smart optics

EN

Operating Manual

Audiology Scanners

aural Scan

free Stage one | free Stage twin

mono Scan | duo Scan

ds Production

– Translation of the original Operating Manual –

EN

Legal notice

SUPPORT

For direct customers and resellers: support@smartoptics.de
For customers of resellers: Your smart optics reseller
Search for resellers:
Use the www.smartoptics.de contact form.
smart optics Help Center support.smartoptics.de

PURCHASE REQUEST

www.smartoptics.de/en/contact/

CHANGES

smart optics reserves the right to make changes in the products and this documentation.
For current documents and software, visit the Download Center:
www.smartoptics.de/en/audiology/downloads/

BRANDS AND TRADEMARKS

Allied Vision Alvium Vimba	Allied Vision Technologies GmbH, DE-07646 Stadtroda
FlyCapture UpdatorGUI	Point Grey Research, Inc.
IPRO	IPRO GmbH, DE-71229 Leonberg
Noah HIMSA	HIMSA II K/S, Copenhagen, (Denmark), Minneapolis (USA)
PYLON	Basler AG, DE-22926 Ahrensburg
Windows .NET Framework Visual C++	Microsoft Corporation, Redmond (Washington, USA)

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1 Symbol Explanation

Symbols on the device

Risk of cuts. Object holder with sharp needles

Do not touch (3D-Sensor)

CE label, documents the conformity of the scanner with EU directives at the time of issuance of the CE certificate.

Fuse, documents a built-in overvoltage protection device.

USB, documents a USB connection for the camera and PC.

RGB Texture Scan, identifies devices with RGB hardware components.

Symbols in the instruction

Sign	Signal word	Meaning
	Note Danger Warning Caution	Warning of possible: — Material damage — Injuries (serious – moderate) — Injuries (minor) — Danger to life
▷		Action step
—		Simple list
1.		Numbered list
		Cross-reference (link)
		smart optics Help Center (external link)
		Chargeable extensions (module/accessory)
		Important note
		Click with the left mouse button
		Click with the right mouse button
		Click with both mouse buttons
		Turn mouse wheel
		Press mouse wheel

Part 1: Operating manual for audiology scanners

2 Technical specifications

2.1 Audiology scanners

Housing

	mono Scan	duo Scan	ds Production	free Stage twin	free Stage one
Shape	flat, closed	flat, closed	flat, closed	high, narrow	high, narrow
Color	grey-black	grey-black	anthracite-light grey	grey-black	grey-black
Material	PUR, integral rigid foam, and acrylic glass	PUR, integral rigid foam, and acrylic glass	Steel sheet DC01 (1.0330)	PUR, integral rigid foam, and acrylic glass	PUR, integral rigid foam, and acrylic glass
Dimensions (closed) W × L × H mm,	280 × 322 × 135	280 × 322 × 135	300 × 350 × 155	186 × 292 × 348	186 × 292 × 348
Weight	5,5 kg	6 kg	10 kg	6,5 kg	6 kg
On/Off switch	LED pressure switch, front	LED pressure switch, front	LED pressure switch, front	toggle switch, rear	toggle switch, rear

Hardware features

Impressions simultaneously	1	2	2	2	1
Scan volume	▮	▮▮	▮▮▮	▮▮	▮

E-Technology

Supply voltage	100-240 V AC 50/60 Hz
Fuse	2 × T 1,6 A L 250 V
Power consumption	max. 30 W
Connections	1 × USB 1 × power

Environment

Storage temperature	-5°C - 50°C
Operating temperature	15°C - 30°C
Relative humidity	40 % – 60 %, max. 80 %

Measurement

RGB component	-	since 10/2022	since 10/2022	✓	-
Accuracy ISO 12836, after 3D calibration	< 9 µm				
Camera resolution	1,3 Mpx				

Speed in seconds, scanning only, from series 10/2022	13	13	15	13	13

2.2 Software features

	mono Scan	duo Scan	ds Production	free Stage twin	free Stage one
Output data format			STL, MSH, ASCII, PLY, HPS		
Color texture scan	-	since 10/2022	since 10/2022	✓	-
Rescan	-	✓	✓	✓	-
Barcode interface	–	✓	✓	✓	–
Interfaces to third-party systems			Noah System winIPRO		

Regarding third-party systems

— Noah System: “Standard for integrated hearing care software” of HIMSA (Hearing Instrument Manufacturers’ Software Association):www.himsa.com/de/produkte/noah-system-4/
smart optics is a registered HIMSA member: HIMSA Mitgliedsfirmen

— winIPRO, auditory acoustics software of IPRO: www.ipro.de

2.3 System requirements PC

The system requirements apply to all audiology scanners.

PC (Minimum)	CPU: Dual Core, i3 | RAM: 4 GB | Port: USB 3.0, HDD: approx. 40 GB free | Graphics card RAM: 1 GB
PC (recommended)	CPU Quad Core, i5 | RAM: 8 GB | Port: USB 3.0 HDD: approx. 80 GB free | Graphics card RAM: 2 GB
Operating System	Windows 10 64 Bit Windows 11 64 Bit (recommended)

2.4 Scope of delivery

Scanner

Item number	Item name	Remark
90548	free Stage twin	
90549	free Stage one	
90573	duo Scan	
90027	ds Production	
90574	mono Scan	

Transport box

- ☐ 1 scanner
- ☐ Object holders (needle adapters):
  - 1 (mono Scan, free Stage one)
  - 2 (duo Scan, free Stage twin)
  - 4 (ds Production)
- ☐ 1 power cable
- ☐ 1 USB cable

Data carrier

- ☐ Software aural Scan
- ☐ Calibration data for the scanner
- ☐ Operating manual (PDF)

Optional accessories (chargeable)

Item number	Item name	Description
90066	Warranty extension	12-month extension, optional as of the 3rd year after delivery
90195	Object holder (needle adapter), 1 piece, blue (left)	Replacement/Accessory
90296	Object holder (needle adapter), 1 piece, silver	Replacement/Accessory
90303	Object holder (needle adapter), 1 piece, red (right)	Replacement/Accessory
90347	Software upgrade	Upgrade for a single license
90410	3D calibration object with certificate	Required for 3D calibration
90524	Dust cover “free Stage”	Handmade, precise fit, branded, to cover when not in operation

Order replacements/accessories

Resellers (regional) or smart optics:

www.smartoptics.de/en/contact (worldwide)

2.5 CE conformity

The audiology scanners from smart optics Sensortechnik GmbH are manufactured and marketed with the utmost care in accordance with the state of the art. The design and construction of all models comply with the basic safety and health requirements of the relevant European directives.

smart optics has confirmed the conformity of the audiology scanners with EU directives and applied harmonized standards through CE marking.

Relevant EU directives

- Machinery Directive (2006/42/EC)
- Low Voltage Directive (2014/35/EU)
- EMC Directive (2014/30/EC)

Further harmonized standards applied

- DIN EN 61010-1:2020-03
  Safety requirements for electrical equipment for measurement, control, and laboratory use
- DIN EN IEC 61326-1:2022-11
  Electrical equipment for measurement, control, and laboratory use – EMX requirements

You can request the declaration of conformity for your scanner from smart optics, e.g. by e-mail to info@smartoptics.de or online via the contact form: www.smartoptics.de/en/contact

3 General safety instructions

3.1 Intend use

smart optics scanners are to be used exclusively for the purpose of their intended use, i.e.:

- The optical three-dimensional measurement of human ear impressions
- The digital production and archiving of earmolds.

3.2 Scannable materials

Scannable materials are light-colored, solid, dimensionally stable, dry, and opaque. Reflective or dark surfaces must be matted with a 3D scan spray.

3.3 User Qualification

To set up, configure, and operate the scanner, users need specific knowledge of hearing acoustics/audiology, in particular CAD/CAM technology, as well as knowledge of the scanner from the operating manual, instruction, or training.

3.4 Constructive protective measures

optics scanners are equipped with a fuse to protect the devices against overvoltage. The automatic power cut-off in the interior when inactive or when the lid is opened (depending on the model) and the stop of electrically moving parts serve to protect against injury.

Some residual risks cannot be ruled out.

3.5 Protection against injuries

WARNING

Electric shock, burns

Electric shock and burns can be caused by:

— Defective electrical devices or cables (e.g. missing isolation),

— moisture on electrical parts,

— electrical connections without grounding,

— overloaded wall sockets and cables.

▷ Use electrical equipment correctly and have it checked regularly. Replace defective cables and mains plugs.

▷ Disconnect the mains plug from the power supply when the scanner is not in use.

▷ Do not use a defective scanner.

WARNING

Magnetic interference of electronic implants

Magnetic components are included in scanners and accessories.

▷ Persons with implants, e.g., heart pacemakers, may only operate the scanner and its accessories with medical permission.

CAUTION

Structured light as a triggering stimulus (applies to an open scanner)

Structure light can trigger migraines or epileptic seizures in people with the appropriate disposition.

▷ Cover the opening during operation, e.g. with opaque foil.

CAUTION

Danger of injuries due to sharp needles

The object holders (accessories) have sharp needles you can prick yourself with.

- ▷ Hold object holders and ear impressions only from the side.
- ▷ Do not press on the object holders from above.

CAUTION

Entanglement of clothing, jewelry, or hair (applies to open scanners)

Loose clothing, jewelry, or hair can be entangled by automatically moving components.

- ▷ Avoid scarves, ties, long necklaces, loose long hair, etc. at the scanner workstation.
- ▷ In case of entanglement, switch off the scanner immediately and pull out the mains plug.

3.6 Protect against material damages

NOTICE

Inaccurate measurements or device defects due to mechanical damage, soiling, or incorrect cleaning of electronic components

All electronic components, especially the 3D sensor (LED projector, camera) are sensitive to contact, dirt, moisture, cleaning agents, and sharp-edged tools.

- ▷ Keep the scanner clean. Avoid milling, grinding, and sawing work in the vicinity, for example.
- ▷ Use 3D scan spray outside the scanner.
- ▷ If electronic components become dirty, do not clean them yourself. Contact your specialist dealer or smart optics.

NOTICE

Data loss due to magnetic fields

smart optics scanners and accessories include magnetic components. These can impair the functioning or delete the data of other technical devices or data carriers, e.g., credit cards.

▷ Keep the distance between magnets and technical devices/data carriers.

4 Device components

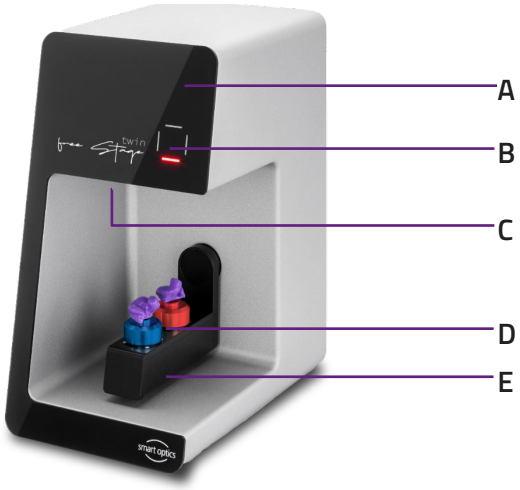
4.1 Front views

free Stage one/free Stage twin

Key

A Front side
B Touch sensor*
C 3D sensor (LED projector, camera, internal)
D Rotary axis, 2 bases (with object holders)
front = left back = right
E Swivel axis

* not available for free Stage one



mono Scan/duo Scan

Key

A Lid
B LED pressure switch (on/off)

ds Production

Key

A Lid opens all the way to the stop

B LED pressure switch (on/off)

4.2 Rear view

Connections and type plate

Key

A Power switch (toggle switch) (free Stage one/twin)

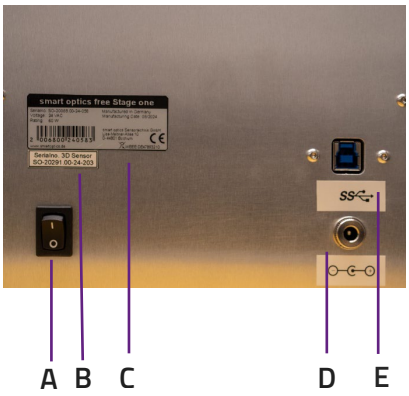
B Sensor number

C Type plate with technical data and serial number

D Main connection*

E USB port

* Connection type depending on device type



4.3 Internal view

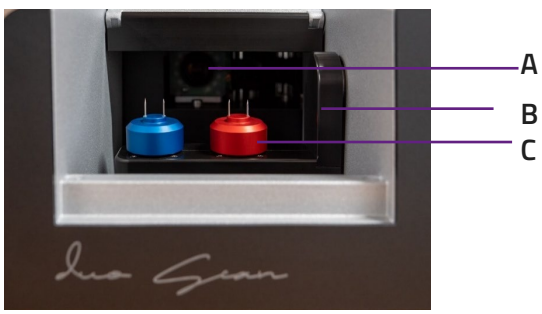
mono Scan, duo Scan, ds Production

Key

A 3D sensor/Optical RGB component

B Swivel axis

C 2 Rotary axes, 2 object holders on bases left right (mono scan has 1 rotary axis and 1 object holder)

