HENSON Visual Field Screeners

INSTRUCTION MANUAL for the Henson 5000, 6000 and 7000

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CONTENTS

Installation

The Henson range of visual field screeners have a range of custom made furniture to allow for a quick, neat installation that complies with all current medical device regulations.

The Henson is usually mounted on an electric table which can also house the printer. (See the Henson Pro Below right)

Fig i Shows the Patient's view of the Henson 6000 on a 'V' top table with a slit lamp.

Fig ii Showing the patient view of the Henson PRO on it's electric table and the "buggy" housing the laptop, printer and fixation monitor.

All of the Hensons, depending on the chosen configuration, can be mounted on various other combinations of table due to their small footprint.

The main connections to the units are Power, Control and Printer, all other connections are only used for diagnostic or Networking purposes.

Normally, there is a single connection to the table for power and all other connections are self contained.

Fig iii Shows the Henson 7000 with its Custom Controller.

INSTALLATION

INTRODUCTION

How to use this Manual

This manual is written for use with the Henson range of Visual Fields Screeners.

Throughout the manual there are references to ‘Selecting’ items and ‘Pressing’ on-screen buttons, How you select or press will depend on your preferred method of control. When using the built-in touch-screen, you literally touch the front surface of the screen over the item you want to ‘select’ with the pointer provided. (For anyone used to Windows™ there is no need to double click whilst In the Henson software).

If you have the external mouse connected, you need to move the on-screen arrow cursor over the button/item you want to select and then press (‘click’) the left hand button.

Some of the Screen shots in this manual are from different versions of software and may differ slightly from the software installed on your machine.

The information in this manual was correct at the time of printing. In the event of software upgrades, up to date operational instructions will be found in the On-Line HELP, which can be accessed by pressing the help button on the toolbar on any screen in the Henson software.

Upgrades of the software and manual are available to download from the Henson Website at WWW.Henson-VFA.com. If you would like to be informed of software upgrades, visit the website and register your e-mail address in the feedback section. You will be added to the e-mailing list for all future information.

It is important that all of the literature and software that was supplied with the Henson is kept in a safe place. The Windows™ licence is unique to your instrument and may be required if the software needs re-installing / upgrading at a later date.

CHAPTER 1

The Henson range of field screeners include the latest in screening and Glaucoma management technology. Each successive instrument has been built on the strengths of the existing equipment and the improvements suggested through research and customer feedback. The software on the current range of instruments contain all of the field test programmes from the previous units and add functionality through the use of developments in computer technology.

The **Henson** software is easy to use and does not require advanced computer literacy for its operation. Instructions are contained within the **Help** menus of the software, many of which are reproduced in this manual. Items in green and underlined are cross-referenced within the Help Menu in the software. Selecting these green items brings up the appropriate section onto the screen.

Once your Henson has been installed you will immediately have the capability to carry out routine visual field examinations on your patients. From then on your confidence with the unit will grow with every use and you will rapidly discover the simplicity of operation and the ease of obtaining valuable and accurate visual field data.

WARNING

It is strongly recommended that the database of patients records be regularly backed up on a USB memory stick or other suitable removable media to avoid any possibility of loss in the unlikely event of hard disk failure.

This simple procedure is described later in this manual in the Database Chapter (Chapter 6).

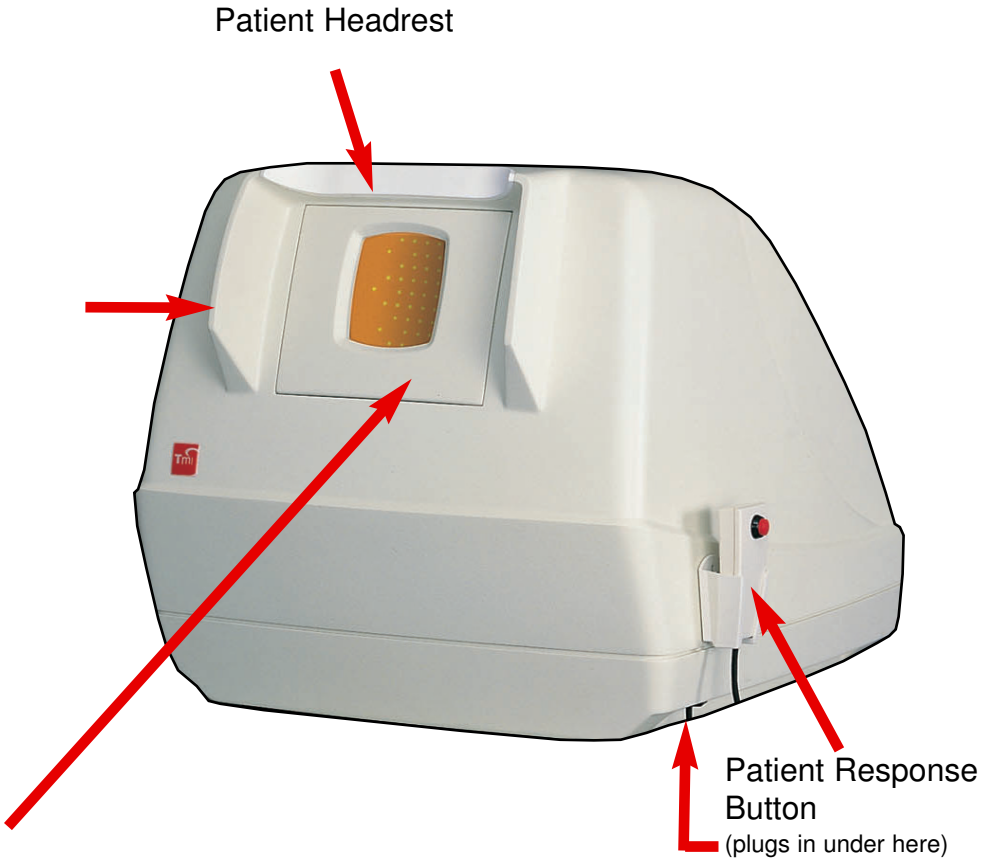


Figure 1. Patient view of Henson 6000

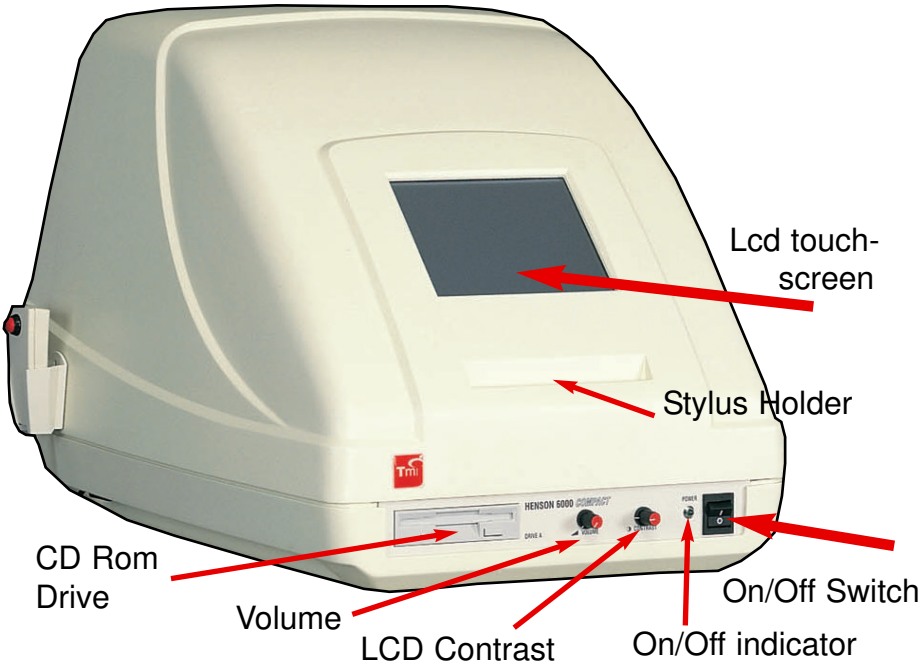
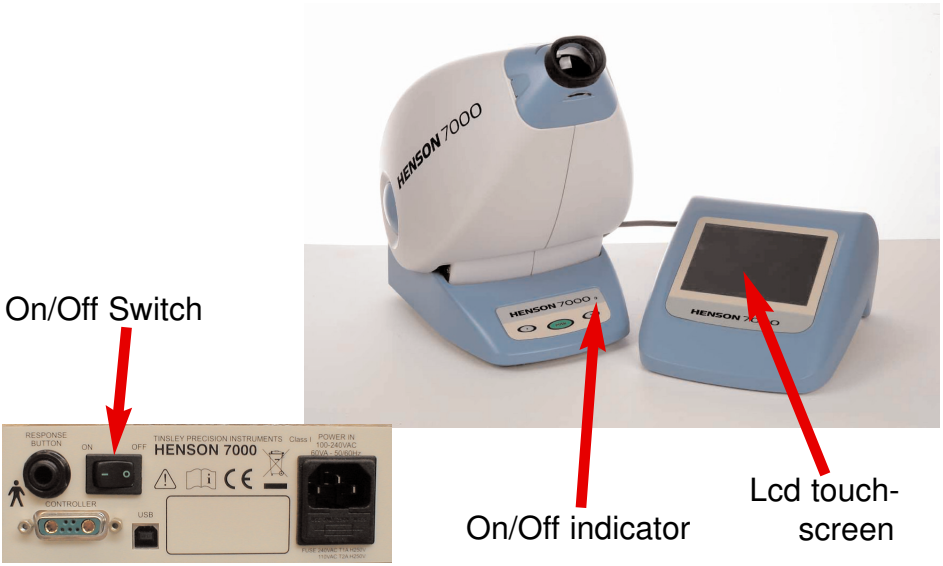


Figure 2. Operator view of Henson 6000 Compact (above) and 7000 with Controller (below)



Introduction

The **Henson *5000, 6000*** and **7000** share common features, a full list of the features of each machine is included in Appendicies 1-3. The table below gives a comparison of the physical features of the instruments.

Unit	**5000**	**6000**	**7000**
Target Type	Bowl	Bowl	Flat
Target Distance	25 Cms	25 Cms	17cms
Maximum stimulus Illumination	1000 Cd/M^2	1000 Cd/M^2	100 Cd/m^2
Background Illumination	3.15 Cd/M^2 (10asb)	3.15 Cd/M^2 (10asb)	3.15 Cd/M^2 (10asb)
Central Field	Yes	Yes	Yes
Full Field	Yes	No	No
Supra threshold			
- Multiple	Yes	Yes	Yes
- Single	Yes	Yes	Yes
- Multi Sampling	Yes	Yes	No
Full & Fast Threshold	Yes	Yes	Yes
Estermann	Yes	Yes	No

The perimeter is controlled from a computer, either in-built (**6000**) or external (**5000 & 7000**) This can be the custom controller, a laptop or Personal Computer (PC) using the Microsoft Windows™ XP operating system.

The Henson test programs are grouped into 5 different test strategies:

Full Threshold
Fast threshold
Single stimulus supra-threshold
Multiple stimulus supra-threshold
Estermann Drivers Test

Included in the software is a powerful database in which the visual field results can be stored and recalled, or exported to /shared with other Henson machines for referral.

Each of these strategies is explained in it's own chapter in this manual. The selection of the correct testing strategy is very important and will depend on the reason for the test, i.e. screening or long term monitoring, and also the reliability of the patient.

The factors affecting test selection are covered in the next chapter.

CHAPTER 1

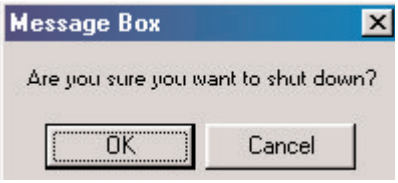
Start-up

The best way to learn how to use the **Henson** is to turn it on and practice with a colleague. In this way you will quickly find out how to select the appropriate strategy, conduct an examination, etc. Although the computer is running under the windows™ operating system, it will start up directly into the Henson Software and present you with the main menu as shown in Fig. 3 below.

Due to the WINDOWS ™ operating system, it is important to SHUTDOWN the machine correctly. If the power to the unit is simply switched off, the computer will perform lengthy self checks when next switched on.

To switch the machine off, Simply press the SHUTDOWN button on the left of the toolbar.

Confirm the action by pressing OK on the message box that appears (Shown right).



When the LCD screen goes balnk it is safe to switch off the main power.

If you wish to exit from the Henson program but remain in windows, Press the Cross in the top right hand corner of the screen.

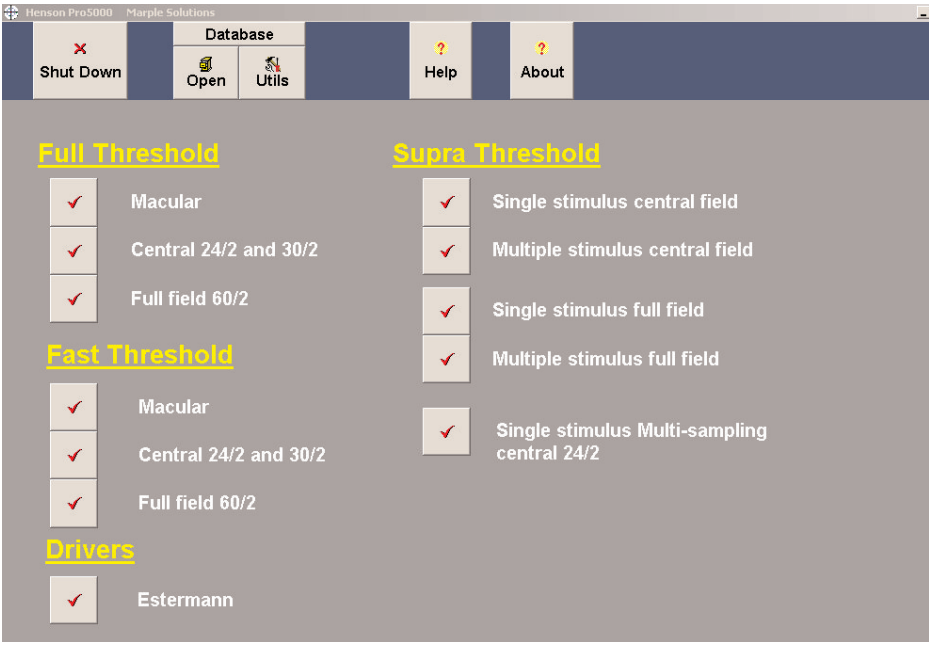


Figure 3. The main menu of the Henson Software from a Pro 5000 (Version 3.24 Software)
To start a test, press the “button” next to required test strategy.

SELECTING A STRATEGY

The **Henson Software** offers five different strategies:

Multiple stimulus supra-threshold
Single stimulus supra-threshold
Full threshold
Fast Threshold
Estermann test {*Not 7000*}

Which one is best for your needs?

If you want to screen the visual field then you should select one of the **supra-threshold** strategies (**Chapter 3**).

If speed is important, the multiple stimulus supra-threshold strategy is approximately twice as fast as the single stimulus supra-threshold strategy in patients with little, if any, defect.

If your patient has a known defect then the single stimulus strategies, where the patient presses a response button every time he/she sees a stimulus, are better. In this situation the frequent failure of the patient to see all the stimuli in a multiple stimulus strategy results in repeated questioning that slows down the test and can lead to frustration for both the patient and the perimetrist. The Multi sampling test was designed for regular testing of patients with known defects.

If you wish to measure accurately the depth of a defect then use the full threshold strategy (**Chapter 4**). The fast threshold strategy is slightly less accurate, but the test will complete is approximately 60% of the time of a full threshold test.

If you wish to test a large number of stimulus locations then choose a supra-threshold strategy (**Chapter 3**).

If you wish to quantify the extent of loss with the indices mean defect, loss variance and fluctuation, then use the full threshold strategy (**Chapter 4**).

Whichever strategy you select you will not have to specify the extent of the examination before you start collecting data. The **Henson software** allows you to extend each examination when and if the need occurs.

Selecting a test program

To select and start a test program simply pres the button next to the required test strategy. A confirmation box will appear asking if you wish to carry out this test. Press Ok and the test screen will load.

To enter the database, press the **Database** menu item.

The Help button is one of the most important buttons on the toolbar. It is available from every screen and will give you context sensitive help. The Help screens contain the most up to date information regarding the use of the software.

The About button gives information regarding the version of software installed.

The shutdown button prepares the machine to be switched off. In a **6000** or **7000** it will shutdown the computer ready for the power to be switched off. In a **5000** with a laptop or PC it will also shut down the computer.

Figure 4. The initial Test Menu from the ***Henson*** software.

Refractive correction

It is important for the patient to wear the correct refractive correction (suitable for a 25cm test distance) during the visual field test.

All of the the **Henson** screeners are designed so that near vision correction lenses can be used. In the case of the **5000** and **6000** the correction is worn by the patient. The **7000** has provision for lenses to be slotted into the eyepiece if required.

The use of these lenses means that the correct alignment of the optical centres of the lenses can be maintained.

Recommended additions (lens power to be added to the patients current distance prescription) are given in the table below:

Patient's Age years	Add on top of distance correction
40-44	+1.50
45-49	+2.00
50-54	+2.50
55-59	+3.00
60-64	+3.50
>64	+4.00

Alignment of patient for testing

The Alignment of the patient is quite important as it ensures not only that the patient is in the correct position with respect to the viewing screen, but also that they are in a comfortable position throughout the test and will not need to move.

The **Henson** should ideally be located on an electric table to facilitate ease of height adjustment.

The **Henson Pro 5000** (Picture 1, Left) has a chinrest and a forehead rest. It is important that the patient's head is placed on the chinrest with their brow touching the forehead rest without having to tilt their head back as this can cause fatigue during the test.

The chinrest has up / down adjustment knobs located on either side of the instrument to ensure that the patient's eyeline is level with the marks on the side of the aperature. (arrowed in yellow)

Picture 1 Henson 5000 patient alignment.

CHAPTER 2

The Henson 6000 Compact should ideally be positioned on an electric table to facilitate ease of adjustment. Position the patient on a chair / stool in front of the Henson 6000 and adjust their relevant heights such that the patient's chin is level with the top of the instrument.

Picture 2 Proper alignment of forehead on brow bar. Inset picture shows alignment for LEFT eye testing.

Ask the patient to lean forward at the waist so that they are looking down into the instrument at approximately 45 degrees below the horizontal.

By aligning the patient this way, they will be looking down at the target screen, can rest their head on the foam headrest and will have correct posture.

The monocular target mask on the 6000 helps to occlude the eye that is not being tested, an eyepatch may also be used as this will help the patients by removing outside stimulus and aid in their alignment.

When performing the Estermann test, the eye mask should be removed so that both eyes have a clear view of the target screen. The patient should then place their head in the centre of the browbar.

All test programes have an alignment button (Right) on the toolbar next to the fixation button. Pressing this illuminates stimulus points at the top, bottom, left and right extremes of the bowl.

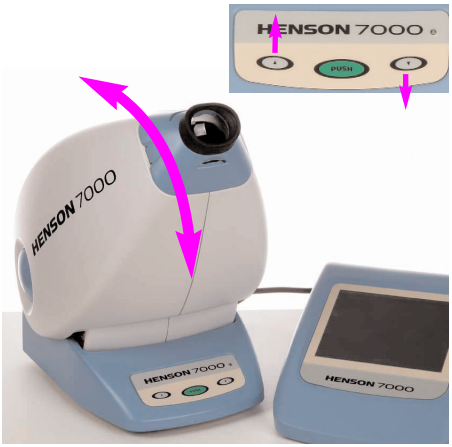
The easiest method of alignment for the 6000 and 7000 instruments is to occlude the eye not being tested and ask the patient to look into the aperature and adjust their position so that they can see all four stimulus points.

Most patients will centralise themselves on the eyepiece. The other eye should be occluded.to minimise distractions

The Henson 7000 has the easiest alignment as the aperature is small and the angle of the unit can be adjusted by pressing the UP and DOWN buttons on the front of the unit.

The angle of the unit can be varied by 35 degrees. This is useful if the patient has limited mobility.

For all units, once the patient is comfortable, Press the central fixation button (left) to remove the alignment points and re-instate the central red fixation light.



Picture 3. Eyepiece Movement of a Henon 7000 Inset: the Up and down buttons on front of unit.

SUPRA-THRESHOLD PROGRAMMES MULTIPLE and SINGLE STIMULUS

Supra-threshold tests

The Supra-threshold central field tests incorporated within the **Henson** software are split into 2 types THRESHOLD and AGE related :

Threshold related tests use the HEART algorithm to derive an estimate of the patient's threshold prior to the supra threshold presentations.

Age related tests use the established relationship between age and sensitivity to derive the test intensity. This is the fastest strategy but can lead to errors when a patient's sensitivity departs from the average value for their age, e.g. when there are media opacities.

(For a full explanation of these routines see **Chapter 8**, Definitions and Explanations)

Both types of test can be run with either the multiple or single stimulus strategy. To set the type of thresholding see chapter 7 for instructions on setting the OPTIONS.

For details of the stimulus locations in the Supra threshold tests see **Chapter 9.**

Supra-threshold tests are ideal for rapid screening of the visual field but can also be used to monitor visual field loss.

The automatic tests present each stimulus at an intensity, which is calculated to be above the patients threshold by **5dB**. If the patient sees the stimulus then it is assumed that no significant defect exists at the test location. If they fail to see the stimulus then it is presented a second time at the same intensity and if missed again presented at **8dB** and if still not seen, then at **12dB** above the patients threshold.

This strategy takes into account the normal hill of vision with peripheral stimuli being presented at a higher intensity than those in the centre of the visual field.
This strategy is faster than the threshold strategies because, in a patient with no visual field loss, each stimulus is presented only once.

There are 2 different versions of the supra-threshold strategy provided with the **Henson** software:

Multiple stimulus supra-threshold strategy
Single stimulus supra-threshold strategy

Each strategy incorporates several different several levels of testing.

The supra-threshold phase of each test is preceded by a demonstration of the procedure and then the measurement of the threshold. This measurement is used to decide what the appropriate supra-threshold test intensity should be.

Both tests have a number of different levels. In the central test these range from a quick 26 test-point screening level to one which tests 136 locations (See 'Extend' Page **22**). Both tests can be customised with the addition of extra stimulus locations (See 'Missed Stimuli' Page **22**).

CHAPTER 3

Multiple Stimulus Supra-threshold Test

In the Multiple stimulus supra-threshold tests each presentation is composed of a pattern of either 2, 3 or 4 stimuli. The patient responds to each presentation by telling the perimetrist how many stimuli they saw. The use of multiple stimulus patterns makes the test approximately twice as fast as single stimulus supra-threshold tests.

The multiple stimulus test is semi-automated and requires more perimetrist involvement than the single stimulus test. With a skilled perimetrist this can result in more reliable results with less variability.

At the beginning of the test the perimetrist has to determine the patients threshold. Stimuli are then presented at **5dB** above this threshold estimate.

Single Stimulus Supra-threshold Tests

Single stimulus supra-threshold tests are ideal for screening the visual field but can also be used to monitor visual field loss.

The test is fully automatic and requires no intervention by the perimetrist other than to instruct the patient on what to do and to ensure that they have the correct refractive correction in front of the test eye and an occluder in front of the non-tested eye.

Stimuli are presented one at a time, at an intensity calculated to be **5dB** above a measurement of the patients threshold. Stimuli that are not seen by the patient are presented a second time at the same intensity. If missed on both occasions the stimulus is marked as a miss and presented at **8dB** above the threshold estimate. If missed at this intensity it will be presented at **12dB** above the estimate. A grey scale indicates the depth of defect (**5 dB, 8dB** or **12dB**).

The patient responds to each seen presentation by pressing the response button.

Starting the Supra-threshold test

Before starting the test you should ensure that the patient has the right correction lens if required and an occluder in front of the other eye. The patient should then be instructed on what is involved and how they are to respond.

The instrument should be at a height that is comfortable for the patient to place their head on the padded head-rest and look down into the bowl at an angle of approximately 40 degrees below horizontal. The patient should be positioned so that the eye being tested is aligned with the viewing aperature. The patient should naturally align themselves correctly with the aperature.

The first phase of the test finds the patients threshold and this is followed by the supra-threshold phase.

When you enter the test, you are prompted to enter the patient's date of Birth.
This is in the format DD/MM/YYYY where DD stands for the day, MM stands for Month and YYYY is the year in four digit format. It is important that single digit days and months are entered witha preceding zero, eg, "08" for August as shown on the right, otherwise the cursor will not move across to the next location.

The software defaults to the right eye (this can be changed in the OPTIONS see chapter 7) as shown by the 'face' icon on the toolbar having the left eye occluded as shown to the right.

Patient's instructions

It is important to give clear and precise instructions to the patient at the outset and during the test. A typical set of instructions is given below for both the multiple and single stimulus strategies.

Multiple Stimulus

When setting the threshold

The test is going to take about 2 minutes. Make sure you are comfortable.
5000 - Place your chin on the chinrest and look straight ahead into the instrument.
6000 - Place your head against the browbar and look down into the instrument
7000 - Place your eye against the eyepiece and look down into the instrument.
Keep looking at the central red stimulus.
Keep your eye as still as possible.
The instrument will flash some lights to the side of where you are looking. Each flash will be of 2, 3 or 4 lights.
I want you, after each flash to tell me the number of lights you saw.
To begin with the lights will be fairly bright. They will then get dimmer and dimmer until you cannot see them.
Do not guess. If you are not sure you saw any lights say none.

When performing the supra-threshold phase of the test

The lights will be brighter now.
Continue to look at the central red light.
Just tell me the number of lights that you see in each flash.
I may ask you to tell me where the lights you saw were.

Single Stimulus

The test is going to take about 2 minutes. Make sure you are comfortable.
5000 - Place your chin on the chinrest and look straight ahead into the instrument.
6000 - Place your head against the browbar and look down into the instrument
7000 - Place your eye against the eyepiece and look down into the instrument.
Press the response button when you see a stimulus.
You will **not** see all the stimuli.
Do not guess. If you are not sure you saw a light do not press the button.
Keep looking at the central red stimulus.
Keep your eye as still as possible.
The test will increase in speed to match your response times.
It will track your speed so do not worry that it will get too fast.
If you want to take a break hold down the response button.
The first part of the test will be a demonstration. When you are comfortable with what is required, the test will start.

These instructions are available, on screen, from within the **Help** facility.

Key operation, Multiple Stimulus Supra-threshold Tests

All operations on the **Henson software** can be performed by selecting the on-screen buttons with the relevant input method, depending on your instrument. If a keyboard is connected then the test patterns can be selected by the left / right arrow keys. The intensity can be changed by the up / Down arrow keys and the stimulus can be presented by presing the Space bar. The first presentation will have to be made by using the on screen button, but after that the keyboard keys can be used.

In the threshold phase of the test, intensity increments are **1dB** steps, while in the supra-threshold phase the intensity is raised or lowered to the next level (**5dB, 8dB** or **12dB**).

CHAPTER 3

Establishing the threshold at the onset of a Supra-threshold Test

If Threshold related testing is selected in the OPTIONS settings, then at the onset of a supra-threshold test it is necessary to obtain an estimate of the patients threshold. This estimate is used to calculate the test intensity, which is set at 5dB above the threshold estimate (see **Table 1** for typical threshold levels, on next page). If AGE related is set then the patients threshold will be set from the date of birth entered.

Do not worry if your unit is set to AGE and you want to measure a particular patient's threshold. you can change the settin gon a test by test basis by pressing the THRESH button.

Single stimulus strategy

In the single stimulus supra-threshold strategy the threshold setting is done automatically. At four locations, one in each quadrant, the threshold is determined with a Repetitive Bracketing strategy. The routine takes into account field losses and uses means and averages to establish a threshold from which the supra-threshold intensity is calculated. Once the threshold has been established the **Henson** will automatically proceed to the supra-threshold phase of the examination. (Consult the online help for more details)

The rate at which the stimuli are presented automatically tracks the patient's response rate. The faster the patient responds the quicker the test will get up to a finite limit of 3.5 times response rate. It can be manually adjusted at any stage of the examination by removing the tick from the box next to Auto (shown arrowed in yellow opposite) and then moving the slider up and down by pressing and holding on it and moving the cursor up and down the **Response Window**.
The test can be paused at any time by pressing the **Stop** button.

If things go wrong, due for example to the patient misinterpreting the instructions, then you can start the test again by pressing the **New** button.

Multiple stimulus strategy

In the multiple stimulus strategy the threshold is determined via a pre-programmed series of presentations. After each presentation the patient, who needs to be carefully instructed, reports back to the perimetrist whether or not they saw any of the stimuli and the perimetrist feeds this information back into the program.(It is worthwile getting the patient used to calling out the number of stimulus seen as a practice for the threshold phase of the test, even though it is not used at this stage).

Patterns are presented by pressing over the present button. The perimetrist can present the stimuli as many times as they like.

If the patient reports that they saw some of the stimuli then the perimetrist enters this response by pressing the Yes button.

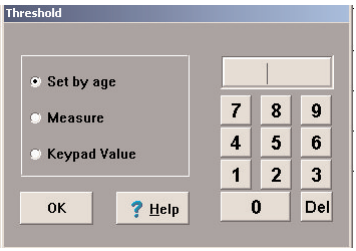
If the patient reports they did not see any of the stimuli then the perimetrist enters this response by pressing the No button (See **Fig. 5** on next page).

This strategy is illustrated in **Diagram 1** on Page **20**.

You can set the patient's threshold to a given value by pressing the **Thresh** button on the menu bar and then entering the value required on the keypad.

You are given the option to set by Age, measure it or enter it directly on the keypad. (see right)

Once the threshold has been established the **Henson** will automatically proceed to the supra-threshold phase of the examination.



