



VSD500

Visual Scratch & Defect

Detection System

User Guide



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Chapter 1 Introduction

1.1 Description

The Thorlabs VSD500 Visual Scratch and Defect Detection system enables users to examine the connector end-face and fiber for permanent defects (such as scratches, cracks, and pits) and transient defects such as loose contamination (dirt, oils, water, and cleaning solvent residues), complementing the interferometric end-face geometric inspection of the existing Thorlabs CC6000 and GL16 product lines. Visual end-face inspection occurs between each polishing step of a fiber optic cable manufacturing process. Initial criteria may be removal of epoxy and chips caused by cleaving, later inspection criteria may include removal of scratches or pits from the fiber and clear delineation of epoxy and cladding.

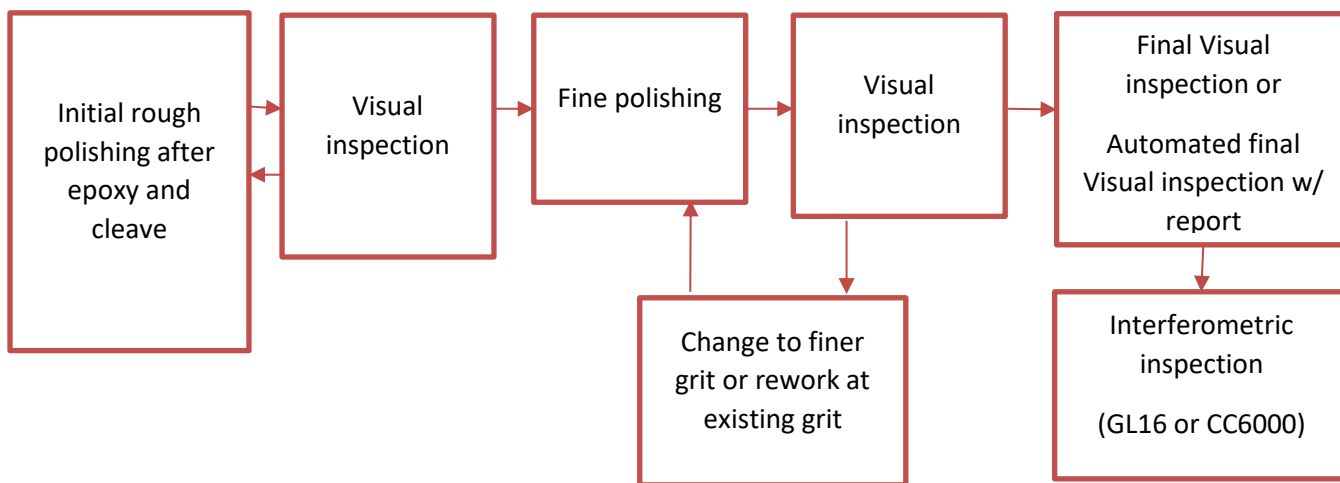


Figure 1 Overview of Fiber Patch Cable Preparation

This manual provides technical specifications, calibration procedures, and guides to product use. For additional questions, please contact Tech Support at techsupport@thorlabs.com.

1.2 Safety

All statements regarding safety of operation and technical data in this instruction manual will only apply when the unit is operated correctly.

**Caution**

Glass debris may be found in or around the equipment, be careful when conducting maintenance activities.

**Warranty Warning**

Do not open the instrument. There are no user serviceable parts in this product. Opening the device will void your warranty. Any modification or servicing of this system by unqualified personnel renders Thorlabs free of any liability. This device can only be returned when packed into the complete original packaging, including all foam packing inserts. If necessary, ask for replacement packaging.

**Attention**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules and meets all requirements of the Canadian Interference-Causing Equipment Standard ICES-003 for digital apparatus. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Additional information relating to Part 15 of the FCC Rules can be found in the About menu of this product's software user interface.

The use of shielded I/O cables is required when connecting this equipment to any and all optional peripheral or host devices. Failure to do so may violate FCC and ICES rules.

**Attention**

This product has been tested and found to comply with the limits according to IEC 61326-1 for using connection cables shorter than 3 meters (9.8 feet).

Chapter 2 Description

2.1 How it Works

The VSD500 Visual Scratch and Defect Detection System is a standalone device with fully embedded control hardware and software. It uses precision optics and a camera coupled with Linux-based software, delivering a clear image of a connector endface when inserted into the front panel fixture. Manual X-Y positioning of the connector is possible with adjustments at the fixture, allowing for viewing of fiber as well as ferrule areas of the endface, and in this way accommodating various fiber sizes. Manual focusing of the endface being tested can be performed using the front panel FOCUS adjustment. The VSD500 field of view is optimized for the standard 125 micron fiber diameter, with a fixed magnification of 640x onto its front-panel 8" LCD screen.

- The integrated software enables performing various operations relating to the displayed endface image, including automatically detecting any scratches and defects on the endface, comparing the detected information against user-selected pass-fail criteria, generating and presenting inspection reports and images to screen and file, and supporting export of that information to removable USB storage. General system configuration is also possible such as inspection criteria definition and options for storing image files to disk. VSD500 configuration is saved by the software at shutdown and reloaded at next startup. All software functions are accessible via a set of five pushbuttons on the front panel (with each button's changing function indicated by adjacent button labels displayed on the LCD screen) and also a separate front panel pushbutton for activating an inspection. The VSD500 can be shutdown as well as restarted via another front panel button.

2.2 Mounts

The VSD500 supports inspection of the standard range of single-fiber connectors, with mounts available for products having ferrule diameters of 1.25 mm or 2.50 mm, and with flat, PC, or APC endface polish. Each mount is positioned and held securely in the front panel mount holder magnetically. Insert the mount into the holder with its flat side facing the holder's opening as it is slid in, as shown below.



Figure 2 Inserting the Fiber Mount

2.3 Features

In addition to its core functionality, the VSD500 system has also been designed with some unique features that improve its usefulness and ergonomics, as follows:

- The system can be operated with the fiber holder on the left or the right side, simply by flipping the entire unit to the desired orientation. When changing the orientation, the power must be cycled in order for the User Interface to display correctly.
- The unit rests securely on a custom platform that tilts the front panel at an easier viewing angle.
- The system will start up via the rear-panel on-off rocker switch, or via the shutdown/restart pushbutton on the front panel (when the rear panel power rocker is already at “On” position).
- The front panel USB port is ready to receive a USB drive for exporting stored files or for software updates. Any of the rear panel USB ports can be used for this purpose as well.
- The three USB2.0 ports at the rear panel are intended for connecting a keyboard, mouse, or barcode scanner, while the video port on the rear accepts an HDMI¹ cable and enables the use of an external monitor to mirror the front panel display.

NOTE: The connection to an external HDMI monitor should be made using a commercial grade high-speed HDMI cable with ferrite cores.

- A keyboard and mouse, if connected, can be used as an alternative to the front panel 5-button array for navigating and activating the menu functions, as well as for naming files or detection criteria configurations.

¹ HDMI is a trademark or registered trademark of HDMI Licensing Administrator, Inc. The use of such trademark by Thorlabs does not constitute or imply any affiliation with or sponsorship, approval, certification or endorsement by HDMI Licensing Administrator, Inc. of Thorlabs or any Thorlabs products. All references by Thorlabs to such trademark are for identification purposes only.

Chapter 3 Quick Start Guide

3.1 System Preparation

Upon receipt of your VSD500 system, the following steps should be followed in order to put it into operation.

- Remove the VSD500 unit, tilt platform, AC adapter, and any provided fixtures from the shipping container.
- Remove the VSD500 unit from its protective bag and ensure that its rear panel power rocker switch is in the OFF (“0”) position.
- Position the supplied tilt platform on the bench where it is intended to be used, and place the VSD500 unit onto the tilt platform in the desired orientation (with the connector fixture on the right or the left).
- Locate the DS12 12 VDC, 4 A desktop AC adapter used to power the VSD500 system. Plug the 4-pin circular connector end of the AC adapter into the VSD500 rear panel 4-pin power jack.
- Connect the supplied AC power cable to a properly-filtered AC outlet and the DS12 adapter.
- If desired, other USB devices can be attached as well (e.g.: keyboard, mouse, barcode scanner, USB drive) at this time.

NOTE: *If the unit has recently come from an environment more than 10 °F colder than the current room temperature, allow at least 3 hours for it to acclimate (outside of its shipping container) before applying power. Not doing so may damage sensitive optical components in the system.*

- When ready to start using the system, set the rear panel power rocker switch to its ON (“1”) position. The system will start up, presenting the main user interface.



Figure 3 Rear Panel

- Load an appropriate type of connector mount into the front panel mount holder.
- After loading the mount, turn the X-Y adjusters so that the light at the mount aperture is maximized.



Caution

Though the LED is of lower power, it is recommended to not look directly into the aperture when the LED is set to ON.

- Clean and fully insert a connector into the connector mount.
- In the VSD500 main menu, turn on the Overlay Tools. This will enable a software function that assists the user with fiber centering and endface focusing in preparation for a future inspection. A scale is also added to the Live View window for manual gauging of the size of any artifacts observed in the view.
- Perform any system software configuration, such as Save Options for image storage, that may be needed (see Chapters 6 and 7 for more information).
- Center the fiber and focus the image using the Overlay Tools.
- If desired at this time, press the front panel CAPTURE button to initiate an inspection.
- When ready to shutdown the VSD500:
 - Press and hold the front panel red momentary pushbutton for at least 3 seconds. This will put the system in standby mode from which it can be awakened later by pushing the same button again.
 - To fully power down the VSD500 after it is in standby mode, set the rear panel power rocker switch to its OFF ("0") position.

NOTE: Safe shutdown occurs by first placing the VSD500 in Standby Mode via the front panel Red power button. It is not recommended to set the rear panel power switch to OFF while the unit is still in operation.

3.2 Package Inspection and Unpacking

3.2.1 Inspection

When your system arrives, check the shipping cartons for wrinkled or damaged corners, holes through the cardboard or other signs of rough handling or abuse. If you find any signs of damage, insist that the delivery service make a note describing the damage on the delivery receipt.

NOTE: If your system arrives in very cold weather, allow the boxes to warm to room temperature before opening them. Exposing a cold unit to a warm room causes condensation that could damage the system. If condensation forms, wait for the unit to dry completely before setting it up and connecting it to an electrical outlet.