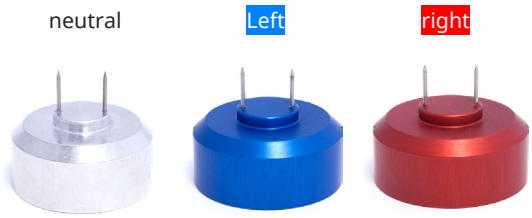


4.4 Accessory

Intended use

Object holder

— Mounting of ear impressions on needles



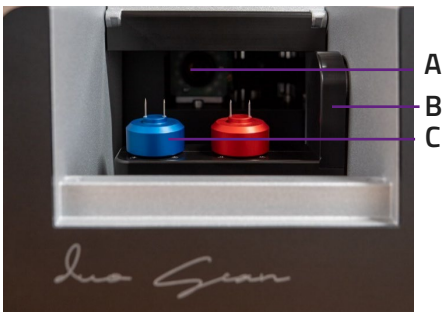
3D calibration object

— Reference for 3D calibration (optional)

4.5 Operating principle

smart optics scanners create open data for common CAD/CAM systems (STL, PLY, MSH, ASC file formats). In digital production, the earmold is manufactured using the scan files.

The most important components of the scanner are the 3D sensor and the positioning mechanism.



The positioning mechanism in the interior of the scanner consists of a swivel axis driven by an electric motor (**B**) and rotating bases (**C**).

The rotating bases (**C**) position the ear impression on the object holders aligned to the 3D sensor (**A**) (above the swivel axis).

A striped pattern is projected onto the object to be scanned by the 3D sensor and recorded by the camera.

With the aid of several camera images taken from different perspectives, aural Scan calculates a 3-dimensional image of the object.

5 Commissioning

5.1 Workstation

The scanner must be placed next to the PC, preferably on a lab table or professional workbench.

Checklist

Shop, lab, workshop	✓
Table	Stable, low-vibration
Space	Width x height x depth of the scanner With lid: height x 2 ½
Stability	2 × weight of the scanner
Indirect light	✓
Temperature	15°C – 30°C
Humid environment	✕

NOTICE

Inaccurate measurements or device defects, due to non-compliance with workplace requirements

- ▷ With open scanners avoid reflections on the measurement object. Protect the scanning area from intense ambient light (artificial light, sunlight), e.g. with light-tight foil.
- ▷ Keep the scanner clean. Avoid milling, grinding, and sawing work near the scanner.

5.2 Set up the scanner

The original packaging is the best protection for scanners and accessories during transportation. Keep it for later transportation.

Check the delivery for visible damage and discoloration on the impact indicators (indicator label). Record and complain about damage in accordance with the shipping conditions.

5.2.1 Unpacking

1. Grap the scanner with both hands at the bottom from the sides.

Also for open scanners: Do not touch the inside. Touching can damage the 3D sensor.

2. Pull the scanner upwards out of the carton
3. Set up the scanner at the workstation so that the power switch and opening are easily accessible.
4. Remove the accessories from the carton.
5. Remove the transport protection (foil, foam insert, foam cube).

Grap the object holders from the side, risk of injury caused by sharp needles!

6. Keep the packaging and transport protection for later transportation.

5.3 Connect the scanner

Checklist connections

Distance PC to scanner	approx. 1,5 m
Sockets	min. 3
Extension cable	
Multiple plug	
Socket adapter	
USB hub	
USB extension	

NOTICE

Faulty data transmission or device damage due to unsuitable cabling

- ▷ USB hubs, USB extensions and USB cables longer than 2 meters reduce data transmission.
- ▷ USB cables or power cables with the same specification as those supplied are suitable.

5.3.1 Power connection

1. Connect the **device plug** to the mains connection socket (at the back).
2. Connect the E+F type **mains plug** to a socket (optionally with a socket adapter).

Voltage differences are automatically regulated by a built-in switched-mode power supply.

5.3.2 USB connection

1. Connect the **type B plug** to the USB port of the scanner.
2. Connect the **type A plug** to a USB port at the back of the PC.

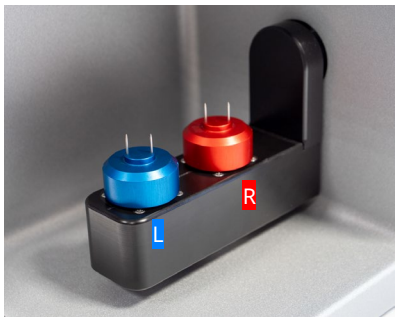
USB 3.0 sockets must be connected to **blue** USB 3.0 ports.

6 Positioning of ear impressions

6.1 Side determination

It is very important to always determine the left and the right side for the entire production process. Impressions of left ears must be placed on the left base and impressions of right ears on the right base.

Color-coded object holders and bases help with the assignment.



Scanners with only one base scan impressions one after the other. The sequence is selectable.

6.2 Mounting of ear impressions

1. Prepare the ear impressions by cleaning (of tamponade, cerumen, withdrawal string), drying and smoothing the auricle (outside, the flat side to be mounted = bottom of the scan).
2. Matt ear impressions made of reflective or dark material with 3D scan spray. Only outside the scanner!
3. Grasp the ear impression from the side.
4. Mount the flat side centered on both needles and tightly fit in the object holder.

Careful with the sharp needles!

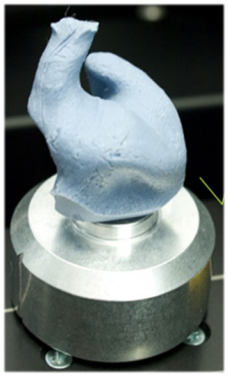
Correct	False
Gapless fit, alignment parallel to the guiding line	Gap between impression and object holder, no alignment with the guiding line
	

The **Object Tone** setting must match the color of the ear impressions or has to been set to **Detect automatically**.

6.3 Removing and inserting object holders

You can remove the object holders from the scanner to scan only one side, to attach ear impressions or to clean the object holders/the interior.

Removal



1. Hold the object holder from both sides.
2. Pull the object holder upwards.

✓ The magnetic connection to the base is released.

Insertion

The horizontal guiding line on the swivel axis of the scanner and the side markings on the object holder show how the impressions can be aligned correctly.


Move to service position

The axes may move during insertion and removal. Do not correct mechanically. A software function moves the axes back to the home position.

7 Installation and upgrade

7.1 Installation

1. Insert the aural Scan data carrier into a drive of the PC.
2. Double-click the file `auralScan.exe`.
3. The setup starts with the selection of the language for installation (Suggested value: operating system language).
4. Follow the setup instructions.
5. Complete the setup by
6. Restarting the PC.


aural Scan

✓ aural Scan is ready for operation

Utilities

Several camera systems are foreseen in the audiology scanners. All camera drivers are installed along with aural Scan.

Installation paths:

```
C:\Program Files (x86)\Point Grey Research
C:\Program Files \Allied Vision
```

Installation with Noah System

To operate aural Scan with Noah (the software of the Hearing Instrument Manufacturers' Software Association (HIMSA)), you must accept the proposed target folder.

7.2 Calibration data

Calibration data is:

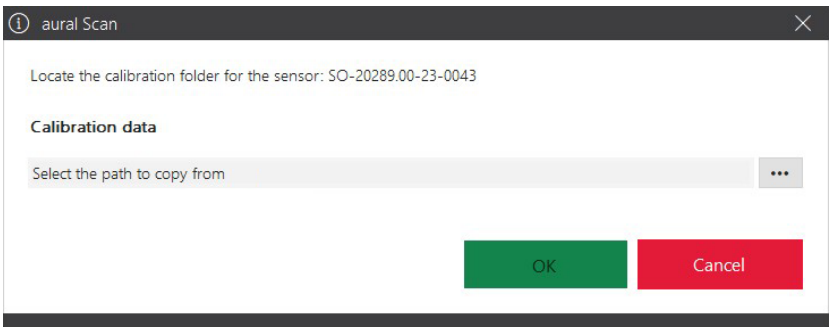
- ☐ scanner-specific, the folder used must match the scanner's sensor number.
- ☐ required to start aural Scan.

Load the calibration data

This step is not necessary if the initial installation is launched directly from the data carrier.

1. Start aural Scan (for the first time).

✓ aural Scan will indicate that a folder (`Calibration directory`) is missing in `Program Files (x86)`:



2. To look for the folder, click on **Browse**.
3. Once the calibration data have been loaded, you can start aural Scan.

✓ The axes must necessarily be calibrated with the first start.

7.3 Axis calibration

The calibration of the axes of the scanner ensures the correct alignment of the axes and thus accurate measurement results.

Schedule

smart optics recommends performing an axis calibration after:

- ☐ the first installation of aural Scan,
- ☐ an aural Scan upgrade,
- ☐ transporting the scanner to a different place,
- ☐ four weeks since the last calibration (with automatic reminder),
- ☐ daily if there are fluctuations in temperature and/or humidity.

7.3.1 Procedure

1. Restart aural Scan or finish the current scan.
2. Select **Axis calibration** in the menu.
3. Optionally start from the info message (displayed after 30 days):

✓ aural Scan requests you to place ear impressions inside the scanner.

4. Only use well-crafted, average-sized impressions.

Failed axis calibration

✓ After the message **Axis calibration successful**, you can start scanning.

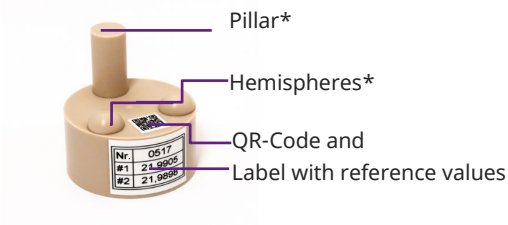
7.4 3D calibration

Your scanner works with sufficient accuracy when you use the axis calibration. However, if there are high demands on the measurement accuracy of the scanner in production or quality control, a 3D calibration is also useful.

A 3D calibration object is required for 3D calibration (chargeable accessory).

7.4.1 3D calibration object

The 3D calibration object is manufactured industrially and individually certified by smart optics. It is optionally available (from your reseller or smart optics).



* Pillar and hemispheres are measuring points for calculating height and distance.

Storage

Please store the 3D calibration object in its original packaging and between 10°C and 35°C.

Properties

The 3D calibration object must not show damage to the surface, scratches, or discolorations.

7.4.2 3D calibration process

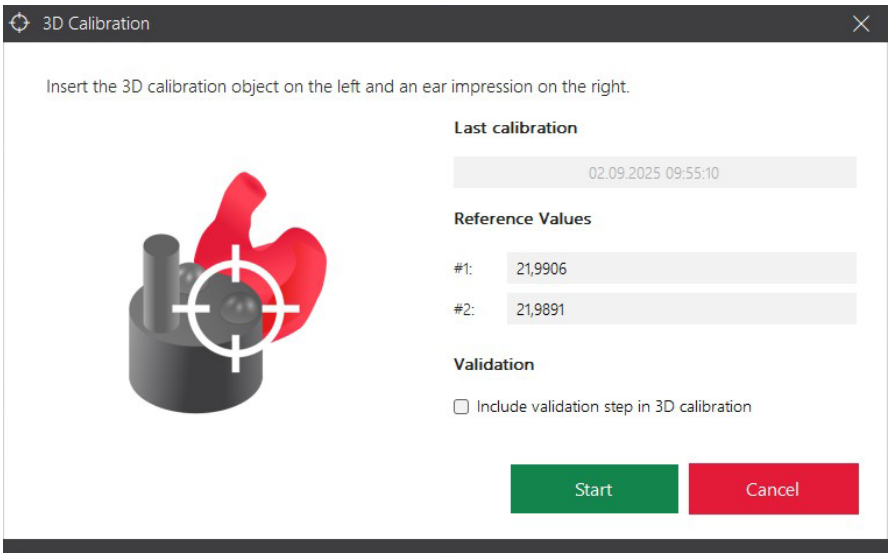
aural Scan compares the current measured values with the documented values of the 3D calibration object and calculates correction values to achieve precise measurement results.