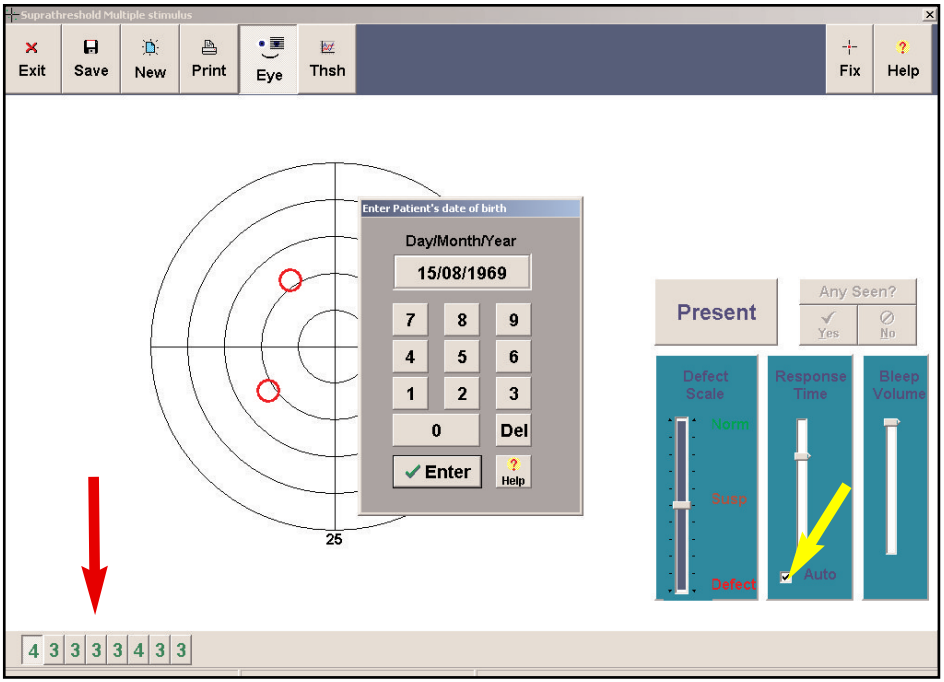


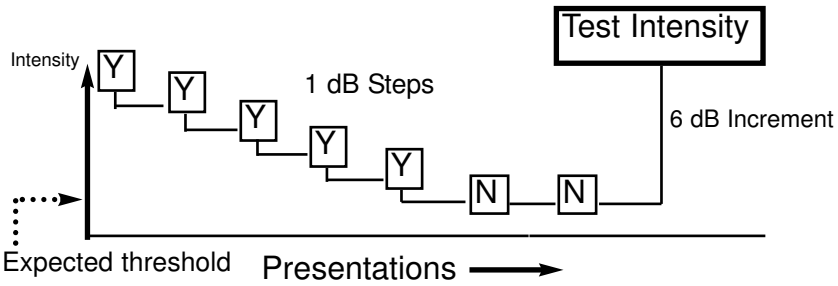
Figure 5. Multiple Stimulus Supra-Threshold Test - establishing the threshold. The arrow shows the patterns that are used to set the threshold. The numbers on the buttons are the expected verbal response from the patient.

Typical Threshold Sensitivity Levels

Table 1 gives typical values for the threshold levels. While individual patients are likely to differ from these values, large unexplainable departures (> 3 dB) should be viewed with caution. The perimetrist should question whether or not the patient fully understood the instructions. In these instances it would be wise to repeat the instructions and it is important to emphasise to patients that they should not guess. If they are unsure then they should say none.

Age years	Threshold sensitivity, dB
<40	38-40
41-50	37-39
51-60	36-38
61-70	35-37
71-80	34-36

Table 1: Typical Threshold Sensitivity Levels.



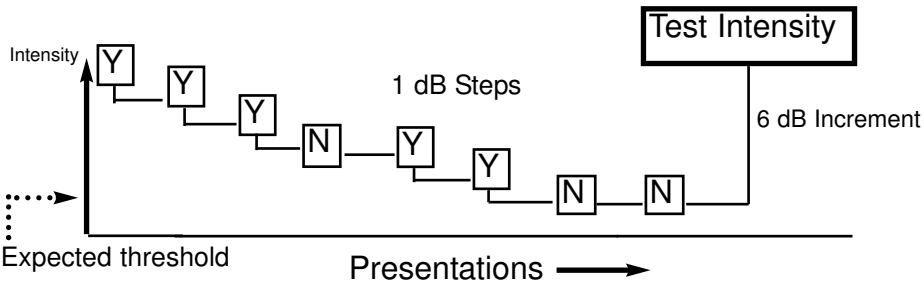


Diagram 1: Sequence for establishing the Threshold in the Multiple Stimulus Strategy (**Y** = Some stimuli seen; **N** = No stimuli seen).

Presenting multiple stimulus patterns in the supra-threshold phase of the examination

Multiple stimulus patterns are presented by pressing the **Present** button. To go onto the next pattern press the right arrow key, to go back press the left arrow key.

You can go to a specific pattern by pressing the appropriate pattern button.

Each of the pattern buttons gives the number of stimuli in the pattern. This number starts off in green and goes to black once the pattern has been presented. If there is a missed stimulus in the selected pattern then the number is red (See Fig. 6).

It is also possible to test individual test locations by pressing the ADD button and touching the field display at the required location. This can be useful as a quick way to retest points previously missed at the same or a higher intensity (for further details see Section "Use of pointer to retest, add or customise supra-threshold tests" on Page 23).

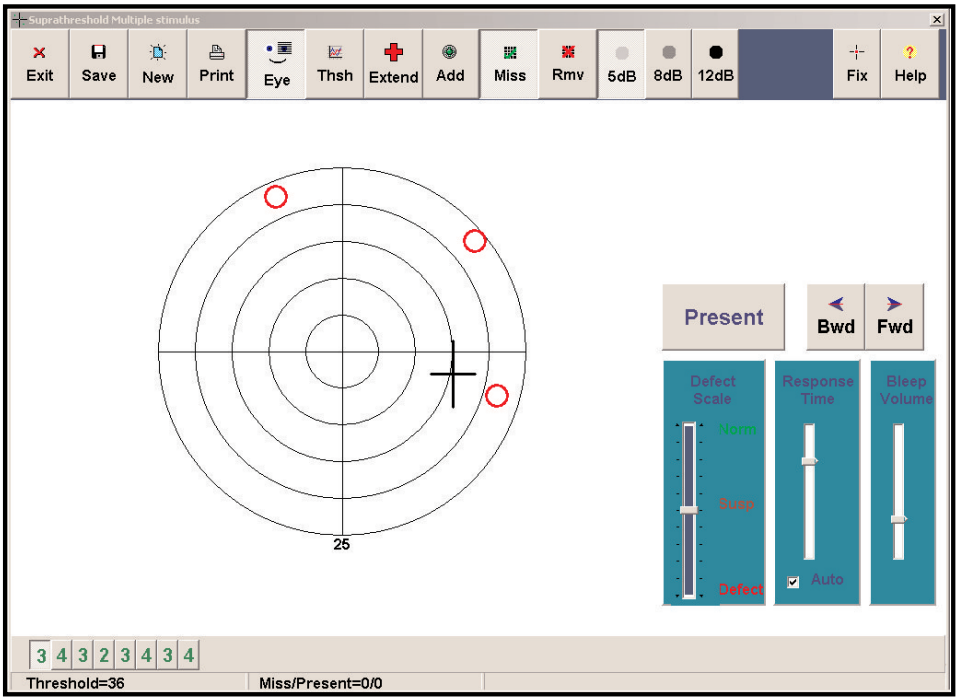


Figure 6. (Above) The initial screen of a multiple Stimulus Supra-Threshold Test
The threshold level can be seen bottom left and progress information about the test can be seen in the form of "number Missed out of number Presented" in the centre. Once the test is started, a timer will appear to tell you how long the test has taken.

Intensity changes in Multiple Stimulus Tests

The Henson starts off its testing phase at 5dB above the threshold estimate. Stimuli missed twice at this increment should be presented at higher increments in order to measure the depth of the defect.
There are 3 different supra-threshold test increments, 5dB, 8dB and 12dB.
Each of the test intensities has a button on the icon bar and the currently selected increment is given by the button, which appears to be depressed. To switch to a different intensity simply press the appropriate button.

Missed stimuli in Multiple Stimulus 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 and only if the patient again reports an incorrect number of stimuli should the perimetrist proceed to establish which stimuli were missed and to enter their locations.

To establish which stimuli were missed the perimetrist needs to asks 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.

Once you have established which stimuli were missed press the **MISS** button on the icon bar and press over the missed locations,

To correct mistakes, i.e. remove missed stimuli, press the Remove (**RMV**) icon and press over the locations.

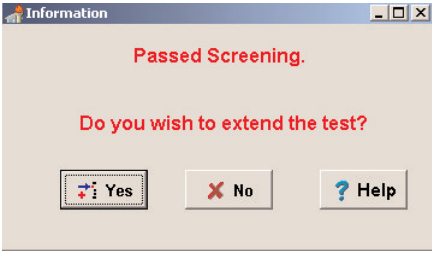
Stimuli missed at a **5dB** increment should be tested at higher intensities.

Extend

All the test programs in the **Henson** software can be extended. Each program starts off with a basic test. In the central supra-threshold strategy this would test 26 test points. If a single point is missed in the basic screening test then the test is automatically extended to the next level.

If all points were seen, i.e. the patient passed the screening test, the perimetrist is presented with a message box (below right) telling them that the patient has passed the screening test and asks if they wish to extend the test.An extension from the first screening level increase the number of test locations to 68 (a second extension can take it to 136).

If you wish to extend the test before it has finished, then you can press the **Red Cross** Extend Icon on the toolbar. The red cross extend icon disappears after two extensions.



The extend facility means that the perimetrist does not have to decide upon the extent of the test before they have collected any data. This improves efficiency in two ways. The perimetrist is not locked in to an extensive test when it is clear, well before the end, that further testing is not going to add information. When it is decided that a more extensive test is needed the perimetrist does not have to repeat a large number of measurements.

Tests can also be extended with the mouse (see following section).
In the options program each strategy can be set up to start off in the extended mode.

Use of the Cursor to retest, add and customise supra-threshold tests

It is possible to add test locations or correct existing ones. This facility is useful for checking the result from a particular location or removing artefactual data such as that produced by a correcting lens rim.

This can be done either during the test or at the end of the test.

The action of the Cursor differs for threshold and supra-threshold tests and the instructions below apply to supra-threshold tests only.

To add a new test location or to re-test an already tested location press the **ADD** button on the icon bar and then select the location of the stimulus you want to present. (by simply pressing the touch screen or clicking the left mouse button).

The test intensity is represented by the selected intensity icon (the one that appears to be down) on the icon bar. To change this simply press the desired intensity (**5dB, 8dB** or **12 dB**).

To enter a location as missed, press the **MISS** button on the icon bar, and then select the missed location.

To correct a test location previously marked as a missed pattern. Press the remove (**RMV**) button and select the location to be removed.

Intensity changes in Single Stimulus Supra-threshold Tests

The intensity is adjusted automatically during the single stimulus supra-threshold test. If a stimulus is missed the program will come back to the location and re-test it at the same intensity. If the patient does not respond a second time it will mark it as a missed location using the **5dB** pattern and come back to test it at a higher intensity.The software will repeat this until, either the stimulus is seen, or not seen at the highest intensity level (**12 dB**).

There are 3 different supra-threshold test intensities, **5dB, 8dB** and **12dB** above the threshold that was established at the start of the test..

Each of the test intensities has a button on the icon bar and the currently selected increment is given by the button, which appears to be down.

Printing

The results from a supra-threshold test can be printed out by pressing the print button. Both eyes will be printed out on the same page. A typical example is shown in **Figure 7** on the next page.

Saving

The results from a supra-threshold test can be saved in the **Henson** patient database for later recall, printing and analysis. For further details see **Chapter 6.**

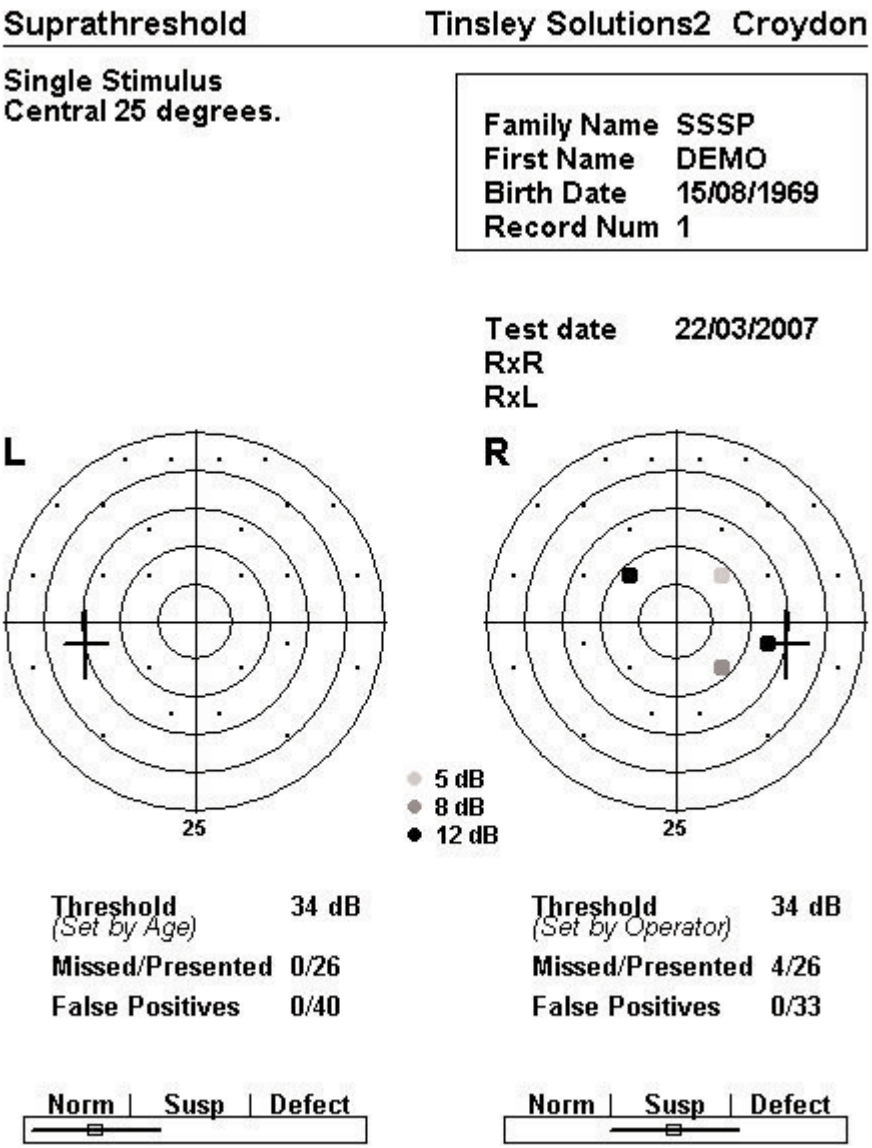


Figure 7. A typical printout from a multiple stimulus 24/2 central field screening test. You can see that the thresholds were set by AGE for the LEFT eye and set from the Keypad for the RIGHT eye.

THRESHOLD PROGRAMMES

Threshold strategies

There are two threshold strategies in the **Henson software** : **Full threshold,**
Fast threshold.

Full threshold routine
The full threshold strategy uses a routine, which gives a measure of the eyes threshold at a series of predetermined test locations. It is most often used to either monitor the extent of loss in patients with established visual field loss or to test for loss in suspect cases. It is not, normally, used to screen the visual field as it is relatively time consuming.

The full threshold test strategy uses the 2 reversal staircase procedure first described by Bebie and Spahr in 1975 and 1976. The step sizes reduce from **4dB** to **2dB** after the first reversal and the threshold is taken as the value lying between the last seen and not seen responses. It normally takes 5 presentations to derive a threshold estimate for each test location.

Fast threshold routine
The fast threshold test is like the full threshold test but uses a routine which is approximately 40% faster and a little bit less precise. It is used when time does not permit a full threshold examination and threshold rather than supra-threshold results are required. The fast threshold routine uses a single reversal procedure with a step size of **3dB**. The threshold is taken as the last seen response.

Threshold Tests

There are 3 full and fast threshold tests provided: **Macular test**
Central 30/2 test
Full Field 60/2 {*Pro 5000 only*}

Each threshold test incorporates a number of catch trials to give the perimetrist a measure of the patients reliability.
The results from the macular and central threshold tests are quantified to give a series of visual field indices
The Central 30/2 test is the most widely used for monitoring glaucoma.
For details of the stimulus locations in each of the tests see **Chapter 9**.

Patient instructions: threshold tests

It is important to give clear and precise instructions to the patient at the beginning of an examination.

A typical set of patient instructions for the threshold tests are:

The test is going to take about 10 minutes. Make sure you are comfortable.

5000 - Place your chin on the chinrest and look straight ahead into the instrument.

6000 - Place your head against the browbar and look down into the instrument

7000 - Place your eye against the eyepiece and look down into the instrument. You can adjust the angle of the bowl by using the UP/DOWN buttons on the front of the unit

Press the response key when you see a stimulus

You will not see all the stimuli

Do not guess. If you are not sure you saw a light do not press the button

Keep looking at the central red stimulus

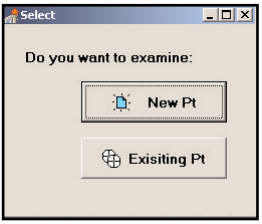
Keep your eye as still as possible

If you want to take a break hold down the response button

The first part of the test will be a demonstration. When you are comfortable with what is required, the test will start.

Starting the test

To start a test programme press over the button next to the name of the test you wish to run in the main menu.



The software will prompt you to select either New patient or recall an existing patient. (See selection box, right)

New patient continues as normal and you are prompted to enter the patients date of birth (see Figure 8 opposite).

Starting from prior data

In the threshold programs the Henson software has a facility to use previously recorded data as a starting point for the next test.

Using previous data has two advantages:

- It speeds up the examination. Less time is spent, at each test location, searching for the threshold.
- It gives more accurate results. When large disparities exist between the starting value and the true threshold there is an increased likelihood that the final threshold estimate will be inaccurate. This results in increased variability from one session to the next.

If you choose Existing patient then you will be presented with a list of compatible (full or fast threshold) tests as shown in figure 8 to the left.

Simply select the patient's previous record and press the OPEN button. (ARROWED)

This will recall the data. When the record appears on the screen you are ready to start the test.

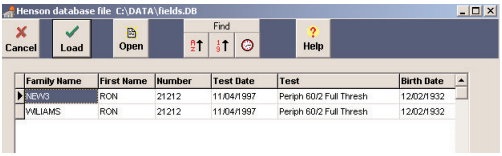


Figure 8. ThePrior test selection window

If less than 9 test locations have been thresholded in the recalled data then the perimeter will start from the age matched normal values.

The Open button is to allow you to recall records from a database that is not the current default. You can browse all drives to select and database to open.

The usual sort buttons are also available. See the database chapter for more details.

If you press the cancel button you will be taken back to the New/Prior question stage.

Give the patient the response button and instruct them as above. The software will automatically start with a 20 presentation Demonstration of the test when you press **Go** button.
During the demonstration or test stages of the examination you can alter the stimulus presentation rate manually by removing the tick in the Auto box (arrowed in yellow below) and then move the slider up or down.

You can suspend the test at any time by pressing the **Stop** button.

If things go wrong due to, for example, the patient misinterpreting the instructions, then you can start again by pressing the **repeat** button.
Note: This will not alter any results you have already collected from the other eye.

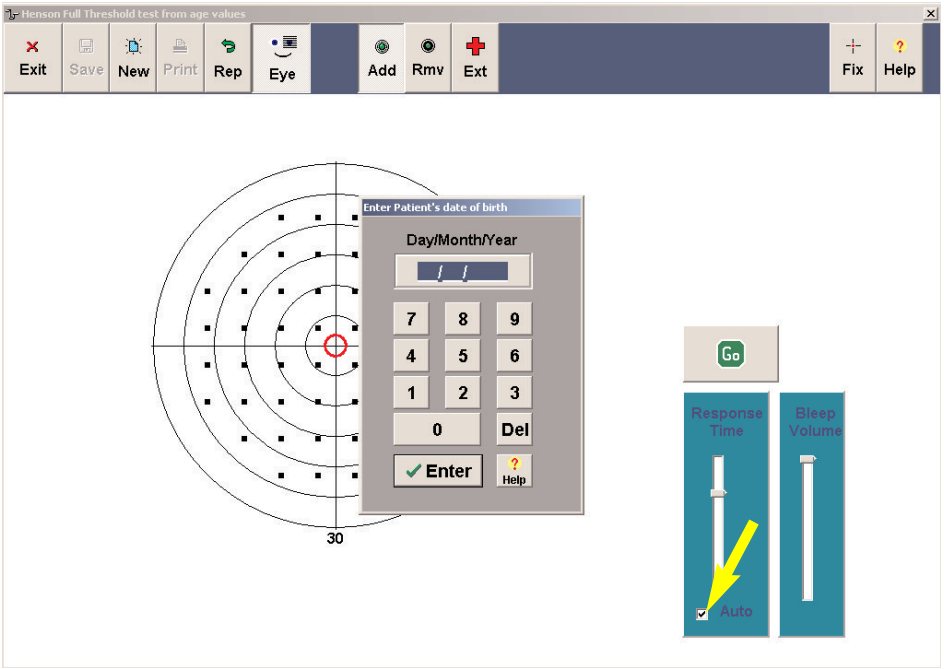


Figure 9. Full Threshold 24-30/2 NEW patient screen showing the enter patient DOB box.

Display Options

The threshold tests can display their results in a variety of different ways:

Threshold Values (default) - (see **Fig. 9** on next page)
Grey Scale
Defect Values
Pattern Deviation Probability Values
Repeat Values

To change the display click the appropriate button or use the menu option Display, then select as required.

These options are only available at the end of the test or after a test has been recalled from the database.

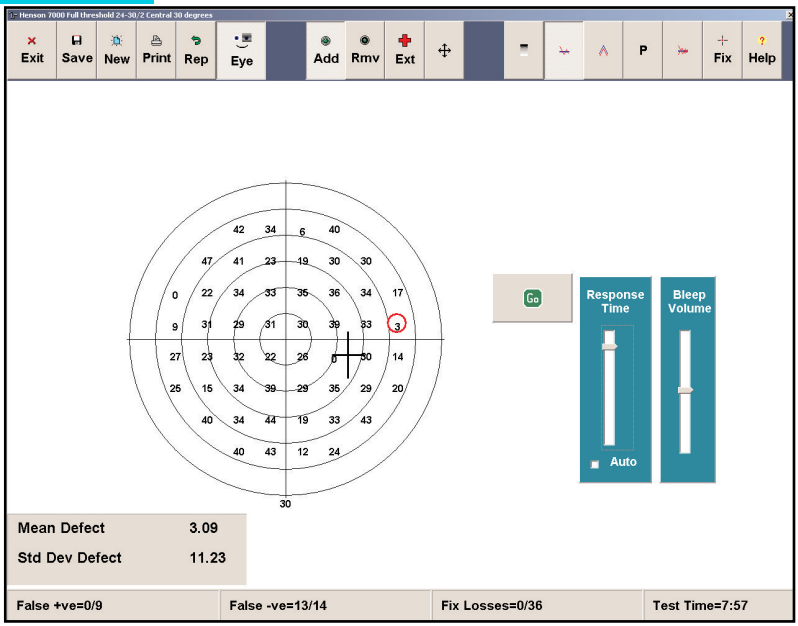


Figure 10. Full Threshold 24-30/2 At end of test showing the measured Threshold Values for the Right Eye.

Grey Scale.

Grey Scale diagrams of one form or another are widely used in Perimetry to indicate the location and extent of any scotomas, (see **Fig. 10** below). The Henson software uses nine different shadings are used to indicate different sensitivities.

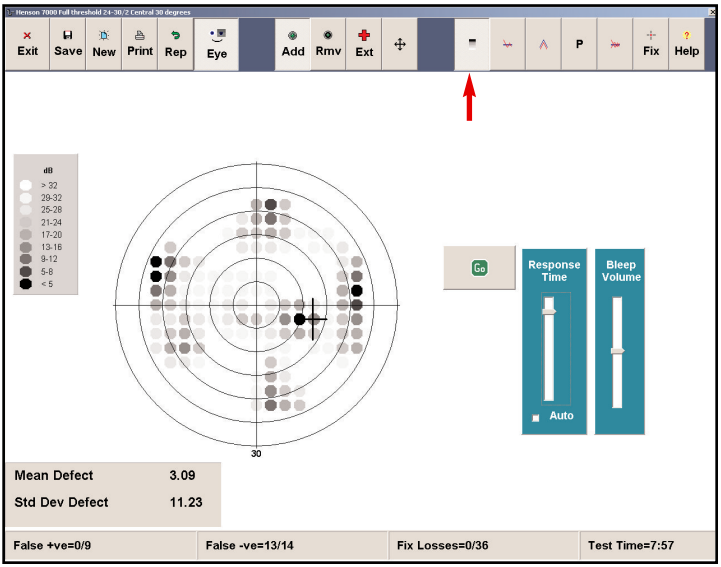


Figure 11. The same 24-30/2 test as in the previous figures, showing the grey scale diagram.

Defect values (threshold tests)

Defect values are the difference between the measured threshold and that expected from an age matched normal eye.

Example:

If the measured threshold was **25dB** in a person of 40 years of age and the normal value for a 40 year old at that particular location was **30dB** then the defect value would be **5dB**.

Positive values indicate a lower than average threshold. (See **Fig. 11** below).

Defect values do not take in to account the variability within a particular age group. Overall shifts in sensitivity are taken into account in the pattern deviation probability values.

Mean defect values are presented at the end of the examination and on the print out.

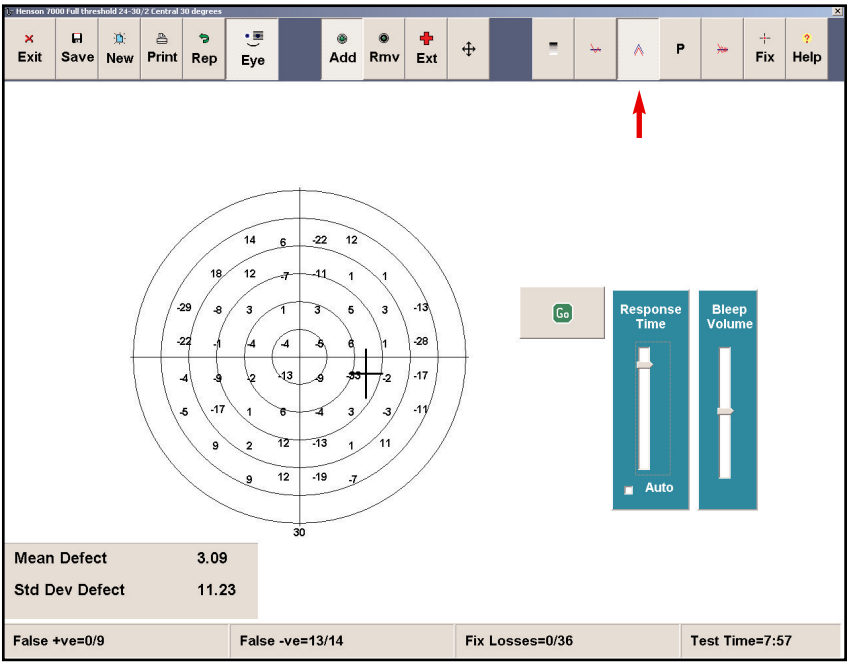


Figure 12. The same full threshold 24-30/2 test as in figure 10 showing the defect values.

Pattern deviation probability values

The full and fast threshold strategies calculate, for each test location, the probability that the threshold measure comes from a normal eye. This calculation takes into account the age of the patient and adjusts for overall shifts in sensitivity. The calculation also takes into account the relationship between variability and threshold, (see **Fig. 12** below).

The overall shift is calculated from an analysis of the most sensitive regions of the visual field. These are compared to those from an age matched normal eye and the defect values shifted to take into account any difference. The shift has a maximum amplitude of **3dB** in either direction.

The three symbols indicate the probability of the marked location being from a normal eye of a patient of the same age; namely 5% = 1 in 20 probability, 1% = 1 in 100 and 0.1% = 1 in 1000 probability.

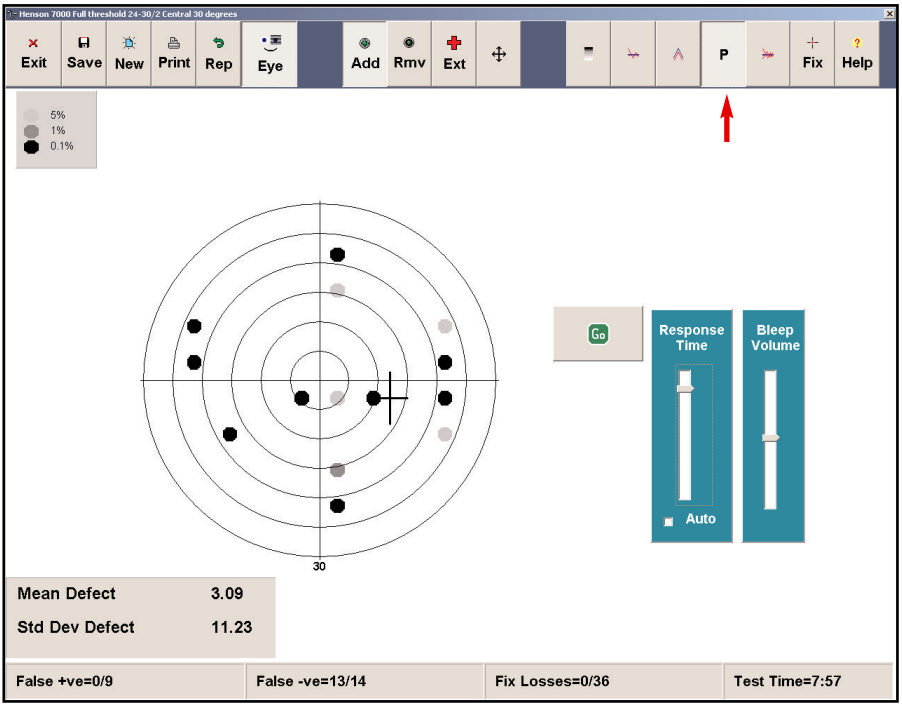


Figure 13. The pattern deviation probability values of the 24/2 test in the previous illustrations.

