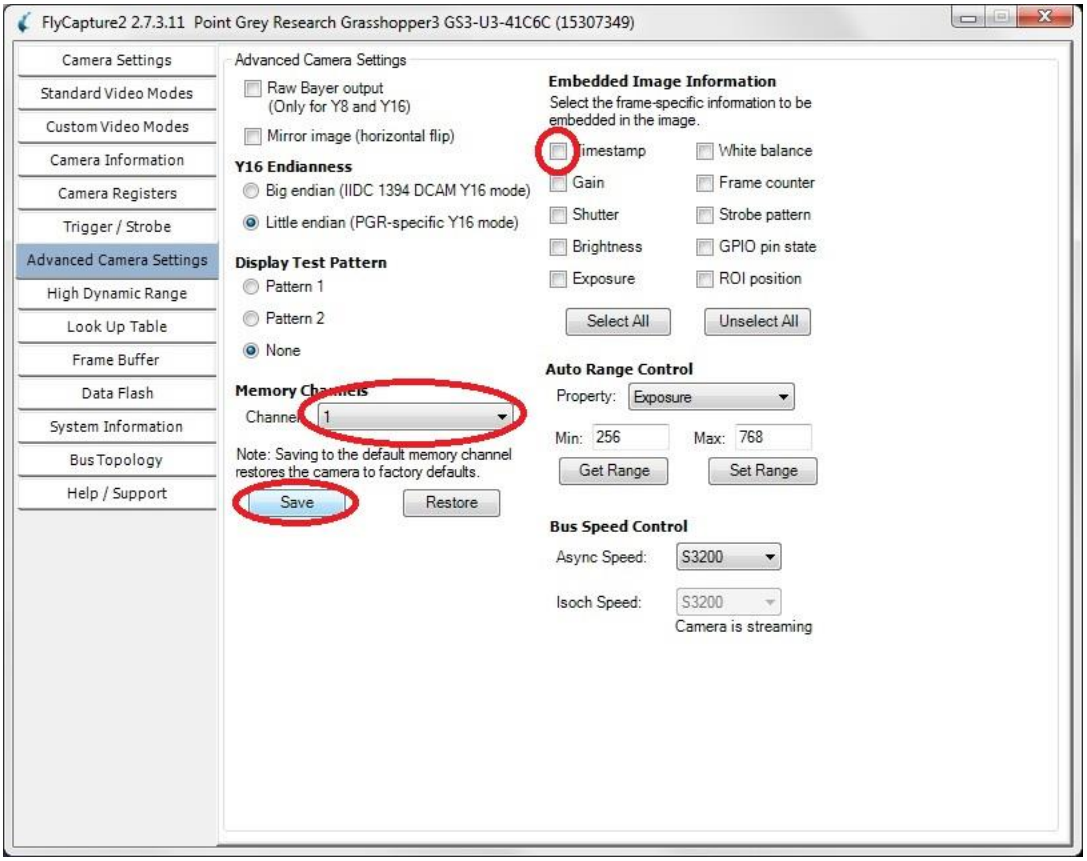
31. Disable all of the Auto options as highlighted in Figure 5.

32. Move the Frame Rate slider until the FPS is approximately 25 and wait for 30 seconds for the camera settings to stabilize. If “Streaming Problem” is still displayed then reduce the Frame Rate further until a green light and “OK” displayed as in Figure 6.



(Figure 6) *showing stabilized frame rate, identified by green icon*

33. On the Camera Control dialog, press the Advanced Camera Settings button which will present the user with a screen as shown in figure 7.



(Figure 7) showing Timestamp check box, Memory Channel and Save button.

34. Ensure the all of the options are set as seen in Figure 7 with the Timestamp disabled and the Memory "Channel" set to 1.
35. Press the Save button.
36. Close the Camera Control dialog window using the red "X" in the top right corner of the dialog.
37. Close the Main Screen window using the red "X" in the top right corner of the dialog.
38. Disconnect the USB cable from the camera.
39. Shutdown the PC and wait for 1 minute.
40. Power up the PC and log onto the system.
41. Connect the USB cable to the camera.
The system is now ready to use.

Leica Biosystems Contact

Contact Information

Commercial information, parts ordering, shipping and system warranty contacts are escalated directly by each Leica Selling Unit (SU) to the Aperio VERSA Manufacturing facility at Leica Biosystems, Richmond, USA, through standard ordering and contact systems;

- Mobile Services job notifications and SAP
- LMS Shop and e-Leica configurator

Technical Support advice for Aperio VERSA scanning systems on Configuration, Operational procedures, maintenance and troubleshooting is available from;

Aperio VERSA Distributor Technical Support

Initial contact for Aperio VERSA support should be made through the Leica SU group managing the Distributor territory to ensure correct information gathering and data tracking through Leica SAP and Mobile Services systems;

- South East Asia: Leica Microsystems (SEA) Pte Ltd. Singapore.
- EMEA and High Growth markets (HGM - Europe, Middle/Near-East, Africa): Leica Mikrosysteme Vertrieb GmbH, Wetzlar, Germany.

For EMEA and HGM territories Technical Support advice is provided by direct e-mail to
Clinical.Support@LeicaBiosystems.com

Leica Internal Technical Support

Leica SU Support contacts can be raised using the **Leica CMS HelpDesk** system for advanced Technical Support advice.

Direct e-mail to CVM.Support@LeicaBiosystems.com raises a HelpDesk Ticket for follow up.

This HelpDesk contact address is used for following Leica products;

- Aperio VERSA
- Aperio VERSA Analytics
- Ariol
- CytoVision

It is important when raising a HelpDesk ticket in this way that the Aperio VERSA Product name is clearly indicated in the e-mail along with;

- Country, user and system details
- Application version number
- VERSA (Leica Biosystems) 6-digit Serial Number
- Mobile Service reference (if applicable)
- Detailed information about issue

Incomplete information may mean the contact not reaching the Aperio VERSA Support Group.

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For all technical queries please contact your nearest Customer Support group. Visit www.leicabiosystems.com for latest contact details.

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