If the 3D calibration is completed with a validation (optional), the correction values are used for a new measurement. The following are recorded in the log: Measured values, scanner's sensor number, and creation time.

The log file serves as proof of the accuracy of this individual scanner.

7.4.3 Procedure

1. Select **3D calibration** from the menu.



Label sample

Nr.	APK-0005
#1	21,9974
#2	22,0368

2. Enter the values indicated on the label into fields **#1** and **#2** in full, with all digits and with the separator comma.
3. Insert calibration block and impression as specified.

Left Base
3D calibration block

Right Base
Ear impression (with object holder)

4. Click on **Start**.

✓ The 3D calibration includes sensor calibration, axis calibration and mesh calibration.

Completion

✓ The 3D calibration will be completed without testing and a log. aural Scan will observe the determined correction values of subsequent measurements.

Validate results

1. Click on **Validate Results**. A test measurement will be carried out.

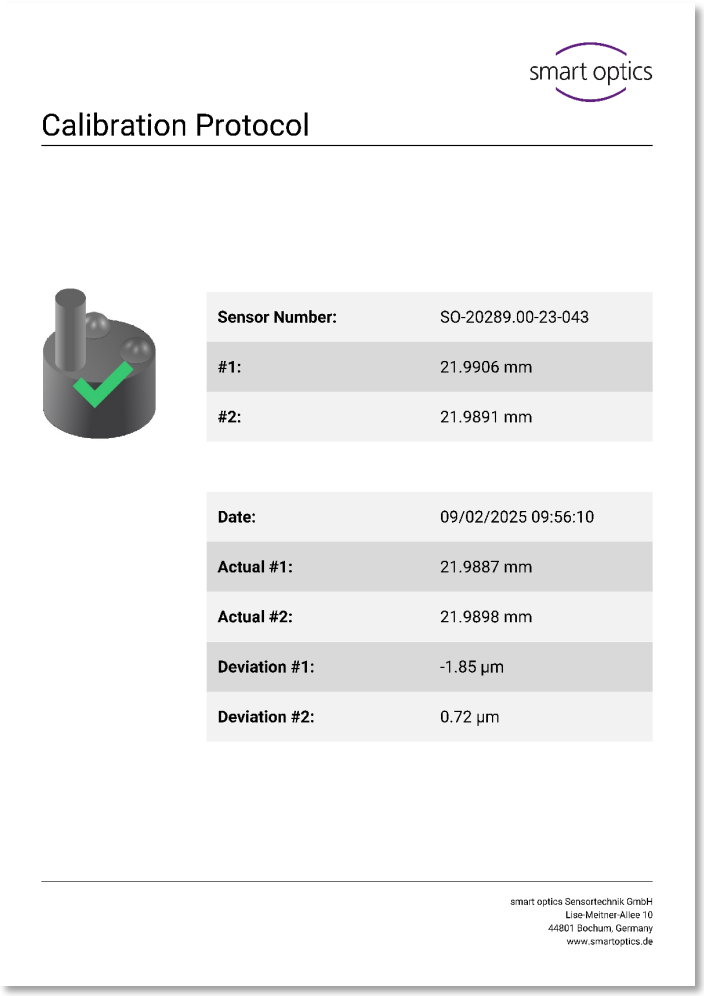
✓ The deviation determined after the 3D calibration will be displayed.

✓ The log is saved as a PDF file:

— `C:\Scans\Calibration` (The folder can be configurated in the settings)

— Naming according to the creation time:
`CalibrationProtocol-[YYYY]-[MM]-[DD]-[hh]-[mm]-[ss].pdf`

2. To open the log in your default PDF software, click on **Report**.



smart optics

Calibration Protocol

Sensor Number:	SO-20289.00-23-043
#1:	21.9906 mm
#2:	21.9891 mm

Date:	09/02/2025 09:56:10
Actual #1:	21.9887 mm
Actual #2:	21.9898 mm
Deviation #1:	-1.85 µm
Deviation #2:	0.72 µm

smart optics Sensortechnik GmbH
Lise-Meitner-Allee 10
44801 Bochum, Germany
www.smartoptics.de

▷ Please contact your Support in case of deviation values of ± 9 µm or red deviation values (Deviation).

Scanners work according to specifications if, after a 3D calibration, the deviation values are less than ± 9 µm.

7.5 Upgrades

You can use any supplied version of aural Scan for the entire life span of the scanner.

New versions of aural Scan contain improvements and corrections. smart optics recommends using the latest version released for your scanner.

After the purchase of the scanner, the use of upgrades is:

- ☐ Free of charge for 12 months,
- ☐ chargeable from the 13th month.

The elapsed usage time is checked at startup of the software, but not before the installation.

After an upgrade extension, you can upgrade free of charge for 12 months.

Current version: Download, release information, release notes

- ☐ www.smartoptics.de/en/audiology/downloads/

To request a 30-day trial version:

- ☐ www.smartoptics.de/en/contact/ Request a 30-day trial

To purchase an upgrade extension or request a quote:

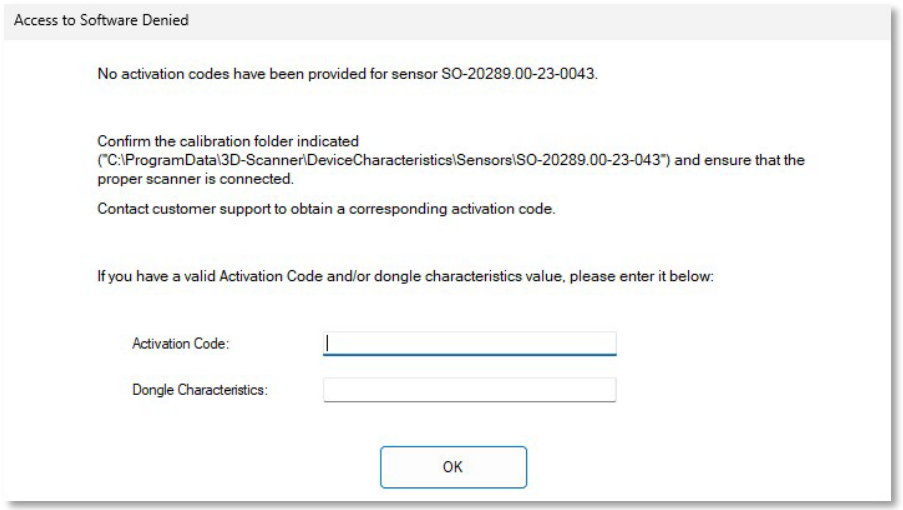
- ☐ From smart optics:
  www.smartoptics.de/en/contact/
- ☐ From a reseller:
  www.smartoptics.de/en/contact/
  Request a quote / Contact a reseller

7.5.1 Activation of access to the software

If the scanner or the last upgrade extension was purchased more than 12 months ago, you will need to enable access to aural Scan when starting the software.

The activation code must be purchased from your seller (reseller or smart optics).

Message on startup:



▷ Enter the activation code (a combination of letters, numbers, and special characters). There is no need to renew the dongle characteristic.

✓ Upgrades can be used without a new activation code during the next 12 months.

Data backup

Activation codes are only valid for the sensor number of a scanner. Keep activation codes together with the upgrade files and the data carrier from the scope of delivery.

8 Device care

smart optics scanners do not require maintenance. The following device care tasks are necessary for the scanner to function properly:

☐ Axis calibration

☐ Cleaning

8.1 Cleaning

The scanner is a high-precision measuring device and should be handled with care.

Contact First Level Support if a component that cannot be cleaned is soiled.

✓ Clean if necessary	✕ Never clean
— Surface (outside + inside) — Object holder — Rotary- / swivel axis	— 3D sensor (LED projector, camera) — Connections — Inner components
✓ Suitable products	**✕ Unsuitable products**
— Cleaning cloth (smooth, lint-free, antistatic)	— Tools (knives, scrapers, scrubbers, brushes a.o.) — Chemical additives (e.g. cleaning-, solvents- and disinfectant products) — Water

9 Faults and repairs

In the following situations, please contact your Support:

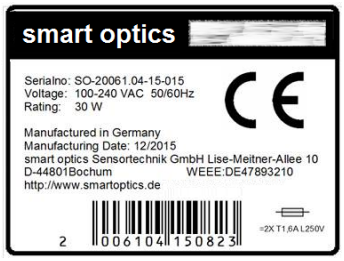
- ☐ Persistent malfunction despite device care and troubleshooting.
- ☐ Repair or custom help required.

Repairs may only be carried out by your authorized dealer and smart optics

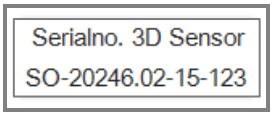
9.1 Serial numbers

When contacting your Support please have the serial number and sensor number of your scanner at hand.

Serial number
Type plate



Sensor number
Label



9.2 Troubleshooting for audiology scanners

9.2.1 Requirements for error-free work

- ☐ Windows updates are installed (Windows settings)
- ☐ Your first version of aural Scan or an upgrade is installed.
- ☐ The calibration data for the connected scanner are loaded.
- ☐ The device care tasks are carried out regularly.

9.2.2 Check the PC

- ▷ Update the following PC components: Important Windows updates, BIOS, Hardware drivers, and virus- and threat protection.
- ▷ Mark aural Scan as trusted in your antivirus software.

9.2.3 What to do in case of problems?

You can find solutions to known problems on our support page:

- ☐ Start problems
- ☐ Connection problems
- ☐ Calibration problems

support.smartoptics.de

You can find more articles in the **Cross Product** and **Audiology** sections. Has your problem not been mentioned here or cannot be solved? Then you can submit a request directly via the support page.

9.2.4 Malfunction

- ▷ Do not operate the scanner in case of:
  - — visible damage to the hardware (scanner, accessories).
  - — loud or immobile axes.
  - — Measurement errors despite regular device care and correct scanning procedures.

A technical examination is necessary in these cases. Hardware damages need to be fixed. Please contact your Support.

10 Disposal

10.1 Disposal of packaging

You can dispose of the packaging once the warranty has expired. smart optics recommends keeping the packaging for transport of the scanner.

10.2 Disposal of the device

Symbol for devices that are subject to the European WEEE Directive (Waste Electrical and Electronic Equipment, 2002/96/EC)

WEEE registration number of smart optics: DE47893210

Send your smart optics scanners for disposal to smart optics (manufacturer), or your reseller (if you are a resident of the area of application of the EU directive).

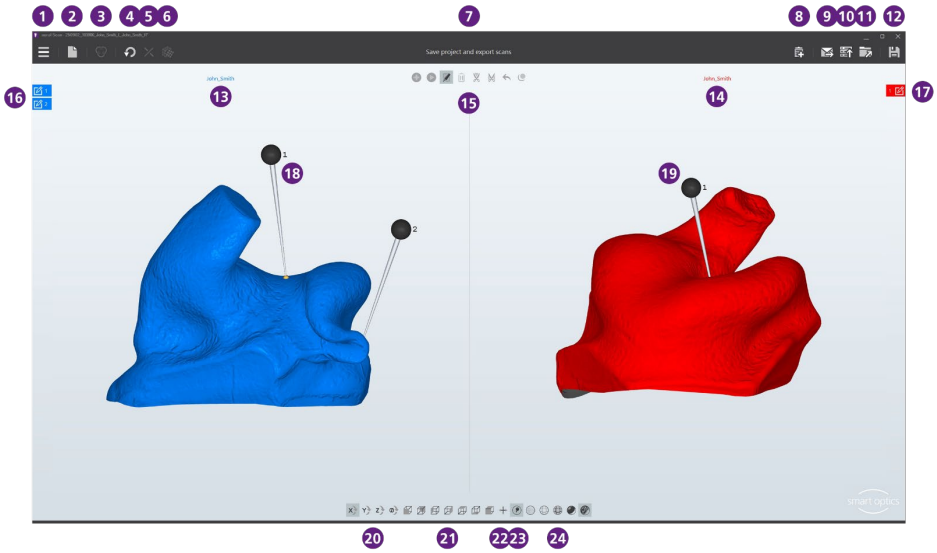
Disposal is not permitted with household waste or public waste disposal companies.