Repeat Values

During full threshold testing with the **Henson,** 10 points have their threshold determined twice. This data gives an indication of the reliability of the patient. The numbers shown on the diagram need to be compared with the corresponding numbers on the threshold value diagram, (see **Fig. 13** below).

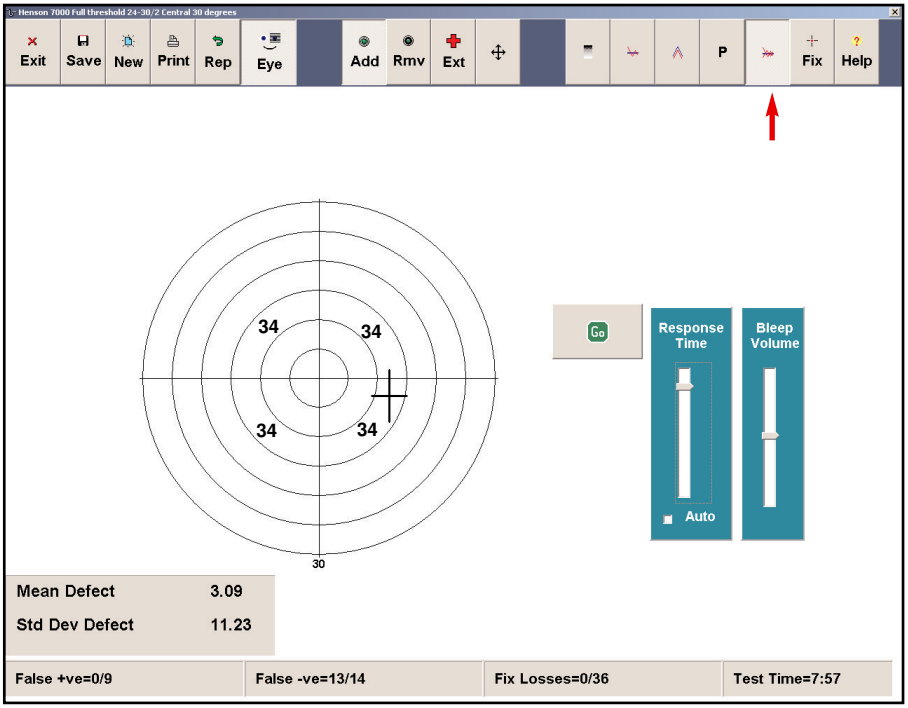


Figure 14. Repeat values of the previous 24/2 full threshold test.

Re-testing, adding or deleting test locations

Test locations can be added, deleted or repeated at any stage of the examination. This facility is useful for checking the result from a particular location or removing artefactual data such as that produced by a correcting lens rim.

To add a new test location press the ADD button then press over the location you want to test on the field chart. Testing will start as soon as you press Go.
You can add as many test location as you like before re-starting the test. You can get a second threshold estimate of a location by clicking over an already measured test point.

To delete the results from a test location press the RMV button and then press the location you want to remove. If the location has been tested twice then you will need to click twice to remove both values.
You can use combinations of deleting and adding locations to re-test locations. For example, if there is a suspected lens rim artefact then you can delete the suspect points, put them back (add them), reposition the trial lens and re-test the locations.

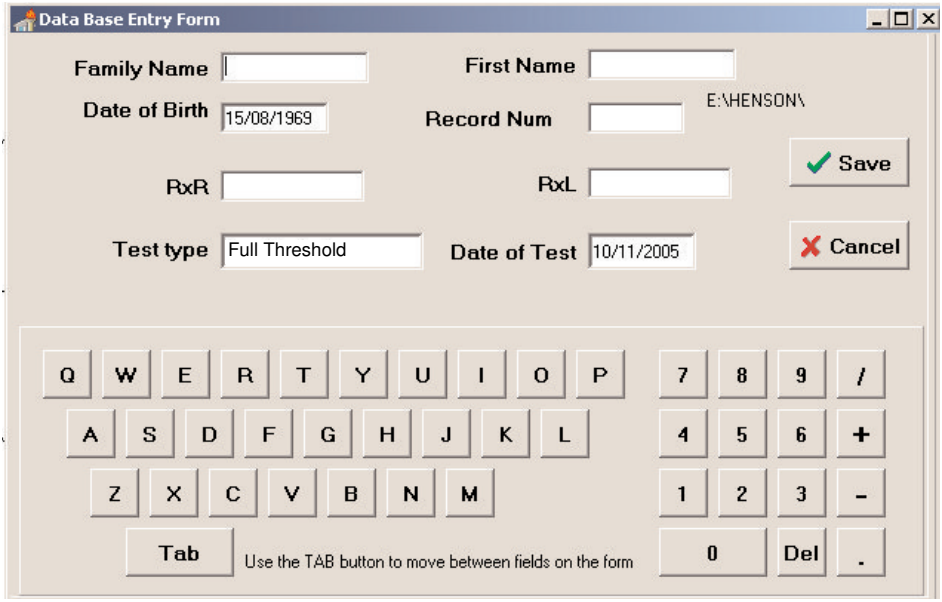
The computation of the visual field indices will be repeated on the revised data set after the addition or deletion of test locations.

Printing

The results from a **Full** or **Fast threshold** test can be printed out by pressing the Print icon at the left of the toolbar, an example of a typical print out can be seen in **Figure 15** on the page opposite.

Saving

The results from a **Full** or **Fast threshold** test can be stored in the **Henson** Database by pressing the Save button. You will first be invited to enter the patients details on the database entry form (below) before pressing the SAVE button, see **Chapter 6** 'Database'.



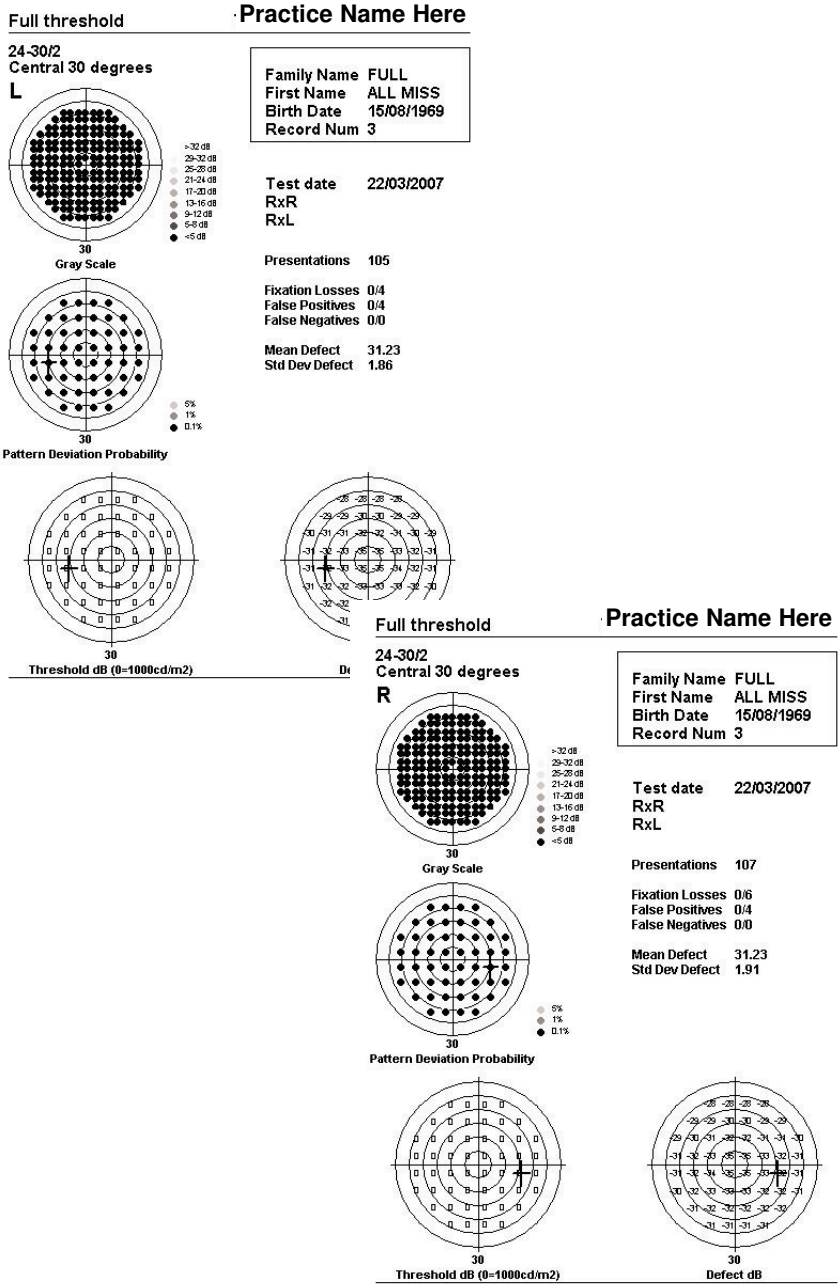


Figure 15. Printouts of the results for the left and right eyes of a full threshold 24/2 test.

CHAPTER 4

DRIVERS TESTS

At the present time UK drivers are required to have a minimal visual field of at least 120º along the horizontal and of at least 20º above and below the horizontal measured with a 3mm white target at a test distance of 33cm (or equivalent perimetry).

At the time of Printing, the DVLA requirement was for an ESTERMANN test. If you are registered for DVLA testing, check the latest information for their current requirements.

The **Henson 5000** and **6000** incorporate the Estermann test which allows the clinician to establish whether or not their patients meet the requirement.

The DVLA will require a hard copy (printout) of the test. It should also be saved for future reference.

Details of the two tests are: Estermann 112 point, 0-72 Deg.

The drivers tests are binocular with a fixed intensity stimulus (100cd/m2).

On the henson 6000 it is importan to remove the monocular eye mask and position the patient's head in the centre of the brow bar. Turning on the alignment lights will help them to position them selves correctly.
For a henson Pro 5000, the patient should position their chin in the centre of the chinrest.

Stimuli are presented one at a time and the patient should respond to each seen presentation by pressing their response button.

Patient Instructions for Drivers Test

It is important to give clear and precise instructions to the patient at the beginning of the examination.
A typical set of instructions for the drivers test would be as follows:

> The test is going to take about 3 minutes. Make sure you are comfortable.
> Press the response key when you see a stimulus.
> Each stimulus will be accompanied by an audible beep.
> You will not see all the stimuli.
> Do not guess. If you are not sure you saw a light do not press the button.
> Keep looking at the central red stimulus.
> **At certain stages of the test the red fixation stimulus will change position, this will be indicated by a longer audible tone.**
> **Fixate on the new position.**
> Keep your eyes as still as possible.
> If you want to take a break hold down the response button.
> The first part of the test will be a demonstration. When you are comfortable with what is required, the test will start.

Starting the test

Select the Drivers test from the initial menu by pressing the button next to the name of the test. Give the patient the response button and explain its use. Ensure that the patient is correctly centred in the window. Ask them to fixate on the red spot at all times. The software will automatically start a 20 presentation demonstration of the test when you press the **Go** button.

During the demonstration or test phase of the Drivers Tests you are able to alter the rate at which the stimuli are presented by removing the tick from the AUTO box on the response time scale and moving the slider up and down

.

You can suspend the test at any stage by pressing the **Stop** button.

If things start to go wrong due to, for example, a patient misunderstanding the instructions, then you can start again by pressing the **New** button.

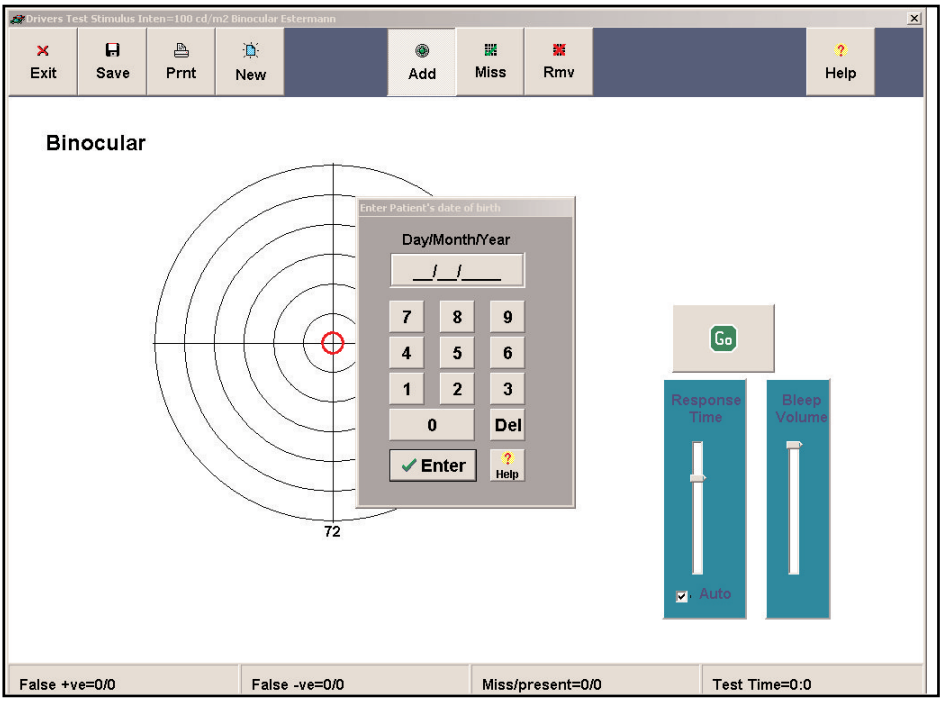


Figure 16. The initial screen of an Estermann test showing the patient Date of Birth box.

Use of the Cursor.

At the end of the test you can add test locations or correct existing ones. This facility is useful for checking the result from a particular location or removing artefactual data such as that produced by a correcting lens rim.

To add a new test location or to re-test an already tested location press the **ADD** button on the icon bar and select the location that you want to present on the on-screen field plot.

To enter a location as missed, press the **MISS** button on the icon bar, and again select the location on the field test plot.

To correct a test location marked with a missed pattern. Press the **ERASE** button on the icon bar, and select the location as you would for adding a test location.

The positions of the stimuli in the Estermann test are shown in Chapter 9.

Printing

The results from the drivers tests can be printed by pressing the **Print** button.

Saving

The results from the drivers tests can be saved in the **Henson Database** by pressing the save button.
For further details see **Chapter 6 Database**.

CHAPTER 5

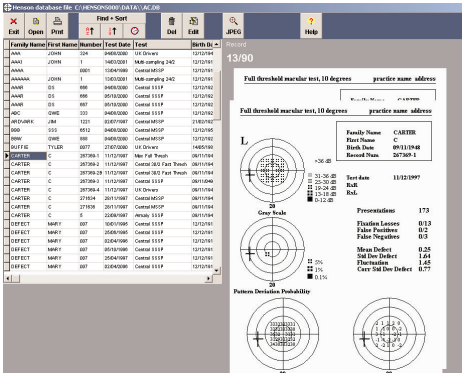
THE DATABASE and DISK UTILITIES

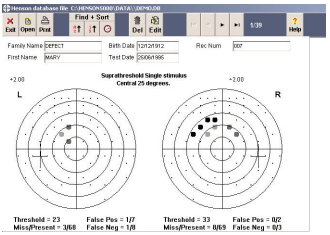
Introduction to database

The **Henson software** includes a powerful database for the storage, recall and analysis of your visual field records.

There are two types of database screen available depending on your model and the screen resolution available.

The Henson Pro 5000 and the 6000 Compact have the database with printouts shown below left which gives full screen printouts as well as the patient details.
The Henson 7000 when used with a PC or laptop will also show this database. When used with the Custom controller it will display the database shown below right. This has a graphical representation of the field plot.





At the end of your visual field test you can save visual field data in the database by pressing the save button on the toolbar. You will be presented with a database entry form in which you will need to enter the patients name, record number etc.

The **Henson software** saves the results from both eyes in a single record. You do not have to save the right eye and left eye independently.

Data held within the database can be recalled back for printing and inspection by pressing the **Database Open** button on the main menu.

In the full threshold programs the recalled data can be used as a starting level for a new test. Starting from prior data improves the accuracy of the threshold routines and (slightly) reduces the examination time.

There are a number of search facilities within the database, which allow you to find a record quickly.

When the record is saved, the database produces an image file which is identical to the printout. This is stored with the database files in a folder that has the same name as the database (i.e. a database called fields.db will have a folder called Fieldsimages)
The images in this folder can be imported by practise management software as an electronic record of the test. The picture files are named according to the patients surname their record number and the date of the test.

i.e. patient John Smith record number 101 who had a suprathreshold test on 03/06/2003 would be SMITH10103062003BE (the BE stands for Both eyes. If the test had been a full or fast threshold test then there would be two image files one ending in LE (left eye) and one with RE.

The images are stored regardless of whether the you use them or not. The images are not part of the database backup as they can be re-created from the backed up data.

The Database utilities program (Dbase Utils on the toolbar) has the facility to copy records, merge databases and export database data as an Ascii file for analysis.

CHAPTER 6

Database files

The **Henson software** utilises a sophisticated and well proven database program (Paradox) to store visual field data.

The database stores the data and the indexes used to sort through the data in 10 different files all with the same root name but with different endings. For example if you elect to save your data in a file called **mydata.db** the software will create the following files in the database path: -

mydata.db	**mydata.mb**	**mydata.px**	**mydata.val**
mydata.xg0	**mydata.xg1**	**mydata.xg2**	**mydata.yg0**
mydata.yg1	**mydata.yg2**		

It is important that these files all remain together in the same directory. If they are separated or selectively deleted then there will be problems in accessing your data.
You are not confined to having a single database. The **default** database as set in the options is where all new tests are saved. It is a good idea to change this database yearly to prevent it from becoming too large and unmanageable.

To set up a new database go into the options program by selecting the icon of the desktop, press the Database tab and enter a path (location) and file name for your new database(see chapter 6 for full details). When you next save some data the new database files will be created (all 10 files) and the record will be stored in it.

If, in the options, you change the default database one that already exists, then, when you next save a record it will be appended to those in the existing database.

When you first create a database the **Henson software** will insert a dummy record. You can delete this after you have saved some data.

When you wish to load, view or process data from a database other than the one defined within the options file simply press the **Open** button. The **Henson software** will open a window in which you can select your database file.

If you decide to save your data on a removable disk (USB flash memory) rather than on the hard drive then the Henson software will generate a new database every time you use a new media. You may notice a slightly longer delay when you first save some data on a new disk.

In addition to the databases used to store your visual field data the **Henson software** uses two other databases located in the directory **c:\henson\temp**. These are called **empty.*** and **temp.*** It is important that these two databases are not deleted or moved from this directory as the software frequently needs to access them when performing certain house keeping functions.

Storing data in the database

All the test programmes used in the **Henson software** have the ability to store data.

To store the current data press the save button. (**Note:** Some tests do not activate the save button until the end of the test.)

You will be presented with a database entry form in which you can enter the patient details (name, record number, corrective lenses worn, etc.). Names must be capitalised . see **Fig. 17** below.

You must enter family name, date of birth and record number. If you do not the software will issue an error message.

The patient's Date of Birth, test type and the current date (Date of Test) are automatically entered by the software. The date comes from the PC's internal clock, which needs to be correctly set via the Windows Control Panel (see **Chapter 11**).

If the default date setting is incorrect, e.g. in the American format **MM/DD/YY**, it should be changed to the UK format through the windows control panel, see **Chapter 11** for instructions.

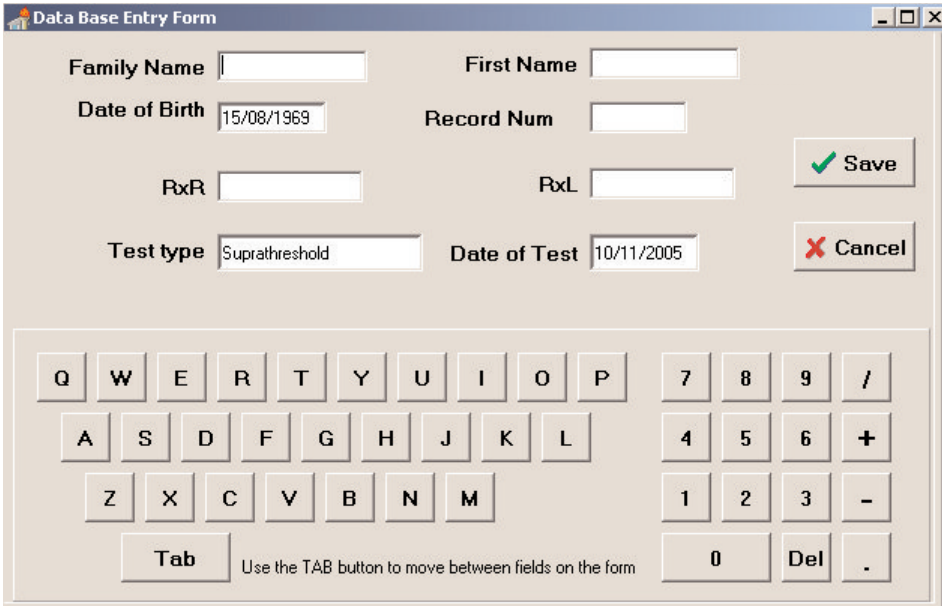


Figure 17. Example of the database entry form.

The TAB button will move the cursor between fields from left to right and top to bottom. If you wish to leave a field blank then press the TAB key again to move on.

Unique record

You cannot have more than one record with the same family name, date of test and record number.

If you want to collect more than one set of data from the same patient on the same day then you must append the patient's record number with an additional character. For example: if the patient's record number is 1234 then on the second record use **1234a** on the third **1234b**, etc. NOTE: this is only necessary for tests performed on the same day.

If you do not do this you are presented with a "Key Violation" message as shown below (see **Fig. 18**).

Remember the **Henson software** saves the results from both eyes in a single record. You do not have to save the right eye and left eye independently.

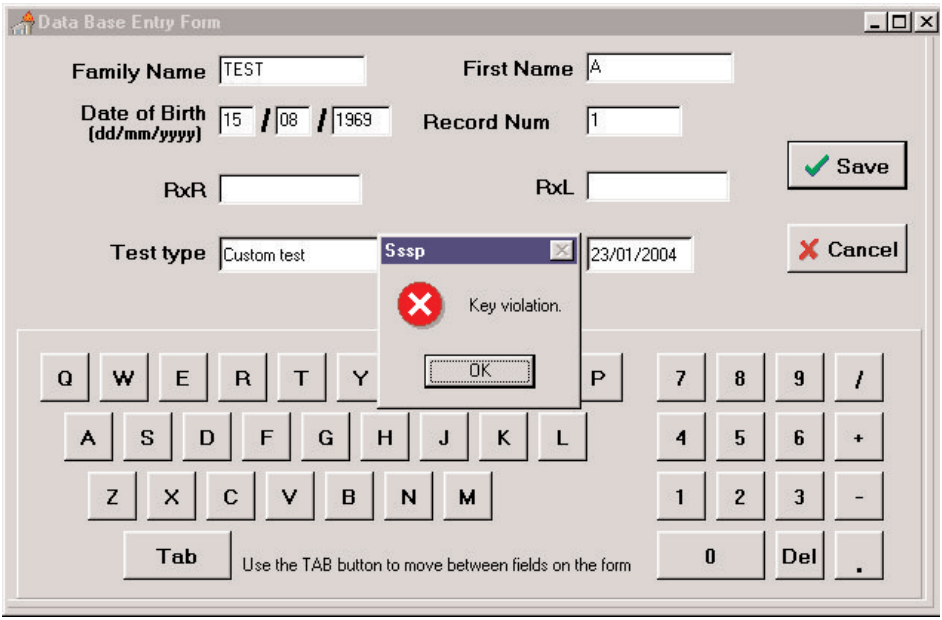
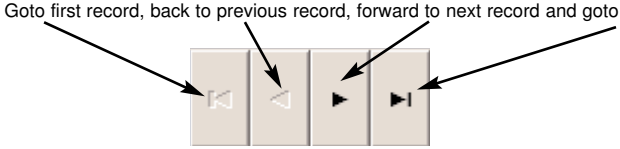


Figure 18. The Key violation error message will be shown when you try to save a second set of data from same patient on same day without adding a suffix to the record number. Note: the SSSP in the header bar of the error message relates to the test you have done, in this case **S**ingle **S**timulus **S**upra-threshold **P**erimetry

Displaying Field Data

When you first open the *Simplified* database, you are presented with a field chart of the first patient in the database. By default the database is sorted alphabetically.

There are Database controls for navigating through the database. They are (from left to right) :-
Goto first record, back to previous record, forward to next record and goto last record.



There is an indicator of the position the record currently being viewed holds within the database. In the example below this is 1/39. This is called the record index number and is not to be confused with the patient record number entrered when the record was saved.

This is in the format X/Y where X is the number of the current record and Y is the total number of records.
Note: the record number given here as X is not related to the patient record number (Rec Num) entered when saving the record, it is merely a guide as to the position in the database when stepping through. When sorted by a different criteria the record will be re-numbered. i.e the first record alphabetically may well be the last record when sorted by test date.

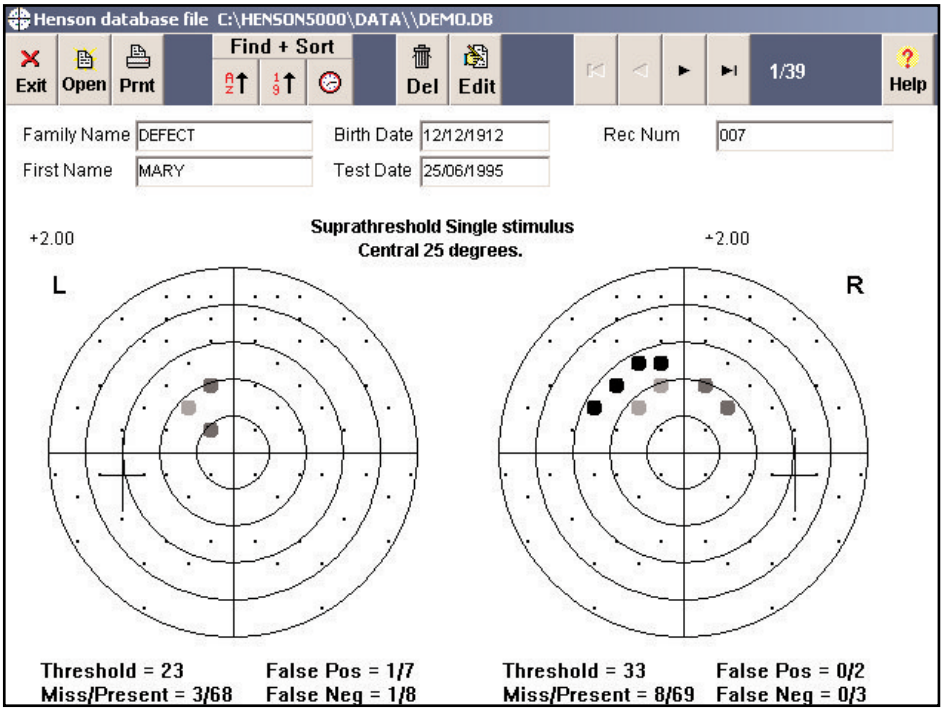


Figure 19 The first record of a Database containing 39 records, Showing a Single Stimulus Suprathreshold Perimetry (SSSP) field data for patient 007 Mary Defect, born 12TH December 1912, tested on 25THJune 1995.

