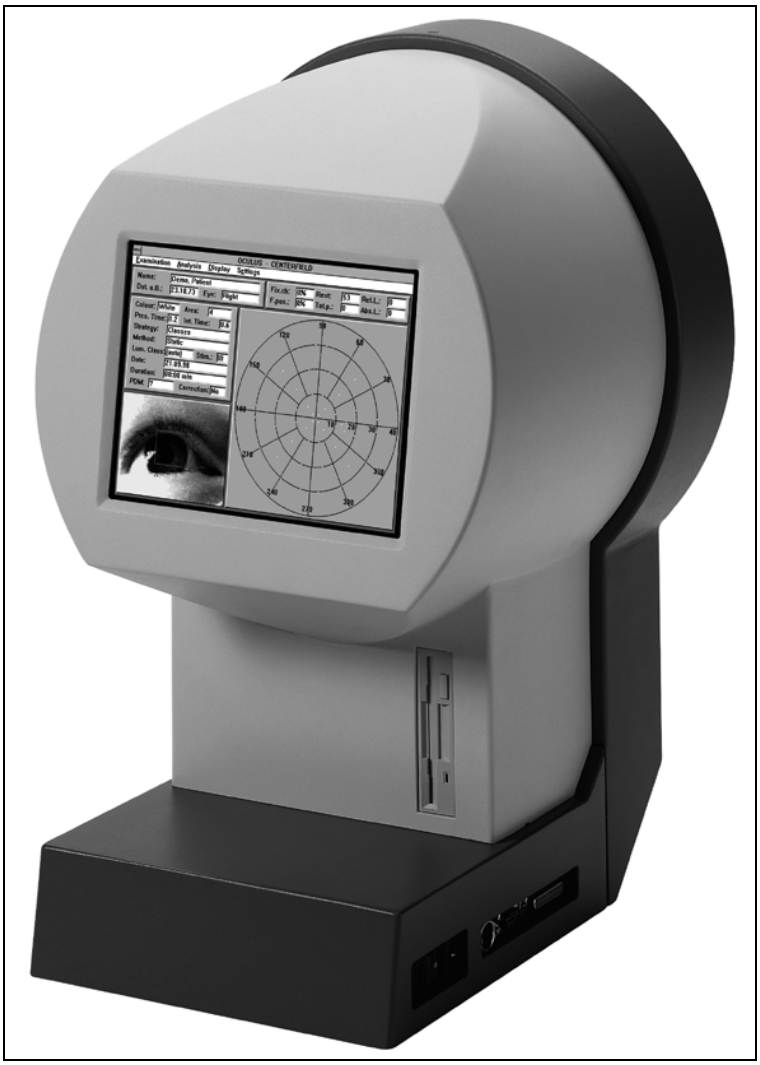


Centerfield

Instruction Manual

OCULUS

G/56950/0800/e

0 Foreword

Thank you for the confidence which you have placed in us by selecting this OCULUS product.

OCULUS is an ophthalmological company with a long and proud tradition. For more than 100 years, it has been our goal to produce modern, innovative products which lighten your workload in the routine of daily practice.

We cooperate with many clinics and practicing physicians and develop performance specifications for new instruments in close consultation with them.

The Instruction Manual before you will help you familiarize yourself quickly with your new unit.

We wish you good results with your new CENTERFIELD perimeter and continued success in your work.

Should you ever have a problem with this unit, please contact your OCULUS representative or get in touch with OCULUS directly. We will be glad to help you in any way possible.

Your OCULUS Team

OCULUS has been certified according to ISO 9001 / EN 46001 and Directive 93/42/EEC for Medical Products since 1996 and therefore sets high quality standards in the development, production, quality assurance and servicing of its entire product range.

1 Table of Contents

2 Standard Issue Equipment and Optional Accessories

Standard Issue Equipment (Centerfield):

OCULUS-CENTERFIELD Perimeter Central unit with software	56950
Dust cover	56950-00/002
Interface for PC/laptop with the CENTERFIELD Perimeter	05202005
Mains cable	05200320
Halogen bulb (12V 5W) for background	05160060
Eye occluder	44560
Hand-held control key	56517
Lens mount for narrow-rimmed corrective lenses	56950-12/0
Fuse 1,25AT (respectively 2,5AT)	05100170 (05100240)
Instruction manual	05550680D / 05550680E
Hardware adjustment disc	
Setup disc	
Software installation instruction manual	I/56950/E
Test certificate electrical safety	
Mulitple socket	05250050
Adapter plug 9-pin/25-pin	05110900

Standard Issue Equipment (Centerfield Plus):

OCULUS-CENTERFIELD Perimeter Central unit with software	56951
PS/2-mouse	05460005
Dust cover	56950-00/002
Mains cable	05200320
Halogen bulb (12V 5W) for background	05160060
Eye occluder	44560
Hand-held control key	56517
Lens mount for narrow-rimmed corrective lenses	56950-12/0
Fuse 1,25AT (respectively 2,5AT)	05100170 (05100240)
Instruction manual	05550680D / 05550680E
Hardware adjustment disc	
Setup disc	
Software installation instruction manual	I/56950/E
Test certificate electrical safety	

Optional Accessories (Centerfield):

PC, software, mouse, mousepad, keyboard, monitor, mains cable (PC), mains cable (monitor)	56910
Laser printer - HP- or compatible version for printout of results	56608

Optional Accessories (Centerfield Plus)

Keyboard	56952-D / 56953-US
Interface for PC/laptop	05202005
Instrument table	56964 (550mm x 550mm) / 56965 (550mm x 800mm)
Laser printer - HP- or compatible Instruction manual, paper, installation software, mains cable, printer cable 25-pin	56608

We reserve the right to change standard issue equipment as required by technical progress.

3 Safety Precautions

The manufacturer is required by law to inform the user explicitly about safety aspects involved in dealing with this unit. This chapter contains a summary of the most important information which is to be noted regarding these points of technical safety.

Other safety precautions are found in the text of this Instruction Manual and are marked with the following symbol:

Please give these remarks your special attention.

Store this Instruction Manual with care in a place where it is accessible at all times for persons using the unit; also, give due attention to the instruction manuals of the unit's other accessories as required.

The unit may only be used for its intended purpose, as described in Chapter 5 of this Instruction Manual, and by persons whose proper use of the unit is ensured by their training and practical experience.

Use the unit only with original parts and accessories delivered by us and in a technically flawless condition. Do not attempt to use the unit if it becomes damaged, but contact your supplier.

Please abide by accident prevention laws where applicable and pay special heed to the printed instructions and information on the unit itself.

The unit may be used in medical areas only if these rooms are equipped according to VDE 0107 norms or the equivalent (Association of German Electrotechnical Engineers).

Always disconnect all mains plugs from their power outlets before carrying out maintenance or cleaning work.

Disconnect the mains plug at once if you notice smoke, sparks, or unusual sounds coming from the unit. Do not use the unit again until the problem has been corrected by our service personnel.

Do not connect electrical plugs and sockets by main force. If it is not possible to connect them, verify whether the plug is correct for the socket. If you find damage in either the plug or the socket, have them repaired by our service personnel.

Do not disconnect electric plugs from their sockets by pulling on the cable, but rather on the plug.

Additional equipment which is connected to the analog or digital interfaces of the unit must have been shown to meet European Union norms or IEC specifications. Moreover, all configurations must meet the requirements of IEC Systems Norm No. 601-1.

Under no circumstances may integrated electric medical systems be created by coupling the CENTERFIELD Perimeter to non-medical electric devices (e.g. data processing equipment) in such a way that patient safety is below that required by IEC Norm No. 601-1. A safety disconnection device must be provided if it is possible that such a coupling might lead to higher leakage current values than those which are permissible.

Do not use the equipment named in the Standard Equipment List in situations:

- Where there is danger of explosion.
- Where flammable anesthetics or volatile solvents such as alcohol, benzene or the like are present.

Do not store or use the unit in damp rooms. Avoid placing the unit near dripping, gushing, or splashing water, and make certain that no fluid can enter the unit. For this reason, please do not place any containers full of liquid on or near the unit.
Take care when cleaning the unit with a damp cloth that no fluid gets into the unit.

This unit is a high-quality technical product. To ensure that it performs flawlessly and

safely, we recommend having the unit inspected regularly every two years by our service personnel.
Should any problem arise which you cannot solve using the enclosed checklist of errors (Chapter 10.5), label the unit "Out of Order" and contact our service department.

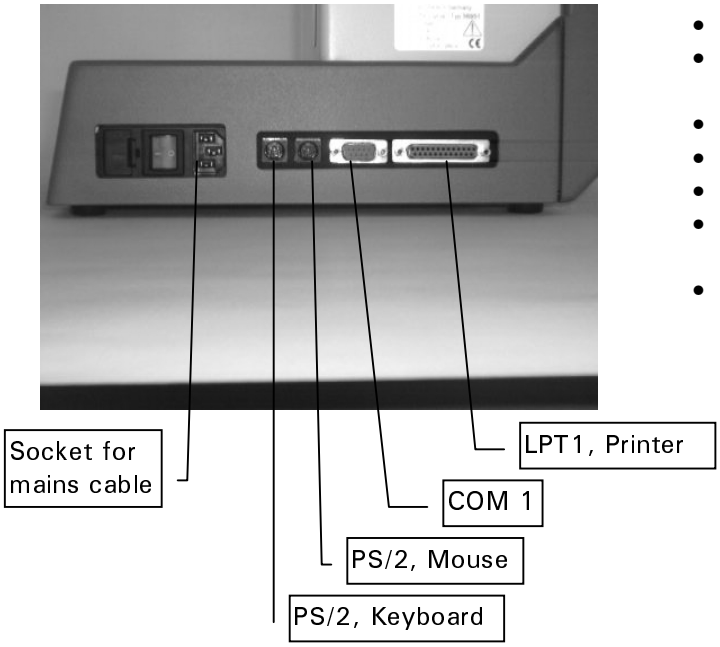
4 Description of Unit and its Functions

4.1 Technical Features of the Unit

The CENTERFIELD back-lit projection perimeter offers kinetic and static, automatic visual field examinations. It fulfils the requirements of ISO Norm No. 12866. It uses a cupola with a radius of 30 cm, corresponding to the Goldmann standard. This cupola is homogeneously illuminated (luminance is calibrated to 10 cd/m^2). The unit is computer-controlled, and linkup takes place only via the serial interface.

4.2 Centerfield Plus

The Centerfield Plus consists of the Centerfield as main instrument and an internal PC. Features of the instrument are additional openings in the housing for ports, floppy disk drive and display.



There is a singleboard industrial PC built in with the following technical data:

- PC Pentium 166 Mhz
- RAM 16 Mbyte
- Harddisk 2.1 Gbyte
- Floppy 3.5"
- Display TFT Colour, NEC NL6448AC33-24
- PS/2 for mouse
- PS/2 for keyboard
- COM 1
- COM 2 (internal connection for Centerfield)
- LPT1, for printer

4.3 Warning Signs and Instructions on the Unit

Caution! Disconnect the mains plug before opening the unit!

Please read the accompanying instructions!

5 Appropriate Use of the Unit

This unit may be used only for the purposes described in this Instruction Manual. It is designed for tests of the visual field of the human eye.

The unit may be used only by persons whose proper use of the unit is ensured by their training and practical experience.

Use the unit only with original parts and accessories delivered by us and in a technically flawless condition.

With the computer controlling the Centerfield Perimeter it is not permitted to run other software parallel to the examination software in the foreground (such as screen saver, user programs, etc.)
Modes to save energy (BIOS or Windows) should be deactivated.

Use the unit only with an electric supply system whose supply voltage is within the range given on the type plate.

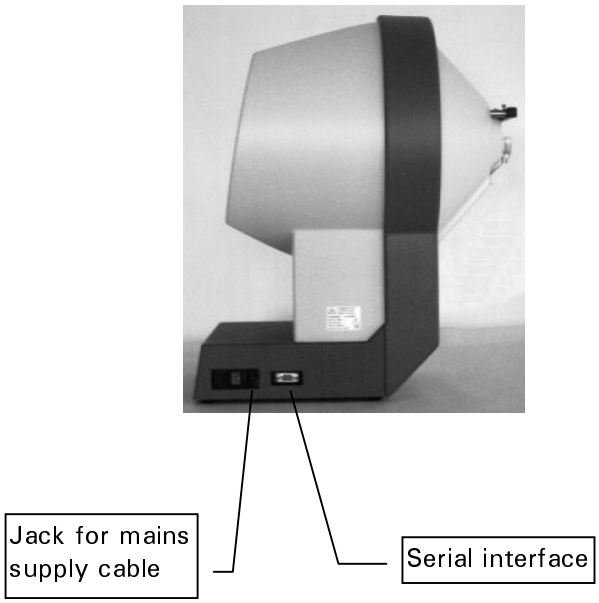
Please take care to observe the safety precautions given above.

6 First Use of the Unit

6.1 Preparing for First Use

Place the OCULUS-CENTERFIELD perimeter on a level surface and connect it to the mains supply using the mains cable delivered with the unit.

Make sure that the mains supply voltage corresponds to that given on the rating plate of the unit. Connect the interface cable to the socket at the side of the PC (only 56950), along with the cable of the hand-held control key.



6.2 Instructions on Transport and Storage

Please use the original packing materials when transporting the unit. This will enable you to avoid unnecessary damage and costs.

Avoid unnecessary impacts when transporting the unit to another location. Such impacts may negatively affect the optical and electronic components and the calibration of the unit.

Always check the unit for damage after it has been moved to a new location. Do not use the unit under any circumstances if it has been damaged. In this case, please get in touch with our service department.

If you keep the unit in an automobile during the cold season of the year, its optical components may become fogged with condensation after being brought into much warmer surroundings.
Please give the unit time to adjust to the new surroundings before turning it on.

The conditions prescribed for transportation and storage by IEC Norm 601-1 are:

- Ambient temperature: -40°C ... +70°C
- Relative humidity: 10%...100% including condensation
- Air pressure 500 hPa...1060 hPa

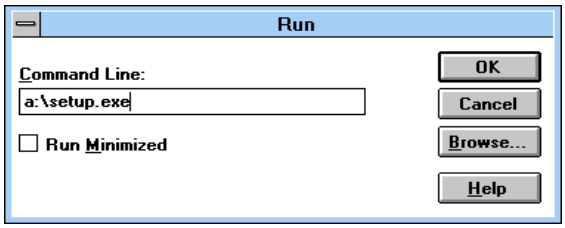
These values apply for a period of 15 weeks at most when the unit is stored in its original packing material.

6.3 Installation of the Software

6.3.1 Windows 3.x

- Insert the floppy disk **Centerfield (56950 / 56951)** into drive "A".
- Click in the "Program-Manager" menu bar "**[File/Run...]**".
- Enter "**a:\setup.exe**" and click the button "**[OK]**".

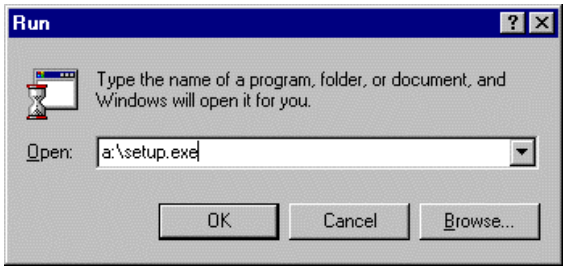
Follow the installation instructions.



6.3.2 Windows 95

- Insert the floppy disk **Centerfield (56950 / 56951)** into drive "A".
- Click "**Start**" in the "**Start**" menu, then "**Run**" in the subsequent pop-up menu.
- Enter "**a:\setup.exe**" and click the button "**[OK]**".

Follow the installation instructions.