Part 2: Software usage aural Scan

11 Scan

11.1 3D viewer workspace

The 3D viewer is the workspace of aural Scan. The left and right sides are worked on independently of each other and saved together as a scan project.

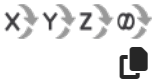


1. Menu
2. New Project
3. Color Texture Scan
4. Start/Repeat Scan
5. Cancel
6. Manual Merge
7. Editing Instructions
8. Project Note
9. Send by E-Mail
10. Upload to FTP Server
11. Copy to Target Directory
12. Save Project
13. Left Scan Name
14. Right Scan Name
15. Edit Scan
16. Left Notes
17. Right Notes
18. Left Markers
19. Right Markers
20. Rotation Axis
21. Alignment
22. Center
23. Show Markers
24. View

11.1.1 Icons in the 3D viewer

The Cartesian coordinate system applies in the 3D viewer.

Rotation axis (X Y Z ∞)



Selection of the rotation axis; the default option is “All axes”. When rotating with the mouse, the scan is rotated about the selected axis.

Alignment (cube)

Isometric

The filled side of the cube is the desired orientation (front, back, left, right, top, bottom). The default option is isometric orientation (front, top).

Both scans are rotated to the selected side and zoomed to 100%.

Centering

Both scans are displayed centrally and zoomed to 100%.

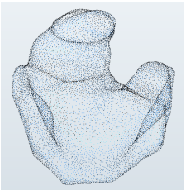
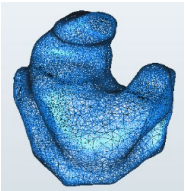
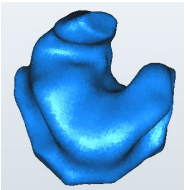
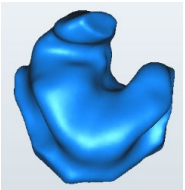
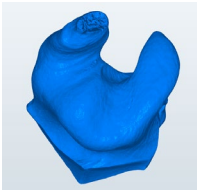
On/Off (Show markers)

The markers (pins) are hidden and shown on both scans (e.g., to check the scan). The notes remain visible.

View (spheres)

Both scans are displayed as dots (corner points of the triangles), triangles (lines), or shaded areas (filled triangles). The Gouraud shading display looks three-dimensional and realistic.

The Visualize Impressions option displays the scan of the impression before smoothing. The display is saved in PLY and HPS format.

Dots:	Triangles:	Flat shading:	Gouraud shading:	Visualize impressions:
				
Display during scanning			Standard after matching	

11.1.2 Mouse in the 3D Viewer

Default mouse button assignment

Setting
Change mouse function

	Left: click, hold + move		Rotate the scan
	Right: click, hold + move		Move the scan
	Rotate mouse wheel		Zoom in/out of the scan

Rotate the scan

1. Select a rotation axis. If **All axes** ∞ are selected, the axis of rotation follows the motion of the mouse, so that tilting movements are also possible.
2. Click, hold, and move the mouse to start the rotation.
3. Release the mouse button to stop the rotation.

Move the scan

1. Click and hold the **right** mouse button (any point in the 3D viewer).
2. Move the mouse.
3. Release the mouse button to stop the motion.

Zoom in/out of the scan

You can zoom continuously up to a maximum or minimum size.

1. Click on the scan.

— To enlarge: Turn the scroll wheel towards your hand.
— To reduce: Turn the scroll wheel away from your hand.

11.2 Starting a scan project

▷ Start a new scan project using one of the following methods:

☐ Icon **Scan**
☐ Scanning a Barcode
☐ Touch sensor free Stage twin

✓ Result of the scan in the 3D viewer: Left scan, right scan
(3D object with color texture scan in impression color, without color texture scan in standard colors).

The display depends on the settings for the 3D viewer, Scanning and Matching.

11.3 Color texture scan

Color texture scans are used to add markings to the surface of an ear impression in a scan. The color of the ear impression is also scanned (by default instead of the Scan color, blue – red).

Availability

Label

The color texture scan requires a scanner with an RGB hardware component.

Annotating

1. Draw the markings with a fine-tipped color pencil (good color contrast compared to the impression material, **not** black).
2. You can use different colors to differentiate information types (e.g., cutting lines, material defects, other notes).

Settings

The following settings are required for color texture scans:

- Color texture must be activated (in the 3D viewer or as setting by default),
- PLY or HPS file format for color data,
- Set the Level of Detail to Ultra for high-contrast, high-resolution drawings.

Checking the results

The scan shows:

- the impression color (approximately),
- the markings (approximately).

Color texture options

Icon	Meaning
	Scanning with color texture.
	Scanning without color texture. Click here to activate.

	No color scan is possible. The file format PLY or HPS is deactivated.
—	If no icon is displayed, no device with RGB hardware component is connected.

11.4 Naming scans

aural Scan names scans automatically. To identify scans more easily, you can enter scan names manually, e.g., with patient names or case numbers.

11.4.1 Naming rules

Automatic naming	Based on date and time (timestamp). **Example** 200612_094143 YY|MM|DD_HH|MM|SS Year|Month|Day_Hour|Minute|Second
File names	Scan names are part of the file names. — Invalid character strings: AUX CON NUL PRN — Invalid special characters: < > : " / \ | ? * — Extensions: STL, PLY, MSH, ASC, HPS
Side identification	Indicates the anatomical position, _L = left, _R = right, completes the file names, no display in the 3D viewer. **Example** Scan name: 200612_094143 File name: 200612_094143_L.STL
Left – Right	Different scan names are possible. The same scan names can be forced (settings: Use the same scan name for the left and right ear cast). Identical file names are distinguished by the identification of the side.
Length	Is limited by Windows rules. The display in the 3D viewer is single line (fewer characters than allowed).
Saving location (Export)	Default `C:\Projects` (Settings: Project folder), `Project folder named with` a time stamp, regardless of the scan name

11.4.2 Editing scan names

Scan names are displayed on both sides of the 3D viewer. Scan names:

— Can be edited before, during, and after scanning.

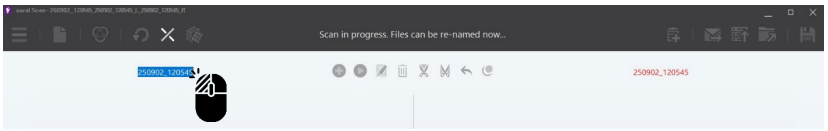
— Can no longer be edited after work is finished.

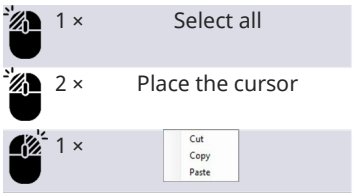
Field representation

	Valid
	Invalid (empty, longer/shorter than allowed)

Editing with the mouse

▷ Click on the scan name you want to edit.



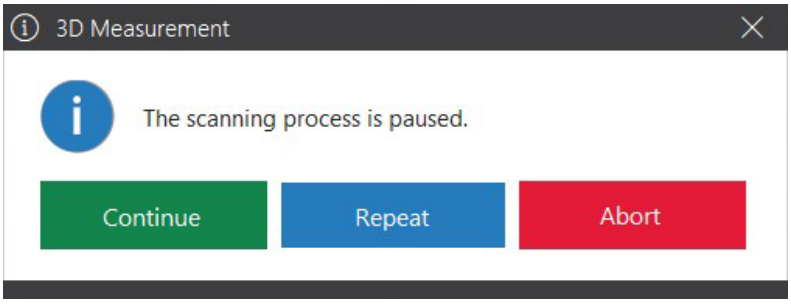


11.5 Cancelling a scan

You can cancel a scanning process without waiting for the result, e.g., if an ear impression is not correctly positioned.

▷ Click on “Cancel” or press ESC.

✓ aural Scan will ask you what to wish to do



Continue
The measurements made are kept and completed.

Repeat
The measurements made are discarded and calculated again.

Abort
The scan project is discarded.

11.6 Repeat scan

You can repeat a scan to replace a bad scan result with a new scan (alternatively: Correcting a scan).

1. Correct possible causes for the poor scan result:
— Settings, e.g., the object tone,
— Positioning of the ear impression.
2. Click on the button “Scan again“.

11.7 Annotating and commenting

11.7.1 Annotate a scan

Individual areas in a scan can be annotated, e.g., to identify errors in the impression or to give instructions to production.

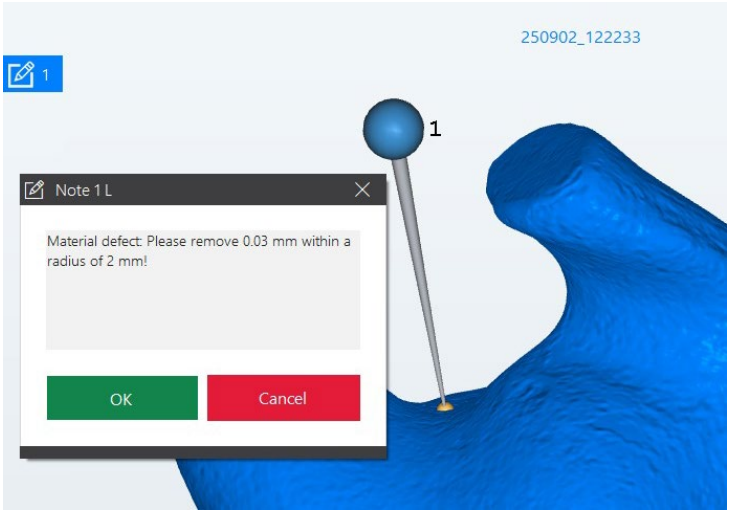
The best basis for annotations is Color texture scans with markings.

1. Enable the Notes Tool (3D viewer, top).
2. Rotate the scan so that the concerned area is visible.
3. Aim precisely at the area and double-click to set a marker (pin).

✓ A numbered note symbol is set in the 3D viewer (blue for the left side, red for the right side, numbered from 1 - 6).

4. Enter and save the note in the text field (150 characters max.).

✓ When work is finished, the text is printed in the Order document `order.pdf`. The target coordinates are documented in the project folder (XML file).



Moving a marker

Markers (pins) are movable so that they can be arranged clearly.

1. Click and hold the marker with the left mouse button.
2. Move the mouse to the desired target position.

✓ The target marker on the scan remains in its original position.

Reading and editing a note field

▷ With the left mouse button on the note icon:

— Show, to read tooltip.

— Click to open and edit the note field.

Bubble in the material.
Please smooth it!

Delete note

1. Click with the left mouse button on the marker (pin) (it will turn blue).
2. Press DEL or click on the trash bin icon.

✓ Deleted notes cannot be recovered.

11.7.2 Commenting a scan project

You can enter general information about the scan project, e.g., to process the order.

1. Click on “Add project note“.
2. Enter and save the note in the text field (150 characters max.).

✓ When work is finished, the text is printed in the order document `order.pdf`.

11.8 Correcting a scan

Holes (gaps) can appear in a scan, e.g., due to narrow places in the ear impression, and light reflections on the surface.

To complete the scan data, these holes must be filled. This is important for further processing in a CAD system and for the quality of the earmold.

Correction functions

— Rescanning
— Fill great holes
— Cutting

11.8.1 Rescanning

The rescanning correction function specifically measures holes (gaps), e.g., in narrow places.

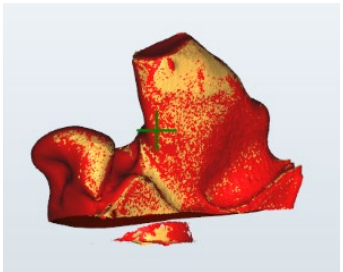
The "Rescan" function is not available for all scanners (see „Technical data“).

1. In the 3D viewer, click on the page to be scanned, then click on “start rescanning”.
2. You can switch sides with a double click.

✓ The coordinates X, Y, and Z (spatial orientation of the scan) and a crosshair cursor are displayed on the selected side. The crosshair cursor marks the starting position of the additional measurement. It must be located on the scan, not beside it.

3. Click on “Measurement”.

✓ The area surrounding the crosshair cursor will be rescanned. The rescan area is displayed in the rescan object color:



11.8.2 Matching

The matching function:

— pieces together the measurements/images,
— is a requisite for finishing work,
— is executed by default immediately after scanning,
— must be carried out manually to end the rescanning process (the main scan and the rescan become a single scan).

▷ Click on “Matching”.

✓ By default, scans are thinned, smoothed, and cut, displayed isometrically in the object color, and rotated once by 360° (for visual inspection).

You can cancel the matching process and continue scanning.