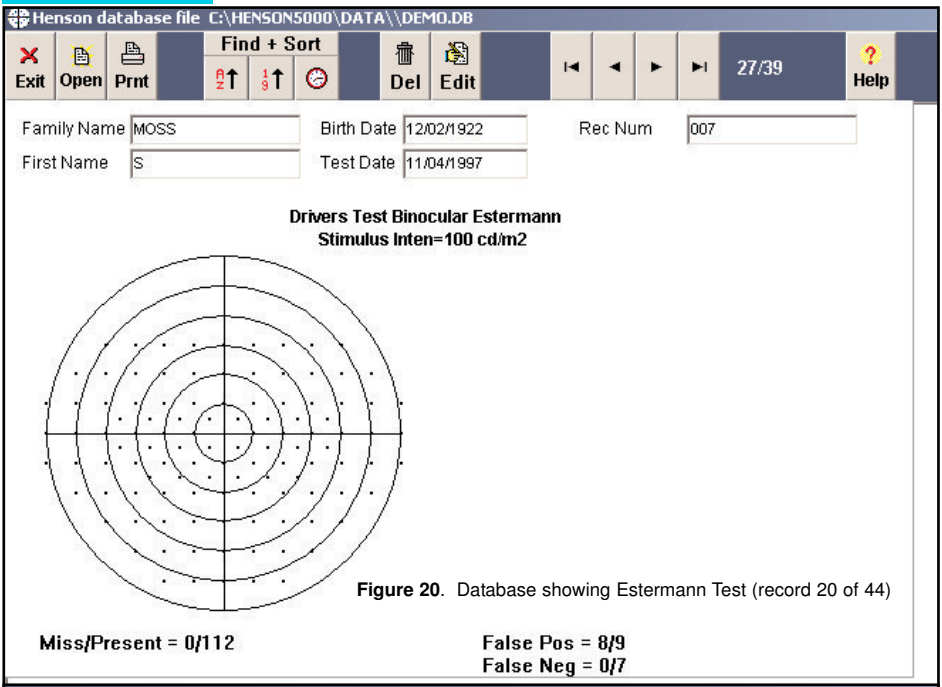


Figure 20. Database showing Estermann Test (record 20 of 44)

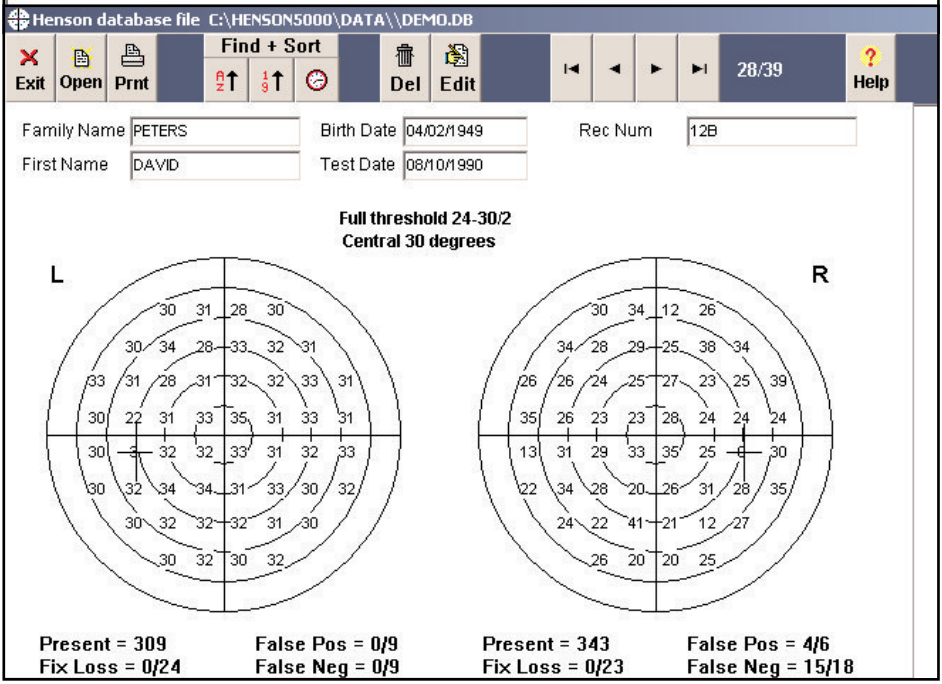


Figure 21. Database showing a Full threshold test (Record 22 of 44)

In the Database with printouts, there is a list of patient details and the accompanying picture of the printout. The printout picture is produced and stored on the system even if you did not request a printout. To display the printout of a record, select the record by pressing / clicking on the patient's name.
If the test is a full or fast threshold then the printouts for the 2 eyes will be on separate pictures. to see the picture that is behind, simply press on it and it will come to the front.

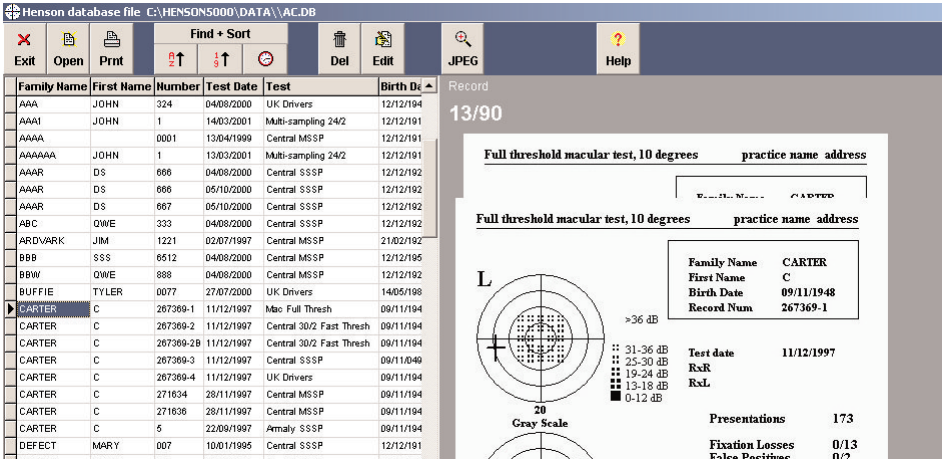
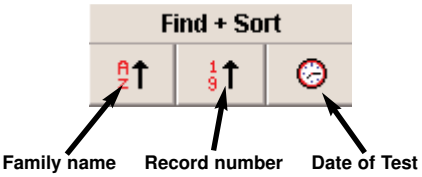


Figure 22 . The database with Printouts.

Sorting the database and Finding a record

To find a particular record within the database select one of the **Find + sort** buttons from the toolbar**.** The three search options are (from left to right):-



If you want to search for a particular family name then select the first option. Conversely if you know the patient's record number or the date of their last test then select the appropriate option.

When you press the button, the database recordes will be re-ordered accordingly. On both types of database, the record index number which is displayed as a fraction will also be changed,

i.e. record one sorted alphabetically will start with an A, record one when sorted by patient record number will be the lowest number and record one when sorted by test date will be the earliest date.

It is important not to confuse the record index number with the patient record number as the record index number can change with the sort criteria.

Once you have selected an option you will be presented with a find box (right) in which you enter what you are looking for, i.e. the family name, record number or date of test.

Press OK and you will be taken to the correct record. The database will have been sorted by the same criterea as you are searching, so similar family names, record numbers or chronological dates will be next to the selected record.

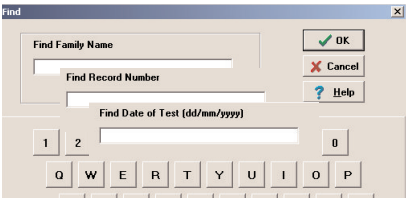


Fig. 23. showing the Find window, with the 3 different criteria.

The find system searches for the nearest match.
For example, if you were looking for the family name Higginsbottom then entering H will take you to the first record that begins with H. You do not need to enter the complete name, but if you have a large database then entering more letters, i.e., HIG, would take you closer to the name you were searching for as it would skip over all of the names beginning with H that were listed before HIG.

If you select **'Date of Test'** the records are automatically re-sorted in date order (earliest first) and the selected record is the first record on the selected date with others on the same day in chronological order.

Deleting a record

Records can be deleted from a database by first of all selecting the record you wish to delete and then pressing the **Delete Record** button. You will be presented with a warning before the data is deleted (see **Fig. 25** below).

Once deleted the record CANNOT be retrieved unless that record was in the database when it was last backed up to the removable media or other location.

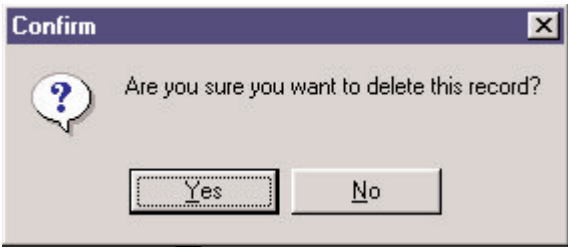


Figure 25. The warning message to confirm deletion of a record.

If you accidentally delete a record and it is contained in the last backup of the database then it can be retireved from the backup and restored into the current database file.

To do this see page 54 which explains the procedure for copying records.

The backed up database wil need to be "opened" and the record copied back into the current database.

Editing data within the database

Occasionally there is a need to edit the data stored within the database. For example the patient's name may have been mis-spelt or the record number may contain an error.

To edit a record you must first select the record you want to edit by either the manual controls or the find facility. When you have the record highlighted or displayed on screen, (depending on the type of database you have), press the EDIT button (See Fig 24 Below)

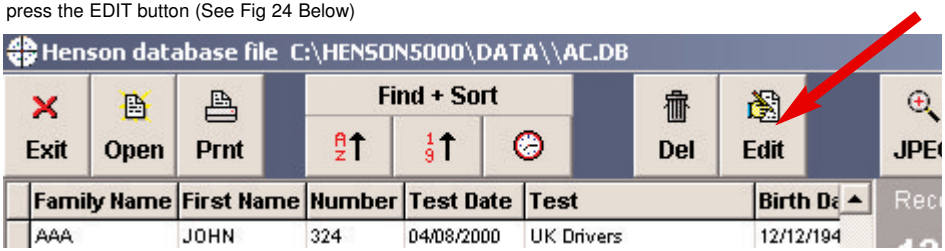


Figure 24. The Database toolbar showing the EDIT button.

A keyboard will appear on the screen along with a box containing all of the data for the currently selected record. (See Fig. 24a below).

All of the fields can be edited (including date of test should your machines internal clock/calendar be found to be incorrectly set).

Once you have made the required changes, you should press the OK button to save them back to the database. If you make a mistake or do NOT want to save the changes, then press the small X in the top right corner of the box (arrowed below). The record will be unaltered and if you made a mistake, editing can be started again.

Remember to use CAPITAL letters when editing names and ensure that dates are in the correct format.

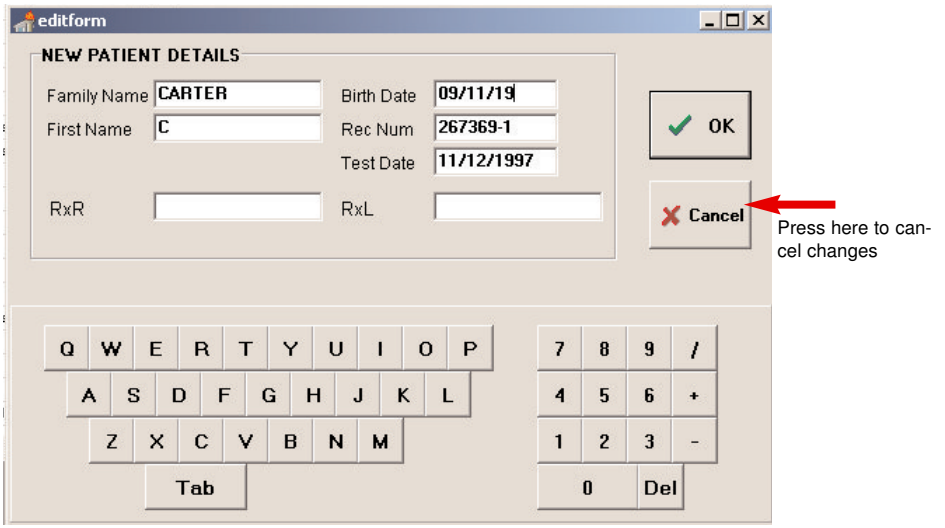


Figure 24a The edit box, showing the year in the date of birth being edited

CHAPTER 6

Analysing the data stored within the database

To allow analysis of data and to expose trends in the patient's data and help clinical decision making we have a separate suite of database software which, due to the screen size restraints of the smaller Henson machines, requires the use of a Personal Computer or Laptop. The software suite is based around the Henson Database but contains extra functions for analysing field data.

Each visual field record is quantified (reduced to one or a group of numbers) and the result plotted as a graph over time with today's date being on the far right of the graph and the earliest record on the left. Two graphs are shown at the same time, one for the right eye and one for the left eye. Within each graph the results from several different types of analysis are given.

To perform this type of analysis the perimetrist first needs to ensure that the database is sorted in such a way that all the records from a given patient are adjacent to each other (this is the default way in which the database is sorted when first entered). The perimetrist selects the first record of the patient whose data they wish to analyse and then select the **Graph** menu item.

The software will analyse all the records from the same patient which follow the selected one. By selecting a record other than the first one the clinician can see the trend following a particular intervention or point in time.

The analysis software can process both supra-threshold and full threshold central visual field data automatically switching to the appropriate analysis once you have selected the starting record.

1. Analysis of supra-threshold data.

The **Database Suite** counts the number of missed points (missed at **5dB** above the estimated threshold) and plots this value over time. This form of analysis is both simple and robust. Counts are made for the whole field and for the superior and inferior hemi-fields. The hemi-field analysis is particularly useful as it utilises the known spatial separation of superior and inferior defects. It is common in the early stages of glaucoma for the visual field defect to be confined to a single hemi-field and, by keeping the results from each hemi-field separate, it is often possible to see significant changes occur in a formally normal hemi-field which would be lost within the noise level of whole field analysis.

2. Analysis of threshold data.

The **Database Suite** analyses threshold data in two ways. It plots the trend in the index mean defect (see page **63**) and it plots the number of defective test locations in the superior and inferior hemi-fields. A defective location being defined on the basis of it's pattern deviation probability (see page **64**) value being beyond the 1% level. Mean defect trends are useful for detecting overall shifts in sensitivity while the number of defective locations highlights changes in localised loss.

Both forms of analysis can be printed out by simply clicking the left mouse button over the print button.

(See **Figure 26** on next page for illustration of Graph).

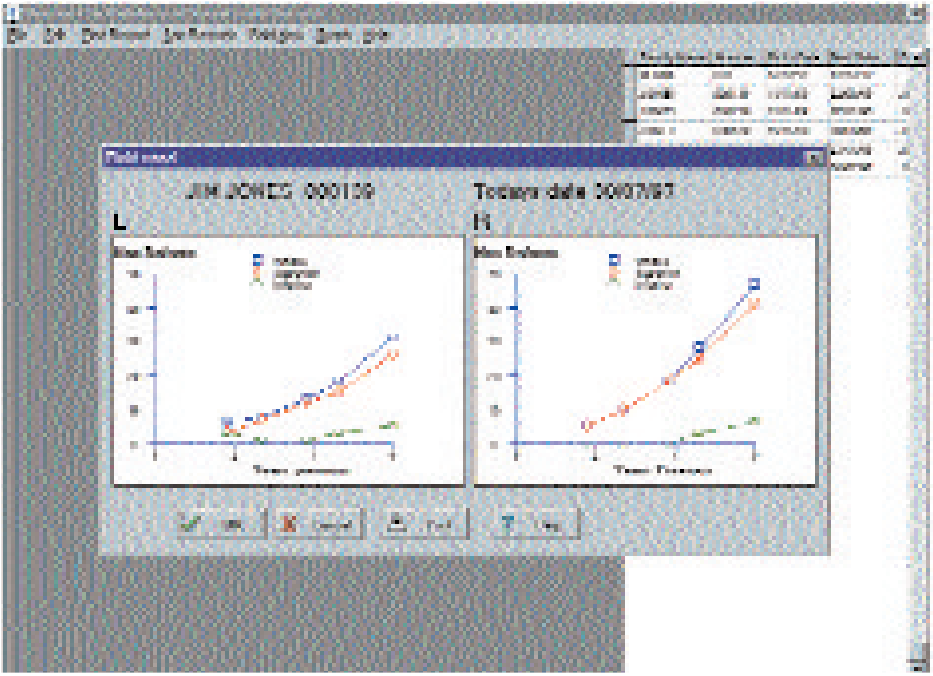
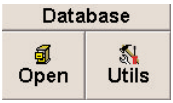


Figure 26. Graph showing trend of defect of patient Jim Jones No. 000139.

CHAPTER 6

Using the Disk Utilities Program

The disk utilities program allows you to perform housekeeping on the database and field records.
To access them, press the Database UTILS button (Shown Right) on the main menu



The screen shown belo will be shown with the current default database shown.

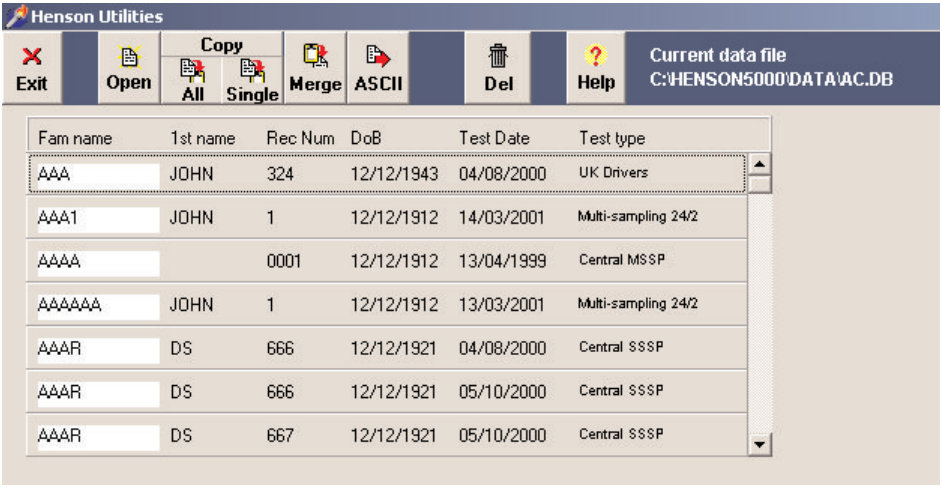


Fig. 27 The Disk Utilities program

All of the functions of the program can be reached by pressing the buttons on the toolbar.

There are 2 copy functions for records:-
Copy All makes a copy of the entire database. and
Copy Single allows individual records to be exported .

The copy all is useful to make a full manual backup of the database to store in a separate location and the copy single is useful if you are referring a patient and want to send their field chart by email in a format that the receiving clinician can use to retest the patient, i.e. sending a full threshold test to allow “from prior” testing.

The **Merge** facility allows you to copy records from another database into your default database. This is useful if you have accidentally deleted a record from the default database but have a copy on your backup.
This is also usefeul if you have more than one practice and want to keep a central record of all field screens from all practices that can be used by all machines across a network. Initially, you would need to merge all of the exisitng databases together. This facility is also useful if you have had a loan machine whilst your machine was serviced or re calibrated. you cna then keep the records you saved on the loan machine and put them on your machine when it is returned.

The ASCII button allows you to expert the entire database in ascii format. This is useful if you are performing a clinical study and want to analyse the patient records in anopther program. if you would like to know the format that the data is stored in, contact service@tinsley.co.uk

The Delete button deletes individual records the same as in the database. Warning, Once records are deleted, they cannot be recovered unless thay were in the last backup made.

Copying visual field records

To copy certain records, press the **Copy Single** button to open up the second database (the one you want to copy records to or from).
You will be presented with a file browse window. (shown below right).

To change drives press the arrow next to the drives window (arowed in yellow) for a list of all available drives. These will include any network drives that are set on your machne.

You can see that on this machine there are several drives available, namely:-
A: a floppy drive
C: a hard drives
F: a CD rom drive
G: a Removable media (usb flash drive)
Y: a mapped Network drive located on a server.

By clicking on any of them, the directories (also called folders) they contain are displayed in the Directories window above.

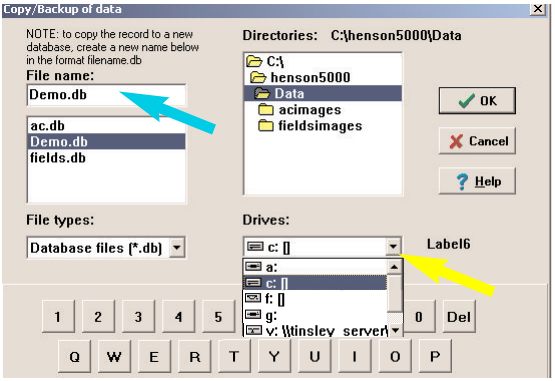


Figure 28. The database selection window.

Navigation of the directories window is as simple as double clicking on the directory to see its contents in the box on the left. Only files with the extension .db will be shown as we are only interested in database files.

The example above shows the contents of the default database folder (C:\HENSON5000\DATA) with a database called Demo.db selected.
(NOTE: The folder name will be the same as your units model number i.e. HENSON5000, 6000 or 7000)

Once you have found the database to copy to / from, highlight it by clicking / pressing on it and press the OK button.

If you wish to copy records to a completely new database to copy your records to then navigate to the folder where you want to save the database and then edit the **File name** in the top box.(arrowed in Blue)
Replace the asterisk (*) with the new name leaving the .db on the end as this identifies it as a database. When you press the OK button a new database will be created ready for the records to be copied.

When the OK button is pressed, the file selection window closes and the second / new database will be shown on the screen below the current database. (see Figure 29 on the next page)

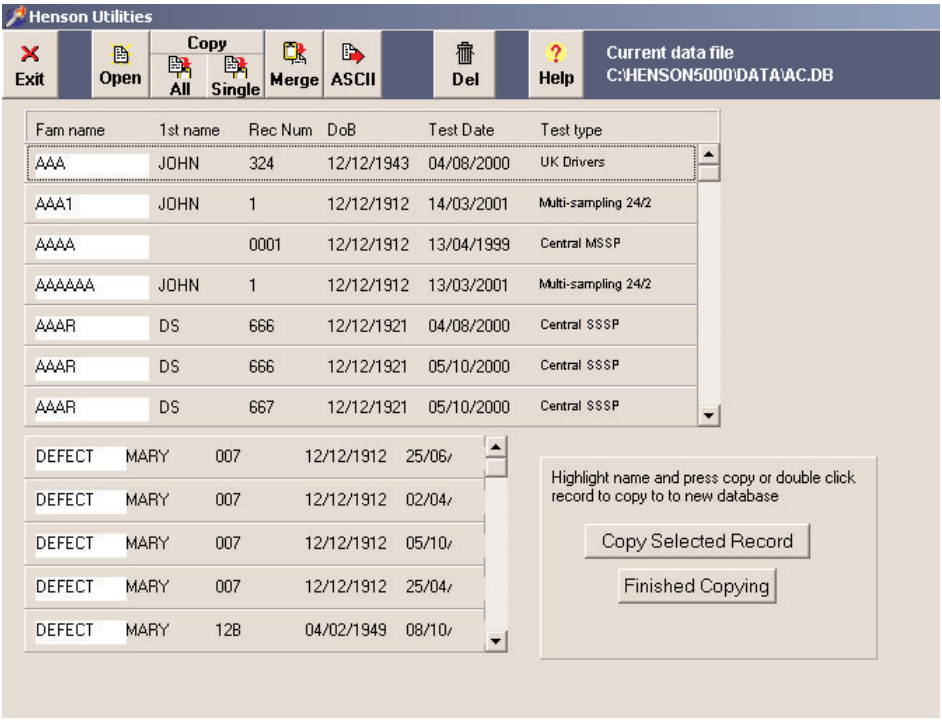
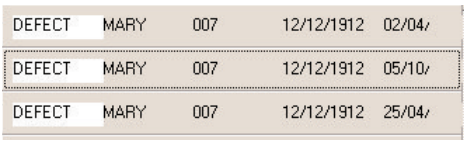


Figure 29. The second data base can be seen below the default database.

To copy a file, click on it to highlight it. Highlighting appears as an outline around the name (see below). You can see from the picture below that the middle record of the three Mary Defect records has been highlighted.



When you have found the record you want to copy by using the slider at the side of the records window, you can either double click on it or press the COPY SELECTED button.

If you attempt to copy a record that already exists in the default database then you will see a messa ge to this effect. The key fields for t database records are surname, record number and date of test. if the record is not an exact duplication, then one of the 2 matching records can be altered using the EDIT box in the database and then attempt the copy again.

You can copy as many records as you like in either direction, i.e. from the default database to the the second database or vice versa.

Copying from the second database into the default is useful if you have deleted a record by mistake and wish to restore it from the last backup copy.

When you have copied the records, press the **Finished Copying** button and the second database window will close.

Copying between Databases

It is possible to copy records between databases when neither of the databases in question are the default database, i.e. the one currently set for saving records on the Henson.

The 'source' and 'destination' databases can be on the hard disk or removable media. The only limiting factor is that they must both be accessible to the Henson machine at the same time. It is not possible to have the two databases on two removable flash drives if both flash drives cannot be plugged in at the same time. (in this case, one of the databases would have to be copied to the internal drive of the henson first)

To do this, upon entering the Disk Utilities program, press the OPEN button and navigate to find the source database and press the OK button. Then when this is displayed on the screen, press the **Copy Single** button and follow the procedure on pages 53 to 54.
NOTE: If you exit the Utilities program and re enter it, then the database shown on screen will have been reset to the current default database.

Copying the whole database - backup

The path and file name of the database in which your records are currently being saved is defined in your options file along with the location path of the backup file. (see **Chapter 7**).

It is good practise to copy the database to another location (preferably at another site) at regular intervals to give yourself a backup copy of your visual field data. This can be done by taking the removable media that the backup is saved on to another PC and copying the files to it's hard disk.

The internal Henson database is automatically copied up to the backup location set in the options program. In most cases this should be a removable drive such as the supplied USB flash drive.

You can manually backup the database by selecting the **Copy ALL** button on the icon bar in the Database Utilities programme.

The procedure for backing up (copying all) of the records is exactly the same as for copying single records except that you do not have to individually select the records.

The visual field data is stored in a number of different database files (see page **40**). The software will automatically place these files in the same location. They should not be separated or selectively deleted through programs such as windows **Explorer**.

It is always good practice to keep a backup copy of the database on removable media and/or another computer, preferably off-site.

When the database becomes large (greater than 1Mb) the software will prompt you to start a new database file. To do this, go into the OPTIONS programme (Page 57) and rename the database (Page 61).

For example; if you are currently saving your field record data in FIELDS.DB then change the name to FIELDS2.DB. (Another options is to change the database file monthly i.e., jan2000, feb2000, etc.). The database can be called by any name as long as the ".db" is left on the end.

All new data will then automatically be saved in the new database. All current records will still be available in the old database. To access them, enter the database, select the OPEN icon, select the DATA directory, and finally select the archived database from the list presented.

Changing the database

The **Henson software** can access and use many different database tables. Each one might contain data from a specific study, or a group of patients.
The database currently being used for storage and recall is defined in the options file (see page **61**).

If you want to recall some data from a different database then select **File** from the menu bar and **Open**.

A window will open allowing you to browse through your files.

The new file name should be entered into the file name box (top left) before clicking over the **OK** button.

The name of the currently selected database file is displayed on the icon bar.

THE HELP and OPTIONS FILES

Within the Henson software there are very extensive Help files and an Options Program to allow you to customise the software.

When you press the Help Menu item you obtain a standard windows Help facility with options to find and jump to selected items. (see **Fig. 30**).

If the help button is pressed whilst in a field test, then any testing of the visual field will be suspended while a Help message is displayed. Pressing any key, including the patient's response button, will remove the Help message and return the programme to where it was prior to the Help message being requested.

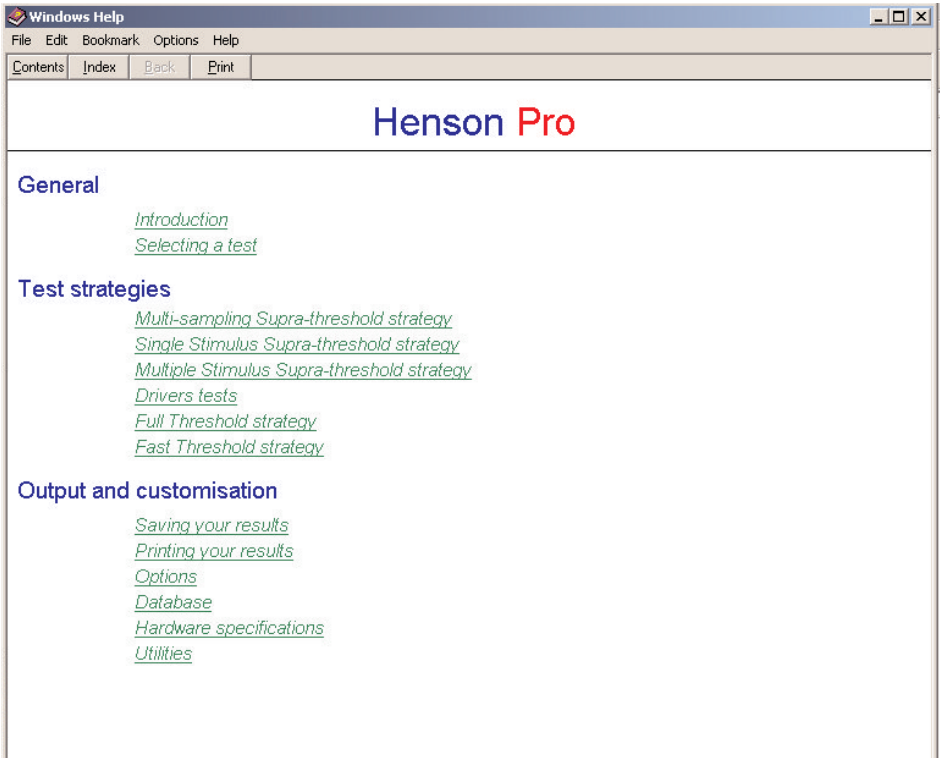
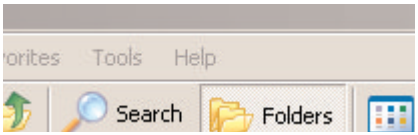


Figure 30: The Help File Contents Page. This page can be displayed form any Help document page by pressing the CONTENTS button

The Help file is like a word document that is cross referenced and linked. Navigation through the Help file is a simple matter of pressing the subject heading you want information about.

When you press the HELP button in any of the Henson software screens, you get context sensitive help, i.e. Help that is relevant to the particular page that you are on.

Any text that is underlined is a LINK to another part of the Help document and pressing the link will display the page. There are navigation controls at the top of each help page.



Contents will take you back to the main menu as shown in Figure 30 on the previous page.

Index - Will display the index page as shown in Figure 31 below. This contains a list of all of the 'Keywords' used in the Help document and a search facility to help you locate the word you were looking for.

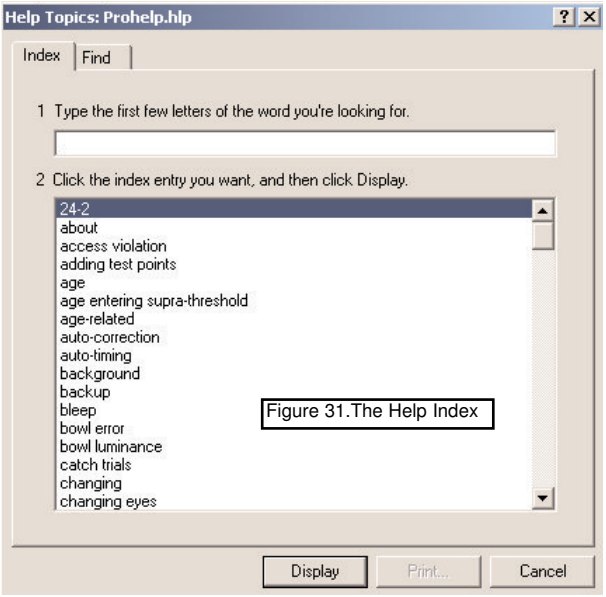


Figure 31.The Help Index

As you type a word into the box at the top of the window, the list below it will change to show you the relevant words.i.e. if you type in cha then the word 'changing' which is currently second to bottom on the list will move to the top of the window. It moves to the second line down to show you the word preceding it in the list.