7 Directions for Use

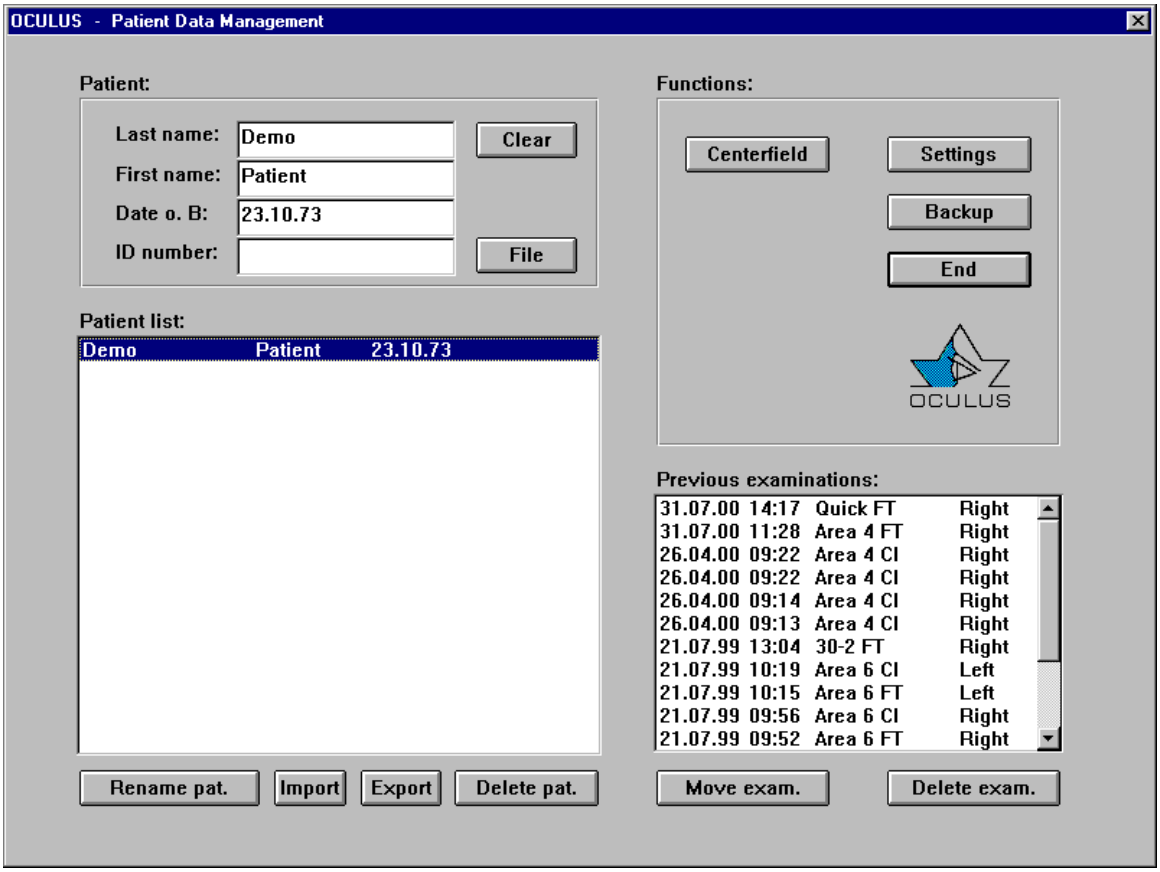
Only 56950: Please turn on the PC first, then the CENTERFIELD Perimeter.

Familiarity with the basic functions of Windows® is required for correct use of this program. Please refer to the Instruction Manual for further information. The following chapter describes the individual functions of the program:

7.1 Patient Data Management

After being turned on, the PC loads the operating system and then displays the OCULUS Company logo.

The patient data management system can now be started with a mouse click or by pressing any key.
The following window appears on the screen:



7.1.1 Patient Selection

All patients examined in the past are now listed alphabetically on the lower left of the screen.

If the list of patients is too long to be displayed on the screen, it can be scrolled up or down with the Windows slide bar.

In order to find the desired patient in the list, it is helpful to type the patient's name in the "Last name:" box (at the upper left). As each new letter is typed, the name is searched for in the list and the display is updated.
The patient can also be found by means of his or her ID number (in this case, however, the "Last name:" box must be empty).

After the patient name has been found in the list, it is transferred to the "Patient" boxes by clicking the name in the list. Simultaneously, all previous examinations of the patient are then listed in the "Previous Examinations:" window at the lower right.

7.1.2 How to Enter a New Patient

To enter a new patient into the patient data management system, first click the **[Clear]** box. This clears the box of any previous patient names. Then enter the complete last name, first name and date of birth in the corresponding patient boxes (at the upper left).

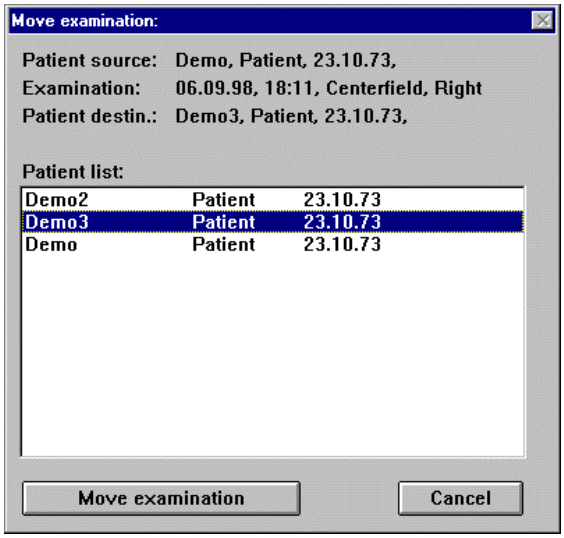
An ID number may be assigned to the patient, however this is not required.
Now click the **"File"** button. The following message then appears:
"No data available for this patient!"
"Do you wish to create a new patient file?".
Clicking the **[New File]** button enters the patient into the patient list.

7.1.3 How to Delete / Relocate Examination Results

Two buttons are found below the "Previous examinations:" list. These are used to activate functions which are always related to the last examination which has been clicked:

[Delete Examination]
This button deletes individual examinations from the patient data management system.
When the button is activated, the question is again asked whether you really wish to delete this examination.

[Move exam.]
If an incorrect patient name was inadvertently selected from the examination list during an examination, the examination results can be subsequently assigned to the correct patient.

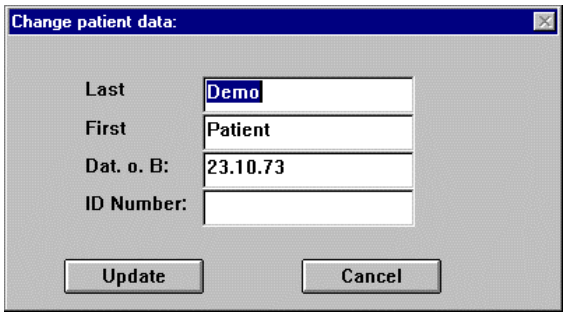


Activating the **[Move exam.]** button causes a window containing the patient list to appear.
The correct patient can now be selected from this window.
If the list of patients is too long to be displayed on the screen, it can be scrolled up or down with the Windows slide bar.
After the correct patient name has been found and selected, the current examination data are assigned to it be activating the **[Move exam.]** button.

7.1.4 Patient Data

7.1.4.1 How to Rename Patient Data

Patient data can be changed subsequently with the **[Rename pat.]** button. This causes the **"Change patient data"** window to appear, in which the patient data can be corrected.
The changes are put into effect with the **[Update]** button.



7.1.4.2 How to Delete Patient Data

Patient data can be deleted with the **[Delete pat.]** button.

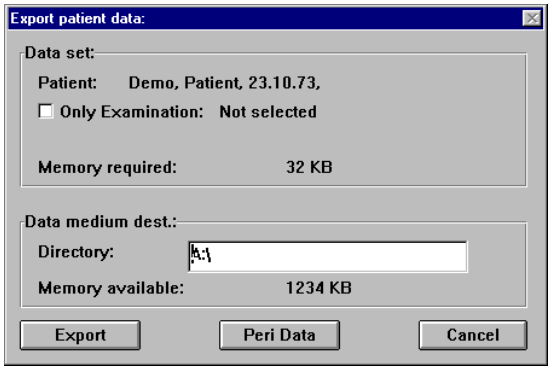
Caution! ⇒ This action must be confirmed twice before the data are in fact deleted, since not only all examinations but also all data for this patient are then removed irrevocably from the patient data management system.

7.1.4.3 How to Export Patient Data

This function permits patient and examination data to be transferred from the PC to another data storage medium (e.g. diskette).

Clicking the **[Export]** button opens window which consists of two data areas:
The upper field names the data set which is to be exported, the lower field is used to identify the destination.

The "Data medium dest." field
Use the **"Directory"** line to enter the disk drive to which the data set is to be transferred (e.g.: "A:\" in the case of a diskette).
A subdirectory can also be named (e.g.: "A:\February\")



Click the **[Peridata]** button to export the selected examinations to the specified directory (see 7.2.10.4 on page 56) in PDIF format.

"Data set:"
Use this field to determine whether all examinations of the patient are to be exported or only one.
If only one examination is to be exported, select from the list of existing examinations before activating the **[Export]** button.

"Including CCD image"
This button has no function in the CENTERFIELD program.

"Memory required" and "Memory available"
These two memory values show how much memory space is required for this action and how much is available on the data medium destination.

Click the **[Export]** button to transfer the data set or the **[Cancel]** button to abandon this function without a transfer of data.

7.1.4.4 How to Import Patient Data

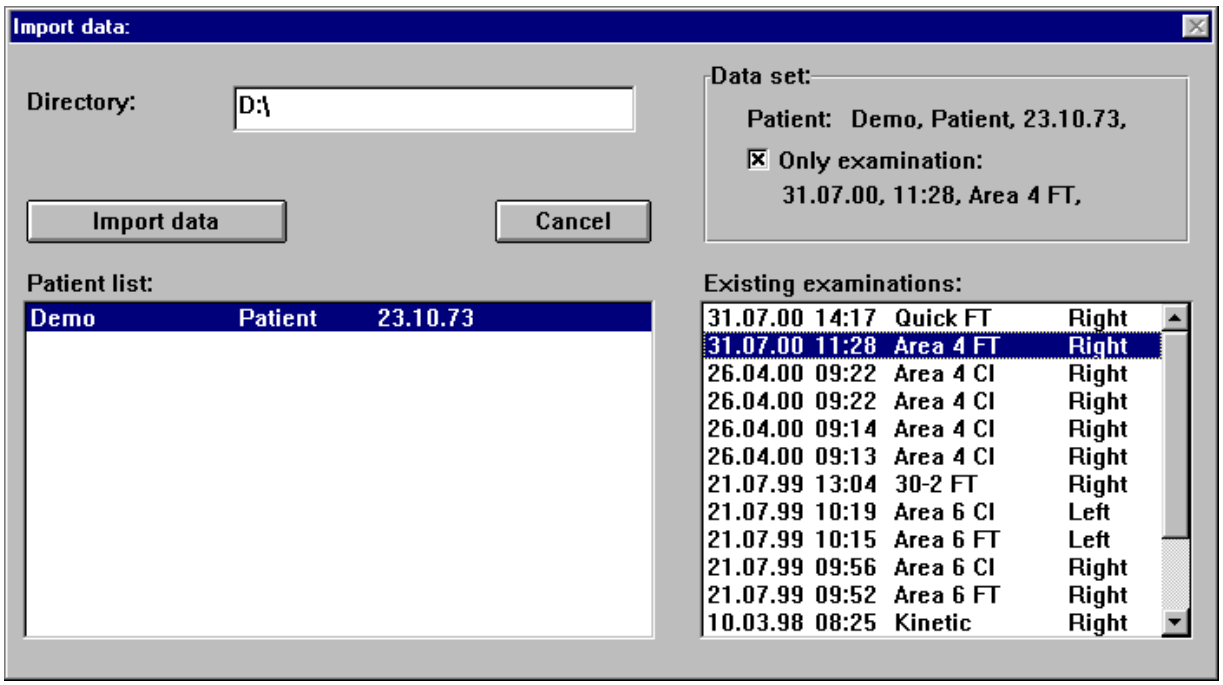
(e.g. from a diskette to the hard disk or to a directory of the PC)

The **[Import]** button starts this function.

"Directory"
Use this box to enter the drive designation letter and the subdirectory (if any) of the source from which the import is to take place.

A patient list displays the patients whose examinations are stored on the data storage medium. The examinations of a single patient are listed when that patient's name is selected.
If only a single examination is to be imported, click it in the list of existing examinations.

To start the import function, click the **[Import data]** button.

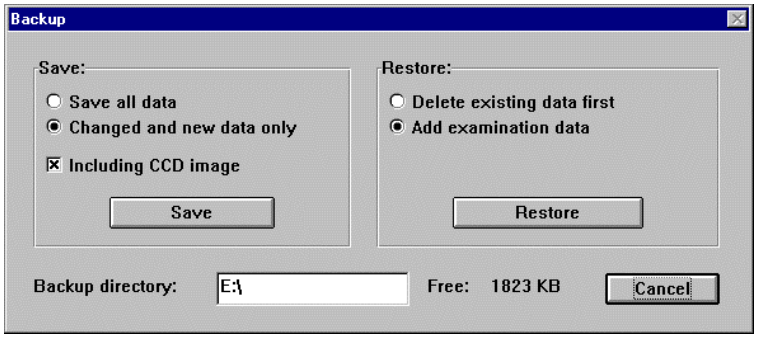


7.1.5 Data Backup

7.1.5.1 How to Backup Data

The **[Backup]** button opens the "Backup" window. It consists of two areas: **"Save:"** and **"Restore:"**.

Use the box below these areas to select the directory into which or from which the backup or the restoration is to take place. This may be, e.g.: "F:\" in the case of an external disk drive with exchangeable data storage media (removable hard disk).



The backup can take place according to different criteria:

- **"Save all data"** Saves all examination and patient data.
- **"Changed and new data only"** Makes a backup only of data which have been changed or created since the last backup.
- **"Including CCD image"** This function has no significance for the CENTERFIELD perimeter.

Note ⇒ The data may take some time, depending on the volume of data. For this reason, this function should be carried out, when the PC (i.e. the CENTERFIELD perimeter) will not be required for a while.

Click the **[Save]** button to start the data backup..

7.1.5.2 How to Restore Data

This function restores data from the backup data storage medium to the system.
The restoral from a backup data set can be carried out according to different criteria:

- **"Delete existing data first"**
  Caution! ⇒ This function deletes all presently stored examination data of the patient before restoring data from the designated data storage medium. After the restoral, therefore, only those examinations are present which are already found on the backup data storage medium.
- **"Add examination data"**
  This function adds the examination data of the backup storage medium to the already existing examination data of the patient.

Use the **[Restore]** button to start the restoral of data.

7.1.5.3 Automatic Backup

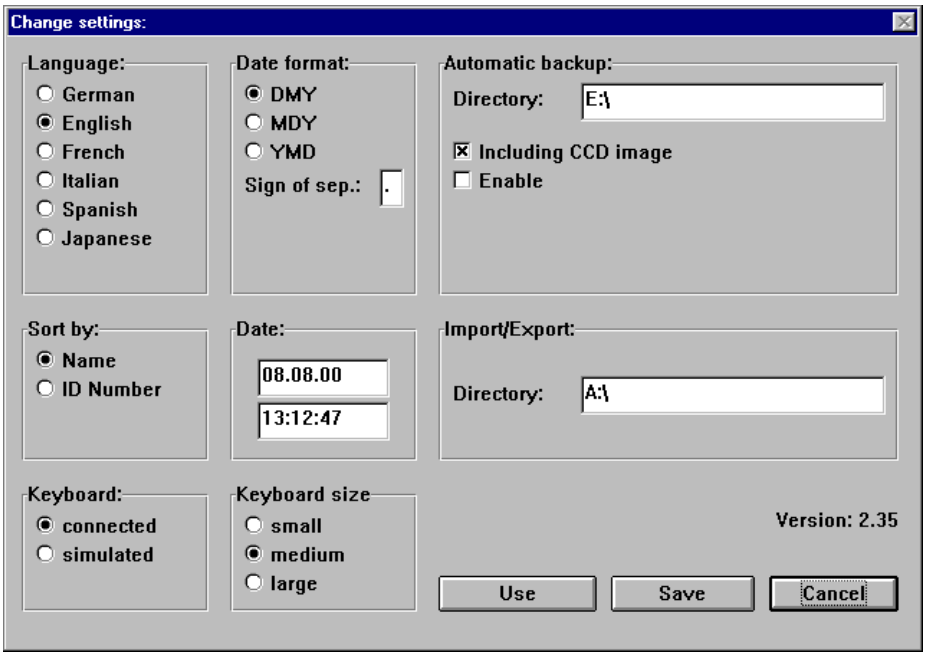
The data backup can also be carried out automatically. In this case, a backup is always made of new examination data at the end of the examination program.

Use the **"Change settings"** menu to activate this function.
This function should only be used if an additional disk drive with removable data storage medium is present.

7.1.6 How to Change Settings

Activating the **[Settings]** button causes the **"Change settings"** menu to appear.

This can be used to adapt the patient data management system to your own preferences:



- **Language:**
  Use this function set the language used by the program for output (German, English, French, Italian, Spanish or Japanese).

- **Date format:**
  Used to change the date display. The following sequences (with punctuation) can be selected:
  Day/Month/Year (DMY),
  Month/Day/Year (MDY),
  or Year/Month/Day (YMD)

- **Sort**
  The patient list can be sorted either by patient names or ID numbers. Sort the list by name if you customarily use patient names in searching for patients.
  On the other hand, use ID numbers if you customarily search in this way.

- **Date**
  Use this box to change the system time and date if necessary.

- **Automatic Backup**
  The automatic backup function is activated by clicking the **"Enable"** box.

  The backup directory in which data backup sets are to be located must be selected here. This directory will then also be used as backup directory during normal backups.
  "Including CCD image" has no importance and is irrelevant with the CENTERFIELD Perimeter.

- **Import / Export**
  The backup directory in which data backup sets will be located must be selected here. This directory will then also be used as backup directory during normal backups.

The **[Use]** button implements your choices for the continuing course of the program. However, the previously stored settings are again loaded when the program is started again.

