



Henson 9000 User Manual

CE

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1 Welcome

Henson 9000 Visual field analyser







1.1 Company notices

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 Identifier	<p style="text-align: center;">Henson9000</p>	
 Manufacturer	<p style="text-align: center;">Visia Imaging S.r.l. Via Martiri Della Libertà, 95/e 52027 San Giovanni Valdarno (AR) Italy www.visiaimaging.com info.hcs.it@topcon.com</p>	
 Distributor	<p style="text-align: center;">AMERICA Topcon Medical Systems Inc. 111 Bauer Drive Oakland, NJ 07436 www.topconmedical.com Phone: +1-201-599-5100 Fax: +1-201-599-5250</p>	<p style="text-align: center;">EMEA-APAC Topcon Europe Medical B.V. Essebaan 11 2908 LJ Capelle a/d IJssel The Netherlands www.topcon.eu medical@topcon.eu</p>
 Country of origin	<p style="text-align: center;">Great Britain</p>	

The Henson unit must be used in accordance with the instruction and user manuals.

Please read the instruction manual before attempting operation.

The information in the user and instruction manuals is to be viewed as an accompaniment to correct training on this equipment.

Contact your sales agent for details of training or contact Topcon for details of training videos and webinar training sessions.

The results of a test are only to be analysed by a suitable qualified person, and it is the responsibility of the practice manager/owner to ensure that only suitably trained personnel are operating this equipment.









Any serious incident that has occurred in relation to the device should be reported to the manufacturer and the competent authority of the Member State in which the user and/or patient is established. A serious incident is any incident that directly or indirectly led to the death of the person or a serious deterioration in a person's health.

The only warranties for products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty.



This symbol on the product or on its packaging indicates that to preserve the environment, this product must be recycled after its useful life as required by law and must not be disposed of with your household or commercial waste. It is your responsibility to dispose of your waste electrical and electronic equipment by handing it over to a designated collection point for the proper recycling of such equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about the authorised collection location nearest to you, please contact your local city office, your household waste disposal service or the agent from whom you purchased the product.

1.2 Important warnings

	This unit must be connected to an earthed electricity supply	
	Hazardous voltages are present inside this unit. No user-serviceable parts inside	
	No modification of this equipment is allowed	
	This equipment is not suitable for use in an oxygen rich environment	
	The instrument is not suitable for operation in environments where handling of fluids is normal use.	
	This equipment should be kept dry at all times	
	Any third-party device must be connected in compliance with the IEC60601-1 standard.	
	If the instrument is externally connected to AC powered, non-medical devices (such as PC, printers, or storage devices), the complete system must comply with the system requirements defined in IEC 60601-1.	
	A safe distance of > 1.5 m should be maintained between the Henson and the non-medical device. If the non-medical device is within 1.5 m an isolating transformer should be used to power the non-medical peripheral device(s).	

Note: If a medically approved PC or a PC with medically approved power supply unit without printer and without optional LAN connection is used then neither a safety isolating transformer nor a distance of > 1.5 m is required. However, for safety reasons it is recommended to maintain a distance of > 1.5 m, if at all possible.

The person or the responsible organization connecting additional devices or reconfiguring the system must evaluate the complete system to ensure compliance to the applicable IEC 60601-1 requirements.



The instrument operator must not touch the patient and the peripheral device simultaneously.

Backing up your data

It is strongly recommended that you regularly back up the database of patient records to a suitable removable media or network/cloud drive to avoid the possibility of data loss. The Henson software has the capability to backup every time a record is saved, as well as a periodic permanent backup. See the [Options-backup](#) section for more details.

This simple procedure is described later in this manual in [Database Backup](#).



CAUTION: When connected to the Internet, the PC used to operate this instrument may be vulnerable to serious security risks, including viruses and worms that could adversely affect performance and/or lead to corrupted diagnostics.

It is the responsibility of the user to ensure that their network is secure. At a minimum:

- antivirus software should be installed
- wireless networks should be secured and
- all timely updates should be performed on all software on the computer/network

Additionally, your IT manager may suggest further precautions such as anti-spyware and firewalls.

It is important to ensure that you are using the latest version of the Henson software which can be obtained from your dealer.

USB devices




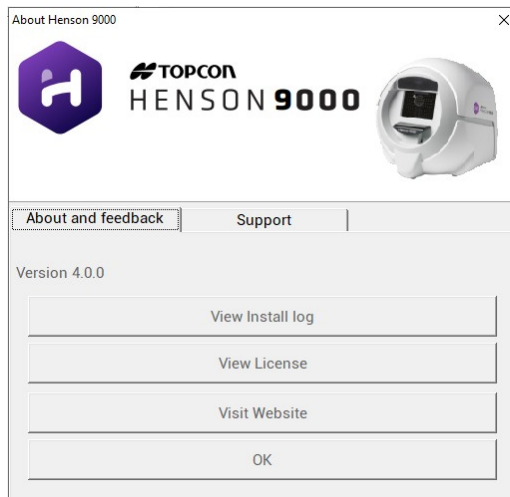
CAUTION: Make sure that your USB devices are secured against malware/viruses. Patient data on USB devices can become corrupted when inserting into computers for backup or transfer. The use of antivirus software on computers is recommended and is the responsibility of the user.

1.3 Revision history

This manual is part number EN-003153-UM.

Release	Date	Change
Version 1.0	August 2013	New revision for version 2.0 software
Version 1.1	May 2014	For version 2.1 onwards software
Version 1.2	July 2014	Additional Installation Information added
Version 1.3	October 2014	Updated information on supra threshold tests, database operations and general formatting.
Version 1.4	May 2015	Changes to patient instructions in the first person. Additional formatting changes and corrections.
Version 1.5	November 2015	Added Progression information to coincide with version 3.4 Software release
Version 1.6	April 2017	Changes for version 3.5 software release - addition of integration, changes to Database images, additional language support.
Version 1.7	May 2018	Changes for version 4.0 software release - new GUI for all test programs, changes to supra-threshold programs.
Version 1.71	June 2018	Updates to images
Version 1.72	August 2018	Updates to Licensing information
Version 1.8	June 2019	Updates to formatting and chin rest information.
Version 1.9	April 2021	Updates for MDR compliance, cleaning instructions for bowl and protective shield and general editing
Version 2.0	October 2021	Updates for software release 4.0.162
Version 2.1	October 2022	Update for software release 4.1.1
Version 2.2	February 2023	Update for software release 4.1.2 - Regional settings page added
Version 2.3	August 2023	Updated for version 4.2 - MWL and DICOM storage and new user interface
Version 2.4	June 2024	Updated for 4.2.4 - ZATA workflow and DCM improvements
Version 2.5	October 2024	Updated for 4.2.5 - Two new DICOM options added

To determine the version of installed software, click the About button  on the main menu.



Information for the software Versions after the 3.5 release.

The release version of software called 3.5 contained some important changes to the way the software operates. These may not affect your operation of the instrument if you do not use the database or have any practice management integration, but it is important that you understand them if you do.

The previous versions of the software stored a PDF copy of the printout alongside the database in an images folder.

The image stored is now a JPEG picture file. The database will operate in the same way as before except that the printout of the 2 eyes in the ZATA threshold tests are shown on different tabs rather than on 2 pages of the PDF.

The quality of the JPEG picture file can be set in the options program.

If you currently use the PDF file for another reason, and the JPEG file cannot be substituted then an additional PDF file can still be created when saving. The storage location for this can be set in the options program ([PDF tab](#)).

Software Licensing

From Version 4.0 the Henson software is licensed. That means it needs to be activated for use during the initial trial period. This can be performed either online if the computer has access to the internet or offline (using an internet connected mobile phone) from within the [options program](#).

1.4 Help/Manual information

Many of the images in this help manual have 'hot spots'. If you are viewing this manual electronically, clicking on an item in an image can often result in a jump to a new page giving further information on a topic.










Some of the screen shots in this manual may differ slightly from the software installed on your machine.




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The copyright owner shall not be liable for technical or editorial errors or omissions contained herein.







The following symbols are used in the manual and on the instrument.

	Consult manual
	WEEE Directive
O I	Power Off (O), Power On (I)
	Type B Applied Part
	Hazardous voltage
CE	CE mark
	USB
	Protective earth
~	AC Mains
	Patient response button (PRB)
	Manufacturer details
MD	Medical Device
	Date of manufacture
SN	Serial Number of device

 REF	Catalogue number of device
 GB	Country of manufacture
	Fuse

Protective Packing symbols

The protective packing symbols on the shipping carton specify the handling requirements and the transport and storage conditions for instrument as it is shipped from the factory. Note these symbols in the event that your instrument needs to be stored for a period of time prior to its setup and use.

	Right side up
	Keep dry
	Fragile
	Temperature range
	Humidity range
	Pressure range

1.5 Intended Purpose

Intended medical indication

The Henson 9000 perimeter is an automated perimeter used by optical professionals for the detection and monitoring of areas of reduced light sensitivity within the eye's central visual field. The Henson 9000 can be used by qualified ophthalmic professionals (ophthalmic technicians, optometrists, orthoptists and ophthalmologists), along with data from other devices, to assist in the diagnosis and monitoring of certain ocular pathologies. The Henson 9000 is not intended to be used as the sole diagnostic method for disease.

Intended patient population

The Henson 9000 is designed for use on all adults and children over the age of six in need of diagnostic evaluation of the visual system.

There is a general requirement that the patient be able to sit upright and still and be able to place their head on the chin and forehead rest of the instrument (with or without supplemental human or mechanical support). The patient must also be mentally capable of following the examination.

Intended part of the body/tissue applied to

The only items in contact with the patient are the patient response button (hand), head rest and chin rest and potentially the trial lens holder (face) which are in short term contact for the duration of the test (less than 30 minutes) and these parts are made from material suitable for short term contact with intact skin.

1.6 Contraindications

No contraindications are known for perimetric examinations.

1.7 Acknowledgements

Microsoft, Windows, Windows 8, 10 and Windows 11 are registered trademarks of Microsoft Corporation.

Adobe and Reader(R) are registered trademarks of Adobe systems.

1.8 Regional Settings

The Henson 9000 software will display dates, times and decimal numbers according to your computer's regional settings.

From the V4.1.2 software release, all input data is checked for the correct decimal separator and any conversions are made as required. A decimal separator is the symbol used to separate the whole numbers from the decimals. This will either be a dot (.) or a comma (,) depending on your region.

All data entry points in the software are now decimal specific. See the example Rx entry forms below.

Note: Version 4.1.2 added a numeric keypad to the Rx form to allow easier use with touch screens.

Decimal separator as a period "."

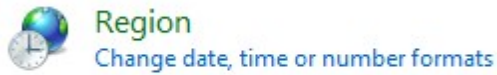
The screenshot shows a software interface for entering a prescription. At the top, there is a blue header bar with a close button (X), a calculator icon, and a help button (?). Below the header, the text reads "Protective shield NOT fitted" and "Enter distance prescription and press the calculate button". The form is for a "New patient, aged 6". It has two main sections: "OD" (Right Eye) and "OS" (Left Eye). The "OD" section has input fields for "SPH" (0.00) and "CYL" (0.00). The "OS" section has input fields for "SPH" (0.00), "CYL" (0.00), and "AXIS" (180). A numeric keypad is visible on the right side of the form. A red circle highlights the "CYL" field in the "OD" section, showing the value "0.00" with a period as the decimal separator.

Decimal separator as a comma ","

The screenshot shows the same software interface as above, but with a different regional setting. The "CYL" field in the "OD" section now displays the value "0,00" with a comma as the decimal separator. The rest of the interface, including the header, instructions, and numeric keypad, remains the same.

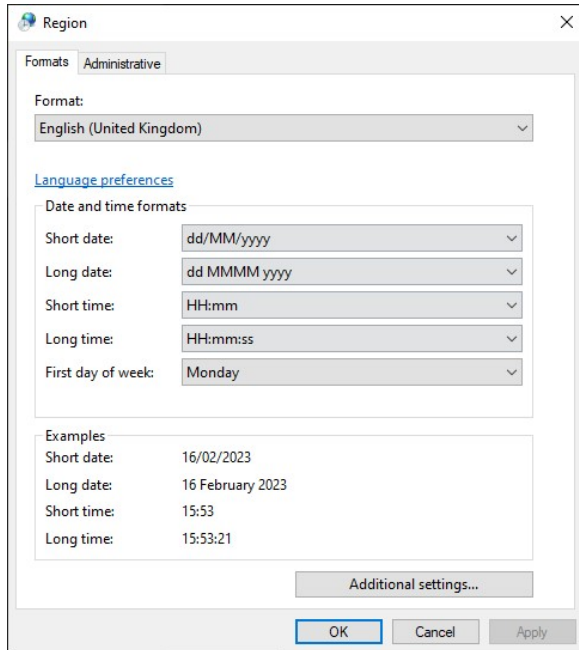
The test reports also display decimals using the correct separator.

To check or change the computer's regional settings - open the control panel and select the region heading. Click on the change date, time or number formats link.



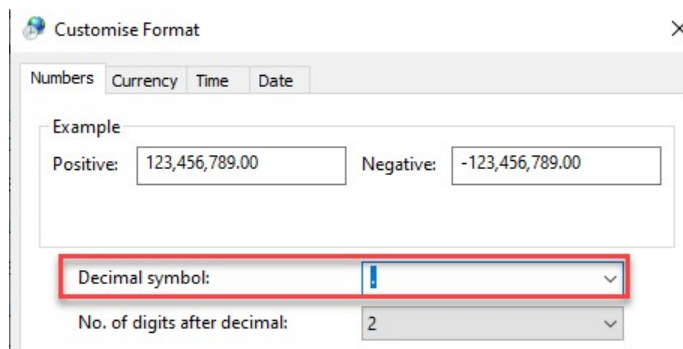
The current region setting will be displayed. The drop-down menu selection at the top of the window allows you to alter current setting (language/ country).

Note: Changing the region does not necessarily affect the language that Windows is displayed in - this can be set by clicking on the language preferences link in the control panel.



The additional settings button at the bottom of the window displays the current number format and decimal symbol/separator.

Click the OK button at the bottom of the window to apply the selection you have made and close the window.



Note: If changing the regional settings, the software should be restarted to enable the change to be registered.

2 Main menu

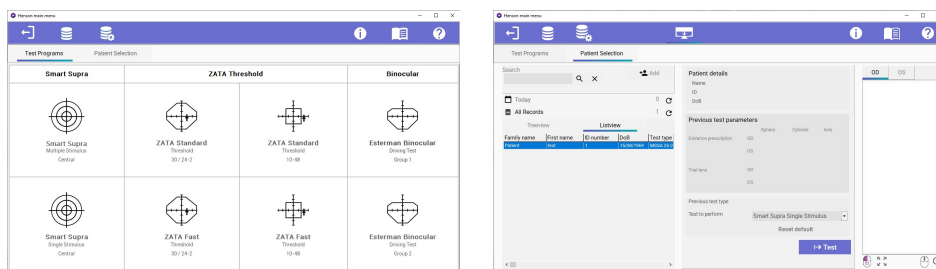
The main menu of the Henson software has been updated from version 4.2.

The software offers a choice between the traditional test selection screen to quickly open a test, or a patient selection screen where the patient can be selected from a work list, the database or entered manually.




If you have a DICOM server, Electronic Medical Records (EMR) or Practice Management System (PMS) capable of supplying a Modality Work List (MWL), then a patient selection screen will be the default start up screen.

(See [Options Integration: DICOM](#) for details.)



If you do not have MWL capability, then the default start up screen, set in [Options: General](#), can be either the Test Program or the Patient Selection screen. The alternate view is always available at the press of a button.

To protect patient data, a privacy button  is located in the centre of the toolbar. Pressing this will switch to the test selection screen thus hiding any patient data on screen.

The software also contains an optional privacy timer that will automatically hide the Patient Selection screen if no controls are pressed within the pre-set time. See the [Options-general-privacy](#) page for more details.

The timer countdown, if enabled, is displayed underneath the privacy button.



See [Appendix 3](#) for installation and setup instructions for the software.

Traditional test selection (test programs)

To start a visual field test or one of the menu bar items, single click over the item on the start-up screen.

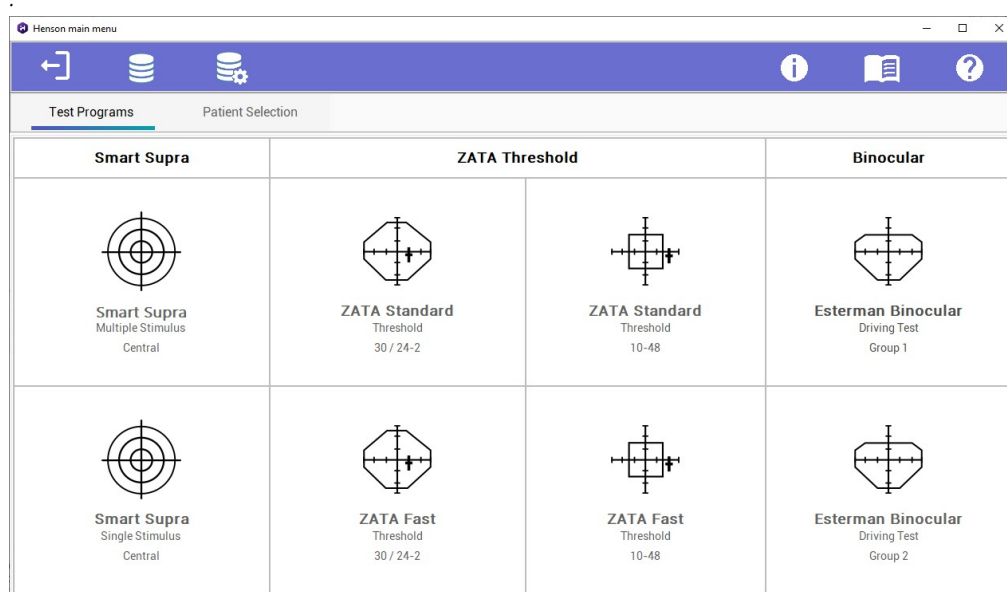
If you are viewing this manual electronically, clicking items in the start-up screen image below will open the relevant sections of the manual.

The instruction and user manuals can be accessed by using the Manual button on the toolbar.



The user manual can also be opened from the About menu accessed from the "i" button. 

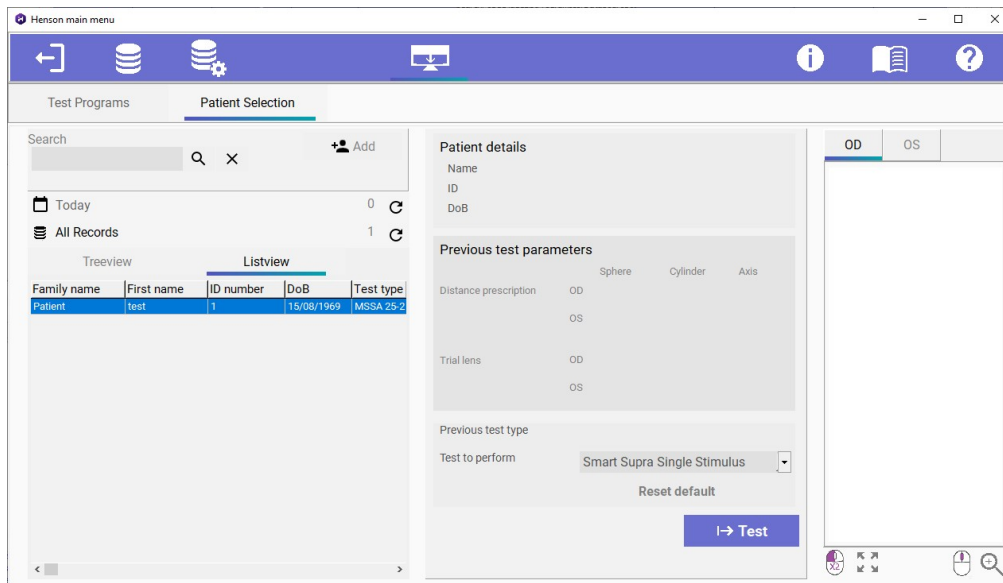
To get more help on a test screen item click over the item in the image below.



Patient Selection view.

If the DICOM server/PMS has supplied a modality work list (MWL), then the patient details will be listed under the Today heading.

If MWL details have not been provided then a message will be displayed informing that a list is not available and the Today section will contain a filtered view of the database, showing tests performed on the current day. The full list of tests stored in the database will always be displayed in the All records section.



To get more help on a test screen item click over the item in the image.

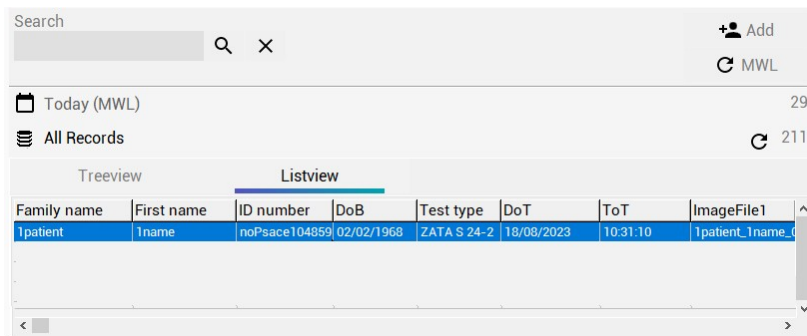
The next three sections explain the elements that make up the patient selection menu screen.

- [Patient selection](#)
- [Patient details](#)
- [Image display](#)

2.1 Patient selection

The left-hand column of the patient selection screen consists of tables from which a patient can be chosen.

It also contains the new patient and search tools.



There are two tables that can be displayed:

- Today (MWL or database) and
- All Records (database)


The two tables occupy the same space and can be expanded by clicking on their header bar. The default table displayed is dependent on the [Options](#) settings where DICOM MWL can be configured.

If MWL is set up, the Today section will be labelled "Today (MWL)" and will display the list supplied by the server - in the order that the server sent it.

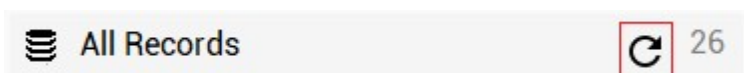
If MWL is not enabled or is set up but no list has been supplied - i.e. the server could not be contacted or there is no list available for today, then the Today section will be labelled "Today" and will display results from patients tested today. In this case, the All Records section will be displayed by default.

The All records section displays the test records in the database. Any patient test can be selected from here.

The required section can be displayed by clicking its title bar. For all sections, the number of items in the list is displayed on the right hand side of the title bar.

The MWL data can be refreshed using the button  MWL at the top of the column. This can be used if changes are made to the list or after a connection issue.

The All Records database button contains a refresh button to import recent test data if the list has not yet updated automatically.

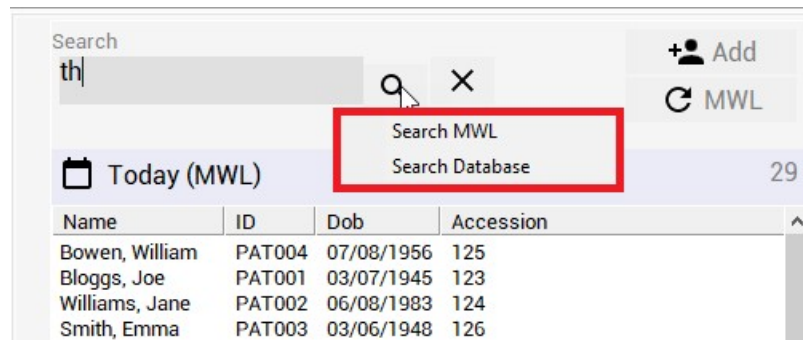


Search

The Search box allows you to enter text and search for records using the patient name, ID number or date of birth.

If an MWL list is available, clicking the Search button presents the option to search either the MWL or the database. (See image below)


If MWL is not set up, then the option is not displayed, and the database is searched by default.



When searching the MWL, the results will be displayed in the Today (MWL) section while the results of database searches will be listed in the All Records section.

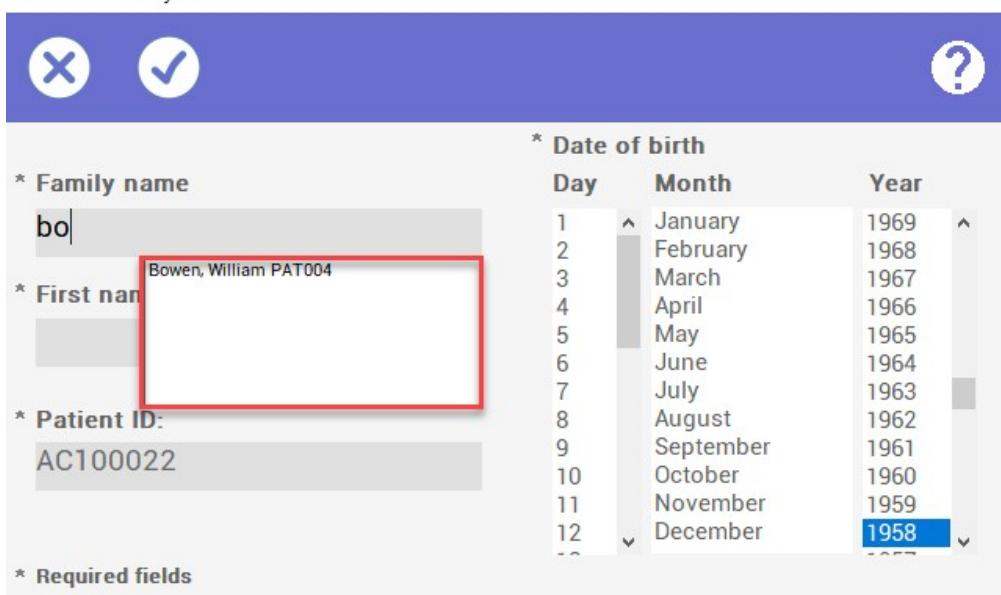
New patient setup

To test a new patient you have two options:

- Switch to the test selection screen, select and run a test and, when saving, enter the patient details.
- Click the Add  button, enter the required patient details which are then displayed on screen ready for test selection.

As the patient details are typed in, matching names in the database will be displayed. If the "new" patient is already in the database then simply select the name from the list of matches and the details will be filled in automatically.

Patient Details Entry Form



* Family name
bo

* First name
Bowen, William PAT004


* Patient ID:
AC100022

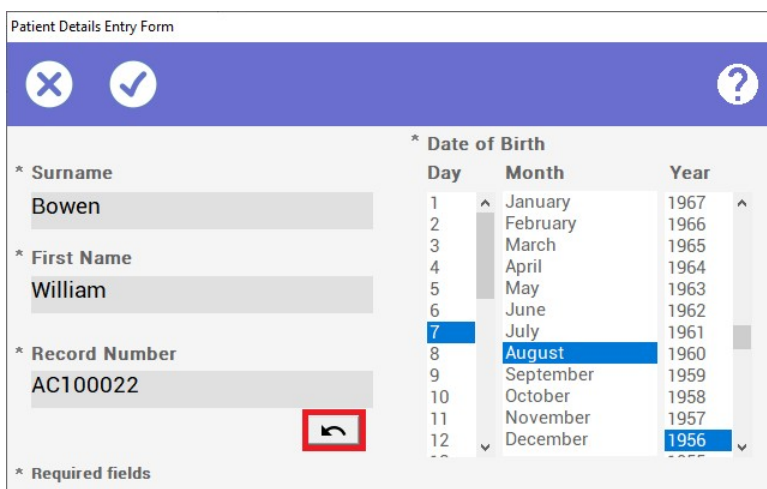
* Date of birth

Day	Month	Year
1	January	1969
2	February	1968
3	March	1967
4	April	1966
5	May	1965
6	June	1964
7	July	1963
8	August	1962
9	September	1961
10	October	1960
11	November	1959
12	December	1958

* Required fields

NOTE: If the option to automatically assign an ID number is turned on (as shown above) then the number assigned will be overwritten if a pre-existing patient is selected.

If the existing patient was incorrectly selected, then pressing the undo button  will reinstate the original text typed (including the automatically assigned ID number).



Patient Details Entry Form

* Surname
Bowen

* First Name
William

* Record Number
AC100022

* Date of Birth

Day	Month	Year
1	January	1967
2	February	1966
3	March	1965
4	April	1964
5	May	1963
6	June	1962
7	July	1961
8	August	1960
9	September	1959
10	October	1958
11	November	1957
12	December	1956

* Required fields

2.2 Patient and test details

The patient details panel is the central column on the selection screen and displays the patient name, date of birth and ID information that will be passed to the chosen test program.

This panel will be populated when an MWL or database patient is selected, or new patient details are entered.

The screenshot shows a form titled "Patient details" with the following sections:

- Patient details:** Fields for Name, ID, and DoB.
- Previous test parameters:** A table with columns for Sphere, Cylinder, and Axis. It contains rows for Distance prescription (OD, OS) and Trial lens (OD, OS).
- Previous test type:** A label for the previous test type.
- Test to perform:** A dropdown menu currently showing "Smart Supra Single Stimulus" and a "Reset default" link below it.
- Test button:** A blue button labeled "I → Test".

When a patient is selected from the MWL, the database is searched for records matching this patient.

If matching test records are found, the following things will occur:

- The All Records section will be filtered to display the matching test results.
- The patient's details will populate the top of the panel.
- The report of the most recent test is displayed in the image section.
- Any Rx and trial lens details recorded in the most recent test will be displayed.
- The previous test type is displayed and is automatically selected in the drop-down test selector, overriding the [default test type](#).

If no results are matched in the database then a message will be displayed and the supplied MWL data will populate the patient details panel.

If the patient is selected from a database (All Records or Today), then the details and test report are displayed as above.

The test type can be selected from the drop-down list. The default test displayed is set in the Options program (see [Options-General](#)).

The Test button is used to launch the selected test.

The test will open on top of the main menu program and you will see the patient details are already set as they have been passed from the main menu program.

If a ZATA test is selected, the database search will display any matching records and the required prior data should be chosen.

If a Smart Supra test has been chosen and the previously selected record contained Rx data, then this will be passed to the Smart Supra test.

2.3 Test Image display

The right-hand column in the patient selection screen is the image display. The most recent test report will be displayed here if an MWL patient is found in the database or a database record was selected.

The size of this column will depend on the resolution of the display. (See screen resolution below.)

The image displayed can be made larger using the mouse control.



Clicking on the image and then scrolling the mouse wheel will zoom into the image at the location of the mouse pointer.

Right clicking on the image will return it to its original size.

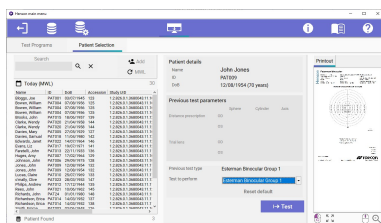
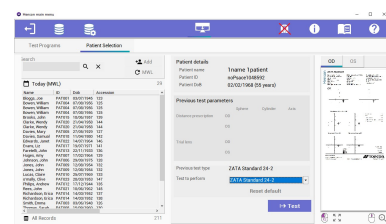
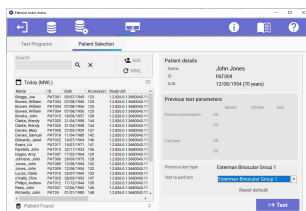
Double clicking the image will open it in the default picture viewer on your computer.

Screen resolution

Low resolution screens (less than 1200 pixels) will only display two columns (the image display column is hidden).

If the screen resolution allows it, the image display column is presented as a small image. Images can be zoomed in on. If there is enough screen resolution (greater than 1350 pixels) the image is displayed with full aspect ratio.

With higher screen resolutions, the image does not increase in size, but the patient selection column will be wider.



3 Visual field tests

The following visual field tests are available with the Henson 9000:

Smart Supra Single Stimulus

This is a supra-threshold test for detection and management of field loss in the central 30 degrees. It is a fully automated test where the patient presses a [response button](#) every time they see a stimulus.

Smart Supra Multiple Stimulus

This is a supra-threshold test for detection and management of field loss in the central 30 degrees. It presents patterns of stimuli to which the patient verbally reports on the number they see. It is faster and more patient friendly than the Single Stimulus test but requires the perimetrist to enter the patient's responses.

ZATA Threshold (Zippy Adaptive Threshold Algorithm):

This test derives an estimate of the threshold at a series of test locations. The ZATA program uses a Bayesian algorithm and adaptive terminating criteria to reduce test times. It is a fully automated test where the patient presses a [response button](#) every time they see a stimulus.

Esterman Binocular Drivers Test

This is a fixed intensity supra-threshold test. It is designed to see whether or not a patient meets the UK DVLA visual field requirements for Group 1 and Group 2 drivers. Again, this is a fully automated test where the patient presses a [response button](#) every time they see a stimulus.

3.1 Smart Supra Threshold tests

There are several differences in the Smart Supra test compared to previous supra-threshold tests.

The supra-threshold increments are not fixed. They are set according to the normal variability found at each test location. As normal patients are more variable in the periphery than they are in the centre the increments increase towards the periphery.

The increments are set according to the probability of them being seen by a normal person. The starting level is set to be at the 95% probability of being seen while the higher levels are set to the 98% and 99% levels.

This makes the probability of seeing a stimulus, for a person with no visual field loss, constant across the visual field. In conventional supra-threshold tests the probability of seeing a stimulus varies, being greater at the centre of the visual field than at the periphery. Using probability levels has the added advantage of producing probability maps (either [Total Probability or Pattern Probability](#)) which are widely used in the management of glaucoma.

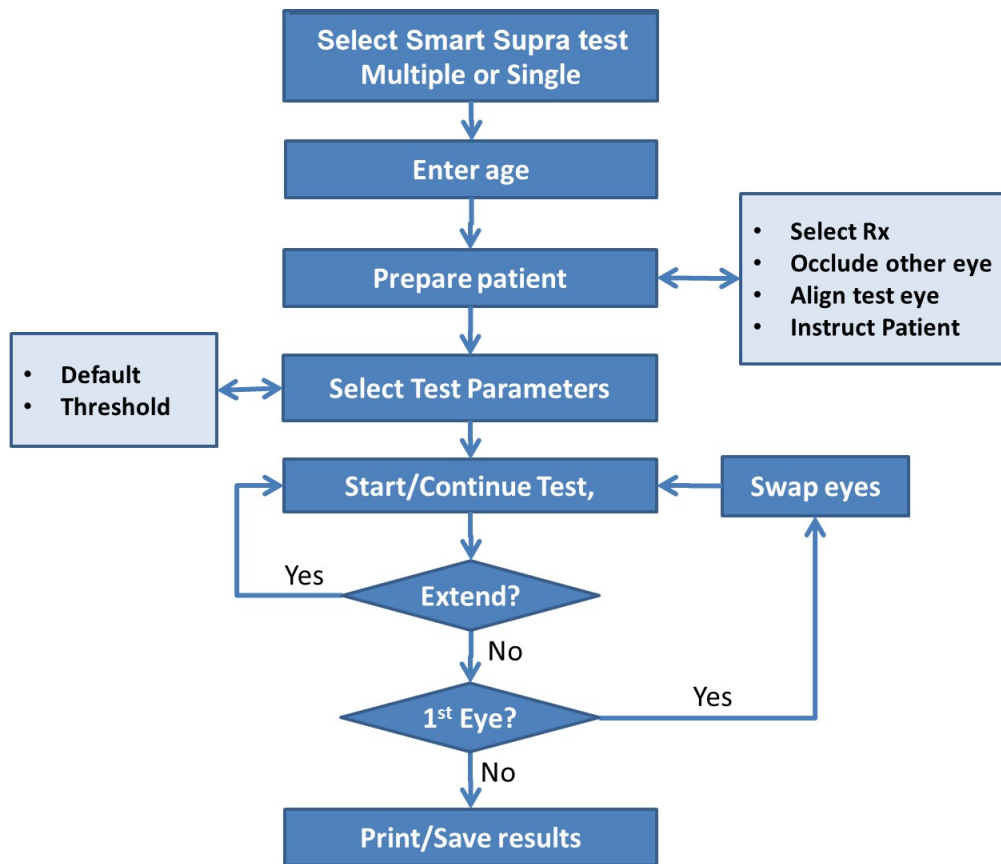
The Smart Supra test, when fully extended, includes much more detailed mapping of the central 10 degrees. Research has shown that the 24-2 pattern can often miss small defects occurring within the central 10 degrees. Thirty-two locations are added to the central 10 degrees when fully extended. This greatly increases the chances of detecting small central defects which are not uncommon in the early stages of glaucoma.

The Smart Supra tests is a 3-level test (30 point, 64 point and 86 point).

There are two different Smart Supra tests provided with the Henson 9000 software, [Single](#) and [Multiple](#) stimulus:

- Both incorporate three [levels](#) of testing.
- Both can be run in an [age-related \(Total Deviation\) or threshold-related \(Pattern Deviation\)](#) mode.
- Both allow repeat testing of a location, the addition of new test locations and the updating of test results.

The flow chart below gives the different stages of a Smart Supra test.



See also:

- [Fixation targets](#)
- [Trial lens calculation](#)
- [Default threshold setting](#)
- [Establishing the test intensity](#)
- [Analysing the results](#)

3.1.1 Single Stimulus

The Smart Supra Single Stimulus test is used to rapidly screen and detect central visual field loss.

The fully automated test requires no intervention other than to [instruct](#) the patient on what to do, ensure that they have the correct [refractive correction](#) in front of their eye and that they are correctly [positioned](#) and comfortable.

The test intensity is derived either from the [patient's age](#) or from a [measurement](#) taken at the beginning of the test.