Back - this button will take you the the help page you were viewing before the current one. This is useful if you are looking at a page that has multiple links to other pages. You can go to each link in turn and then return with a press of the back button.
(Note - the back button will be greyed out and inoperable on the first page you see. This is beacause ther eis no page to go back to)

Print - The print button will send the page currently displayed to the default printer.

Options

The operation of the **Henson software** is in part controlled from an OPTIONS file. To edit this file you need to run the OPTIONS programme.
To run the **OPTIONS** program EXIT from the Henson Software by pressing the small X in the top right hand corner, Press the **START** button, select All Programs, Henson and then **Henson Options.** (alternately, double click on the Icon on the Desktop). A tabbed notebook will appear which allows you to alter various settings to customise the software, Practice name and address, Computer, Database path and file name, etc.

It is important that you have exited the Henson software and that the main menu and all tests are closed prior to running the options program or the settings you change will not be saved. To this end, the Options program will prompt you with the question shown below. If you answer Yes there are Henson programs still runing then Options will close to allow you to go back and close those programs.

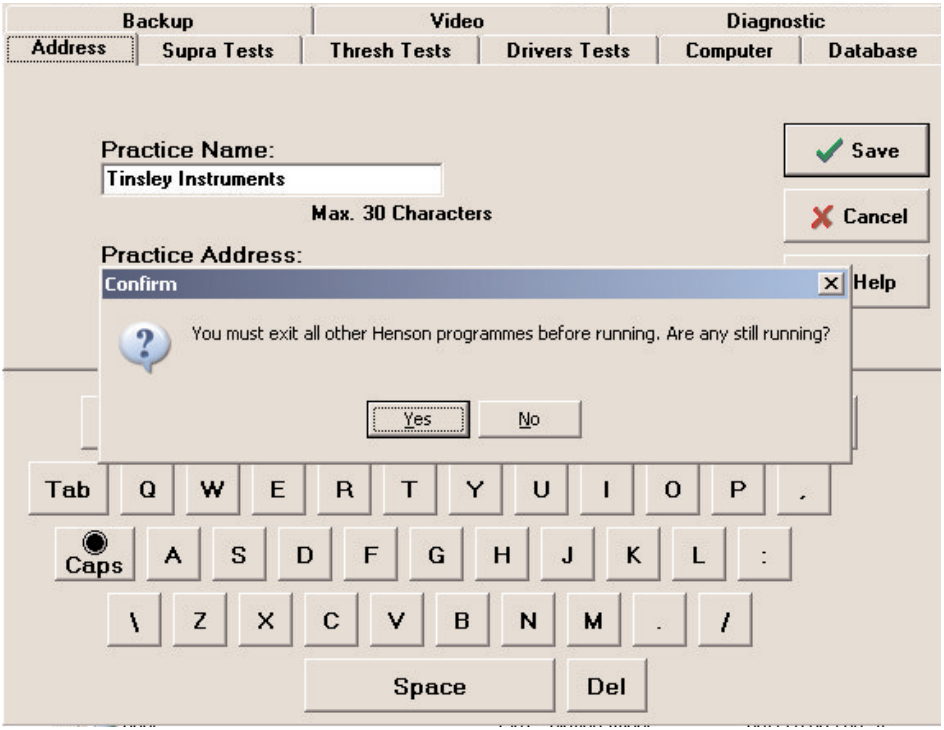


Figure 32. The Practice Name and Address Options page with the reminder message.

Note: The save buttons located on eery page of the Options program will save ALL the changes made in all of the sections and close the Options program. You can move between the tabbed sections without having to save each section separately. The Cancel button will exit the Options program without saving ANY of the changes made.

Practice Name and Address

The practice name and address that is set here appears on the top of all printouts.

To change thesename and address, press the Address tab in the paged notebook screen and then use the edit facilities of either the on-screen, or external (if fitted), keyboard to enter the correct name and address. When you are happy with the changes, press a tab to change something else, or press the save button (see **Fig. 33**).

N.B. There are 30 character spaces available for the name and 35 for the address, including spaces.

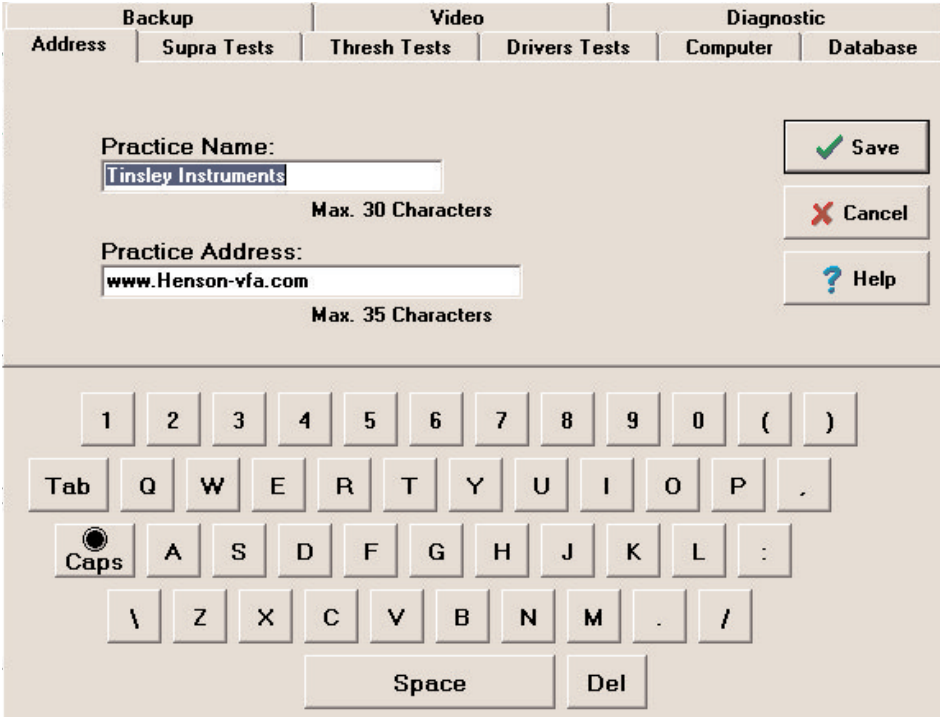


Figure 33. The Practice Name and Address change Tab.

Supra-threshold Options

The Supra Tests tab has common setings for the single and multiple Supra threshold tests.

On this tab, you can select the following :-
- with which eye the Henson software starts testing,
- whether or not the program issues bleeps before each stimulus presentation and
- The method of establishing the Threshold at the start of the test., Age or threshold related. These are explained in the chapter on Supra thresholding earlier in this manual.

The default set here will be applied to all supra threshold tests, but can be over ridden on an individual test by pressing the Threshold button at the start of the test.

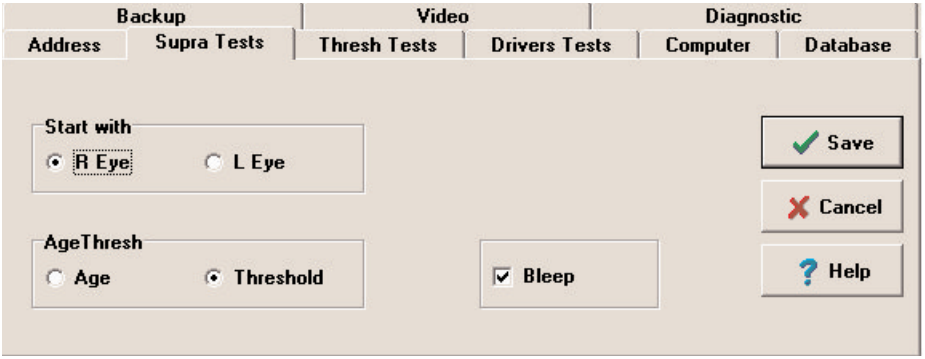


Figure 34. The Supra-Threshold Options screens.(Multiple stimulus shown, single is similar)

Threshold options

The tab marked Thresh Tests relates to the threshold programs (full and fast threshold). Within this page you can select the following :-
- with which eye the Henson software commences,
- whether the program includes repeats and
- whether or not the program issues bleeps before each stimulus presentation (see Fig. 35).

When you are happy with the options, press one of the save buttons. Note: all of the save buttons (there is one on every page) will save the data on all the pages.

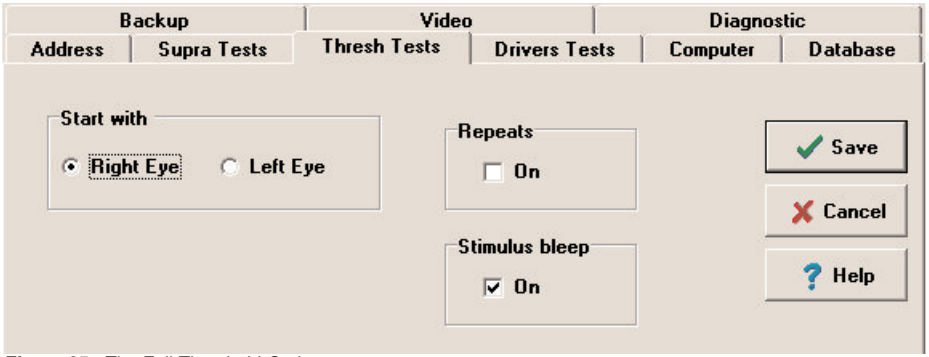


Figure 35. The Full Threshold Options screen.

Drivers Test Options

The Drivers tab allows you to select whether the Drivers Estermann test has the Stimulus Bleeps before each presentation.

At the time of going to press the DVLA requirement was for the Bleeps to be enabled so that the false positive catch trials could be used. This helps to prevent the problems associated with 'Professional patients'.

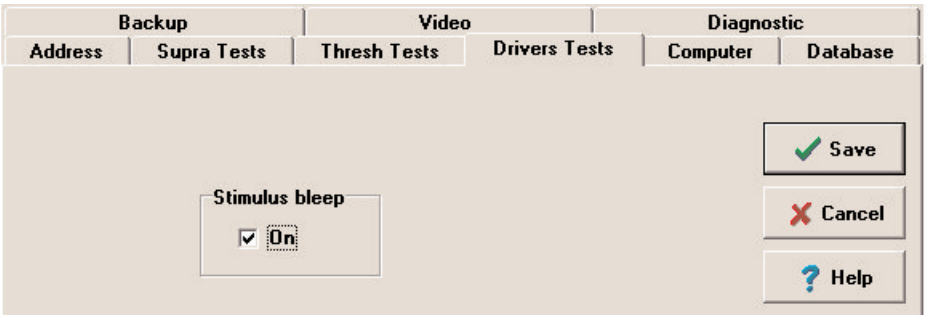


Figure 36. The Drivers Estermann settings Tab

Computer Options

The computer options control the connection between the bowl and computer, regardless of the Henson model you have.
The main setting in this window is for the USB lead that connects the computer to the Bowl. There will be a device listed in the USB device box (where the blue bar is in the figure below).

If you have a Henson 6000 then this is an internal connection. The Henson 5000 has an external
If the software has been re-installed or a new device has been installed, then this device should be highlighted by clicking on it to ensure that its details are saved.

If the box next to Response Timing has a tick in it then the software will speed up / slow down the presentation rate in the test to track the patient's response time. The test will speed up to a minimum of 3.5 times the patient's response time. The time between presentations can also slow down to a maximum of 4 seconds between presentations. Regardless of the setting here, this can be over-ridden in the test program.

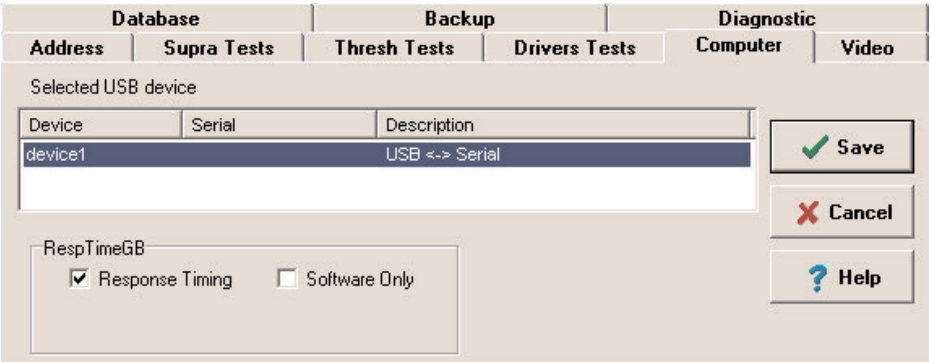


Fig. 37 The computer communications options

If the Software only box is ticked then the software can be used without the Bowl connected. this may be useful if thew software is installed on a separate PC for fields eveluation away from the henson machine.

The Henson 7000 has an additional pane that appears in the computer tab. This sets whether the 7000 is conected to the custome controller and whether the controller's Internal thermal printer is being used.

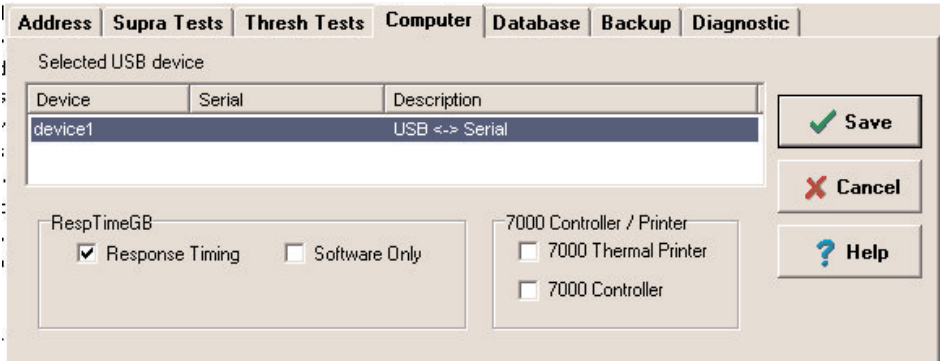


Fig. 37A The 7000 computer tab showing the controller / printer options

If the internal printer is used then the 7000 Thermal printer box should be ticked (this will automatically place a tick in the controller box as well.) This is used to change the layout of the printout due to the smaller size of the thermal paper.

Name and path of database

The default database (the database that is used when you store visual field records and the one that will be displayed when you first go into the database program to recall a record) is backed up automatically by the software every time a record is saved.

The options program requires that there are 2 locations set, one for the actual database location and one for the backup.
The backup cannot be on the same drive that the database is located (normally the internal hard disk drive C: of the machine).

If the Henson is networked and the database is stored on a network drive (on a server for example) then the backup can be on the internal drive of the henson (laptop / PC / Controller) as this is a different physical drive to the original.

The screenshot below shows the database tab (the backup tab is show on the opposite page)

The database is chosen by clicking on the drives and folders displayed, selecting a drive in the DRIVES window will display the directories (folders) it contains in the Directories window.

Clicking on a directory will then diplay the database files it contains in the Files window. (Note only .db files are displayed, all other file types are hidden)

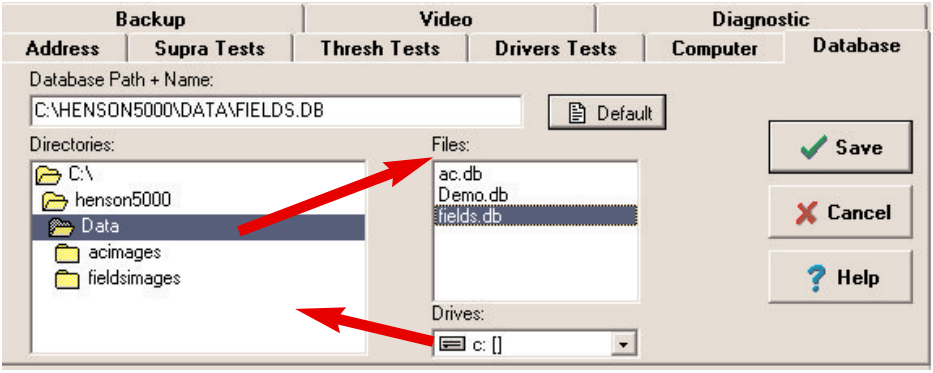


Figure 38. The default database as shown on the options file.

If a drive or directory contains more items than the window is able to display, scroll bars will appear at the side of the window to allow you to see the directories and files that are at the bottom of the list.

To select a database as the default , simply click on it in the FILES window. (the full path of the file will then appear in the top “Database Path + Name” window.

If you want to start a completely new database, then select the folder where it will be. This folder will then apprear in the Database Path + Name box at the top. You can then type the new name for the database, making sure that you put a .db on the end. (the software will remind you if you forget).

If you want to return to the default database, the one that was set when the software was first instellad, then press the default button. The default database is set as :-
C:\HENSONxxxx\DATA\FIELDS.DB where xxxx is the model number of your Henson (i.e. 5000)

Other database names can, and should, be used when you want to create specific database tables, e.g. ones used for a specific study. The name should only contain letters and numbers (no punctuation) and always end in .DB (full stop followed by DB) as this is the ending recognised by the program as indicating a database file.

If lots of records are to be stored then it is advisable to start a new database every calendar year so that databases do not get too large and unmanageable and backing up is easy.

If the Henson unit is connected to a network then the database can be stored on another Henson machine, a computer or a server. Up to 8 Henson machines can access a centrally stored database at the same time.

If your machine has the database with the JPEG printout images then the images will be stored in a directory that will be created as a sub directory of the one containing the database. It will be called xxxxxIMAGES, where xxxxx is the name of the database. This would be FIELDSIMAGES for the example in Fig. 38 above.

Backup settings

The backup section sets the location where the software will copy the dabase to as a backup. As you can see from Figure 39 below, the settings are the same as for the databse except that you only choose the location (path), not the File name. The name will be the same as that for the current default database

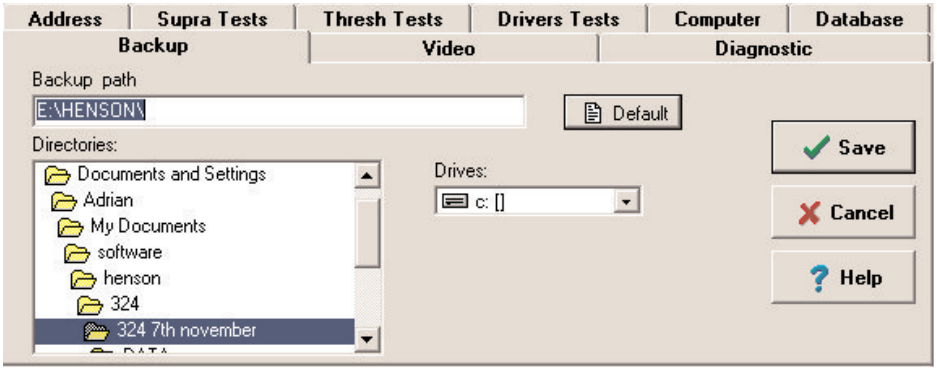


Fig. 39 The Backup Location settings.

Video Options

If you have a version of **Henson** that is fited with On screen fixation monitoring then you can set whether the on-screen video is displayed or not.

Place a tick in the YES box and highlight the name of the driver that is installed.
The item listed will depend on the model of **Henson** you have and also which hardware is installed to import the video feed.

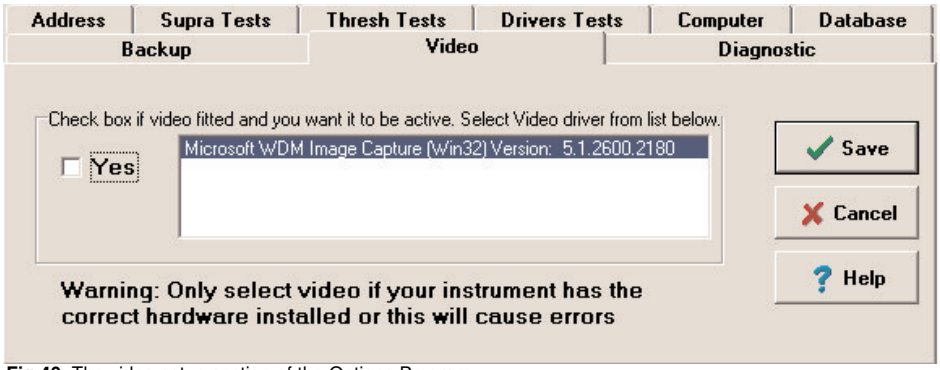


Fig 40. The video setup section of the Options Program.

The Microsoft WDM image capture driver shown at the top of the window in the above example is the default driver loaded for the **6000 Plus**. If the optional USB or grabber card is used on the **5000** then there will be a different driver listed. Unless the laptop or PC is used for other image capture applications (i.e. Fundus camera), there should only be one driver listed. The Henson 7000 does not have video capability.

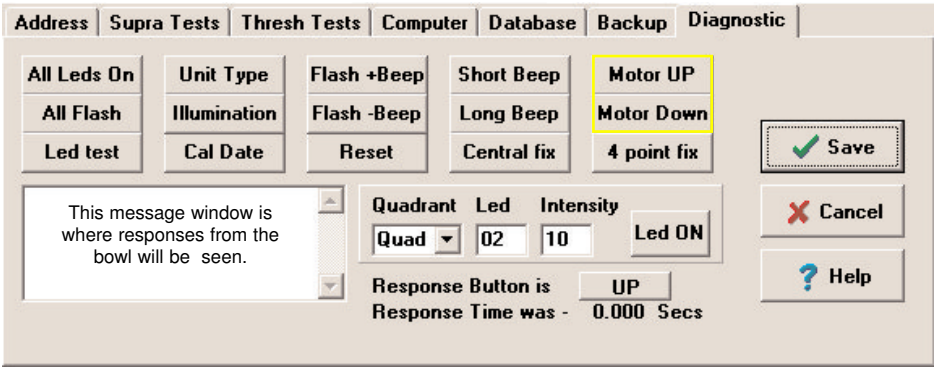
CHAPTER 7

Diagnostics

The last tab on the Options program is the Diagnostics.

This allows you to send commands to the bowl to interrogate it for firmware version and also to illuminate stimulus points. The buttons highlighted in Yellow are only visible on the Henson 7000.

An explanation of the buttons is given below.



All Leds ON will illuminate all stimulus points on a 5000 and on a 6000/7000 will step through them all in sequence from top to bottom.

All Flash will

Led test will check all leds and report back “ALL PASS” or the Led numbers of any suspect Leds

Unit Type will report back the model number of the bowl (5000/6000/7000 etc)

Ilumination will report back the light level in the bowl from one of 7 levels. (Limit Low, Too Low, Slightly Low, Adjusted, Slightly High, Too High and Limit High)

Cal Date will report back the date that the bowl was last calibrated.

Flash + Beep will flash the stimulus point directly above the central fixation and produce the beep sound.

Flash - Beep will just flash the stimulus point directly above the central fixation.

Reset will turn off al stimulus and fixation points and return the bowl to its just switched on state.

Short and Long beep will produce the beeps as used for stimulus and fixation presentations / moves.

Central and 4 Point Fix will illuminate the fixation patterns as used in the central field tests.

Motor Up/Down (7000 only) will power the motro up or down until it reaches the end stops.

Any Stimulus point can be illuminated by setting the Quadrant, led number (02 to 80) and the intensity (o to 40dB) and pressing the LED on button.
When the Response Button is pressed the UP on the adjacent button will change to DOWN and will revert when the button is released.

If you press one of the Flash buttons followed by the resonse button the response time will display the interval in seconds.

DEFINITIONS and EXPLANATIONS

Defect values (threshold tests)

Defect values are the difference between the measured threshold and that expected from an age matched normal eye.

Example:

If the measured threshold was **25dB** in a person of 40 years of age and the normal value for a 40 year old at that particular location was **30dB** then the defect value would be **5dB**.

Positive values indicate a lower than average threshold.
Defect values do not take in to account the variability within a particular age group. Overall shifts in sensitivity are taken into account in the pattern deviation probability values (see next page).

Mean defect values are presented at the end of the examination and on the print out (see page 33).

Mean Defect (threshold tests)

The mean defect score, which is displayed both on the printout and in the bottom left hand side of the screen after the patient has completed a central threshold test, gives a global measure of how the patient's sensitivity compares with that of an age matched normal patient.

Mathematically it is the average of all the defect values shown in the central 30 degrees.

Mean defect values are not given for locations outside of the central 30 degrees as these locations are heavily influenced by facial contours and it is difficult to establish what the age corrected normal value should be.

Minus values mean that your patients eye is more sensitive than the normal.

Fluctuation (threshold tests)

Fluctuation is a measure of how much your patient's results differ when the thresholds are measured a second time. When the second measurement is taken within a single examination, as they are in this test, it is more correctly called short term fluctuation. Long term fluctuation being reserved for variations from one visual field examination to the next.

Fluctuation can tell you how variable the patient is. Small values indicate that the patient is very reliable/consistent while large values indicate the opposite.

Fluctuation is calculated by measuring twice 10 pre-selected locations. These locations and their repeat values can be viewed at the end of the test by selecting the repeat values display option.

Care must be exercised when looking at this statistic as glaucoma increases patient variability in the region of visual field loss. Large values might, therefore, simply indicate that some of the repeated measures occurred at, or close to, a visual field defect. The concept of a global measure of variability in glaucoma is now recognised as being incorrect and the value of this statistic limited.

You will only get fluctuation values if you have the repeats option selected in the options file.

Standard Deviation of Defect (threshold tests)

The standard deviation of the defect values is a measure of the variability in the defect scores. Large values are indicative of localised scotoma. The index can be used to monitor progression where increases in the index indicate a deepening or enlargement of localised loss.

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

The index is particularly sensitive to lens rim artefacts and to droopy lids. Care must be exercised to ensure that changes in this index are not due to these artefacts. These artefacts can be removed by using the mouse.

Corrected Standard Deviation of Defect (threshold tests)

The standard deviation of the defect values from a threshold test are the result of natural variability in the patient's responses combined with variability due to the pathology. A patient who has no pathology does not have a zero standard deviation of defect values.

The natural variability is measured with the index fluctuation and this is used to give a better estimate of the variability which is due to any pathology. This new index is call corrected standard deviation of the defect.

The index is particularly sensitive to lens rim artefacts and to droopy lids. Care must be exercised to ensure that changes in this index are not accounted for by these artefacts. These artefacts can be removed by using the mouse.

The index is based upon the assumption that fluctuation can be represented by a single number.
This assumption is no longer considered valid.

Pattern deviation probability values

The full and fast threshold strategies calculate, for each test location, the probability that the threshold measure comes from a normal eye. This calculation takes into account the age of the patient and adjusts for overall shifts in sensitivity. The calculation also takes into account the relationship between variability and threshold.

The overall shift is calculated from an analysis of the most sensitive regions of the visual field. These are compared to those from an age matched normal eye and the defect values shifted to take into account any difference. The shift has a maximum amplitude of **3dB** in either direction.

Fixation Target

The Henson has two fixation targets: a small central red spot and 4 peripheral spots located 6 degrees from the central point along the 0, 90, 180 and 270º meridians (Diamond patern). The 4 peripheral spots are provided for patients who have lost central vision. They are instructed to look at the centre of the 4 point pattern.(or as many of them as they can see)

You can switch between these two fixation targets at any stage of the examination by simply pressing the target button. (see **Fig. 41** below). The button will toggle between the 2 different fixation patterns and it's icon will change depending on which fixation pattern is currently being used.

The current fixation target is represented by the button which appears is not shown. The button toggles between the 2 types of target. If the symbol for the central target is shown on the button then the 4 point fixation must be on and vice versa.

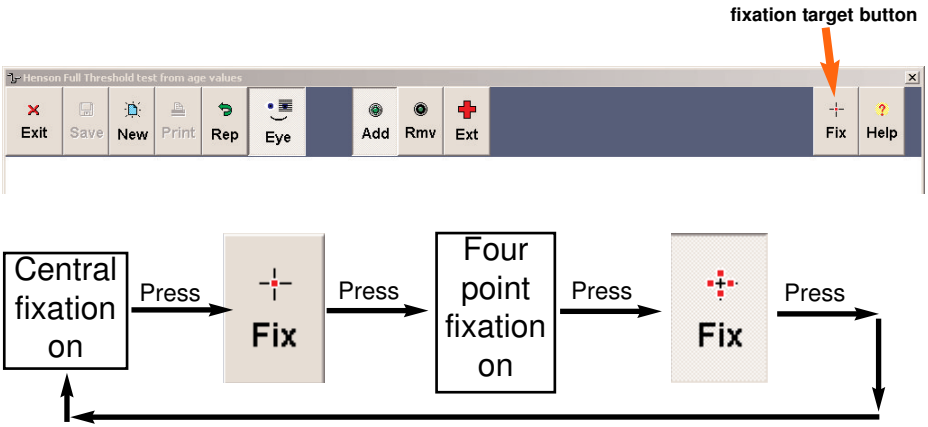


Figure 41. The fixation target button and the sequence of changing the Fixation Target.

Patient response button

The patient response button is used in all single stimulus strategies:

- Full threshold
- fast threshold
- Multi-sampling
- Single stimulus supra-threshold
- Drivers (where installed)

The patient is instructed to momentarily press the response button every time they see a stimulus.

When held down the response button will stop further stimulus presentations until it is released.

Catch Trials

The single stimulus tests all incorporate catch trials to give the perimetrist an estimate of the patient's reliability.