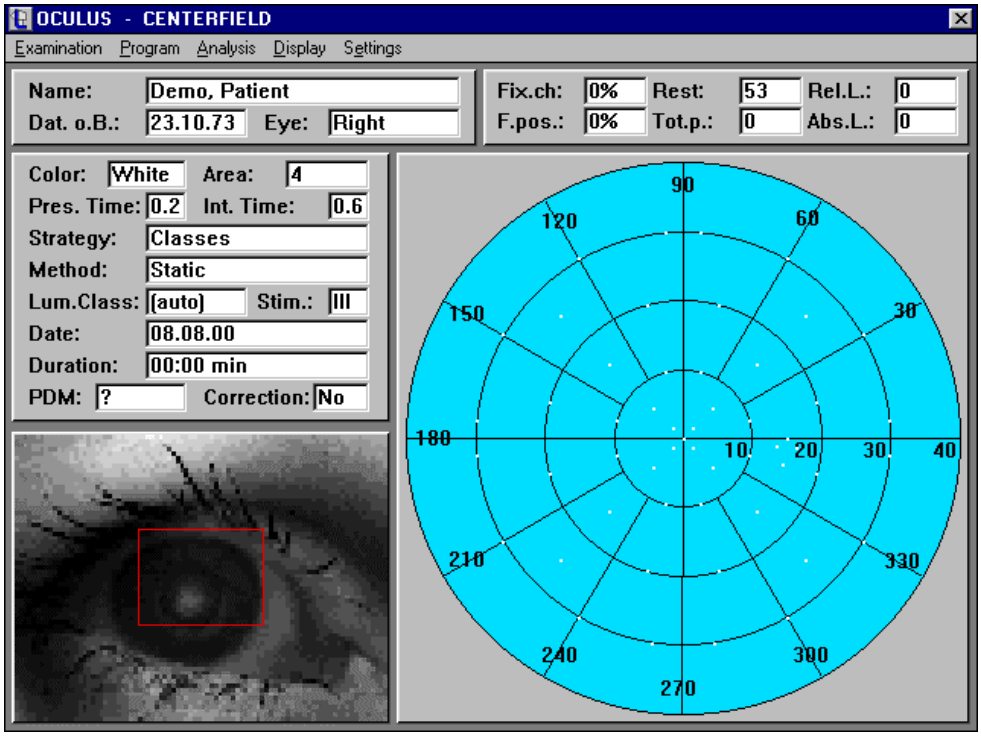
The **[Save]** button can be used to make your choices permanent. They will then be implemented every time the program is started until they are changed and again stored with **[Save]**. The **[Cancel]** button rejects the changes without implementing them and cancels this function.

7.2 The Examination Program

In order to start the examination program, select a patient from the patient list and then click the **[Centerfield]** button.

7.2.1 The Menu Bar of the Examination Program

After the **"OCULUS CENTERFIELD"** examination program is loaded the unit is initialized and the patient data system and pre-selected examination parameters are displayed. The following window appears on the screen:



The following main menu items are found in the main menu bar:

- **Examination**
  Used to carry out or load a static or kinetic examination, to load already stored examination results, to print out the latest results and to exit from the examination program with the menu item **"New Patient"** (= return to the patient data management system).

- **Program**
  This menu item is for managing self-defined programs that facilitate a quick examination start.

- **Analysis**
  Comparison, statistical evaluation and combination of examinations.

- **Display**
  The following display modes are available: standard, gray-scale, 3D, and sectional profile in the 30°- and 70° visual field.

- **Settings**
  Here it is possible to select user-specific settings (language, date format, fixation check and camera brightness) as well as system settings.

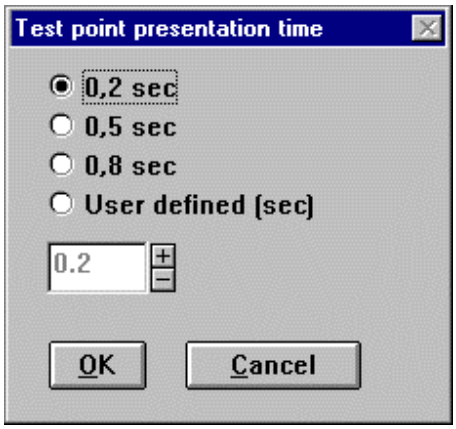
7.2.2 Direct Selection of Examination Parameters

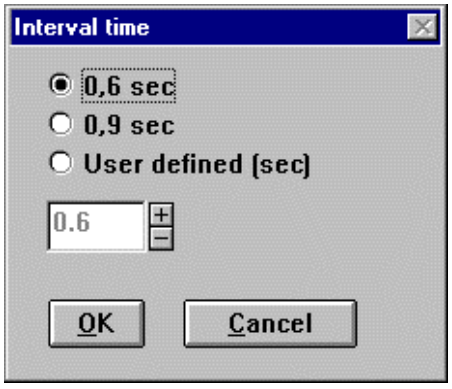
The following examination parameters can be directly selected in the standard, gray-scale and sectional profile display modes by clicking the corresponding parameters with the left mouse key:

- **COLOR**
  The **"Set up Color"** window appears. Here you can select a blue or white stimulus.

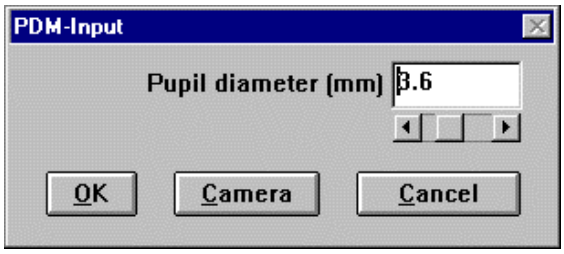
- **PRES. TIME**
  The **"Test point presentation time"** window appears. Now you can select a setting of 0.2, 0.5 or 0.8 seconds or enter a user-defined time of your own. The presentation interval is linked to the reaction time of the patient. The selected presentation time is the maximum interval during which the stimulus remains illuminated. If the patient reacts quickly, the unit automatically continues with the examination (i.e. the next stimulus presentation).

- **INT. TIME**
  The window **"Interval Time"** appears. Now you can select an interval time between 0.6 and 0.9 seconds or enter a user-defined time of your own. The interval time is the time between two stimulus presentations.
  83% of the interval time is used up by the reaction time of the patient, i.e. when the interval time is 0.6 seconds the patient has the stimulus presentation time plus 0.5 seconds to press the key. It is helpful to adjust the interval time in the case of very slow-reacting patients.



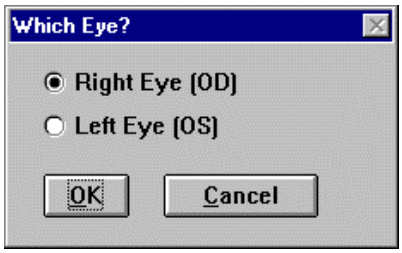


- **PDM**
  The **"Enter PDM"** window appears. Use this window to input the pupil diameter. You also have the alternative of activating the **[Camera]** button, after which you will be asked to click the left and the right pupil margins. Confirm this with **[OK]** and then click the left and right margins of the pupil in the camera image with the black cross hairs. Then click **[Save]** or, in case of an error, **[Repeat]**.

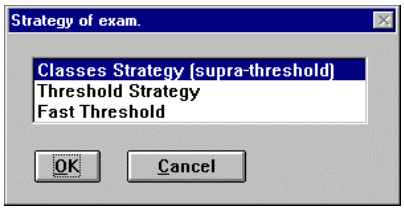


After selecting the menu item "Static in dialog" the user is questioned about the following points one after another; however, they can also be adjusted directly:

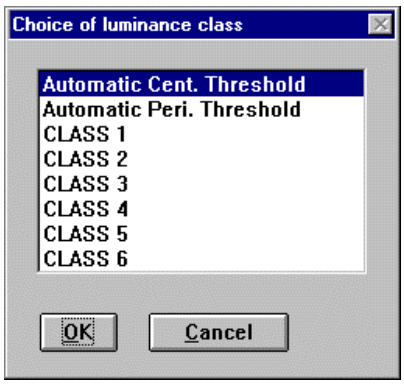
- **EYE**
  Specify the eye to be examined in the **"Which eye?"** window.



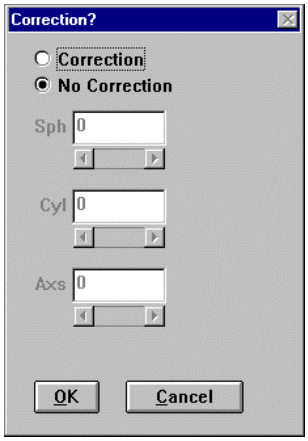
- **STRATEGY**
  Here you can select the examination strategy of your preference in the window **"Strategy of exam."** window.



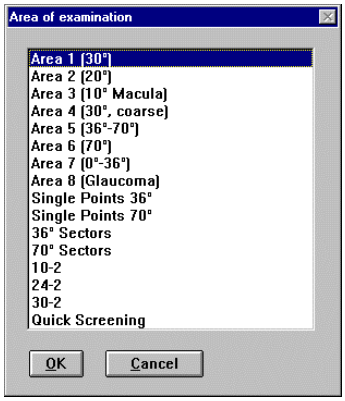
- **Lum. Class.**
  Use the **"Choice of luminance class"** window to select luminance class 1-6 directly.
  The LC is automatically determined when **"Automatic Cent. Threshold"** or **"Automatic Peri. Threshold"** are selected, (cf. page 32).



- **CORRECTION**
  A correction value which is to be used during the perimetric examination can be selected in the **"Correction"** window.



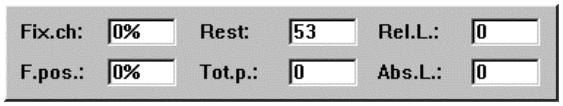
- **AREA OF EXAMINATION**
  The **"Area of examination"** window permits you to select the area which you desire to examine.



7.2.3 Information Boxes

The contents of the boxes LAST NAME, FIRST NAME and DATE OF BIRTH are entered by the patient data management program.

After selection of the standard, gray-scale or sectional profile displays a window (at the upper right) appears showing data which are relevant for the examination. These data cannot be changed. Specifically, they are:



1. **Static examinations:**
   - **Fix.ch:**
     The fixation check. Fixation is checked frequently during the examination. This takes place in dependency on parameters selected in the "Settings" menu either by means of the central threshold value which was individually measured at the beginning measured or by means of fixation monitoring in the blind spot with the Heijl-Krakau method. A result of 100% means that all fixation presentations were answered correctly. A minimum of 70% should be achieved here.
   - **F.pos.:**
     The rate of correct responses, which should also be above 70%, is a further indicator of reliability.
     Explain to the patient before beginning the examination that a test point will not necessarily appear after each movement signal.
     If the hand-held control key is pressed even though no test point was shown, the program registers this as an erroneous response.
   - **Rest**
     The number of test points which remain to be tested.
   - **Totp.:**
     Sum of all presentations.
   - **Rel.L.:**
     The sum of all relative field defects found.
   - **Abs.L.:**
     The sum of all absolute defects found.

2. **In kinetic examinations:**
   - **Meridian:**
     The meridian of the current test point position.
   - **Eccentr.:**
     Eccentricity of the current test point position.
   - **Rest**
     Number of test points which remain to be tested.
   - **Tot.p.:**
     Sum of all presentations.

7.2.4 How to Carry Out an Examination

7.2.4.1 Prepare for an Examination

For the preparation of the examination please cover the eye which is not to be examined with the occluder. Take care that the patient is sitting comfortably.
For the positioning of the patient's eye please follow the instructions below:

1. The patient now places his forehead on the headrest, so that he can see with the eye to be examined the four fixation marks. The patient has to fix his gaze on the centre of the four marks.

2. Now check the correct height of the eye by observing the patient from aside and directing him, in order to place his eye which is to be examined exactly in the middle between the upper and the lower edge of the lens. - The exact height is marked on the housing.

3. Observe the camera image, and direct the patient into the correct position (only to left and right), in order to place his pupil in the centre between the right and left bar of the red square.

4. Now adjust the right distance of the patient's eye by means of the adjustment knobs at the headrest, and orientate yourself by the camera image, until the pupil is within the red square.

5. Please check once more the height of the patient's eye from aside, and, if necessary, repeat the steps 2 - 4.

7.2.4.2 General Remarks

The patient can interrupt the examination at any time by continuously pressing the signal button. The examination then continues automatically as soon as he again releases the button. The examiner himself can interrupt the examination by pressing the right mouse button.

This opens the following window:

Press the **[Continue]** button to continue the examination.

Please make sure that the pupil is in the centre of the red square again when the examination is continued.

The examination time is shown continuously during the examination.

7.2.4.3 How to Work With the Keyboard

You can change settings directly with the keyboard during the course of the program:

- **Brightness of the CCD camera**
  The keys "+" and "-" change the brightness of the camera in 10% steps. Pressing the "+" key increases the brightness of the camera image, "-" darkens it.

- **Pupil diameter**
  Use the "p" key to enter the subprogram for measuring pupil diameter (cf. 7.2.2).

- **End Program**
  Use the "ESC" key to return (after a question whether you really wish to exit from the program) to the patient data management program.

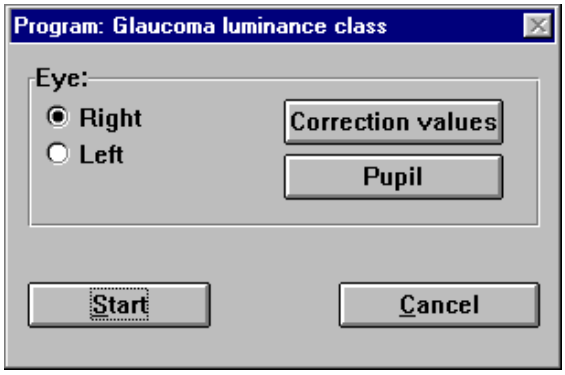
- **Version number**
  The "V" key shows the version number of the examination program.

7.2.4.4 Color Perimetry

Yellow-blue perimetry (SWAP = Short Wavelength Automated Perimetry) is particularly well-suited for detecting juvenile maculopathy and glaucoma patients under the age of ca. 40 years. The problem of blue absorption by the lens appears frequently in older patients; this makes it difficult to distinguish in the examination results between visual field defects which result from retinal damage and which result from blue absorption by the lens.

7.2.4.5 Static Perimetry / Quickstart

OCULUS provides ready-to-use programs which you can start with a single click. From the menu bar, select Program and then the desired item. As per delivery this software package includes the programs **Glaucoma luminance class**, **Glaucoma threshold**, **Driver's license test**, **Macula luminance class**, **Macula threshold** and **Screening**. Now the following window appears:



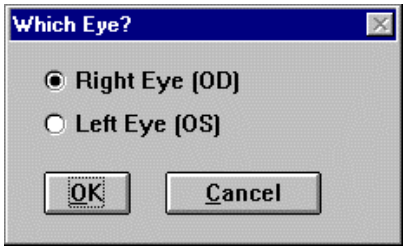
Select the eye to be examined and adjust Correction values and Pupil diameters as necessary. Clicking on the **[Start]** button then starts the examination.
The programs are described in detail in chapter 7.2.6 on page 38.

7.2.4.6 Static Perimetry with Manual Parameter Selection

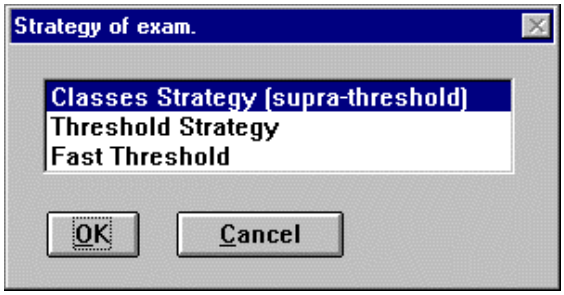
Select the heading "Examination" in the menu bar in order to carry out a static examination. Now you can select **"Static (In Dialogue)"**, **"Static (As set)"**, and **"Re-examination"**. During **"Static in dialog"**, all data which are relevant for the examination are determined by successive questions, and the examination then starts. **"Static (As set)"** uses the parameters which have already been set (cf. 7.2.2) and starts the examination.
"Re-examination" uses the parameters of the previous examination.

7.2.4.6.1 How to Select Examination Parameters

First select the correct settings for the eye which you wish to examine and confirm them with the **[OK]** button.



Now select the desired strategy from the "Strategy of exam." window. The following strategies are possible:



- **By classes**
  This suprathreshold, threshold-adapted strategy contains six different luminance classes which are adapted to retinal threshold sensitivity (in 5 dB steps). A distinction is made here between recognized luminance classes and relative and absolute defects. Relative and absolute defects are marked with corresponding symbols.

- **Threshold strategy**
  Precise threshold values are determined in the 4/2-step mode.

- **Fast threshold strategy**
  The threshold value is determined by using the results of neighboring points.