3.2.2 Unpacking

Your system is shipped as a single shipping box containing the instrument, manual, power supply, power cord, mounts, and stand. Carefully open the box, making sure not to puncture it too deeply if using a box cutter. Remove the items in the box very carefully.

3.3 Maintenance

The VSD500 system is reliable and robust, requiring minimal maintenance. The primary components needing periodic care are its front panel screen and whatever set of connector mounts were provided as standard or ordered by the end user.

3.3.1 Cleaning the System Enclosure, Screen, and Mounts

Use a damp, lint-free cloth to clean the system's enclosure. Avoid, at all costs, abrasives or solvents as they can permanently damage the finish. For the screen, a mild glass cleaner on lint-free cloth can be applied periodically to remove debris.

While a mount is not attached to the VSD500, check it for evidence of any dust or dirt collected on or inside the mount, and use compressed air to blow off particles. An alcohol wipe can be used on the mounts if excessively dirty.

Chapter 4 Automated Inspection

The primary purpose of the VSD500 is to automatically inspect a connector endface for scratches and defects, compare the detected information against user-selected pass-fail criteria, and present an inspection report, all at the press of a button. To trigger this process, press the [CAPTURE] button adjacent to the connector mount. Upon completion of a successful Inspection, a Report will be displayed along with a Results menu allowing viewing of the images associated with that inspection. Select Export Results to save the report and associated images to a USB drive. To initiate another inspection, press the [BACK] button to return to the main menu, then press the [CAPTURE] button.

Results



Captured Image

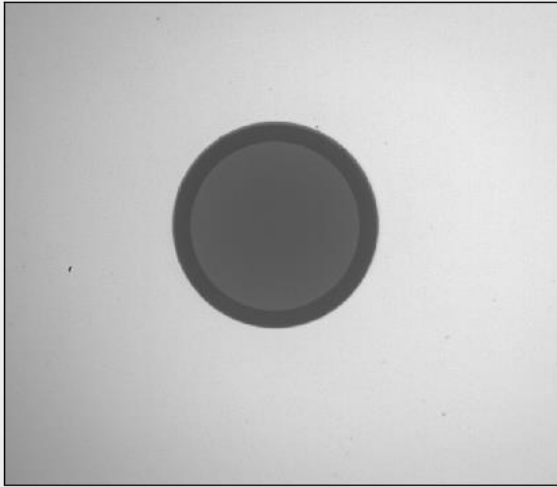
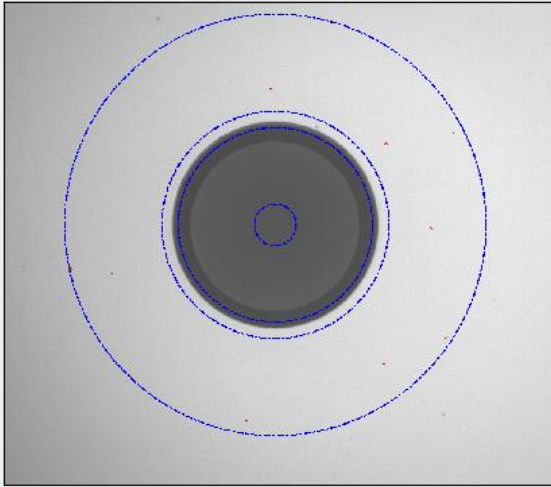
Analyzed Image

Report

Export Results

Back

Criteria: SF_SM_UPC
Date: Mon May 16 2022
Time: 16:01:16

PASS

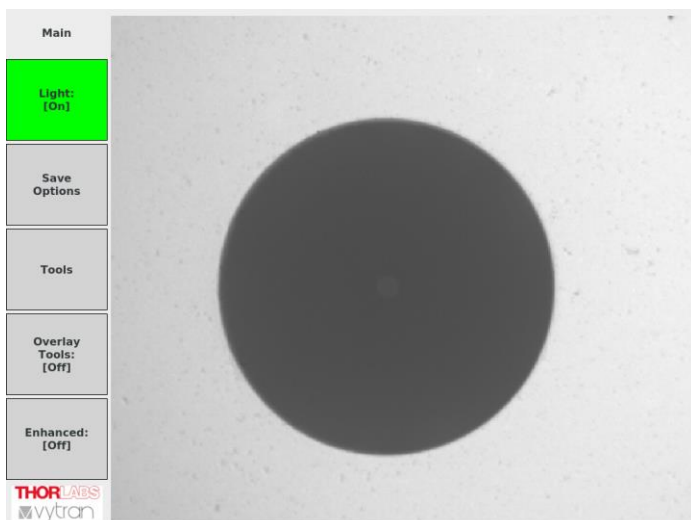
	Size Range	Num Allowed	Num Found	Num > Max	Size Range	Num Allowed	Num Found	Num > Max
	DEFECT				SCRATCH			
Zone A 0 - 25 um	Any	0	0	0	Any	0	0	0
Zone B 25 - 115 um	2 to 5(um)	5	0	0	0 to 3(um)	Any	0	0
Zone C 115 - 135 um	N/A							
Zone D 135 - 250 um	0 to 10(um)	Any	9	0	Any	Any	0	0

To see further examples of the inspection output, and for more detail on how the menu system works, see the following chapters.

Chapter 5 Menu System

The VSD500 provides functionality that is accessed via layers of menus. The functions available on each menu layer are indicated by the name on the soft keys, and each soft key is activated by the adjacent front panel pushbutton, or using an attached mouse. Soft keys with labels of the format “xxx: [zz]” are option toggle buttons. These allow for selecting options (“zz”) for the function (“xxx”). Soft keys without this label format will, when pressed, cause a switch to another menu layer of type indicated by the key name.

5.1 Main Menu

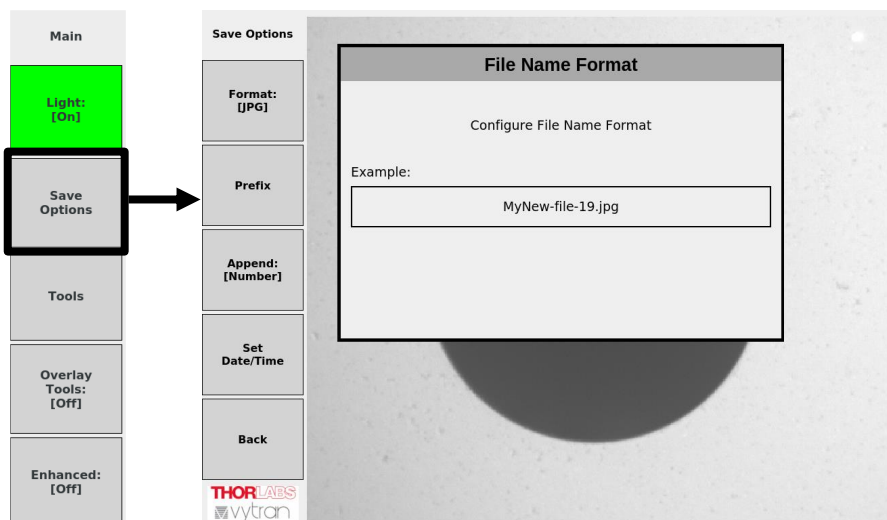


5.1.1 Light

The VSD500 LED light source can be toggled On or Off using the [Light] button.

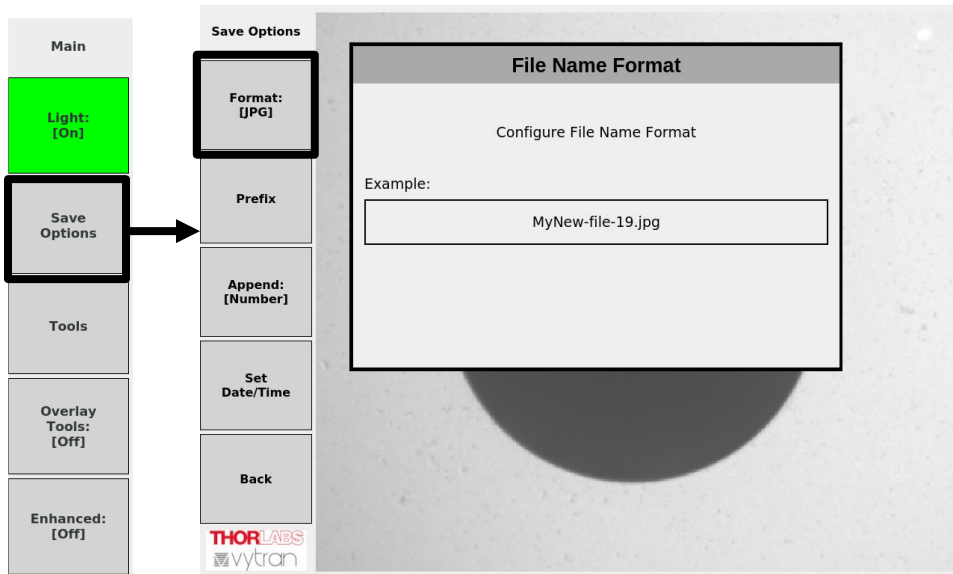
5.1.2 Save Options

This menu choice allows for configuring image format and naming conventions for storing the Captured & Analyzed images as well as Reports to files. When invoked, an example of the default results storage filename will be shown, dependent on previous-selected options for file image Format, as well as filename Prefix and Append text.



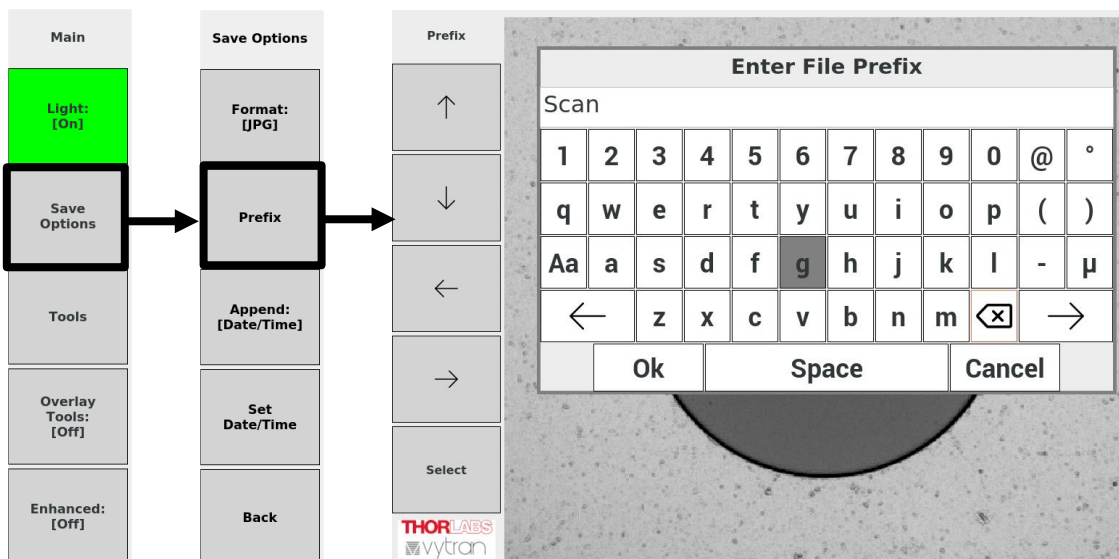
Format

The desired stored image file format can be selected by repeated button press until the desired choice is shown. Available choices are BMP, PNG, and JPG.