There are two different test algorithms, [Standard and Multi-sampling](#)

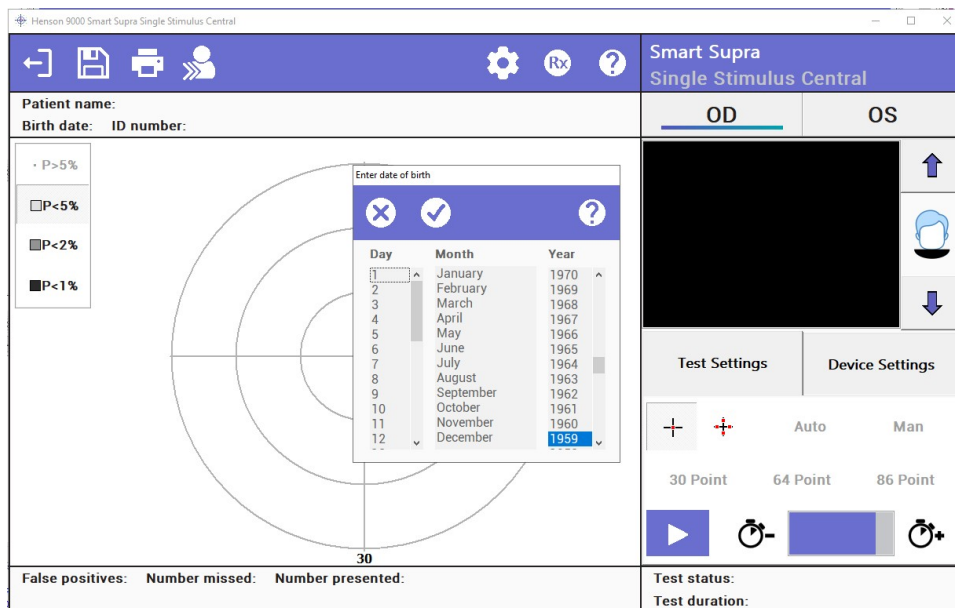
The patient responds to each seen presentation by pressing the [response button](#).

This test incorporates a number of [false positive catch trials](#) that help to discourage the patient from predicting the next presentation.

The test can be customised with the [addition](#) of extra stimulus locations.

The tests contain a trial lens calculation form. This can be accessed by pressing the [Rx button](#) on the toolbar. If patient details, including previous Rx values, have been passed from the main menu, then these will be populated in the Rx form automatically. They can be edited here before calculation if required.

To get more help on a test screen item click over the item in the image below.

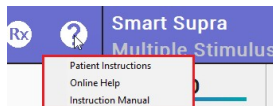


3.1.1.1 Patient instructions

It is important that the patient understands what they need to do during the test.

The patient instructions below can also be accessed in the test software by pressing the Help button and selecting Patient Instructions from the drop-down menu.

The instructions will be displayed in the language selected for the instruction manual in [Options](#).



The eye not being tested should be occluded and the test eye must be correctly aligned with the patient sitting comfortably.

The patient should be able to see the fixation point clearly.

Threshold set by age:

- The test is going to take about 2 minutes.
- You must look at the central red light and keep your eye as still as possible. Please let me know if you cannot see the fixation point clearly.
- You should press the response button when you see a light flash.
- Not all of the flashes of light are the same intensity.
- Some presentations are deliberately blank so do not press the button unless you are sure you saw a light flash.
- You must keep looking at the central red light and keep your eye as still as possible.
- If you want to take a break, you can hold down the response button. The test will pause until the response button is released.
- The first few presentations are a demonstration, so do not worry if you make a mistake at the beginning.


Add when setting the threshold by measurement:

- At the beginning of the test the flash will be very dim.
- Do not worry if you do not see many flashes.
- Only press the button when you are sure.
- The flashes will brighten up later on.

3.1.1.2 Standard and Multi-sampling Algorithms

The Smart Supra Single Stimulus test offers two different algorithms, **Standard** and **Multi-sampling**.

The default algorithm at installation is Standard but this can be changed in the [Options-tests](#) program.

You can change the test algorithm at the onset of a test by clicking the test Options  button.

Standard algorithm

In this algorithm the patient has to miss a flash at the first test level twice, or see it once, before it is marked as missed or seen. Having to miss the stimulus twice before the location is marked as a miss reduces the number of false positives misses. If missed twice at the first level it is then presented again at a higher intensity. This algorithm has been part of the Henson software for many years.

A patient has to miss a flash twice at the 95% level before it is marked as a miss. Once missed twice at the 95% level it is then presented at the 98% level, and if missed at this level then at the 99% level.

It is recorded as:

- Seen - if seen at one of up to 2 presentations at the 95% level,
- 95% - if missed twice at the 95% level but seen at the 98% level,
- 98% - if missed twice at the 95% level and missed at the 98% but seen at the 99% level,
- 99% - if missed twice at the 95% level and missed at the 98% level and missed at the 99% level

Multi-sampling algorithm

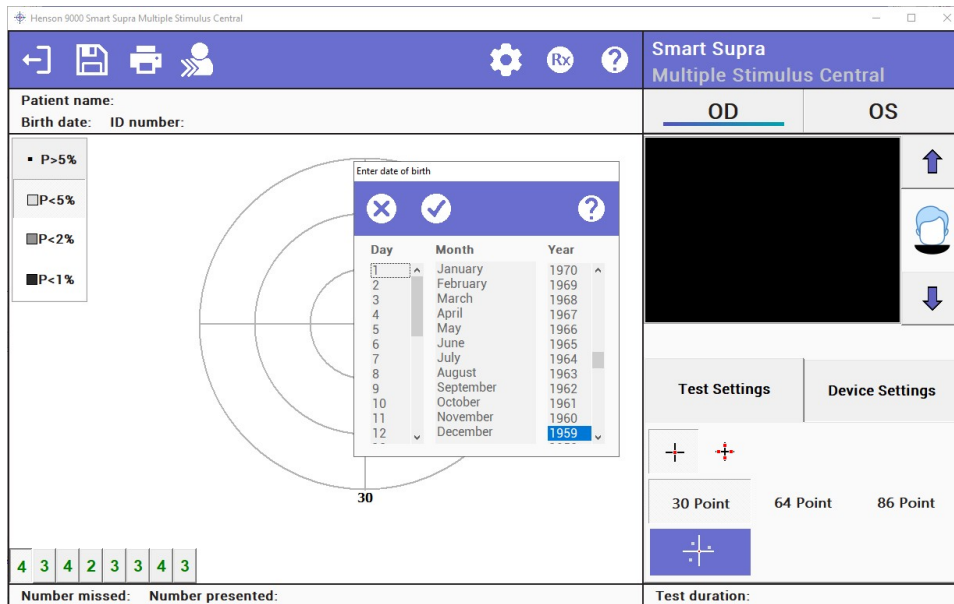
In this algorithm the patient has to miss a flash at each test location twice or see it twice before it is marked as seen or missed. This algorithm takes a little longer to perform, as there are more presentations, but is more robust to response errors and produces less variable results.

3.1.2 Multiple Stimulus

The Smart Supra Multiple Stimulus test is used to rapidly screen and detect central visual field loss. The test requires more perimetrist involvement than the single stimulus equivalent. With a skilled perimetrist, this can result in more reliable results with less variability.

The perimetrist should [instruct](#) the patient on what to do, ensure that they have the correct [refractive correction](#) in front of their eye and that they are correctly [positioned](#) and comfortable.

To get more help on a test screen item click over the item in the image below.



Each presentation is composed of a pattern of 2, 3 or 4 stimuli.

1. After each presentation the patient tells the perimetrist how many stimuli they saw.
2. If the patient gives the wrong number, then the perimetrist should repeat the presentation.
3. If on the second presentation the patient still reports the wrong number, the perimetrist asks the patient where the stimuli they saw were. Any missed stimuli are then marked as [misses](#). It is often useful when trying to establish which stimuli were missed to ask the patient to report the clock hour positions of the seen stimuli.
4. If on the second presentation the patient reported the correct number then the perimetrist should proceed to the next pattern. In this case it is assumed that the error in the first presentation was a false one.
5. If there is some doubt, the perimetrist can re-present the pattern. There is no limit to the number of times it can be presented.

Missed locations should be tested at [higher intensity](#) levels to quantify the depth of any defect.

At the beginning of the test the patient's [threshold](#) is determined either from their age or from a short threshold test. Stimuli are then initially presented at an intensity that will be seen by 95% of patients with no field loss. Higher test intensities correspond to a 98 and 99% probability of being seen.

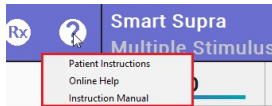
Each Supra Threshold test is composed of three [stages](#), 30 point, 64 point and 86 point. The test can be [customised](#) with the addition of extra stimulus locations.

3.1.2.1 Patient instructions

It is important that the patient understands what they need to do during the test.

The patient instructions below can also be accessed in the test software by pressing the Help button and selecting Patient Instructions from the drop-down menu.

The instructions will be displayed in the language selected for the instruction manual in [Options](#).



The eye not being tested should be occluded and the test eye must be correctly aligned with the patient sitting comfortably.

The patient should be able to see the fixation point clearly.

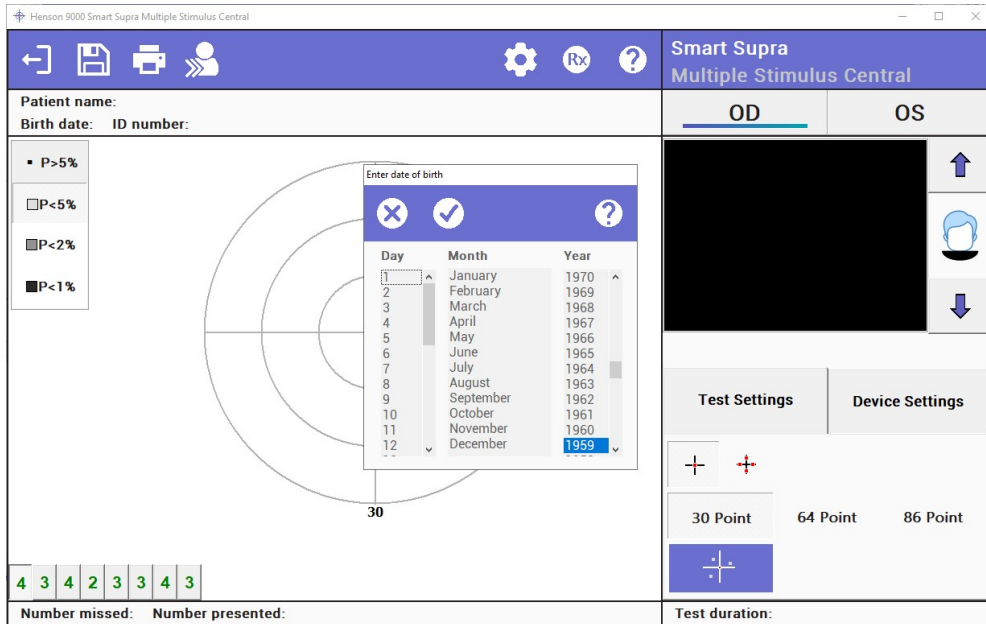
Threshold set by patient's age

- The test is going to take about 2 minutes.
- You must look at the central red light and keep your eye as still as possible. Please let me know if you cannot see the fixation point clearly.
- I am going to present patterns of 2, 3 or 4 light spots.
- Not all of the spots will be the same intensity.
- After each presentation I will ask you how many you saw.
- I may ask you where you saw the lights.




Add when setting the threshold by measurement

- To begin with, the lights will be fairly bright.
- They will then get dimmer and dimmer until they cannot be seen.
- You should not guess. If unsure whether you saw any - it is advisable to say "none".

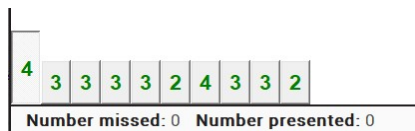
3.1.2.2 Presenting and selecting different multiple stimulus patterns



The currently selected multiple stimulus test locations are represented on the screen by red circles.

- To present this pattern to the patient click  or press the space bar.
- To go forward or back a pattern click the arrow buttons   or press the left or right arrow keys on the keyboard.

All the patterns within the current test level are represented by a line of pattern buttons along the bottom of the screen: The currently selected pattern is the button that is shaded and taller than the rest.



Windows 10



Windows 11

To select a specific pattern click the Pattern button.

Each Pattern button shows the number of stimuli in the pattern.

The number on the button is initially green and turns black once the pattern has been presented. If there is a missed stimulus in the selected pattern then the number is shown in red to make it easier to retest missed points at the end of the test.

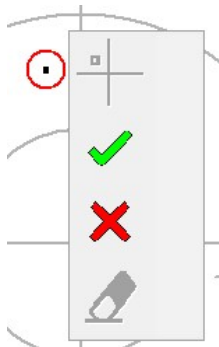
When extending the test to a higher [level](#), additional Pattern buttons will be added to the end of the line.


3.1.2.3 Missed stimuli in multiple stimulus supra-threshold test

It is not unusual for a patient with no visual field loss to miss the occasional stimulus. To differentiate between these and misses due to genuine field loss, the pattern should be presented a second time.

If the incorrect number is given twice then establish which stimuli were missed by:

1. Asking the patient where they saw stimuli. It is often helpful at this stage to tell the patient to consider the bowl as a clock face and to give the hour positions of the stimuli.
2. To mark a location as missed move the mouse to the missed location, click the left button and from the pop up select the red cross.




To correct mistakes (i.e. remove stimuli marked as missed) repeat 2 but select the eraser  symbol.

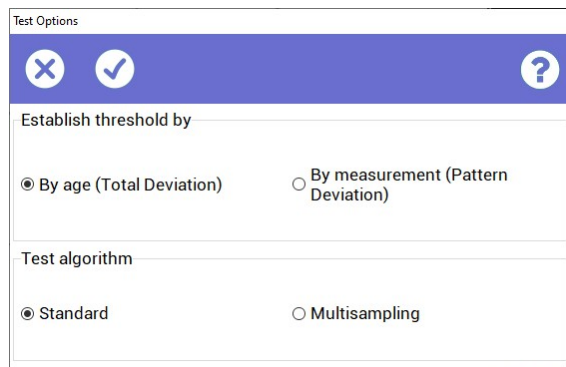
3.1.3 Setting the test intensity

The Single and Multiple Stimulus Smart Supra tests present stimuli at intensities that are calculated to be above the patient's estimated threshold. They use one of two techniques to establish the patient's threshold:

- **Age related (Total Deviation).** The threshold is set by the age of the patient. This is the fastest method but can lead to errors when a patient's threshold departs from the average value for their age, e.g. when there are media opacities.
- **Threshold related (Pattern Deviation).** The threshold is set by a series of measurements taken at the onset of the test. The algorithm is different for [Single](#) and [Multiple](#) stimulus tests.

The default threshold method when the software is installed is By age (Total Deviation). This can be changed within the [Options-tests](#) section.

You can change the method at the onset of a test by clicking the Test Options button  which displays the following options form.



Test Options

Establish threshold by

By age (Total Deviation) By measurement (Pattern Deviation)

Test algorithm

Standard Multisampling

The software will revert to the default method for the second eye or when starting a new patient.

3.1.3.1 Smart Supra Single Stimulus threshold algorithm

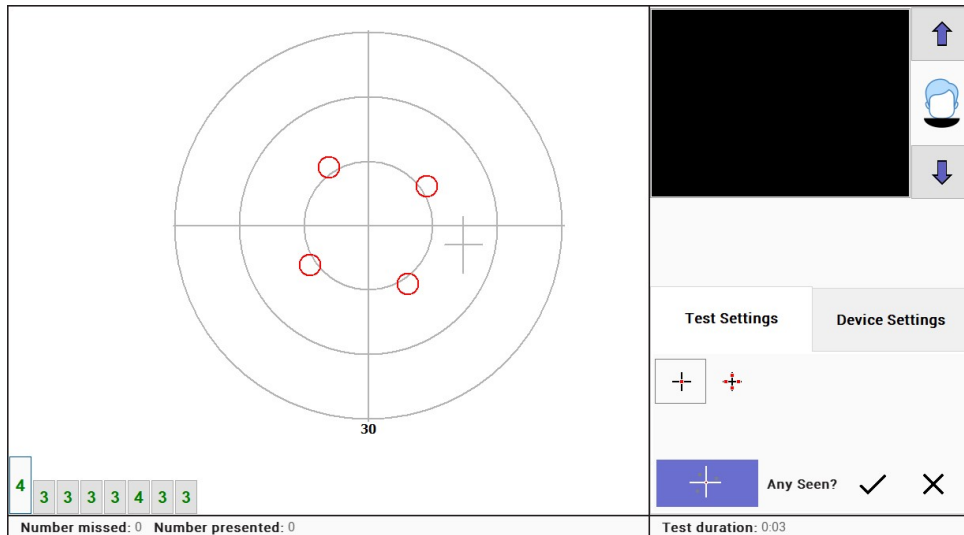
The threshold sensitivity is measured at four test locations, one in each quadrant. The locations are displaced 9 degrees from the vertical and horizontal meridians.



- At each location a repetitive bracketing algorithm (1 dB steps, six presentations) is undertaken.
- The average intensity of the last four presentations, at each of the four test locations, is then taken as the threshold. To guard against the inclusion of data from locations where the threshold is abnormally depressed, the algorithm excludes data from locations where the average of the last four presentations is below the 95% confidence limits of the expected age setting. If all test locations are excluded, the threshold is set at 4 dB below the age setting.
- Several [demonstration](#) presentations are made prior to the collection of data.

3.1.3.2 Smart Supra Multiple Stimulus threshold algorithm

The perimetrist controls the presentation of the stimuli. The patient's response should be the number of stimuli they saw.

1. Present the current pattern by clicking Present .



2. Ask the patient how many stimuli they saw, the pattern can be re-presented if necessary.
3. Click either the  or the  buttons depending on whether or not they saw **any** stimuli. They do not have to give the exact number in the pattern.
4. The pattern will automatically move on ready for the next presentation.
5. Keep repeating 1-3 until the threshold has been established at which point the test will automatically jump to the supra-threshold testing mode.


Notes:

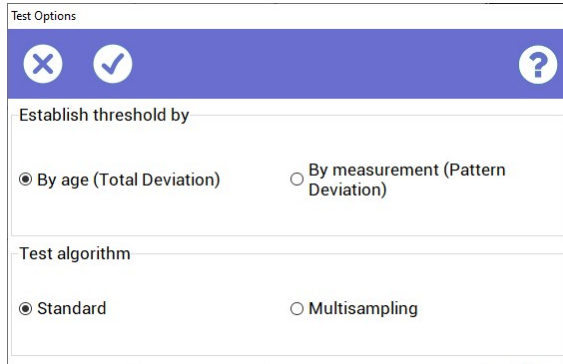
The algorithm starts by presenting a pattern that should be easily seen. At each subsequent presentation it reduces the intensity until the patient reports (twice) that none are seen.

If none were seen on the first presentation, then the algorithm increases the test intensity.

It is important to tell the patient what is going to happen, i.e. that the patterns are going to get dimmer and dimmer until they cannot see any of the stimuli. This helps to put the patient at ease when the stimuli get too dim to see. It is important that the patient does not guess.

3.1.4 Test Options

Clicking  allows you to change how the Smart Supra test sets the threshold. The default values are set in your [Options](#) file.



Test Options

Establish threshold by


By age (Total Deviation) By measurement (Pattern Deviation)


Test algorithm

Standard Multisampling

For the **Multiple and Single Stimulus** tests you can select to set the test intensity on the basis of the patient's age or from a [measurement](#) taken at the beginning of the test.

For the **Single Stimulus** test only, you can choose between the [Standard or Multi-sampling](#) test algorithms.

Once you have made your selection click the  button.

Click  to exit without changing the settings.

During the test, the volume of the beep sound that accompanies the presentation can be changed or turned off completely.

Clicking the device settings tab below the video display will access the volume control.

The volume setting for the Smart Multiple Stimulus test is stored separately to that of the single stimulus tests. All single stimulus tests (Smart Single, Esterman and ZATA) have the same volume setting and this is used and adjusted in all programs. As the multiple stimulus test does not use false positive catch trials the presentation sound is not a trigger to patients to press a button in error, but a signal to respond verbally.

3.1.5 Extending the test

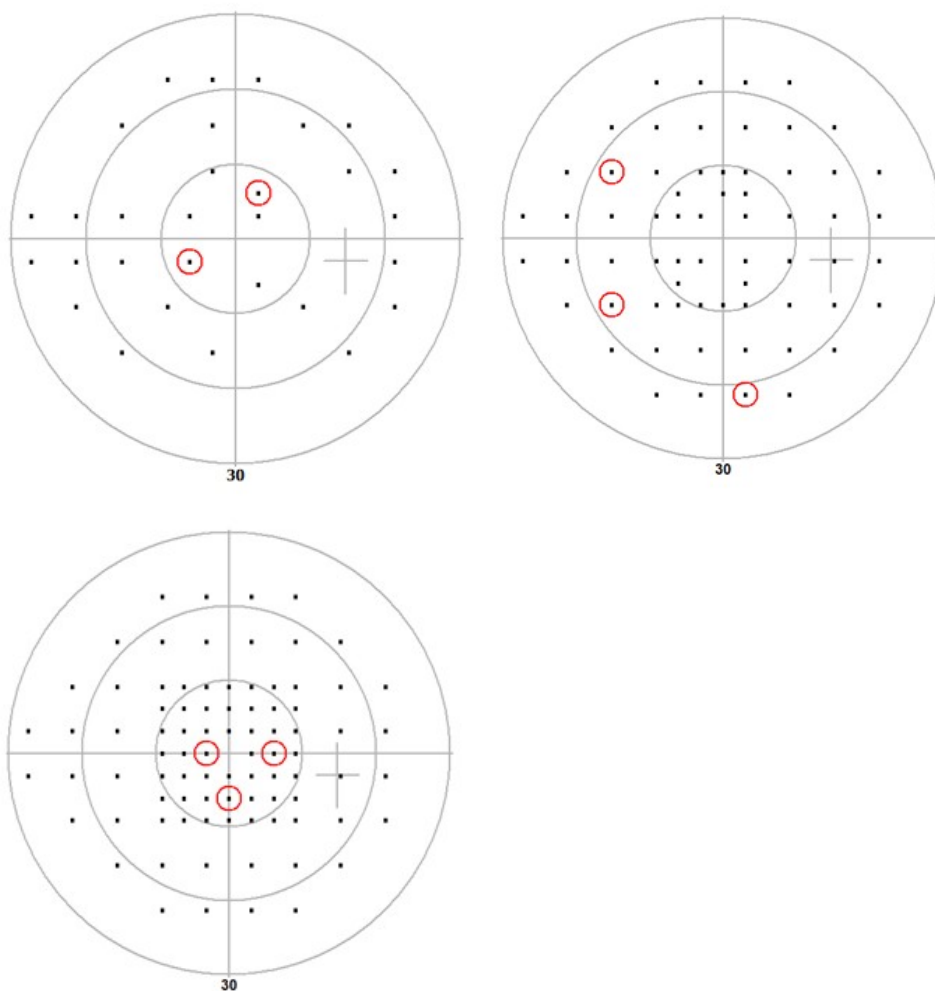
Each Smart Supra test is composed of three levels.



The selected level is highlighted in blue and the level can be increased at any stage of the test by pressing the corresponding button.

Note: the change of level only affects the eye being tested, the other eye, if not already tested, will start at the default setting.

The figure below shows the distribution of stimuli across each of the three levels.



Additional stimuli can be presented [manually](#).

The perimetrist does not have to decide on how many stimuli to present at the onset of the examination. They can start off with a simple screening test and then opt to test more locations during or at the end of the test.

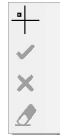
3.1.6 Adding and correcting presentations

In the Smart Supra tests it is possible to add extra test locations, re-test locations, mark a location as missed or re-classify a missed location as seen.

This can be done at any stage of the test.

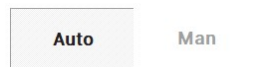
In the Multiple Stimulus test:-

1. Move the cursor to the location you wish to test.



2. Click the left mouse button and a pop-up menu will appear. The top (present) icon is the only one active.
3. Click the present icon to present a stimulus.
4. If the patient reports that they have seen it, click the tick icon.
5. If the patient does not see it, click the cross icon. The location will be marked with a grey square corresponding to the test intensity.
6. Repeat for all locations to be tested/retested.
7. To remove a location marked as a miss, click the eraser icon.

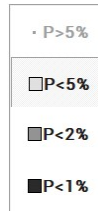
In the Single Stimulus test:-



1. Select Manual operation .
2. Move the cursor to the location you wish to test.
3. Check that the patient is fixating properly.
4. Click the left mouse button to present the stimulus.
5. The resulting display will change according to whether the patient presses the response button or not.

3.1.7 Changing the supra-threshold increment

There are three different Smart Supra test increments that correspond to the 95, 98 and 99% chance of a stimulus presentation being seen by a person with no field loss.



The currently selected increment has a blue background.

Single Stimulus


In the single stimulus test the increment is adjusted automatically. If a 95% stimulus is missed the program will come back to the location and re-test it at the same intensity. If it is missed a second time it will test it at the 98% level and if missed at this level than at the 99% level.

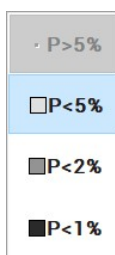
Multiple stimulus

In the Multiple Stimulus test the program starts off testing at the 95% level. If the patient reports fewer than the correct number of stimuli then the pattern should be repeated. If they still report fewer than the correct number then:-

1. Ask the patient where they saw the stimuli. It may be easier for patients to visualise the target screen as a clock face and report the hour numbers where the stimuli were seen.
2. Move the cursor to the missed location and click the left mouse button to display the following pop up.



3. Select the missed icon . Repeat if more than one location is missed.
4. Continue with the rest of the test patterns, extending the test if necessary.
5. At the end of testing, return to any patterns marked in red.
6. Increase the test intensity to the next P value using the buttons on the test screen as shown below.



7. Present the pattern at the higher intensity, repeating steps 1-3, increasing the intensity if required.

3.1.8 Analysing the results

The number of seen/missed stimuli are shown on the chart and in the status bar at the bottom of the screen, see below.

Smart Single

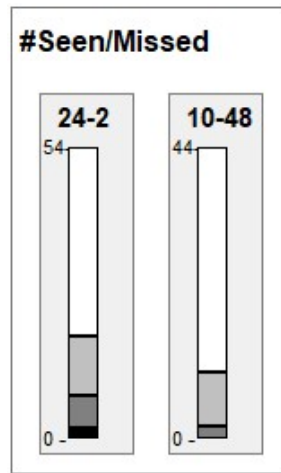
False positives: 0/0	Number missed: 0	Number presented: 0	Test status: Stopped
			Test duration: 0:00

Smart Multiple

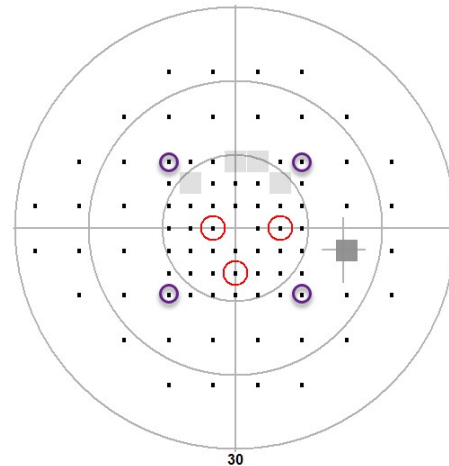
Number missed: 0	Number presented: 0	Test duration: 0:00
------------------	---------------------	---------------------

At the end of the second level, (64 points tested) a cumulative histogram is presented showing the relative number of locations missed at each level as a series of stacked bars. This histogram is only looking at the test points in the 24-2 pattern. The extra 10 points from the 10-48 test are not included.

At the end of the third level (86 points tested) an additional cumulative histogram is presented showing the relative number of locations missed at each level in the 10-48 pattern. (44 locations in total as the corner points are not included in the 10-degree circle.)



A histogram of an 86 point test



The 4 Corner points are not included in the 10 degree histogram

3.1.9 Toolbar



Exit the program and return to main menu.



[Save](#) current visual field data (both eyes).



[Print](#) results (both eyes).



Start new patient (same test).



Open the [Help file](#) (context-sensitive).



Open Rx Help screen.

3.2 ZATA Threshold test

ZATA (Zippy Adaptive Threshold Algorithm) was introduced in 2009 and was the first threshold test to use prior data in an effort to shorten test times. Shorter test times are important in perimetry, as patients find it hard to maintain their attention much beyond three minutes and loss of attention is associated with increased variability.

When possible, the ZATA program uses the data from a [previous visual field](#) test to seed starting values. When no prior data is available it starts from age-dependent normal values. Starting from prior threshold estimates not only makes the test faster but it is more manageable for patients.

The ZATA test can use either the [30-2, 24-2 or 10-48](#) pattern of test stimuli.

ZATA Fast and ZATA Standard.

ZATA Fast differs from ZATA Standard in that it has looser terminating criteria. The terminating criteria dictate how accurate the threshold estimate must be before the program stops testing each location. Looser terminating criteria mean that the ZATA Fast test will be marginally quicker than ZATA Standard, although the accuracy of each threshold estimate will be reduced by a small amount. ZATA Fast is appropriate for patients where less accurate estimates are acceptable. i.e. those with no established loss.

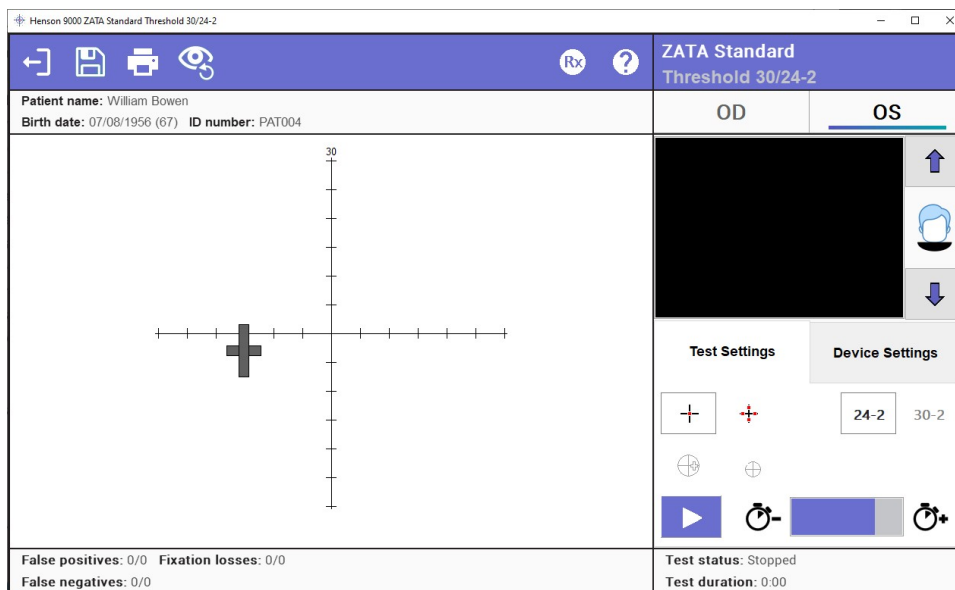
The ZATA program presents one stimulus at a time and the patient responds to each seen presentation by pressing a [response](#) button.

The test contains a trial lens calculation form - access this by pressing the [Rx button](#) on the toolbar. If prior data is imported and the patient's Rx was saved, this will be imported as well.

At the end of the test the results can be viewed in a variety of [different](#) ways.

The standard [printout](#) includes, threshold values (numeric and grey scale), total deviation values (age and pattern related), probability values (age and pattern related) along with a series of global indices (MD, PSD, GHT), test details and patient demographics.

To get more help on a test screen item click over the item in the image below.

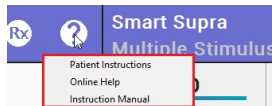


3.2.1 Patient instructions

It is important that the patient understands what they need to do during the test.

The patient instructions below can also be accessed in the test software by pressing the Help button and selecting Patient Instructions from the drop-down menu.

The instructions will be displayed in the language selected for the instruction manual in [Options](#).



The eye not being tested should be occluded and the test eye must be correctly aligned with the patient sitting comfortably.

The patient should be able to see the fixation point clearly.

- The test is going to take about 4 minutes.
- Press the response button when a light flash is seen.
- Some presentations are deliberately blank.
- Do not guess. You must ONLY press when you are sure.
- You must keep looking at the central red light and keep your eye as still as possible.
- If you want to take a break hold down the response button. The test will pause until you release.
- The first few presentations are a demonstration so do not worry if you make a mistake at the beginning.
- As the test proceeds, fewer and fewer lights can be seen; this is normal.


3.2.2 Entering patient details

If the test was launched from the patient selection screen of the main menu then the patient details will have been sent to the ZATA test and any prior tests will be displayed for selection. (See the [passed patient details](#) section on the next page)

If not then the options below will be presented.

New Patient

If the patient has not been tested before then click the New Patient button.

You must enter the patients name, date of birth and ID number before clicking  to continue.

As you type, the software will suggest matching patients already in the database via a drop-down list below the text window. To select one of the suggestions, simply click on it and the remainder of the details will be filled in automatically.

If you accidentally select a suggestion, you can clear it by clicking the undo button that is displayed below the record number. (See below, right).

The first screenshot shows the 'Patient Details Entry Form' with the following fields:

- * Family name: bo
- * First name: Bowen, William PAT004 (highlighted with a red box)
- * Patient ID: AC100022
- * Date of birth: A table with columns Day, Month, and Year. The Year column is set to 1958.

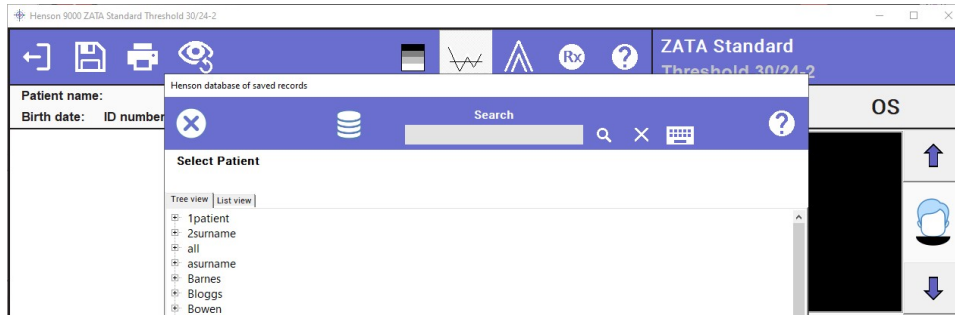
The second screenshot shows the same form with the following fields:


- * Surname: Bowen
- * First Name: William
- * Record Number: AC100022
- * Date of Birth: A table with columns Day, Month, and Year. The Year column is set to 1956.

An undo button (a curved arrow icon) is highlighted with a red box below the Record Number field in the second screenshot.

Existing Patient

If you select Existing Patient (one with a previous record in the database) the software will display the table of records.



1. Scroll through the table to find the patient, or use the [Search](#) function.
2. Highlight the required record (usually the last test for the patient) and then click the load button 
3. The patient's name, ID number and date of birth will be loaded and, if the selected test is the same threshold test, the threshold data will be loaded ready to start testing from prior values.
4. The software will also search back through the patient's records and will load any Rx information found. The software will prompt that Rx information has been found and you should press the Rx button to process it.

Cancel

Pressing Cancel closes the ZATA test and returns to the main menu.

Passed Patient Details

If the patient was selected from the main menu, then the patient details will have been passed to the ZATA program in the same way that practice management/electronic medical record systems can send patient details to the Henson software automatically. See [Appendix 8](#) for details.

The ZATA test will open the database and try to match the patient with a previous test.

There are three possible outcomes:

1. The patient is matched and a previous ZATA test is found - a list of records is displayed and the operator is prompted to select the required record and press the load button to use these results as prior data.
2. The patient is matched but there are no previous ZATA tests - the patient details will be used for the test and any Rx information from previous test will be imported.
3. There is no matching patient in the database -the patient details will be used for the test.

Note: Using prior data reduces test times for patients with established field loss.

If prior data is found and loaded, the threshold values will be displayed on the target until the start test button is pressed.

Henson 9000 ZATA Standard Threshold 30/24-2

Patient name: William Bowen
Birth date: 07/08/1956 (67) ID number: PAT004

ZATA Standard
Threshold 30/24-2

OD OS

Test Settings Device Settings

24-2 30-2

False positives: 0/0 Fixation losses: 0/0
False negatives: 0/0

Test status: Stopped
Test duration: 0:00

3.2.3 Blind spot

After the demonstration at the beginning of a ZATA test the Henson 9000 searches for the blind spot as this used to monitor **Fixation losses** during the test.

It starts off by presenting a supra-threshold stimulus at the most likely location of the blind spot. If this is not seen, this location is stored as the blind spot. If it is seen, then a stimulus is presented at the next most likely location. This is repeated until either the patient does not see one of the stimuli or until all the potential blind spot locations have been tested.

The blind spot location is used throughout the test to check of fixation. Every now and again a stimulus is presented at the blind spot and if the patient sees this stimulus (presses the response button) it is assumed that they were not fixating accurately. The number of blind spot tests and the number of times the stimulus was seen in the blind spot are displayed as fixation losses on the status bar (see below) and [printout](#).

False positives: 0/15 (0%)	Fixation losses: 0/13 (0%)	Test status: Finished
False negatives: 0/0		Test time: 4:18

Occasionally, the perimeter may fail to find the patient's blind spot, i.e. the patient presses the response button for every potential blind spot location. This is usually the result of a false positive response by the patient (they pressed the response button in error when the stimulus was presented in their blind spot) or the eye not being tested is not occluded properly.

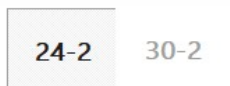
When this occurs, a message will ask if you want to repeat the search or to continue without blind spot checking during the test.

It is possible to repeat a search for the blind spot during the test by clicking the  button.

3.2.4 Extending the 24-2 test

The ZATA 24/30-test starts off testing the [24-2 locations](#).

The test can be extended, either during or at the end of the 24-2 test, to include the 30-2 locations by clicking the 30-2 button.





The current level is highlighted in blue.

3.2.5 Fovea measurement

In a ZATA test it is possible to measure the sensitivity of the eye at the fovea. For this measurement the patient fixates the centre of a four-point pattern of lights positioned below the normal central fixation light.

The software uses a 4-2 staircase algorithm to obtain three measurements of the foveal threshold, and then takes the average of these three readings to give the final estimate. The 3 measurements are intertwined to avoid any obvious sequences.

1. Click  and then confirm in the pop-up window.
2. Instruct the patient to look at the centre of the four lights, and to press the response button when they see a light flash at the centre of the pattern. The operator should emphasise that many of the presentations will not be seen. If the patient is not sure they saw a stimulus presentation, they should not press the response button.
3. Click  to start testing.




It is possible to set a prompt to remind you to test the fovea in the [Options -Tests -ZATA section](#).

3.2.6 Outputs

At the end of a ZATA test the following three buttons will appear on the menu bar.