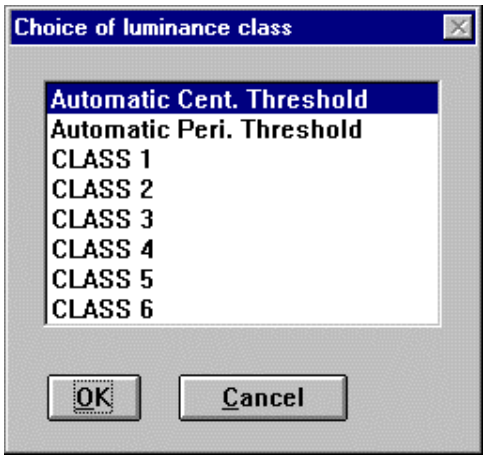
The next window is **"Choice of luminance class"**.

"Automatic central threshold"
This item determines that the central threshold value will be determined after the start of examination. The most suitable luminance class for the examination is then set automatically on the basis of the result. Knowing the threshold luminance of the central visual field is of great importance for various reasons, e.g. for determining the initial brightness as an individual starting value for each patient. Here too, the most suitable luminance class is automatically assigned on the basis of central threshold measurement.

Once measured, the threshold value is displayed together with the corresponding luminance class which has been selected. This test can also be used as a learning phase for the patient. You can repeat this measurement as often as desired should the result appear unacceptable for any reason. Each luminance class is allocated to a specific region of threshold luminance in the center or on the 15° circle (cf. Table 1).

Automatic peri. threshold
This item determines the threshold values at approx. 15° of eccentricity at 4 points according to the area selected. The best threshold value is then used for selection of the most suitable luminance class for the examination.

Classes 1-6
After selecting the class strategy you can measure the luminance class again directly.

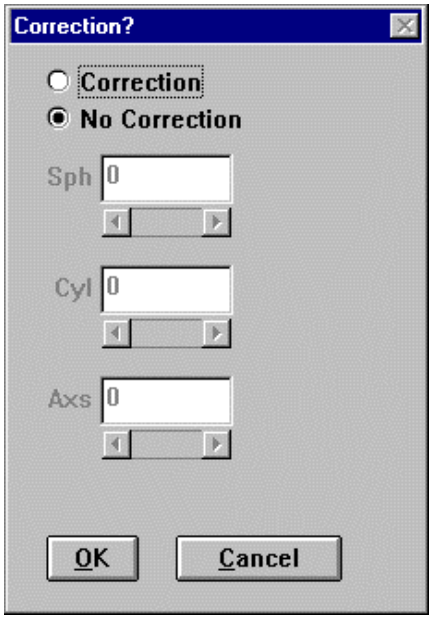


Central threshold luminance measurement TC	Central threshold luminance measurement at the 15° meridian T15	Selected luminance class	Symbol
38<TC<30	<22	1	□
30<TC<25	22<T15<17	2	⊡
25<TC<20	17<T15<12	3	▥
20<TC<15	12<T15< 7	4	⊞
15<TC<10	7<T15< 2	5	▦
10<TC< 0	2<T15	6	■

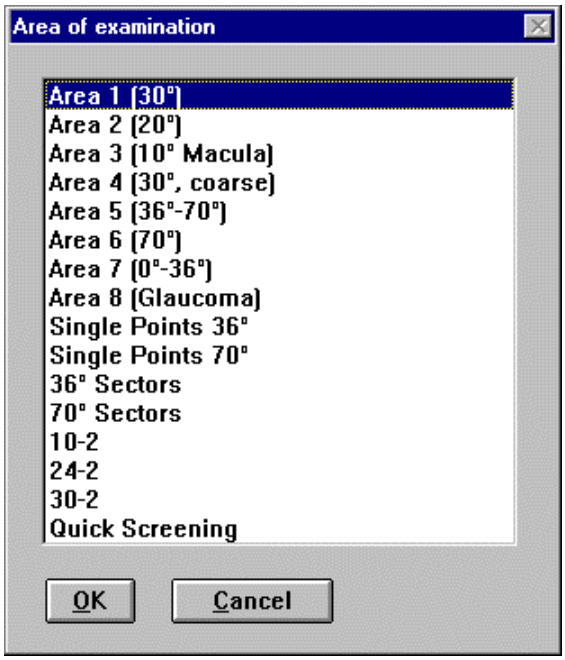
Table 1

Relationship between central threshold luminance TC and at the 15° circle T15 and the 6 luminance classes in the central visual field area.

If a near correction is used, enter it now in the **"Correction?"** window. Use the corresponding thin-rimmed lenses in the prescription lens mounting.



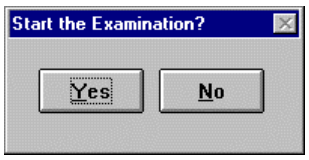
Now select the desired **Area of examination** (grid) (cf. chapter 7.2.2).



If necessary, change the parameters for dot color, presentation duration, interval duration, point size and pupil diameter (cf. Chapter 7.2.2).

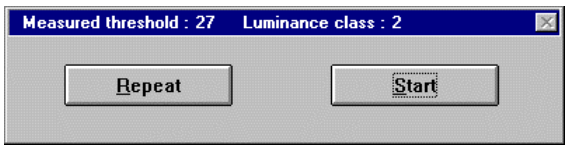
7.2.4.6.2 How to Start the Examination

After the examination parameters have been entered and **"Static in dialog"** or **"Static as pre-selected"** has been selected, the following window appears:



Check the fixation of the patient eye again (cf. Chapter 7.2.4.1) and confirm with the **[Yes]** button.

Now the central (or peripheral) threshold is measured (cf. Table 2), and the luminance class which has been determined (unless it was preset) is displayed).



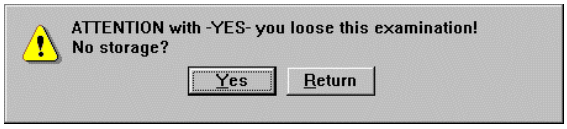
Clicking the **[Start]** button now starts the examination.

7.2.4.6.3 How to End the Examination

After completion of the examination the following window appears:

You can save the examination results immediately by selecting the **[Save]** button, or you can carry out a subsequent test, e.g. in order to determine the size of a scotoma more precisely. To do this, select the **[Supplementary]** button.
Already examined points will not be examined once more (exception: single points and sectors), therefore it is not recommendable to choose the same area for re-examination. Points wich seem to be implausible can be re-examined by choosing single points.

If you inadvertently activate the **[No save]** button, you can correct this in the next window with the **[Go back]** button.



7.2.4.7 Kinetic Perimetry

To carry out a kinetic examination, select the heading "Examination" in the menu bar. Now you can choose **Kinetic (automatic)**.

Kinetic (automatic) automatically examines any desired number of isopters according to the Goldmann standard.

7.2.4.7.1 Kinetic Symbols

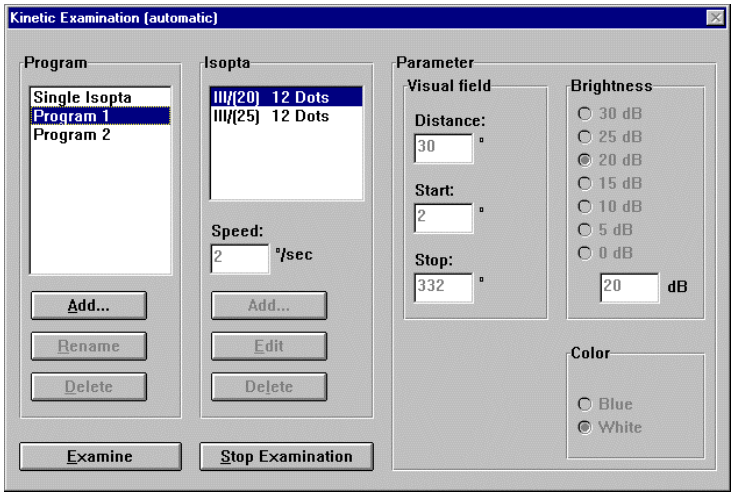
Symbols are assigned to the points which are measured according to their brightness and size. Specifically, these symbols are:

Brightness	Stimulus size III
0 dB (1000 asb)	▽(III/4)
5 dB (315,0 asb)	○(III/3)
10 dB (100,0 asb)	◁(III/2)
15 dB (31,5 asb)	◇(III/1)
20 dB (10,0 asb)	▷
25 dB (3,15 asb)	□
30 dB (1,0 asb)	△

Table 2

7.2.4.7.2 Automatic Kinetic Perimetry

After selection of the menu heading **"Kinetic (automatic)"** the following window appears:

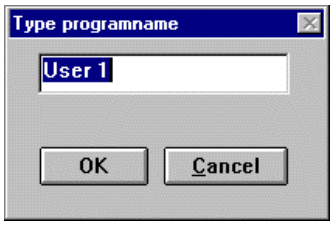


Program Selection

Select the program of your choice from the **"Program"** group. Each program may contain any desired number of isopters. These are listed in the **"Isopters"** box. You will find the exact parameters of isopters in the **"Parameter"** area.

User-defined programs

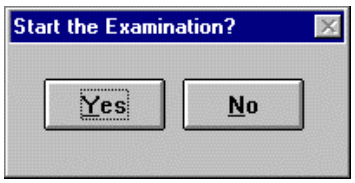
You can define programs yourself if you wish to examine a personally selected set of isopters. To do so, click the **[Add...]** button in the **"Program"** area and enter a name for the desired program in the window which then appears.



If you select the new program from the list in the "Program" area, you can then add the desired of your choice. To do so, click the **[Add...]** button in the "Isopters" area. Isopter III/4 is automatically shown as a standard. If you wish to assign other parameters to this isopter, click the **[Edit]** button in the **"Isopter"** area. The boxes in the **"Parameter"** area are then available to you for adjustment (cf. 7.2.4.7.2, page 35).

How to Start the Examination

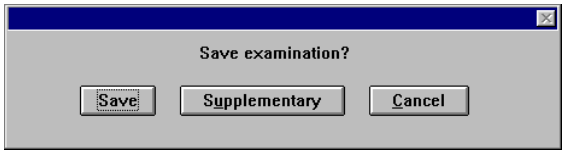
Activate the **[Examine]** button in order to start the examination. You are then given an opportunity to check the fixation of the patient eye again. Answer the following window with the **[Yes]** button.



How to End the Examination

The **"Kinetic (automatic)"** window again appears after completion of the examination. Now you can examine with other isopters or bring the examination to a close. If you wish to examine with other isopters, select the corresponding program and activate the **[Examine]** button again. The examination comes to an end if you select the **[Stop examination]** button.

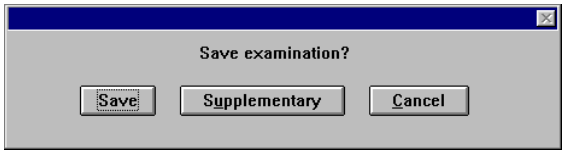
In the window



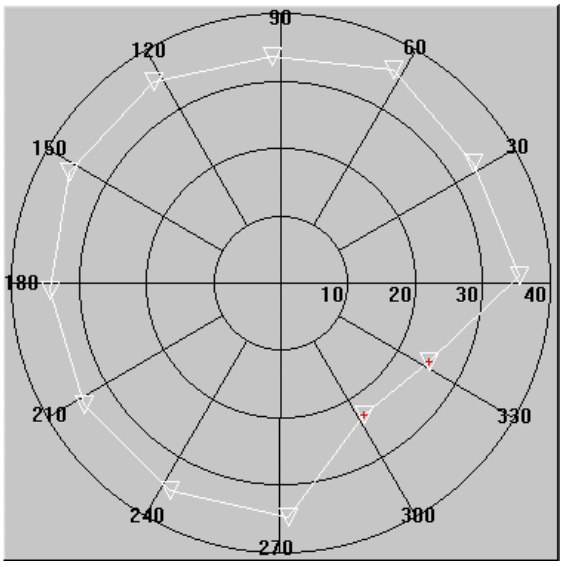
Click **[Save]** if you are satisfied with the data. The data are not saved if you click **[Cancel]**.

Re-examination

If you believe that some of the points which you have examined do not fit the findings, you can re-examine these points individually.



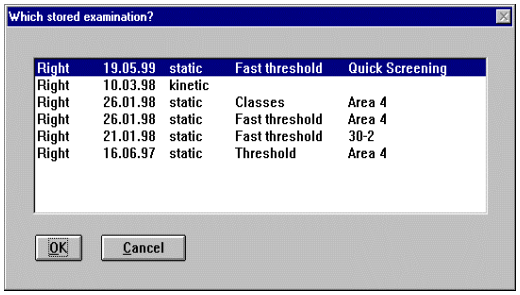
To do so, click the **[Supplementary]** button in the following window and then select the point which you wish to examine simply by clicking it with the mouse. These points are then marked with a red cross.



Use the right mouse button to complete your selection of points.

7.2.5 How to Load Stored Examinations

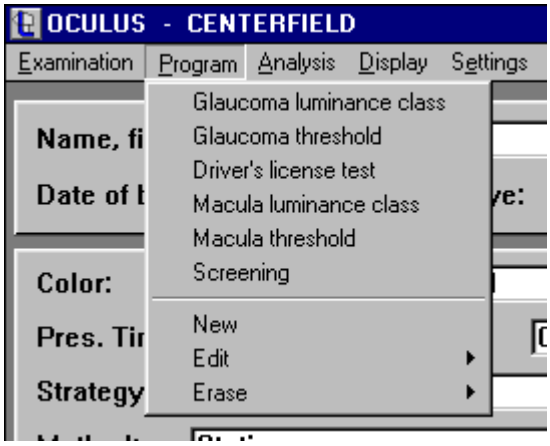
Select **"Examination"** from the menu bar and then the item **"Load stored examination"**.



Now select the desired examination and click the **[OK]** button.
The examination is then displayed.

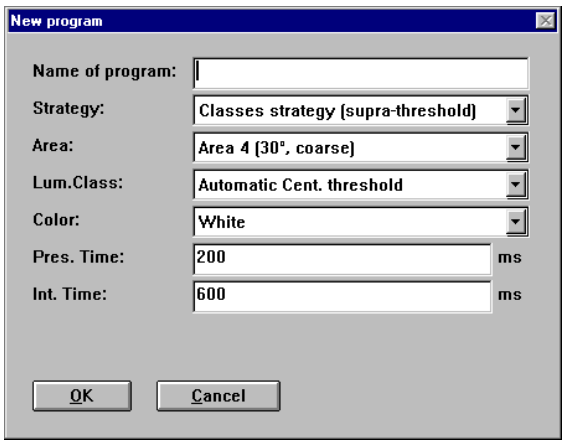
7.2.6 Static Programs

You can speed up your examinations by saving frequently used examination parameters (area, strategy, presentation duration, etc.) in a program. Programs created in this way can be saved and called up at any time. This saves you the tedious work of having to enter each single parameter before an examination. The following programs have default preconfigurations:
Glaucoma luminance class, **Glaucoma threshold**, **Driver's license test**, **Macula luminance class**, **Macula threshold** and **Screening**.

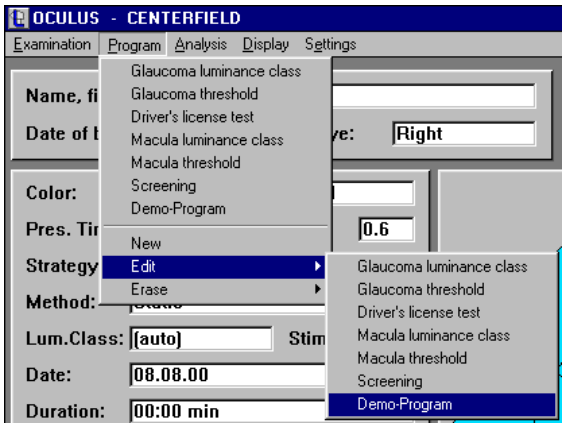


From the menu bar, select **Program/New** to create your own program.

Enter a meaningful program name and select the desired items from the displayed examination parameters.



Now click **[OK]** to save your new program. You can now select the new program from menu item **[Program]**.
It is also possible to edit or delete existing programs. To do so, select **Program/Edit** or **Program/Erase** and highlight the desired program name.