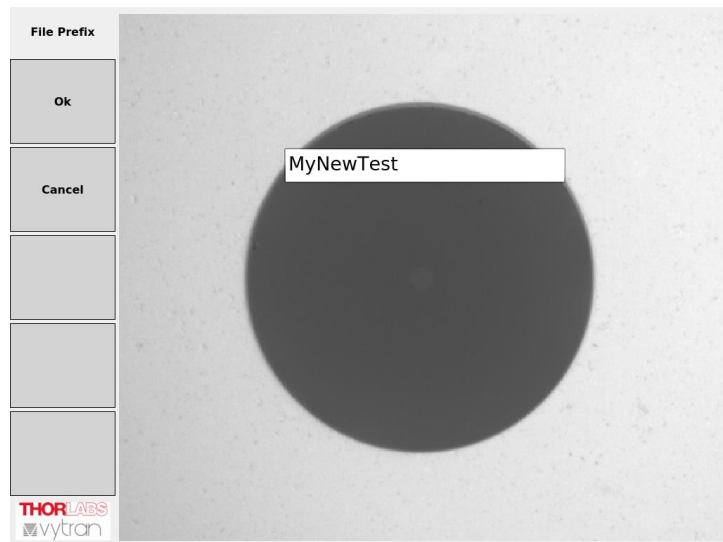
Prefix

In this menu, the four navigating buttons can be used to define a desired image filename prefix. When the chosen letter is highlighted, press the [Select] button. Select the "Aa" choice to toggle between lower case and capitals. When the full prefix is satisfactory, use the buttons to move and select the [Ok] choice to save it and exit the virtual keyboard, or select the [Cancel] choice to exit without saving any changes. Alternatively, a keyboard or barcode scanner can be used to directly enter a prefix name, using an ENTER key to finish. Also, a Mouse can be used instead of the menu buttons to operate the virtual keyboard.



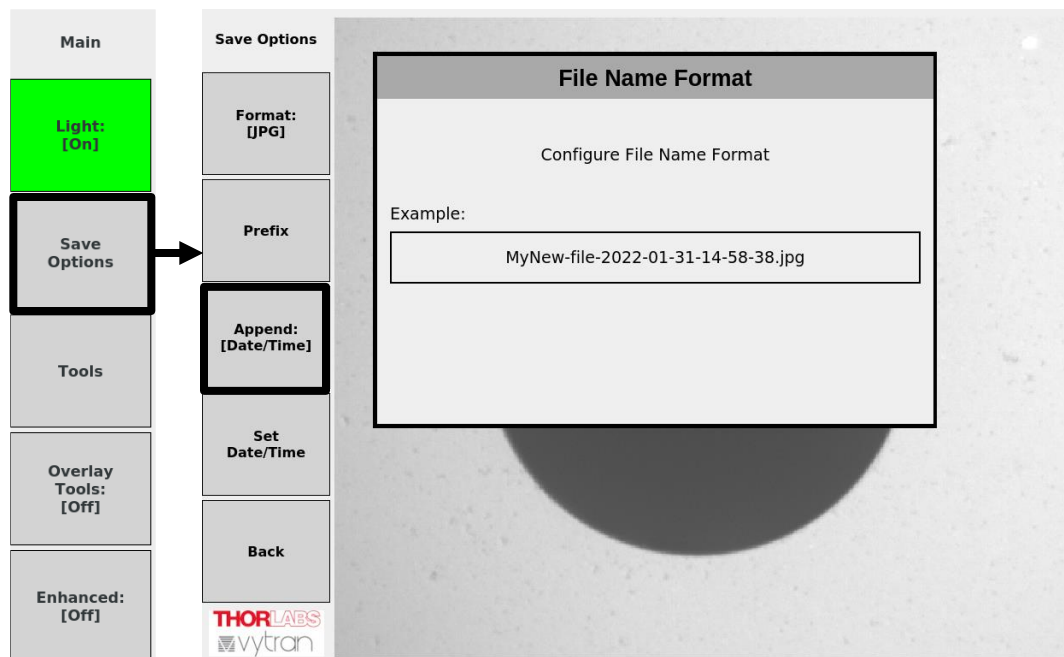
Prefix Entry Shortcut

If a USB keyboard or Barcode Scanner is attached, the software provides a shortcut to prefix entry when at the Main Menu. Simply begin typing (or scan text in using the Barcode Scanner), and the following menu will appear. Entry is completed when an “Enter” is received by the software.



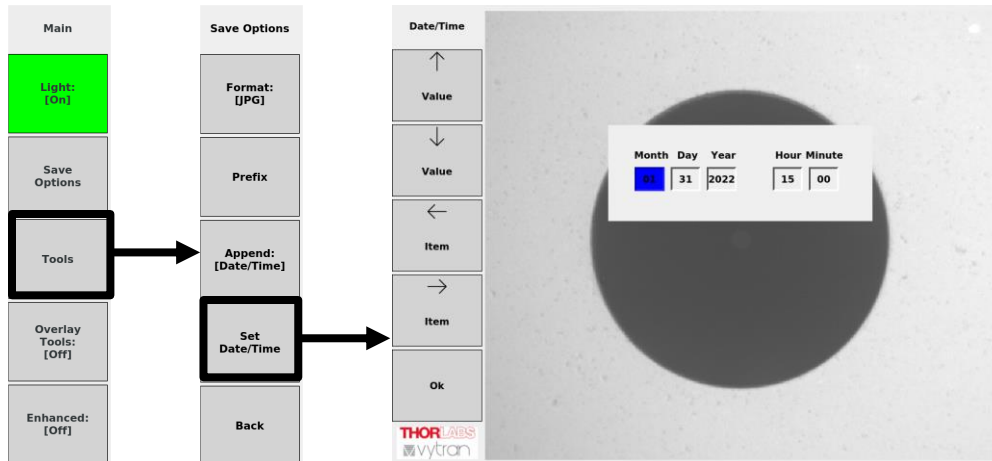
Append

Repeated button press will toggle between appending a “Date/Time” signature vs. appending an autoincrementing integer (“Number”) to the filename.



Set Date/Time

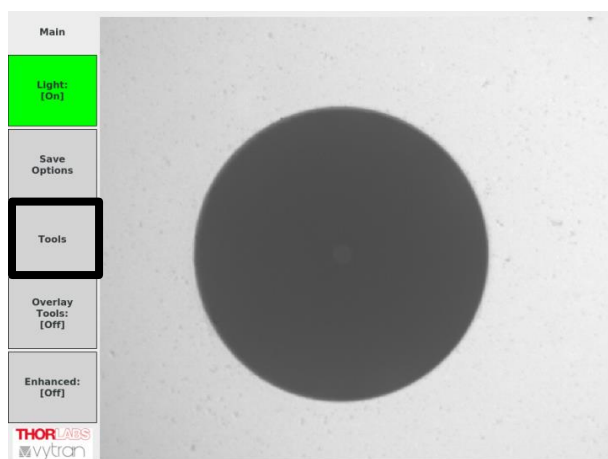
The current date and time, used in Inspection file naming and in reports, can be set with this menu feature. Use the [Item] buttons to select a field for changing, and the [Value] buttons to set a field value. When finished making changes, press the [Ok] button.



5.1.3 Tools

Various aspects of the VSD500 can be configured or inspected via the [Tools] menu and its submenus. These include:

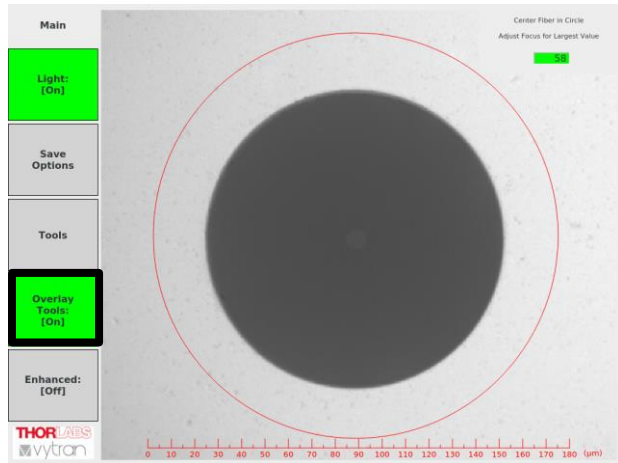
- Defining the automatic inspection Pass-Fail criteria
- Setting quality of the camera Live View
- Monitoring and managing internal and external storage
- Managing the internal database
- Setting unit Date/Time
- Inspecting system information
- Updating software



See the **Tools Menu** chapter for more detail.

5.1.4 Overlay Tools

The Overlay Tools mode can be toggled On or Off using the [Overlay Tools-On/Off] button. This mode provides software assisted fiber centering and endface focusing, both of which are needed prior to activating an inspection. When switched On, a dialog will appear at top right of the live view, as shown below.