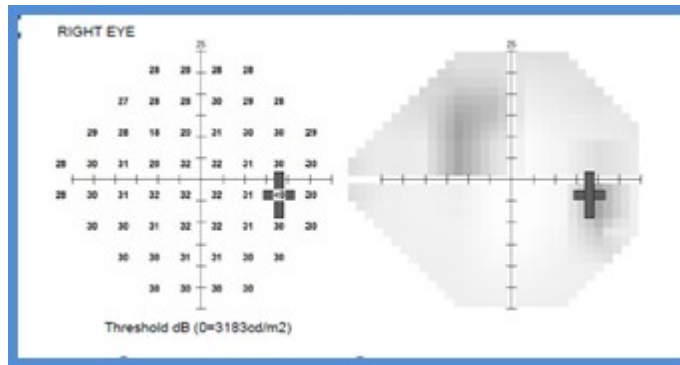


The currently displayed format is represented by the button with a dark blue background.

-  displays the results in a [grey scale](#) format.
-  displays the [threshold](#) values (dB).
-  displays the [Total Deviation](#) values.

3.2.6.1 Threshold/grey scale

Threshold and grey scale values are displayed on the [standard printout](#). Threshold values are given in decibels of attenuation where 0 corresponds to 3183 cd/m² (10000 asb).



The above figure shows the Threshold (left) and grey scale (right) values from a 24-2 field test as seen in the standard printout.

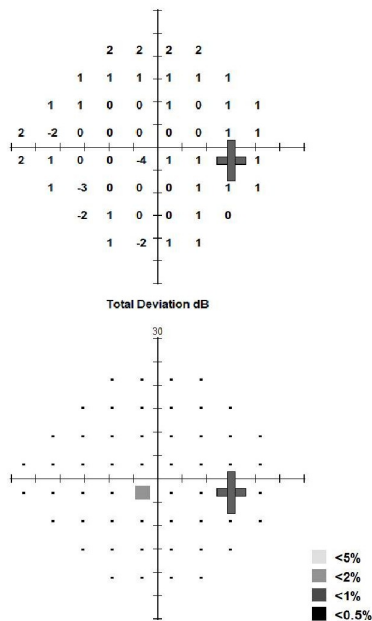
3.2.6.2 Total Deviation

Total Deviation values are the difference between the measured threshold and that expected from an age-matched normal eye. Negative values represent a reduced sensitivity.

They are presented in two different forms:

- Absolute values in decibels (dB).
- Symbols representing the probability that the threshold measure comes from a normal eye. The probability values take into account the variability in threshold estimates at each test location.

Positive values indicate a higher than average sensitivity.



The above figure shows the Total Deviation values as seen in the standard printout. Absolute values at the top and probability symbols below.

Example:

If the measured threshold was 25 dB in a person of 40 years of age and the normal value for that location was 30 dB, then the Total Deviation value would be -5 dB.

Total Deviation values appear on the standard [printout](#).

3.2.6.3 Pattern Deviation

Pattern Deviation values remove the effect of overall shifts in sensitivity to better expose the pattern of any field loss.

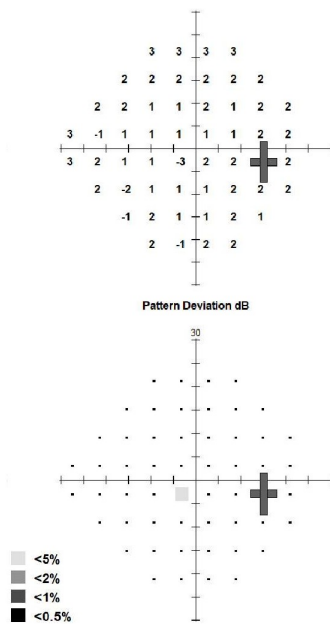
At the end of a test the software calculates, for each test location, the [Total Deviation](#) values (the differences between the test result and that of an age-matched normal). To then derive the Pattern Deviation values it offsets the Total Deviation values according to the overall height of the patient's hill of vision. If the patient has a less sensitive eye than that of an age-matched normal (maybe they have some media opacities) then the Pattern Deviation values will be lower than the Total Deviation values.

The offset is calculated from an analysis of the most sensitive regions of the visual field and has a maximum amplitude of 6 dB in either direction.

When there is a particularly large amount of visual field loss, the Pattern Deviation calculations are not displayed.

The Pattern Deviation values are presented in two different forms:

- Absolute values in decibels (dB).
- Symbols representing the probability that the threshold measure comes from a normal eye. The probability values take into account the variability in threshold estimates at each test location.



The above figure shows the Pattern Deviation values as seen in the standard printout.

Absolute values at the top and probability symbols below.

3.2.7 Global Indices

Global indices are single numbers that characterize the whole visual field. They are used to monitor the extent of loss over time.

There are four provided with the ZATA Threshold test:

- [Mean Deviation](#) (MD).
- [MD%](#)
- [Pattern Standard Deviation](#) (PSD).
- [Glaucoma Hemifield Test](#) (GHT).

When a 24-2 ZATA test is extended to the 30-2 test pattern, then the global indices displayed on the report are from the 24-2 locations only.

These are marked with "24-2" after the index name. as shown below.

24-2 test		30-2 test	
Presentations	54	Presentations	76
MD24-2	-2.13 dB P<5%	MD24-2	-2.13 dB P<5%
MD%24-2	93 %	MD%24-2	93 %
PSD24-2	6.52 dB p<0.5%	PSD24-2	6.52 dB p<0.5%
GHT	Outside normal limits P<5%	GHT	Outside normal limits P<5%

3.2.7.1 Mean Deviation (MD)

The Mean Deviation value, on the printout, gives the clinician an estimate of the extent of damage.

A more negative value indicates a less sensitive eye. Mean Deviation values are sensitive to both scotoma and media opacities. The value will go down (more negative) if a patient has a glaucomatous field defect and if they have a cataract.

The Mean Deviation score is based on the average of all the [Total Deviation](#) values, excluding those from the blind spot area.

A P-value is given when the probability of the MD value coming from a normal patient is below 10% (possible outputs are <10%; <5%; <2%; <1%; <0.5%). When it is above 10% then the message *Within Normal Limits* will be displayed.

Presentations	54
MD24-2	-2.13 dB P<5%
MD%24-2	93 %
PSD24-2	6.52 dB p<0.5%
GHT	Outside normal limits P<5%

The figure above shows the global indices as they appear on the printout.

3.2.7.2 MD%

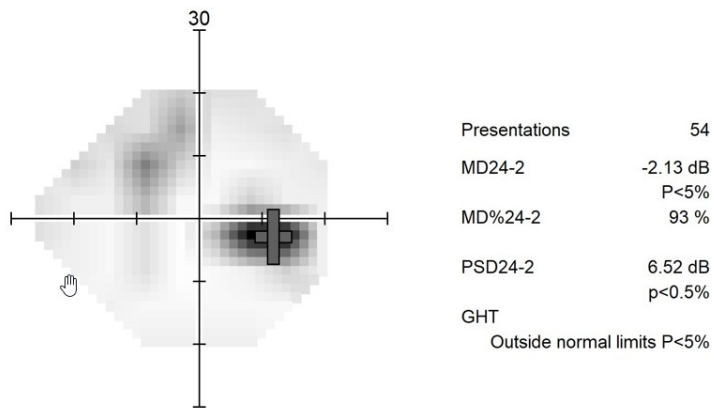
The MD% global index gives a percentage score of the residual central field (24-2 test pattern).

It is calculated from the well-established Mean Deviation index, but rather than give a value in dBs it gives a percentage score which is much easier for patients to understand.

MD% takes account of all of the tested locations in the 24-2 test pattern and is sensitive to cataracts and glaucoma.

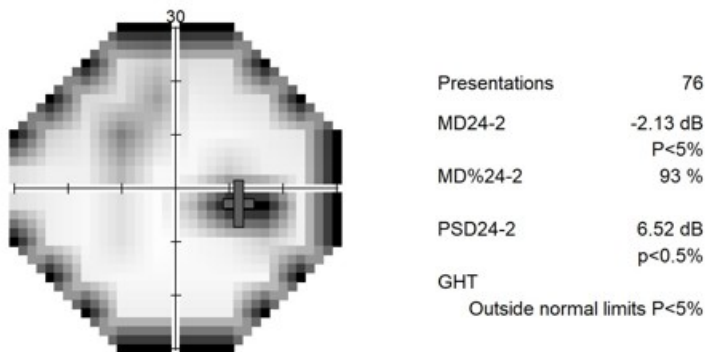
As the scale is based on MD, a positive MD, indicating a better than age normal sensitivity, will yield an MD% greater than 100%.

An MD% of 100% represents a perfectly normal, age-matched, field (MD=0).



The MD% value is currently only displayed for the 24-2 test pattern.

If a ZATA test is extended from 24 to 30 degrees, then the MD% will be calculated for the 24-2 test locations only. It will be displayed on the report as MD%24-2.



3.2.7.3 Pattern Standard Deviation (PSD)

The Pattern Standard Deviation is a measure of their threshold variability. Large values are indicative of localised scotoma. This global index can be used to monitor progression. Increases in the index indicate a deepening or enlargement of localised loss.

The index is **insensitive** to overall shifts in sensitivity that may occur due to cataract etc.

The index is **sensitive** to lens rim artefacts and droopy lids.

A P-value is given when the probability of the PSD value coming from a normal patient is below 10% (possible outputs are <10%; <5%; <2%; <1%; <0.5%). When it is above 10% then the message "Within normal limits" will be displayed.

Presentations	54
MD24-2	-2.13 dB P<5%
MD%24-2	93 %
PSD24-2	6.52 dB p<0.5%
GHT	Outside normal limits P<5%

The figure above shows the global indices as they appear on the printout.

3.2.7.4 Glaucoma Hemifield Test (GHT)

The Glaucoma Hemifield Test compares the defect values in the superior hemifield to those in the inferior hemifield and reports on whether this falls within normal limits.

The test is very sensitive to the early changes that occur in glaucoma which are often restricted to either the superior or inferior hemifield. The output from this analysis is either:

- *Within Normal Limits*,
- *Borderline or*
- *Outside Normal Limits*

If the MD is less than -20, then the GHT output will be replaced by a message stating "Advanced field loss" and no p-value will be given.

In cases where the result is *Borderline* or *Outside Normal Limits* it also gives a p-value

- <10%
- <5%
- <2%
- <1%
- <0.5%

As field loss progresses, the defect may become more vertically symmetrical and this will lead to the GHT reporting that the differences between the hemispheres is reducing - even to the point where it would report normal for a completely depressed field.

To prevent this, the GHT, like the probability plots, does not display a result when the MD exceeds -20 dB.

Presentations	54
MD24-2	-2.13 dB P<5%
MD%24-2	93 %
PSD24-2	6.52 dB p<0.5%
GHT	Outside normal limits P<5%

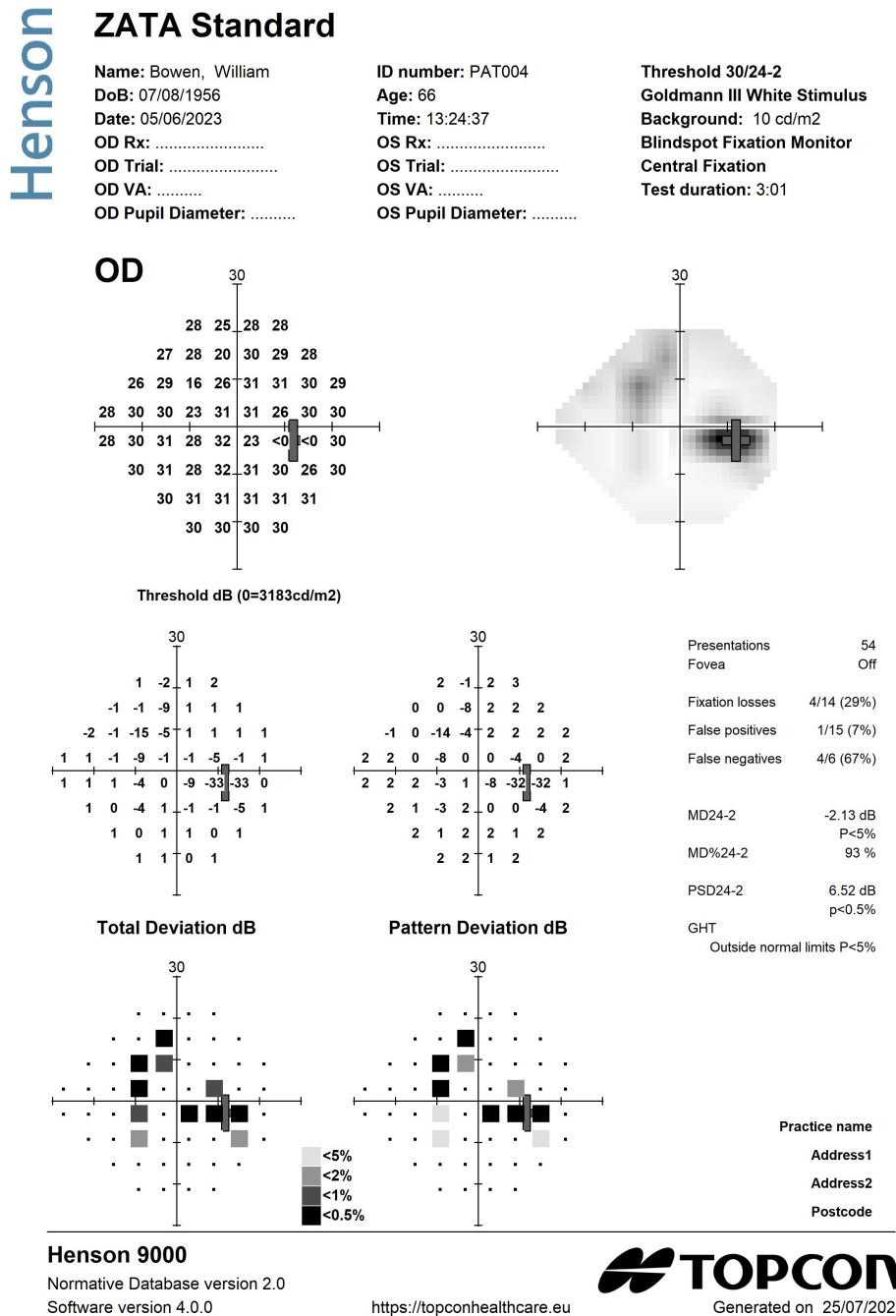
The figure above shows the global indices as they appear on the printout.

3.2.8 Printout

Below is an example printout from the ZATA Threshold test.

Patient demographics and details of the field test used are given at the top of the chart.


You can get further help on the different elements of the printout by clicking over that item in the image below.



The ZATA report can be produced with a newer standard header format for single eye tests. This can be selected in the [Options-general-report](#) section.

The Standard header contains the patient details and parameters as before but with the addition of the test metrics (catch trials, etc).

As you can see below, the header also has the provision for a custom logo to be placed in the top corner of the report. This can be selected in the [Options-general-customisation](#) section.

Name:				
DOB: 01/01/2000				
ID number:				
OD		24-2 Threshold		
Fixation monitor:	OFF	Stimulus:	Goldman III, white	Date: 13/06/2023
Fixation Target:	Central	Background:	31.5 asb	Time: 14:10:28
Fixation losses:	0 / 0	Strategy:	ZATA Standard	Age: 23
False positives:	0 / 0	Pupil Diameter:		
False negatives:	0 / 0			
Test duration:	0:00			
Fovea:				

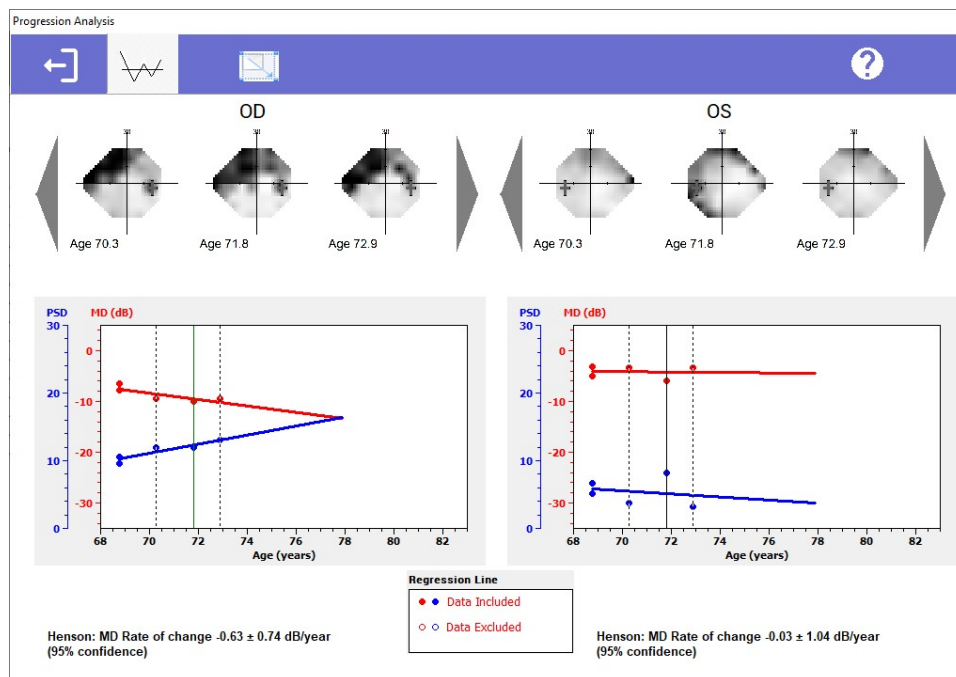
3.2.9 Progression: Rate of change

You can monitor the rate of change in the visual field in the [Database](#) program.

The progression screen below shows two graphs (one for each eye) that display the global indices [Mean Deviation](#) (MD) and [Pattern Standard Deviation](#) (PSD) versus the age of the patient.

As a visual field defect gets worse the Mean Deviation will become more negative and the Pattern Standard Deviation more positive, at least initially.

Each data point represents a visual field record (collected or imported) and when there are 4 or more data points a best fitting (least squares linear regression) line is drawn through the points.



The Mean Deviation rate of change (dB/year) is given below the plots along with its 95% confidence limits.

In the example shown, the rate of change is -0.98 dB/year in the right-eye (OD) while the confidence limits are +/-1.63 dB/year. If the rate of change is higher than the confidence limits the progression is significant at the 95% limit.


The three vertical lines on each plot represent the time points that correspond to the three grey scale images shown above each graph.

When first entering the analysis, the display will show the last three visits. You can move to different visits by clicking the left/right arrows on either side of the grey scales.


Outliers in the data series can have a large effect upon the gradient of the regression lines. They can be removed by clicking over the data point. Clicking a second time re-introduces the data point.

The data can also be presented on a [Glaucoma Staging System II](#) (GSS) chart by clicking the  button.

The GSS II chart plots [Mean Deviation](#) versus [Pattern Standard Deviation](#) and divides the plotted area into seven stages (Normal, Borderline and five levels of loss).

Click  to close the progression windows and return to the database.

On return, the visual field chart on the right-hand side of the screen will be replaced by an image of the last progression screen.

This can then be [printed](#) by pressing the print  button

If the option to auto-create the progression image is set in the [Options-database](#) then the 2-page PDF will be created in the folder defined there.


Note: If 30-2 tests are included in the progression data, the plotted indices are calculated from the 24-2 locations. This is to ensure compatibility with 24-2 progression.

3.2.9.1 Glaucoma Staging System II (GSS II)

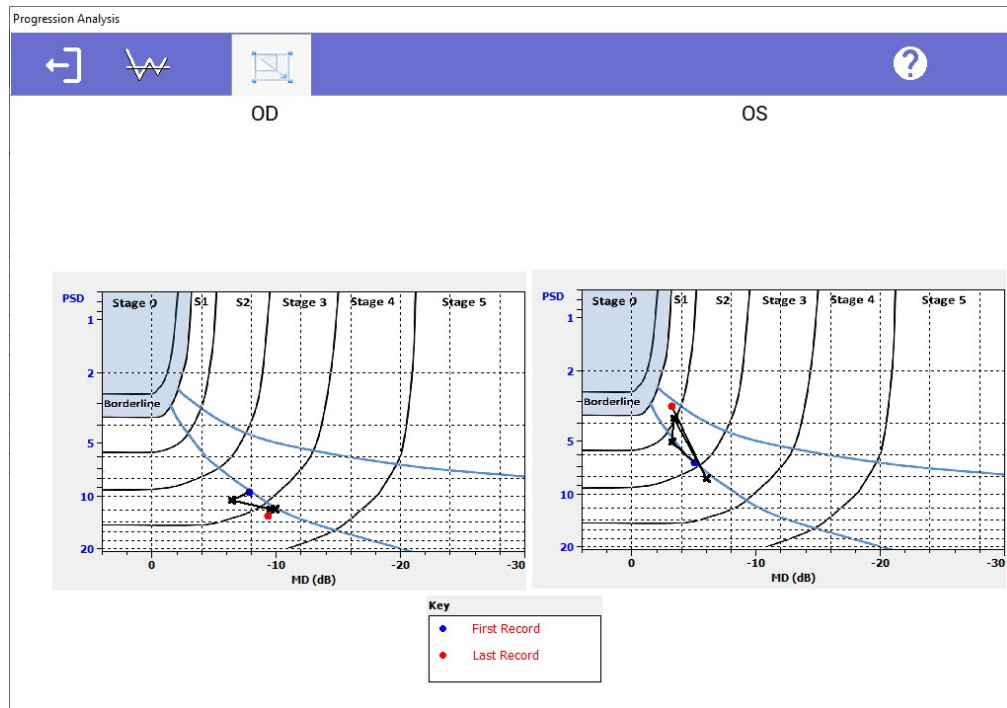
It is often helpful when reviewing visual field data to have a means to scale the extent of loss.

The Henson 9000 uses the GSS II system developed by Paolo Brusini. It is based upon the [Mean Deviation](#) and [Pattern Standard Deviation](#) and plots these two global measures against each other.



Click the  button to display the GSS2 plot.

The plot area is divided into seven regions, Normal, Borderline and five stages of loss. Stage one being early loss while stage five is advanced loss.





Using both Mean Deviation and Pattern Standard Deviation is better than using either index in isolation. Pattern Standard Deviation is more sensitive than Mean Deviation to early localised loss while Mean Deviation is more valuable when defects become advanced.

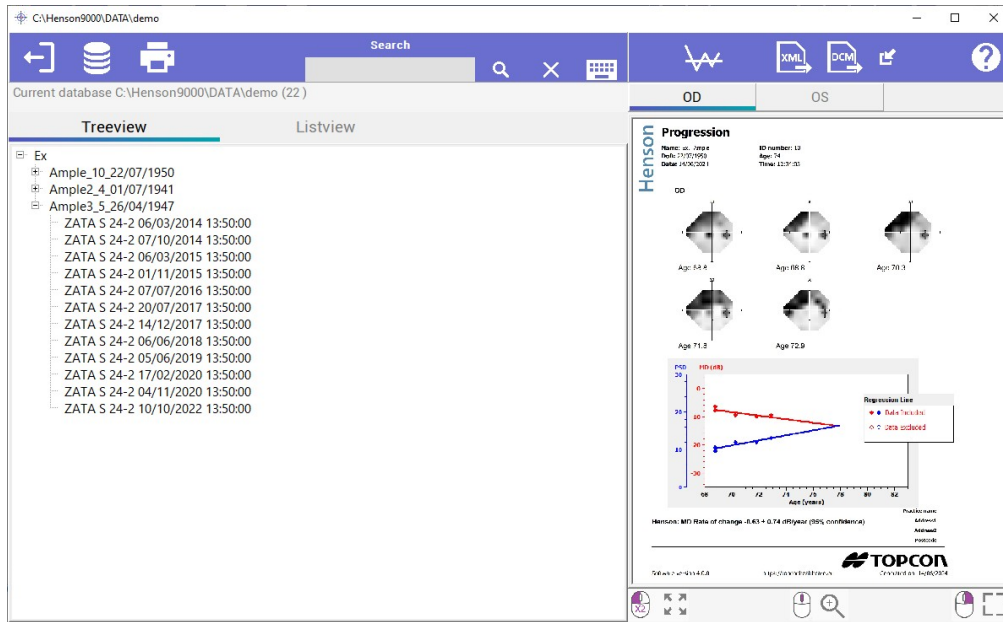
The progression software plots each visual field result as a point on a GSS II chart and connects the points together with a line. The first record point is coloured blue while the last one is coloured red. Ideally you would like to see all the points clustered together indicating that there has been very little change.

Movement towards the lower right-hand corner (towards stage five) indicates progressive loss.

3.2.9.2 Printing

To obtain a print of the progression analysis:

1. Exit the progression analysis by clicking 
2. The right-hand panel will contain the progression analysis, see below.
3. Click 

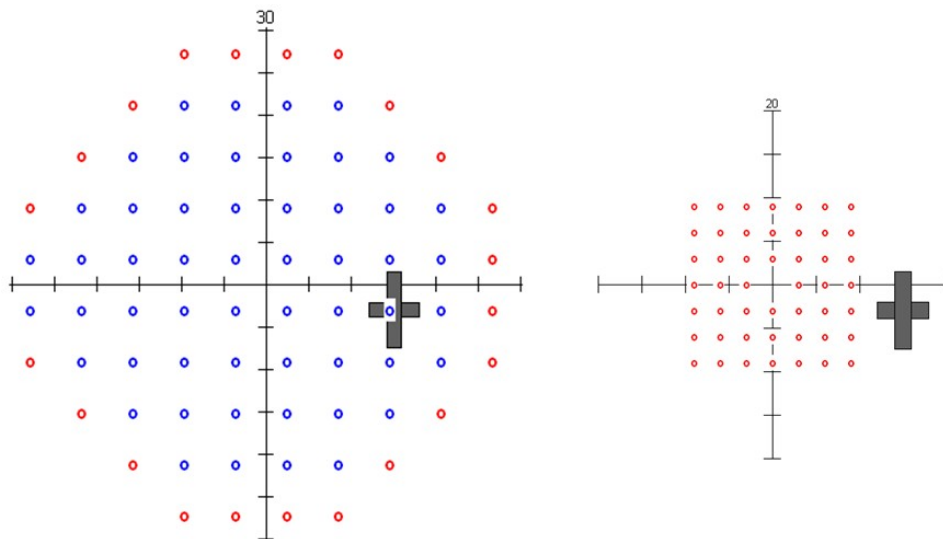


The image shows a maximum of six grey-scale plots. When there are more than six data points the grey scales from the first two and last three will be displayed.

Any changes made while in the progression analysis (e.g. excluding an outlier) will be duplicated in the image which will display either the line plot or GSS II plot depending on which was active on exit.












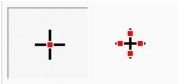


3.2.10 Stimulus locations

The ZATA test can use either the 30-2, 24-2 or 10-48 patterns of test stimuli. The 30-2 and 24-2 test pattern presents stimuli on a 6 degree square matrix displaced 3 degrees from the vertical and horizontal mid-lines and covers an area of either 30 or 24 degrees. The 30-2 is an extension of the 24-2 test that can be selected during or at the end of a 24-2 test. The 10-48 pattern presents stimuli on a 3 degree square matrix within the central 10 degrees.



Left: 24-2 (right eye) locations shown in blue with 30-2 extension locations shown in red
Right: 10-48 locations for right eye

3.2.11 ZATA controls

	Start/stop the test
	
	Exit the test program and return to main menu.
	Save current visual field data (both eyes).
	Print results (both eyes).
	Open the help file (context-sensitive).
	Start this eye again. Any data already collected will be lost unless saved.
	Tested eye has blue background. Changing eyes can be done at any time without losing data.
	Blind Spot re-locate.
	Extend test .
	Test fovea .
	Fixation targets .
	Display format.
	This symbol will appear on the menu bar when the patient response button is depressed.

3.3 Esterman Binocular Driving tests

The Henson 9000 provides two [visual field tests](#) for Driving. The first, Group 1, meets the standard set by the UK Driver and Vehicles Licensing Agency (DVLA) for drivers of cars and motorcycles. The second, Group 2, is for drivers of HGV and public service vehicles.

Both drivers tests are binocular with a fixed intensity stimulus (10 dB, 318.4 cd/m²) with the Goldmann equivalent background intensity of 10 cd/m².

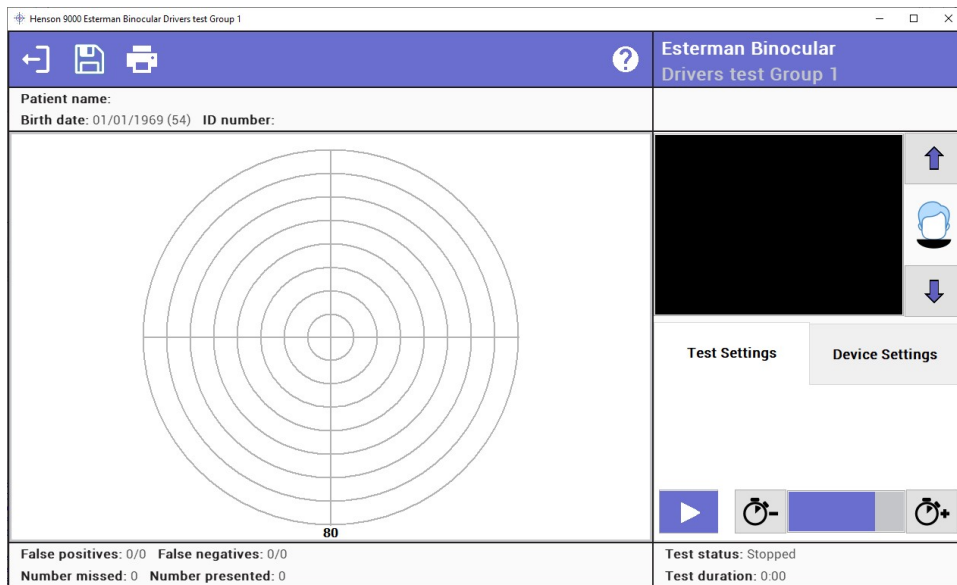
When performing an Esterman Binocular drivers test the patient's forehead should be placed in the middle of the head rest and they should be allowed to turn their head to follow the fixation point.

Depending on the reason for the test, there may be specific requirements for lens correction.

The Esterman Binocular drivers tests are single stimulus tests and the patient responds to each seen presentation by pressing a [response](#) button.


The Esterman Binocular drivers tests incorporate a number of false positive and false negative [catch trials](#). These are used to give a measure of reliability.

To get more help on a test screen item click over the item in the image below.

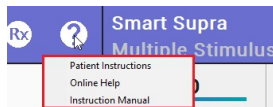


3.3.1 Patient Instructions

It is important that the patient understands what they need to do during the test.

The patient instructions below can also be accessed in the test software by pressing the help  button and selecting "patient Instructions" from the drop-down menu list.

The instructions will be displayed in the language selected for the instruction manual in the [Options - languages](#) section.



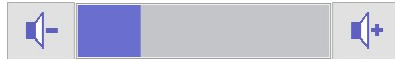
- The test is going to take about 4 minutes.
- You must look at the central red light and keep your eye as still as possible. Please let me know if you cannot see the fixation point clearly.
- Press the response button when a light flash is seen.
- Some presentations are deliberately blank and you will not see a flash. If you repeatedly press the response button when there is no flash you will fail the test.
- Keep looking at the central red light.
- On occasions the red light will move to a new position; you must follow it with your eyes and, if necessary, turn your head.
- You must keep your eyes as still as possible.
- If you want to take a break hold down the response button. The test will pause until the button is released.
- The first few presentations are a demonstration only and do not form part of the final result.

3.3.2 Options

The [Options](#) program has a Tests tab with an option to maintain a minimum value for the beep volume. (Min volume On).

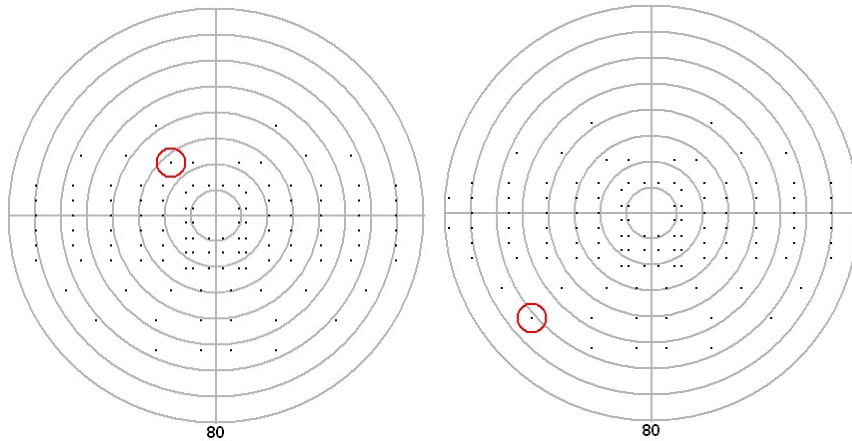
The UK DVLA require that a beep is made when a stimulus is presented so this option should be selected when testing patients within the UK.

For use in countries where there is no such requirement leave the check box empty. This will allow the beep to be turned off completely using the slider.



3.3.3 Stimulus locations

The patterns of the stimuli in the Group 1 and Group 2 drivers tests are shown below:




Group 1-120 point test

Group 2-124 point test

4 General information

The overall speed of Henson 9000 tests is further improved with:

- A fast start-up time - the Henson 9000 uses LEDs which do not need to be warmed up.
- The printing and storage of both eyes as a single record - you do not need to print and/or store each eye individually.
- The use of multiple stimulus presentations in its Smart Supra test.
- Rapid response times to operator commands.
- Rapid access to database records.
- Click and touch screen operation.
- Single click operation for common operations, e.g. when you have finished a Smart Supra test just click  to start a new test.

Windows™ operating system

The Henson 9000 uses the Windows™ operating system. Most users will already be familiar with many of the screen layouts and operations. Printing can be handled by any Windows™ enabled printer and the Henson can be easily networked, either wireless or wired, using standard procedures built into most Windows™ based computers.

External PC

Utilising an external PC means that you are not confined to having the operator on one side of the perimeter and many different layout options are available.



Extendable tests

Most tests [can be extended](#). You do not need to start a new test when early results look suspicious. Supra-threshold tests can be extended from the 30 point screening test to a 64 point test and then onto a combined 86 point 24-2 and 10-48 test. The ZATA 24-2 test can be extended to a 30-2 test.

Repeating/adding new test locations

Supra-threshold tests allow stimuli to be [re-presented](#) to confirm a response. You can also add new locations by placing the cursor over the location you wish to test and clicking the mouse button or touch pad. Existing presentations can be retested and updated in the same way.

Online help

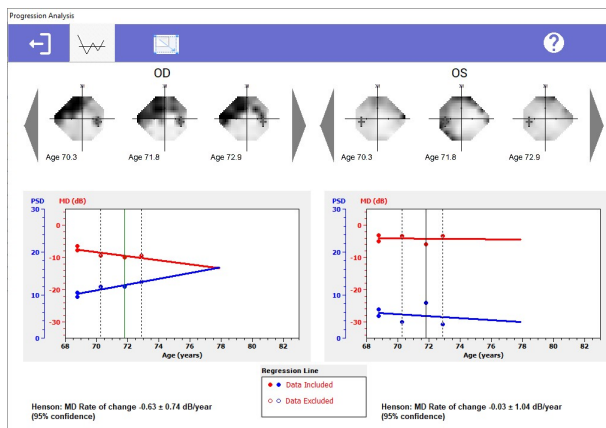
Advanced context sensitive help facility.

Advanced analysis routines

The ZATA Threshold test includes [Total Deviation](#), [Pattern Deviation](#) and Probability maps. It also includes the global indices, Mean Deviation (MD) and Pattern Standard Deviation (PSD). It includes a Glaucoma Hemifield Test (GHT) for the early detection of glaucomatous loss with probability measures as well as an easy to understand MD% index which gives an age-matched percentage score of overall field remaining.

Presentations	54
MD24-2	-2.13 dB P<5%
MD%24-2	93 %
PSD24-2	6.52 dB p<0.5%
GHT	Outside normal limits P<5%

When you have a series of threshold tests from a patient, either collected or imported, these can be analysed to see if there is any [progression](#). An example of this analysis is given below.



4.1 Preparing the patient

Before undertaking a visual field test the patient needs to be [carefully instructed](#) on what the test is about and how they need to respond.

They need to be [carefully positioned](#) at the instrument, have the correct [refractive correction](#) in front of the eye under test and an occluder in front of the other eye.

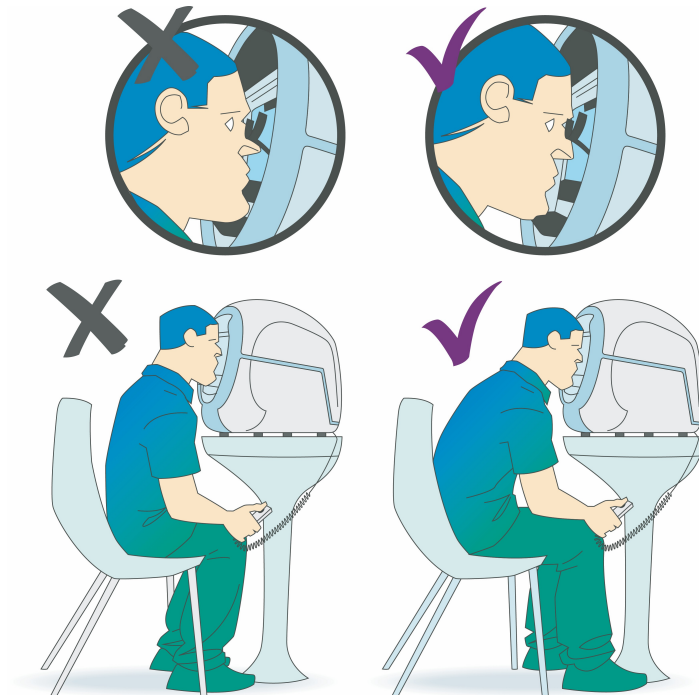


4.1.1 Aligning the patient

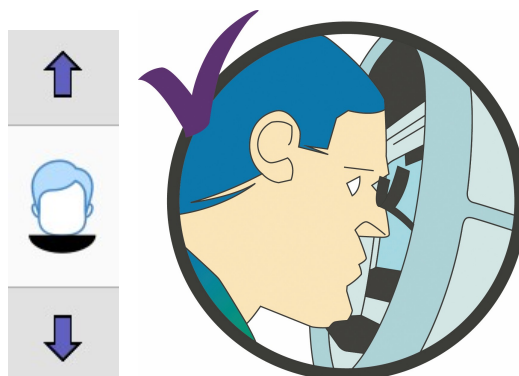
The patient should be seated comfortably with their forehead touching the headrest.