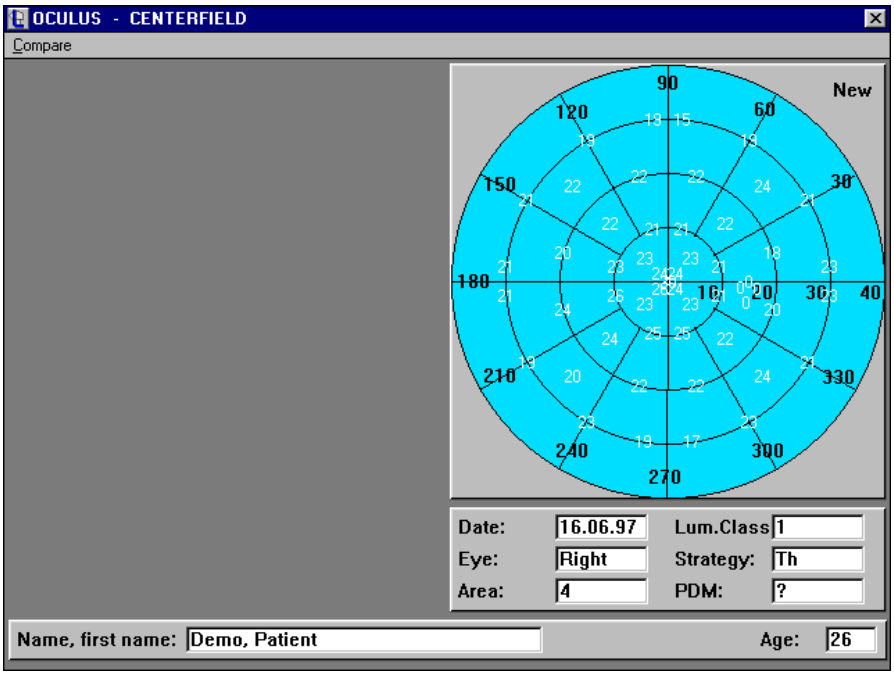


7.2.7 Analysis

The menu item **"Analysis"** offers you the possibility of comparing examinations and evaluating them statistically.

7.2.7.1 How to Compare Examinations

Select **"Compare"** in the **"Analysis"** window. The menu bar and the contents of the window then change:



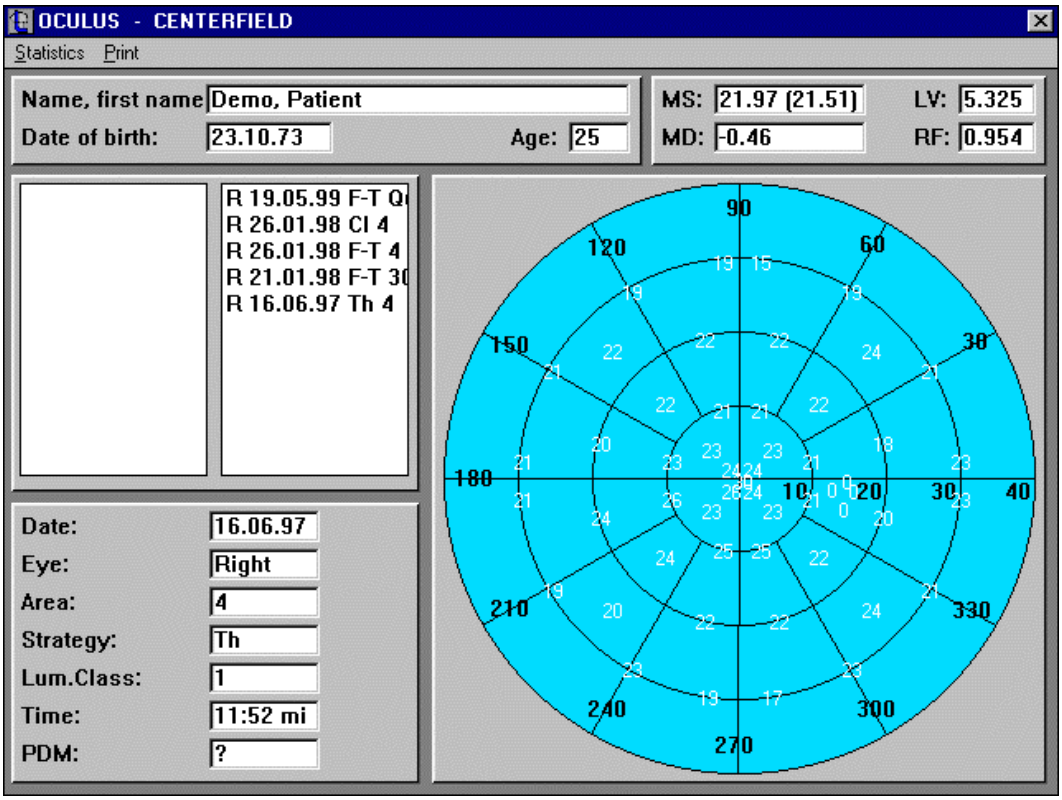
The current examination is shown on the right (New). If the stored data set contains an examination of the same date on the other eye, this is automatically displayed on the left (Old).
You can display two examinations next to each other on the screen. The previously stored examination is always shown on the left, the new one on the right. To select a stored or a new examination, click **"Compare"** in the menu bar and then **"Stored"** or **"New examination"** as the case may be. The selection is carried out as described in Chapter 7.2.5. Examinations of the left and right eyes can also be displayed here next to one another. This makes it easy to recognize homogeneous visual field defects rapidly.

In order to compare the two examinations select **"Show comparison"**. The two examinations are now shown above each other, and the comparison display is generated. The value 0 means that the result at that point has not changed. A plus value indicates an improvement, a negative value a deterioration at the corresponding point.

You can make a printout of the current screen contents at any time by selecting the menu item **Print (screen)**. By selecting the menu item **Print (international)** you can also make a reduced, detailed printout of both eyes. **Preview (international)** shows the detail printout on the screen.
Back returns you again to the examination display.

7.2.7.2 Statistical Evaluation

You can receive a detailed statistical evaluation of one or more examinations by selecting **"Analysis"** from the menu bar and then the item **"Statistics"**.
The menu bar now changes to show both **"Statistics"** and **"Print"**. The current examination is displayed in the window with the statistical data MS, MD, LV and RF. In addition, all static examinations of the current patient are shown in two lists. The left list contains all examinations of the left eye, the right one all examinations of the right eye. This display is designated in the statistics subprogram as the main display. If you wish to evaluate another set of examination results, select the menu item **"Statistics"** and then **"Select"** (cf. chapter 7.2.5).
You can generate a "screen shot" printout at any time in the **"Statistics"** subprogram by selecting the menu heading **"Print"** and then **"Screen"**.



7.2.7.2.1 Statistical Data

- **MS (Mean Sensitivity)**
  This is the mean sensitivity of all previously determined threshold values. (Underlying this is the mean sensitivity level of normal values in relation to the age group and the examined patient. If the normal value is below that of the patient, his or her result is better).

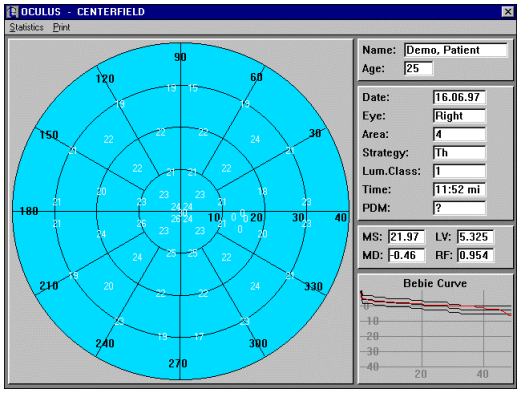
- **MD (Mean Defect)**
  The mean sensitivity loss is derived from the difference between the normal value and the MS value which has been determined for the patient. If MD is negative, the mean sensitivity which has been determined is better than the norm for that age.

- **LV (Loss Variance)**
  The loss variance shows how homogeneous the entire visual field is and whether individual areas clearly deviate from the rest of the results. No major inhomogeneity is present if this value is below 25. The value would then be viewed as normal.

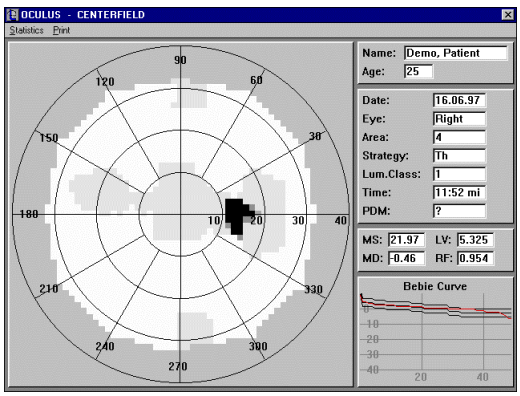
- **RF (Reliability Factor)**
  This factor combines the results of monitoring the patient's responses, his central fixation, and his fixation with the Heijl-Krakau method. If the patient's cooperation is acceptable to very good, the result should lie between 70% and 100% (i.e. a value between 0.7 and 1.0); this means that on the average 70% to 100% of the response checks and fixation monitoring questions were correctly answered.

7.2.7.2.2 Statistical Display of Examination Results

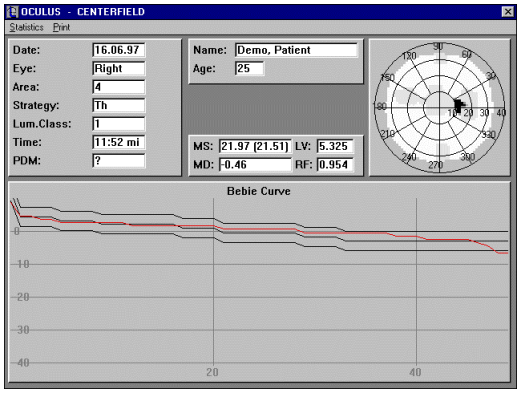
- **Numerical Full-screen Display**
  The result is displayed here in dB numbers if a normal or rapid threshold examination was carried out. The cumulative defect curve is also displayed on the right side of the screen.



- **Full-screen Gray-scale Display**
  If desired, you can select a gray-scale display in place of the dB numerical display.



- **Cumulative Curve of Visual Field Defects** Shows the corresponding cumulative curve of visual field defects. A small view of the gray-scale display is also present as an inset.



7.2.7.2.3 Cumulative Curve of Visual Field Defects (Bebié curve)

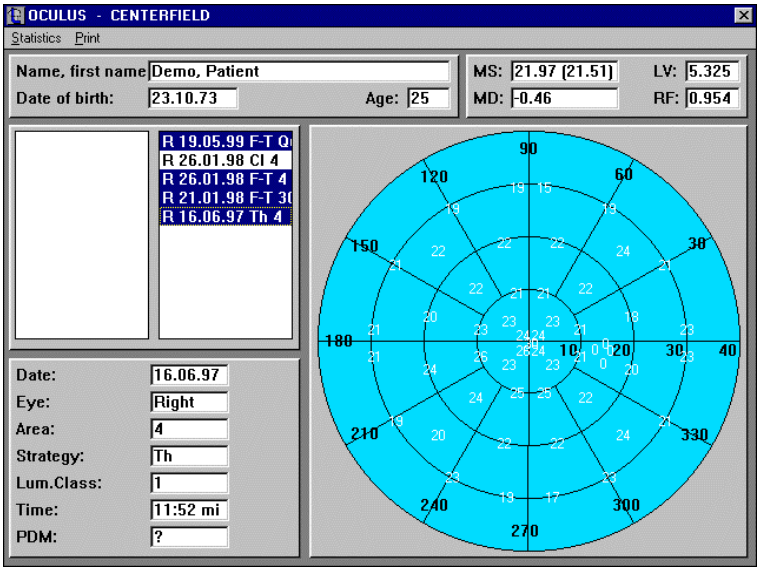
The cumulative defect curve shows the examination results "without addresses", i.e. the positions of the individual measuring points are not included in the curve. Deviations in the threshold values are sorted in descending order from left to the right.

dB values are shown on the abscissa, the number of the test points on the ordinate. Three black curves in the "normal" area display a plus/minus range of tolerance. The red curve represents the evaluation of the current measurement.

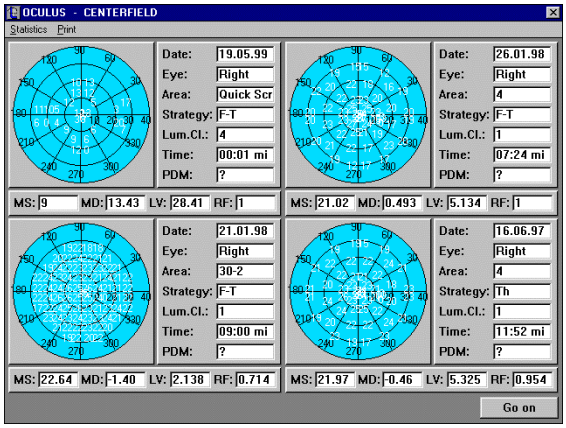
7.2.7.2.4 Progressive Display

If you have examined a patient over a longer period of time, you can show the progression of the examination results. To do so, select from both lists in the **Main display** the examinations which you wish to view by clicking them.
You can now select one of three possible forms of progressive display. The following applies to all three forms of display:

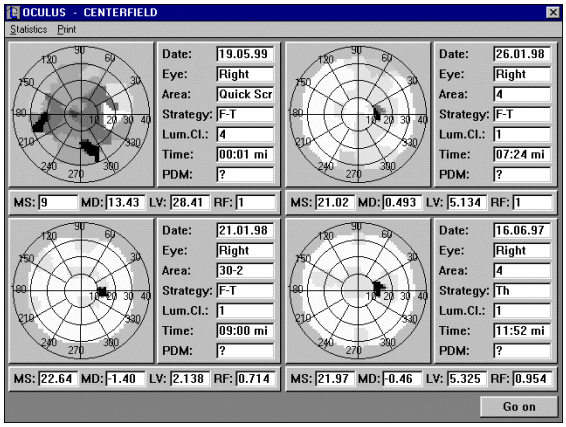
- If only examinations of a single eye were selected, they are shown sorted by date in both halves of the screen.
- If examination of both the left and right eyes were selected, those of the left eye are shown on the left, those of the right eye on the right.
- If more than four examinations in total or if more than two examinations of different eyes were marked, the missing examinations are shown in each case after the **[Go on]** button is clicked.



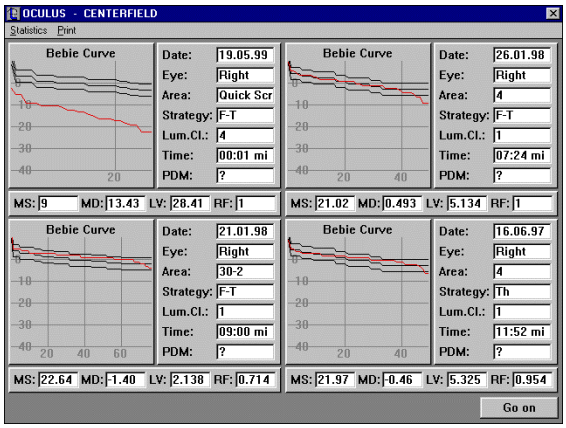
- **Visual Field Examination Progression**
  Displays examinations with numeric threshold values or symbols of the various classes.



- **Gray-scale Image Progression**
  Displays gray-scale printout values of the respective examinations (this is helpful only in threshold examinations).

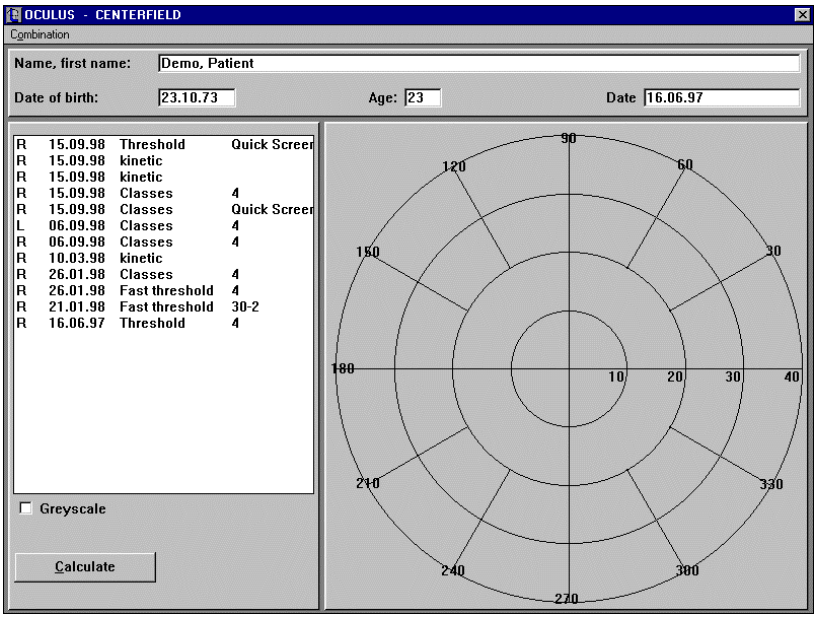


- **Cumulative Defect Curve Progression**
  A presentation of the cumulative defect curves of the corresponding examinations (only helpful in threshold examinations).