3D viewer- and matching options (Colors, Object rotation and Thinning, Smoothing, Cutting filter) can be configured.

11.8.3 Fill holes

aural Scan can automatically fill holes (gaps) in scans without measuring. The function is fast and suitable for flat surfaces in the impression.

The rescan function is better suited for the construction of an earmold.

1. Click on „Hole Filling“.

✓ Holes up to 10 mm^2 and larger flat surfaces such as the underside are closed.

2. Check the result.

11.8.4 Cutting

Data that is not needed for the construction of the earmold can be removed before work is finished, e.g. Excessive length of ear, aurical/base, and material residues (tamponade, cerumen, withdrawal strings).


1. Enable a data removal function within or outside the selection.

Make the selection by clicking around the area with the left mouse button.

✓ The selection includes all levels, not just the surfaces, and can be canceled by pressing ESC.

2. Complete the selection with the right mouse button.
3. Check the result.

4. Click on “Save“.

✓ The cut scan data will be saved inside the project folder or inside NOAH database.

11.9 Scanning a barcode

In aural Scan, scan names can be created, and new projects can be started using a barcode scanner. USB barcode scanners are not available from smart optics.

Preparation

1. Connect the USB barcode scanner to aural Scan‘s PC following the manufacturer’s instructions.
2. In the menu, select **Settings** and then the **General** tab.
3. Enable the option Use the same name for the left and right ear cast.

✓ A single barcode assigns the name to the left and right sides.

Starting scan with a barcode

1. Start a new scan project.

✓ The cursor will flash in the left naming field.

2. Scan the barcode.

✓ The scanning process will start.

Renaming scans with a barcode

1. Mark the scan name you wish to change.
2. Scan the barcode.

✓ The scan will be kept and the scan name changed.

12 Finish and export work

12.1 Checking the scan results

1. Rotate the scans to check them, by 360° (space bar) or individually (mouse icon).

✓ The scan result is good if the ear impressions are fully scanned (without any holes) and do not contain any unnecessary components (excess lengths, base, material residues).

✓ Bad scan results can be caused by:

☐ Wrong view in the 3D viewer (e. g. dots)

☐ Flaws in the impression

☐ Wrong settings (3D viewer, Scanning, Matching).

2. If you have changed any of the settings, repeat the scan. If not, you can correct or annotate the scan.

12.2 Save project

▷ Click on “Save project“.

✓ The scan project will be saved in the project folder (by default `C:\Projects`) or inside the NOAH database.

12.3 Export methods

12.3.1 E-Mail

The **email** method is used to send the export files via email.

Microsoft Outlook or Mozilla Thunderbird is required as the standard e-mail program under Windows.

Starting the sending of an E-Mail

☐ Click the **Send via E-Mail** button in the user interface.

Sending files via E-Mail

When work is finished, aural Scan initiates a new email with the attachment. You can only continue working in aural Scan when the email has been sent or saved.

12.3.2 FTP

The **FTP** method is used to transfer data to external parties, service providers, or labs. Project- and export files are uploaded to one or more FTP servers.

This requires connection information and login information for the recipient.

Starting FTP export

☐ Click the **Upload to FTP server** button in the user interface.

Uploading files to an FTP server

At the end of work, aural Scan will ask you to select or enter an FTP connection (if one has not been saved yet).

12.3.3 Folder

The **Folder** method opens the export dialog. After selecting the folder (configurable, by default `C:\Scans`), all data displayed in the export dialog is saved in the corresponding folder.

Start export

☐ Click the **Copy to target folder** button in the user interface.

Export files

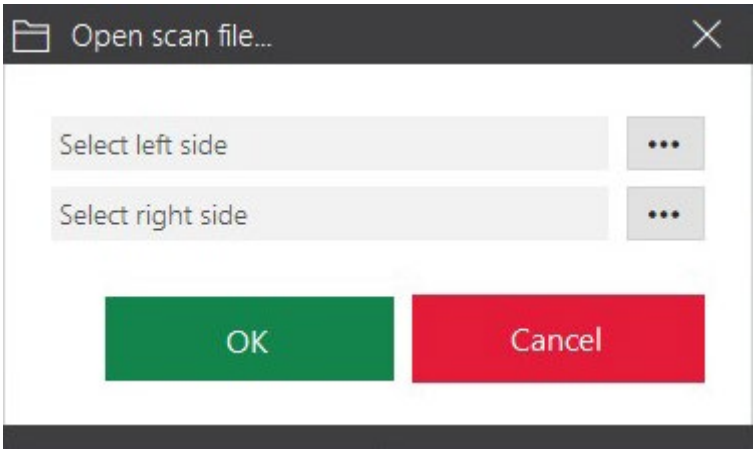
Files can be added or removed when completing work in the export dialog. Exporting the data does not affect the project directory.

This is just a data export without creating subfolders.

12.3.4 Editing and exporting

You can edit the finished project at a later time and export them again.

1. Open the scan file for the left and/or right side.



2. Edit the scan. The following functions are available:

- ☐ Rotate, zoom, display
- ☐ Annotating and commenting
- ☐ Fill great holes
- ☐ Cutting

3. Export the scan projects.
4. Choose an export method, FTP, email or folder.

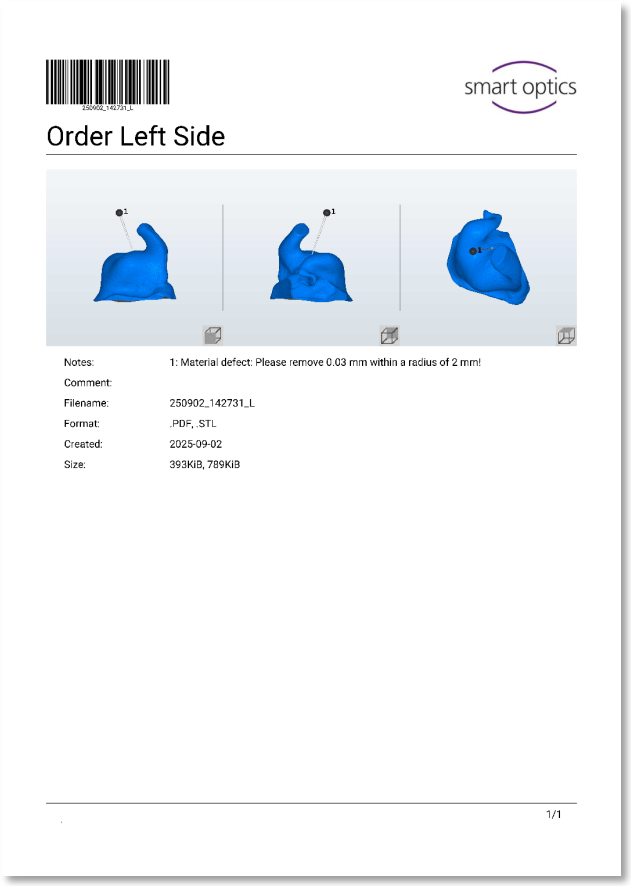
5. Quit aural Scan or place the software in standby mode (confirm the message “Discard the current scan?”)

12.4 Documents (order.pdf, project.log)

Order document Order.pdf

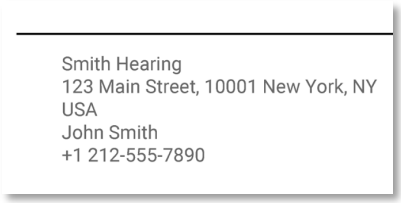
Setting: PDF file

aural Scan generates by default the order document “`order.pdf`” for a scan.



Barcode	Coded order data to be captured by a barcode scanner
Company logo	Configurable
Title “Order Left Side/Right Side”	Fixed text
Front, back, top screenshots	Fixed perspectives, with markers
Notes	Text from an annotation with a number assigned in the image
Comment	Text from the project note
Filename	Name of the scan file without extension
Format	Format of the scan file: STL, PLY, MSH, ASC, HPS
Created	Date created in the format YYYY-MM-DD
Size	Size of the scan file in kilobytes

The order document can have the design of your company logo and your company address. The company address is printed in the footer.



Project log “Project.log“

aural Scan generates by default the order project log “`project.log`” for a project. Certain settings and general conditions are logged (useful for analyzing scan results).

```
Sensor number: SO-20289.00-23-0043

Name left: 250902_142731_L.ply
Name right: 250902_142731_R.ply
UseSameScanNamePrefix: Disabled
AlwaysAddSideDescription: Enabled
IncludePatientName: Disabled
IncludePatientId: Disabled
UseStandbyMode: Disabled

Used scan strategies:
        FastAural

Matching settings:
        Smoothing: 3
        Thinning: 3
        HoleFilling: Disabled

Cylinder cutting: Enabled
        Top height: 60
        Bottom height: 5

Save type(s):  Stl
```

- ☐ The scanner’s sensor number
- ☐ Timestamp: Creation time + Name
- ☐ Name left/right: Side identification
- ☐ Settings:
  - — Use the same name for the left and the right ear cast
  - — Always add side description to scan names
  - — Apply patient name (Noah)
  - — Enable standby mode (Noah)
- ☐ Strategy Default
- ☐ Matching settings:
  - — Smoothing

- Thinning
- Fill big holes

☐ Cutting filter settings:

- Enabled
- Height of the top cutting filter | Height of the bottom cutting filter

☐ Project folder

☐ File formats

13 Software settings

aural Scan usually achieves good results with the standard settings. However, you can change these settings during operation, should it be necessary.

smart optics recommends checking the following settings after installation:

☐ File formats

☐ Language

☐ Object tone

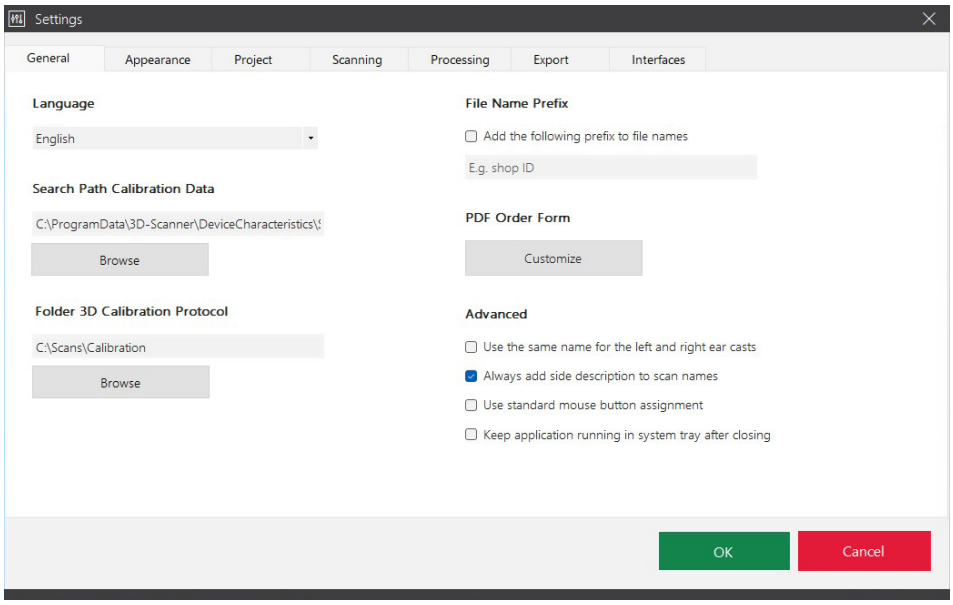
☐ Project folder

☐ Interfaces (for Noah)

▷ In the menu, select **Settings** and then the desired tab.

✓ Changes apply immediately.

13.1 General settings



13.1.1 Language

Determines the display language for the operating elements within the software.

Default value:	System language

13.1.2 Search path calibration data

This setting defines the path to the scanner's calibration data. Multiple data can be saved centrally in one location, the software searches for the folder matching the scanner independently.

13.1.3 Folder 3D calibration protocol

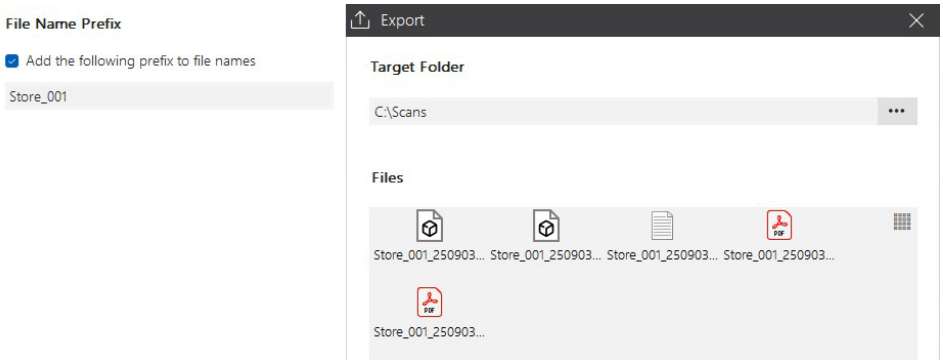
Determines the folder in which aural Scan saves the 3D calibration logs (logs are optional).

aural Scan saves new logs as a PDF file in the new path.