The patient's eye that is to be tested should be looking through the centre of any corrective lens which should be positioned as close as possible to the eye.

The fixation in the Henson bowl is below horizontal and so the patient may find it more comfortable to tilt their head slightly forward. Ensure that the height of the table is adjusted so that the patient's forehead can rest comfortably on the headrest without stretching.



The chin rest should be raised to support the patient's chin using the on-screen up/down buttons (see below). Do not try to lift a patient's head with the chin rest as this can cause excessive loading of the mechanism.



WARNING: As the chin rest is a moving part the patient should be cautioned about keeping their hands, fingers and hair away from the chin rest mechanism.

It is recommended that patients keep their hands either on the table-top or in their lap when performing the test.

Note: The chin rest buttons are disabled when the test is running.

4.1.2 Patient Instructions

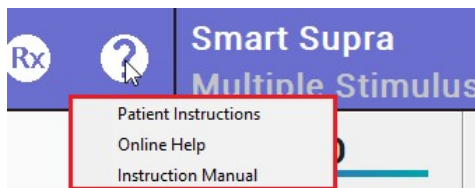
It is important that the patient understands what they need to do during the test.

The patient instructions can be accessed by following the links below.

- a. [Smart Supra Multiple Stimulus](#)
- b. [Smart Supra Single Stimulus](#)
- c. [ZATA](#)
- d. [Esterman Binocular \(drivers\)](#)

They can also be accessed in the test software by pressing the help button and selecting "Patient Instructions" from the drop-down menu list.

The instructions will be displayed in the language selected for the instruction manual in the [Options - languages](#) section.




4.1.3 Refractive correction

It is important that the patient wears the correct refractive correction (suitable for a 25 cm test distance) during the monocular visual field tests. The Esterman binocular field test will have different requirements depending on the country and the reason for the test (e.g. suitability for driving).

The Henson 9000 is fitted with a full aperture trial lens holder. Place the correct lenses in the holder and then, with the patient correctly aligned, ask the patient to move the holder as close to their eye as possible.

(The integral lens holder is also available to retrofit to all Henson 9000 units should you require one for your instrument.)


An occluder should be placed in front of the eye not being tested.


The Smart Supra and ZATA test screens contain an Rx calculation form that can be accessed by pressing the  button on the toolbar.

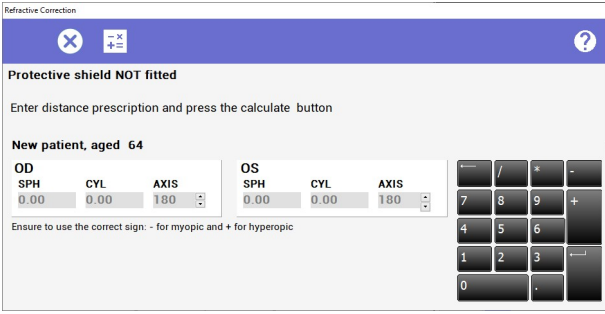
For the ZATA test, if prior data has been imported and the patient's Rx was previously saved, it will be displayed in the Rx form when it opens.

For Smart Supra tests, if the patient details (including previously stored Rx values) were passed to the test, then this will populate the Rx form automatically.

Note: Any imported Rx will only be displayed on the report and saved back to the database if the Rx form calculation is made.

To close the Rx form without using the imported data - or any of the data entered just click the Cancel button .

For other tests or where no prior Rx was imported, enter the patient's distance correction and press the Calculate button .



Refractive Correction

Protective shield NOT fitted

Enter distance prescription and press the calculate button

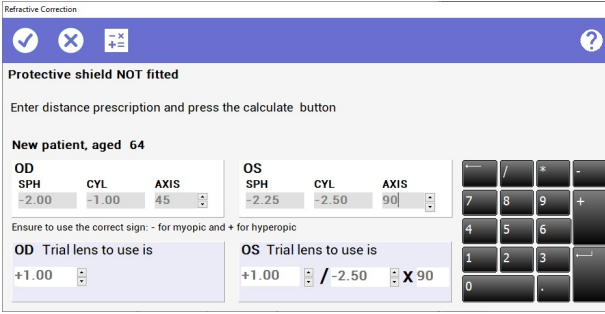
New patient, aged 64

OD			OS		
SPH	CYL	AXIS	SPH	CYL	AXIS
0.00	0.00	180	0.00	0.00	180

Ensure to use the correct sign: - for myopic and + for hyperopic

Calculator keypad: 7, 8, 9, +, 4, 5, 6, 1, 2, 3, 0, ., /, *, -, =

The software uses the patient's age and the distance prescription entered to calculate the required trial lens to use, using the information given in the table in [Appendix 9](#)



Refractive Correction

Protective shield NOT fitted

Enter distance prescription and press the calculate button


New patient, aged 64


OD			OS		
SPH	CYL	AXIS	SPH	CYL	AXIS
-2.00	+1.00	45	-2.25	-2.50	90

Ensure to use the correct sign: - for myopic and + for hyperopic

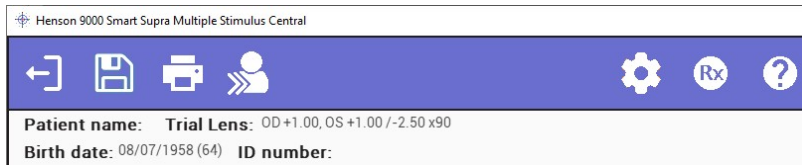
OD Trial lens to use is	OS Trial lens to use is
+1.00	+1.00 / -2.50 X 90

Calculator keypad: 7, 8, 9, +, 4, 5, 6, 1, 2, 3, 0, ., /, *, -, =

Close the form by pressing the Save and exit button 

You can exit without saving the Rx calculation by clicking the Cancel button 

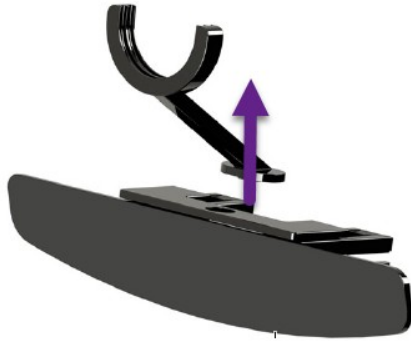
The trial lens is displayed with the patient information at the top of the screen. This information will also be displayed on the printed report and saved in the database.



Using the trial lens holder

The Henson 9000 is equipped with a trial lens holder.

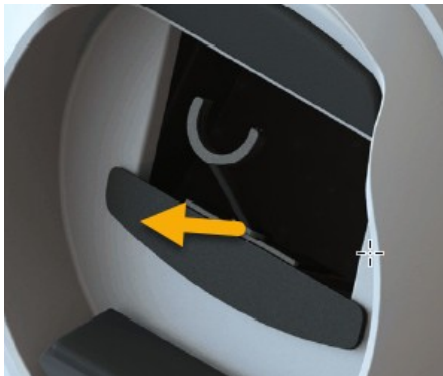
To fit the lens, pull the lens holder from the carriage on the front of the unit.



Fit the required lens into the holder arm and attach it back to the carriage.

Pull the carriage to the front of the unit.

Position the patient and ask them to look through the lens, keeping it as close to their eye as they can. (This will prevent the lens frame from causing aberrations)



Protective shield

If the Protective shield with the +3.5D lens fitted is installed on your Henson, then the patient should wear their distance spectacles if they have any.

The lens will not affect young emmetropic patients as their accommodation can relax sufficiently.

For other shields please see the instructions supplied with the shield.

4.2 Auto timing

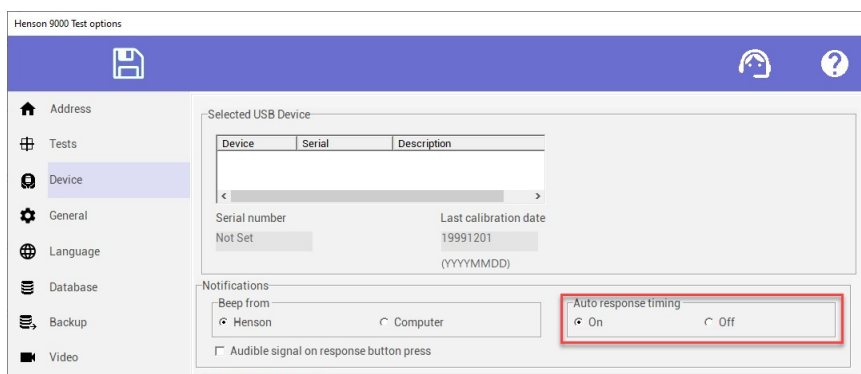
In single stimulus tests the speed of presentations changes according to how fast the patient presses the [response button](#).

- If the patient responds quickly, the speed of presentations increases.
- If they respond slowly the speed of presentations will decrease.

The perimetrist can adjust the speed by clicking the arrows at either end of the scale.



The auto timing can be enabled and disabled in the Options program.



4.3 Catch trials

Single stimulus tests incorporate catch trials to give the clinician an estimate of the patient's reliability.

- **False positives:** When no stimulus is presented but the normal presentation sound will occur (volume dependent).
- **False negatives (only in threshold and drivers tests):** When a repeat presentation is made at an already seen location.
- **Fixation losses:** Threshold test only, where presentations are made at the blind spot location established at the start of the test.

Catch trials occur at random intervals and the results are given, as a fraction and percentage, on the status bar at the bottom of the test screen.

False positives: 0/0	Number missed: 0	Number presented: 0	Test status: Stopped
			Test duration: 0:00

The fraction numerator is the number of errors and the denominator the number of catch trials. For example, 3/10 false positives would indicate that the test had made 10 false positive trials and the patient had, in error, responded to 3 of them.

The relationship between catch trial responses and test-retest variability is not very strong and the results from these trials should only act as a guide.

Studies suggest that false positive catch trials are a better indication of the reliability of a test, as a patient who responds to every stimulus when they hear an audible signal would present as having a clear field when in fact there could be field loss.

The Henson software performs catch trials throughout the test so that the patient reliability can be assessed during the test rather than having to wait for a post-test reliability score when it is too late to perform any corrective actions.

Note: if only a few positive catch trials are presented, one accidental response has a greater impact on the false positive rate and this should be considered when reviewing the results.

To combat this issue, the Henson software has introduced optional enhanced catch trials, these are detailed in the next section.

4.3.1 Enhanced Catch Trials

The Smart Supra Single Stimulus and the ZATA tests have an option to enable enhanced catch trials. If this option is enabled, then an increased number of catch trials will be performed at the start of the test.

The options is enabled for each test separately in the [Options - tests](#) section.



Catch trials

Enable enhanced catch trials

Stop test if low reliability

Yes No

The enhanced catch trials are a pseudo-random sequence of catch trials presented at the start of the test.

The Smart Supra Single Stimulus test has six false positive trials in the first 15 presentations. This higher concentration of catch trials in the early stage of the test helps the operator determine the patient's reliability before the test has progressed too far.

There is an optional intervention that stops the test sequence and displays a message if the patient reaches the pre-set threshold of 66% of the catch trials. (4 out of the 6 trials).

The intervention offers the ability to [re-instruct](#) the patient with the option to restart the current eye without losing data from the other eye (if tested).

The ZATA test has the same false positive catch trials but adds six fixation loss trials in the first 24 presentations. The addition of the fixation loss trials ensures that the patient understands the instructions and is maintaining fixation early in the test.

The same optional intervention is available when either of the catch trials reaches the 66% trigger point. A message will be displayed confirming which catch trial has stopped the test allowing for the instructions to the patient to be more specific. The ZATA test also has the ability to restart testing of the current eye.

4.4 Changing eyes

The selected eye has a blue background.

In the example below the Right eye OD is selected.



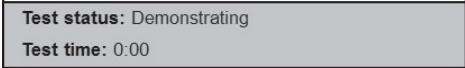
You can change eyes at any time by clicking the unselected button. Swapping during a test will not result in any loss of data.

Being able to swap is particularly useful when screening the visual field. If the first eye was OK and the second eye showed a defect, then it is possible to go back to the first eye and test some more locations now that the suspicion of a defect has been raised by the result from the second eye.

4.5 Demonstrating the test

All the single stimulus tests begin with a demonstration. This consists of a series of presentations where the responses of the patient are not saved.

During the demonstration stage the test status indicator will show "Demonstrating".




Test status: Demonstrating
Test time: 0:00

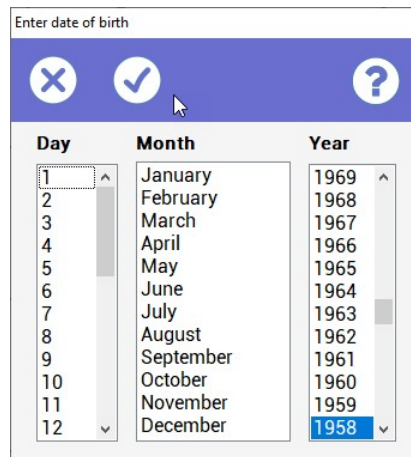
It is a good idea to tell the patient not to be concerned if they make some errors at the beginning of the test as the first few presentations do not count.

4.6 Entering the patient's date of birth

To enter the patient's date of birth:

Click over the correct day, month and year using the vertical sliders when necessary and then click  to continue.

Clicking  will exit the test.



Day	Month	Year
1	January	1969
2	February	1968
3	March	1967
4	April	1966
5	May	1965
6	June	1964
7	July	1963
8	August	1962
9	September	1961
10	October	1960
11	November	1959
12	December	1958


4.7 Fixation targets

The Henson 9000 has two fixation targets:

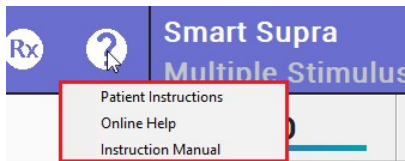
- Central : A small red spot in the centre of the field.
- Four-point: A four spot diamond target where the spots are located 6 degrees from the central point along the 0, 90, 180 and 270 meridians. The four-point target is provided for patients who have lost central vision. The patient should be instructed to look at the centre of the four-point pattern.

The selected target is highlighted in blue  and can be changed at any stage of the test.

4.8 Help facility

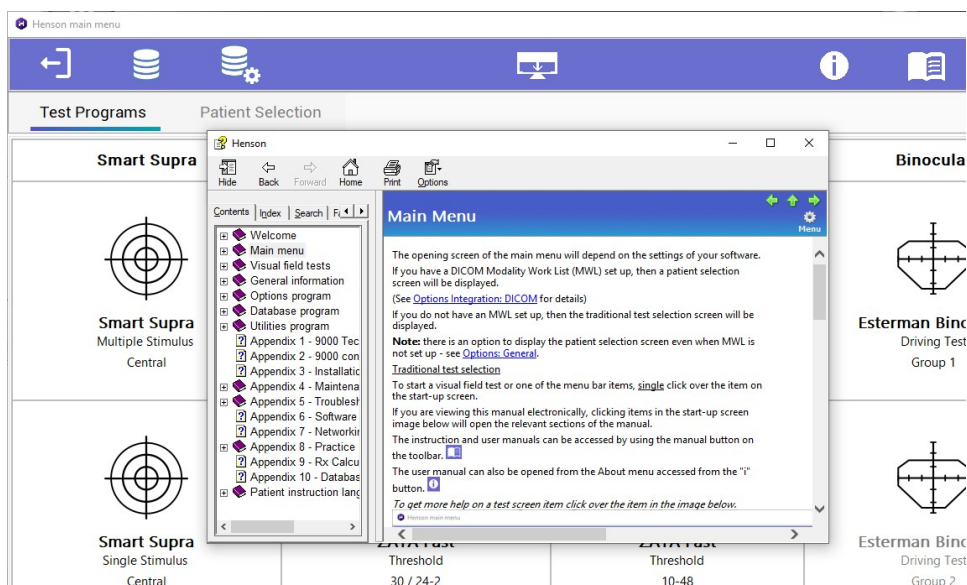
Clicking  in any test presents three options:

- Open the patient instructions - these will be displayed in the language selected for the Instruction manual in the [Options - languages](#) section.
- Open the on-line help (in English).
- Open the instruction manual - the language of the manual will be the one selected in [Options - languages](#).



Opening and closing the help facility will not affect the test programs. You can keep the help program open while continuing with a field test, but the test window will be placed in front of the help window when it is active.

An example of a Help page is shown below. Many of the images in the help contain hot spots. The cursor will change from a pointer to a hand when over a hot spot. Clicking the hot spot will jump to a new help page where additional information will be available about the selected item.




4.9 Help Rx

It is important that the patient wears the correct refractive correction (suitable for a 25 cm test distance) during the monocular visual field tests. The Esterman binocular field test will have different requirements depending on the country and the reason for the test (e.g. suitability for driving).

The Henson 9000 is fitted with a full aperture trial lens holder. Place the correct lenses in the holder and then, with the patient correctly aligned, ask the patient to move the holder as close to their eye as possible.

(The integral lens holder is also available to retrofit to all Henson 9000 units should you require one for your instrument.)


An occluder should be placed in front of the eye not being tested.


The Smart Supra and ZATA test screens contain an Rx calculation form that can be accessed by pressing the  button on the toolbar.

For the ZATA test, if prior data has been imported and the patient's Rx was previously saved, it will be displayed in the Rx form when it opens.


For Smart Supra tests, if the patient details (including previously stored Rx values) were passed to the test, then this will populate the Rx form automatically.


Note: Any imported Rx will only be displayed on the report and saved back to the database if the Rx form calculation is made.

To close the Rx form without using the imported data - or any of the data entered just click the Cancel button .

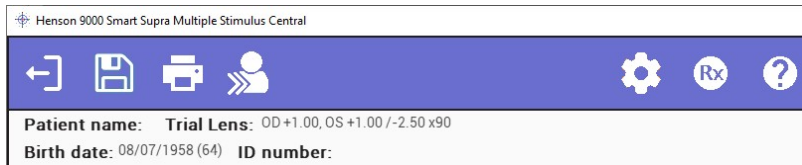
For other tests or where no prior Rx was imported, enter the patient's distance correction and press the Calculate button .

The software uses the patient's age and the distance prescription entered to calculate the required trial lens to use, using the information given in [Appendix 9](#)

Close the form by pressing the Save and exit button 

You can exit without saving the Rx calculation by clicking the Cancel button 

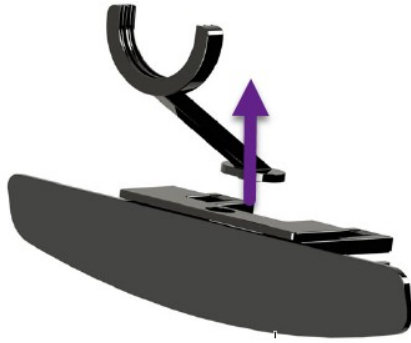
The trial lens is displayed with the patient information at the top of the screen. This information will also be displayed on the printed report and saved in the database.



Using the trial lens holder

The Henson 9000 is equipped with a trial lens holder.

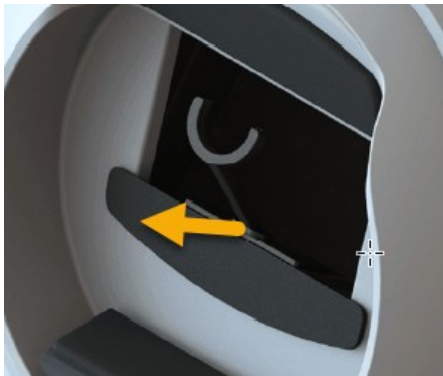
To fit the lens, pull the lens holder from the carriage on the front of the unit.



Fit the required lens into the holder arm and attach it back to the carriage.

Pull the carriage to the front of the unit.

Position the patient and ask them to look through the lens, keeping it as close to their eye as they can. (This will prevent the lens frame from causing aberrations)




Protective shield

If the Protective shield with the +3.5D lens fitted is installed on your Henson, then the patient should wear their distance spectacles if they have any.

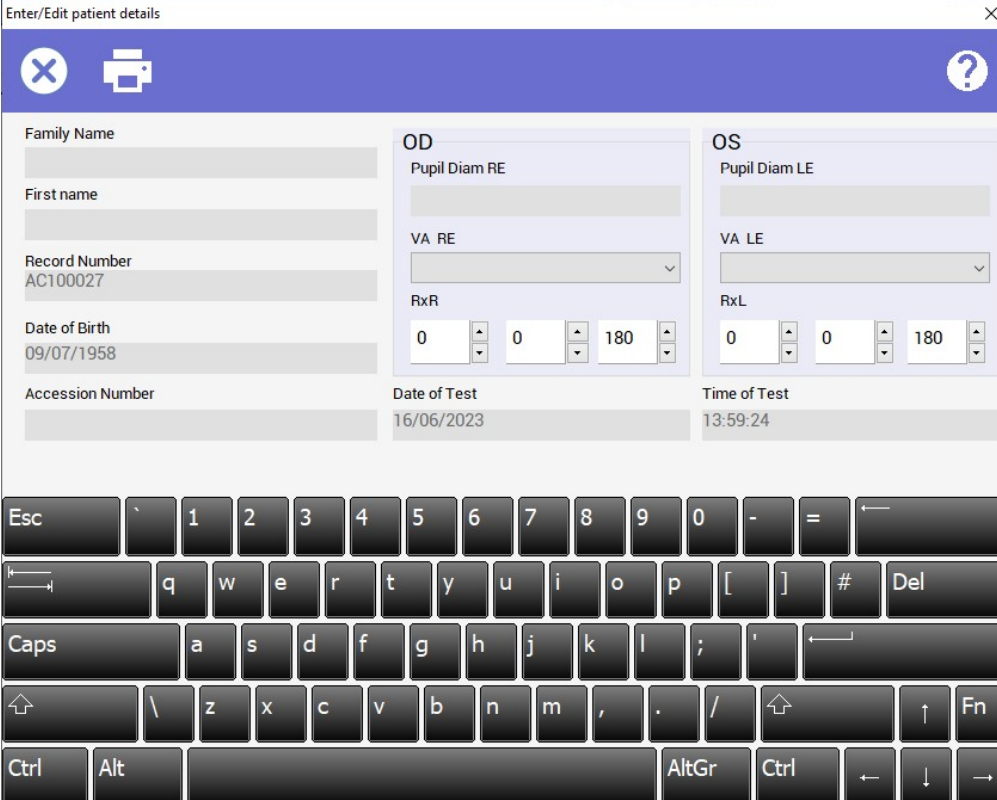
The lens will not affect young emmetropic patients as their accommodation can relax sufficiently.

For other shields please see the instructions supplied with the shield.

4.10 Printing the results of a field test

Click  to print your results. To save time the Henson prints and saves both eyes as a single operation, i.e. you do not need to print and save the results from the first eye before you test the second eye. This enhancement also allows a review of the results from the first eye after testing the second eye. In the Smart Supra tests further examination of the first eye can be made in the light of findings from the second eye before committing to a print/save.

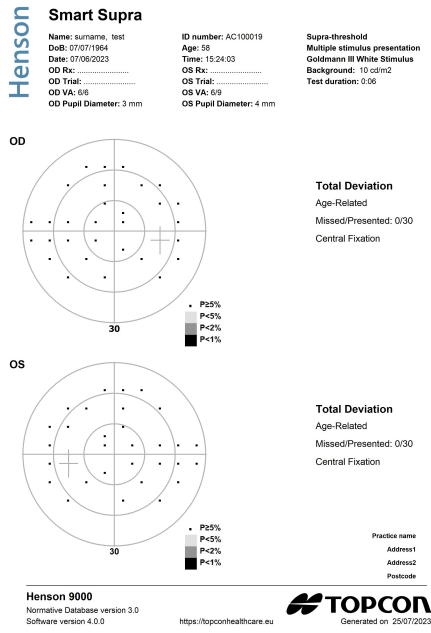
If your Options are set to enter [patient information on the printout](#) then you will be presented with the window below.



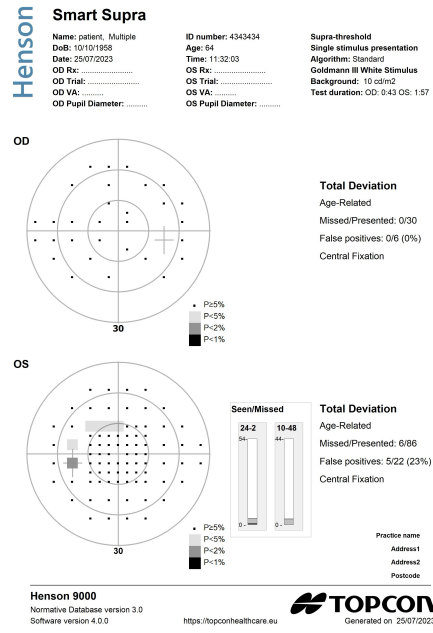
Click  to print or  to return without printing.

Notes:

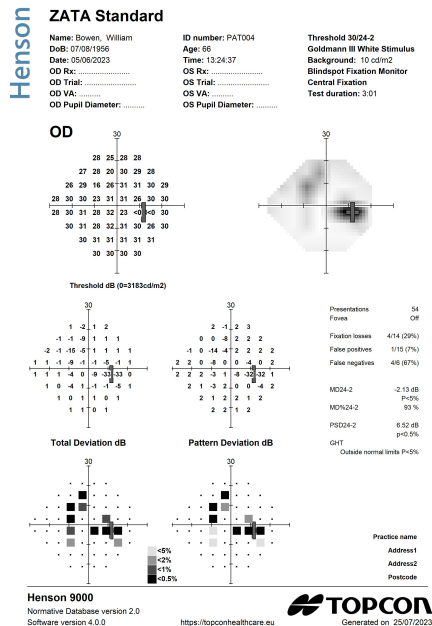
1. You should test both eyes before printing unless you are only testing one eye or printing the results of an Esterman Binocular Drivers test.
2. The print will be generated as a PDF file which will be opened in your default PDF viewer.



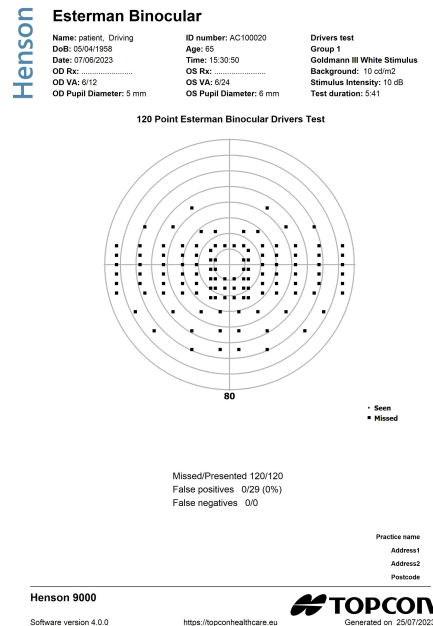
Smart Multiple printout



Smart Single printout



Zata Printout



Esterman Printout

4.11 Response button

The Patient Response Button is used in the single stimulus tests.

The patient needs to click the response button each time they see a stimulus.

The test is paused if the button is held down. This is useful if the patient needs to temporarily stop the test.

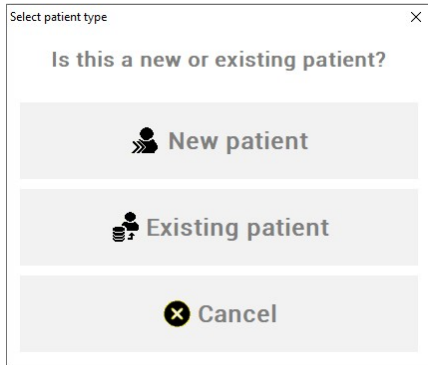


will appear in the lower right hand corner of the test window when the button is pressed.

4.12 Saving visual field data

Prior to saving or printing* the test result, the software requires the patient details to be entered.

An on-screen prompt will present asking whether the patient is new or already in the database.

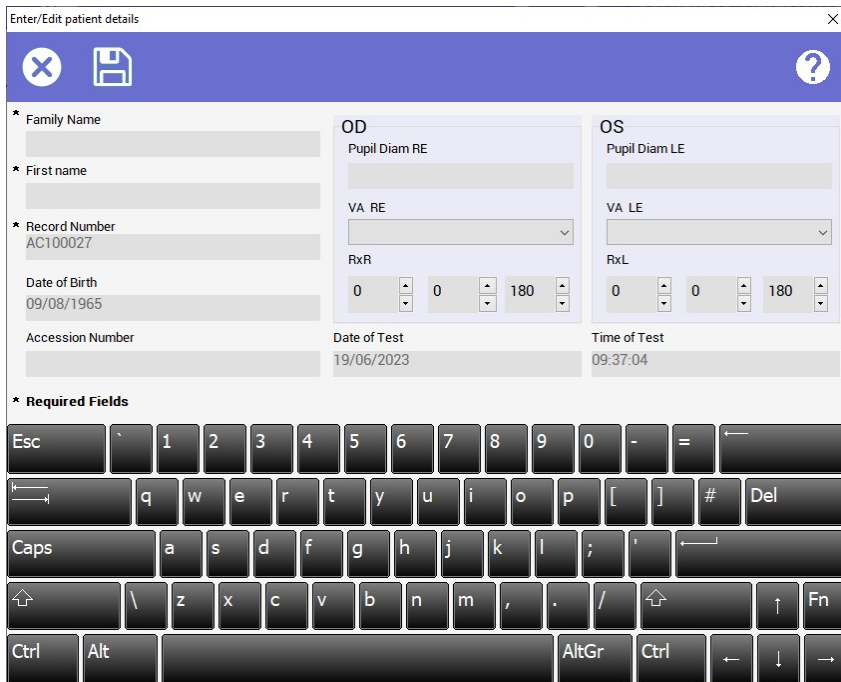


If you are unsure whether the patient is already in the database, then you can select either new or existing. It is always possible to return to this selection by clicking Cancel.

If Existing patient is selected, a database table will be displayed, the entries in the table all have the same date of birth as that entered at the start of the test.

Selecting from the list will fill in the patient details. and display the form below. If there are no matches, then clicking the Cancel button returns you to the New/Existing patient menu and you can choose New patient.

When New patient is selected, the form below is displayed with the patient date of birth and any Rx values entered during the test pre-filled.




Use either the on-screen keyboard or an external keyboard to enter/edit the data in the fields.



Only use the following characters: letters A-Z, numbers 0-9 and hyphen -

As you type into the Surname, first name or ID edit boxes, the software will search the database for any patients matching the date of birth entered at the start of the test AND the data you are typing in. If any matches are found, these are displayed in a drop-down box.

If a patient is selected from the drop-down list, the details of this patient will be used to populate the required fields.

NOTE: If the setting for automatic ID is enabled in Options then this will be overwritten by the ID number from the selected patient.

If the patient was selected in error, then pressing the undo button  will remove the selected patient details and restore any text typed in.

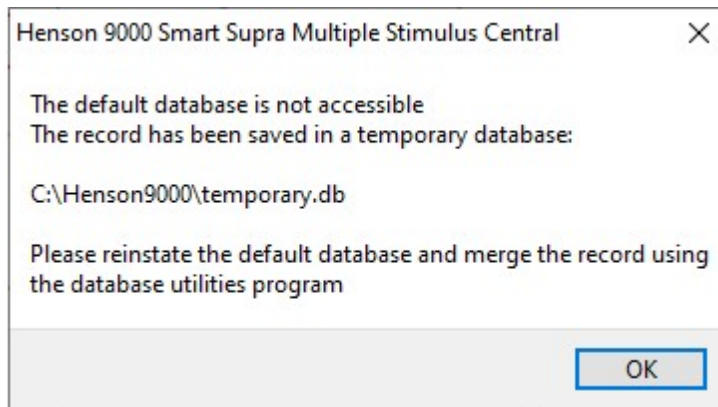
Click  to save and  to return without saving. To save time the Henson software saves and prints both eyes as a single operation, i.e. you do not need to save and print the results from the first eye before you test the second eye. This enhancement also allows a review of the results from the first eye after testing the second eye.

In Smart Supra tests this further examination of the first eye can be made in the light of findings from the second eye before committing to a print/save.

If during saving a test, the default database is not available, for example, due to network connection issues, then the Henson software will create a temporary database and save the record in it.

The temporary database will continue to be used until the default database is reinstated.

The message below will be displayed when saving.



Note: No backup of the main database will be attempted as it is inaccessible.

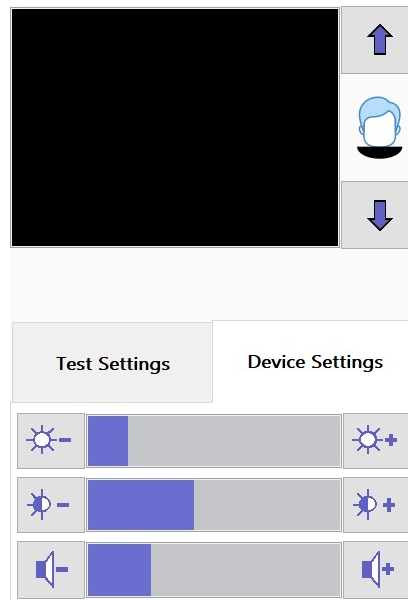
There is an import routine in the [Utilities program](#) to assist merging the records from the temporary database into the default database once the connection has been restored.

Notes:

- Both eyes are saved in a single database record. You should, therefore, test both eyes before clicking save unless you are intending to test only one eye or are saving the Esterman Binocular Drivers test.
- The date of test, time of test, date of birth and type of test are automatically entered. The date and time of test are generated from the PC's internal clock, which needs to be correctly set via the Control Panel.
- A [JPEG](#) image of the printed output is automatically saved with the database. A second JPEG can accompany the [backup](#) and optionally [PDF](#), [DCM](#) and [XML](#) files can be saved to locations set in the [Options Integration](#) section.

4.13 Video camera

The Henson 9000 is fitted with a video camera for monitoring fixation. The camera is [set up](#) within the Options program.

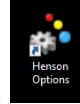


The intensity and contrast can be adjusted during a test by clicking over the appropriate buttons (see above).

5 Options program

The Options program allows you to set up and customize the software.

To make changes, you must close ALL Henson programs, including the Start-up screen, and



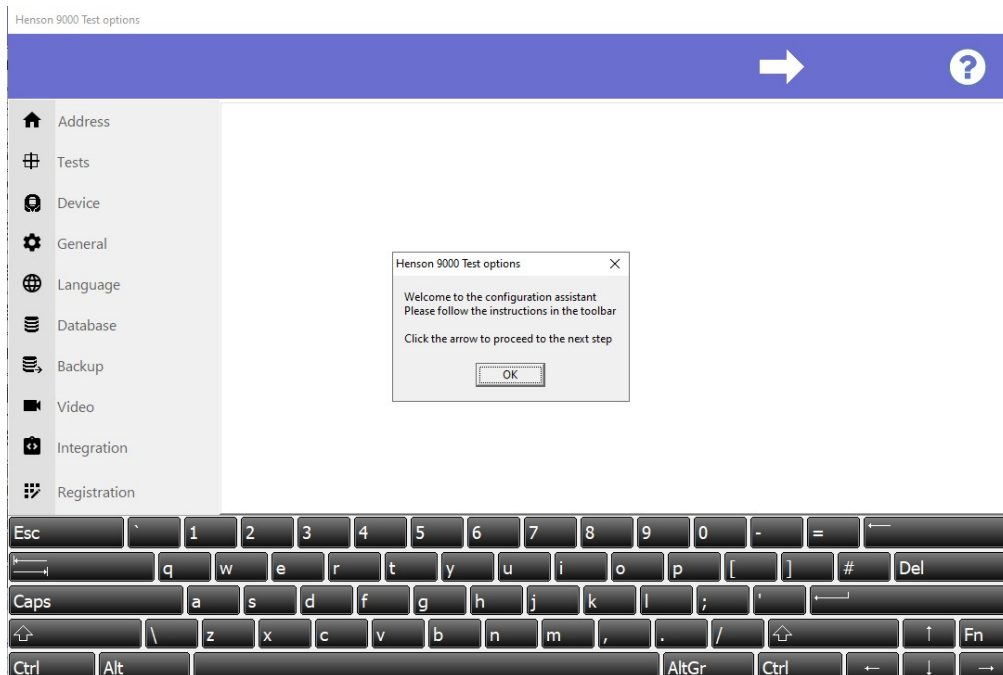
run the Henson Options program from the desktop icon.

Configuration assistant

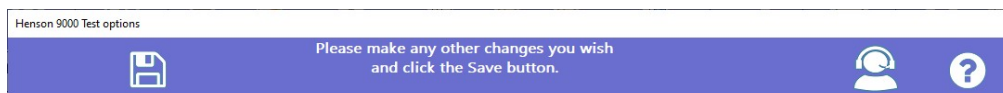
On the first run of the Options program after installation, a configuration assistant will run to guide the user through the screens that need attention to get the software operational.

There will be a welcome message (below) asking you to follow the instructions in the toolbar and press the arrow button to proceed to the next screen.

You will not be able to click on any other tabs until you have completed the setup sequence.



Once all pages in the configuration assistant sequence have been visited, the Save button will appear at the top left of the toolbar. The Help Desk symbol (see picture below) is now visible so that the Configuration Assistant can be activated at any time in the future.



Normal operation

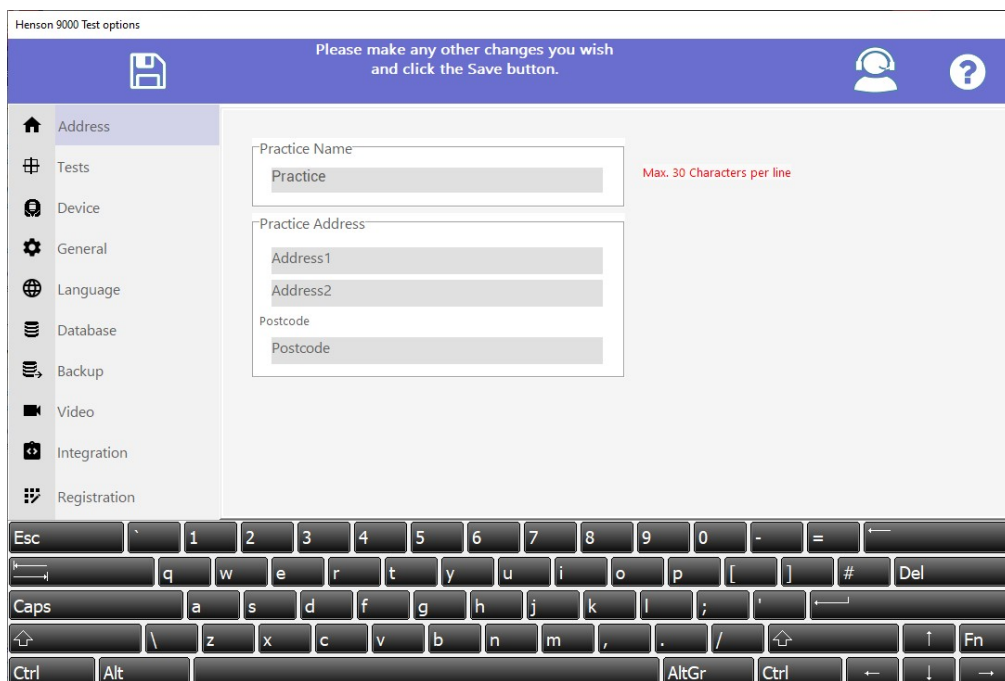
On subsequent uses of the Options program, the Configuration Assistant will not run unless required and you are free to navigate through all of the tabs.