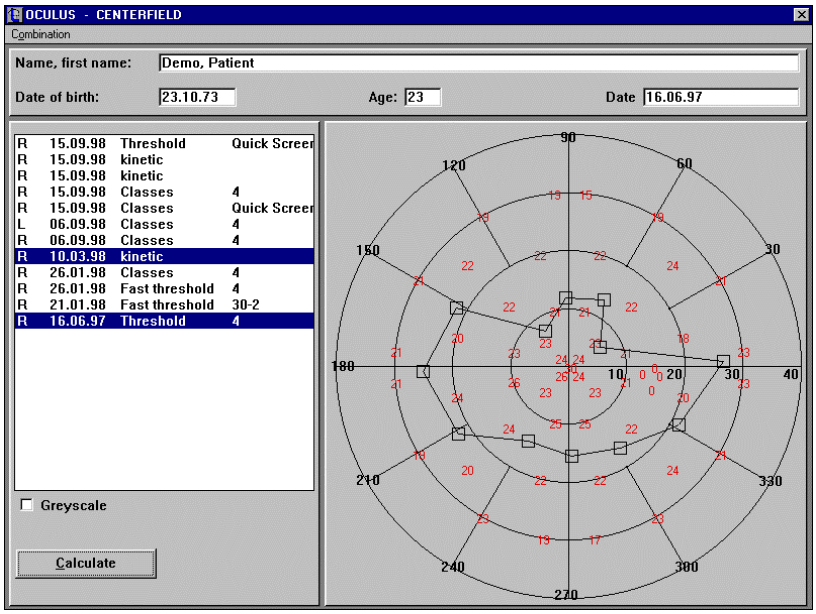


7.2.7.3 Combination Display

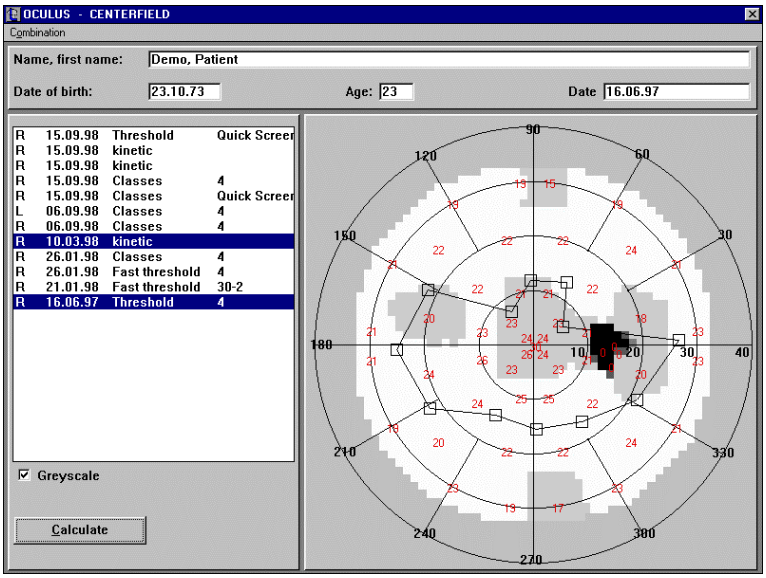
Different examinations can be presented as a unified system of coordinates. This is useful, for example, in peripheral kinetic and central static examinations. For this purpose, click **"Analysis"** in the menu bar and then **"Combination"**. The menu bar now contains the heading "Combination", and the contents of the window change. The left side shows a list of all examinations for this patient.



Mark the desired examinations in the list and activate the **[Calculate]** button. The selected examinations are now sketched as a unit into the system of coordinates (on the right).



If a threshold value examination is among the selected examinations you can also activate the **"Grayscale"** box. After pressing the **[Calculate]** button the threshold value examination is now shown as a gray-scale printout.



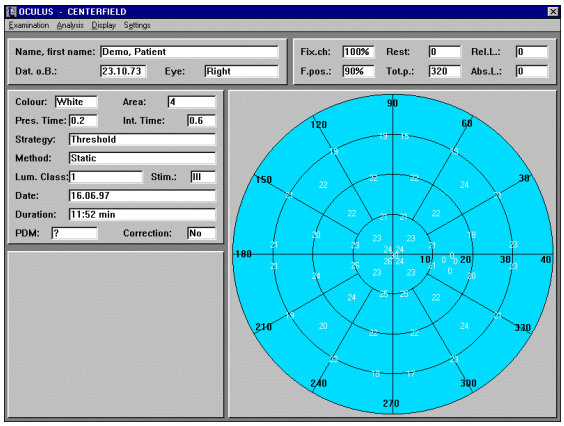
You can generate a “screen-shot” printout at any time during the "Combination" subroutine by selecting **"Combination"** and then **"Print" (screen)** from the menu bar. **"Go back"** returns you again to the examination display.

7.2.8 Displaying Examination Results (On the Screen)

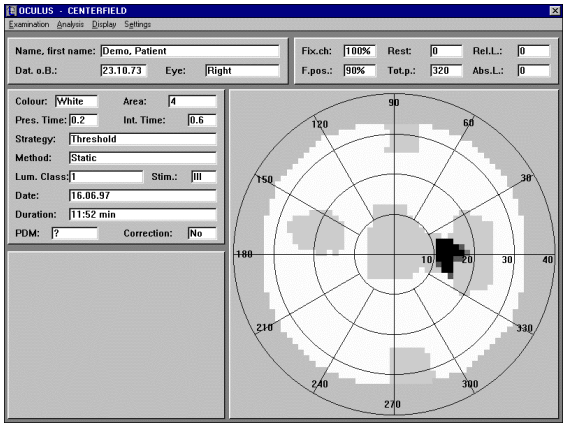
You have several options of displaying examination results graphically in the CENTERFIELD program.

For this purpose, select one of the following items under the **"Display"** heading:

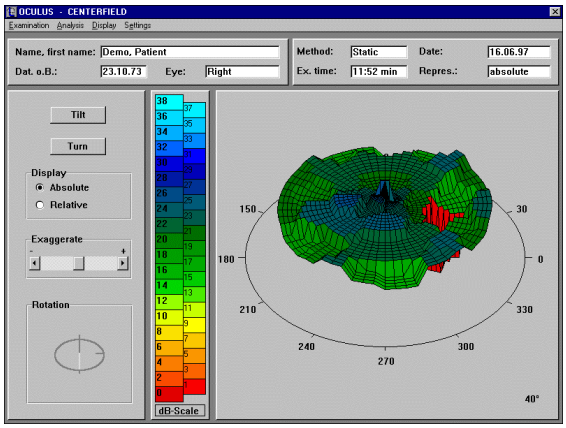
- **Standard**
  Displays selected stored examination results in standard mode.
  When displaying a kinetic examination in standard mode, you can receive the precise coordinates and parameters of any point which was measured by clicking that point with the left mouse button.



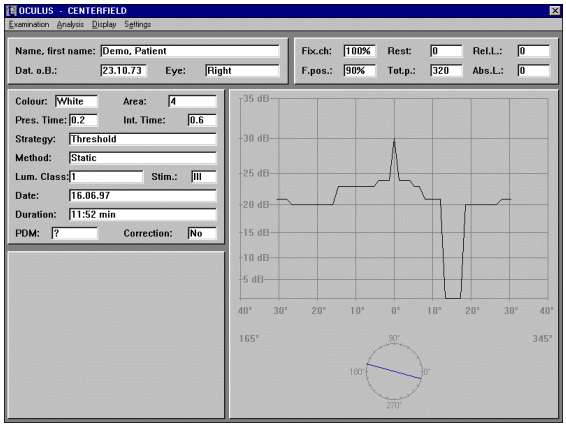
- **Gray-scale**
  Permits you to view threshold strategy results in the form of a gray-scale printout.



- **3D**
  The 3D display lets you view the selected examination as a visual field "hill", i.e. in three dimensions as it were. This display form is particularly helpful in explaining the visual field to the patient. The following buttons help you in doing so:
  - ♦ **Tilt**
    The 3D image is tilted up and down horizontally. This permits visual field defects to be viewed from above.
  - ♦ **Turn**
    The visual field is rotated back and forth from left to right.
  - ♦ **Absolute or Relative**
    Setting the display "Absolute" generates a color distribution of 0 to 38, where "0" is the absolute visual field defect of the patient in red and 38 is the highest displayable sensitivity. The scale extends from -19 to +19 in the relative mode and shows deviations in comparison to the highlighted normal value group.
  - ♦ **Exaggerate**
    The "Exaggerate" option permits the entire visual field to be displayed more graphically.
  - ♦ **Rotation**
    Here the visual field display can be moved freely through space. To do this, click into the field **Rotation** and keep the left mousekey pressed. The movement of the mouse to the right/to the left causes a rotation, the movement up or down causes a tilting of the field of view-hill.



- **Sectional Profile**
  This function serves to display a sectional profile which is calculated form the examination results. The in sectional profile which is desired in each case can be selected below the graphic display with a 360° axis in 5° steps: move the mouse arrow to the degree of your choice and click once to view the desired sectional profile. The blue line shows the current sectional profile.



All presentations can be scaled to 10°, 20° 40° and 70°. To do this, choose in the menu **"Display"** the according field.

7.2.9 How to Print Out Examination Results

You can generate a printout of the screen contents no matter how the examination results are displayed. Select the menu item **"Examination"** and then **"Print" (screen)**.
However, it is more interesting to make an "International" printout of the current examination results, since it includes a printout of more detailed information which is not always present in every screen display.

7.2.9.1 Preview international

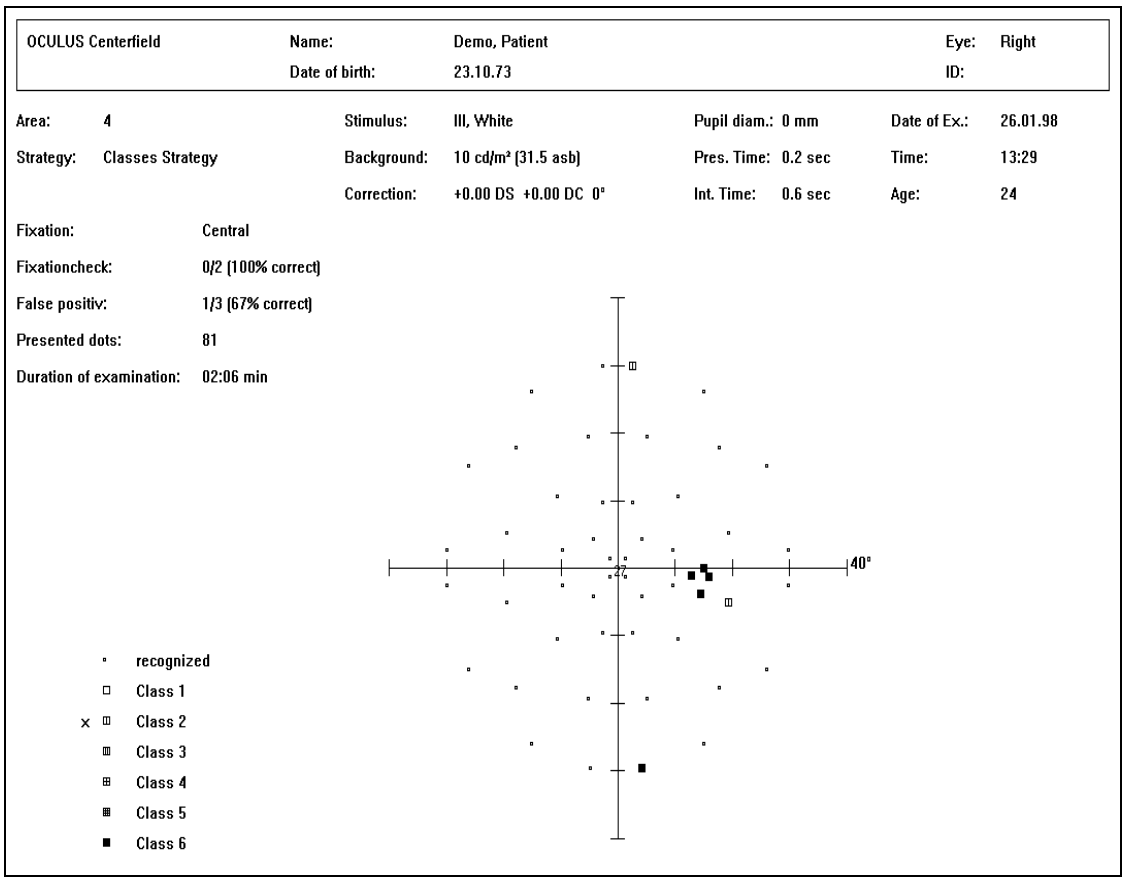
Before you transmit the international printout to the printer, you can display it on the monitor. To do this, choose in the menupoint **Examination** the field **"Preview (international)"**. These kinds of display can be adapted in the menu point **"View"** to **"100%"**, **"50%"**, **"Page preview"** and **"Actual width of page"**. Is the resolution too bad, you can move the image to see the areas not yet visible. To do this, click with the mouse on the image and keep the left mousekey pressed. Now turn the image by moving the mouse in the desired direction.

7.2.9.2 Sample Printouts (International)

The structure of the printout varies slightly, depending on the strategy which is used.

7.2.9.2.1 Examination with the "Classes" Strategy

This printout contains not only data of the patient and the specific examination but also a graphic image in which the points which were examined are marked on a coordinate system with "Class" symbols. These symbols are explained in a table at the lower left of the printout. A cross at the left of this table shows the luminance class found during the examination.



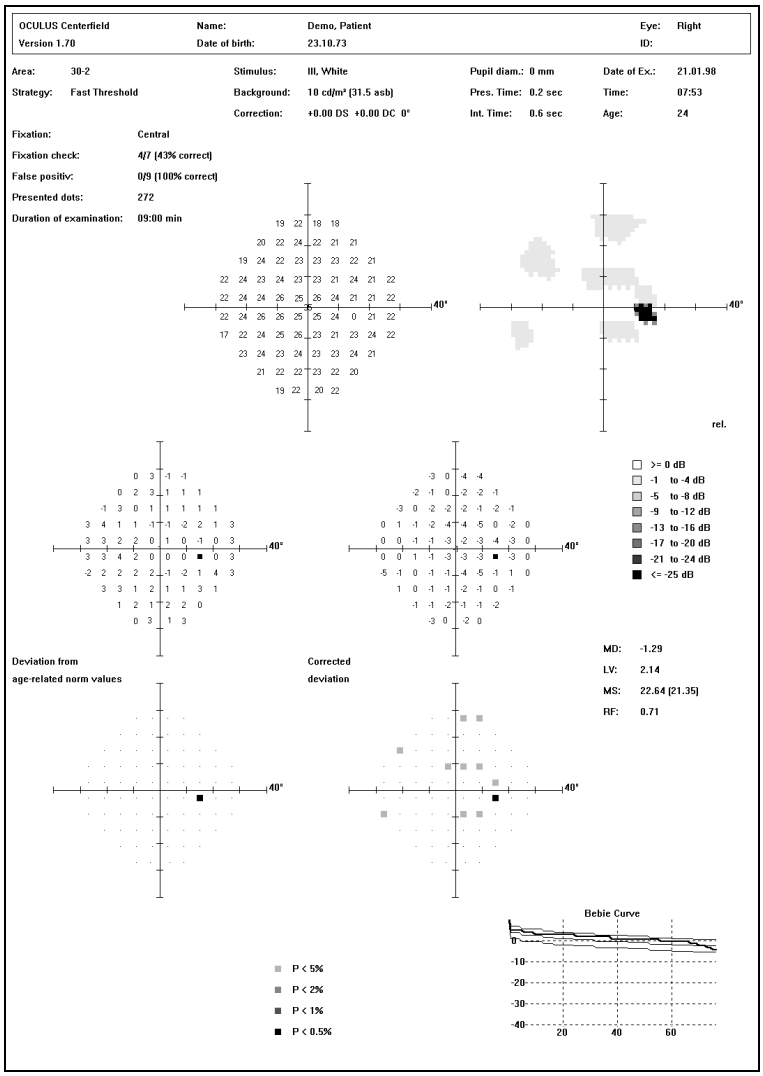
7.2.9.2.2 Examination With a Threshold Strategy

Six graphic images are plotted into this printout. The main graphic image (at the upper left) shows the threshold values which were found; the resulting gray-scale printout is next to it. The smaller printouts at the left show the deviations of the measured threshold values from the normal values for the patient's age group. - Positive numbers mean that the patient's perceptive ability is better than the norm, negative values mean that it is below the norm. Solid squares show a complete defect.

The smaller printouts on the right side show the corrected deviation, i.e. the visual field "hill" is raised or lowered in such a way that the generalized deviation is no longer visible (eg. cataract). - The visual field defects which are now displayed correspond to local damage.