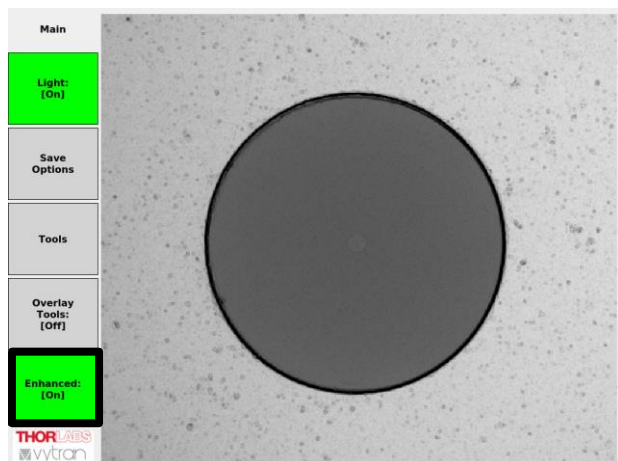


Using Overlay Tools mode:

- Center the fiber by adjusting the mount in X and Y until the connector's fiber is entirely within the circle overlaying the camera live view.
- Focus the endface by first defocusing the view using the front panel FOCUS knob, noting what direction of turning was required. Then turn the FOCUS knob about $\frac{1}{4}$ turn in the other direction past the point where it is sharp. Next, reverse focusing direction once more. While turning the knob back through best focus, the focus assist dialog at top right of view will show best focus location by switching color to green from red. Best focus will also be indicated by the largest number showing in the dialog.
- When Overlay Tools mode is switched ON, a scale is also added to the Live View window for manual gauging of the size of any artifacts observed in the view.

5.1.5 Enhanced

The Enhanced mode can be toggled On or Off using the [Enhanced-On/Off] button. When switched ON, this mode improves visibility of end face artifacts by applying real-time post-processing to the image from the camera. Via the Tools menu, the user has the ability to select from and configure two types of enhancement. See the [Tools Menu](#) chapter for enhanced camera view configuration instructions and examples.



Chapter 6 Tools Menu

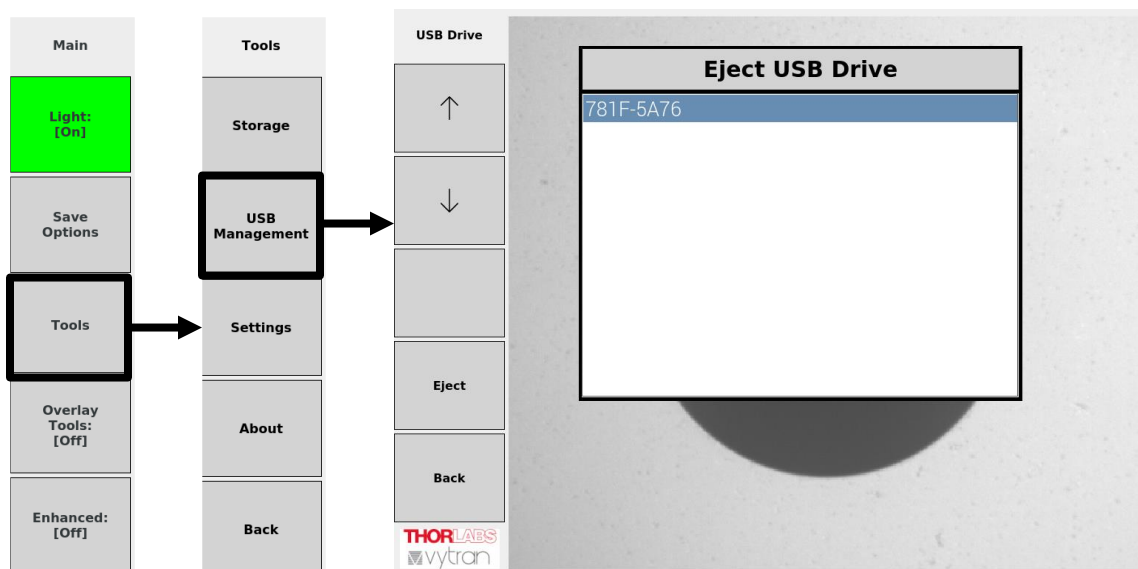
Pressing the [Tools] button in the Main menu will invoke the following menu options.

6.1 Storage

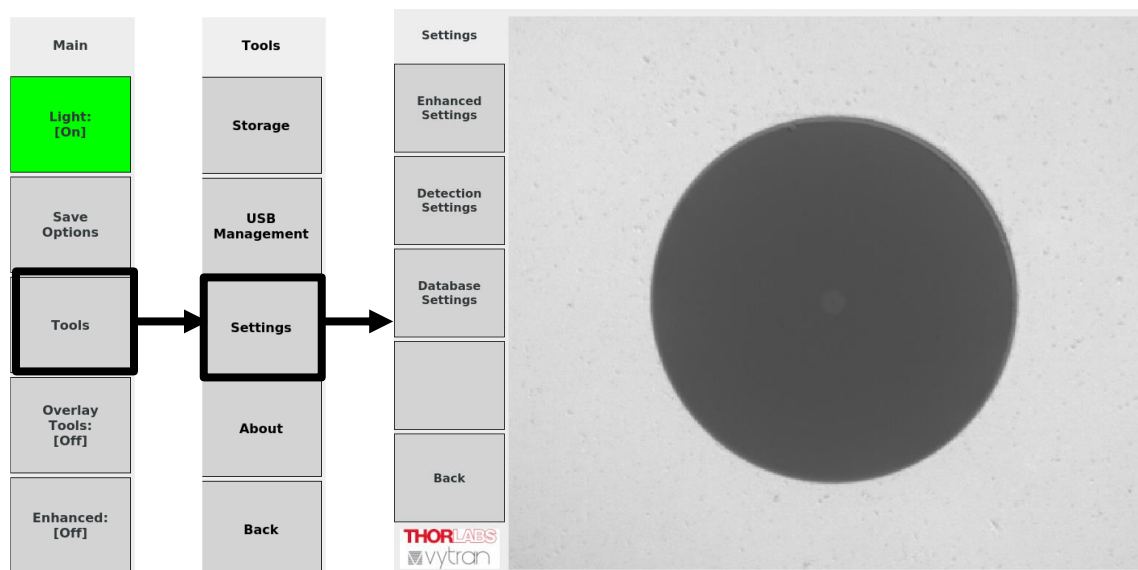
Inspection file sets (consisting of a captured image, analyzed image, and a report) are automatically saved to the internal solid-state disk and can later be selected for viewing, exporting, or deleting. See the [Storage Menus](#) chapter for more detail.

6.2 USB Management

Use this button to safely eject one or more inserted USB flash drives. Select the desired USB storage drive (if multiple flash drives are attached) and press the [Eject] button.



6.3 Settings



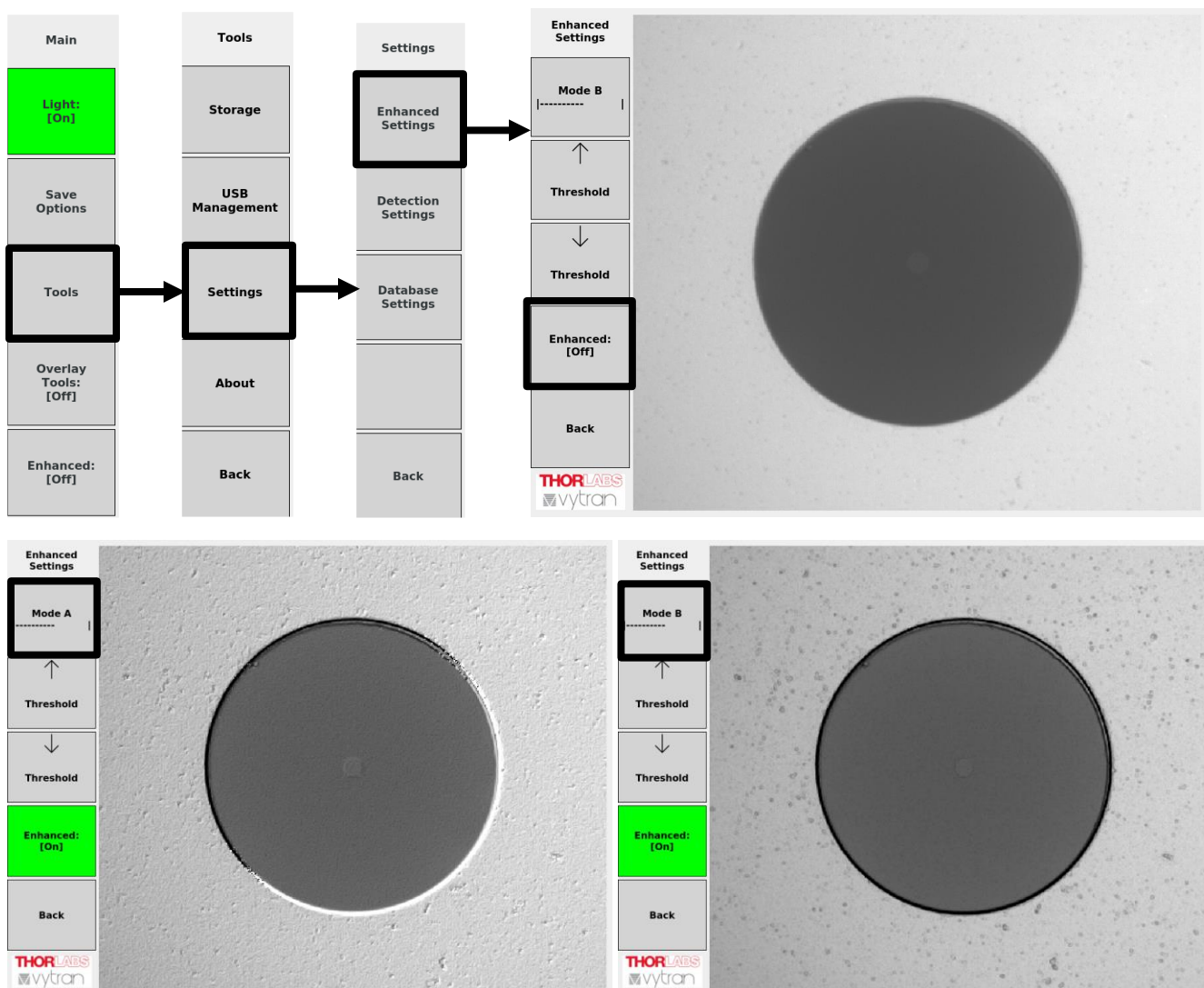
6.3.1 Enhanced Settings

The VSD500 can be used as a tool for both manual and automated end face visual inspection. To facilitate manual detection of end face artifacts (e.g.; defects and scratches), an Enhanced Mode for the camera Live View is provided. When switched ON (via the [Enhanced-On/Off] button in the Main Menu), this mode improves visibility of end face artifacts by applying real-time post-processing to the image from the camera.