(Note: If the assistant does run, then it is probably that the Henson bowl was not powered up when it ran the first time and the default video settings were not downloaded from the Henson.

On each tab there are a series of controls. On the first tab (shown below) you can enter the name and address of your practice. This will appear on the printed field charts.

Once you have made changes click . Changes on all tabs will be saved.

To get help on other tabs click over that tab on the image below or continue through the chapter.



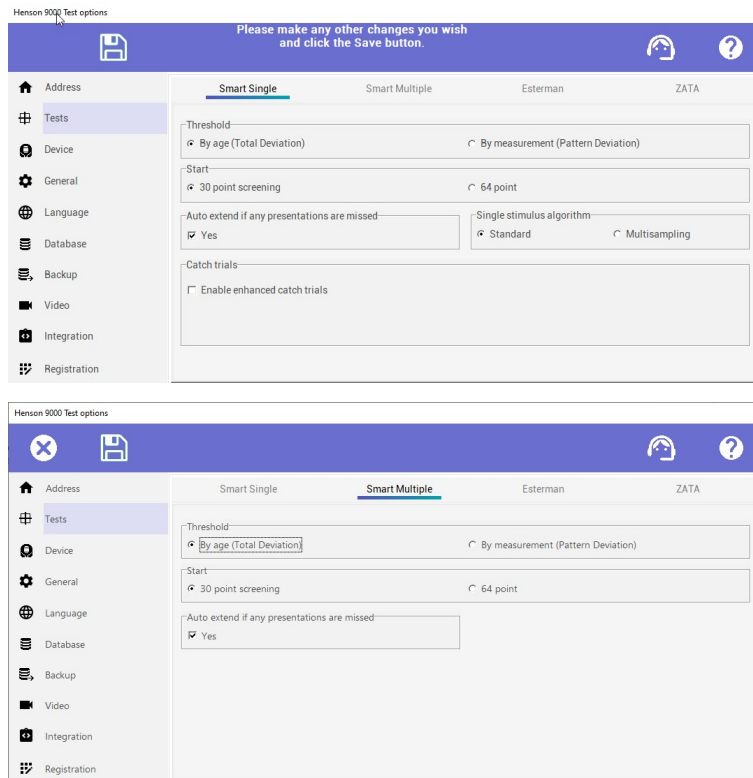
5.1 Tests

The Tests tab of the Options program allows you to customize certain characteristics of the test programs.

Each test has a separate tab.

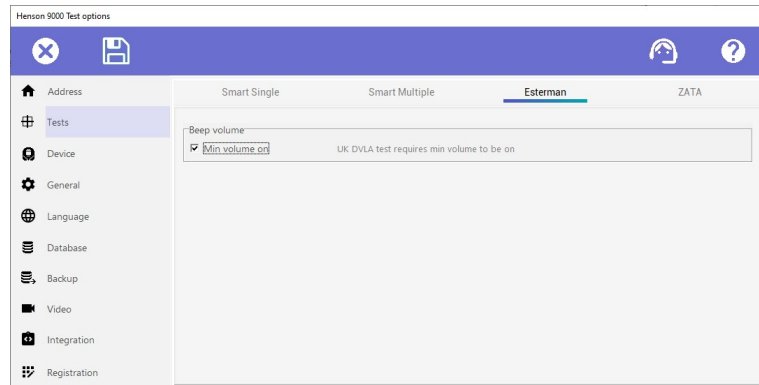
Smart Supra

- The [threshold](#) is set by age (Total Deviation) or by measurement (Pattern Standard Deviation).
- The program starts off with the 30 point screening pattern or the 64 point test pattern.
- The program auto extends from the 30 point screening pattern to the 64 point pattern when any stimuli within the screening pattern have been missed (twice) - this is the recommended setting as it is less disruptive for the patient.
- The Smart Supra [Single Stimulus](#) test uses the [Standard or Multi-sampling](#) algorithm and whether the [Enhanced catch trials](#) are enabled (with or without a warning message).



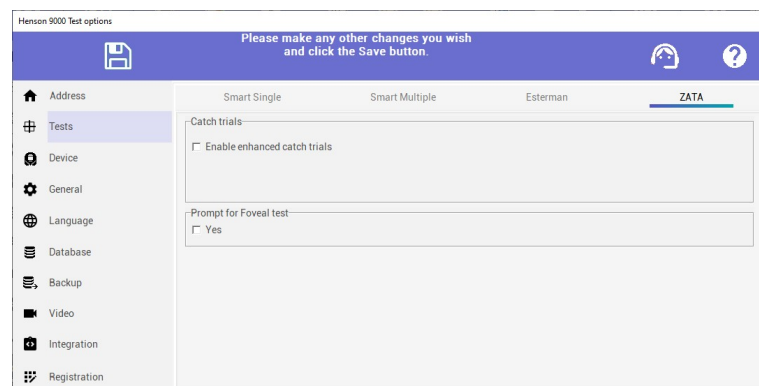
Drivers test

- The audible notification ("beep") can be turned off in the Esterman drivers test. The UK driving standards agency (DVLA) requires a notification during testing. With this setting enabled, the volume of the beep cannot be turned completely off.



ZATA Test

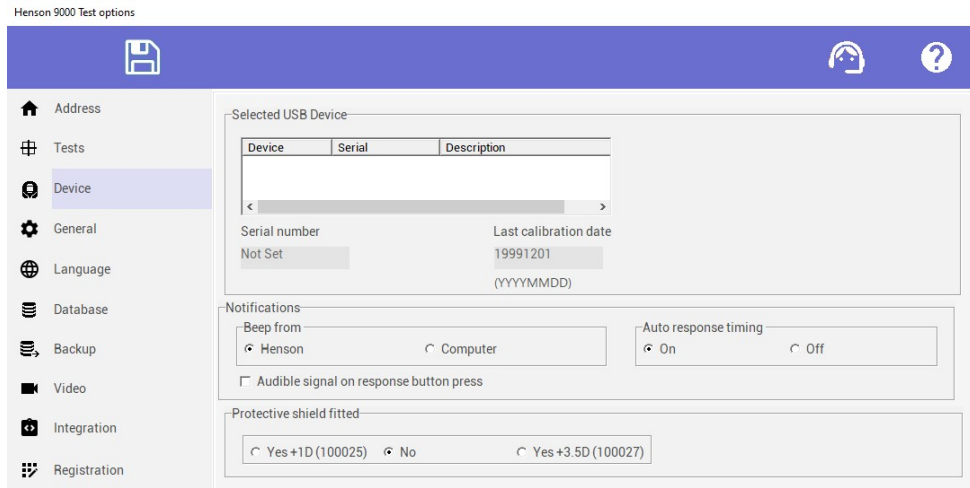
The ZATA test has an option to turn on the [enhanced catch trials](#) (with or without a warning message) and also to prompt the operator to measure the foveal threshold. When selected, the operator will be prompted by an on-screen message if they try to swap eyes, print, save or exit the test without performing the foveal test for each eye.



5.2 Device

The Device page of the Options program allows you to select and adjust Henson device related items.

The Henson device should be automatically detected and displayed in the USB device box. If there is more than one item displayed, you will need to select the Henson device.



When the Henson is connected and powered on, its serial number and last calibration date will be downloaded and displayed.

This information is used in the optional XML output.

If you do not wish the Henson to make the traditional test beep sounds and you have speakers on your PC then you can select that the computer makes the test sounds.

If you would like the Henson to make a beep sound when the response button is pressed, tick the "Audible signal on response button press" box.

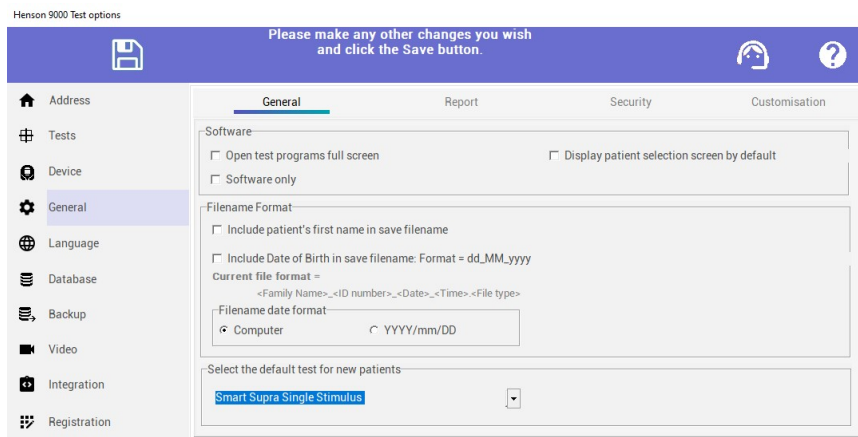
The automatic adjustment of the inter-stimulus interval based on patient response time can be enabled or disabled.

The volume of the button audible output is the same as the volume of the test beeps, controlled from the test screen. If the stimulus beeps are turned off (volume reduced to zero) then the audible beep for the response button press will be emitted by the PC/Laptop if it has speakers fitted.

5.3 General

The General page contains three tabs: one is for General settings, one for Report settings and one for Security.

General tab



On the general page you have three headings:

Software

To open the software so that the test programs fill the entire screen tick the "Open test programs full screen" box.

Note: The main menu program does NOT open full screen automatically, unless, either MWL is set up or "Display patient selection screen by default" is selected and the open full screen option is ticked.

Software only mode should only be selected if you do not have an instrument attached. In software only mode messages are not sent to the Henson. (This facility is useful for those who wish to access the database on a separate computer.)

When software only mode is selected (or when the Henson device is not detected) the symbol circled below will be displayed on the toolbar of the main menu and the application title will have "Software only" appended to it.



Filename Format

There are tick box options to include the patient's first name and/or date of birth in the image and PDF filenames.

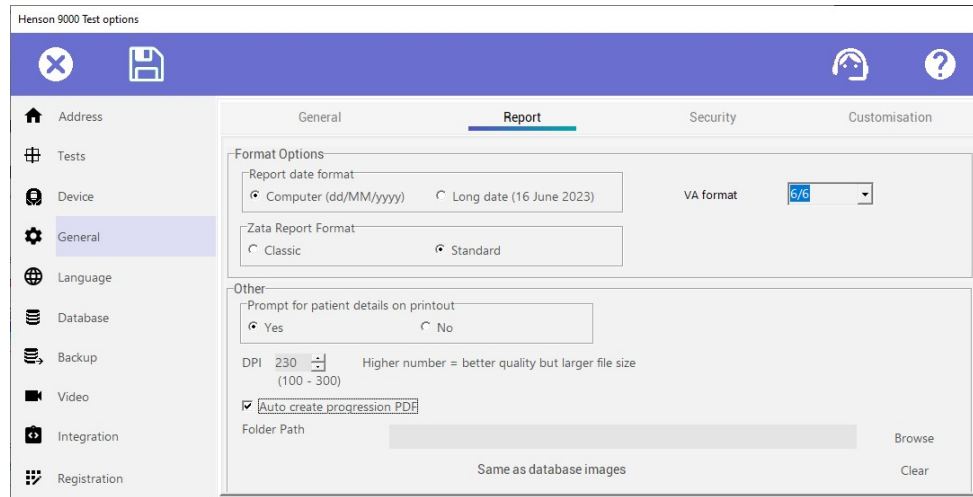
The format of the date of birth used in the filename can also be set. The two options are the computer setting (as set in the Windows operating system - and displayed on the lower right corner of your desktop) or the more international YYYYmmDD format. The legend on the screen will update to show the current filename format that will be used.

Other

If a protective shield is fitted then click the radio button corresponding to the version fitted.

5.3.1 General: Report

The report tab contains settings relevant to the report produced when printing or saving a test.



Format Options

The date format used on the report can be changed between the computer standard date (as set in the Windows™ operating system - and displayed on the lower right corner of your desktop) or the long date format which avoids any confusion between the DD/MM and MM/DD formats as the month is written in short form.

The VA format can be set to either 6/6 or 20/20 and this is used to tailor the drop-down list displayed for entering patient details when printing or saving.

The ZATA test report can be displayed using two different headers, the Classic is the original Henson report format, and the Standard is a more modern single eye version.

Classic

Henson ZATA Standard
 Name: ID number:
 DoB: Age:
 Date: Time:
 OD Rx: OS Rx:
 OD Trial: OS Trial:
 OD VA: OS VA:
 OD Pupil Diameter: OS Pupil Diameter:

Threshold 30/24-2
 Goldmann III White Stimulus
 Background: 10 cdm2
 Blindspot Fixation Monitor
 Central Fixation
 Test duration:

Standard

Name: Logo Here
 DOB: 01/01/2000
 ID number:
OD 24-2 Threshold
 Fixation monitor: OFF Stimulus: Goldmann III, white Date: 13/06/2023
 Fixation Target: Central Background: 31.5 cdm Time: 14:10:28
 Fixation Issues: 0 / 0 Strategy: ZATA Standard Age: 23
 False positives: 0 / 0 Pupil Diameter:
 False negatives: 0 / 0
 Test duration: 0:00
 Fovea:

Other

The option to prompt for patient details on printouts is the recommended setting where the printout is not going to be printed.

Traditionally the printout would not have the patient information printed on it and it would have been hand-written. With paperless offices the "printout" may be filed and so should have the patient details entered in the header.

The DPI (dots per inch) setting controls the quality of the report images produced.

A Higher DPI means better quality but also a larger file size. This may not affect the main database storage, but images saved with the backup may fill a USB flash drive.

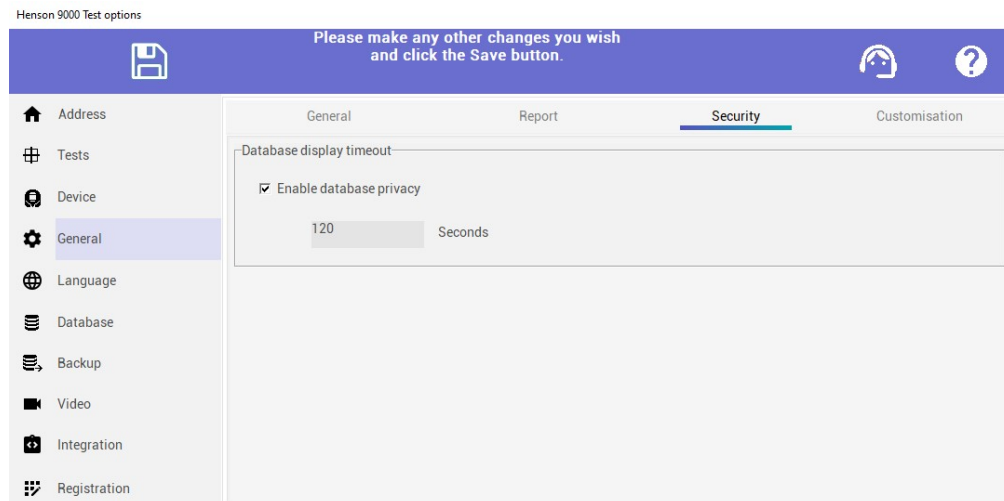
The option to automatically save progression reports is for practices where the reports are viewed remotely. When ticked a path and browse button appear allowing you to select the folder to save them in. To save them with the database images just click the "Same as database images" button.

5.3.2 General: Security

The Security tab has a setting to hide patient details when the Patient Selection screen is not used for a period of time.

The option when turned on allows the setting of a timeout in seconds.

If the Patient Selection screen is visible and no controls are touched within the timeout period, then the screen reverts to the test selection screen (Test Programs) so that patient data is not left on display.



Clicking any of the controls on the patient selection screen will reset the timeout period.

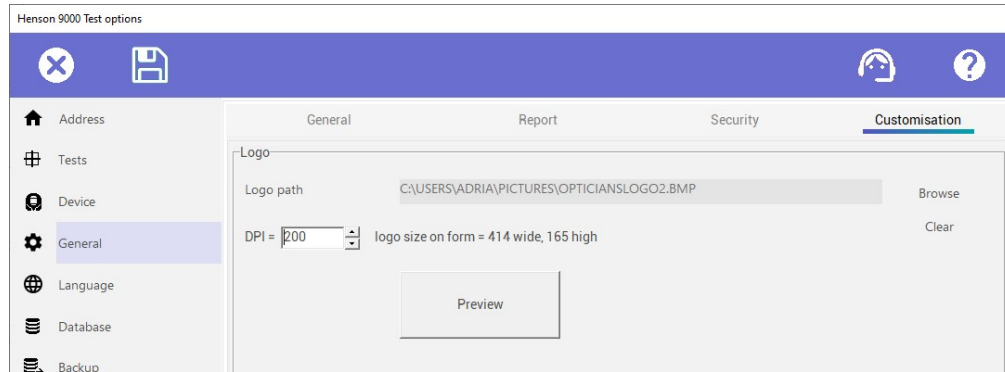
The Privacy button on the main menu toolbar displays a graphical representation of the timeout period.



5.3.3 General: Customisation

The customisation tab is visible if the ZATA standard report type is chosen. It allows a customer logo to be selected for inclusion in the top right corner of the printout.

The logo should be a bitmap file that is smaller (in pixels) than the size shown on the screen.



Changing the DPI setting will allow for a larger file to be selected without cropping.

Note: the DPI setting on this page is linked with the DPI setting on the General-report page.

Browse for the required logo (only bitmap files will be visible in the file selection window). Once selected the file will be copied to a local file and this path will be displayed in the logo path box.

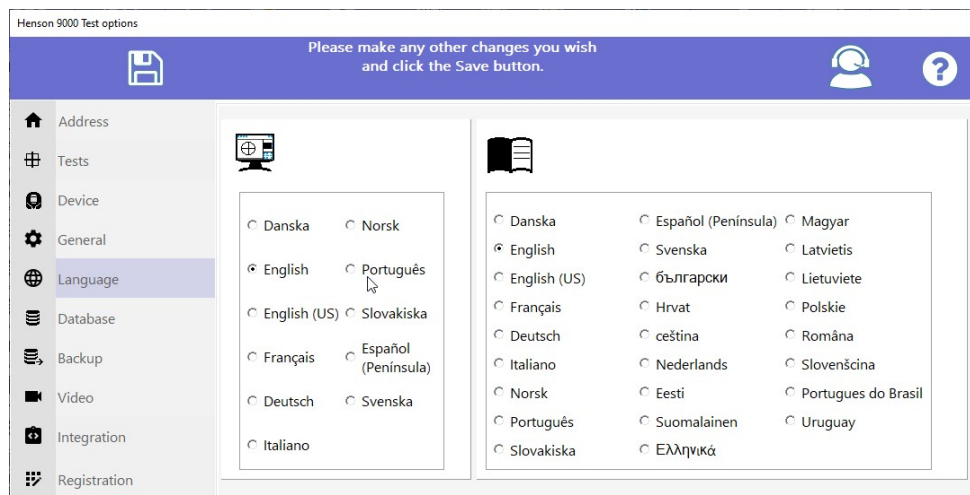
Press the preview button to view an empty report showing the selected logo.

If the logo is cropped (parts of it are not visible) then either increase the DPI setting (this will result in larger file sizes) or edit the logo (using a suitable picture editor) to reduce its size.

Note: if the logo is edited in its original location, then it must be re-selected using the browse button.

5.4 Languages

The Language page is where the display language for the user interface and the instruction manual are chosen.



The selection on the left is for the user interface. The user interface will change when the corresponding language button is chosen.

The selection on the right-hand side is for the Instruction manual, which can be opened using the icon on the main menu toolbar. (See below)




The manual and interface can be viewed in separate languages.

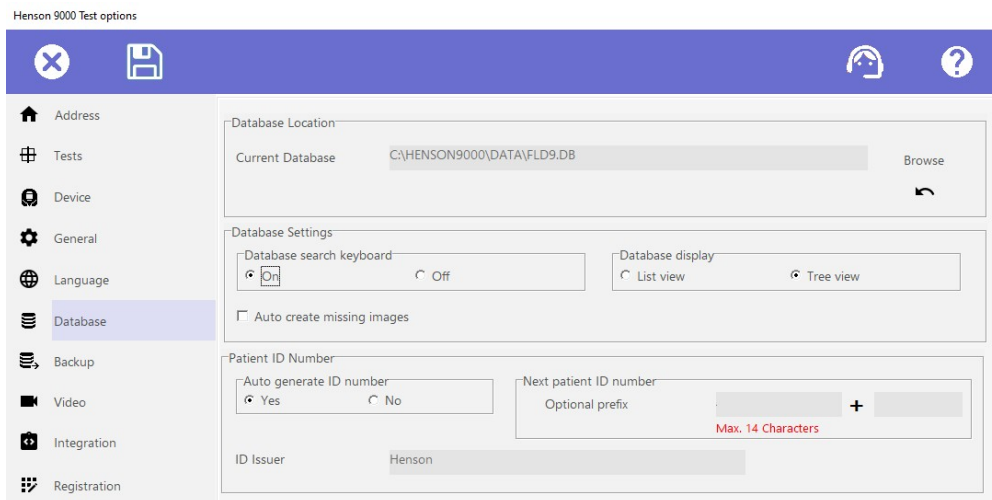
The patient instructions, which can be accessed from any test screen will be displayed in the language chosen for the instruction manual.

5.5 Database

The Database page of the Options program is where the name and path of the default [database](#) are set.

The database is where:

- Visual field records will be stored when you click save  in any test.
- Records will be recalled from when you open the database program.
- Records for the selection of prior data will be recalled from when opting to start a ZATA program from existing data.



Current Database

The location and name of the current database is selected using the Browse button. The drive will normally be the internal C: drive. The selected path and file name will be displayed in the Current Database box.

The Undo button can be used to restore the path and file name that were set before the Browse button was pressed.

Database Settings

When using a touch-screen, you can select that a keyboard will appear on screen when either of the search boxes in the database program are selected.

The database can be displayed as a list of tests in alphabetical order (by patient surname) (Listview) or as a list of patient surnames which can be expanded to see first name and then tests (Treeview). The latter can be easier to operate with larger numbers of records.

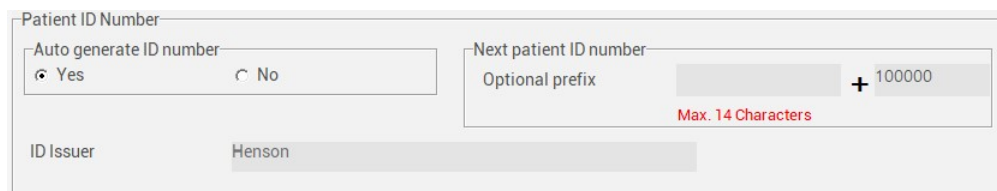
The database can be set to automatically create any missing image files in the database where the image does not exist by clicking on a record.

This is useful if you have upgraded the software and already have entries in the database. Versions prior to 3.5 stored the images as PDF files rather than JPEG files and so these can be created on demand.

Patient ID Number

The ability to auto-generate a unique ID number for every patient is available when entering new patient details. If you do not use any patient ID information (from practice management or other systems) then one can be generated for you.

Click the Yes radio button and the Next patient ID number settings will be displayed.



The screenshot shows a form titled "Patient ID Number". It contains two main sections. The first section, "Auto generate ID number", has two radio buttons: "Yes" (which is selected) and "No". The second section, "Next patient ID number", includes an "Optional prefix" text box, a plus sign, and the number "100000". Below this is a red label "Max. 14 Characters". At the bottom, there is an "ID Issuer" field with the text "Henson" entered.

There are two options:

1. You can add a prefix to the ID number - this can be letters and/or numbers up to a maximum of 14 characters - the box does not accept more than 14 characters.
2. Manually set the first number to be assigned. This should be a maximum of 7 digits and contain only numbers. The default starting point is 100000 as this should provide sufficient numbering range for most practices.

Note: The next ID number will be incremented automatically as numbers are assigned to patients when saving. The number displayed will be the next number to be used on saving a new patient record. The total length of the ID number (prefix + number) that the database can store is 21 characters.

The Patient ID issuer is a DICOM field in the XML output file and relates to the origin of the ID number assigned to the patient.

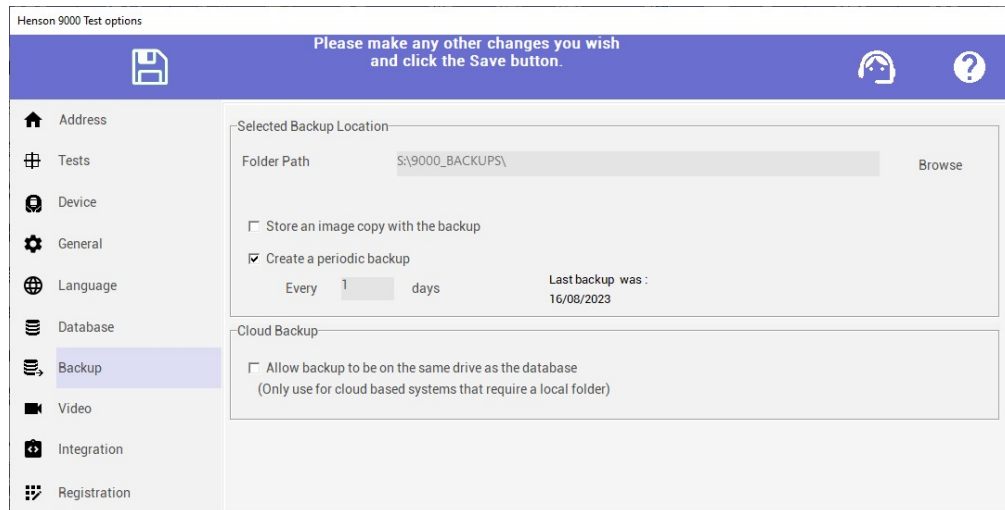
If the [Auto ID](#) setting is enabled on the Database page the text box will display "Henson" and will not be editable.

If the Auto patient ID is not turned on, then by default the box will display the practice address as set on the [Address](#) page but can be edited.

Pressing the =Practice name button resets the contents of this box to the practice name set on the address page.

5.6 Backup

The location of the folder for the database backup is specified here. Normally this will be a network or removable drive fitted to your computer.



If you have access to a network, then the backup location can be a mapped drive on another computer/server.

The backup folder should be on a different drive to the [default database](#) to prevent losses due to hard drive failure. (**Note:** Sometimes even different drive letters are just partitions of the same physical drive).

Only the location needs to be specified, the database name will be the same as the current database. The location is selected using the Browse button which opens a standard Windows browse window.

There is an option to include a copy of the report image file with the backup. This can be useful if a practice management/EMR system imports and deletes the images, rather than have the database images deleted, the backup ones can be sacrificed instead.

The backup system uses a rolling 20 copy backup. The backup file will be called <database name>_BKUPNN.db where the NN is an incrementing number from 1 to 20.

After the 20th backup is made then the first one will be overwritten. The rolling backup should allow time for any database issues to be identified before data is lost.

There is an option to create a permanent backup periodically. By default, this is turned on with a period set to 7 days.

When a backup is made, if the time period has been exceeded, then an additional backup of the database is made with the filename <database name>_PERM_DD_MM_YYYY where DD_MM_YYY is the current date.

(**Note:** The date format will replicate the computer's regional date setting.)

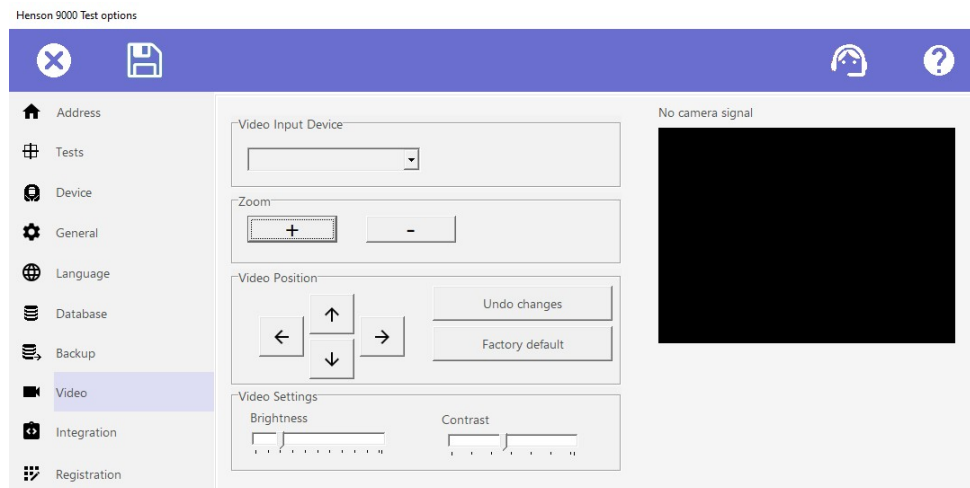
Cloud Backup

If you are using a cloud backup system for off-site storage that uses a folder on the local drive. This can be used as a backup location if the "Allow backup..." box is ticked. The local folder can then be selected, and this will override the check for same drive made when saving.

You can make additional copies of the database file using the [Utilities](#) program.

5.7 Video setup

The Video page of the Options program allows you to select the Henson camera and optimize the image.



Select the correct camera from the Video Input Device drop-down menu.

With a patient [correctly positioned](#) and looking through any trial lens, use the +/- and arrow buttons to adjust the magnification and position of the image.

Adjust the Brightness and Contrast sliders to optimize the image (these can also be adjusted when running a test program).

To revert any changes made, click the undo button and the image will revert to the initial size and position when the options program was started.

To download the default setup from the Henson 9000, click the Factory defaults button. The image will revert to the factory settings.

5.8 Integration Introduction

This section of the Options program contains six tabs and is used to set up the inputs and outputs from the software.

These are usually related to Practice Management (PM) or Electronic Medical Records (EMR) system integration or for remote viewing of report on shared folders.

The Henson software allows for various output formats and methods of control and patient detail passing.

The following sections deal with each item individually.

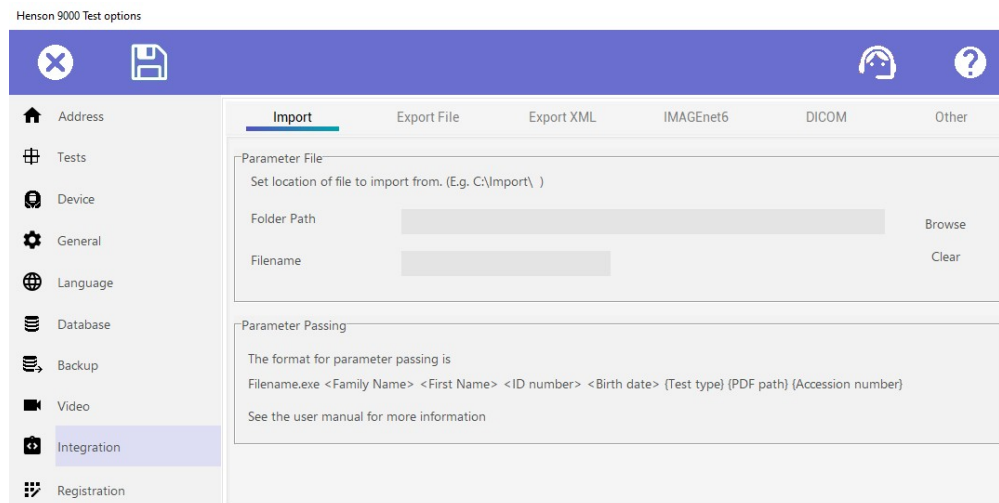
For import of patient details consult the [Import](#) and [DICOM](#) pages.

For output of report files check the [Export file](#), [IMAGEnet 6](#) and [DICOM](#) (storage) sections.

The [Other](#) section deals with file export file names when imported into other systems.

5.8.1 Integration - Import

Import



When integrated with PM/EMR software, the Henson can be set up to import patient data.

There are 2 methods of integration:

Parameter File

If the PM/EMR software is located on a different PC to the Henson software, then a parameter file can be used. The required parameters are written into a text file and saved in a pre-set location. The Henson software is operated normally - but instead of entering patient details, the software detects the file, opens it to read-in the contents and then deletes it. The patient details that were contained within it are used for the test.

The Folder Path of the text file is set using the browse button. Only a folder is selected as the parameter file will not exist until created by the PM/EMR software. The file name should be typed into the filename box - remembering it must end in ".txt". See [Appendix 8](#) for details of the required contents of the file.

Parameter Passing

If the PM/EMR software is installed on the same PC as the Henson software then direct passing of parameters is possible using programmable buttons, these need to be set up in the PM/EMR system. There are no selectable options, but the software informs you of the date format of the PC.

See [Appendix 8 - Practice management Integration](#) for more details.

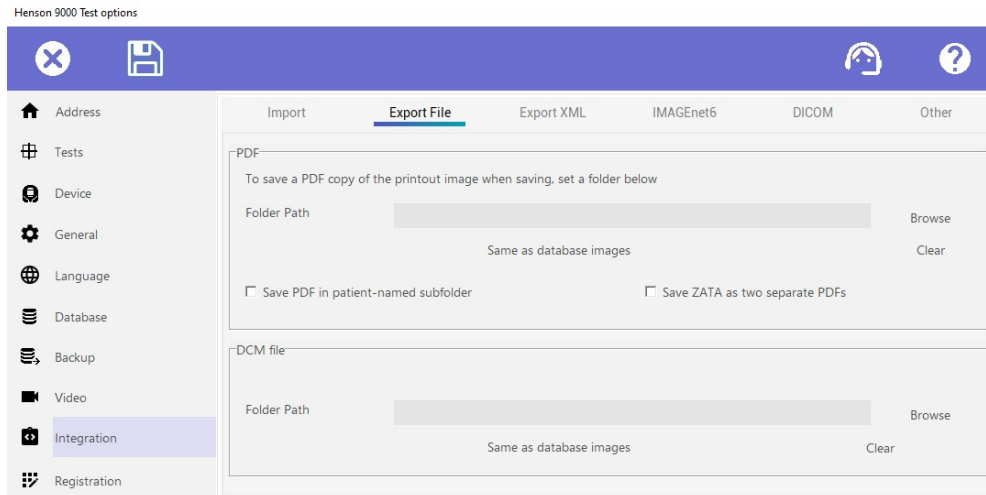
5.8.2 Integration - Export file

When saving a test, the Henson automatically saves a [JPEG](#) image of the report in a sub folder of the database file, (and optionally another copy with the backup).

The Integration Export file tab allows you to set up the location to save additional copies of the printout in PDF and DCM formats.

This facility is provided for PMS/EMR systems that automatically import files to patient records.

Each file type can have its own path set. If a path is blank, then no file will be created.

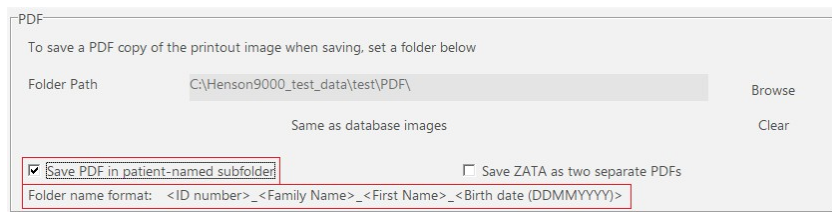


PDF export

Use the Browse button to open a Windows file selection box and select the required folder.

There is an option to store the PDF in a sub folder based on the patient's details. Ticking the box displays the folder name format.

Note: If you have not set the path, you will be prompted to do so first.



There is also an option to save the ZATA PDF export as 2 separate files rather than the traditional 2 page file used when printing.

DCM export

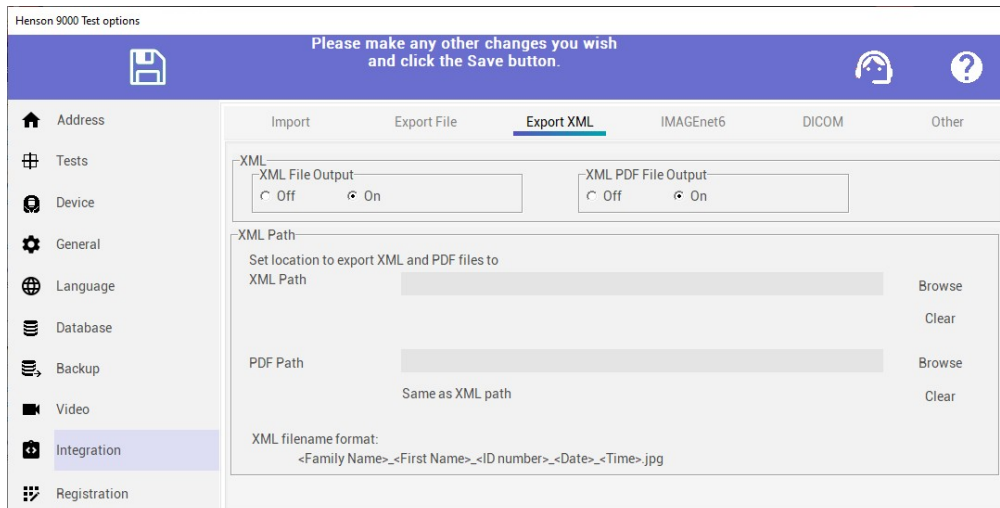
The lower section of the page is the path selection for a DCM file. A DCM file is a special DICOM file used for report transfer. It contains a PDF of the report alongside patient and test details. See the [DCM section](#) in Appendix 8 for more details. By default, the ZATA test produces an individual DCM file for each eye.

5.8.3 Integration - Export XML

The Henson tests can export an XML file and a PDF report when saving. See the [Integration XML](#) page for more details.