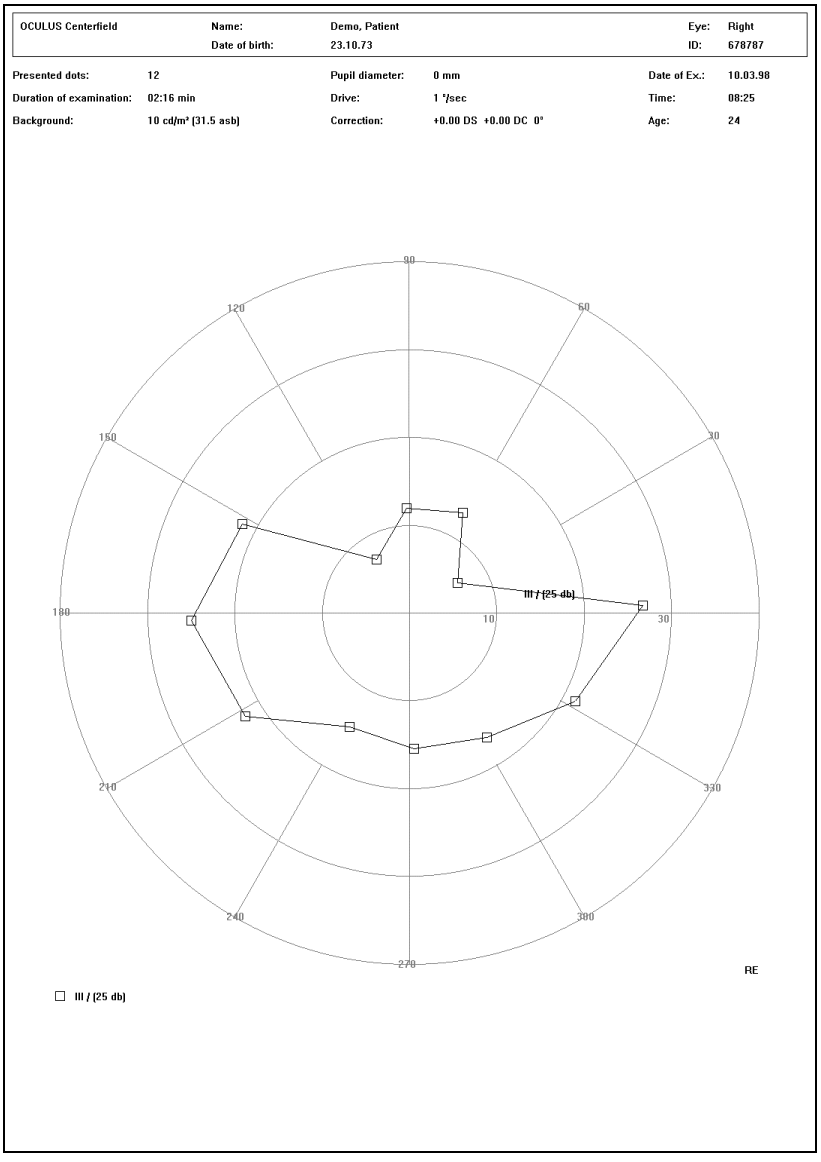
The two images at the bottom are a graphic display of the deviations which are shown in numerical form above. These numbers are translated into gray-scale symbols as follows: the darker the symbol the less likely it is that the visual field is normal at this location. As the legend at the bottom of the illustration here shows, for example, a black square indicates that the chance is less than 0.5% that this deviation will occur in a normal person.

The statistical values MD (Mean Defect), LV (Loss Variance), MS (Mean Sensitivity) and RF (Reliability Factor) are printed out on the right along with the graphic images. A negative MD means a better-than-normal result.



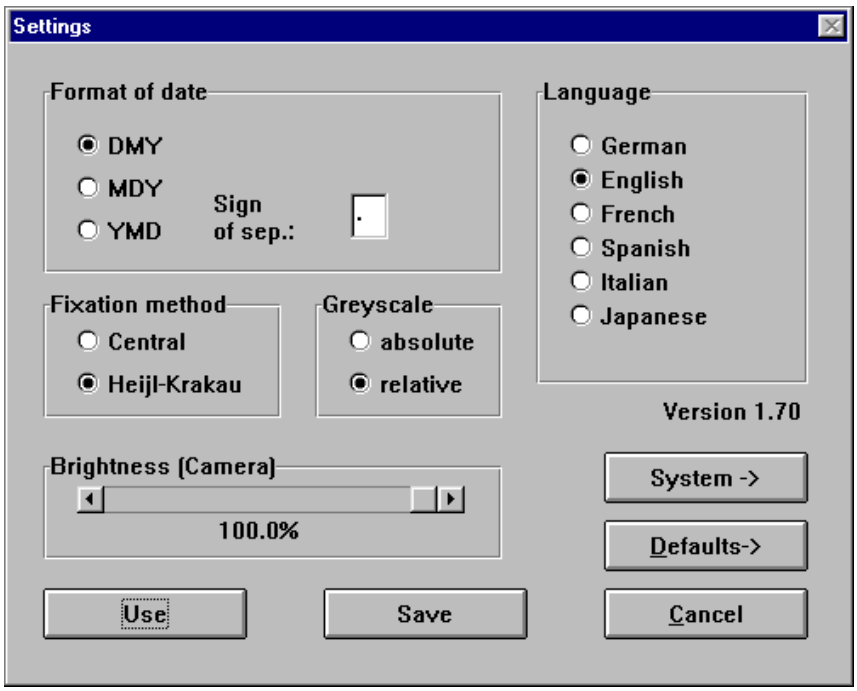
7.2.9.2.3 Kinetic Examination

The kinetic printout contains both a graphic image and data of the patient and the specific examination. The individual isopters which have been examined are connected by lines in the graphic image. The points on an isopter are designated according to brightness and point size by a clearly recognizable symbol (cf. Table 2, page 35). These symbols are explained at the lower left of the printout.
The eye which was examined is identified at the lower right of the graphic image (RE = Right eye, LE = Left eye).



7.2.10 Settings

Program-specific settings (date format, language, fixation method, camera brightness) can be adjusted with the **"Settings"** item of the main menu.



- **Date format**
  Select the date format and the separating punctuation sign used in your country. The letter "D" stands for "day", "M" for "month", and "Y" for "year".

- **Fixation method**
  Use this area to set the fixation method used during static examinations. Fixation monitoring with the **Heijl-Krakau** method presents a stimulus to the blind spot at regular intervals. If the stimulus is recognized, the response is regarded as "false" and is incorporated into the evaluative checks of fixation. The **Central** Fixation Check offers at regular intervals a stimulus which is 8dB brighter than the measured central threshold value. The response counts as false if the stimulus is not recognized.

- **Greyscale**
  Here you can choose between an absolute and a relative grey scale for your printouts. Absolute assigns a fixed grey tone to each measured dB value, while Relative highlights large deviations from the stored normal value collective with dark grey tones.

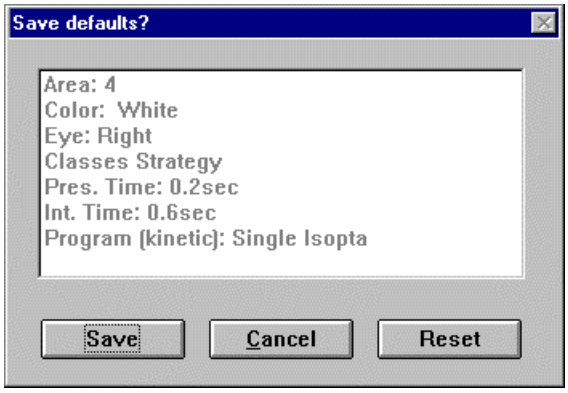
- **Camera brightness**
  You can adjust brightness with the slide bar if the camera image of the eye is too dark or bright.

- **Language**
  Select the language in which the program is used.

Click the **[Use]** button if you wish to use the settings only temporarily.
Click the **[Save]** button if you wish to use the settings permanently.
The **[System->]** button opens a further window in which you can modify settings of the system. These settings have been pre-selected by OCULUS and should not be changed.

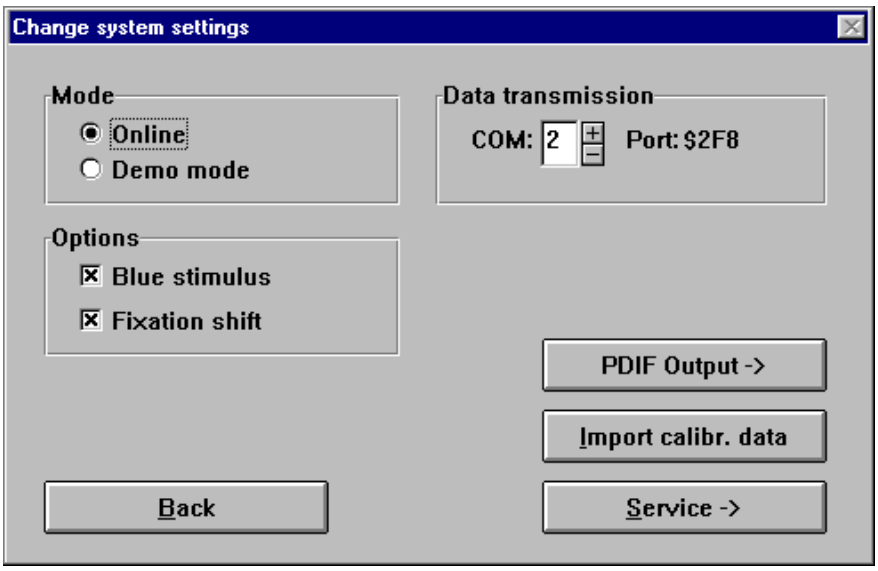
7.2.10.1 Store standard values

If you often use the same area and strategy, you can leave those values as standard (default), so that the perimeter chooses these values automatically after each start. To do this, click the field **[Default->]**.
In the following window the present settings are displayed. Those can be left as new standard values by clicking the field **[Save]**.
If these values do not comply with your standard examination, click the field **[Cancel]** and choose new values in the main window.
With the switch **[Reset]** those values will be changed to the OCULUS-standard.



7.2.10.2 System settings

After pressing the button [**System->**] the window **System settings** appears.



- **Mode**
  The examinationprogram can be used with and without the device.

  If the switch **mode** is switched to **Demo mode**, than the software can not control the instrument, so it is not possible to make measurements. But it is possible to evaluate stored examinations (e.g. loaded from network)

- **Options**
  If the device has got an additional blue projector the switch **Blue stimulus** must be activated.
  If the perimeter has got additional fixation markers to measure the peripher visual field the switch **Fixation shift** must be activated.

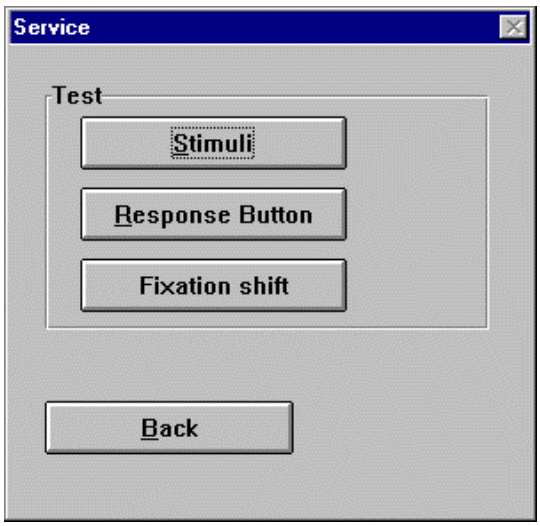
- Data transmission
  Set the number of the used COM-port which is connected to the Centerfield-perimeter.

To activate the option of additionally issuing examination data in PDIF format, click the [**PDIF output ->**] button.

If a systemcrash causes a new set up of the software the specific calibration data has to be copied to the computer too. To do this press the button [**Import calibr. data**] and follow the instructions.
By pressing the button [**Back**] you go back to the window **Settings**.
The button [**Service->**] enables you to check the device hardware.

7.2.10.3 Service functions

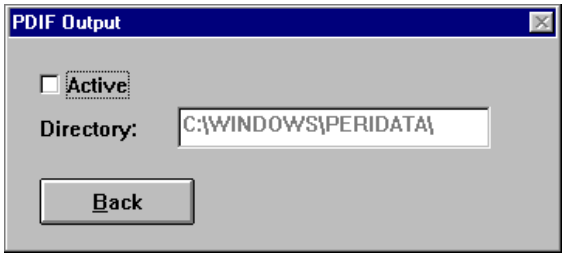
If the button **[Service->]** is pressed the following window appers:



Press the button **[Stimuli]** to test all projectors (white and blue (option)).
To test the response button press **[Response button]**.
Press the button **[Fixation shift]** to test the additional fixation markers (option).

7.2.10.4 The PDIF Format

Clicking the **[PDIF ouput ->]** button produces the following window:



Here you can activate the PDIF format used by Peridata by clicking on the **Active** check box. The default directory for data output is `C:\WINDOWS\PERIDATA\`.

Note: The PDIF format is only defined for threshold value examinations. Classes and kinetic examinations are not exported.

Click **[Back]** after carrying out your changes.

8 Recommended Examination Areas

8.1 Main Examination Areas

8.1.1 Glaucoma Program With Dense Test Point Grid

Area 1
30° with dense test point grid. Glaucoma program with luminance class strategy. Eccentricity 0°-30°, a total of 188 stimulus presentations, central visual field area with very dense grid. Examination time: 7-12 min. This important program is designed for all examinations in which localized visual field defects are expected up to 30° in the central and paracentral visual field area. This program should be used with very high test stimulus density in particular to detect small visual field defects. The dense test point grid should be used with the luminance class strategy (Lc) especially for glaucoma (G.)

Examples:
Loss of nerve fiber function in:
- Glaucoma (Bjerrum scotoma).
- Retinal embolism.

Chorioretinis juxtapapillaris.
Central, paracentral and centrocecal scotomas.
- All types of macular degeneration with centric and eccentric fixation.
- Diseases of the optic nerve.
- Small paracentral bitemporal and homonymous visual field defects.

Concentric constriction in which the perimeter of the intact visual field islet is within the 30° visual field.
- Advanced pigmentary retinopathy.
- Other degenerative retinal diseases.

8.1.2 Reduced Visual Acuity of Unknown Origin

Area 4
0°-30°, with coarse visual field grid. 53 test points. Examination time: ca. 2-4 min. with luminance class strategy, ca. 6-8 min. with rapid threshold strategy, 8-10 min. with the classic threshold strategy.
This area is helpful during the initial examination and provides a rough overview of the 30° visual field. With regard to the number of test points, both the luminance class strategy and the normal and rapid threshold strategies are appropriate for this examination grid.

Area 5
36°-70°, 47 test points in the peripheral visual field. Examination time: ca. 2-4 min. with the luminance class strategy.
This is a helpful supplement to Area 1 for examining the entire visual field and completely displaying scotomas beyond the 30° visual field.

Area 6
0°-70°, 54 test points in the 0-30° area, 50 test points for the visual field between 31° and 70°.
Examination of the entire visual field, with lower resolution in the 30°-area (overview screening examination). The periphery is examined as in area 5. Examination time: ca. 4-8 min.
Use:
1. When normal findings are expected, e.g. for written evaluations of ability to work (driver's license appraisals, evaluation of fitness for police work, evaluation of fitness for work as airplane pilot etc.).
2. Used for all rough superficial examinations, usually of visual field defects in the periphery, e.g. quadrant and unilateral defects.
3. Also used to provide preliminary orientation in medical certification of blindness.

Area 8
0°-30°, glaucoma threshold grid with 66 test points; used especially in a study of normal values.

Area 3
0°-10°, with central higher resolution. Dense test point grid. All 69 test points are used for exact detection of the macula.

Area 2
0°-20° eccentricity. 128 test points for a check of already known visual field defects.

Individual 36° and 70° locations
This function permits you to select individual stimuli with a dense grid from 0°-30° or 0°-70°. To do so, move the mouse arrow to the area which is to be examined, keep the left mouse button pressed, and move the mouse as desired over the test locations which are of interest. Confirm your selection of test points by pressing the right mouse button.

The 36° or 70° sector
This function permits you to select specific sector areas. Click counterclockwise to designate the desired sector (e.g. click first at 30°, then at 90° in order to select the 30°-90° sector).

8.1.3 Other Areas

30-2
0°-30°: symmetric grid with 77 test points. This grid can be combined with the "Classes" strategy and with normal and rapid threshold tests.

24-2
0°-24°: symmetric grid with 55 test points. This grid can be combined with the "Classes" strategy and with normal and rapid threshold tests.

10-2
0°-10°: symmetric grid with 69 test points. This grid can be combined with the "Classes" strategy and with normal and rapid threshold tests.

Quick Screening
0°-30°: 27 test points. The duration of examination is ca. 45 to 90 seconds with the luminance class strategy.

9 Strategies of Static Perimetry

The test point grid (area) is only one of the legs on which perimetry stands; it merely preselects locations at which the patient's luminance difference sensitivity (LDS) is to be determined. Truly informative perimetric findings are achieved only by presenting test stimuli of different brightness in order to derive conclusions about the threshold of luminance difference sensitivity at each grid location. This procedure is called the "examination strategy".
The Oculus Centerfield possesses three examination strategies, each of which can be used with each area (or grid).