Via this [Enhanced Settings] menu, the user has the ability to:

- Turn on or off Enhanced Mode (by repeated press of [Enhanced] button)
- Choose type of enhancement (by repeated press of the [Mode] button)
- Set the level of enhancement (by pressing the [Threshold] Up/Dn buttons)
 - Level will be indicated on [Mode] button
- Save any changes and return to previous menu (by pressing the [Back] button)

NOTE: The enhanced settings and mode has no effect on the automated inspection. See below images for examples of the Live View under the different modes.

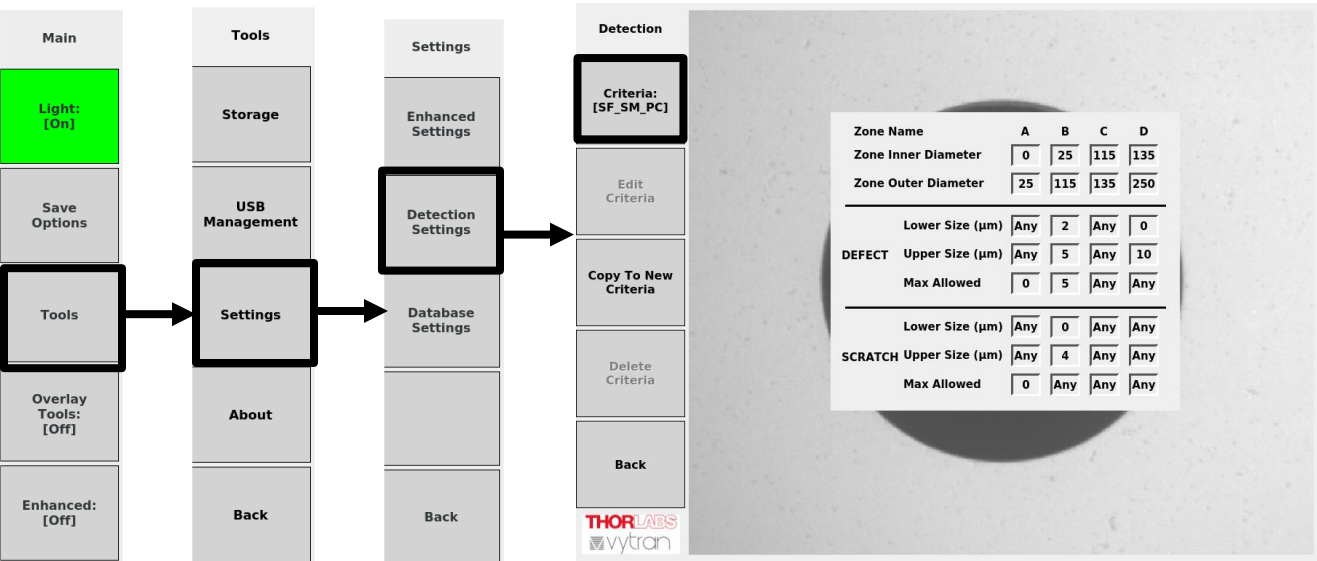


6.3.2 Detection Settings

Successful inspection with determination of passing or failing of an analyzed endface requires prior selection of a Pass/Fail criteria to be applied. The VSD500 includes a standard set of Pass/Fail criteria for common connector types, as defined by the applicable IEC61300-3-35 specification. These factory-supplied criteria cannot be modified, but the VSD software also provides the capability for creating editable custom criterias from a copy of an existing criteria. Custom criteria can also be deleted from the Detection Settings menu.

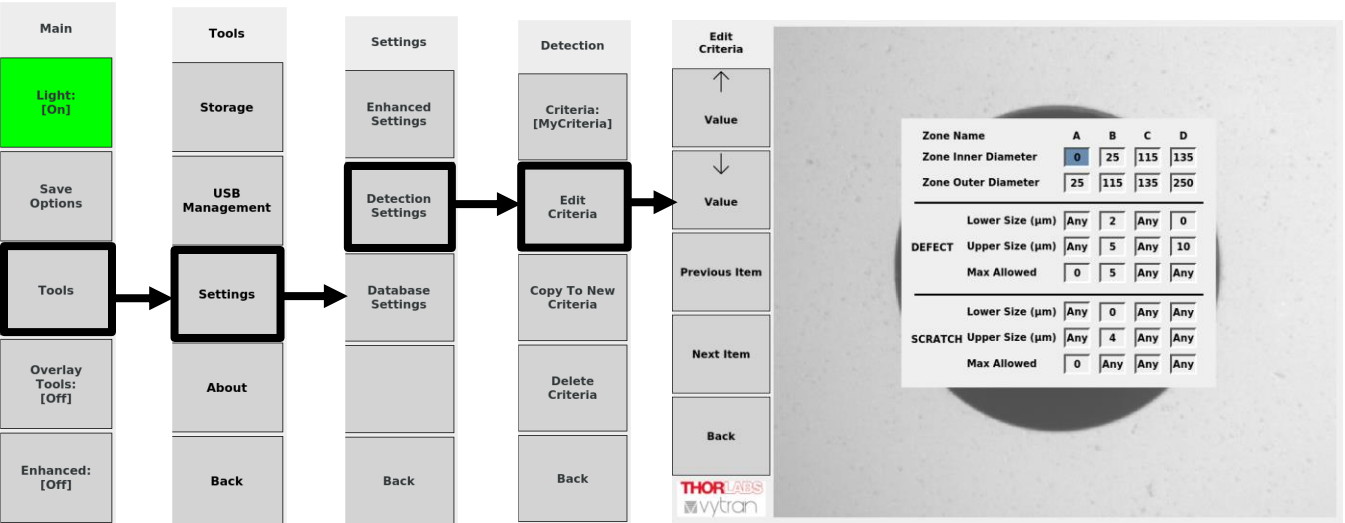
Criteria

The [Criteria] button allows a user to choose the Pass-Fail criteria set that will be used for analyses. At time of criteria selection, that criteria's definition is displayed for review.



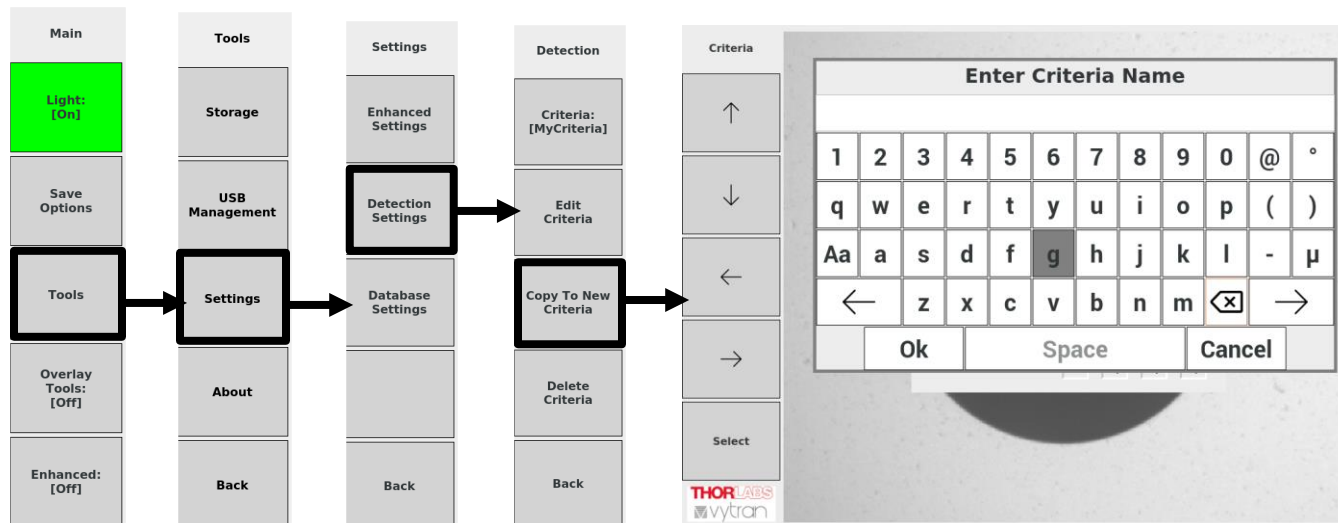
Edit Criteria

If the "Custom" choice is selected with the [Criteria button], the [Edit Criteria] button becomes enabled. Pressing that button will invoke an edit menu for navigating through and changing fields in the Custom Criteria. After editing, press the [Back] button to exit and save any changes.



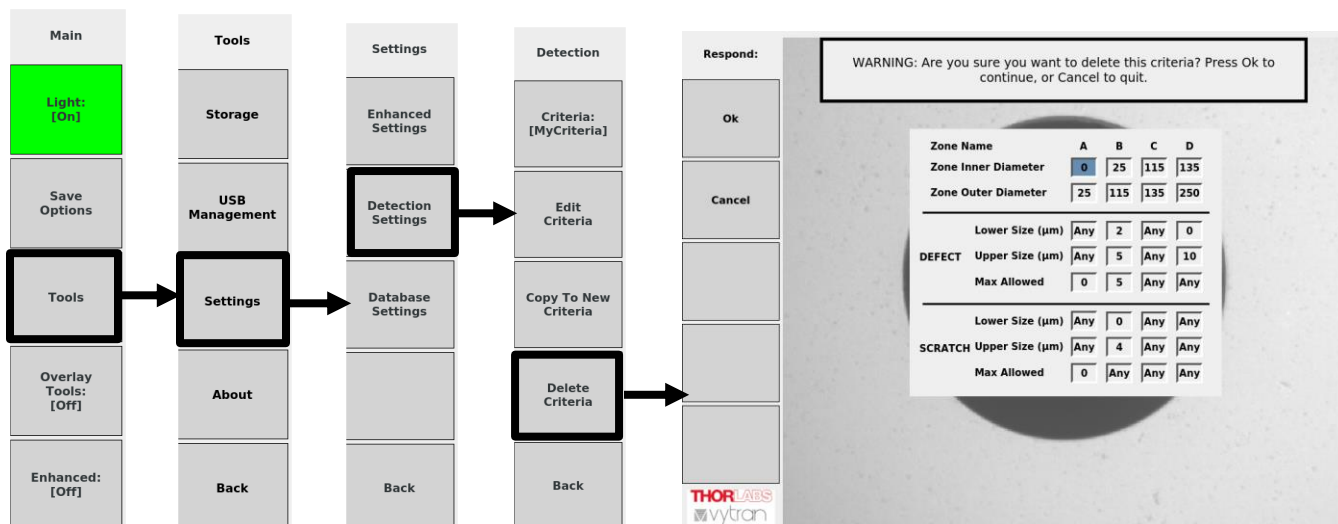
Copy To New Criteria

Use the [Copy to New Criteria] button to create custom criterias. Pressing this button will make a copy of the currently selected existing criteria, prompt the user for a name to assign to it, and then present the new criteria for editing.