Default value:	`C:\Scans\Calibration`

13.1.4 File name prefix

If this setting is activated, the project data and the calibration-protocol is preceded by the prefix entered during the export.



13.1.5 PDF file

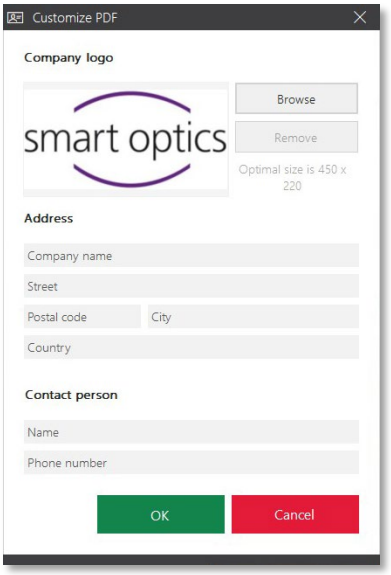
Customize

Company logo, address, and contact details can be printed in the PDF document.

1. Enter the relevant information into the corresponding fields.
2. Load your company logo into the template in the form of an image file. File formats: BMP, JPG, JPEG, GIF, PNG, image size: 450 × 220 px.
3. Reset PDF document to default: Field entries and logo are removed.

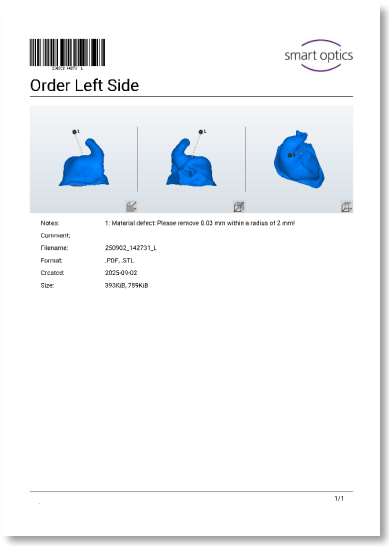
Dialog

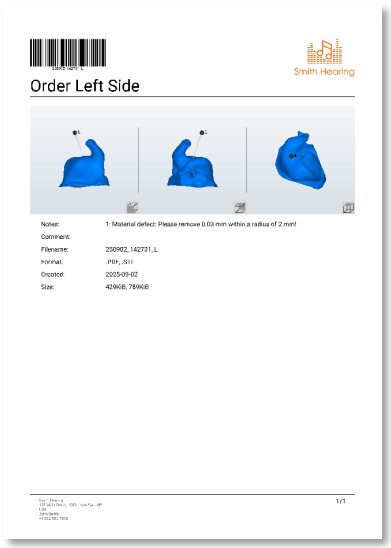
Default



Customized

PDF (printout)





Default value: —

13.1.6 Advanced

Use the same name for the left and right ear cast

Determines whether only a single scan name can be entered for the left and right sides. If the scan names are the same, the side identification must necessarily be appended.

Recommendation:

▷ Enable this option when naming with barcodes.

Default value: disabled, scan prefixes can be different for the left and right side.

Always add side description to scan names

Side identification: anatomical location identification:

_L	left, sinister	_R	right, dexter

	Left and right ear casts use the same name	Scan name always with side description
☑	Max_Mustermann_L Max_Mustermann_R	Max_Mustermann_L Max_Mustermann_R
☐	Max_Mustermann Maximilian_Muster	Max_Mustermann_L Maximilian_Muster

Default value: enabled, file names are formed with _L and _R

Use standard mouse button assignment

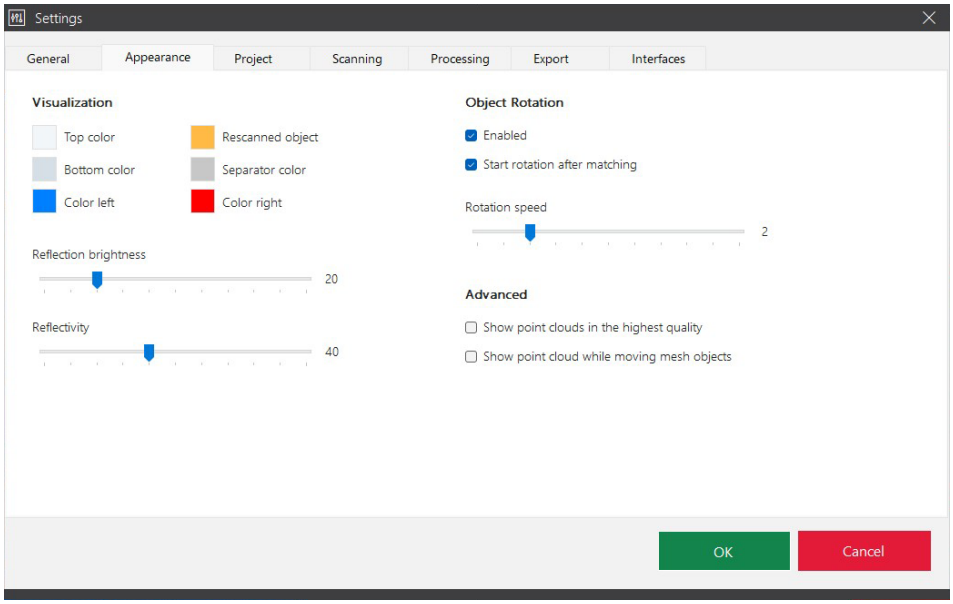
Changes the assignment of the right and left mouse buttons for moving scans:

Move  Rotate 

Default value:

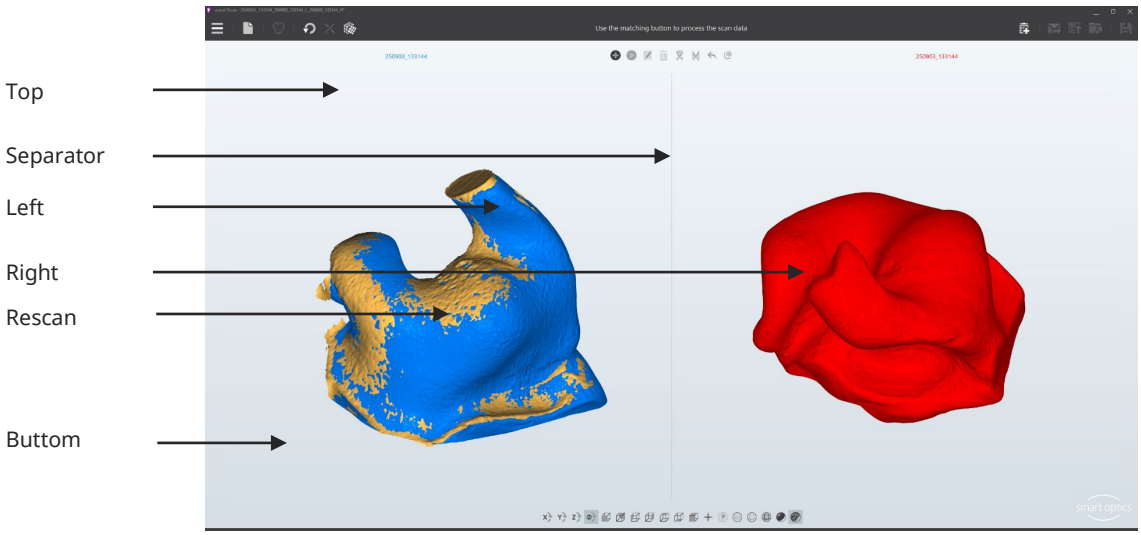
Move  Rotate 

13.2 Appearance settings



13.2.1 View

Visualization



Scans, rescanned areas, and the background are differentiated by colors. These colors belong to the 3D viewer, not to the scan (this is different for the Color texture scan).

To change a color

1. Click on the color box.
2. Select a color from Windows' basic colors or define one with **Define Colors** (RGB values/hue + saturation + brightness).

Reflection brightness

Determines the brightness of the light reflection on the scans in the 3D viewer.

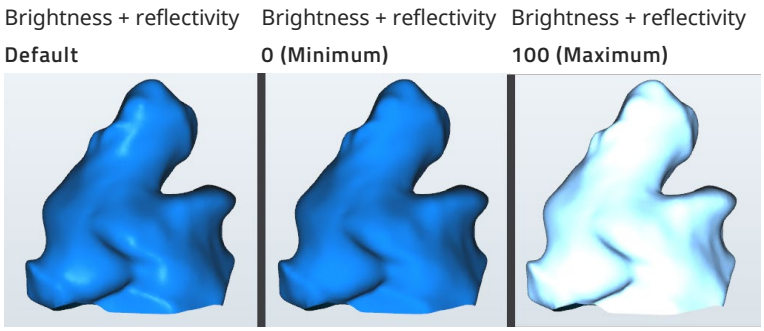
Default value: 20

Reflectivity

Determines the intensity of the light reflection on the scan in the 3D viewer.

Default value: 40

Effect of the reflection in the 3D viewer (brightness + reflectance); it does not influence the 3D measurement.



13.2.2 Object rotation

The object rotation is a 360° rotation in the 3D viewer around the Z axis of the scan. In the view by default, all sides are visible except the underside. The object rotation is used to check the results.

Enabled (Object rotation)

Determines whether the object rotation is allowed (manual rotation using the space bar).

Default value: enabled

Start rotation after matching

Determines whether both scans are automatically rotated after matching.

Default value: enabled

Rotation speed

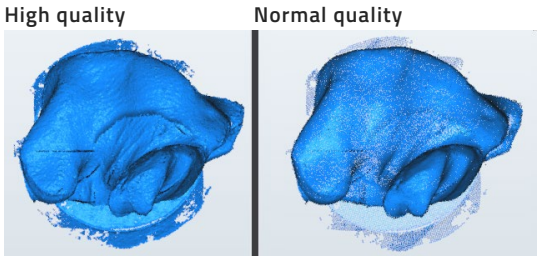
Determines the speed of the object rotation. Applies to both manual and automatic rotation.

Default value: 2 (slow)

13.2.3 Advanced

Show point clouds in highest quality

Determines the quality of the display in the 3D viewer during scanning. Requires a better graphics card performance and slows down the scanning process. It does not influence the 3D measurement itself.



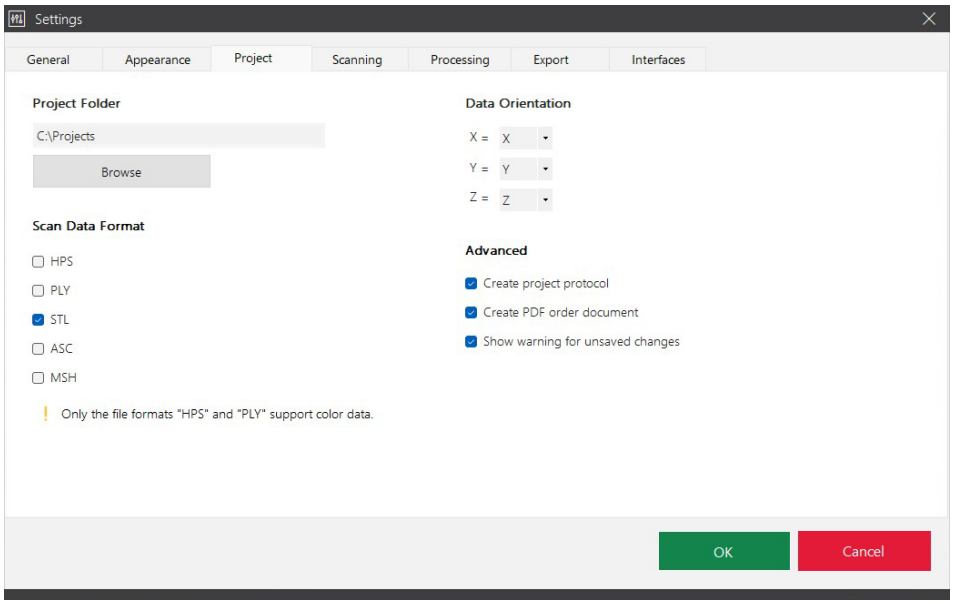
Default value: disabled

Show point cloud while moving mesh objects

Determines whether moved scans are visualized in the 3D viewer as a pixel cloud. Accelerates the visualization.