There are two types of catch trial:

False positives
False negatives

False Positives

During the course of the test, the Henson sounds the beep but does not present the stimulus. If the patient presses the response button, they have responded to the sound not the stimulus. This is known as a false positive and gives an estimate of how trigger happy the patient was.

False Negatives

A false negative is when the patient failed to press their response key when a stimulus was presented at a location previously seen by the patient. They are a measure of attention or rather lack of it.

Both false positives and false negatives tests occur at random intervals throughout the examination. The results are given as a fraction, the top number presenting the number of errors and the bottom number the number of tests. For example, False positives 3/10 would indicate that there had been 10 false positive tests and the patient had, in error, responded to 3 of them.

Normally the number of false positive should be less than 15% and false negatives less than 30% of the catch trials.

Swapping Eyes

You can swap between the right and left eye at any time during an examination by pressing the swap eye button. The picture on the button will change to indicate which eye is being tested. If the eyepatch is on the Right eye then the Left eye is the one under test, and vice versa.

Note: You will **not** lose data when you swap from one eye to the other.

Figure 42. Swapping Eyes. The EYE button showing that the RIGHT eye is currently being tested. (as the eye patch is on the left eye of the picture)

Start New Patient

There are several ways in which you can start testing a new patient.

If you wish to repeat the test you have just completed then simply press the **New (Patient)** button. This will allow you to start the next test within a few seconds. (see **Fig. 42** below).

You will be asked to confirm that you want to start a new patient.

Remember; if you start a new patient without either printing or saving the current data on screen, it will be permanently lost.

If you wish to use a different test then you will need to go back to the Main Menu (the one with all the programs listed). There are 3 ways in which you can get back to this screen:

1) Double click the small icon in the extreme top left-hand corner of the screen.
2) Select the **Exit** icon in the toolbar.
3) You can press the X icon in the top right hand corner of the screen.

Whichever technique you choose you will be asked to confirm that you want to terminate the program if the data has not been saved.

Remember; if you terminate without either printing or saving the results from the current examination, they will be permanently lost.

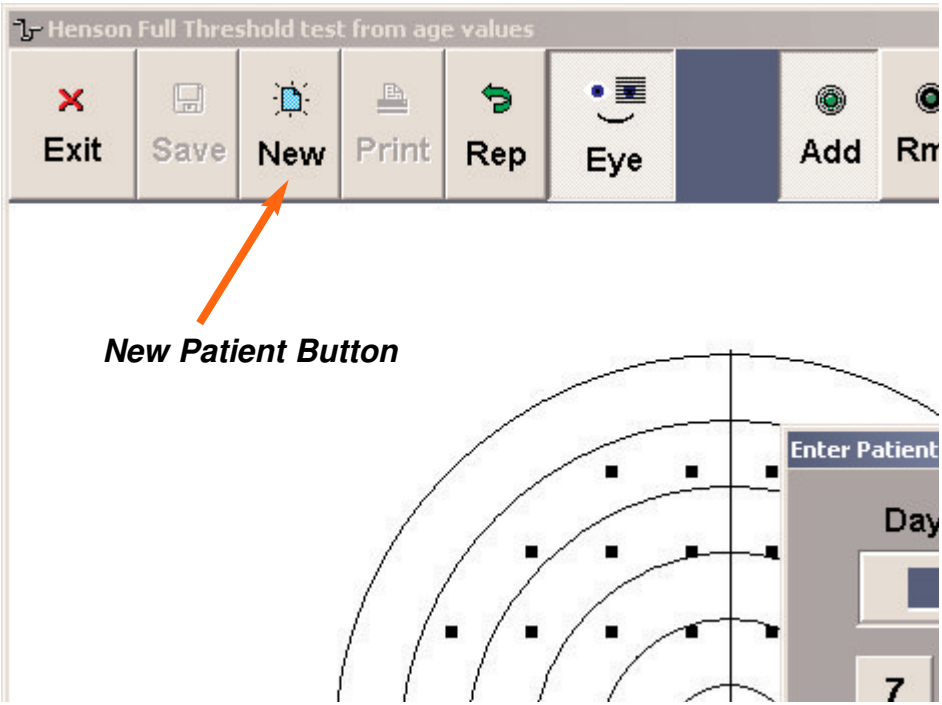


Figure 43. The start New Patient button.

Saving your results

To save your results simply press the save button on the toolbar.

You will be presented with a **Data Base Entry Form**. Before you can save the data you will have to fill in the **Family Name and Record Num**. The fields, **First name, RxL,** and **RxR** are optional while the fields **Test type, Date of Birth** and **Date of Test** are automatically filled in by the computer.

The computer checks your entry to see that no duplicate exists, i.e. no record with the same family name, record number and test date. Problems will arise if you try to save two records from the same patient on the same day. If you need to do this then add a letter to the end of the record number which you change for each additional record. For example if your patients record number is **123456** then use **123456a** for the first test of the day **123456b** for the second etc.

You can move between the edit boxes by pressing the TAB button or pressing in the appropriate edit box and then with a keyboard, using the normal word-processor editing keys (left and right arrow keys, home, end, backspace, delete). If you are using the on screen keyboard, to correct mistakes, press the DEL key until the mistake is erased and then re-type.

When the patient details are correct press the **SAVE** button.

Note: The Date of birth must be in the format shown DD/MM/YYYY (day/month/year) format separated by /.

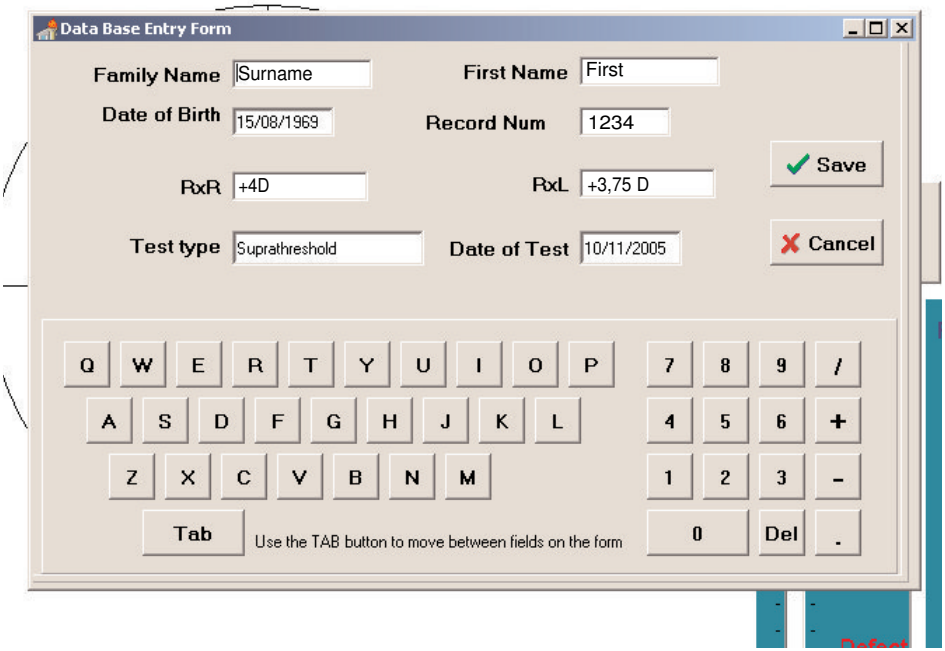


Figure 44. Screen showing completion of data base entry form prior to saving or printing results.

Quantify

There is often a need to reduce the large amount of data presented in a visual field chart into one or a series of numbers. This reduction is known as quantification.

The **Henson** software contains a series of quantification systems for both threshold and supra-threshold strategies.

Full and fast threshold test strategies

The threshold strategies generate the indices:

Mean defect)
Standard Deviation of defect) **See "Definitions"**
Fluctuation)
Corrected Standard Deviation of Defect)

They also calculate, for each test location, the age corrected defect and the pattern deviation probability value.

Supra-threshold test strategies

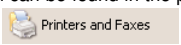
Both the multiple and single stimulus supra-threshold strategies quantify the visual field results in two ways:

1. By giving the number of missed stimuli in the whole field, superior hemi-field and inferior hemi-field. This is useful for monitoring visual field loss.

2. By giving a measure of the probability that the result comes from a normal eye. This quantification is given in the form of a horizontal scale divided into 3 regions, normal, suspect and defect. The borders correspond to 10% (normal/suspect) and 0.1% (suspect/defect) probability values.

Printing

The **Henson** software prints through the Windows environment and as such can be linked with a wide range of printers (lasers, bubble jets, ink jets, networked printers, etc.).

The software will print to your default Windows printer using its default settings for paper, quality and colour, etc. To make permanent changes to these values alter the values for your printer within its **Print Manager** (this can be found by double clicking your printer icon which can be found in the printers folder which can be called up by pressing the START button and then selecting 

).

The **Henson software** prints both eyes at the same time. In the supra-threshold strategies the right and left eyes are placed side by side on the same page and in the threshold modes, because of the large amount of data, they are placed on separate sheets.

To get a second copy simply press the **Print** button a second time. You do not have to wait until the printer has finished printing. As soon as the print button has become re-enabled it is ready to send a second print job to the printer.

The practice name and address will appear on the printout as will any entered patient details. Patient details are entered when data is stored in the database. Recalling from the database will automatically capture the patient details

Threshold Related Supra Threshold Testing

The Threshold related Supra Threshold test is the traditional method of collection field data quickly. In the Henson software, It settles the patient using ten demonstration presentations, then measures the patients threshold using the HEART algorithm (see Below) before moving on to the supra threshold part of the test.

This test has been established as the default for Glaucoma screening. The patient's Threshold "on the day" is measured as the base for the supra threshold part of the test.

HEART Algorithm

The HEART algorithm is used to derive an estimate of the patient's threshold prior to the beginning of a single stimulus supra-threshold test.

Before starting the test it is important that the patient is carefully instructed on the nature of the test and what they are to do.

The algorithm measures the sensitivity at 4 test locations, one in each quadrant. The locations are displaced 9 degrees from the vertical and horizontal meridians.

At each location the algorithm starts off 1dB brighter than the expected threshold for the patient's age. It uses a repetitive bracketing procedure with 1dB steps until 6 presentations have been made at all 4 locations.

The average intensity of the last 4 presentations, at all 4 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 4 presentations is below the 95% confidence limits of the expected age setting

-If all test locations are excluded the threshold is set at 4dB below the age setting.

AGE Related Supra Threshold Testing

In age related supra-threshold strategies the Henson uses the established relationship between age and sensitivity to derive the test intensity. This is the fastest strategy but can lead to errors when a patient's sensitivity departs from the average value for their age, e.g. when there are media opacities. This strategy is particularly well suited to screening for diseases such as glaucoma.

The age related tests require the operator to enter the patient's age at the beginning of the test

The age-related strategy can be combined with either single stimulus presentations or multiple stimulus presentations, it is, however, only available for test which examine the central field.

The age-related settings on all Henson perimeters are calculated from the following equation

Threshold =36.65 - (0.059 x age)

Examples are shown below

Patient Age	Threshold dB
30	35
40	34
50	34
60	33
70	33
80	32

CHAPTER 8

TEST STIMULUS LOCATIONS

SUPRA - THRESHOLD TESTS.

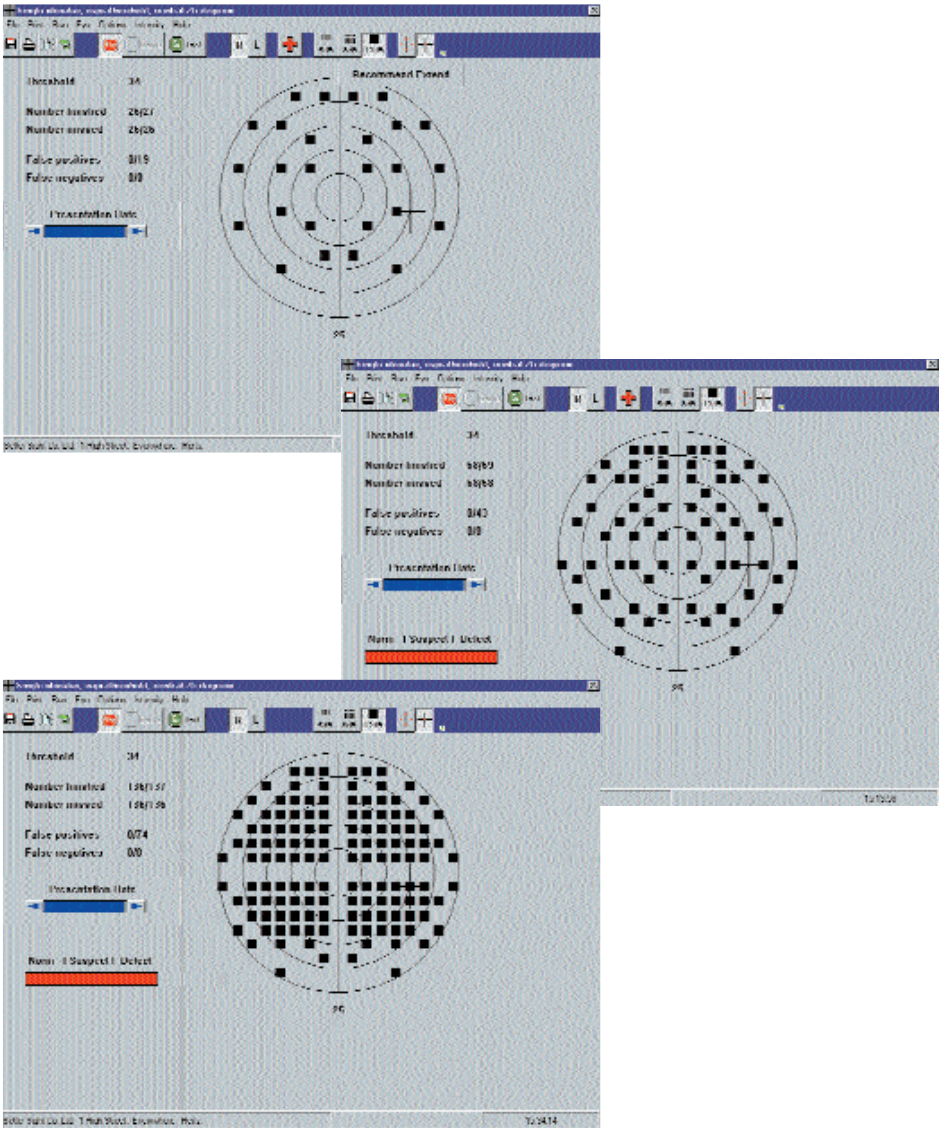


Figure 45. The three levels of testing in the multiple or single stimulus supra-threshold tests of the Central 0-25º. 26, 68 and 136 points.

Armaly supra-threshold test

The **Henson software** incorporates a glaucoma screening test which is similar to that proposed by Armaly.

The test places stimuli on a series of rings that surround the fixation point rather than on the square matrix that is used in the other supra-threshold tests. It also includes additional stimuli out at an eccentricity of 30 degree above and below the horizontal mid-line (see **Fig. 46** below).

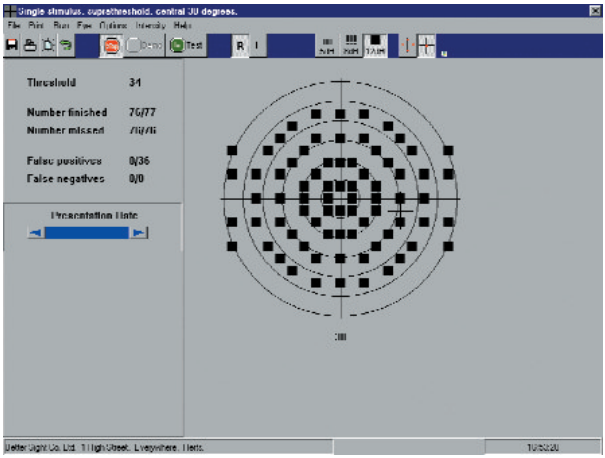


Figure 46. The position of the 76 points in the Armaly 0-30º supra-threshold test.

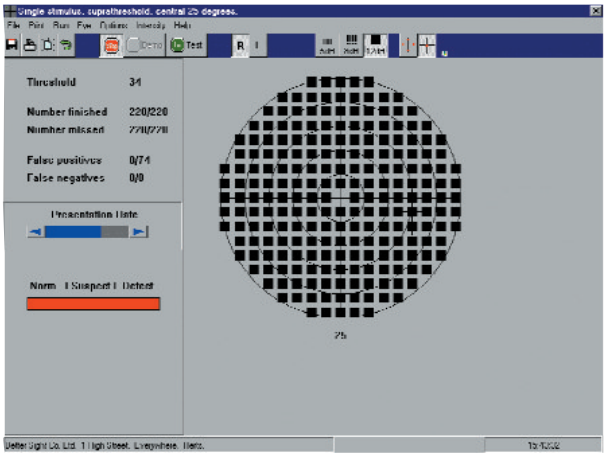


Figure 47. The **220** locations available for testing in the central 25º field, supra-threshold strategy.

POSITION OF STIMULI, CTD. **FULL & FAST THRESHOLD TESTS.**

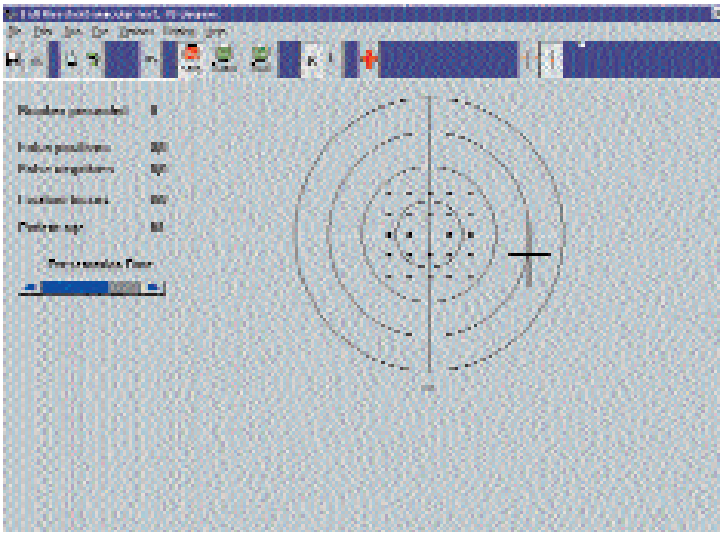


Figure 48

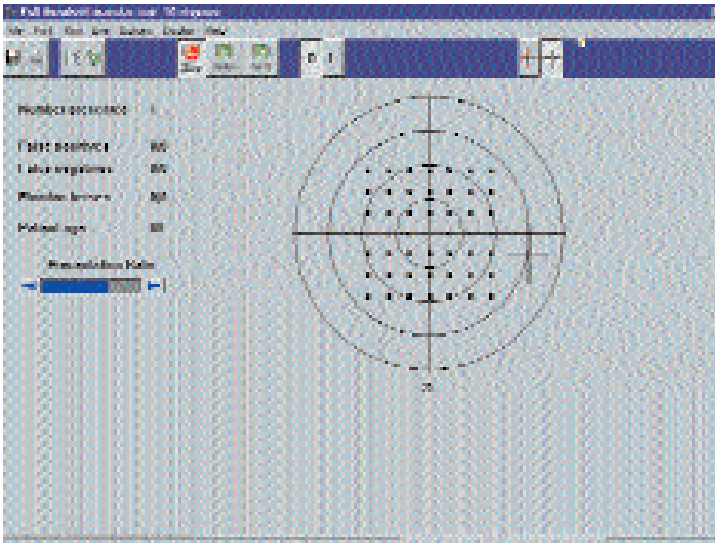


Figure 49. Position of stimuli, full and fast threshold **Macular test 0-10º,** levels 10/1 and 10/2, 24 and 48 stimuli.

POSITION OF STIMULI, CTD **FULL AND FAST THRESHOLD TESTS, CTD.**

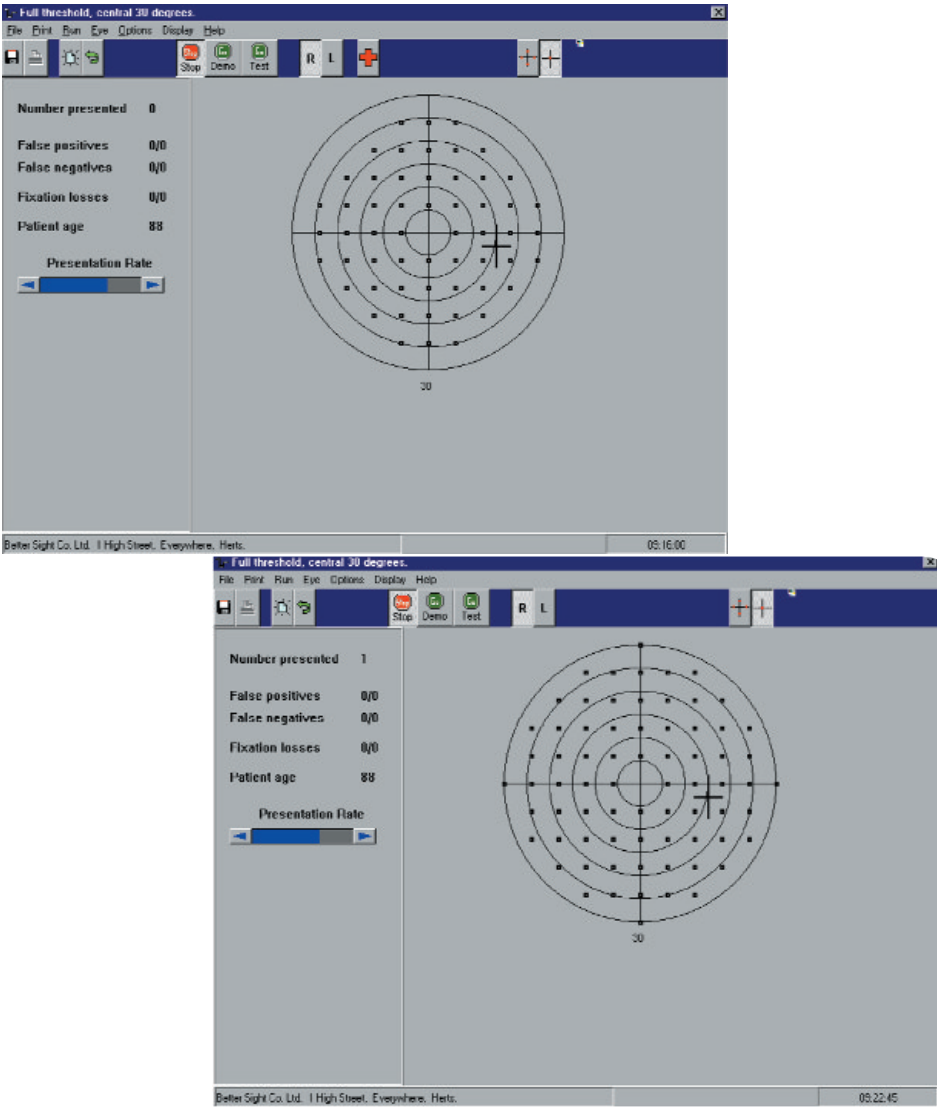
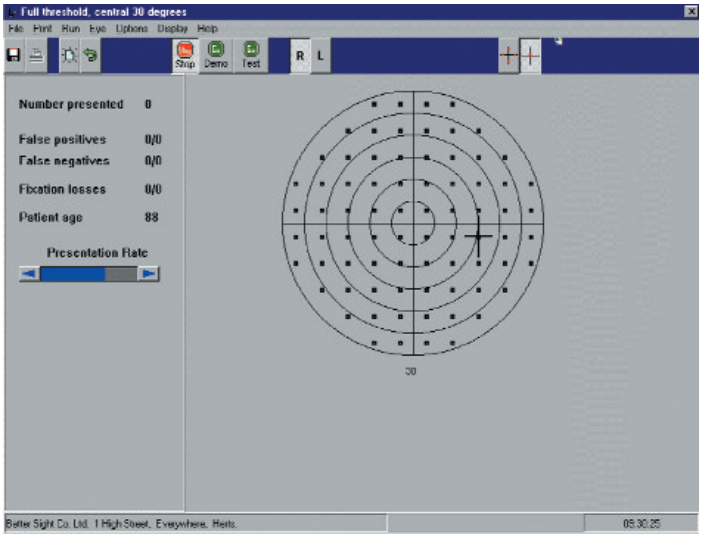


Figure 50. Position of stimuli, full and fast threshold 24/1 and 30/1 tests, 0-24º and 0-30º, 56 and 72 stimuli.

POSITION OF STIMULI, CTD **FULL AND FAST THRESHOLD TESTS, CTD**



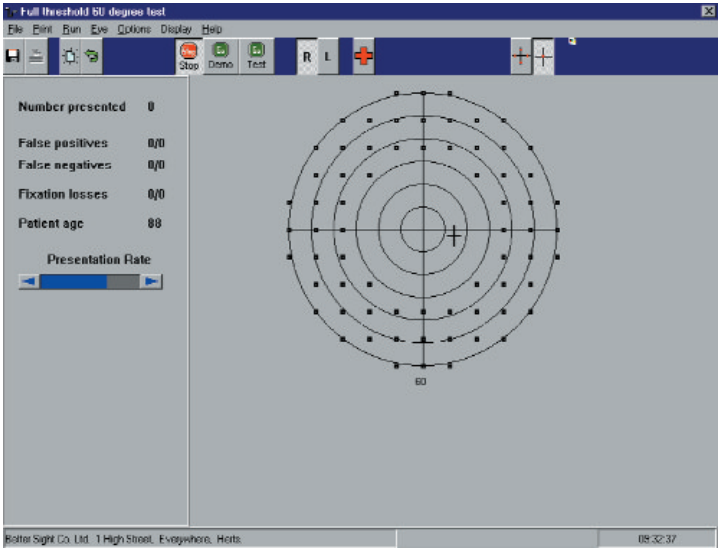


Figure 51. Position of stimuli, full and fast threshold 24/2 and 30/2 tests, 0-24º and 0-30º, 52 and 76 stimuli.

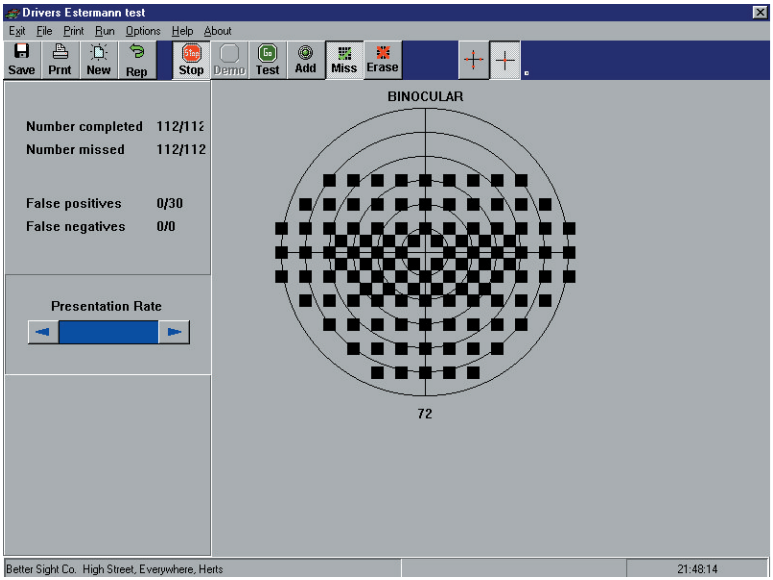


Figure 52. Position of stimuli, Estermann test.

ERROR MESSAGES

Bowl Error

This message (see figure 53, below) occurs when the bowl is not responding to messages sent to it from the computer.

This might be due to a number of reasons.

1. The lead between the computer and bowl is disconnected (Pro 5000 only)
2. The USB lead is not registered in the Options program. See Chapter 7 for details.
3. There is a fault in the hardware. Try running the Diagnostic tests in the Options and Consult your Agent if a service engineer visit is required.

Figure 53. Bowl not responding message.

Selecting **Continue** allows you to proceed with the test selected.
Selecting **Restart** returns you to the Main Menu.
Selecting **Help** brings up the Help screen with service contact details.

The diagnostics tab in the Options program (see chapter 7) can be used tocommunicate with the “bowl” and verify that there is a real error.

LEDs

The perimetric stimuli used in All **Henson** field screeners are Light Emitting Diodes (LEDs). These are small solid state light sources with a very long life expectancy and extremely constant light output. They can be controlled electronically to give precise intensities and are thus ideal for perimetry.

They are fitted inside light tubes to project a stimulus size of angular subtence 0.5 degrees (Goldmann size III).

Their intensity ranges from 0.016-1000 cd/m^2 (0.05-3150 asb), where 0dB corresponds to 1000cd/m^2.

Their presentation time is 200 msec in all tests.

In the centre of the bowl they are presented on a square 3 degree matrix. The 5000 also has peripheral stimulii (30-72 degrees) on a 12 degree matrix. Six degree resolution is obtained in the peripheral field by moving the fixation target.

LED error

At the beginning of each examination the **Henson unit** checks that all LEDs are working properly.
If the test detects a faulty LED, an error message will be displayed.

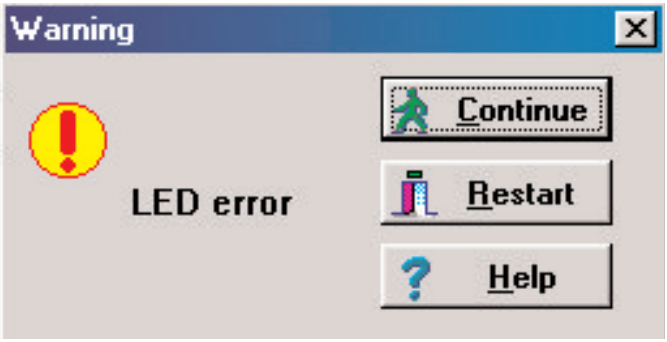


Figure 55. An Led error Message

If you select Continue the **Henson** will proceed with the test. Data collected may be subject to error.