Delete Criteria

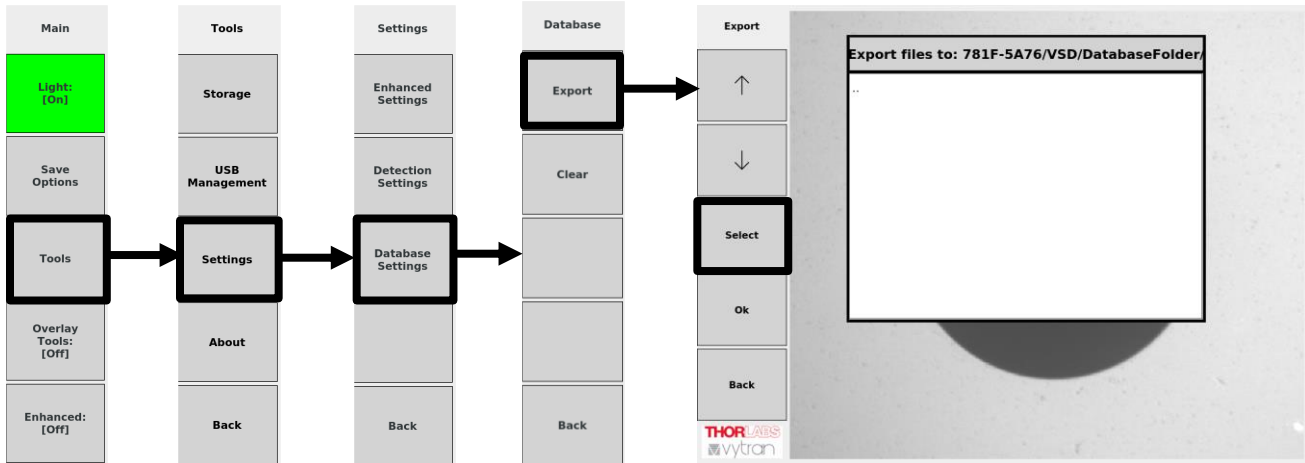
If the "Custom" choice is selected with the [Criteria button], the [Delete Criteria] button becomes enabled. Pressing that button will prompt the user for confirmation of intent to delete the criteria. Press the [OK] button to confirm, or the [CANCEL] button to exit without deleting.



6.3.3 Database Settings

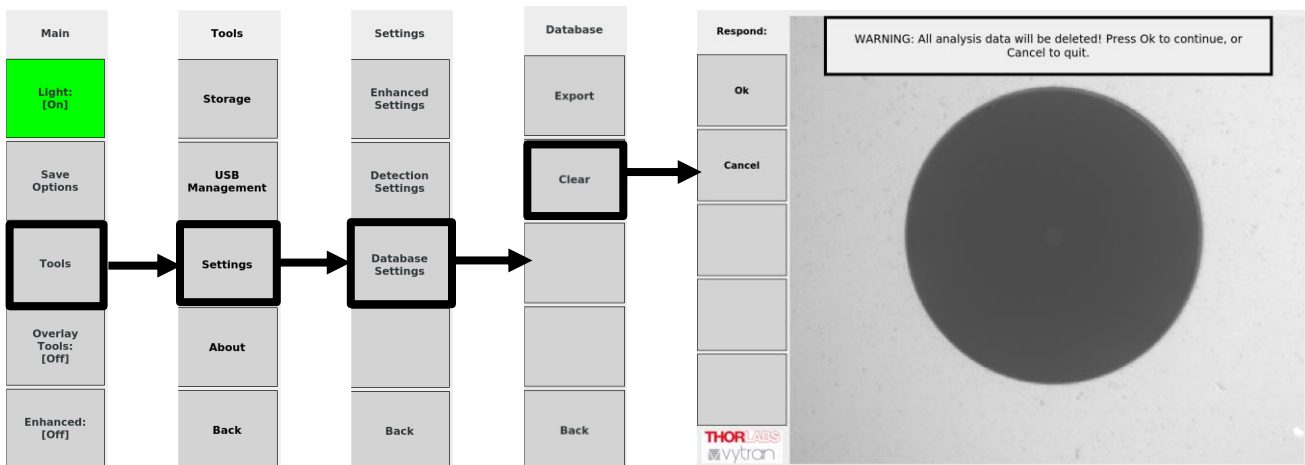
Export

The VSD500 internal MySQL database backup file (containing data from all analyses performed by that time) can be exported to an attached USB flash drive. The database backup file is named with the current date and time. After inserting a USB drive, pressing the [Export] button will present a menu where the user can navigate to a destination folder (for the database backup file) on the USB drive using the [Select] button. Press the [Ok] button to initiate the export. If initially no USB drive is found, a warning message will be displayed along with presenting an opportunity to insert a USB drive and retry the export.



Clear

Data from an Inspection are automatically stored to an internal MySQL database and will accumulate over time with VSD500 use. In order to prevent internal disk becoming full and interfering with normal operation, the database can be periodically reset (cleared of data). When this button is pressed to perform that reset, a warning will first be shown and the user is given an opportunity to cancel the operation. If it is allowed to proceed, a confirmation will be shown.



6.3.4 About

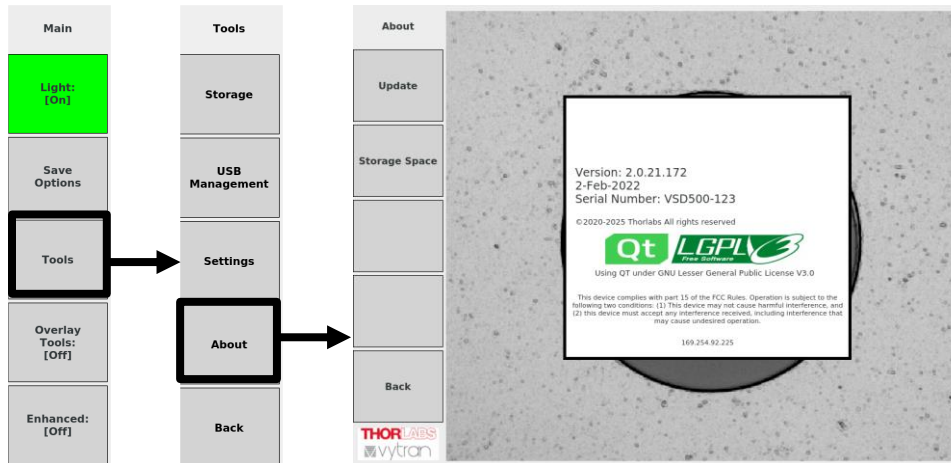
This menu includes the following VSD500 information and functions:

The current software version.

The unit serial number.

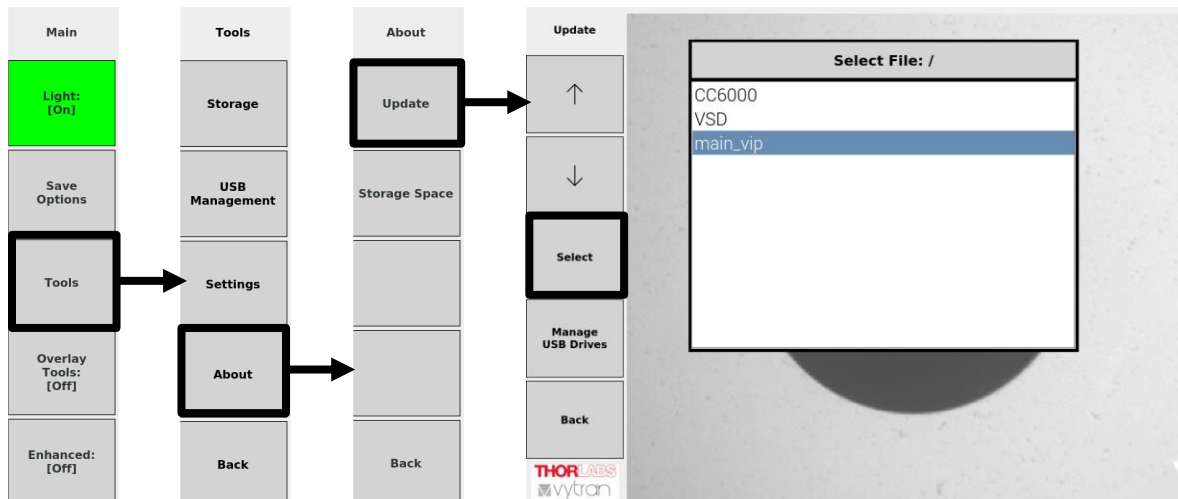
A function for updating to a newer software version.

Access to the status and management of internal storage space.



Update

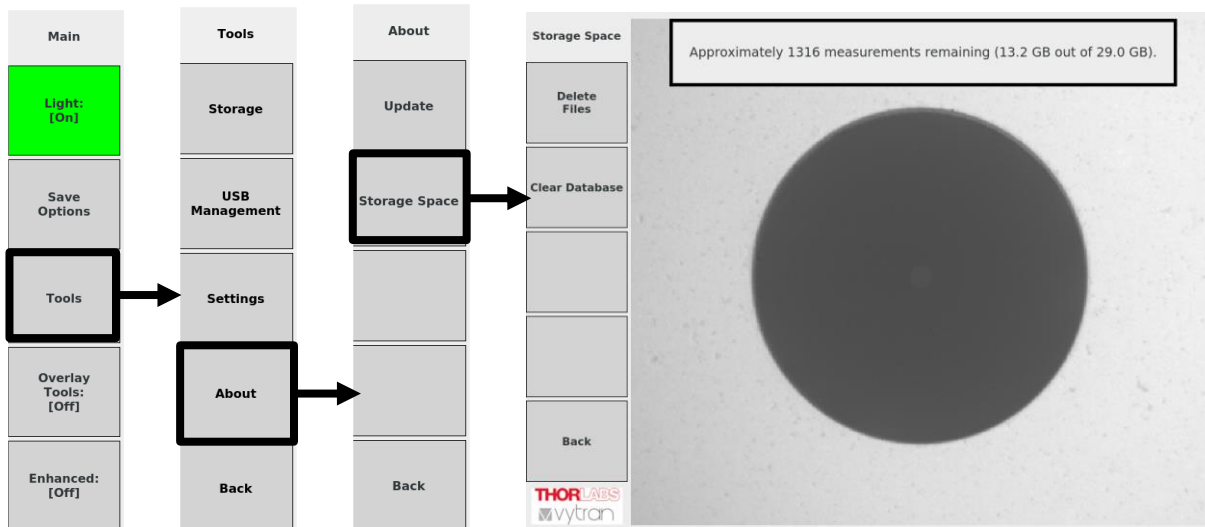
To perform a software update, a new version must first be obtained from Thorlabs, written to a USB flash drive, and the flash drive inserted into one of the USB ports. Navigate to the folder containing the update file and highlight the file. Press the [Select] button to initiate the update. If no drive is inserted when the [Update] button is pressed, a warning message will be shown. Upon successful update, the VSD500 will immediately reboot itself.