Default value: disabled

13.3 Project settings



13.3.1 Project folder

Determines the folder in which aural Scan saves the scan projects.

- ▷ Enter the path or select it from the folder structure with **Browse** (local folder, network path, or network drive).
- ▷ aural Scan saves directly to the NOAH database as soon as a project is started from NOAH. In this case, the **Save Project** button triggers the saving of the project in Noah.

13.3.2 Scan data format

HPS PLY STL MSH ASCII

Determines in which file formats the scans are saved.

⚠ Only the file format “PLY and HPS” supports color data and visualization of the impression before smoothing.

Default value: STL

13.3.3 Data orientation

X Y Z

aural Scan saves the data in the Cartesian coordinate system XYZ, with the following values per axis: x; y; z; -x; -y; -z.

- ▷ Please change the assignment of the axes so that the scan data do not have to be realigned to be processed in a CAD system.
- ▷ Enter the coordinates of the CAD system. aural Scan does not check the values.

Default value: x = x, y = y, z = z (Cartésien)

13.3.4 Advanced

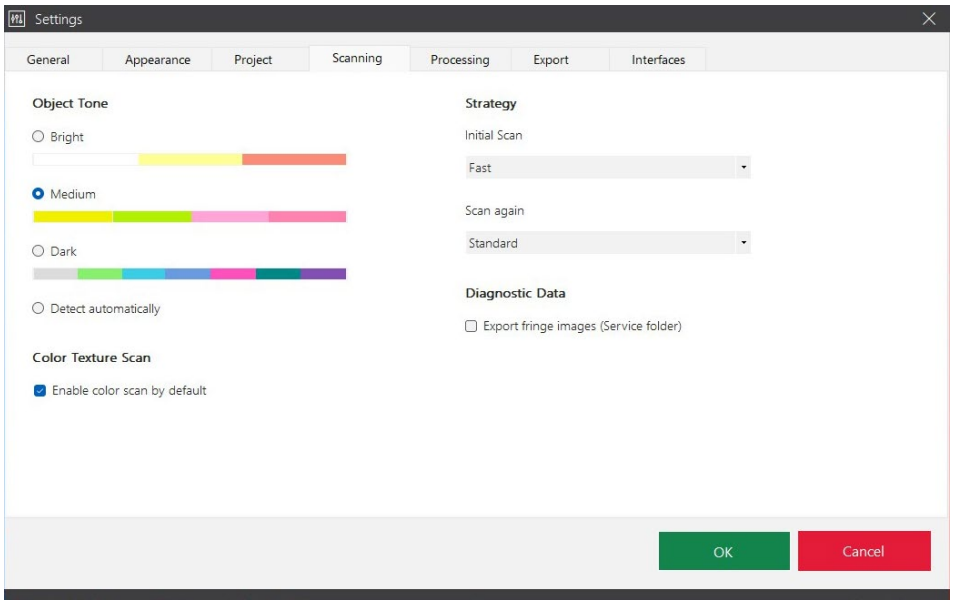
The export of the project log and the PDF order document within the project directory can be activated/deactivated with these options.

Default value: enabled, project log and PDF order document are created.

aural Scan displays a message by default if projects have not been saved using the **Save project** button. This message can be deactivated when using specific workflows.

Default value: enabled

13.4 Scanning settings



13.4.1 Object tone

Categorization of the impression material to be scanned as light, medium, or dark according to the color scale.

▷ Select the setting that is most similar to the impression material to be scanned. Change the setting if the color of the impression material changes.

✓ The light intensity of the sensor will be adjusted accordingly.

▷ Shiny materials must be additionally matted with 3D scan spray.

Default value: Medium

If the option **Detect automatically** is selected, the software automatically adjusts the exposure to the color of the inserted impression.

13.4.2 Strategy

Determines the type of measurement and the number of images. The setting is logged (`project.log`).

The strategy has the following modes:

Mode	Scanning Time	Number of Images
Ultra-fast	52 %	+
Fast	71 %	+ +

Standard	100 %	+ + +
Enhanced	132 %	+ + + +

▷ If necessary, change the scanning strategy to regulate the scan coverage.

The standard values are selected to allow audiology scanners to achieve measurement accuracy according to ISO 12836. If you have any questions about quality management, please contact your Support.

	Standard	**Enhanced**
	— Refers to the first scan.	— Refers to a repeat scan.
Default value:	Fast	Standard

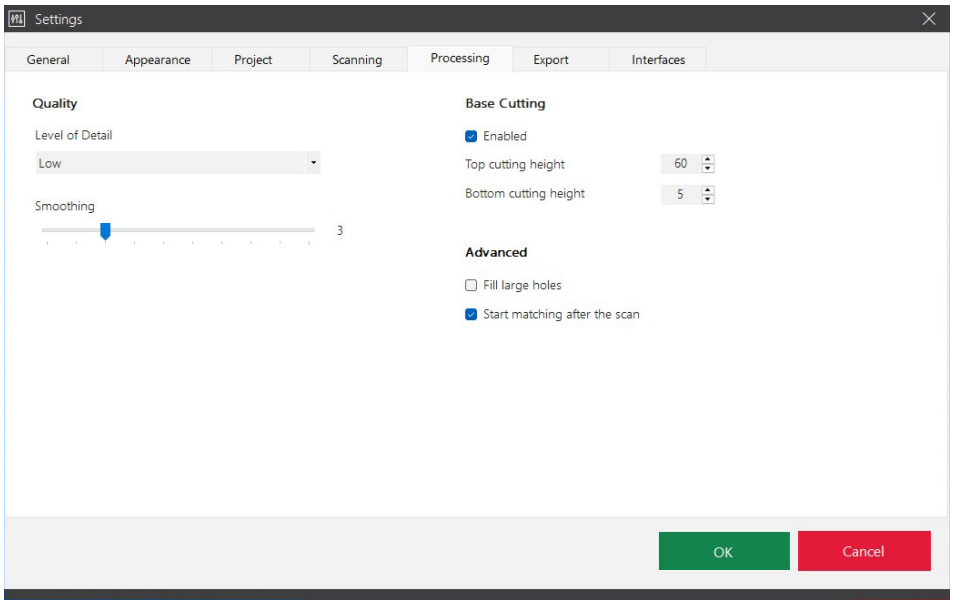
13.4.3 Diagnostic data

aural Scan creates recordings with a striped light pattern for Support (finding the cause of measurement errors). The setting is automatically deactivated when aural Scan is closed.

▷ Activate the setting if measurement errors have occurred and scan immediately.

Default value: disabled, does not create BMPs.

13.5 Processing settings



13.5.1 Quality

Level of Detail

Determines the accuracy, i.e., the distance between the pixels that are linked to form a data set. The maximum accuracy is limited by the maximum resolution of the sensor. The size of the data increases with greater accuracy. The setting is logged (`project.log`).

Value range (steps):

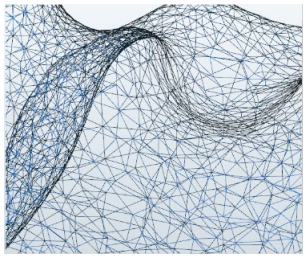
Level of Detail	Details	Data Size
Ultra	■■■■■	■■■■■
Very High	■■■■	■■■■
High	■■■	■■■
Medium	■■	■■
Low	■	■

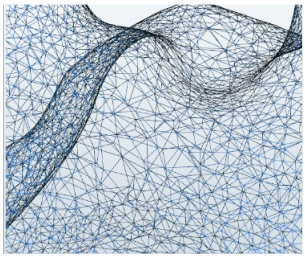
Default value: Strong

Smoothing

Determines the digital smoothing of the 3D data meshes. Bubbles, edges, and other defects on the surface of the impression are adjusted. The physical product needs less polishing later on. The setting is logged (`project.log`).

3 (Default) **10 (Maximum)**





Scale 0 – 10

Steps of 1

Default value: 3 (low)

13.5.2 Base cutting

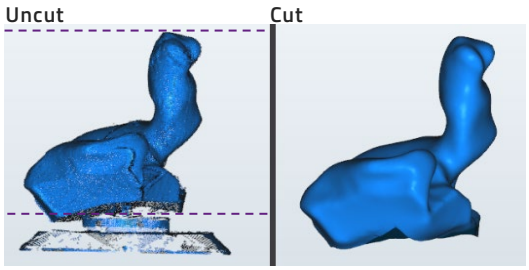
Cutting filters are used to cut the top and bottom area of a scan in the date set and make manual cutting unnecessary.

The settings must match the size of the ear impressions.

Top cutting height | Bottom cutting height

Top cutting height:
Impression

Bottom cutting height:
Base



The cutting filters are only applied if the **Enabled** setting has been checked.

▷ Change the values if matched scans include unnecessary areas, e.g., the base, or are cut excessively, e.g., in the auditory canal area.

The setting is logged (`project.log`).

Default value: Top = 60 mm, bottom = 5 mm
Value range: 0 -100 mm

13.5.3 Advanced

Fill large holes

Determines whether data that is missing on flat surfaces is automatically filled during matching. Alternative function for rescanning, but less accurate. The setting is logged (project.log).

Default value: disabled

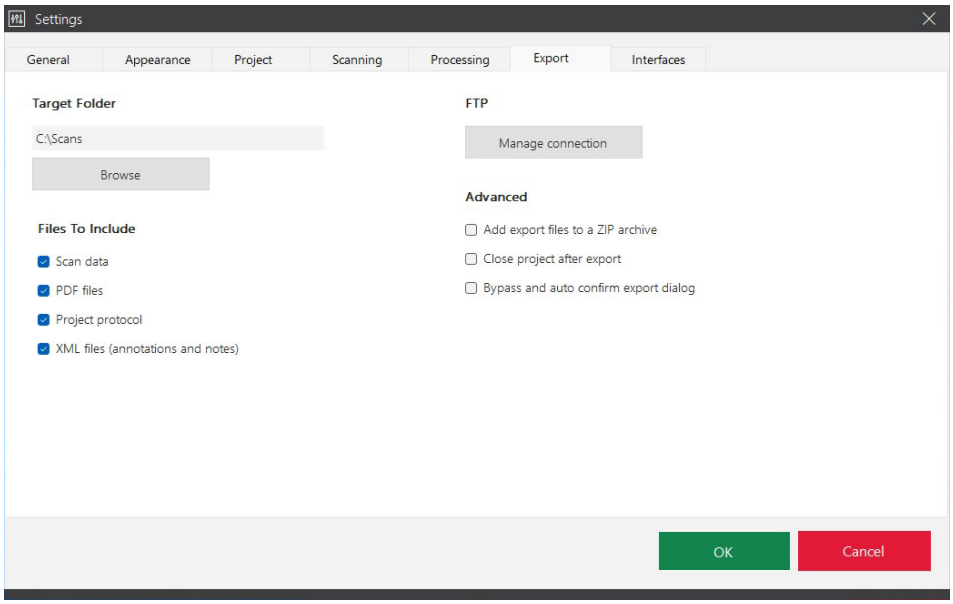
Start matching after the scan

After scanning, all images are merged into a data record, filtered, thinned, and smoothed (i.e., “matched”). Representation: Gouraud shading (unmatched: dots)

▷ If disabled, you will have to do the matching manually.

Default value: enabled, scans are matched immediately.

13.6 Export settings



13.6.1 Copy to target folder

The export directory is used to share and save scan files.

▷ Enter a path or search for it in the folder structure.

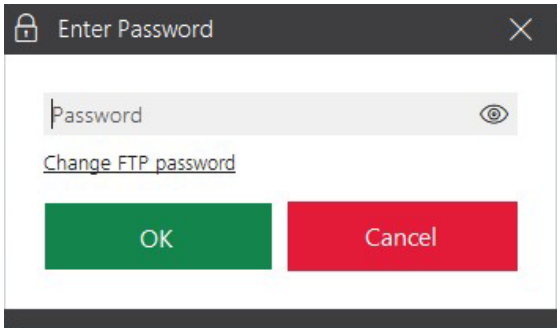
✓ If the recorded folder does not exist, it will be created during the next export.