If the led that has failed is in the test that is carried out, then it is possible to continue using the instrument by ignoring the “known Miss” and then testing several locations around the missed point.

It is possible to quantify the missing LED by using the Diagnostics tab in the Options, See chapter 7.

The Led test will tell you the number of the Led that has failed. You can also illuminate all stimulus points to see the location of the missing LED.

There are more stimulus points on the machine than are used in any of the tests, so statistically there is a good chance that the faulty LED is not in the test you are about to perform.

Database error

To ensure integrity of data stored in the database the **Henson software** conducts a number of checks which may result in errors being reported on the screen.

Required fields
When saving data the Henson software requires you to enter family name, date of birth and record number. If you do not enter the Data in all of these fields then you will get an error message telling you which field is missing (Family name (Famname), Record number (Recnum) Date of birth (DoB)), .

Format
The data entered into the date of birth field must be in the correct format (shown at the side of the input box). The software will report an error if the date is impossible, e.g. 12/29/45.

Unique record
You cannot have more than one record with the same family name, date of test and record number. If you want to collect more than one set of data from the same patient on the same day then append the patient’s record number with an additional character. For example: if the patient’s record number is 1234 then on the first record use 1234a on the second 1234b etc.

If you don't do this you will be presented with a "Key Violation" message as shown below (see **Fig. 59**).

Remember the **Henson software** saves the results from both eyes in a single record. You should not save the right eye and left eye independently.

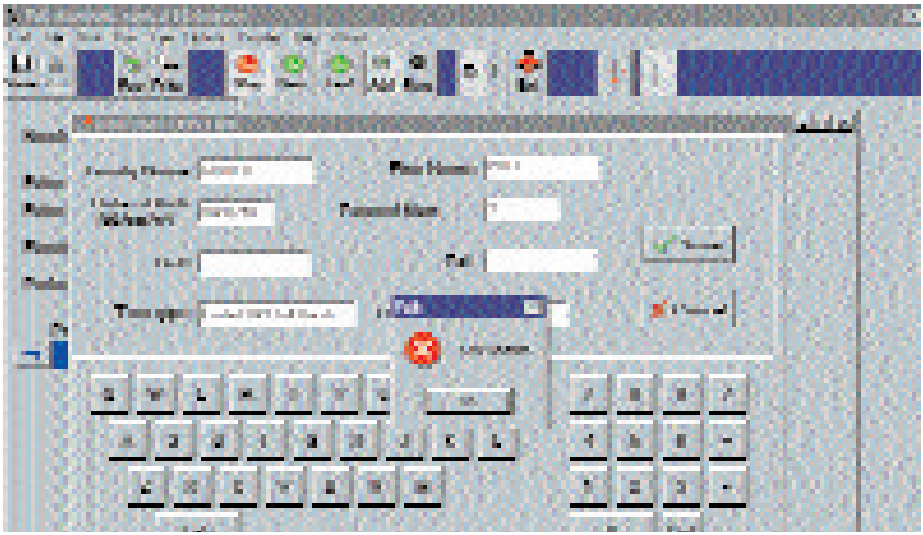


Figure 59. Key violation message due to trying to save second set of data from same patient on same day without adding a suffix to the record number.

CHAPTER 10

CHANGING SYSTEM SETTINGS AND PRINTERS IN WINDOWS™

DATE AND TIME

Changing the Date or Time, which is automatically entered on all your Database stored records can be accomplished as follows:

1. Exit from the Henson Software and you will be presented with the Wndows™ desktop. Press the START button. (see **Fig. 60** below).

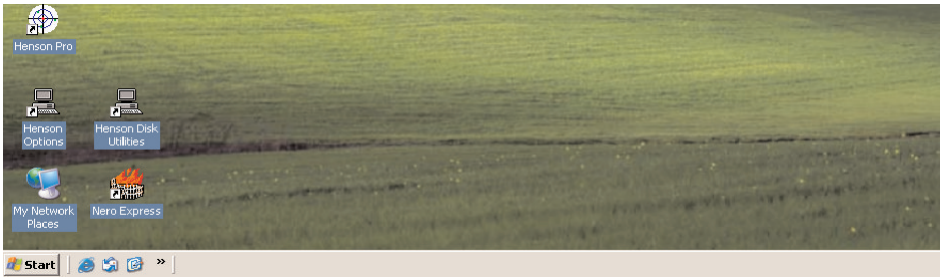


Figure 60. The Windows Desktop showing the start button. (Your desktop background may appear different to this).

2. The Start menu will be displayed (as in **Fig 61** below). Press the CONTROL PANEL link (arrowed).

You should now get the control panel window shown in **Fig. 62** on the next page.

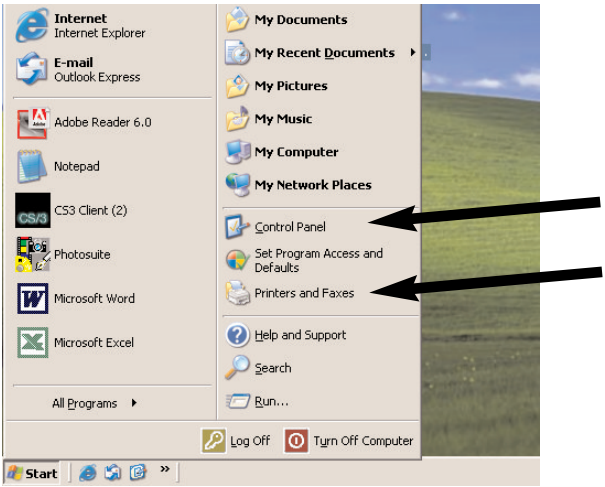


Figure 61. The start menu showing the CONTROL PANEL and Printers and faxes links.

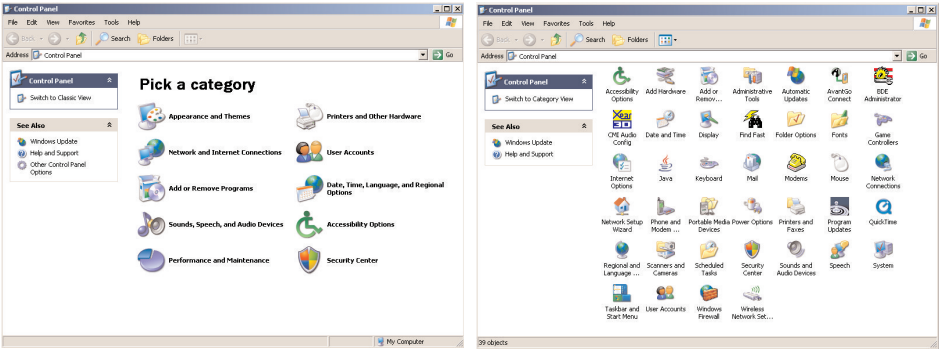
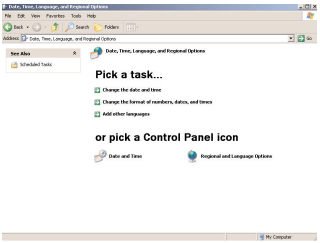


Figure 62. The 'Control Panel' window. The left is the XP Category view, the right is the 'Classic View'. Either can be selected from the table on the left of the screen.

3. In Category View, press the **Date,Time, Language and Regional options** shortcut and then the CHANGE THE DATE AND TIME link. (see below right)

In classic View double click the '**Date/Time**' Icon to bring up the DATE and TIME Properties screen as in figure 63 below.



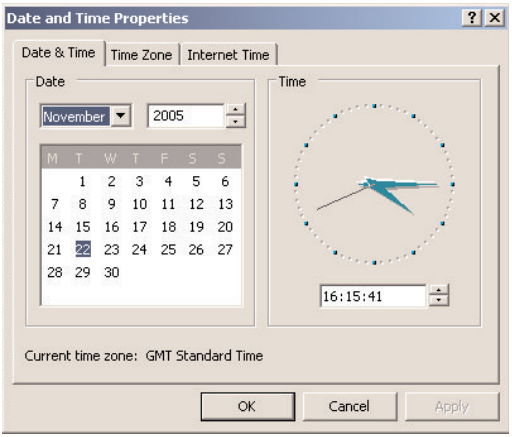


Figure 63. The '**Calendar**' and '**Clock**' sub-screen which can be changed using the mouse or touch-screen.

4. To set the **Date,** scroll to the correct year and month using the drop down menus and then highlight the correct day.

5. To set the time, highlight the hour by clicking on it, dragging the cursor over the hour numbers, then use the up/down arrows to obtain the required hour. Repeat for the minutes.

The screen should show that the computer is working on either the **GMT** or **GMT+1** (for British Summer Time) **Time Zone**. If any other **Time Zone** is required then this can easily be changed.

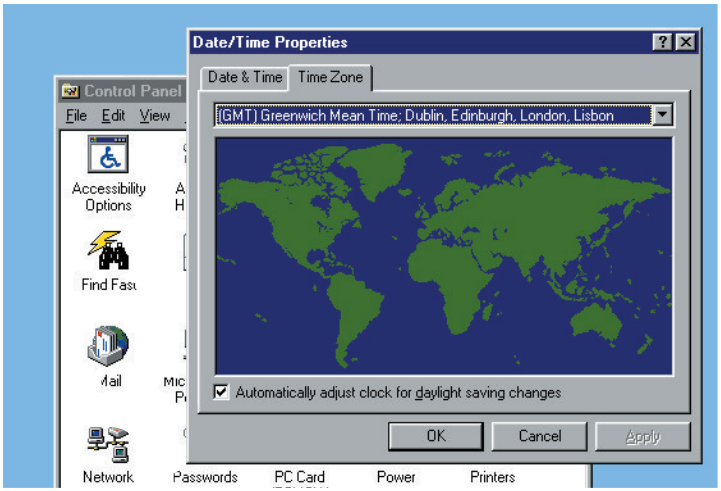


Figure 64. The '**Time Zone**' map sub-screen.

Clicking on the '**Time Zone**' tag, top left behind the '**Date & Time**' tag exposes a map of the world with the operative Time Zone highlighted as shown in **Figure 64**

You can scroll to any time zone you wish by pressing the down arrow on the right side of the top Bar indicating the current time zone setting. This produces the window show in **Figure 65**.

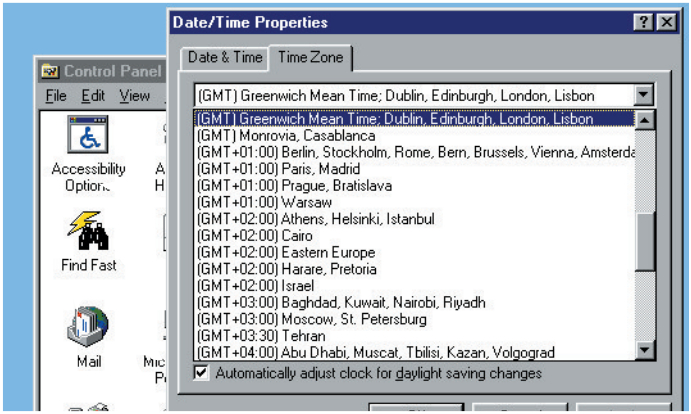


Figure 65. The '**Time Zone**' index sub-screen.

Once the required Time Zone is selected select **OK**.

The dates within the database need to be saved in the format **Day/Month/Year.(DD/MM/YYYY)**

If the default settings are different from this proceed as follows:

Call up the Control Panel sub-screen as previously described (see Fig. 66) then select the '**Regional and Language Options**' via the routes below dependant on your control panel view.

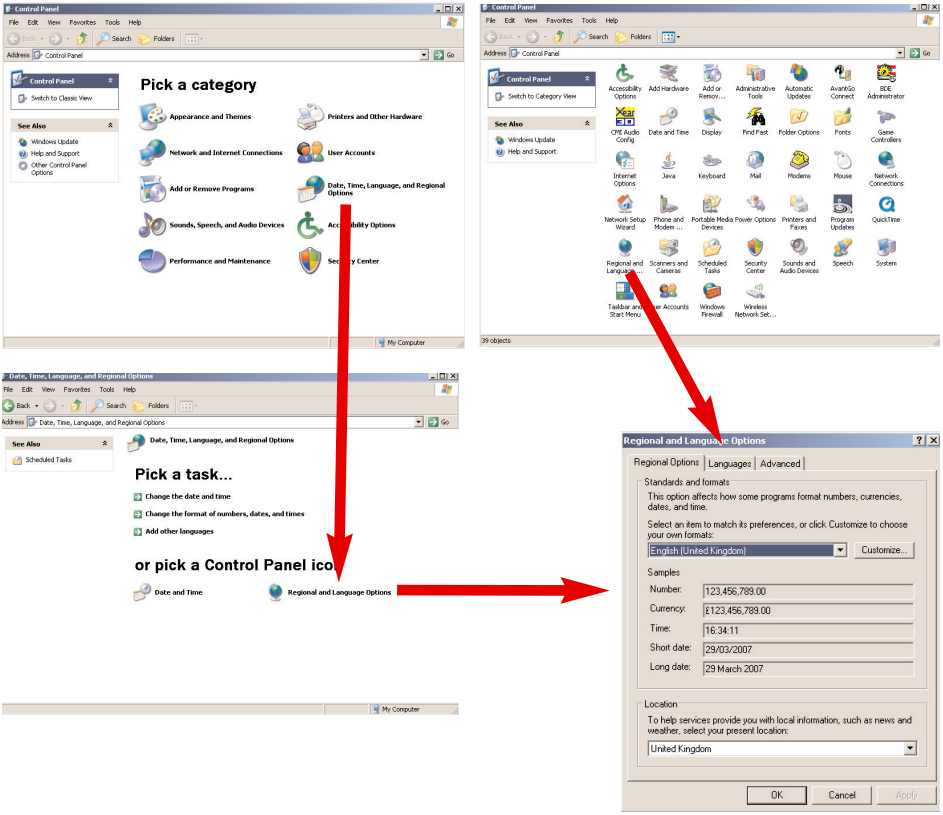


Figure 66. Click on '**Regional Settings**' Icon if you need to change the **Date** style.

Select '**Date**' from the index tabs and change the date as desired. Select **OK** to save changes. See figures 67 and 68.

Figure 67. The 'Regional Settings' sub-screen.

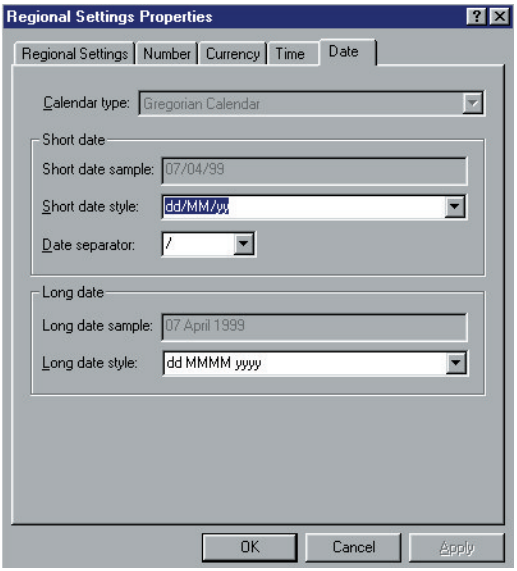


Figure 68. The Regional Settings 'Date' style sub-screen.

CHAPTER 11

CHANGING PRINTERS

The **Henson** range of Field screeners can be used with any Windows ™ compatible printer providing it has USB support. This usually means that the printer is Windows™ 98/2000/XP compatible only. (It will not support Windows 95, DOS or windows 3.11)

The USB printer and drivers will be pre-installed/configured if you purchased the printer as part of the system. If however these parts were not supplied and a printer is to be added, follow the instructions below: -

NOTE:
Check in the Printer manual for specific installation instructions. Ususlly there will be disks supplied with a programme that needs to be run to install all the relevant settings.

USB Printers usually require that the driver is loaded first and then the printer is plugged into the Henson, at which point it will be recognised by the operating system and the driver will be allocated.

To install a new **USBI port** printer
DO NOT PLUG YOUR PRINTER INTO THE HENSON AT THIS STAGE
1. Exit the Henson Software.
2. Insert the software disk that was supplied with the printer. If this was a cd and your machine does not have a cd rom drive then you will need to copy the driver from the CD to a usb pen drive or similar drive that can be pluged into your henson.
3. If the software starts automatically jump to step 5 if not, press the START button and select RUN
4. Browse to the disk where the software is and select the SETUP or INSTALL program.
5. Follow the on screen instructions
7. At some point in the installation you will be prompted to plug your printer in.
8. The printer should be detected and the installation will continue.
9. Once finished there may be a prompt to restart Windows. Allow the software to shut down and restart.

Your printer will then be set as the default printer for all software. By following the above procedure to enter the PRINTERS folder and double clicking on the ICON for your printer, a settings menu is normally available allowing you to customise the characteristics. If you are unsure about the settings, then do not adjust them. The Henson software will work with the default settings for most printers.

TECHNICAL SPECIFICATION
Henson 5000

1. TYPE

Computerised perimeter capable of measuring the visual field out to an eccentricity of 72 degrees. (with re-location of central fixation)
Chart distance: 25 cm.
Background luminance: 3.15cd/m^2.

2. STIMULI

LEDs with broad spectral output ranging from 540-590nm (3dB down). Angular subtence: 0.5 degrees (Goldmann III). Luminance: 0.016 – 1000 cd/m_ (0.05 - 3150 asb). Presentation time: 200ms.

3. FIXATION MONITOR

Heijl-Krakau technique in full threshold programmes. Henson Compact **Plus** has on-screen image of eye presented via CCD camera behind central fixation LED in bowl.

4. FIXATION TARGETS

Red LED or cross pattern of red LED's with broad spectral output of 625 – 675 nm.

5. COMPUTER

There is an in-built IBM compatible computer with at least 32Mb of system ram (64Mb in 6000+). It is connected to a hard disk of at least 2Gb capacity and a 1.44Mb floppy disk drive.

6. INPUTS / OUTPUTS

RS-232 port for connection to Laptop / PC

7. DIMENSIONS

LL x WW x DD mm (L x D x H)

8. WEIGHT

12 kg

9. ELECTRICAL SPECIFICATION

Mains Input Voltage: 100-240 VAC ; universal input.
Fuses: 2 off 20 x 5mm IEC 60127-2 High breaking capacity.
Fuse rating: 240Vac T0.5AH250V
110Vac T1AH250V
Frequency 50/60 Hz
Power consumption: 60 W
Input Connector filtered IEC 320 socket.

10. CLASSIFICATION

Mains operated
Class 1
Type B Applied Part
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.

APPENDIX 1

11. ENVIRONMENT

Temperature:
Operating . . . . . 5° to 35°C (41° to 95°F)
Storage. . . . . –20° to 50°C (–4° to 122°F)

Relative humidity. . . . . 10% to 90% (noncondensing)

Maximum vibration:
Operating . . . . . 0.9 GRMS using a random-vibration spectrum that simulates shipment by air
Storage. . . . . 1.3 GRMS using a random-vibration spectrum that simulates shipment by truck

Maximum shock:
Operating . . . . . 1.52 m/sec (60 inches/sec) (less than or equal to a pulse width of 2 ms)
Storage. . . . . 2.03 m/sec (80 inches/sec) (less than or equal to a pulse width of 2 ms)

Altitude:
Operating . . . . . 0 to 3048 m (0 to 10,000 ft)
Storage. . . . . 0 to 12,192 m (0 to 40,000 ft)

12. ACCESSORIES AND DETACHABLE PARTS

The Henson is supplied with the following accessories and detachable parts:
Set of spares in case consisting of fuses and bulbs
Patient response button and cable assembly
Mains lead for Henson
Back up installed software. (This may be held on the internal Hard disk)
Occluder
Dust Cover
(This) Operating Manual

13. OPTIONAL EXTRAS

Electric Table (without top)
Custom made top with Printer carier
InkJet Printer
Laptop or PC with Windows™ Operating System

14. LIST OF SPARE PARTS

Bulbs:	12 V 5W MES for background illumination
Mains Fuses:	240V : T1AH250V
	110V : T0.5AH250V

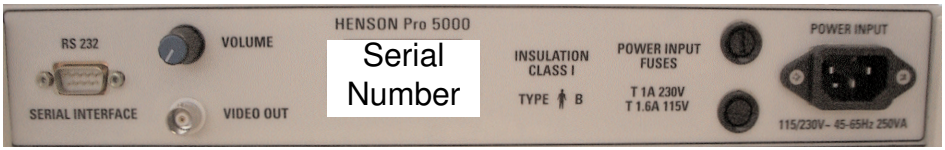
Occluder
Patient Response button
Dust Cover

Connection Details for Henson 5000

The connections on the rear of the Henson 5000 can be seen below. The mains input on the right is fed either direct from the wall socket using the supplied mains cable, or from the power feed that comes from the top of the (optional) electric table.

The RS-232 Serial Interface connection (left) is the communications link to the PC or laptop.
If your computer is using Windows™ '98 as the operating system then there will be a direct "null modem" cable (supplied) connecting the bowl to the PC. If you have windows XP then the null modem cable will connect to the PC via the Supplied USB to serial converter lead. It is important that only the supplied USB to serial lead is used as the Henson Software was written to talk directly to this lead.

The Connector for the video fixation monitor is a standard BNC connector and is a composite video signal. This can either be displayed on an external monitor, or on the computer's screen if a suitable video grabber is used.



The Volume control knob is used to change the volume of the Beep sound that the bowl makes when a stimulus is presented. Turning the Knob Clockwise will increase the volume.

There is also an off position, turn the knob completely anti-clockwise until a "click" is heard.

Note: The Beep sound can also be disabled in the software.

APPENDIX 1

TECHNICAL SPECIFICATION
Henson 6000

1. TYPE

Computerised perimeter capable of measuring the visual field out to an eccentricity of 72 degrees. (with re-location of central fixation)
Chart distance: 25 cm.
Background luminance: 3.15cd/m^2.

2. STIMULI

LEDs with broad spectral output ranging from 540-590nm (3dB down). Angular subtence: 0.5 degrees (Goldmann III). Luminance: 0.016 – 1000 cd/m_ (0.05 - 3150 asb). Presentation time: 200ms.

3. FIXATION MONITOR

Heijl-Krakau technique in full threshold programmes. Henson Compact **Plus** has on-screen image of eye presented via CCD camera behind central fixation LED in bowl.

4. FIXATION TARGETS

Red LED or cross pattern of red LED's with broad spectral output of 625 – 675 nm.

5. COMPUTER

There is an in-built IBM compatible computer with at least 32Mb of system ram (64Mb in 6000+). It is connected to a hard disk of at least 2Gb capacity and a 1.44Mb floppy disk drive.

6. INPUTS / OUTPUTS

PS/2 mouse+keyboard connector (Y-adaptor lead supplied)
RS-232 port for Modem use. (6000 Plus model Only)
RJ45 10/100Mbps Ethernet connector.
SVGA connector for external monitor. (15 way high density D connector).
2 x USB 1.1 compatible Ports

7. DIMENSIONS

530 x 400 x 300 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 High breaking capacity.
Fuse rating: 240Vac T1.6AH250V
110Vac T2AH250V
Frequency 50/60 Hz
Power consumption: 110 W
Input Connector filtered IEC 320 socket.

10. CLASSIFICATION

Mains operated
Class 1
Type B Applied Part
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.

APPENDIX 2

11. ENVIRONMENT

Temperature:
Operating . . . . . 5° to 35°C (41° to 95°F)
Storage. . . . . –20° to 50°C (–4° to 122°F)

Relative humidity. . . . . 10% to 90% (noncondensing)

Maximum vibration:
Operating . . . . . 0.9 GRMS using a random-vibration spectrum that simulates shipment by air
Storage. . . . . 1.3 GRMS using a random-vibration spectrum that simulates shipment by truck

Maximum shock:
Operating . . . . . 1.52 m/sec (60 inches/sec) (less than or equal to a pulse width of 2 ms)
Storage. . . . . 2.03 m/sec (80 inches/sec) (less than or equal to a pulse width of 2 ms)

Altitude:
Operating . . . . . 0 to 3048 m (0 to 10,000 ft)
Storage. . . . . 0 to 12,192 m (0 to 40,000 ft)

12. ACCESSORIES AND DETACHABLE PARTS

The Henson is supplied with the following accessories and detachable parts:
Set of spares in case consisting of fuses and bulbs
Patient response button and cable assembly
Mains lead for Henson
Back up of installed software. (This may be held on the internal Hard disk)
Occluder (eye patch)
Dust Cover
(This) Operating Manual

13. OPTIONAL EXTRAS

Electric Table (without top)
Custom made top with Printer carier
V shaped table top
InkJet Printer

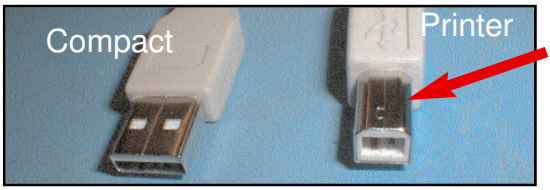
14. LIST OF SPARE PARTS

Bulbs:	12 V 5W MES for background illumination
Mains Fuses:	240V : T1.6AH250V
	110V : T2AH250V

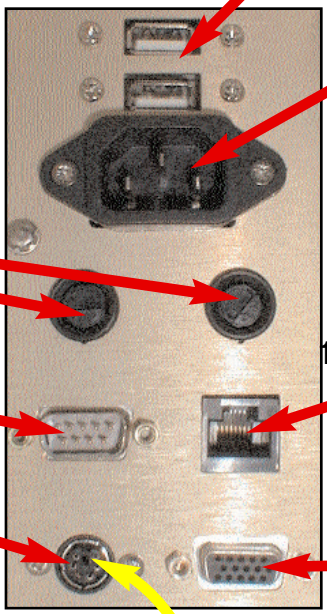
Occluder
Patient Response button
Dust Cover

Connection Details for Henson 6000

These are the connections to the base of the Unit.
The mains input comes from the table (if used).
The Lan adaptor is an RJ45 wired for standard 10/100Mbps Ethernet.
The USB printer lead can use either of the two USB ports.



USB Ports (used for printer)
Lead supplied with printer is A-B type.



Mains Power Input

Fuses
T1.6A at 240Volt
(20mmHBC Antisurge Type)

RS-232 port (6000 Plus only)

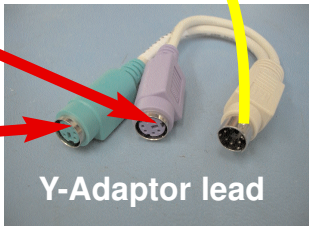
10/100 Lan Adaptor

PS/2 socket
A PS/2 keyboard can be plugged directly in here, but to use a mouse you must use the supplied adaptor shown below.

External VGA Monitor

PS/2 Socket for Keyboard (purple)

PS/2 Socket for Mouse (green)



The supplied Adaptor lead has standard colour coded sockets to match PC compatible peripherals.

APPENDIX 2

TECHNICAL SPECIFICATION
Henson 7000

1. TYPE

Computerised perimeter capable of measuring the visual field out to an eccentricity of 30 degrees. (with re-location of central fixation)
Chart distance: 17 cm.
Background luminance: 3.15cd/m^2.

2. STIMULI

LEDs with broad spectral output ranging from 540-590nm (3dB down). Angular subtence: 0.5 degrees (Goldmann III). Luminance: 0.016 – 1000 cd/m_ (0.05 - 3150 asb). Presentation time: 200ms.

3. FIXATION MONITOR

Heijl-Krakau technique in full threshold programmes.

4. FIXATION TARGETS

Red LED or cross pattern of red LED's with broad spectral output of 625 – 675 nm.

5. COMPUTER

The Controller contains an embedded computer with at least 128Mb of system ram.
It is connected to a hard disk of at least 20Gb capacity.
The Patient unit can also be controller from any Windows™ based Pcs with

6. INPUTS / OUTPUTS

Controller
-PS/2 mouse connector
-PS/2 keyboard connector
-RJ45 10/100Mbps Ethernet connector.
-2 x USB 1.1 compatible Ports
-7W2 D connector from Patient Unit

Patient Unit
-USB 1.1 Type B Connector
(for external control without controller)
-Connection to Controller (7W2 D type)
-Mains Inlet Connector (IEC 320)
-Patient response Button (1/4" Jack)

7. DIMENSIONS

Patient Unit
300 x 230 x 300 - 350 variable mm (L x D x H)

Controller
250 x 225 x 125mm (L x D x H)

8. WEIGHT

Patient Unit
7 kg

Controller
3Kg

9. ELECTRICAL SPECIFICATION

Mains Input Voltage: 100-240 VAC ; universal input.
Fuses: 2 off 20 x 5mm IEC 60127-2 High breaking capacity.
Fuse rating: 240Vac T1AH250V
110Vac T2AH250V
Frequency 50/60 Hz
Power consumption:60VA
Input Connector: IEC 320 socket.