Storage Space

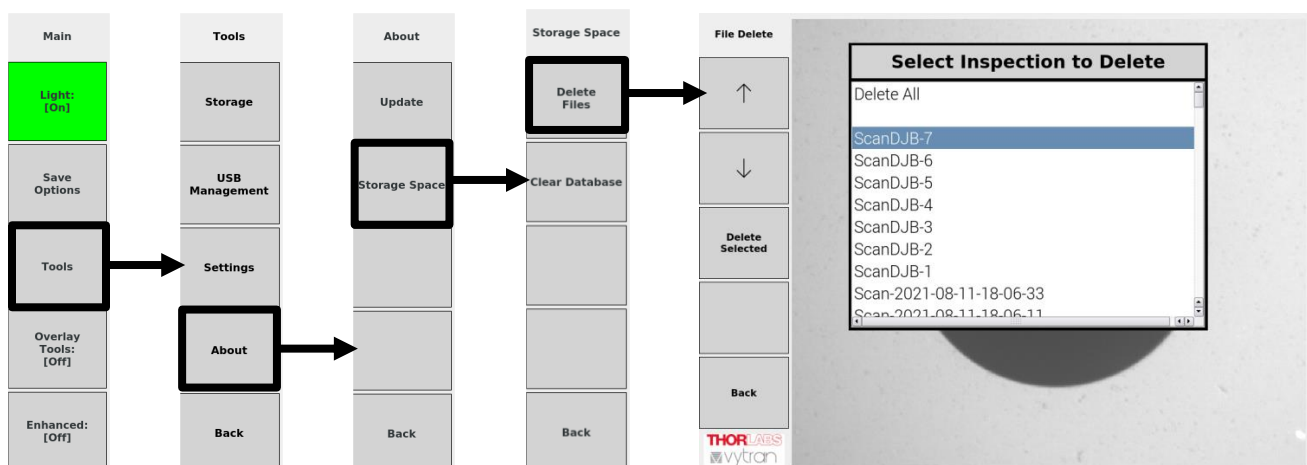
Data from each Inspection run is automatically stored to the VSD500 internal solid-state disk. This data is stored into a database as well as in the form of exportable images and Report PDF files. This button provides the means for the user to monitor and manage the stored data so that its accumulation does not reach a level where normal operation could be impaired.

NOTE: If the available solid-state disk space becomes lower than 125 MB, a warning will be displayed and the ability to perform further analyses will be blocked until space is freed up by using this function.



Delete Files

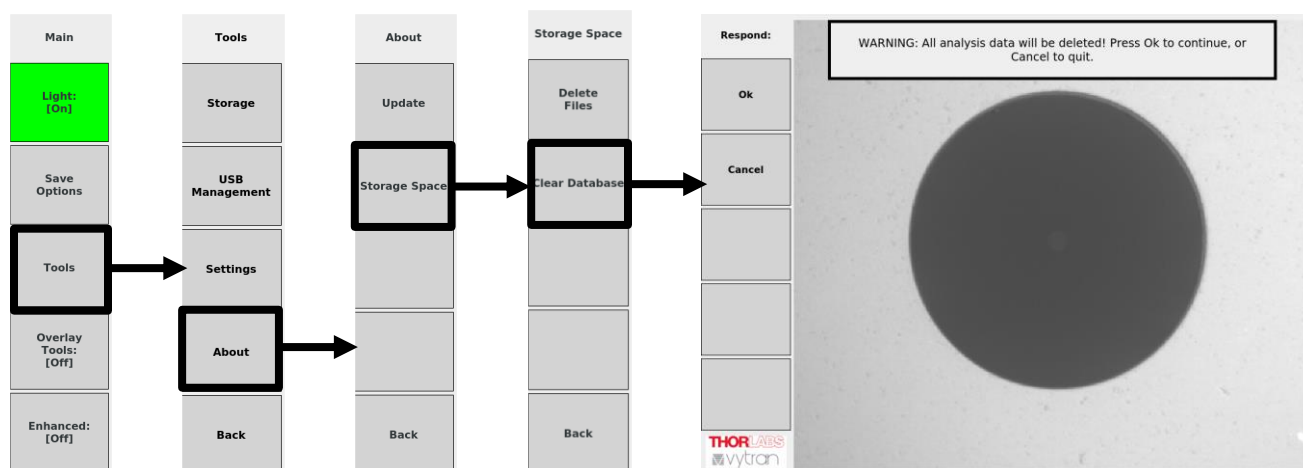
For each automated Inspection run, a set of files (captured image, analyzed image, and Report) are created and stored to the VSD500 internal solid-state disk. Accumulation of these Inspection files over time can cause the internal disk to become full and interfere with normal operation. Pressing this button will allow the user to delete a set of Inspection files that are no longer needed, freeing up disk space.



Clear Database

Data from an Inspection are automatically stored to an internal MySQL database and will accumulate over time with VSD500 use. In order to prevent internal disk becoming full and interfering with normal operation, the database can be periodically reset (cleared of data). When this button is pressed to perform that reset, a warning will first be shown and the user is given an opportunity to cancel the operation. If it is allowed to proceed, a confirmation will be shown.

NOTE: Clearing the database will have no effect on previously stored Inspection files.

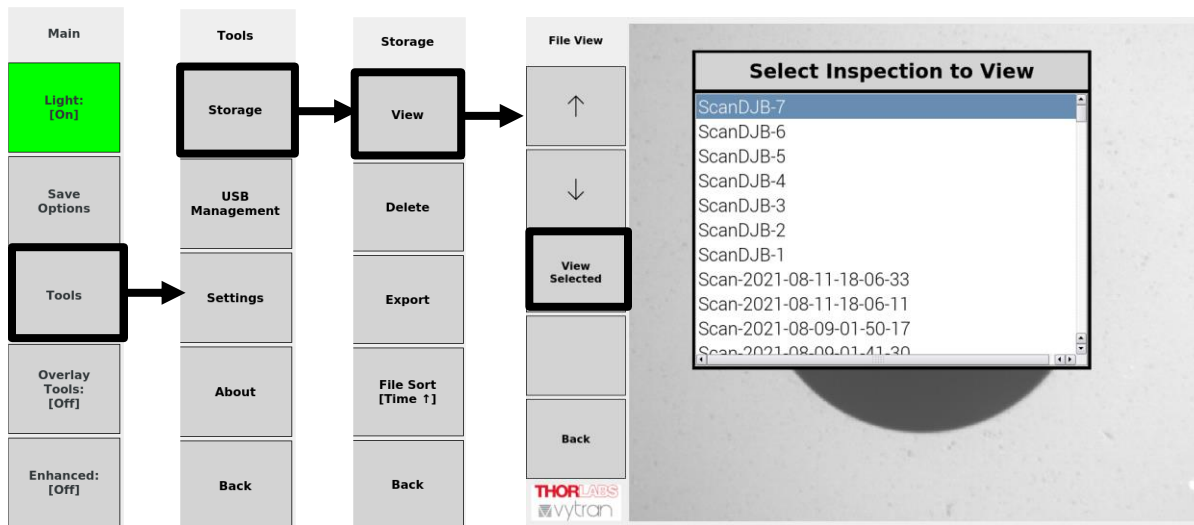


Chapter 7 Storage Menus

The VSD500, as part of its automated endface scratch and defect analysis, stores various information such as the camera image presented to it, the resulting image showing detected artifacts, and a report summarizing the results with comparison to the selected Pass/Fail criteria. All this information is automatically saved to files on the internal solid-state disk and can later be selected for viewing, exporting, or deleting.

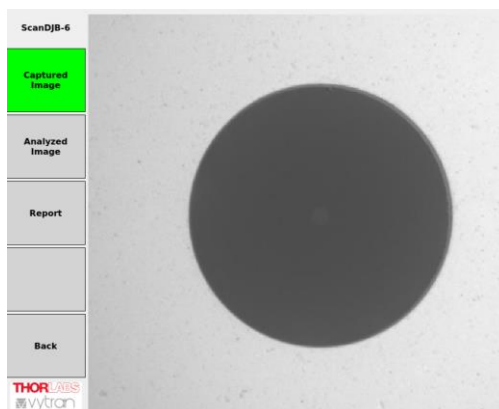
7.1 View

When invoked, this menu will present a list of previously-stored Inspections whose file set can be opened for viewing upon press of the [View Selected] button.

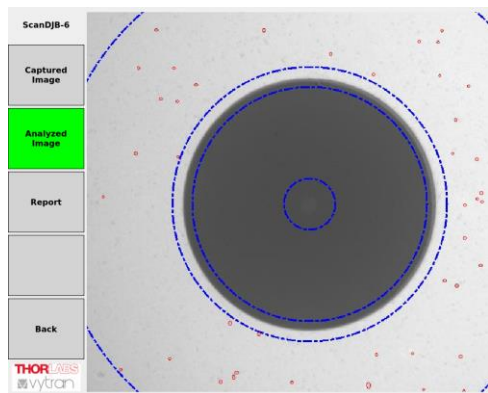


After selection of an Inspection, its Captured Image, Analyzed Image, or Report can be displayed. An instance of each of these three file types are stored each time an Inspection is run.

- **Captured Image:** Camera images acquired and used for automated artifact (scratches and defects) detection upon press of the front panel CAPTURE button.



- **Analyzed Image:** Results image graphically showing all detected endface artifacts.