13.6.2 FTP

FTP connections are required for the FTP upload export method. Upon finishing work, the export files are loaded onto the selected FTP server. The recipient must provide the connection information to the FTP server and the corresponding login information.

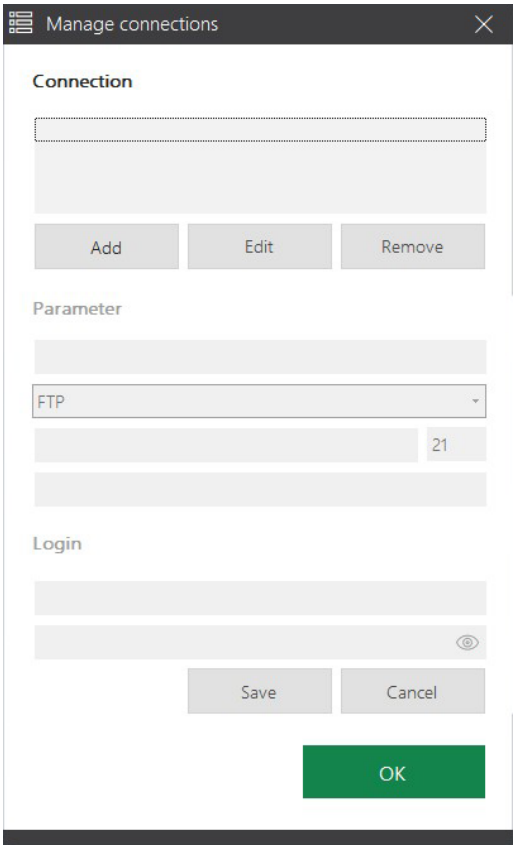
FTP connections can be edited both in the settings and upon finishing work.

The FTP connection management dialog is password-protected (by default: smartoptics).



Managing connections

1. The link **Change FTP Password** allows you to replace the default password (smartoptics) with a new password.
2. Log in with the current password.



3. To add an FTP connection:
   Enter the information under **Parameter** and **Login**.

Connection	— Name of the FTP connection — For identification purposes — Freely selectable — Cannot be changed

FTP	— Protocol for data transmission — FTP or FTPS (encryption with security function) — Can be changed
Server	— URL of the FTP server, e.g., `uploads.labor.de` — Can be changed
/Path/	— Shared path on the server where the export files are saved — A slash must be placed before and after folder names — Can be changed
User	— Name for logging into the FTP server — Can be changed
Password	— Password of the FTP user — Can be changed

4. Click on **Add** to check the new connection and save it in the connection list.

✓ A valid connection will be saved. Connections with an invalid URL or incorrect login information will not be saved.

5. Remove FTP connections if, you no longer use them (to prevent incorrect uploads), or the operator has changed the connection information (to prevent project cancellation).

Default value: —
Password for the dialog: smartoptics

13.6.3 Files to include

This setting allows you to include or exclude data for export. The following filters are available for export:

☐ Scan data

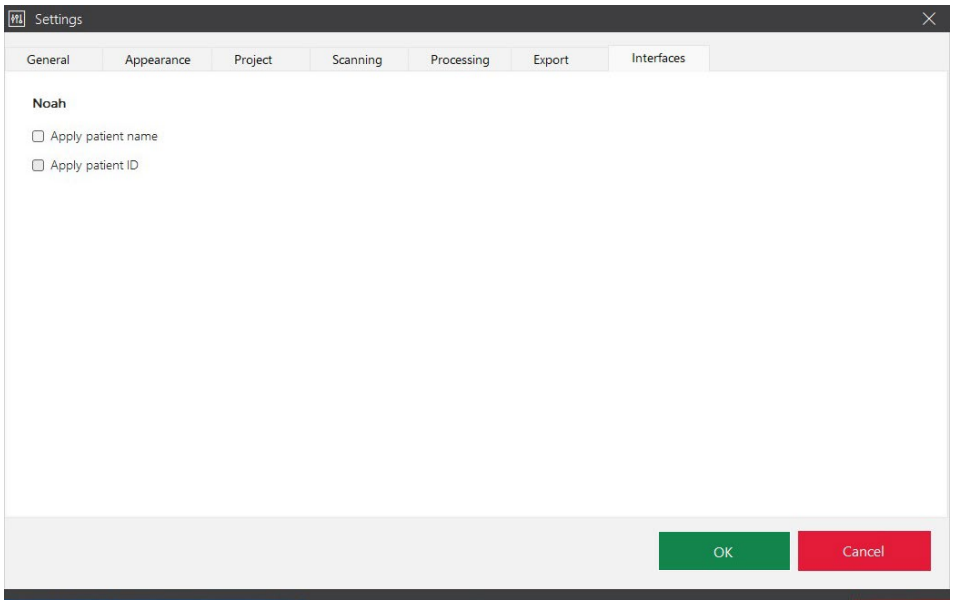
☐ PDF files

☐ Project protocol

☐ XML files (annotations and notes)

Default value: All entries enabled

13.7 Interfaces



13.7.1 Noah

These settings only concern the operation of aural Scan with Noah System from HIMSA:

Apply patient name

Determines whether the patient names in Noah are included in the scan names. The default name (timestamp) is appended.

Default value: disabled

Apply patient ID

Determines whether the patient ID from Noah is included in the scan names.

Default value: disabled

14 aural Scan with Noah

www.himsa.com
Hearing Instrument Manufacturers' Software Association

aural Scan can be integrated into Noah (Manufacturer: HIMSA). Scanning processes start directly from the Noah patient browser. Scan results will be assigned to a patient in Noah and available with other actions.

14.1 Noah interface setup

Noah System (from Version 4.13) and the workstations for audiology scanners can be configured in different ways. The following work steps are necessary at each workstation.

1. Install the current Noah version as described in the Noah Knowledge Base. Please note requirements such as the installation type.
2. Install aural Scan to the default installation folder:
   `C:\Program Files (x86)\3D-Scanner`
3. Start Noah first, then aural Scan.

If necessary, Noah must be configured further now.

4. Edit the following settings in aural Scan:

— Interfaces: Apply patient name or patient ID (optional),

5. Close aural Scan and Noah.
6. Restart Noah and select the Noah server.

✓ Noah has a new start button for aural Scan.

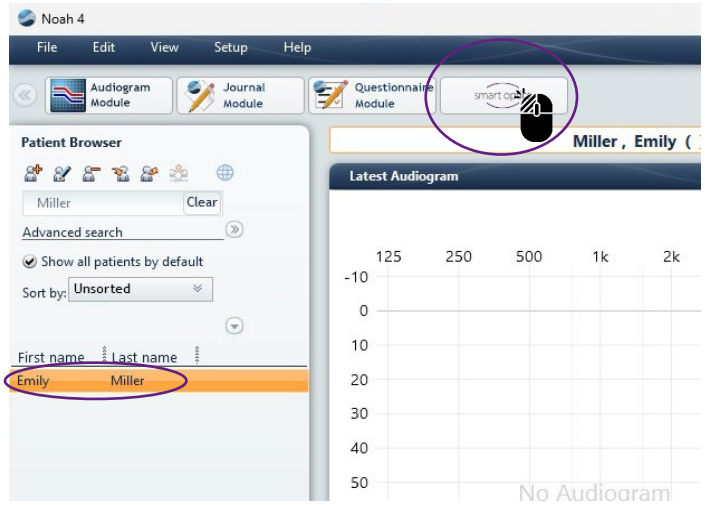
Noah View

Recommendation

To view the patient browser and sessions (linked files) at the same time, use the "Mixed view" in Noah“.

14.2 Scanning with Noah

1. Switch on the scanner.
2. Choose a name (Noah patient browser, left).
3. Start aural Scan with the smart optics button.



✓ aural Scan will start and open a scan project for the patient.

4. Finish work, optionally with an export (FTP, E-Mail, Export).

✓ Noah saves a patient folder (for all scans concerning a patient) and Links to the scan files (under **Sessions**).

5. Start the next scan project from Noah.

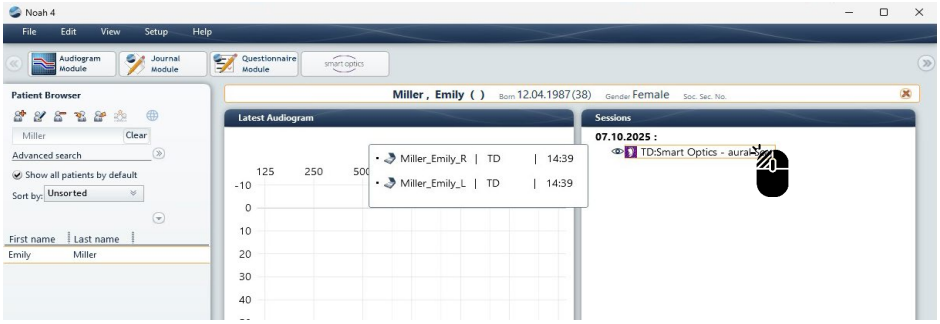
14.3 Viewing, editing and exporting scans from Noah

You can view and edit scans individually from Noah with and without a scanner and re-export the scan project; the aural Scan software must be installed.

1. In Noah's patient browser (on the left), click on a patient.

✓ The links to the scan files are displayed under **Sessions**, sorted by creation date.

2. Click on **the right** or **left scan**.



✓ aural Scan loads the scan into the 3D viewer on the right or left side.

Noah actions

— Tooltip (mouseover):

Information on the scan, the Noah server, and saving time

— Context menu (right-click):
Delete Action deletes the link to the scan file (not the file itself).
Print opens the order document "`order.pdf`".

15 Shortcuts

15.1 Shortcuts

aural Scan supports Windows shortcuts, e.g., for selecting, copying, and cutting field contents (CTRL + A, CTRL + C, CTRL + X, CTRL + V). The same shortcut can have different effects depending on the context or cursor position.

Shortcut	Context	Meaning
Esc	Scan	Cancel the ongoing scanning process
	Scan name	Jump from the left to the right scan name and vice versa (the focus must be in the 3D viewer)
⇧ +	3D viewer	Jump from the left to the right scan (the focus must be in the 3D viewer)
	Dialogues and messages, e.g., settings	Select the next user control, e.g., input field, checkbox, button
↵ / Enter	Scan	Start scanning
	Dialogues and messages, e.g., settings	Trigger the function of a selected button
␣	3D viewer	Rotate the scan by 360°
	Dialogues and messages, e.g., settings	Turn a checkbox on or off
	Dialogues and messages, e.g., settings	Open the context menu of a selected input field
Strg + ⊞	Dialogues and messages, e.g., settings	Open the context menu of a selected input field
Strg + F4	Software	Close the software (cancel the scan at the same time if a scan is still open)
Alt + F4	Software	Close the software (cancel the scan at the same time if a scan is still open)

	Dialogues and messages, e.g., settings	Select option, select entry in a list

16 Troubleshooting for aural Scan

You can find solutions to known problems on our support page:

- ☐ aural Scan startup problems
- ☐ Other problems

support.smartoptics.de

You can find more articles in the **Cross Product** and **Audiology** sections. Has your problem not been mentioned here or cannot be solved? Then you can submit a request directly via the support page.

16.1 File paths

Open protected Windows folder

▷ Enter the path name into the Explorer using the placeholder „Percent“:
`%appdata%`, `%programfiles%`

Data paths by default

Details in square brackets are placeholders for your individual details.
Note on XML files:
XML files are important for software functionality. Do not change the file names or contents of XML files manually.

Target folder	`C:\Program Files (x86)\3D-Scanner\aural Scan`
Session logs	—
3D calibration logs	`C:\Scans\Calibration`
Project folder (standalone)	`C:\Projects`
Project folder (with Noah)	—
Project log	`C:\Projects\[Project]\project.log`
Camera driver	`C:\Program Files (x86)\3D-Scanner\aural Scan\Prerequisites\Camera`
Calibration data	`C:\Program Files (x86)\3D-Scanner\aural Scan\data\[SO-202…*]`
FTP connection information	`C:\Users\[User*]\AppData\Roaming\3D-Scanner\aural Scan\config\FTPConnections.xml`
Settings for aural Scan **Default** **Custom**	`C:\Program Files (x86)\3D-Scanner\aural Scan\data\Settings.xml` `C:\Users\[User]\AppData\Roaming\3D-Scanner\aural Scan\config\Settings.xml`
Order document “order.pdf	`C:\Projects\[Scan name]\order_[Scan]_[Side].pdf`

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