The XML file contains full patient and test details and is saved alongside a copy of the report in PDF format to a folder selected on this page.

Note: The ZATA test will produce an XML and accompanying PDF report for each eye individually. All other tests produce a combined XML file and a single PDF.



To enable the XML output file, click the On radio button in the XML section; the controls for the XML path are displayed.

The destination folder is selected using the Browse button.

The PDF file that accompanies the XML has a separate setting to turn it on. When On is selected the controls for the PDF path are displayed.

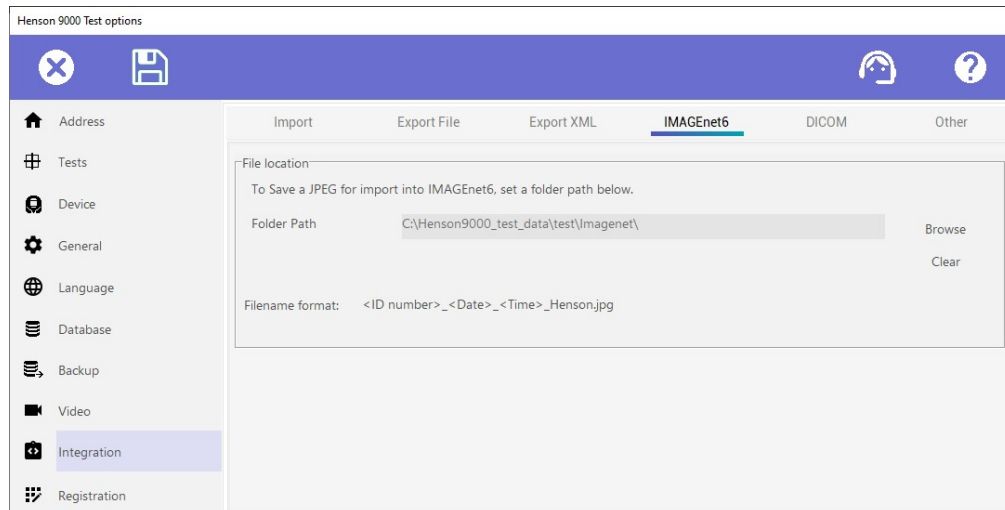
The PDF path can be different from the XML path, if required, or can be set the same by pressing the Same as XML path button.

(If the PDF path is turned on after the XML path is set, then the default PDF path will be the same as the XML path.)

5.8.4 Integration - IMAGEnet6

The Henson software can save a copy of the report in PDF format with a filename set for IMAGEnet 6.

Click the Browse button to set the location for the file.



5.8.5 Integration - DICOM

The Henson software can accept Modality Work Lists (MWL) from a DICOM compliant server and send reports for storage to the server.

To enable the MWL, click the Enable tick box and set the address of the server along with the port, server and client titles.

(This information will be provided by the MWL server configuration.)

The screenshot shows the 'Henson 9000 Test options' window. At the top, a blue banner contains a save icon and the text: 'Please make any other changes you wish and click the Save button.' Below this is a navigation menu with icons for Address, Tests, Device, General, Language, Database, Backup, Video, Integration (highlighted), and Registration. The main area has tabs for Import, Export File, Export XML, IMAGEnet 6, DICOM (selected), and Other. Under the DICOM tab, there are sub-tabs for MWL and Storage. The MWL sub-tab is active, showing a 'Modality Work List (MWL)' section with the following fields and options:

- Enable MWL
- Server Address: [Text Field] Test
- Server Port number: [Text Field] Modality: [Text Field]
- Server AE Title: [Text Field] Client AE Title: [Text Field]
- MWLAuto-refresh [1] Minutes
- Display in reverse order
- Use Date

The Modality field does not have to be filled in, but if it is, the text will be used in the modality query of the server.

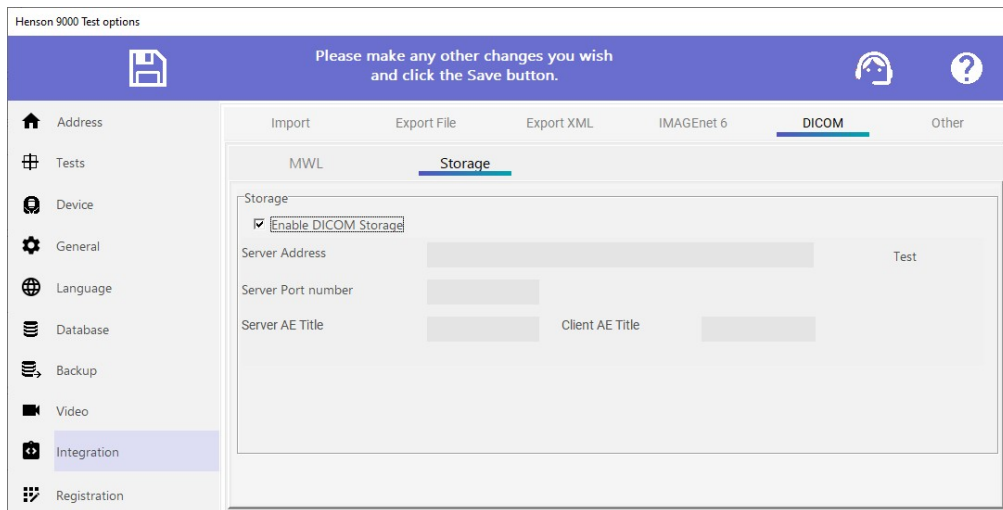
NOTE: The modality text is case sensitive and must match that used on the server (usually this is UPPERCASE)

If the MWL list is prone to change during the working day, then an automatic refresh can be activated. Once activated, set the refresh time in minutes. A manual refresh is also available on the Patient Selection screen.

The list can be displayed in reverse order. This is useful if the MWL is refreshed and the newest patients are added at the bottom of the list.

The Test button can be used to determine if the address and port information is correct, and the server is responding.

To enable the storage of files in the DICOM server, click the Enable DICOM storage tick box.



Set the address of the server as well as the port and server/client titles (this information will be provided from the DICOM server).

The Test button can be used to determine if the address and port information is correct, and the server is responding.

When a field test is saved from any of the tests, a copy of the report will be encapsulated in a DCM file and sent to the DICOM server for storage.

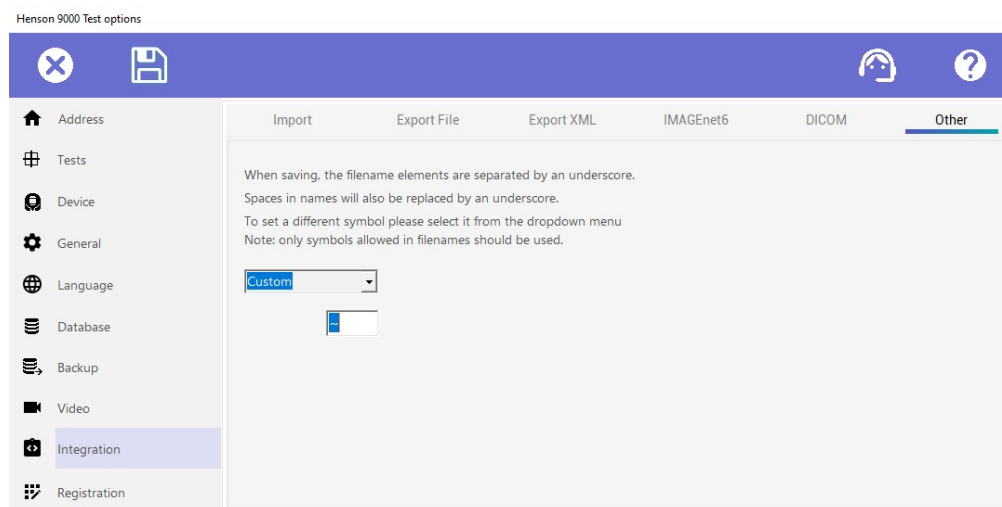
5.8.6 Integration - Other

This page allows the separator used when parameter items have spaces in them to be chosen.

By default, the different elements that make up the file name are separated by underscore characters (_).

If a patient's name contains spaces in either the surname or first name, then traditionally these would also be replaced by an underscore character.

The Other tab allows the patient name separator character to be chosen so that practice management system import routines are not getting out of sync when a space is present in a name.



A variety of allowed characters are available in the drop-down menu or, if a custom separator is required, then choosing "Custom" from the menu allows for the separator to be typed into the text box.

Note: Choosing a custom character or string that is not permitted in file names will result in an error when saving that may result in loss of data.

5.9 Registration and licensing

The Henson software needs to be licensed in order to continue to work after the 30 day evaluation period.

The licence key supplied is a single use licence and cannot be used for multiple computers.

Once the software is activated this process does not have to be repeated unless the software is required to be moved to another computer in which case the licence needs to be **released** first.

All user accounts that log in to the computer must activate the license separately. This activation can use the same licence key and overcomes issues with Windows locking users out.

To activate the software, the postcode of the site (or a PC identifier) needs to be entered along with the licence key which can be found on the label on the rear panel of your Henson.

Henson 9000 Test options

Please make any other changes you wish and click the Save button.

Software License DICOM License

Licence Status:
Your temporary licence will expire in 30 days.

Activate Online

Activate Offline

Enter the 25 digit license key from your Henson in the boxes below and click activate

Licence Key
____ - ____ - ____ - ____ - ____

Postcode

There are 2 options to register the software:

Online - if your computer has an internet connection then you can register it directly.

Offline - if your computer does not have an internet connection then registration can be done using a smart phone that has a data plan.

In both cases a licence number will be required - this is either supplied with your Henson device or was purchased as part of an upgrade. The licence number is in the form of a 25 digit number separated by hyphens.

For example, 12345-12345-12345-12345-12345

Enter the licence key **and** postcode in the boxes on the form as shown above.

If you have an internet connection, just click the Activate **Online** button and the software will communicate with the licensing server online and activate the software.

If you do not have an internet connection then only the Activate **Offline** button will be displayed as shown below:

Licence Status:

Your temporary licence has 30 days.

Could not find licence server. Check your internet connection.

Enter the 25 digit license key from your Henson in the boxes below and click activate

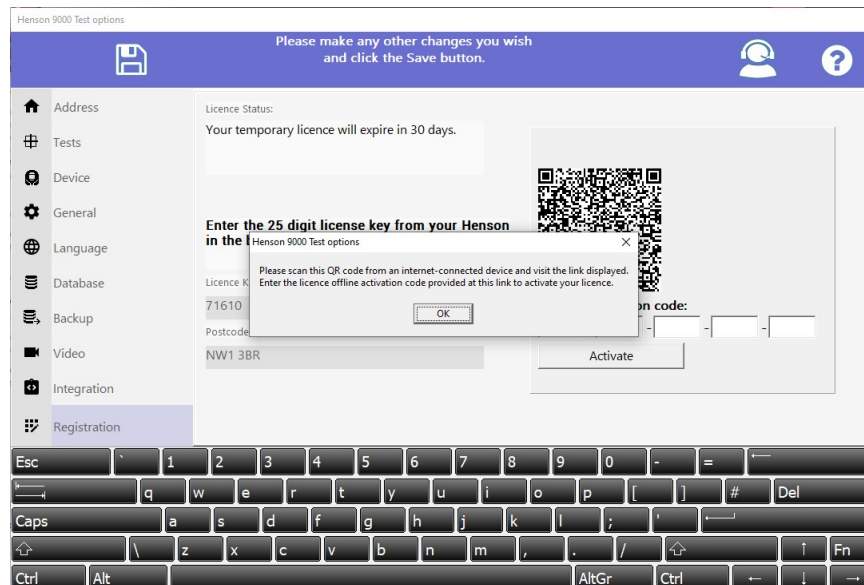
Activate Offline

Licence Key:

 - - - -

Postcode:

Pressing the Activate Offline button after filling in the license key and postcode details generates a QR code (as shown below) which should be scanned with a smart phone device with a data connection.



The QR code is a link to a website which will then display the licence **activation** key for you to enter in the boxes below the QR code.

Once entered press the Activate button and the software will check the response and activate the software if the number is correct.

If there is any error in the process, then the reason will be displayed.

To **release the licence** for example to use it on another computer, just navigate to this tab and press either the Online or Offline Release button.

If performing the Offline tab, another QR code will be displayed that should be scanned with a data enabled smart phone to release the licence.

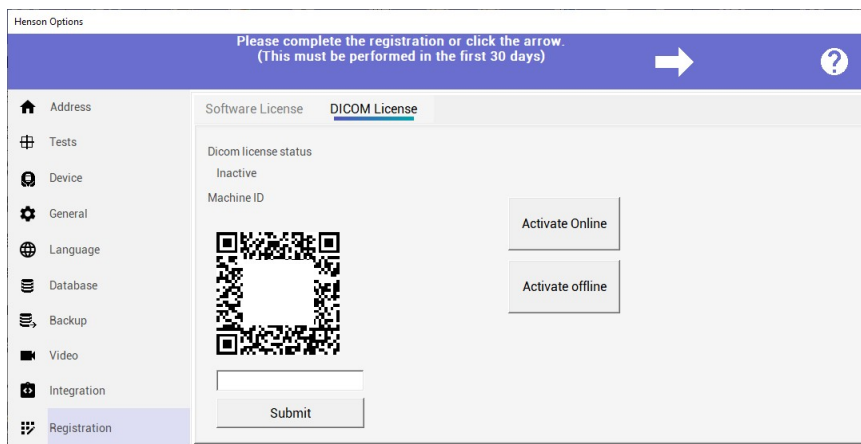
DICOM license

The DICOM license will be applied automatically online if any of the DICOM elements is enabled (DCM, MWL or Storage).

When saving, if the computer has internet access, the license will be applied online automatically.

If access to the internet is not possible then a message will be displayed and the DICOM license screen will be displayed.

As with software licensing, click the Activate Offline button and scan the QR code with a data enabled mobile device.





The mobile device will display a web page with a registration number. Type the registration number into the box below the QR code and click the Submit button.


The license status will change to Active.

5.10 Save/Cancel


In the Options program there is a global save button that will save all changes made since the program was opened.

Click  to save the changes made on all pages.

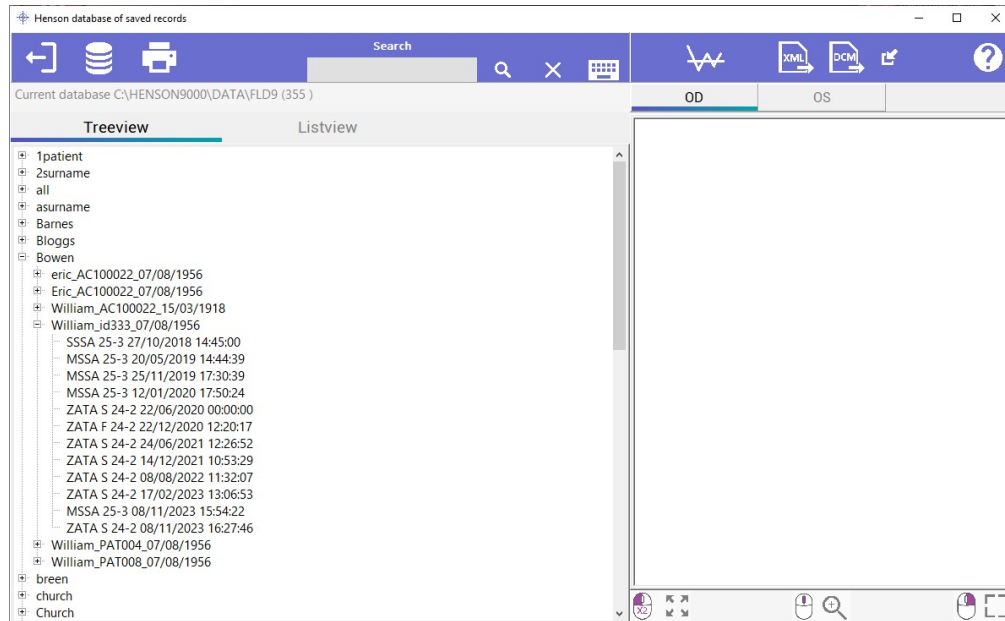
Click  to exit without saving any changes. **Note:** You cannot exit without saving if the Configuration Assistant has been active.

Click  to obtain on-line help.

6 Database program

Visual field data from all test programs are saved in a powerful Windows™ database. To view this data exit any test programs and from the [start-up screen](#) click  on the menu bar.

The location of the database file is set within the [Options](#) file.



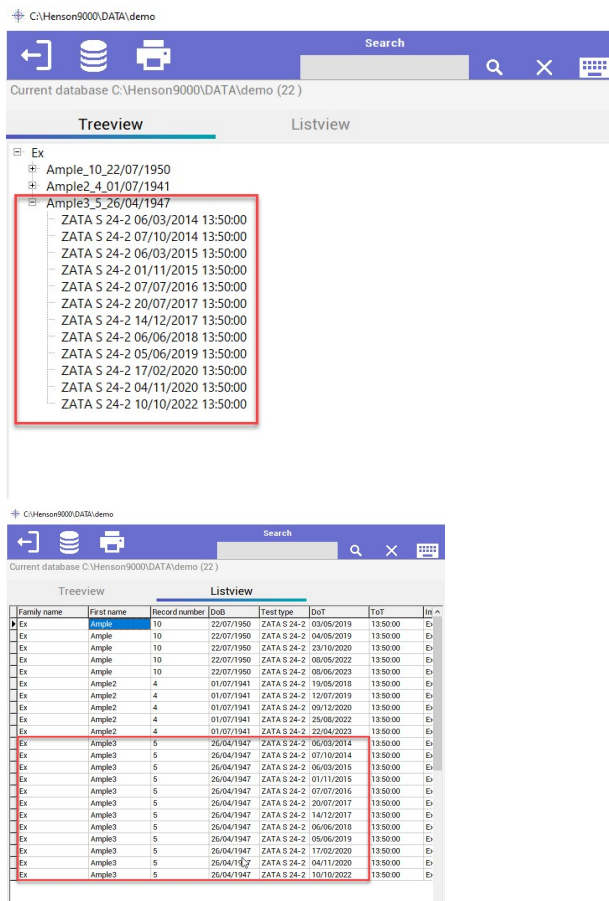
To get more help on a Database item click over that item on the image.

Note: To print reports you will need to have a PDF viewer installed on the computer.

6.1 List/Tree views

There are two options for viewing database records, Listview and Treeview.

Listview, lists all records in alphabetical order, (by surname, first name and then chronologically by test date), while Treeview lists all patients, grouped by surname. Clicking on a surname in Treeview will display the first names of all the patients with the same surname and clicking on a first name will display all records for the selected patient.



The default view can be set in the [Options](#) program and the view can be changed by clicking the Listview or Treeview tabs.

6.2 Moving through the database

The selected record in the database is highlighted and has an arrowhead in the left column, see below.

Treeview		Listview					
Family name	First name	Record number	DoB	Test type	DoT	ToT	In ^
▶ Patient	test	1	15/08/1969	MSSA 25-2	24/05/2018	10:30:38	Pe
patient	a	123456	11/07/1964	MSSA 25-3	17/10/2023	16:21:02	pe

You can move through the database list by:

- Clicking on any row in the grid.
- Pressing the up/down arrow or Page keys (if the database grid has been clicked on).
- Dragging the vertical slider up or down.
- Using the scroll wheel of the mouse (if the database grid has been clicked on).
- Using the [Search facility](#).


Note: The order of records is initially sorted by family name. You can sort by ID number (Record Number) or test date (DoT) by clicking on the appropriate column header.

6.3 Finding a record in the database

When you first enter the database, the Treeview and Listview are both sorted alphabetically by family surname.

To sort the database by ID number or date of test, change to the Listview and click on the appropriate column heading.

Treeview		Listview					
Family name	First name	Record number	DoB	Test type	DoT	ToT	In ^
▶ Patient	test	1	15/08/1969	MSSA 25-2	24/05/2018	10:30:38	Pe
patient	a	123456	11/07/1964	MSSA 25-3	17/10/2023	16:21:02	pe

You can search for a specific family or first name or an ID number by entering details into the search box on the toolbar and pressing the search button. 

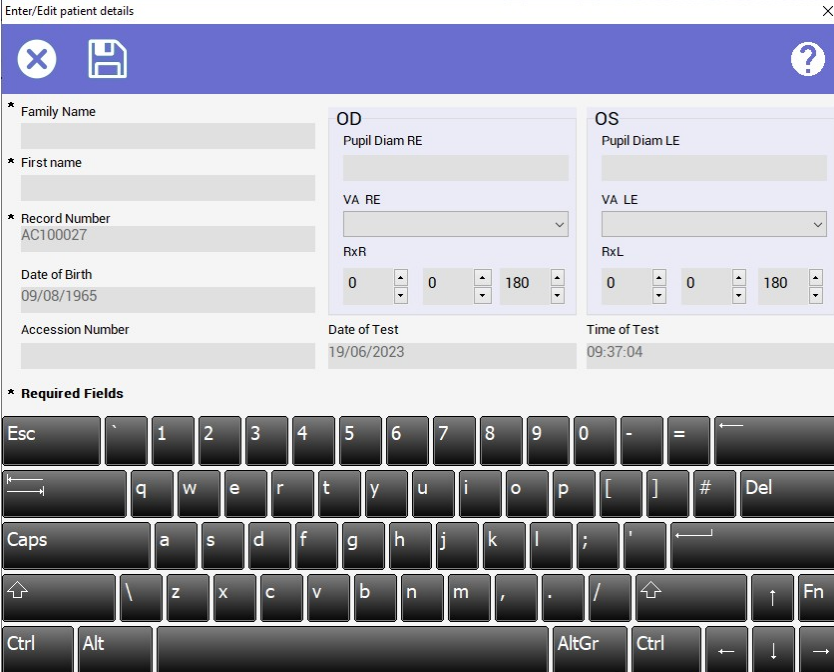


The database view will change to the List view and the matching records will be displayed.

To clear the search, press the clear search button.  The view will revert to that set in Options.

6.4 Editing data in the database

To edit a record, click  to display the screen below.



Use either the on-screen keyboard or an external keyboard to enter/edit the data in the fields.


Only use the following characters: letters A-Z, numbers 0-9 and hyphen -

Click  to save your changes,  to return without saving.

Note: It is not possible to edit the patient date of birth as for all tests except the Binocular Esterman test, as this date was used to establish the test/age normal defaults.

6.5 Deleting a record from the database

To delete a record from a database:

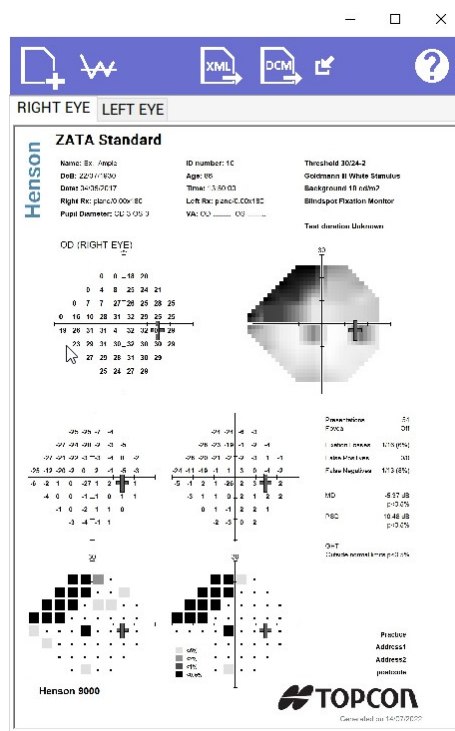
1. [Select](#) the record to be deleted.
2. Click .
3. When prompted, confirm the deletion.

The database will be updated along with the backup.

Once deleted, a record can only be retrieved by recovering it from the previously numbered backup file.

6.6 Visual field chart

The stored image of the visual field chart for the [selected record](#) is shown in the right-hand panel.



The image displayed can be made larger using the mouse control.



Clicking on the image and then scrolling the mouse wheel will zoom into the image at the location of the mouse pointer.


Right clicking on the image will return it to its original size.

Double clicking the image will open it in the default picture viewer on your computer.

6.7 Image files

The Henson saves an image of the report when a record is saved.

The format of this image file is JPEG.

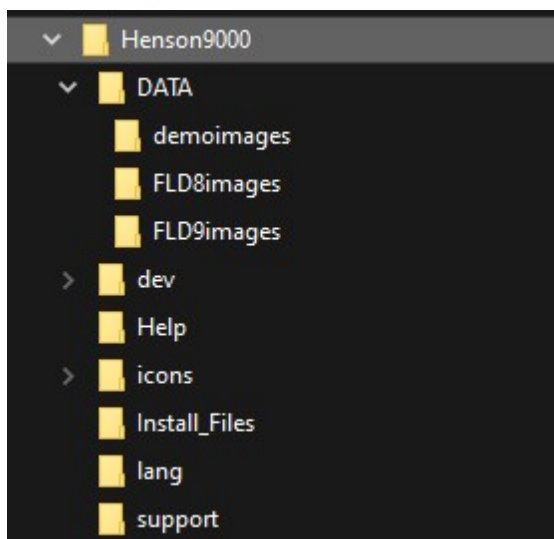
Lost images can be re-created by pressing the create image button  on the toolbar and select whether to create an image for the currently selected record or all missing images.

The directory where the image files are stored is a sub directory of your database directory and its name will be your database name plus 'images'.

In the example below you can see the Henson directory with a sub-directory 'Data' where the database files are normally placed. You can also see 2 further sub-directories, 'FLD9images' and 'FLD8images'.

These sub-directories contain the image files. In this case there are two sub-directories because there are two databases, 'FLD9' and 'FLD8'.

Note: the FLD8 database is from a version before 4.1. It was replaced by the FLD9 database structure to accommodate longer ID numbers and names. FLD8 database can be merged into FLD9 databases in the [Utilities program](#)




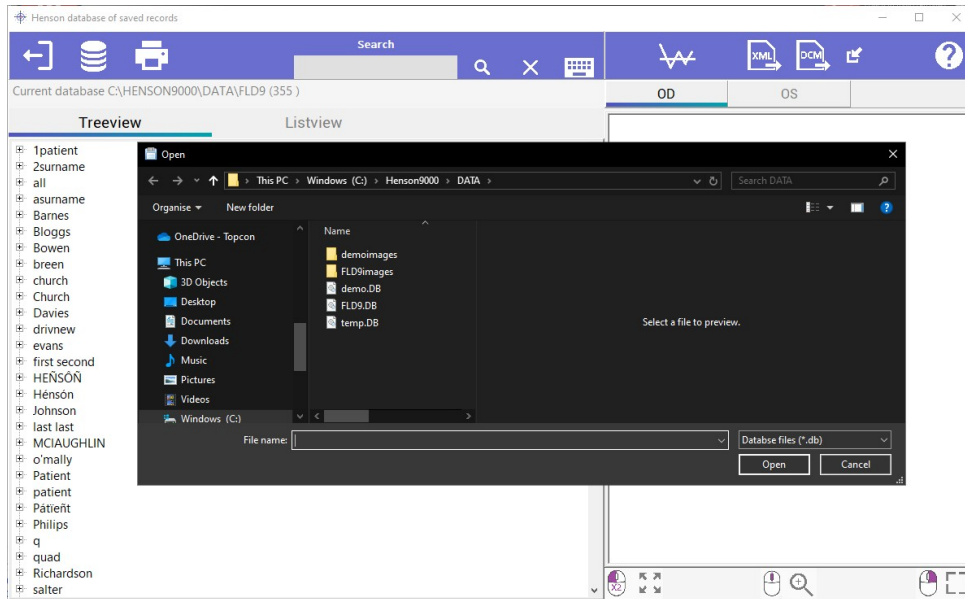
Note: On some of the early Henson perimeters the image files were stored in a sub-directory simply called 'images'. If this is the case you can just rename this directory by adding the name of the database, e.g. if your database is FLD9 then the directory should be renamed 'FLD9images'. This will prevent the re-creation of the images in the new folder if they already exist.


6.8 Changing the active database

The Henson can access and use many different database tables. Each one might contain data from a specific study, or a group of patients. On start-up, the database program displays data stored in the table defined in the [Options](#) program.

To view data stored in a different database:

1. Click  to see the Window (below).





2. Select the drive, folder and database name, then click .

Note: When you next collect and save data, the program will revert to the default database specified in the [Options](#) program.

6.9 Printing a database record

To print a record from the Database:

- a. [Select](#) the record you wish to print.
- b. The test chart should appear in the right-hand panel - if not click  to restore.
- c. Press  on the toolbar.
- d. The currently displayed image will be opened in your computer's default PDF viewer.
- e. Follow the PDF viewers controls to print, email or save the file.

6.10 Backup copy of the database

The Henson automatically keeps a backup copy of the database that is updated every time you save or modify a record. This backup copy should be on a different drive (e.g., external disc or network drive). The location of backup copy is defined in the [Options](#) file.

This backup will ensure that you do not lose your data in the unlikely event of a drive failure.

The backup uses a rolling 20 copy system. Each successive backup is appended with an increasing number from 1 to 20 before it goes back and overwrites backup 1.

There is an option to create a periodic backup that is NOT overwritten in the normal sequence. This can be found in the [Options-backup](#) section. The periodic backup will be renamed as the database name with `_PERM_DDmmYYYY` where DDmmYYYY are the current date.

The interval between backups can be set in days. The default setting is 7 days.

Important:

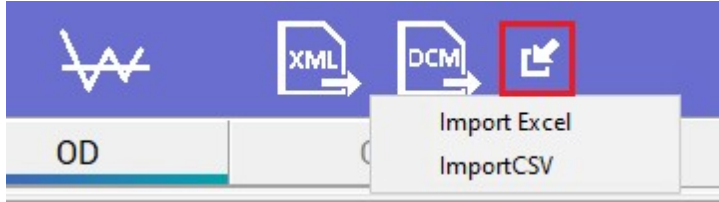
You should periodically make an additional copy of the database and store it in a safe location away from the computer attached to the Henson.

This will ensure that if the computer is damaged (e.g. a fire) you still have a copy of the database.

To make an additional copy, go to the [Copy facility](#) of the [Utilities](#) program.

6.11 Import records

The Import button presents 2 options:




The Excel option is a formatted import of HFA data. (see below)


The CSV is a comma separated variable file containing patient information only, see the CSV section below for file details.

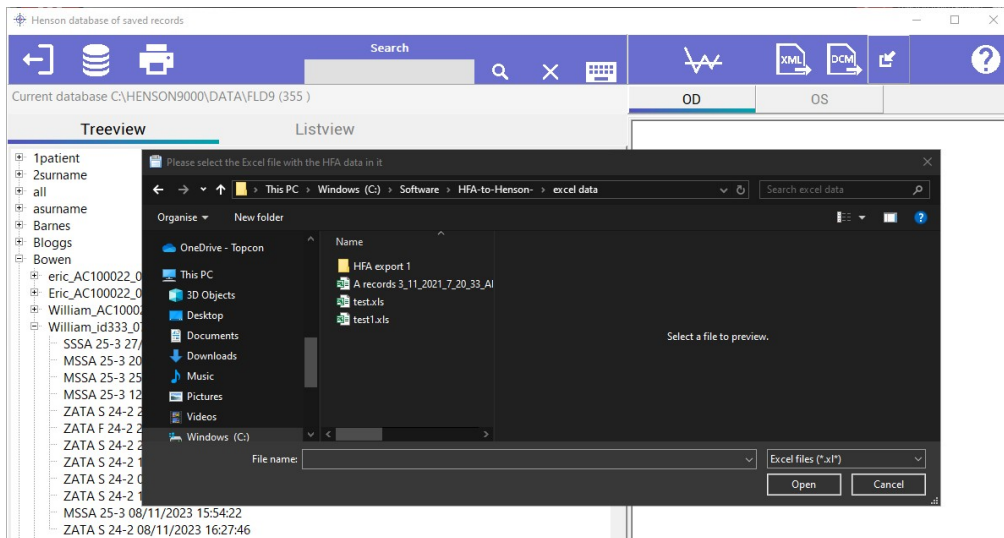
Excel import of HFA data

The Henson Database can import threshold test data using the 24-2 test patterns from the Humphrey Visual Field Analyser (HFA II).

This is a two-stage process. The HFA II files are first exported to an Excel Spread Sheet using the [HFAtoExcel.exe](#) program. In the second stage they are imported from the Excel Spread sheet into the Henson database.

The Import Records button  triggers the second stage.

Select the Excel file where your HFA data has been stored and then click .



The 2 stage process allows:

1. Editing of the HFA II data. It is not uncommon to find typing errors in records. These can easily be checked and corrected within Excel before entering the data into the Henson database.
2. It allows users to analyse the visual field data, e.g. number of tests undertaken within a specific time frame.

For the first stage it is recommended that users consult their distributor who will be able to guide them through the process of exporting data from the HFA II, a process that can take a long time when a large number of records need to be transferred.

CSV import

The CSV is a file format where, as the name suggests, the items in each row are separated by commas. It can be created in a text editor, saved from Excel or possibly output from practice management software.

The file will contain patient information only and can be used to select patients from the main menu.

The format of the file must be as follows for the import to work.

Header row

Surname, first name, ID number, date of birth, Rx Right , Rx left <CR>

Surname, first name, ID number, date of birth, Rx Right , Rx left <CR>

<CR> denotes a carriage return to start a new line.

The first row of the file is ignored so it should not contain actual data. It can contain headers for the columns. (it cannot be blank).

The rows containing the patient data should all be terminated by a carriage return (this will be pressing the enter key if typing manually or done automatically if created from Excel or other software)

The date of birth should be in the same format as the Henson computer, e.g. DD/MM/YYYY (the format is displayed in the lower right side of the computer desktop)

The Rx data should be in the format SPH/CYLxAXIS, e.g. -2.75/-1.5x90

To import the CSV file, press the import button and select CSV.

Browse for the CSV file using the browse window (note, only files with the CSV file extension will be listed) and select it.

The file will be imported and the entries will be visible in the database in the normal way in the tree and list views

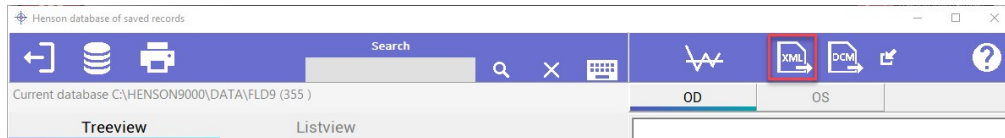
There will not be a test associated with the name entry in the list and tree views and the date will be displayed as 01/01/1900.

When using the patient selection screen, the entry should be selected in the usual way before choosing and starting a test.

6.12 Export XML

The database allows for XML files to be produced manually.

If the XML output is selected in the [Options program](#), then the XML button will be displayed on the toolbar.



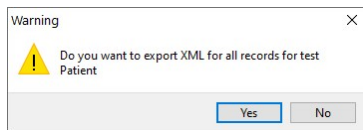
Pressing the XML button presents three options.



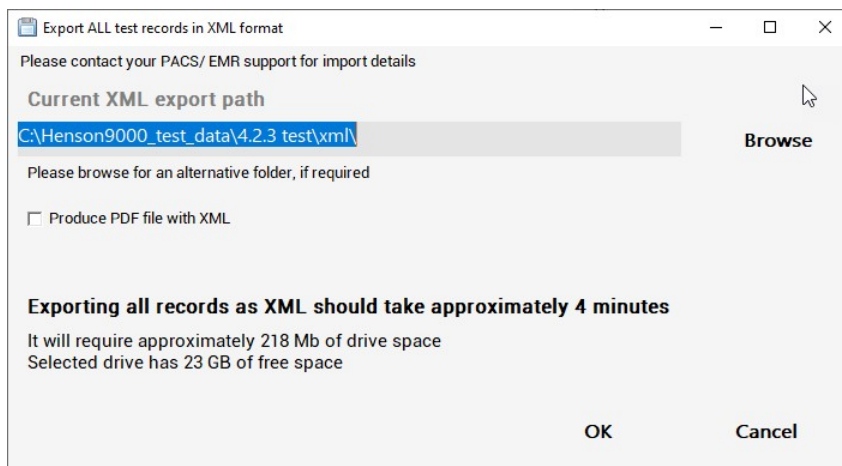
The first option exports an XML file for the currently selected record.

The second option will prompt and ask if you want to export XML files for all records associated with the currently selected patient.

(In the example below "test" is the first name and "patient" is the surname of the currently selected patient.)



The last option will perform a bulk export of XML files for all records. A window is displayed, confirming the location to export to. The current XML export path (as set in Henson Options) is displayed but a different location can be selected with the Browse button.



The number of records will be counted, and an estimate of the time will be given. (Approximately 18 minutes for every 1000 records depending on destination folder)

An estimate of the drive space required will also be displayed along with the amount of free space available on the selected drive.

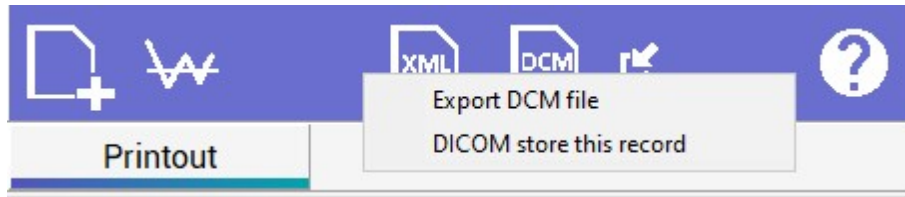
Pressing the OK button will start the export process. An on-screen indicator will display the progress.

6.13 Export DCM

If either of the DICOM options (DCM file or DICOM storage) are enabled in Options-Integration then the Database will display the Export DCM button.



When pressing this button, the pop up menu will display either or both of the options available.



The DCM save will save a copy of the DCM to the folder specified in [Option-Integration-Export file](#).