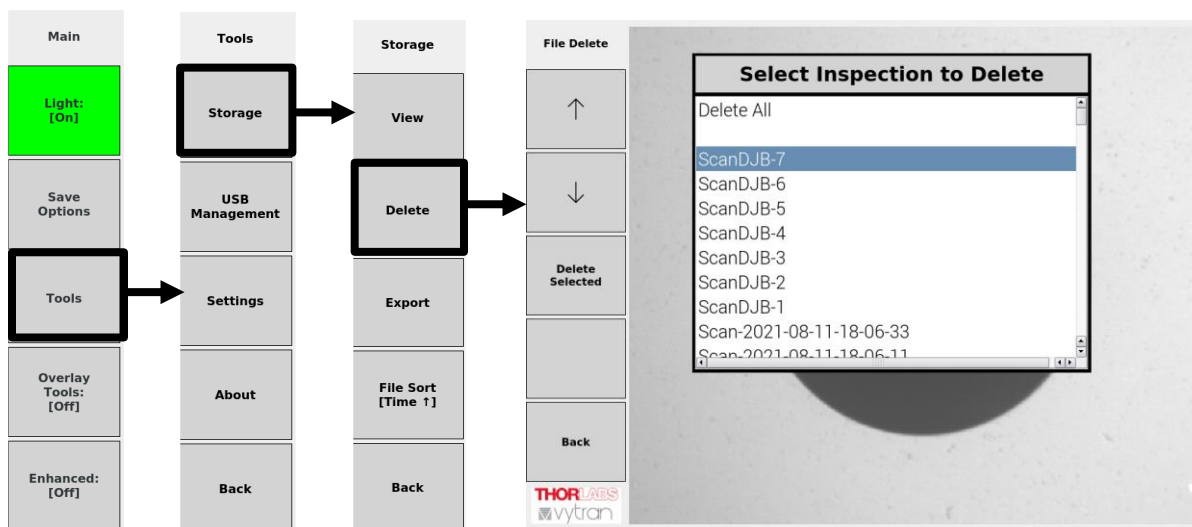


- **Report:** A preformatted report showing inspection results, criteria details, and Pass-Fail status.



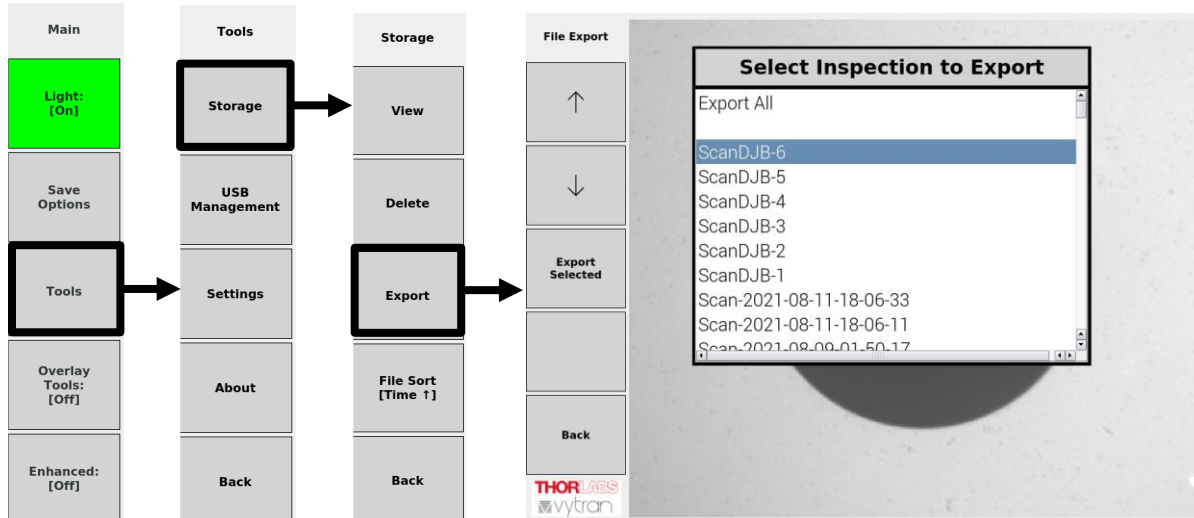
7.2 Delete

When invoked, this menu will present a list of previously-stored Inspections available for deletion. Pressing [Delete] will delete the chosen (highlighted in the list) Inspection file set from the internal hard drive. To delete all Inspections in the list from the hard drive, select "Delete All" before pressing the [Delete] button.



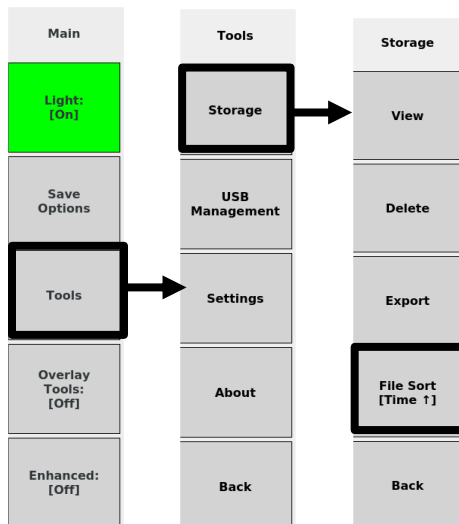
7.3 Export

When invoked, this menu will present a list of previously-stored Inspections available for export. Pressing [Export] will export the chosen (highlighted in the list) Inspection file set to an attached USB flash drive. To export all Inspections in the list to an attached USB flash drive, select “Export All” before pressing the [Export] button.



7.4 File Sort


Use the [File Sort] button to configure the order that the Inspections in the View/Delete/Export menus will be listed. Repeated press of this button will toggle through the sorting choices of ascending creation date_time, descending creation date_time, ascending alphanumerically, and descending alphanumerically.



Chapter 8 Specifications

Item #	VSD500
Optical Magnification	640X
Field of View (W x H)	260 μm x 224 μm
Lateral Resolution	0.3 μm
Light Source	450 nm LED
Integrated Display	8", 1024 x 768 px, IPS LCD
Internal Storage	32 GB Solid State Drive
Power Supply	12 VDC, 4 A
Dimensions (W x H x D)	12.34" x 7.06" x 6.3" (313.4 mm x 179.4 mm x 153.2 mm)
Mass (Weight)	2 kg (4.4 lbs)

Chapter 9 Certifications and Compliance

**THORLABS**
www.thorlabs.com

EU Declaration of Conformity

in accordance with EN ISO 17050-1:2010

We: Thorlabs Inc.
Of: 56 Sparta Avenue, Newton, New Jersey, 07860, USA

in accordance with the following Directive(s):

2014/35/EU	Low Voltage Directive (LVD)
2014/30/EU	Electromagnetic Compatibility (EMC) Directive
2011/65/EU	Restriction of Use of Certain Hazardous Substances (RoHS)

hereby declare that:

Model: VSD500

Equipment: Visual Scratch and Defect Detection System


is/are in conformity with the applicable requirements of the following documents:

EN 61010-1	Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.	2010
EN 61326-1	Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements	2013

and which, issued under the sole responsibility of Thorlabs, is/are in conformity with Directive 2011/65/EU of the European Parliament and of the Council of 8th June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment, for the reason stated below:


contains no substances in excess of the maximum concentration values tolerated by weight in homogenous materials as listed in Annex II of the Directive


I hereby declare that the equipment named has been designed to comply with the relevant sections of the above referenced specifications, and complies with all applicable Essential Requirements of the Directives.

Signed:  **On:** 25 January 2022

Name: Danielle Strong
Position: Director of Quality and Compliance

EDC - VSD500 -2022-01-25



**THORLABS**
www.thorlabs.com

UKCA Declaration of Conformity

We: Thorlabs Inc.
Of: 56 Sparta Avenue, Newton, New Jersey, 07860, USA
in accordance with the following UK Legislation:

SI 2016/1101	The Electrical Equipment Safety Regulations
SI 2016/1091	The Electromagnetic Compatibility (EMC) Regulations
SI 2012/3032	Restriction of Use of Certain Hazardous Substances (RoHS)

hereby declare that:
Model: VSD500

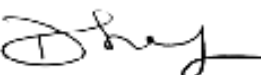
Equipment: Visual Scratch and Defect Detection System

is in conformity with the applicable requirements of the following documents:

BS EN 61010-1	Safety Requirements for Electrical Equipment for Measurement, Control and Laboratory Use.	2010
BS EN 61326-1	Electrical Equipment for Measurement, Control and Laboratory Use - EMC Requirements	2013

and which, issued under the sole responsibility of Thorlabs, is in conformity with The Restriction of Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012, for the reason stated below:
contains no substances in excess of the maximum concentration values tolerated by weight in homogenous materials as listed in Annex II of the Directive

I hereby declare that the equipment named has been designed to comply with the relevant sections of the above referenced specifications, and complies with all applicable Essential Requirements of the Regulations.

Signed:  **On:** 25 January 2022

Name: Danielle Strong
Position: Director of Quality and Compl...

EDC - VSD500 -2022-01-25

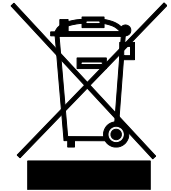
**UK
CA**

9.1 FCC Compliance

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Chapter 10 Warranty and RMA Information

Thorlabs verifies our compliance with the WEEE (Waste Electrical and Electronic Equipment) directive of the European Community and the corresponding national laws. Accordingly, all end users in the EC may return “end of life” Annex I category electrical and electronic equipment sold after August 13, 2005 to Thorlabs, without incurring disposal charges. Eligible units are marked with the crossed out “wheelie bin” logo (see right), were sold to and are currently owned by a company or institute within the EC and are not disassembled or contaminated. Contact Thorlabs for more information. Waste treatment is your own responsibility. “End of life” units must be returned to Thorlabs or handed to a company specializing in waste recovery. Do not dispose of the unit in a litter bin or at a public waste disposal site. It is the user’s responsibility to delete all private data stored on the device prior to disposal.



Annex I

10.1 Return of Devices

This precision device is only serviceable if returned and properly packed into the complete original packaging including the complete shipment plus the cardboard insert that holds the enclosed devices. If necessary, ask for replacement packaging. Refer servicing to qualified personnel.

Chapter 11 Thorlabs Worldwide Contacts

For technical support or sales inquiries, please visit us at www.thorlabs.com/contact for our most up-to-date contact information.



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