10. CLASSIFICATION

Mains operated
Class 1
Type B applied part
Continuous operation

APPENDIX 3

10. CLASSIFICATION...Continued

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

Temperature:
Operating . . . . . 5° to 35°C (41° to 95°F)
Storage. . . . . –20° to 50°C (–4° to 122°F)

Relative humidity. . . . . 10% to 90% (noncondensing)

Maximum vibration:
Operating . . . . . 0.9 GRMS using a random-vibration spectrum that simulates shipment by air
Storage. . . . . 1.3 GRMS using a random-vibration spectrum that simulates shipment by truck

Maximum shock:
Operating . . . . . 1.52 m/sec (60 inches/sec) (less than or equal to a pulse width of 2 ms)
Storage. . . . . 2.03 m/sec (80 inches/sec) (less than or equal to a pulse width of 2 ms)

Altitude:
Operating . . . . . 0 to 3048 m (0 to 10,000 ft)
Storage. . . . . 0 to 12,192 m (0 to 40,000 ft)

12. ACCESSORIES AND DETACHABLE PARTS

The Henson is supplied with the following accessories and detachable parts:
Set of spare fuses
Patient response button and cable assembly
Mains lead for Henson
Back up installed software. (This may be held on the internal Hard disk)
Occluder
Dust Cover
(This) Operating Manual

13. OPTIONAL EXTRAS

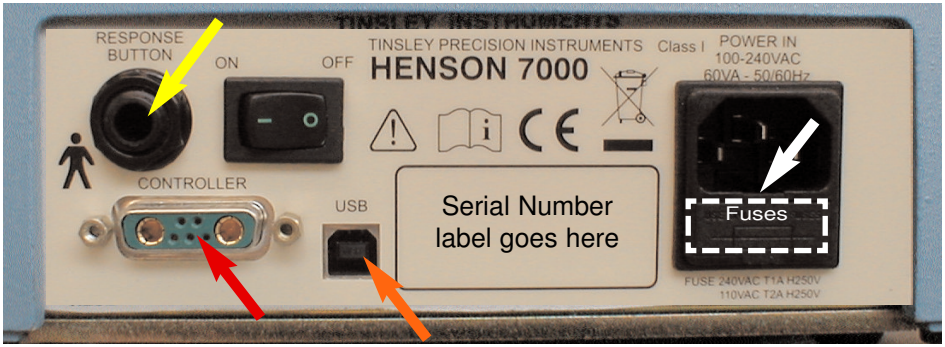
Electric Table
V shaped table top
InkJet Printer

14. LIST OF SPARE PARTS

Mains Fuses: 240V : T1AH250V
110V : T2AH250V
Occluder
Patient Response button
Dust Cover

Connection Details for Henson 7000

The Picture below shows the conections on the rear of the Henson 7000 Patient unit.
It is important that only the cables supplied with the Henson 7000 are used for the connections to the rear panel.



The mains Inlet is on the right hand side of the rear panel, the fuse drawer is highlighted by the dotted white line. The white arrow is pointing at the tab to open the fuse drawer.
The 7 way connector (arrowed Red) is used to connect to the Optional Controller unit.
The USB connector (arrowed in orange) can be used to connect the Henson 7000 to a USB 1.1 port on a laptop or PC, but it should only be used when the controller is not present.

The response button (supplied) can be plugged into the jack socket (arrowed in yellow) to be used by the patient instead of the front panel mounted button.

The picture to the right shows the connections on the rear of the Henson 7000 Controller.

The 7 pin D type plug (bottom left) should only be used to connect the Henson 7000 controller using the cable supplied.

All of the other connections are standard PC types for :-
1 PS/2 Keyboard
2 Mouse
3 RJ45 10/100 Ethernet connector
4 2 off USb 1.1 Type A Connectors

Note: Picture is rotated through 90 degrees

APPENDIX 3

INSTALLATION

1. LOCATION

The electrical installation of the room where the Hensonvisual field screener is to be operated must comply with the "Regulation for the electrical equipment of buildings" published by the Institution of Electrical Engineers. The unit must be protected from ingress of liquids and flammable anaesthetic mixtures.

2. MAINS SUPPLY

The mains supply required is 250 VA (maximum, depending on instrument) 110-240Vac. An IEC approved mains lead must be used with conductors of at least 0.75mm^2 cross sectional area.

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 back (5000/7000) or base (6000) of the unit.

4. ACCESSORIES

If the unit is located on an electric table, the table should be connected to the mains supply using the supplied lead and the Henson should be powered from the power outlet at the top of the table.
Printer. Connect the mains lead suppied with the printer from the socket on the rear of the printer and to a suitable mains supply. Connect the printer USB data cable between the USB interface connector on the printer to the USB port connector on the base / rear of the Henson (6000 / 7000) of the Henson or the laptop / PC (5000). See the printer manufacturer's manual for details.

5. SAFETY

Ensure the connected leads do not trail on the floor and are not subject to abrasion on sharp edges. Use only printers, computers and monitors that conform to EN60950.

6. EMC

The Henson range of visual field screeners conform to European Directive 89/336/EMC but they do emit radiation and if it 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.

7. AMBIENT TEMPERATURE AND HUMIDITY

For use the equipment should only be operated if the ambient temperature is between 10 and 40 degrees Celsius and the humidity is between 30% and 75% non condensing and pressure between 700 and 1060 m bar.

For storage and transport the ambient temperature must be between 0 and 60 degrees Celsius, the humidity between 10% and 80% non-condensing and pressure between 500 and 1060 mbar.

INSTRUCTIONS

The Henson *Visual field screener* must be used in accordance with the operating instructions. Please read the instructions before attempting operation.

APPENDIX 3

SOFTWARE INSTALLATION

To Re-Install the Current Software

Exit from the Henson Main menu and Press the START button in the bottom left corner.
Press on the BACKUP icon on the START MENU list. A list of options will appear. Select the “install version x software” link that is appropriate (usually the highest number there) and then follow the on-screen instructions shown below.

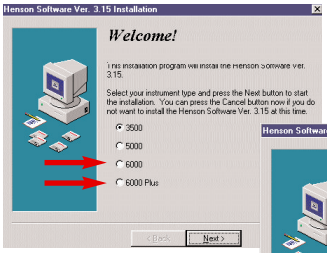


Fig. 69

Press the button for the model of instrument you have, 6000 or Plus (Arrowed).
Then press NEXT
At the end, press Finish. The new software is now ready to use.

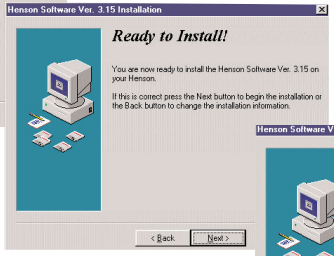


Fig. 69a

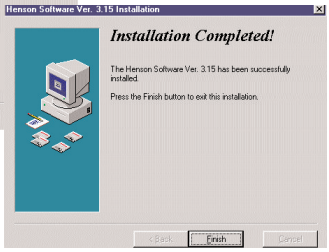


Fig. 69b

To Load a Software Upgrade.

Insert Disk one of the new software disks into the floppy drive.
Exit fom the Henson main menu by pressing the small X in the top right corner.
Press START (bottom left) and RUN.

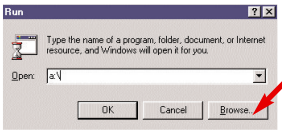


Fig. 70

Press the Browse button (arrowed in Fig 70) to display the window in Fig 70a. Press the Drive selection button (arrowed) and press the A: drive

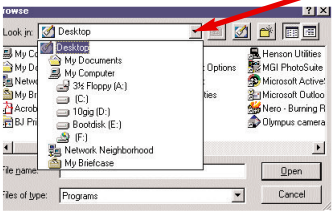


Fig. 70a

The file selection window (below) will appear.
Press (highlight) the name of the installation file (usually the only file there) and press OPEN.

Press the OK button on the RUN window and follow as from Fig69 above.You will be prompted to insert disks as required.

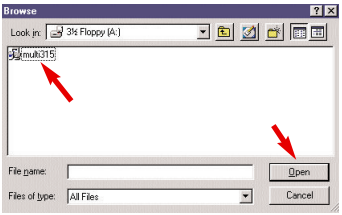


Fig. 70b

APPENDIX 4

MAINTENANCE

1. CLEANING INSTRUCTIONS

Henson HOUSING

The housing should be kept clean by wiping with a Damp cloth.
Do not use abrasive cleaners.

Henson SCREEN (INNER SURFACE OF BOWL PERIMETER) (Not 7000)

The stimulus screen must not be touched, as fingers will tend to leave greasy marks, which cannot be easily removed without damaging its optical properties.
It is unlikely that the screen will become contaminated due to the reduced aperature size.

In the event that the screen becomes marked, Clean using a dry soft brush e.g. paint brush. Brush from the centre of the screen outwards. Do not use an air line to blow out as this may contain oil or water. If inside surface of the bowl is badly marked with greasy marks it will need to be removed. Note this should only be attempted by a qualified maintenance engineer, refer to maintenance manual.

Henson Headrest/Browbar/eyepiece

The brow bar should also be kept clean using a damp cloth followed by an antiseptic wipe.

2. PREVENTATIVE MAINTENANCE AND INSPECTION

a. Every six months it is recommended that all mains leads should be inspected and replaced if there is any sign of damage to the insulation etc.

b. The background illumination lamps should be checked periodically. Check that both lamps above the eye aperature are illuminated.

3. REPLACEMENT OF BACKGROUND ILLUMINATION BULBS

The lamps are mounted on the inside of the aperature bezel. (see Photo Overleaf). Remove the monocular eye screen. Remove the four screws that secure the bezel and tilt it forwards from the top. Remove the beze being careful not to snag the wiring. The two bulbs are now accessible for removal. Simply unscrew the bulbs and replace with bulbs of the same rating. There are bulbs in the spares kit supplied with the instrument.

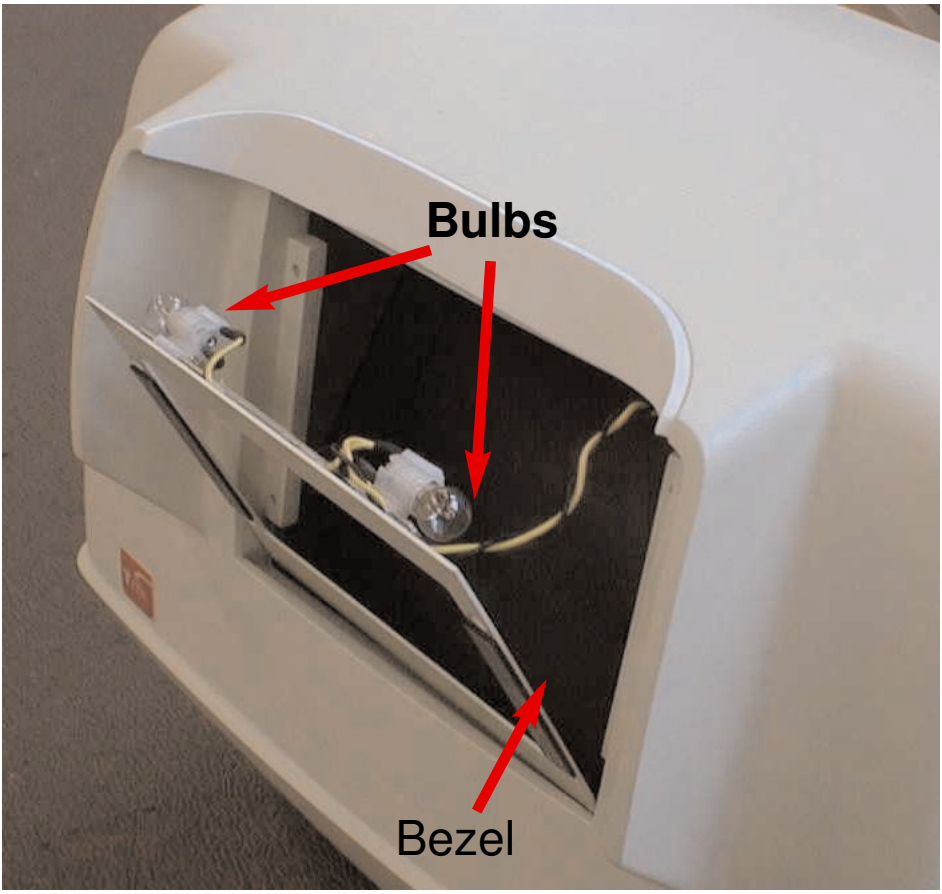


Figure 72. Diagram showing method of replacing background illumination bulbs.

4. **REPLACEMENT OF FUSES ON CHASSIS OF Henson *6000***

Switch unit off and disconnect from the mains.

The fuses are located in a recess in the base of the unit. Remove the fuse holders using a tool e.g. screwdriver. Check which fuses are faulty and if necessary replace. Reinsert fuses into fuse holders checking that the correct value and type has been used as specified next to the fuse holder noting the mains voltage that is being used.

Connect the mains supply and switch on.

5. REPLACEMENT PARTS

The following replacement spare parts are available from your Dealer :-

Item	Tinsley Part Number
5000 Dust Cover	SUN9100
6000 Dust Cover	SUN9300
7000 Dust Cover	SUN9302
Mains Cable	WIR5104
USB A-B Cable	WIR5121
Null Modem Cable (1M)	WIR5110
Null Modem Cable (2M)	WIR5111
Null Modem Cable (5M)	WIR5112
Null Modem Cable (10M)	WIR5113
USB to Serial Cable	WIR3507
Eye Patch	SUN1294
Patient Response Button (Cream Type)	6000-319
Patient Response Button (Grey Type)	3000-319
Mains Fuse 240V use: T1AH250V	FUS1227
Mains Fuse 110V use: T2AH250V(240V)	FUS1228
Background Illumination bulb (5000/6000)	LMP1013
Manual	MAN9999
Software CD	SUN5???*

(* Part number for software will change with later version of softwarae. Contact the dealer for the latest version part number)

6. REPAIRS

The Henson range of visual field screeners contain no user serviceable parts except for replacement of bulbs and fuses. They must only be serviced by an appropriately qualified person. In case of difficulty please contact:-

H. Tinsley will make available on request circuit diagrams, component parts, description, calibration instructions, etc. to assist appropriately qualified technical personnel in repair.

7. WARRANTY

If within twelve months from the date of installation any defect is discovered in any apparatus 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 apparatus is immediately forwarded to our works, carriage paid, in the original packaging and with seals unbroken.
If the original packaging is not available, then contact your service representative to request packaging

H. Tinsley reserves the right to alter the specification of the hardware or software at any time without notification.

APPENDIX 5

ICONS and SYMBOLS Used

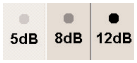
This button saves the currently displayed field in the database (both eyes)

This button prints the currently displayed patients field record (both eyes).

This button clears the current patient. Note all unsaved data will be lost. (i.e. Both eyes)

This button allows you to re-test the current eye without losing the data for the other eye. (If already tested).

This button switches between the single and multiple point fixation targets.



These buttons select the intensity above threshold for the supra threshold tests.

This button allows you to extend the test i.e., from the 26 to the 64 point supra threshold test

These buttons allow you to customise the test by adding and recording more points individually.

These buttons start and stop the test and can be used at any time throughout the test.

This button selects the eye to be tested. (The left eye is currently selected as the right has a patch over it).

This button allows the threshold value to be entered

This button exits from the current strategy, you will be prompted to save if you have not already done so.

These buttons display the (L to R) Greyscale, Threshold values, Defect values, probability values and repeat measures at the end of a Full threshold test.

This button invokes the on-line HELP facility

Symbols Used

Type B Applied part	USB
Mains OFF	Mouse
Mains ON	Keyboard
Protective Earth	Network
AC mains	Refer to Manual
CE Mark	WEEE Directive
Warning	

Computer Settings (6000 / 7000 only)

Some of the Henson range of Visual field screeners are controlled by a computer. There are various options on the computer that are factory set, but may be reset in a fault condition, such as a sudden power cut or a mains bourne power spike.

The resetting of the various controls is relatively striaght forward, but requires the use of a keyboard. This is plugged into the 'Y' adaptor that was supplied with the Henson (and may have been left hanging below the screener if mounted on a standard table). The keyboard required is a standard AT computer keyboard and plugs into the larger of the 2 sockets on the 'Y' lead (the other (PS/2) connector is for the supplied mouse). If a PS/2 keyboard is available (same plug as a mouse) then this can be plugged directly into the Henson without using the Y connector lead

If there is a problem with the in-built screen, then a computer monitor can be plugged into the base of the unit. Note: Some computer monitors have alignment problems depending on their age.

The set-up information is held in the BIOS settings of the computer board which can be accessed by pressing the DELete key when prompted at switch on (the message "Hit Del to enter Settings Menu" will briefly flash onto the screen after the memory test).

You will be presented with the screen below:- (or something similar):-

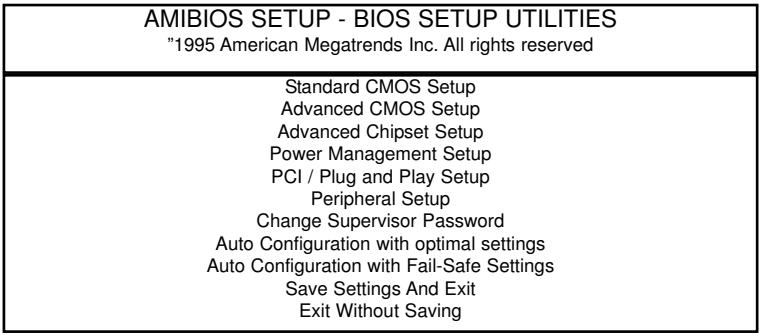


Figure 73 the main start-up menu.

Firstly, the Display type needs to be checked. This is either in the Standard or Advanced setings, depending on the BIOS version. Using the left and right arrow keys select the Advanced Settings and press the ENTER key.

Scroll down (down arrow) to the current "display type" setting. There are three options,(CRT, LCD, BOTH) which can be scrolled through by pressing the Page up/Down buttons. (Pg Up / Pg Dn) Ensure BOTH is selected.

Check that the LCD type is set to 640 DSTN or 640x480 DSTN. Change if necessary using the same procedure as above. (Failure to do this may damage the LCD screen).

If any settings have been changed it is necessary to save them before exiting the setup menu. Pressing the ESCape key on the keyboard in any of the sub menus, will return you to the main menu. It should not be necessary to change any other settings unless the system has experienced a complete reset (see the appendix on troubleshooting).

Select the "Save settings and Exit" option on the main menu. Press ENTER and then press "Y" when prompted.

This will save the new settings and continue with the normal start-up of the machine.

APPENDIX 7

Networking The Henson

Any of the Henson units that have an internal Computer board have a network card which would allow the Henson to be linked in with a windows™ based network.

The networking is set up and tested at the factory and then disabled by default, but the procedure below details how to enable it and connect the Henson.
Firstly, exit from the henson software by closing all tests and then pressing the small X in the top right hand corner of the main menu.

Press the START button and then press on SETTINGS and CONTROL panel.

A window similar to the one shown to the right will open.

If the System icon is not visible then scroll down by pressing the small arrow on the bottom right of the window until it is

Double click on the SYSTEM icon to reveal the System properties box (below left)
Press the Device manager tab to open the hardware list.(Below Centre)

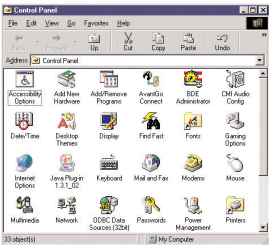


Fig 73 Control Panel

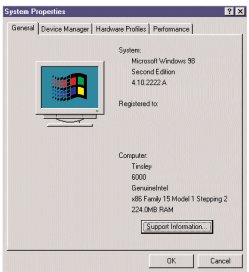


Fig 74 Properties

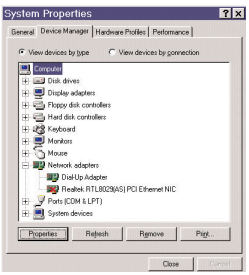


Fig 75 Hardware List showing network disabled

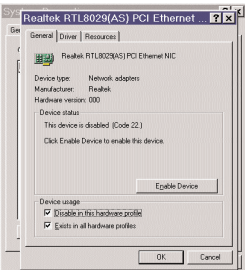


Fig 76 Network Card Properties

The network card will be shown with a small red cross next to it to denote that it is disabled (Fig.75).
Press on it to highlight it and then press the PROPERTIES button at the bottom.

The window in Figure 76 will be displayed, press the ENABLE DEVICE button followed by the OK button.

The screen should refresh back to Fig 77, but this time the network card will not be listed with a red cross. (Only the heading of network adaptors will be visible in the list).

Press the CLOSE button. The Henson might prompt you to do a restart.If it does, click on OK.

The instructions on the next page detail the network settings that have been factory installed. If you are installing a different network, then they might be useful.

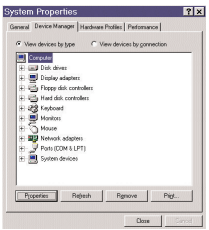


Fig 77 Network Card enabled

APPENDIX 8

Open the control panel as shown previously and Double click on the Network Icon (Shown right).

The network properties window will be shown (see Fig 78 Below right).

Press the small arrow to the the right of the windows logon box and select *Client for Microsoft networks*.

Next press the ADD button and from the window that opens (Fig 79 Below), choose protocol followed by the ADD button again.

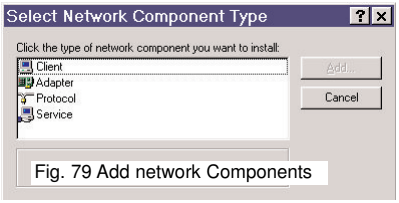


Fig. 79 Add network Components

You will be presented by the selection window below.

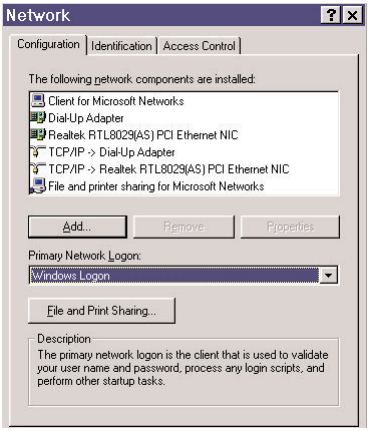
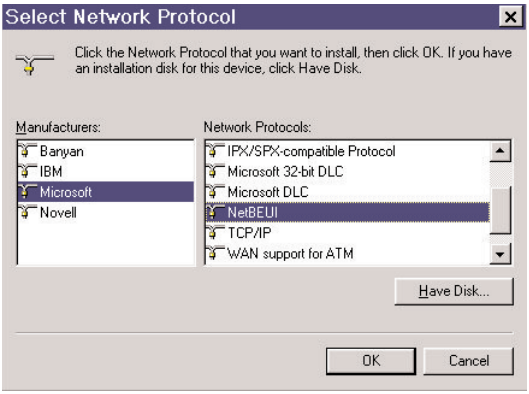


Fig. 78 Network Properties

From here you can load any of the standard Network protocols.
If the software asks for the windows disk, click on the BROWSE button and navigate to the WIN_CD folder on the C: drive. This folder contains an image of the Windows installation disk which contains all the necessary files.



Trouble shooting

Your **Henson** field screener is a complex machine and it is possible that errors can occur in its operation. Listed in this chapter are the most common problems and a list of suggested solutions to try before calling the service department. The following cases have been compiled from frequently asked questions and service visits and cover most eventualities.

1.Unit not powering up.

If the **Henson** unit appears completely dead, i.e., Green power light on front is not illuminated and there are no beeps at switch on, this is probably a power supply or fuse problem.

The mains power supply to the unit should be traced back checking at every connection that there is power,

If the unit is supplied from an electric table does the table still operate?

If yes then change the fuses in the Henson 6000 (See appendix 4) and check that the printer (if powered from the table) is OK.

If No then check the fuses at the rear of the Electric table and in the power cable from the wall socket, if these appear to be OK then check the wall socket itself.

If all the above have been checked and the unit is still not functioning, try powering the Henson unit directly from the wall socket using the power lead from the electric table. If the unit still does not function then call the service department.

2. Unit not printing

a) the Printer feeds paper but it is blank
The ink cartridge has run out, replace with a new cartridge.

b) the Print is coloured (i.e., blue, yellow or red)
The unit is fitted with a colour cartridge and one or more of the three colours has run out. Replace with a BLACK cartridge. (As the **Henson 6000** prints out in black only, this will ensure more prints per cartridge)

c) There is a windows' error message after pressing the print button.
This will usually be a time-out error, i.e. the computer could not communicate with the printer. This could be due to: -

Printer Off-line
Printer has run out of paper.
Centronics/ USB data lead not securely plugged in (both ends).
The ink cartridge is not securely mounted in the printer.
The printer is switched off or has a power feed problem.

d) There is no printer set-up on the computer.
See Chapter 11 for instructions on setting up your printer.

3. Unable to Save data.

If you receive an error message when trying to save your field data at the end of a test, print the data instead if you have not already done so, as it is unlikely that you will be able to save the data on this occasion.
All of the solutions listed below require that you exit the Henson Software and this would mean that you would lose the current test data.

a). There is no database set up in the OPTIONS program.
Close the Henson software and open up the OPTIONS by double clicking on the Icon on the desktop. Press the tab marked DATABASE and check that the path and filename are listed. The default settings are: -
PATH: **C:\HENSONxxxx\DATA** and the filename is **FIELDS.DB.** If these are not there, then enter them and press the SAVE button. (where xxxx is the model number of your Henson)
Re-enter the Henson software and try to save again.

b). The current database has an internal fault.. (NOT Exact read/write error)
This fault means that the current database has become corrupted. The data in the database can still be read back but further data cannot be stored in it.
A new database will need to be started. Follow the instructions in (a) above and create a new database by changing the **filename** from fields.db to something else, i.e. fields 04.db (for 2004).
The field records from the old database can be imported into the new database, see chapter 6 for details of the MERGE control.

c). The database is inaccessible
This can occur if the current database is stored on another machine, i.e. a network server or another Henson field screener. The error message would indicate that a “network drive” could not be found. Check the machine on which the database is located is switched on and connected to the network. Contact your network support for further help. If network help is not immediately available, print the record and then follow the instructions in (a) above to create a temporary database on the Compact’s hard disk to allow further saving until the network problem has been fixed. The temporary database can be MERGED into the original (see chapter 6).

Setting for the on-screen Video

Some of the Henson Visual field screeners have a facility to display the fixation video feed from the Henson bowl on the operator's screen.This is a live video sream of the Patient's eye movements and allows you to monitor how well the patient is fixating during the test. This is especially useful during FULL THRESHOLD testing.

The figure on the right shows the on-screen display of a single stimulus test

There are various settings that can be changed on the video, these are accessed by pressing theVIDEO button (arrowed)

This will display the settings box below.
The default settings are for VIDEO 1 and PAL-M or PAL-N.
All other settings (brightness/ contrast etc,) can be altered to suit vieving / lighting conditions.

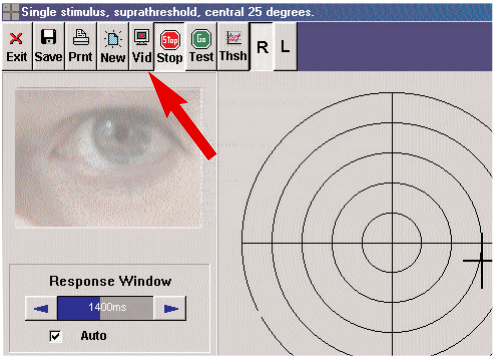
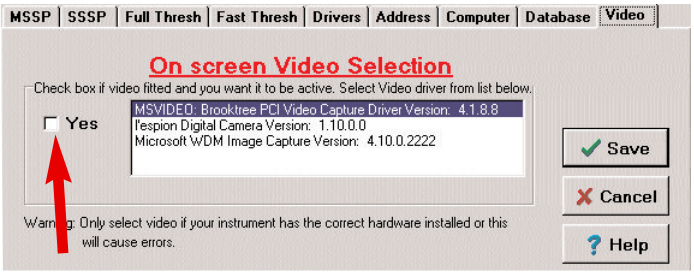


Figure 76 Picture of eye on screen.

To DISABLE the on-screen video, open the Options program (Chapter 7) and remove the "tick" from the Video selection box (arrowed below), then SAVE the new settings.



APPENDIX 10

Calibrating the touch screen(6000 only)

If your Henson has an LCD screen fitted with a touch screen, it may need calibrating periodically to maintain its peak efficiency. This is especially true if the correct pointer is

To do this EXIT from the Henson software (press the X in the top right corner of the main menu screen) and double press on the **touch screen icon**, alternatively, press on the START button in the bottom left corner of the desktop. (see below) then select **programs, touchscreen and configuration** / **Setup**.

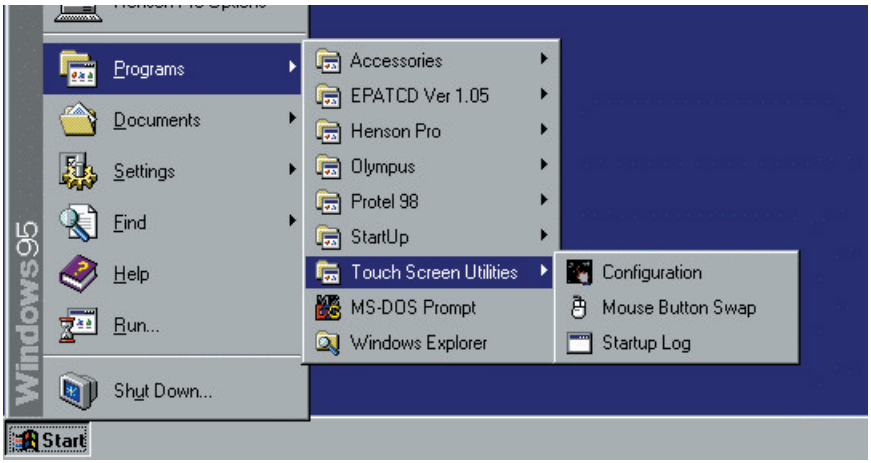


Figure 74 Click on Configuration to calibrate the touch screen.

The window shown below (or one similar) will open on the desktop, press the Calibration button and then on the large calibrate button in the centre of the next menu screen.

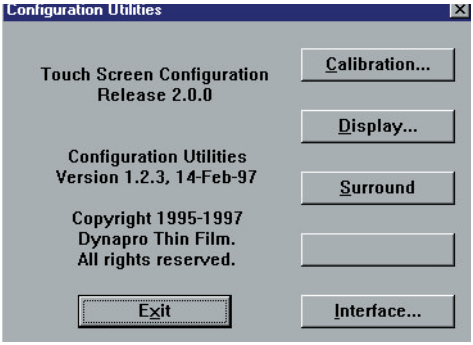


Figure 75 the Touch-Screen setting menu.

You will be prompted to touch the screen in three locations and will then be returned to the main menu.

Press EXIT to return to the windows screen.

APPENDIX 11