The DCM store option will send the DCM file to the DICOM server specified in [Options-integration-DICOM](#)

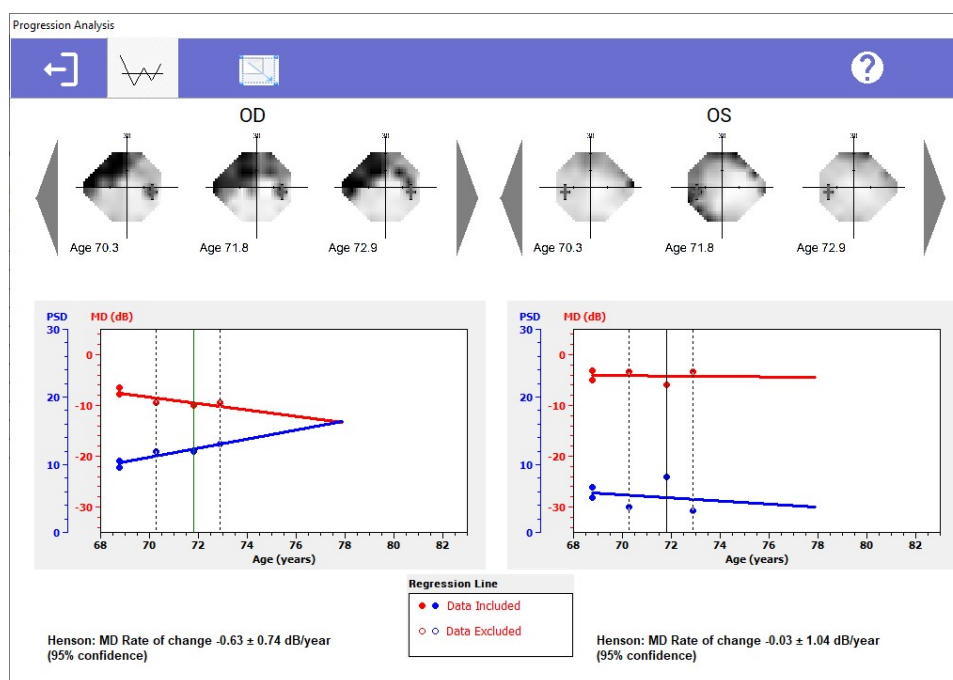
6.14 Progression analysis

You can monitor the rate of change in the visual field in the [Database](#) program.

The progression screen below shows two graphs (one for each eye) that display the global indices [Mean Deviation](#) (MD) and [Pattern Standard Deviation](#) (PSD) versus the age of the patient.

As a visual field defect gets worse the Mean Deviation will become more negative and the Pattern Standard Deviation more positive, at least initially.

Each data point represents a visual field record (collected or imported) and when there are 4 or more data points a best fitting (least squares linear regression) line is drawn through the points.



The Mean Deviation rate of change (dB/year) is given below the plots along with its 95% confidence limits.

In the example shown, the rate of change is -0.98 dB/year in the right-eye (OD) while the confidence limits are ± 1.63 dB/year. If the rate of change is higher than the confidence limits the progression is significant at the 95% limit.


The three vertical lines on each plot represent the time points that correspond to the three grey scale images shown above each graph.

When first entering the analysis, the display will show the last three visits. You can move to different visits by clicking the left/right arrows on either side of the grey scales.


Outliers in the data series can have a large effect upon the gradient of the regression lines. They can be removed by clicking over the data point. Clicking a second time re-introduces the data point.

The data can also be presented on a [Glaucoma Staging System II](#) (GSS) chart by clicking the  button.

The GSS II chart plots [Mean Deviation](#) versus [Pattern Standard Deviation](#) and divides the plotted area into seven stages (Normal, Borderline and five levels of loss).

Click  to close the progression windows and return to the database.

On return, the visual field chart on the right-hand side of the screen will be replaced by an image of the last progression screen.

This can then be [printed](#) by pressing the print  button

If the option to auto-create the progression image is set in the [Options-database](#) then the 2-page PDF will be created in the folder defined there.


Note: If 30-2 tests are included in the progression data, the plotted indices are calculated from the 24-2 locations. This is to ensure compatibility with 24-2 progression.

6.14.1 Glaucoma Staging System II (GSS II)

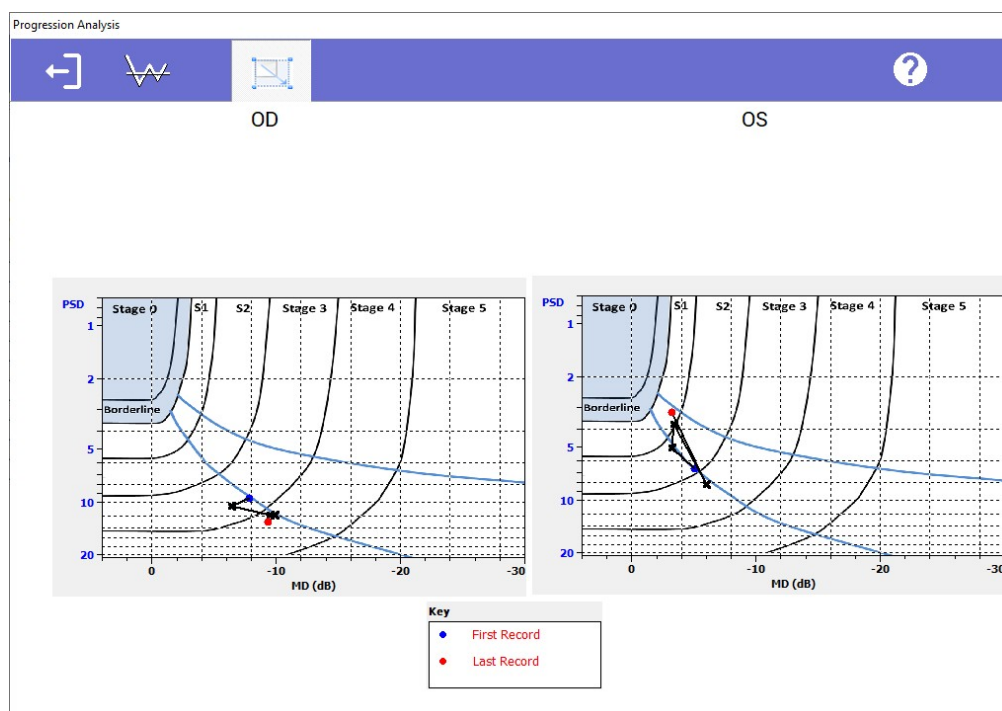
It is often helpful when reviewing visual field data to have a means to scale the extent of loss.

The Henson 9000 uses the GSS II system developed by Paolo Brusini. It is based upon the [Mean Deviation](#) and [Pattern Standard Deviation](#) and plots these two global measures against each other.



Click the  button to display the GSS2 plot.

The plot area is divided into seven regions, Normal, Borderline and five stages of loss. Stage one being early loss while stage five is advanced loss.





Using both Mean Deviation and Pattern Standard Deviation is better than using either index in isolation. Pattern Standard Deviation is more sensitive than Mean Deviation to early localised loss while Mean Deviation is more valuable when defects become advanced.

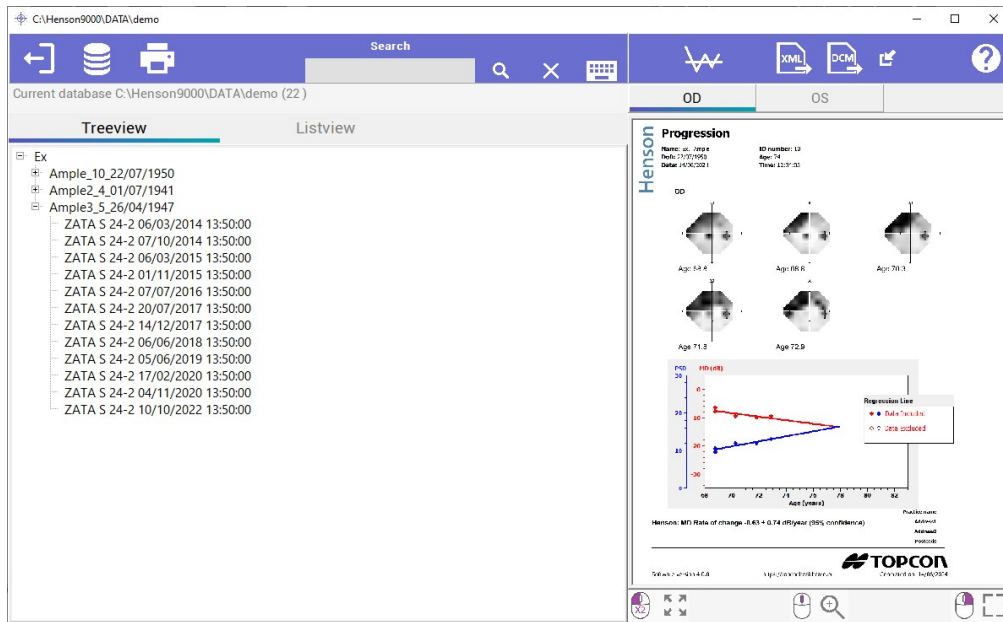
The progression software plots each visual field result as a point on a GSS II chart and connects the points together with a line. The first record point is coloured blue while the last one is coloured red. Ideally you would like to see all the points clustered together indicating that there has been very little change.

Movement towards the lower right-hand corner (towards stage five) indicates progressive loss.

6.14.2 Progression printing

To obtain a print of the progression analysis:

1. Exit the progression analysis by clicking 
2. The right-hand panel will contain the progression analysis, see below.
3. Click 



The image shows a maximum of six grey-scale plots. When there are more than six data points the grey scales from the first two and last three will be displayed.

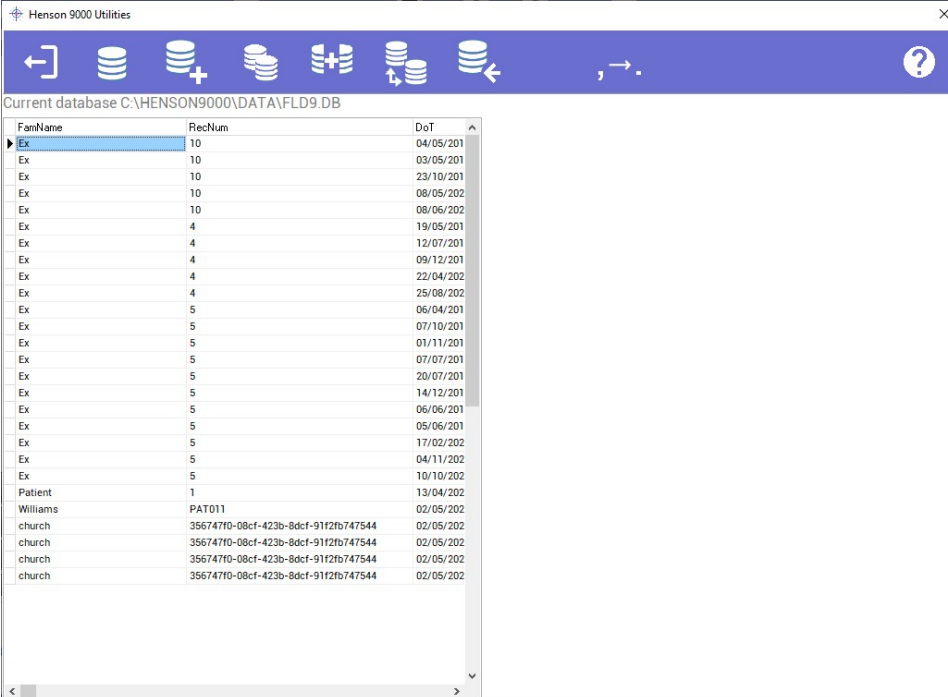
Any changes made while in the progression analysis (e.g. excluding an outlier) will be duplicated in the image which will display either the line plot or GSS II plot depending on which was active on exit.

7 Utilities program

The Utilities program contains a number of routines to help with the management of your visual field database.

When opened, a list of the records in the current database (specified in the [Options](#) file) is displayed.

To get more help on a utilities screen item click over that item on the image below.





The screenshot shows the 'Henson 9000 Utilities' window. The title bar indicates the current database is 'C:\HENSON9000\DATA\FLD9.DB'. The main area displays a table with three columns: 'FamName', 'RecNum', and 'DoT'. The first 20 rows are labeled 'Ex' and contain various record numbers and dates. The last three rows are labeled 'Patient', 'Williams', and 'church'.

FamName	RecNum	DoT
Ex	10	04/05/201
Ex	10	03/05/201
Ex	10	23/10/201
Ex	10	08/05/202
Ex	10	08/06/202
Ex	4	19/05/201
Ex	4	12/07/201
Ex	4	09/12/201
Ex	4	22/04/202
Ex	4	25/08/202
Ex	5	06/04/201
Ex	5	07/10/201
Ex	5	01/11/201
Ex	5	07/07/201
Ex	5	20/07/201
Ex	5	14/12/201
Ex	5	06/06/201
Ex	5	05/06/201
Ex	5	17/02/202
Ex	5	04/11/202
Ex	5	10/10/202
Patient	1	13/04/202
Williams	PAT011	02/05/202
church	356747f0-08cf-423b-8def-91f2fb747544	02/05/202
church	356747f0-08cf-423b-8def-91f2fb747544	02/05/202
church	356747f0-08cf-423b-8def-91f2fb747544	02/05/202
church	356747f0-08cf-423b-8def-91f2fb747544	02/05/202

7.1 Opening an existing visual field database

To view records from a different database:


1. Click  on the Utilities toolbar.
2. Select the drive, directory and database from the drop-down menus.
3. Click .

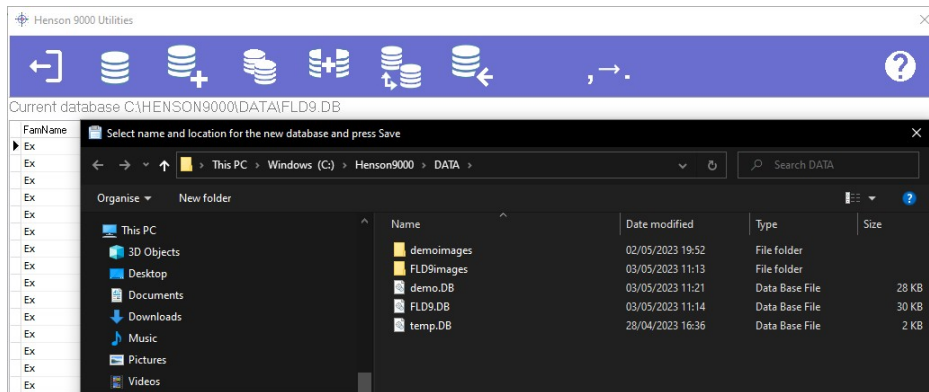
Once a database is opened you will be able to perform all the other utility routines, e.g. copy, merge or edit.

When you exit the Utilities program the Henson software will revert back to the database defined within your [Options](#) file.

7.2 Creating a new visual field database

To create a new Henson database:

1. Click  on the Utilities toolbar. A Windows browse form opens, showing only database type files.



2. Browse to the drive and directory where you want to create the new database.
3. Enter a file name for your new database (you do not need to type the file extension .db) in the text box on the form.
4. Click the Save button.

Once created the new database will be opened in the Utilities program. It can be set to be your default database within the [Options](#) program.

If you want to create a new folder for the database, browse to the location and right-click in the folder. Select New from the pop-up menu and type the folder name before pressing enter or clicking elsewhere in the folder. Double click the newly created folder to open it and select it as the destination, before clicking the Save button.


When the database is created, a folder will be created in the same location to hold the visual field chart images.

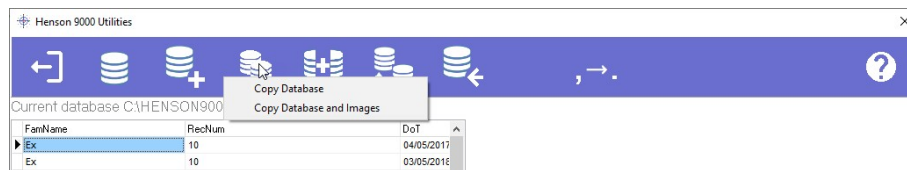
When you exit the Utilities program the Henson software will revert to the default database defined within your [Options](#) file.

7.3 Copying a visual field database

To copy the database, make sure that the destination is available - this can be a removable drive (USB flash drive) or a network / mapped drive.

Connect a removable drive/pen to an available USB port.

1. Click  on the Utilities toolbar, a pop-up displays two options:
 - Copy the database or
 - Copy the database and the images folder.



2. Select the required options. A Windows browse form opens.
3. Browse to the destination folder and click the "Select folder" button.
4. When the copy has been completed, an on-screen message will confirm the copy.

If this copy is for backup purposes store the removable drive in a safe place. Ideally this should be at a remote location so that if there is an event, such as a fire, that damages your perimeter you will still have a copy of your data.


Notes:

- The database name will remain the same as the original.
- This function copies all the database files along with the sub-directory '***images' which contains the image files.

7.4 Merging databases

The merge facility allows for two databases to be merged together. The database currently displayed by the utilities program is the destination of the merge and the source is selected by browsing the file system.

If you do not wish to merge into the default database, the one set in Options-Database, then first open the destination database by clicking the [Open button](#).

1. Click  on the Utilities menu bar, a Windows browse form opens, displaying only Henson database file types.
2. Browse for the drive, directory and name of the database you wish to merge into the current database.
3. Click the Open button on the form.


Depending on the size of the database this operation may take a few moments.

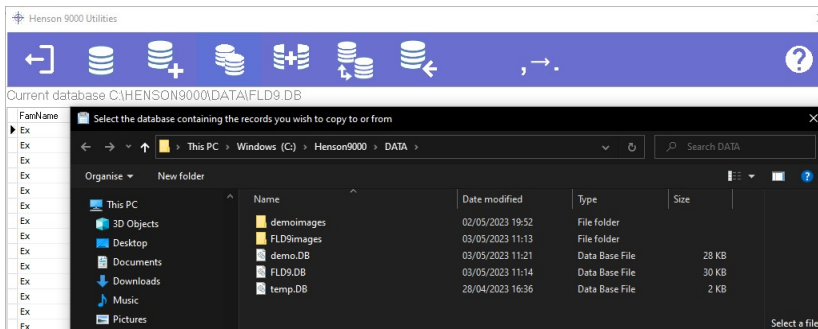
The Merge function copies all of the records into the currently displayed database and will also copy the associated image files.

The merge facility can be used to restore from a backup file or if you have more than one Henson perimeter and you want to add the data you have collected on one instrument to that collected on the other.

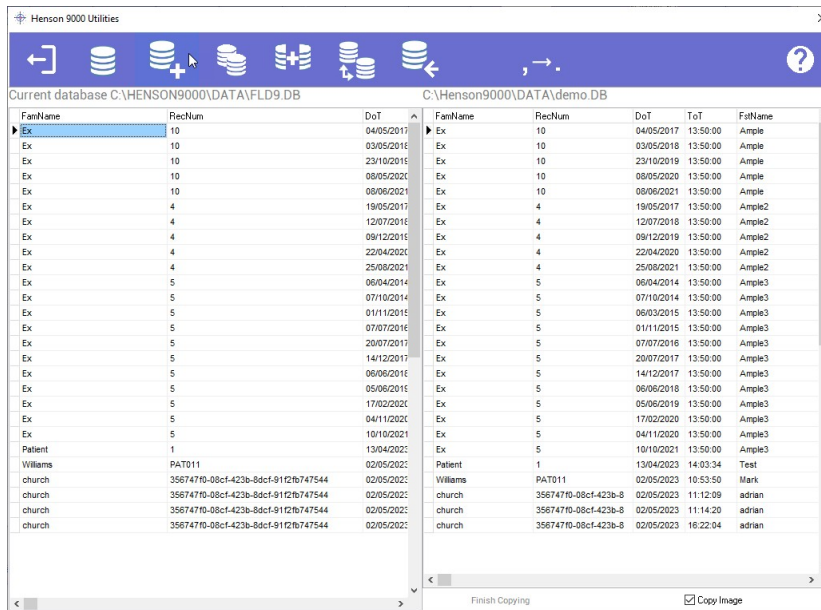
7.5 Copying selected records between databases

The individual copy facility allows records to be copied between two databases. Both databases are opened and records can be copied from one database to the other by double clicking.

1. [Open](#) the target database. If the default database ([Options - database](#)) is not the intended source or destination, then use the [Open button](#) to select another database.
2. Click  on the Utilities toolbar, a Windows browse form is displayed, filtered for Henson database file types.



3. Browse for the other database and click the Open button.
4. Both sets of database records are now listed, the original on the left and the newly opened database on the right, see below. The full path and name of the database is displayed above the records.
5. Double clicking on a record in EITHER table will copy the record to the OTHER table.
6. The associated image file will be copied across if the Copy image tick box (lower right corner of the window) is ticked
7. Click the Finish Copying button when finished to close the second database window.

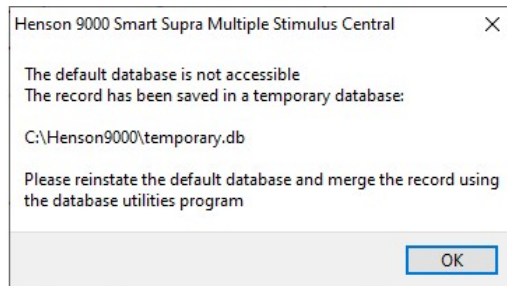


7.6 Importing temporary records

If during saving a test, the default database is not available, then the Henson software will create a temporary database and save the record into it.

This temporary database will continue to be used until the default database is reinstated.

The message below will be displayed when saving and no backup of the main database will be attempted.



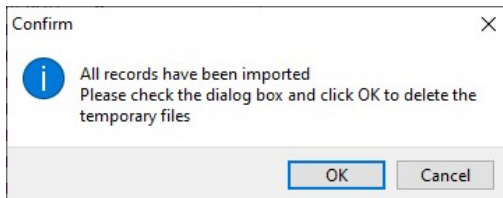
To import the temporarily saved records into the default database, once it has been restored,

press the Temp button  in the utilities program.

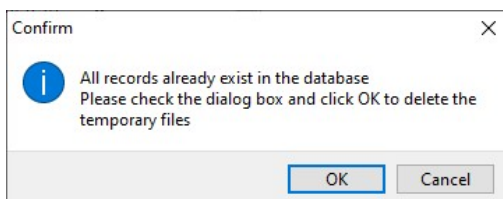
This is identical to the database merge routine except that the source database is pre-set to the temporary database.

The merge will be made, and the statistics shown on screen.

If the records were merged successfully (no errors encountered) then you will see the following message:



If the records were already in the database due to a previous import you will see the following message:





In either case, pressing the OK button will delete the temporary database after the merge of the records.

Pressing the Cancel button will leave the temporary database in place. Once the records are transferred there is no need to keep the temporary database.

7.7 Import Henson 6000 records

To import data from a Henson 5000 or 6000 database:

1. Click  on the Utilities toolbar. A Windows browse form opens filtered for Henson database file types.
2. Browse for the location of the database extracted from the legacy device.
3. Click  to initiate the import.
4. Once completed, a message will confirm the import.

7.8 Utilities decimal separator

The decimal separator is the symbol used between the integer and decimal part of a number. It will either be a period (.) or a comma (,).

From the 4.1.2 release of software the decimal separator is handled and displayed in accordance with the computer's [regional settings](#).

If the computer's regional settings have been changed previously then there could be a mixture of decimal points and commas in the database data. This should not present an issue as the data is presented correctly but if any errors occur when creating images or generating XML files then the conversion button can be used.



The notation on the button will depend on the computer's regional setting. Pressing the button will convert the field data to data with the decimal separator in the format required by the computer.

8 Appendix 1 - 9000 Technical specification

The Henson 9000 is a central visual field perimeter which is controlled from a PC running a Windows™ compatible operating system. It includes a series of [visual field tests](#), a [Database program](#), a [Utilities program](#) and an [Options program](#).

1. TYPE

Automatic perimeter capable of measuring the visual field out to an eccentricity of 80 degrees (with re-location of central fixation).

Stimulus distance is 25 cm.

2. STIMULI

LEDs with broad spectral output ranging from 400-740 nm.

Round with an angular subtense of 0.5 degrees (Goldmann III).

Luminance 0.05–3183 cd/m² (0.16-10000 asb).

Presentation time 200 ms.

Background is controlled with broad spectral LED's with output ranging from 400-740 nm.

Background luminance is 10 cd/m² (31.4 asb)

3. FIXATION MONITOR

Heijl-Krakau technique in ZATA program.

On-screen image of eye presented via CCD camera located below the central fixation LED.

4. FIXATION TARGETS

Red LED or cross pattern of red LED's with broad spectral output of 625–670 nm.

5. COMPUTER

The unit can be controlled from any PC meeting the minimum specification and running a compatible operating system.

6. INPUTS / OUTPUTS

2 off USB 2 compatible type A Ports (one for control and one for camera)

Mains Inlet Connector (IEC 320)

Patient Response Button socket.

7. DIMENSIONS

440 x 400 x 452 mm (L x D x H)

8. WEIGHT

14 kg

9. ELECTRICAL SPECIFICATION

Mains Input Voltage: 100-240 VAC: universal input.

Fuses: 2 off 20 x 5mm IEC 60127-2 Time delay.

Fuse rating: T2AH 250V (all voltages)

Frequency 50/60 Hz

Power consumption: 60 VA

Input Connector filtered IEC 320 socket.

10. CLASSIFICATION

Mains operated Class 1, Type B Applied Part (Headrest, Chin rest and Patient Response Button)

Continuous operation

Equipment not suitable for use in presence of flammable anaesthetic mixtures with air or oxygen or nitrous oxide.

Ordinary equipment without protection against ingress of water

11. ENVIRONMENT

ENVIRONMENTAL CONDITIONS						
	IN USE		STORAGE		TRANSPORT	
	Min	Max	Min	Max	Min	Max
Temperature (°C)	+10	+35	-10	+55	-40	+70
Relative humidity (%)	30	90	10	95	10	95
Atmospheric pressure (hPa)	800	1060	700	1060	500	1060
Vibration, sinusoidal (Hz 0.5g)					10	500
Shock					30g 6ms	
Bump					10g 6ms	

12 BIO-COMPATIBILITY


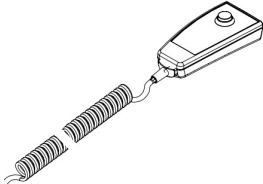



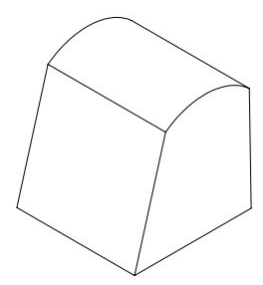
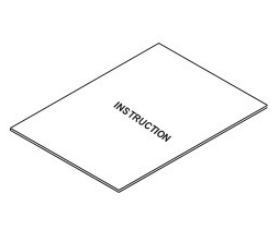

The chin rest and headrest pads are made from silicone rubber. The patient response button case is made from ABS plastic.

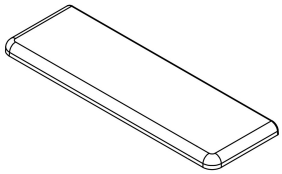
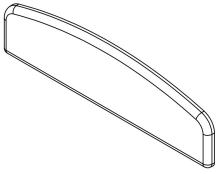

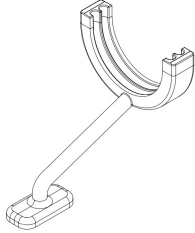
All are suitable for short term contact with intact skin.

13. ACCESSORIES AND DETACHABLE PARTS

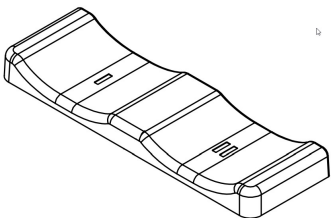

The Henson is supplied with the following accessories and detachable parts:

All parts are available as replacements. Part numbers are given (where applicable) in the table below.

	
<p>Software license v4.0 49-0000796</p>	<p>Patient response button 49-0000160</p>
	
<p>Mains lead (country specific)</p>	<p>USB flash drive 49-0000830</p>
	
<p>Occluder (eye patch) 48-0000189</p>	<p>Dust Cover 42-0001425</p>
	
<p>Instruction manual</p>	<p>Dual USB cable 42-0001426</p>

	
Chin rest rubber 42-0001427	Headrest rubber 42-0001428
	
Patient response button holder 49-0000829	Trial lens arm 49-0000831

14. OPTIONAL EXTRAS

	
Scooped chinrest 42-0001429	Electric Table

9 Appendix 2 - 9000 connection details

The picture below shows the rear panel and connections of the Henson 9000



The fuses are located in a drawer under the mains power inlet on the left-hand side of the rear panel.

The USB B type connectors are on the right-hand side.

The patient response button is plugged into the jack socket in the middle of the rear panel.

It has been discovered that some computers do not supply sufficient power on the USB ports and combined with the 2M USB cable do not power the camera properly, resulting in a blank picture when testing.

In these cases, the use of a mains POWERED USB hub is advised. This can also neaten the installation by making all cable connections from the Hub.

10 Appendix 3 - Installation

1. LOCATION

The Henson should be placed on a suitable flat surface, with no part of the unit over hanging the edge of the surface.

The patient aperture should be positioned away from direct light.

The electrical installation of the room where the Henson Perimeter is to be operated must comply with the "Regulation for the electrical equipment of buildings" published by the Institution of Electrical Engineers. The unit and any ancillary parts must be protected from ingress of liquids and flammable anaesthetic mixtures.

2. MAINS SUPPLY

The mains supply required is 60 VA (maximum, depending on instrument) 110-240Vac.

The supplied mains lead must be used and, if faulty, must be replaced by an IEC approved* mains lead with conductors of at least 0.75mm² cross sectional area. Replacement mains leads are available from the manufacturer, see the [replacement parts](#) section.

Access to the mains supply plug and socket must be maintained at all times as this is the means of isolating the device from the mains supply.

3. INTERCONNECTING

Connect the supplied mains lead from the mains input connector on the instrument to the mains supply (either direct from the wall socket or via the electric table).

Plug the patient response button jack plug into the socket on the rear panel of the unit.

4. ACCESSORIES

If the unit is located on a table with in-built electrical connections, the table should be connected to the mains supply using a suitable mains connection lead and the Henson should be powered from the power outlet at the top of the table.

5. SAFETY

Ensure the connected leads do not trail on the floor and are not subject to abrasion on sharp edges. Use only computers, printers, computers and monitors that conform to EN60950.

6. EMC

The Henson range of perimeters conform to European Directive 2014/30/EU for EMC. If emitted radiation causes interference with other items of equipment, position it further away or try a different orientation. Do not operate transmitters or mobile telephones in close proximity to the equipment.

Emissions tests	Test	Result
CISPR 16-2-1:2014 +A1:2017	Mains terminal disturbance voltages	Pass
CISPR 16-2-3:2016	Electromagnetic radiation disturbances – Magnetic field	N/A
CISPR 16-2-3:2016	Electromagnetic radiation disturbances – Electric field	Pass
IEC 61000-3-2:2018	Harmonic current emissions	Pass
IEC 61000-3-3:2013 +A1:2017	Voltage fluctuations and flicker	Pass
Immunity tests	Test	Result
IEC 61000-4-2:2008	Electrostatic discharge	Pass
IEC 61000-4-3:2006 +A1: 2007 +A2:2010	Radiated RF electromagnetic fields	Pass
IEC 61000-4-4:2012	Electrical fast transients and bursts	Pass
IEC61000-4-5:2014 +A1:2017	Surges	Pass
IEC61000-4-6:2013	Conducted disturbances induced by RF fields	Pass
IEC61000-4-8:2009	Power frequency magnetic fields	Pass
IEC61000-4-11:2004 +A1:2017	Voltage dips and short interruptions	Pass

Recommended separation distances between portable and mobile RF communication equipment and the device

The Henson device is intended for use in an electromagnetic environment in which radiated RF interferences are controlled. The customer or the user of the device can help prevent electromagnetic interference by keeping a minimum distance between portable and mobile RF communication equipment (transmitters) and the device as recommended below, according to the maximum output power of the communication equipment.

Rated maximum output of transmitter (W)	Separation distance according to transmitter frequency (m)		
	150kHz to 80MHz $d = 1.2 P$	80MHz to 800MHz $d = 1.2 P$	800MHz to 2GHz $d = 2.3 P$
0.01	0.12	0.12	0.23
0.1	0.38	0.38	0.73
1	1.2	1.2	2.3
10	3.8	3.8	7.3
100	12	12	23

For transmitters rated at a maximum output power not listed above the recommended separation distance d in meters (m) can be estimated using the equation applicable to the frequency of the transmitter, where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note:

(1) At 80 MHz and 800 MHz, the separation distance for the higher frequency range applies

(2) These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects, and people.


7. COMPUTER EQUIPMENT

The attached computer should be approved to EN60950 and meet the following minimum specification:

- CPU : 1GHz (minimum) Memory : 1 GB (minimum)
- Screen Resolution : 1024 x 768 (minimum - 1280 x 1024 recommended)
- Operating System : Windows™ Professional Version 8 onwards.
- Network : Wired or Wireless network adapter if networking is required.
- Connectivity : TWO Free USB type A ports (or a suitable powered USB hub) to connect to the Henson.

8. Installing the software

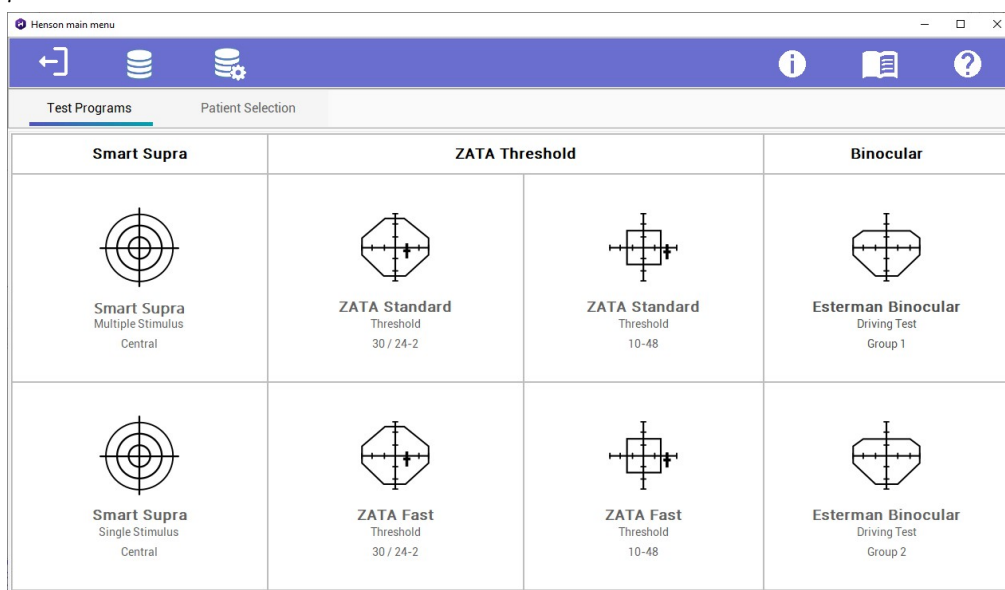
- Insert the supplied USB flash drive into the computer and wait for the prompt.
- Select Open folder to view files.
- Open the folder called Software and **RIGHT** click on the software .EXE file.
- Select **Run As Administrator** from the pop up menu.
- Follow the on-screen instructions to install the software.
- Once the software is installed, connect the USB cables between the perimeter and the computer and switch on the Henson using the rear mounted power switch.

- Wait for the Henson to complete its startup sequence. (Approx. 30-40 seconds).
- Open the Henson Options program by double-clicking  on the computers desktop
- A configuration wizard will run to guide you through the necessary steps: Language, Address, Backup, Camera and Registration.
- After the wizard completes you can change other settings,
- Click on the Device tab and check that there is a USB device listed in the list box on the page.
- Click Save to save all of your changes. (You can run the Options program again at any time from the desktop shortcut)
- Open the Henson software by double-clicking the desktop icon.



- The default menu screen is now visible.

To get more help on a test screen item click over the item in the image below.



- **Note:** If using a touch screen PC, it is advisable to check that the touch screen is in Mouse mode and not Digitizer mode as this affects the performance of the chin rest controls
- **Note:** To print reports you will need to have a PDF viewer installed on the computer.

11 Appendix 4 - Maintenance and warranty

Warning : Mains isolation - The mains cable to the device should be isolated from the mains supply by removing it from the wall socket before any inspection, maintenance or cleaning is undertaken.

If the unit is supplied with power from an electric table/stand, then the mains cable to the table / stand should be isolated from the wall socket instead.

[Regular Inspection](#)

- Changing the fuses.
- Replacing the head and chin rest pads.

[Cleaning](#)

[Preventative Maintenance](#)

[Replacement Parts](#)

[Repairs and Re-calibration](#)

[Warranty](#)

11.1 Regular inspection and maintenance

Before any maintenance or cleaning is undertaken, it is important that the mains cable is removed from the wall socket, isolating the unit from any power.

The equipment can also be isolated from the mains by removing the mains cable from the instrument.

Inspect the equipment casings and all cables before use.

If any damage is found the equipment should not be used before it has been inspected by a competent person.

Particular attention should be paid to the mains cable at the back of the instrument and the cable of the patient response button.

To change the Fuses

The fuses are housed in a small drawer located in the mains connector which is located on the rear panel of the Henson.

1. To change the fuses remove the mains lead from the wall socket and then from the socket on the rear of the Henson.
2. Use a small screwdriver to lever the fuse drawer out of the socket.
3. Withdraw the fuse drawer.
4. The fuses can be removed and replaced.
6. Push the drawer back into the mains inlet before reconnecting the mains lead.
7. Finally, reconnect the mains lead to the wall socket and switch on.



1.



2.



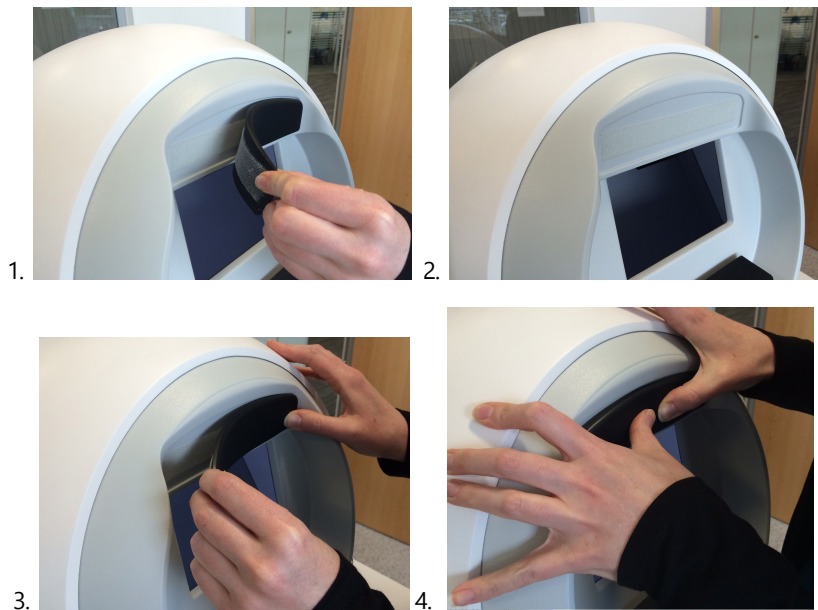
3.



The head rest and chin rest pads are attached with an industrial hook and loop type fastener and can be replaced without any tools.

To change the headrest pad

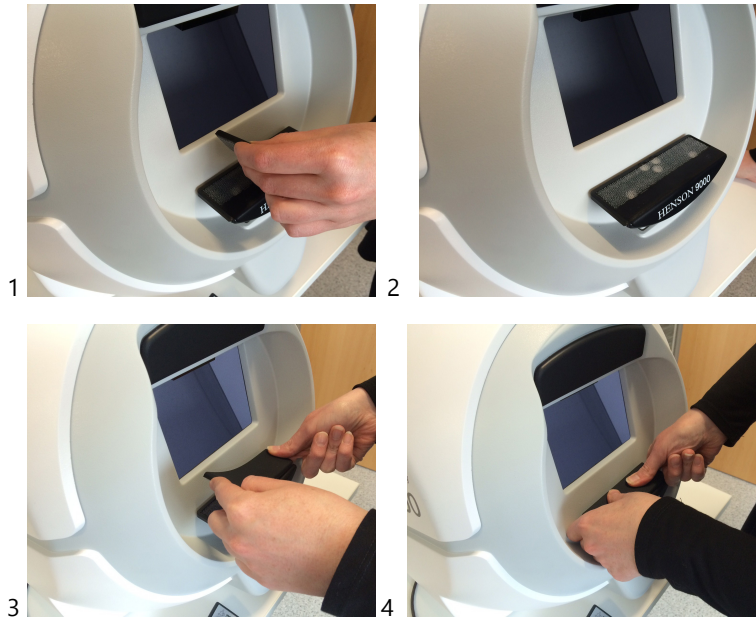
1. Prise up one end of the headrest pad.
2. Peel it off to reveal the attached fastening strip.
3. Align the headrest pad with the moulding indentation and lay it flat.
4. Start from the centre, press the pad into place and work across pressing constantly. The head rest will snap into place.



To Replace the chin rest pad

Note: Ensure the chin rest is in its lowest position before changing the pad


1. With fingers, prise up one end of the pad.
2. Pull upwards and off to reveal the chin rest top fastening strip.
3. Align the new pad with the rear edge and one end of the chin rest top.
4. Starting in the middle, press firmly down towards the edges and listen for the fastener to snap into place.



11.2 Upgrading the software

Upgrades of the software and documentation are available periodically. Contact your dealer and ask to be added to their mailing list.

If the software is upgraded, up-to-date operational instructions can be found in the online help,

which can be accessed by clicking .

11.3 Cleaning

Housing

The housing may be kept clean by wiping with a damp cloth. This should be done with the unit disconnected from the mains supply. Do not use abrasive cleaners. Do not allow liquid to enter the unit.

Stimulus Display Screen

Dust and small deposits on the stimulus display screen can be brushed away using a soft lens brush or by gently wiping with a lint free cloth.

If disinfection is required, the inside of the bowl can be sprayed with IPA, carefully following the instructions below.

1. Ensure that the bowl is free from dust. If not, gently wipe with a dry lint free cloth. Do not rub the fragile surface as this may cause damage. It is recommended that a mask and gloves are worn.
2. Remove any dirt (if necessary) by gentle wiping with a damp lint free cloth. Do not rub.

ENSURE THERE IS ADEQUATE VENTILATION IN THE ROOM

3. Spray the inside of the bowl with a **fine mist** of 70% IPA in a sweeping motion. (The IPA should be dispensed from an atomiser type bottle). Care should be taken to avoid any excess. Any drips can be blotted dry with a clean lint free cloth,
4. Let the bowl dry by evaporation (approximately 15 minutes). Do not wipe dry.

Headrest pad, chin rest pad, trial lens arm and plate

All of the patient contacting parts should be wiped between patients with a suitable cleaning wipe.

Replacement pads and trial lens arm are available from your dealer.

Patient Response Button

The response button should be wiped clean with a suitable, cleaning wipe. The cable should be checked for cracks and splits regularly.

11.4 Preventative maintenance

Every six months it is recommended that the mains lead is inspected and replaced if there is any sign of damage to the insulation or plugs.

The connected computer should be maintained in accordance with the manufacturer's instructions.

This includes hardware and software maintenance.

The computer operating system should be kept up to date with any patches and software upgrades.

The Henson Software should be kept up to date with any patches and upgrades.

11.5 Replacement parts

There are NO user serviceable parts in the Henson device.

See Appendix 1, section 13 for the replacement parts available from your supplier:

11.6 Repairs and recalibration

The Henson contains no user serviceable parts except for replaceable external items (fuses, head rest, chin rest, patient response button)

The unit must only be serviced by an appropriately qualified person.

The Manufacturer will make available, on request and at its discretion, circuit diagrams, component part lists, descriptions, calibration instructions, or other information that will assist Service Personnel to repair those parts that are designated by the Manufacturer as repairable by Service Personnel.

Calibration

Due to the life expectancy of the Light Emitting Diodes (LEDs) used for the stimuli and the nature of their operation (very short pulses of output) it is not expected that they will require recalibration in the lifetime of the instrument unless a fault develops.

The illumination uses the same LEDs and has a measurement circuit to maintain a stable background illumination and it is recommended that this illumination is checked every two years to ensure it is within acceptable limits.

Please contact your supplier for more details.

In case of difficulty please contact your dealer.

11.7 Warranty

If, within 24 months from the date of installation, any defect is discovered in the instrument in respect of material or workmanship and reasonably within our control, we undertake to make good the defect at our own expense, provided notice is given to us as soon as it is discovered and that the instrument is immediately forwarded to our works, carriage paid, in the original packaging and with security seals unbroken.

If the original packaging is not available, then please contact the service representative to request packaging.

Please note that the manufacturer reserves the right to alter the specification of the hardware or software at any time without notification.

12 Appendix 5 - Troubleshooting

Every effort has been made to make sure your Henson perimeter works without error for many years. However, if things do go wrong here are some checks that you can do before contacting your distributor for help.

Perimeter fails to start

Check the [cables](#) and [fuses](#).

Cannot find the software on the desktop

[Re-install](#) the software

On screen error messages

There are several error messages that you may see when operating your Henson. Many of these are just warnings that are self explanatory, e.g. "You have only tested one eye" when you select print or save. More information on these can be obtained by simply clicking the Help button attached to the message.

Other messages inform you that the hardware is not working properly and need further investigation.

Some of these messages are listed below:

- [Background out of Tolerance](#)
- [Bowl Error](#)
- [LED error](#)
- [Chin rest](#)
- [Registration issues](#)
- [Database issues](#) when saving
- [Windows 11](#)

12.1 Background out of tolerance

The Henson incorporates special sensors within the bowl which continually maintain the background luminance at the correct level.

- If this intensity cannot be maintained at the beginning of an examination, an error message will be displayed.
- The most likely cause for this error is the room illumination being too bright. If this is the case, turn down the room illumination and press the Restart button.
- The error may also be caused by a failure of one of the bowl illumination LEDs.
- Clicking continue will proceed with the test. Data collected will not, however, be valid.
- If problem continues, contact a service engineer.

12.2 Bowl error

A Bowl error message will appear when the communications with the bowl do not appear to be working.

Check that the USB cables(s) between the Henson and computer are plugged in and that the Henson is powered up.

If problem continues, contact a service engineer.

12.3 LED error

As part of the power on testing, the Henson 9000 checks the operation of the stimulus LEDs.

This result is reported to the software at the beginning of each examination.

If an LED error had been detected at power up, an error message will be displayed when a test is started.

- If the message is intermittent and the Henson 9000 has not been power cycled, then it is a software issue - the latest software should be downloaded and installed.
- If the led error is reported in every test, then contact your service engineer.

12.4 Chinrest

The chin rest is controlled from the on-screen buttons. Click and hold/press and hold the direction button and the chin rest will start to move in the chosen direction. Release the button and the chin rest will stop.

Do not tap the chin rest button as this may result in the chin rest moving to its end stop. Press and hold the on-screen button and the chin rest will move after a small delay.



If the chin rest will not respond to the buttons check that it has not reached a limit (upper or lower).

If you are using a touch screen check that it is configured for mouse operation (i.e. it will replicate mouse buttons correctly) some touch screens invoke a right mouse click if the touch screen is pressed for several seconds.

Try using a left click from a physical mouse instead of the touch screen. If this works, then the touch screen settings need changing.

If the chin rest does not stop when releasing the on-screen button when using a touch screen, check the settings of the touch screen to ensure they are replicating a mouse.

A press and release of the touch screen direction button will stop the chin rest.

If the chin rest is still not working, then contact the service agent.

12.5 Registration issues

The software registration is performed in the [Options](#) program.

The license key supplied (on rear of Henson 9000 or separately) is for use on a single PC only.

If the PC is to be changed then the license should be removed for the old PC using the release procedure before it is required for the new PC.

If the software has been licensed and an error stating license has expired is experienced when selecting tests - this is usually attributed to a Windows account permissions issue. The account is using a different privilege level to that used for registration.

Open the Henson Options program and click on the registration button - if the software is showing as licensed but you cannot open any tests then contact IT support who can help.

The Options program needs to be re-run with the lower privilege by double clicking on the Options8.exe file in the C:\henson9000\ folder, and the licensing repeated using the same license key.

If the Henson software is being installed as a viewing station - for example to view test results in a different room, then licensing does not need to be completed for this software. After the 30-day trial period, the main menu and test selections will not operate but the options program and database will operate as normal.

It is recommended when installing as a viewing station that the desktop shortcut for the main menu is changed to point to the database2.exe program in the same folder. This way, the database can be opened directly.


Note: when sharing the database across a network, please see [Appendix 10](#) - Database sharing, to prevent any access issues.

12.6 Database errors

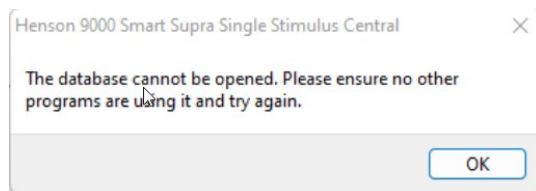
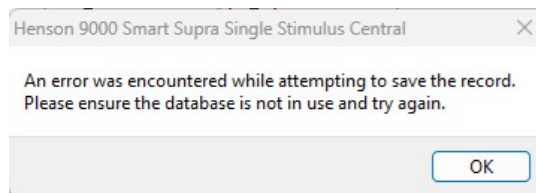
The Henson Database program contains your saved visual field records.

It has a specific set of error messages related to the workings and limitations placed upon its operation.

In most cases the error message will have an associated help facility that can be accessed by

clicking  Further detail on some of these messages is given through the following links:

- [Database error when saving](#)



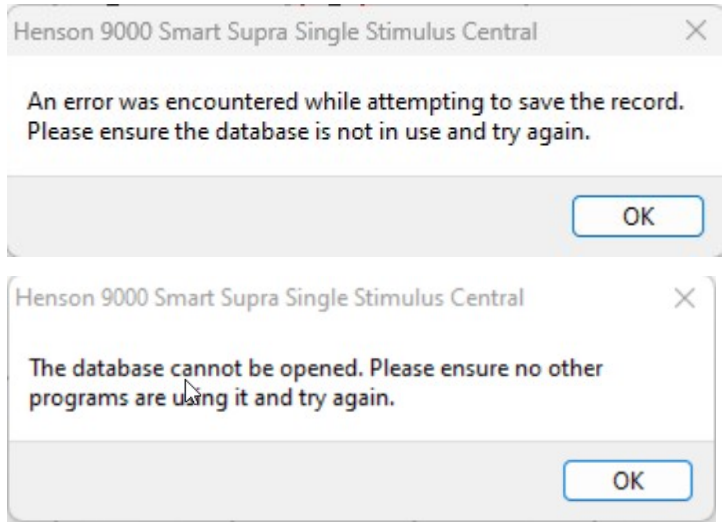
- Default database cannot be found
- [Test not recognized](#)
- [Backup warning](#)
- [Key Violation](#)
- [Windows 11 related errors](#)

12.6.1 Database engine

Access to the database files is provided by a database engine which runs in the background on the computer.

The engine is installed as part of the Henson software installation and usually does not require any configuration.

If any database access messages are seen, then this could point to some data file corruption or the engine requiring a setting change.



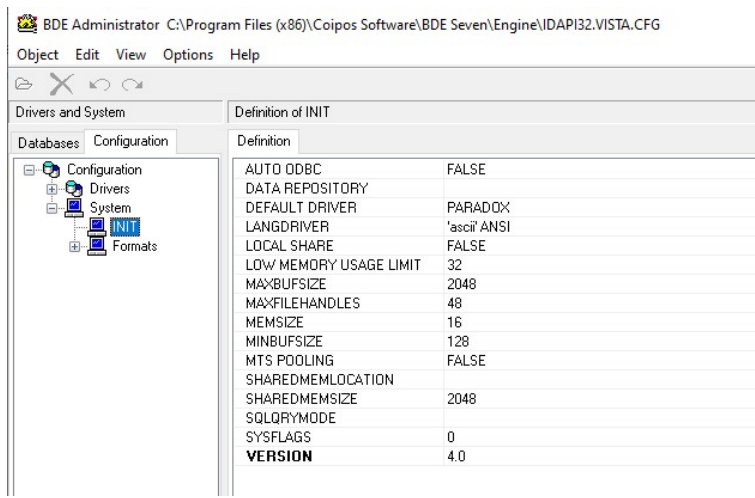
If using Windows 11, the engine properties may need updating.

Open a file explorer window and navigate to the following folder:

```
c:\program files (x86)\coipos software\BDE seven\engine\
```

look for a folder **en** or **de**, inside one of them will be a program called **bdeadmin.exe**

Right click the icon and select "Run as administrator" to open this program, click on the configuration tab, double click on System and click on INIT.

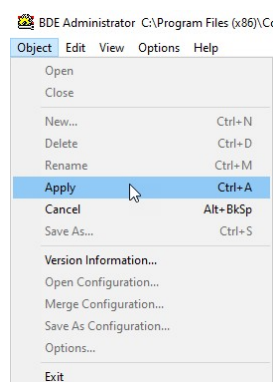


Change the following items by clicking on the number and typing the new one.

Definition	NEW value	
Computer physical memory	4GB	8Gb
SharedMemSize	4096	8192
SharedmemLocation	0x5BDE	0x7BDE
MaxBufSize	4096	8192
MaxFileHandles	256	
MemSize	16	

NOTE: The last item is "Zero x 5 BDE"

Click on Object in the toolbar menu, followed by Apply.



Click OK to confirm the save all INIT objects message and cancel for the restart message.

Re-run the BDE administration program but this time double-click the icon, do NOT right click and run as administrator. Check the the values just edited are as per the table above. If not then edit them again and save changes as before.

Restart Windows and attempt to save a test (Note: you do not need to perform a full test, just a sample.)

If this does not fix your issue, please contact your service provider.

12.6.2 Test not recognised

One of the facilities available in the Henson Database is to import records from earlier [Henson](#) perimeters (6000 and Pro 5000).

(Note: Henson 8000 databases can be merged into the 9000 database, they do not need to be imported - see [Utilities- Merge](#))

During the import process the Database will check that the data comes from a test that is supported by the Henson 9000 software.

In cases where the test is not supported you will see an on-screen message stating that the test type is not recognized.

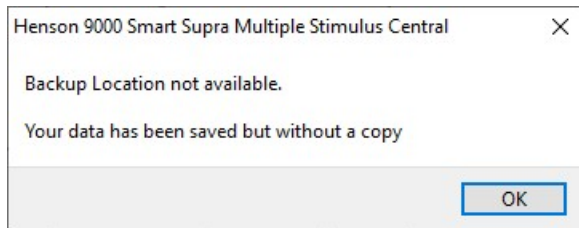
An unsupported test may have originated in an earlier device that was imported into the 5000/6000.

12.6.3 Database Backup not available

Every time a perimetrist saves or edits a visual field record the result is saved within the database and a copy of the entire database is made at the backup location.

Ideally, the location of the Database Backup is a removable drive (e.g. USB pen drive) or a network location.

If the Database Backup location is not available (e.g. the USB drive has been removed or the network is not available) when saving, you will see the warning message below.



Click the OK button to close the message.

When the backup location is re-established (e.g. re-insert the USB drive or connect to the network), the next save/edit event will make a full backup of the database.

Note. If images are being stored in the backup location these will not be recreated.

The location of Database Backup is set within the [Options](#) program.

12.6.4 Key violation

A key violation message will appear when trying to save a record in the database using the same family name, ID number, date and time of test of a record that already exists.

Due to the time of the test (to the nearest second) being included in the key fields this type of duplication will not occur when saving in the database - but may arise if importing records from another database.


12.6.5 Windows 11

Windows 11 may cause errors with database access due to a memory size issue.

The error message displayed is related to database access: either no default database found or no access to the database when saving.

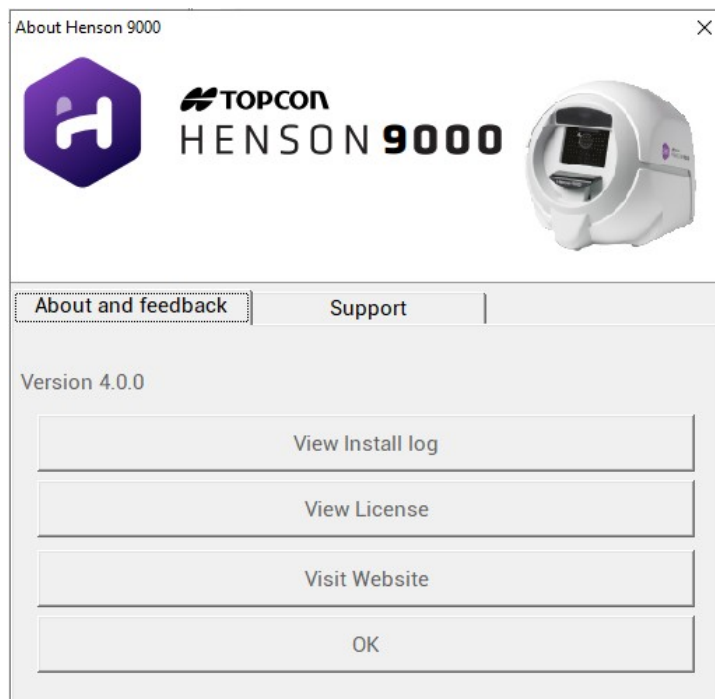
Please follow the instructions in the previous section [Database Engine](#) to change the memory settings of the database engine.

13 Appendix 6 - Software acceptance license file

Clicking  on the Start-up screen opens a window that shows the version number of the current software.

In addition it gives a button to view the software license document.

Click OK to close this window.



14 Appendix 7 - Networking

The Henson can be networked to enable:

- Multiple machines to access the same database,
- Multiple machines to access a network printer,
- Server backup (the database must reside on the server).

The options for networking the Henson will depend on the computer equipment used.

Most computers will have a network connector and many laptops will also include a wireless adapter.

Refer to the computer's manual for details of networking options.

15 Appendix 8 - Practice management integration

The Henson software has a number of settings to allow integration with practice management (PM) or electronic medical records (EMR) systems to control the tests and collect the output.

It may be possible for your PM/EMR software to directly control the Henson software - see the [patient detail import](#) section.

Various additional outputs can also be set for when the test is saved.

By default, when saving, the software stores the test results in the database file and a JPEG image of the report in a sub folder.

A backup copy of the entire database is then made to a specified location. The backup is numbered from 1 to 10 before the oldest backup is overwritten.

An (optional) copy of the JPEG image can be stored with the backup. This is turned on in [Options](#)

An (optional) PDF of the report image can also be stored in a folder - specified in the [Options](#) program.

An (optional) XML file containing the test details can be stored in a folder, specified in the [Options](#) program. An (optional) PDF of the report (single eye for ZATA) can be saved in the same or a separate folder.

Details of the various settings are described in the following sections.

15.1 Patient detail import

It may be possible for your practice management (PM)/ electronic medical records (EMR) software to directly control the Henson software.

If the computer running your PM/EMR software is directly connected to the Henson and has the facility for programmable buttons. You can use them to run the Henson tests directly from the patient screen without using the Henson main menu. This type of control is called **passing parameters** as the patient details are passed directly to the Henson software.

If the computer with PM/EMR is not connected to the Henson it may still be possible to pass the patient details to the Henson software. This would be done by programming the PM/EMR software to generate and save a text file containing the patient details. The Henson software when next operated will read the **text file** and use the patient details it contains in the test.

In both cases the PM/EMR software will have to be set up to generate the information required and pass this to the Henson software.

Note: The format of the **date of birth** parameter should match between the computer sending the parameters and the computer receiving them. The format for dates can be seen in the lower right-hand corner of the desktop and adjusted in the control panel regional settings.

The Henson software has a filter for incoming date formats and can accept and decode if the date separators do not match (date separators are the symbols between the day, month and year elements of the date, for example '/' or '-').

It can also detect if the day and month numbers are swapped - but only if the day is greater than 12. If the day and month are swapped and the day number is 12 or less, it will be accepted as a valid date, but the date of birth displayed will be incorrect.

The software can also accept dates in the YYYY/MM/DD format as well as the YYYYMMDD format (no separators).

Passing Parameters

Each of the Henson test strategies is a separate program and can be run individually.

After the file name, there are a number of items (called parameters) that should be passed.

The following table gives the path and file name that must be programmed into the button in the practice management software along with the parameters to send.

If no parameters are passed, then the test program will open normally as if opened from the main menu.

When passing parameters, the patient details are added to the end of the file name - all separated by spaces - and the software reads them in.

Note: if the patient name contains spaces, then these should be replaced by %20 to prevent the space being seen as a field separator. The test program will replace the %20 with a space in the program.

P1	P2	P3	P4	P5	P6	P7
Smart Supra Single Stimulus test - C:\Henson9000\Sssp.exe						
<Surname>	<first name>	<ID_number>	<Date_of Birth>	<PDF Path>	<Accession Number>	
Smart Supra Multiple Stimulus test - C:\Henson9000\Msspl.exe						
<Surname>	<first name>	<ID_number>	<Date_of Birth>	<PDF Path>	<Accession Number>	
ZATA Threshold test - C:\Henson9000\Zata.exe						
<Surname>	<first name>	<ID_number>	<Date_of Birth>	S10 / S24 / F10 / F24	<PDF Path>	<Accession Number>
Esterman Binocular drivers test - C:\Henson9000\Driv.exe						
<Surname>	<first name>	<ID_number>	<Date_of Birth>	1 / 2	<PDF Path>	<Accession Number>

For example, to run the single stimulus supra threshold test you would send

C:\Henson9000\Sssp.exe **Smith John 123456 27051957 Z:\HensonBackup\PDF**

(Where 123456 is the ID number, 27051957 is the patient's date of birth (27th May 1957) and a PDF of the report will be saved in the specified folder on the Z: drive.)

Parameter 5 for the ZATA and Esterman tests tells the software which version of the test to perform. The ZATA test has 4 options and the Esterman only two.

On the Esterman test you must enter either 1 or 2 to denote Group 1 or 2 test. If it is omitted then a Group 1 test will be performed.

On a ZATA test you must enter one of the test codes from the following table:

Test strategy	Data text to use
Standard 24-2	S24
Fast 24-2	F24
Standard 10-48	S10
Fast 10-48	F10

If this parameter is omitted then a 24-2 standard test will be performed.

Note: If a parameter for PDF path and/or accession number are required then Parameter 5 MUST be specified even if the default test is required.

The **<PDF_Path>** is the option to specify a **location** for a copy of the printout in PDF format to be saved. This setting will produce a PDF of the report **in addition** to any export PDF path that is set in [Options Integration >Export](#). If this parameter is omitted, then no additional PDF will be produced.

Note; if the accession number is to be sent but there is no PDF path, then use "PDF" as the parameter. the test program will ignore this and read the accession number as normal. Omitting it will cause the accession number to be read in as the PDF path.

The **<Accession Number>** is a unique number. It is usually generated from a PM/EMR system to uniquely identify a test. If supplied as a parameter, it will be saved with the data in the database and will be output as part of the XML file if set up in [Options Integration>XML](#)

Your practice management software's user manual / supplier can tell you how to configure your software to send these parameters if they are available.

Text files.

If your practice management software does not support passing parameters, you may be able to use text files to transfer the parameters.

The Henson software is operated normally. The test is chosen from the main menu, but instead of entering details, the patient details are read in from a text file which is accessible to the Henson software (usually across a network: the location is set in the [Options program](#)).

Once the details are loaded the file is deleted.

The format for the text file is as follows:

Each item must be on a separate line - punctuation such as hyphens (-) and underscores (_) can be used in names but no other punctuation should be used.

The date of birth format should match that used by the computer's regional settings - this can be viewed by looking at the [General tab](#) in the options program.

Filename Format

Include patient's first name in save filename

Include Date of Birth in save filename: Format = dd_MM_yyyy

Current file format =
 <Family Name>_<ID number>_<Date>_<Time>.<File type>

Filename date format

Computer YYYY/mm/DD

The format for the data is the same as for parameter passing with the omission of the test type. The operator will choose the test type from the main menu.

<surname>

<first name>

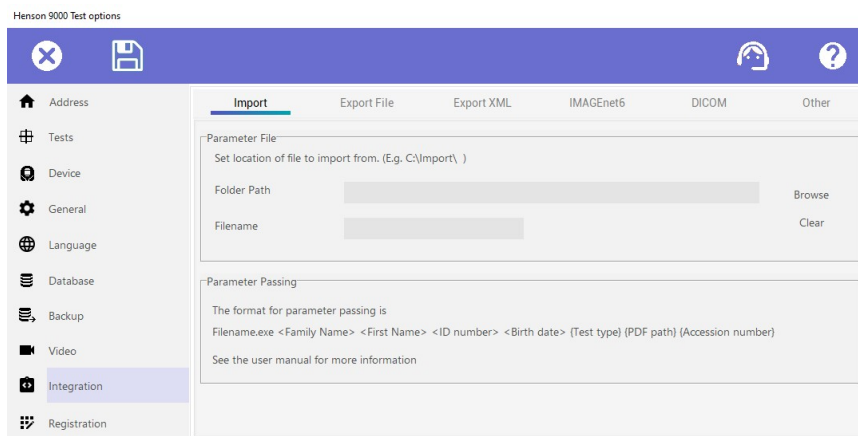
<ID number>

<date of birth> (the format for the date of birth should match the Henson computer's regional setting for dates)

<path to a folder to save the PDF> (this is optional but if used will save a copy of the report in PDF format **in addition** to any Export PDF setting in the Options program)

<Accession number> (this is optional and if supplied will be used in the XML output file)

The path to the text file and its name are set in the options program on the [Integration>Import](#) page.



To set the path, use the Browse button. To set the file name, click in the file name box and an on-screen touch keyboard will appear. You can use this or a regular keyboard to type the name of the file – making sure to include the file type (eg. .txt). This file should be created by the PMS and will be deleted once read in by the Henson software.

The required date format (imported from the computer's regional settings) is displayed in the parameter passing section.

15.2 PDF Export

The PDF export is a copy of the JPEG report saved in a location chosen in [Henson Options](#).

The PDF can be used for network viewing - shared with other PCs on the network or imported by practice management software. (These often work by monitoring a folder and importing then deleting files as they appear in the folder.)

There is an option for saving the PDF into a sub folder named after the patient. This is useful when the folder is shared for viewing across the network.

15.3 XML Export

The XML export is a special file containing the details of the test in a structured report for machine reading.

Once enabled in the Options program an XML file and associated PDF report will be saved in the designated folder(s) when a test is saved.

The [Options - XML](#) section is used to set the target folder for the XML file. The XML and PDF can be saved to different folders if required.

The XML file can be imported into practice management software.

For Smart Supra and Esterman tests, the XML file and PDF report contain the details for both eyes.

For the ZATA test, there is an XML file and PDF report for each eye. (**Note:** This is different to the usual PDF report that contains BOTH eyes in a 2-page PDF file).

If the XML destination folder is not available when a test is saved, a message will be displayed noting that the XML files have been saved in a temporary folder.

The temporary folder will continue to be used for as long as the destination folder is unavailable.

On the next save when the XML folder is available again, all of the files stored in the temporary folder will be moved to the XML folder location at the same time as the new files are saved.

The [Database program](#) can also be used to export XML files manually, on an individual test basis, per patient and as a bulk export of all records.

15.4 DCM Export

The DCM export is a separate copy of the PDF report enclosed in a DCM format file with patient details. It is saved in a location chosen in [Options- Integration - export file](#)

The DCM file is traditionally imported into a DICOM server or practice management software. (These often work by monitoring a folder and importing then deleting files as they appear in the folder.)

The information contained in the DCM file is as follows:

DICOM Tag	Description
0008 0012	Instance date
0008 0013	Instance time
0008 0020	Study date (date of test)
0008 0023	Content date (date of test)
0008 002A	Acquisition date and time
0008 0030	Study time (time test was saved)
0008 0033	Content time (time test was saved)
0008 0050	Accession number (passed from MWL only)
0008 0060	Modality "OPV"
0008 0066	Acquisition date and time combined (YYYYMMDDHHMMSS)
0008 0064	Conversion type (SYN)
0009 0070	Manufacturer (Topcon)
0008 0080	Practice name (from Options: address)
0008 0081	practice address
0008 0090	Referring physician name (blank)
0008 1090	Manufacturer model number
0010 0021	Issuer of patient ID
0010 0040	patient sex (blank)
0016 0033	Issuer of ID number (see Options: Database)
0018 1000	Device serial number
0018 1020	Software version number
0018 1030	Protocol name
0018 1200	Date of last calibration
0020 0010	Study Id (Blank)
0020 0011	Series number
0020 0013	instance number (1)

DICOM Tag	Description
0020 0018	maximum stimulus luminance (3184)
0020 0020	Background luminance (10)
0020 0028	Stimulus presentation time (200)
0024 0034	Catch trial sequence
0024 0055	Catch trials data flag attribute (YES)
0024 0048	Negative catch trials quantity attribute
0024 0050	False negatives quantity attribute
0024 0056	Positive catch trials quantity attribute
0024 0060	False Positives quantity attribute
0020 0062	Image laterality (L / R / B (both))
0024 0088	Duration
0024 0086	Foveal sensitivity measured attribute (YES)
0024 0087	Foveal sensitivity attribute
0024 0114/115	Patient clinical information Left/Right eye sequence
0024 0112	Refractive power used on patient sequence
0022 0007	Sphere power
0022 0008	Cylinder power
0022 0009	Cylinder axis
0024 0112	Pupil size
0028 0301	Burned in annotation (YES)
0040 A043	Concept name code sequence (blank)
0040 0244	Performed procedure start date
0040 0245	Performed procedure start time
0040 0254	Description
0042 0010	Document title
0046 0014/15	Right/left lens sequence attribute
0046 0146	Sphere power
0046 0018	Cylinder sequence
0046 0147	Cylinder power
0022 0009	Cylinder axis

15.5 DICOM

If a DICOM compatible server is available, then the following features can be enabled in Options.

Modality Work List (MWL)

The server provides a list of the patients that are due to be examined on the day. In larger establishments the MWL is filtered by Modality (test/device type) but in smaller practices a list of all patients with an appointment is provided. The list can be supplied from the DICOM server in chronological order (appointment time) or alphabetically.

The Options -DICOM section allows for the server details to be entered.

DICOM Storage

If DICOM storage is set up then, when saving a [DCM](#) file will be sent to the DICOM server for storage. The DICOM server will then analyse and store the file provided.

15.6 Modality Work List (MWL)

A modality work list is a list of the patients due to be tested that day, sent from a DICOM server.

it enables the operator to select a patient without needing to type anything into the software.

The MWL, once configured in [Options-Integration-DICOM](#) is displayed on the main menu as a list of names with dates of birth ID numbers.

An accession number is also sometimes sent from the DICOM server and this is a unique reference number for that particular test.

Many PMS/EMR systems utilise longer ID numbers and the most recent Henson software database has been upgraded to accept ID numbers up to 41 digits.

If your software has been upgraded to version 4.2 then the existing database structure (default name FLD8) will still be being utilised.

To change to the new structure (FLD9) you will need to set the new database in the [Options-database](#) section and then [merge](#) your existing database records into the new database structure.

16 Appendix 9 - Rx Calculation

The following tables are used in the calculation of trial lenses.

Age	Emmetropic	Hyperopic
Rx	= 0	> 0
<30	None	Rx
30-39	+1.0	Rx + 1.0
40-44	+1.5	Rx + 1.5
45-49	+2.0	Rx + 2.0
50-54	+2.5	Rx + 2.5
55-59	+3.0	Rx + 3.0
> 60	+3.5	Rx + 3.5

Age	Myopic						
	>= - 0.5	-1	-1.5	-2	-2.5	-3	< -3
<30	None	None	None	None	None	None	Rx + 3.5
30-39	+0.5	None	None	None	None	None	Rx + 3.5
40-44	+1	+0.5	None	None	None	None	Rx + 3.5
45-49	+1.5	+1	+0.5	None	None	None	Rx + 3.5
50-54	+2	+1.5	+1	+0.5	None	None	Rx + 3.5
55-59	+2.5	+2	+1.5	+1	+0.5	None	Rx + 3.5
>60	+3	+2.5	+2	+1.5	+1	None	Rx + 3.5

Emmetropic patients

Young patients can accommodate at the 25cm test distance and so do not require any lenses.

With increasing age the accommodation requires assistance and so you will see an age based + recommended in the first column of the table

Hyperopic patients

Hyperopic patients will need an age based correction of the same value as emmetropic patients on top of their distance correction.

Myopic patients

Myopic patients can usually focus at 25cm if their correction is less than -3D. For patients with stronger correction an addition is required on top of their distance Rx.

Again, as age increases, additional correction may be required and the table shows the recommendations.

Cylinder correction

For cylinder values under 2 the spherical equivalent (cylinder divided by 2) should be used. For cylinders values of 2 or more the cylinder should be corrected.

17 Appendix 10 - Database sharing

This appendix details the necessary steps to share the Henson database across a network.

The sharing can be between computers operating Henson 9000 devices or a single Henson 9000 and computers set up as viewing stations.

There is no limit to the number of computers that can share the database as long as the settings detailed below are made on ALL computers.

The settings control the access to the database files. This control is necessary to prevent 2 computers writing to the database at the same time.

Failure to carry out the settings on all computers could lead to corruption of the database.

The type of share will determine how the system is set up:

For example:

A. Multiple Henson devices sharing one database

1. Merge all of the existing Henson database together (see [Utilities: Database merge](#)).
2. Place the merged database in a central (server) location.
3. Set up access to this location from all Henson (and viewer) computers.
4. Open Henson [Options](#) and set the Database location on all devices to the central database.
5. Perform the network engine share setup below on all PCs pointing at the central share folder.

B. One Henson device and one or more viewing stations

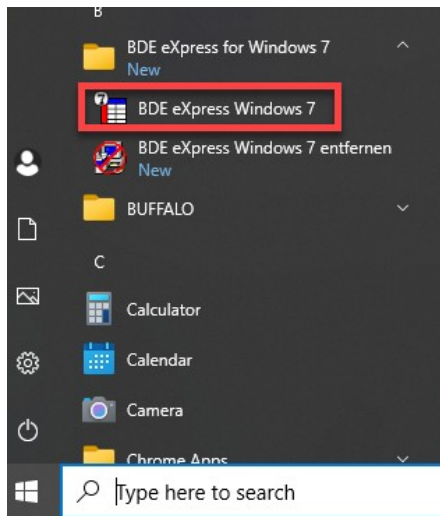
1. Decide whether database is to reside on Henson computer or centrally (as in A, above).
2. If centrally - follow instructions from A 2.
3. If the database is to be kept on the Henson computer, then share the database folder (as set in options) using the appropriate security settings for your network.
4. Establish a mapped drive connection to the shared Henson database folder on all of the viewer PCs.
5. On each of the viewer PCs, open the Henson [Options](#) program and set the Database location to the mapped database folder.
5. Perform the network engine share setup below on all PCs, pointing at the Henson database share. (This Includes the PC that is connected to the Henson, even if the database is on the Henson PC)

NOTE: if any PC accessing the database does not have the network share set up pointing to the same folder, then it may cause data corruption.

To set up the network engine share.

On Windows 8 onwards

Click start, find BDE Express and click to run it.



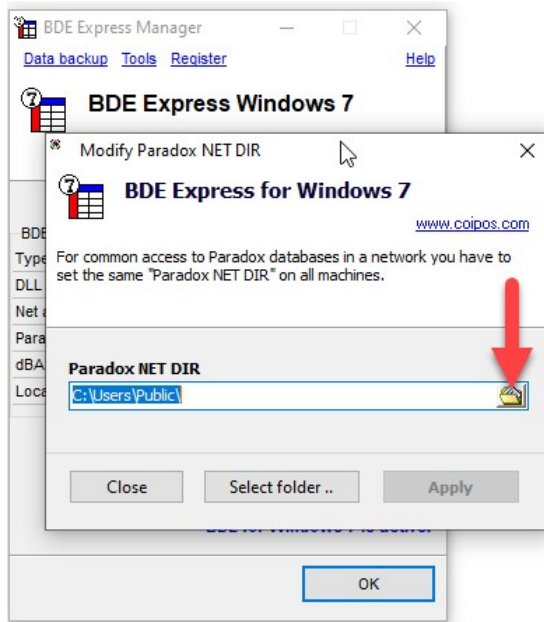
The engine status screen will be displayed



Click on TOOLS and then select "Modify Paradox NET DIR (admin only)" from the drop down list.

If you see a windows security screen allow the action.

Click the Browse icon (arrowed) and browse for the location of the database.



Note: This will either be a central shared folder or the Henson database folder - depending on your setup.

Click OK to close the browse window and then Apply to close the "Modify paradox NET DIR" window.

A message will confirm the change was successful.

Close the BDE express window.

Repeat this for all computers wishing to access the database - ensuring to browse to the same location on each computer.

Note: The mapped drives set up on each computer do NOT have to be the same drive letter, but they must all point at the same folder location.

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