9.1 Class Strategy

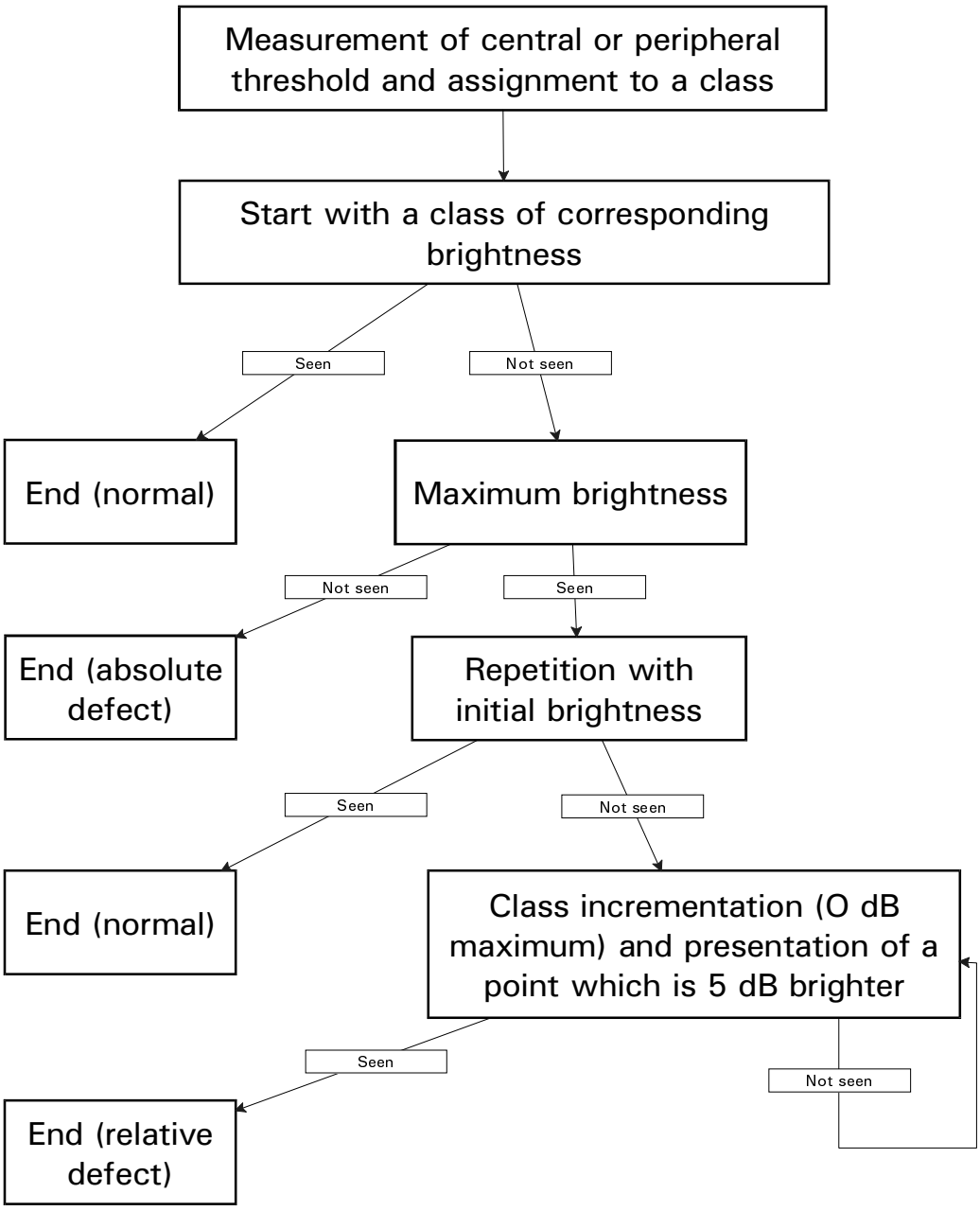
Threshold-oriented - i.e. suprathreshold - strategy deliberately foregoes exact determination of the luminance difference sensitivity threshold at each location examined; rather, it determines deviations from the individual normal curve after an initial examination; in this way it localizes defects. This strategy thus makes it possible to examine a great many locations in a relatively short time and to detect even small scotomas.

At the beginning of the examination, the patient is assigned to a class after measurement of his central or peripheral threshold. The Centerfield possesses 6 luminance classes at increments of 5 dB, so that it can adapt perfectly to different sensitivity levels. Each luminance class corresponds to a collective body of sensitivity values for the anticipated visual field hill.

A suprathreshold test stimulus of 5 dB is presented at each location which is examined (preliminary presentation). For example: a point with 7 dB is presented if a sensitivity of 12 dB is anticipated. The point is classified as normal (small square) if the point is recognized by the patient (he presses a button manually), and the program proceeds on to the next point.

If the patient fails to react to the point, it is presented again (second presentation) at maximum brightness (O dB = 318 cd/m^2). If the patient fails to recognize this point as well, the software classifies an absolute defect at this location (large, solidly colored square) and proceeds to the next point.
If the maximum brightness has been recognized, the point is again presented with the same brightness as the first time. The point is classified as normal if the patient now reacts (by pressing the button manually). - This presentation is equivalent to a repetition of the first presentation.
If the patient fails to react, the point is allocated to the next class and is presented 5 dB brighter, corresponding to the expected brightness of this class. If the point is seen, the program marks it as having been seen at the corresponding luminance class (refer to **Fehler! Unbekanntes Schalterargument.**, page 32 for the class symbols). If the point was not recognized it is again assigned to the next higher class (etc.).

The Class Strategy proceeds according to the following plan:



9.2 Threshold Strategy

The "Threshold Bracketing Strategy", as it is also called, determines the threshold value as precisely as possible at each grid location. It must be remembered here that the physiologic LDS threshold is not a mathematically precise threshold but rather a transition area between "recognition" and "non-recognition" of a test stimulus. Within this transition area, the probability of recognizing a test stimulus increases or diminishes depending on whether it is presented as bright or dark. There is thus no "precise" LDS threshold value; rather, the threshold which is determined with a perimeter must be regarded as having a small factor of uncertainty; this amounts to 2-3 dB, depending on the eccentricity of the measurement location. A reliable statement about the LDS threshold can be reached only through repeated determination and subsequent, appropriate calculation of the mean value.

The threshold strategy almost always requires far more presentations for exact measurement of the test point. It should therefore not be used with dense grids, since the resulting time required for examination places too great a burden on the patient.

At the beginning of the examination, as in the class strategy, the central or peripheral threshold is measured in order to arrive at an approximate estimate of the peak of the visual field hill which is to be measured. This procedure yields quite serviceable starting values for the examination.

The Centerfield Perimeter first extracts 5 points from the selected gird and examines them in isolation, in order to present suprathreshold points as rapidly as possible. - The patient would promptly tire if a large number of points were to be presented below threshold. Looking at a smaller number of points in isolation has proven to be inadvisable: the examinee requires a certain readaption interval in order to recognize a point which has been presented first above threshold and then dark again, since the subsequent point is "blanked out" by the previous, brighter point.

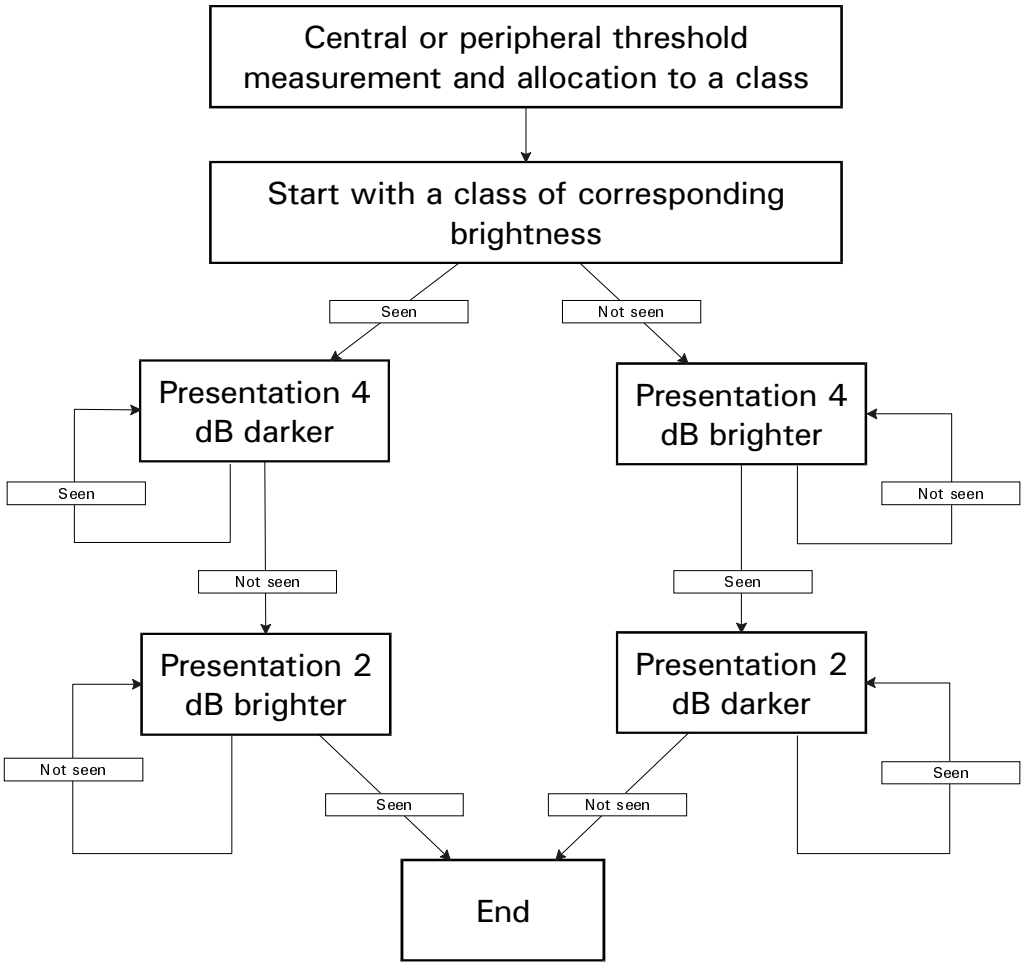
After completing its examination with these points, the program automatically continues with the next five points.

If a point is regarded by itself, the strategy is as follows:

The program first presents the point at the expected sensitivity (corresponding to the class).

Then the point is "narrowed down" corresponding to the 4 dB / 2 dB strategy.

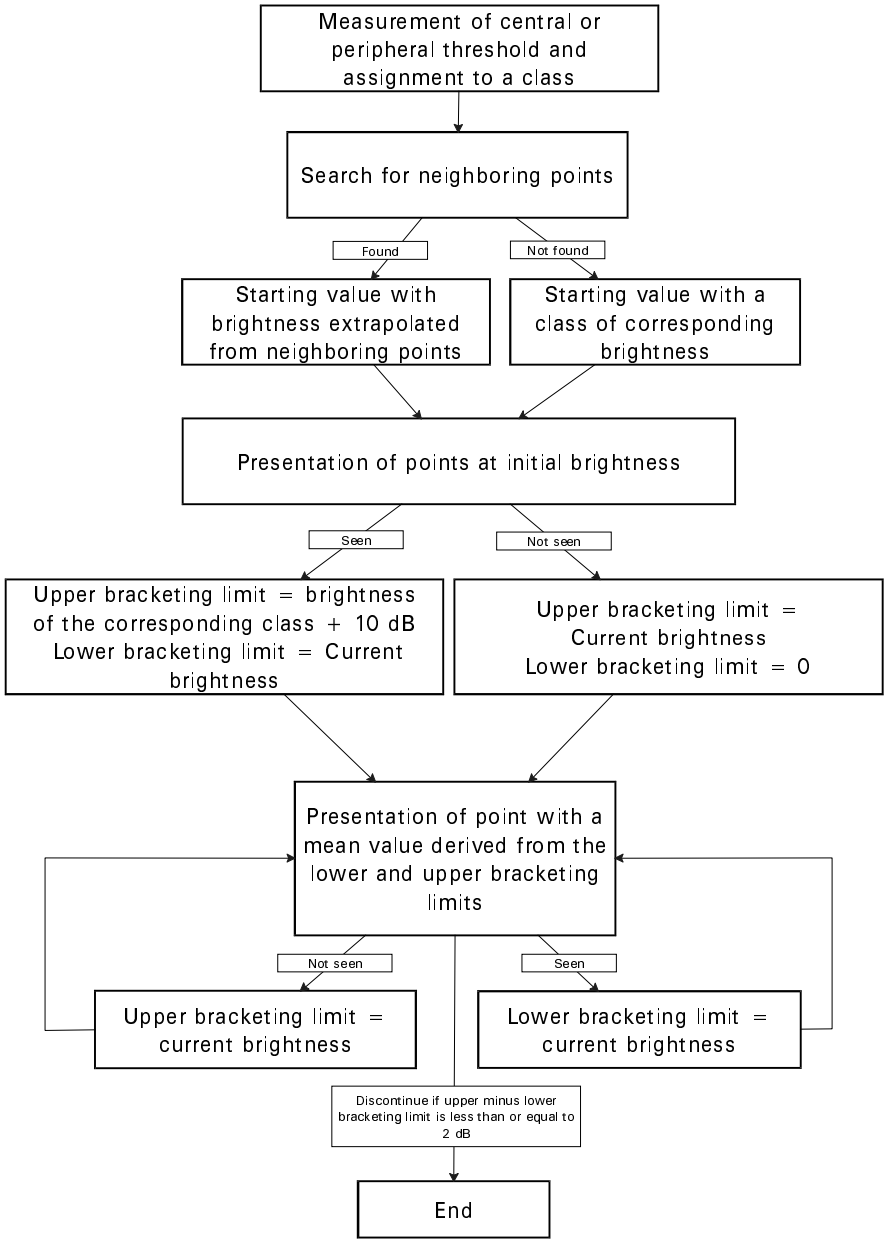
This looks as follows in the flow chart:



9.3 Rapid Threshold Strategy

This strategy too is used to determine the threshold value at each grid location.
In contrast to the threshold strategy, five points are not regarded here in isolation, but rather the visual field is examined as a whole. The problem of making presentations "too long below threshold" does not arise with this strategy, since the threshold value which is sought is determined by using a mean value derived in each case from a presentation at maximum and minimum brightness. - In addition, this strategy uses the results of points already examined in the immediate vicinity of the points currently undergoing examination. The Rapid Threshold Strategy is less informative than the Threshold Strategy if the patient's answers are false, but comes to the same results if his cooperation is good, while being considerably faster.

Procedural Flow Chart



10 Maintenance

10.1 Care, Cleaning and Disinfection

Always disconnect the mains plug before cleaning the unit!

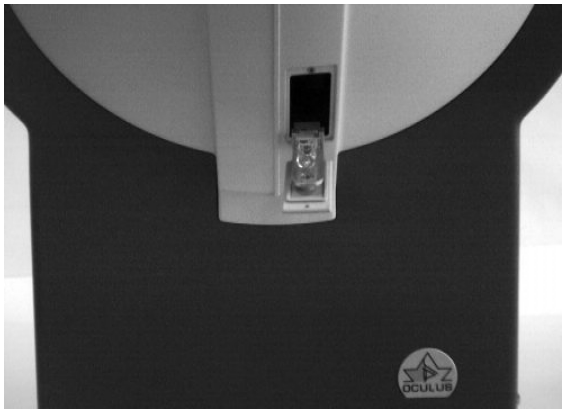
Do not clean the unit with agents which are aggressive, contain chlorine, are abrasive, or have sharp edges.
Always take care to observe the product descriptions and instruction manuals of agents and equipment which you use for the care, cleaning and disinfection of the unit or its accessories.

- **Cleaning the forehead rest**
  Clean these parts with soapy water (or alcohol in case of heavy soiling) and a damp, lint-free cloth.

10.2 How to Change the Background Lamp

Before changing the background lamp please exit from the program and switch off the unit properly with the mains switch.

At the lower part of the front housing with funnel is the cover for the background lamp. Open this cover carefully with a screwdriver and remove it by pulling down. Touch the background lamp with a towel and pull it out of the socket.



The background lamp may still be hot. - Let it cool off first!

Remark: Use only a type 05160320 halogen bulb (12 V, 5 W) for replacement.

Insert the new background lamp into the socket, making sure not to touch the glass bulb with your fingers.
After the replacement of the bulb place the cover on it again and fix it.

10.3 How to Replace the Fuses

Always disconnect the mains plug before replacing the fuses!

The unit's two fuses are located in a small fuse drawer which is integrated into the mains input socket at the side of the unit.
Press the tab of this drawer lightly from above and pull out the sliding drawer.

When replacing the fuses use only the fuse type which is designated on the rating plate.

Insert the fuses and push in the drawer until it snaps into place.

10.4 Service and Service Intervals

The CENTERFIELD Perimeter has been constructed in such a way that no special maintenance is required. The electronic brightness regulator automatically adjusts the unit constantly to the correct pre-set levels.

As a precaution, however, we recommend a check of the unit's photometric and electric values every 2 years. Please contact the OCULUS Service department for this purpose.

10.5 Troubleshooting

If a problem occurs which you cannot solve with the following troubleshooting table, please mark the unit "Out of order" and get in touch with our service representative.

Never connect or disconnect a plug while the PC or the CENTERFIELD Perimeter are turned on!

Malfunction	Possible cause	Remedy
No function after the mains switch is turned on, the mains switch does not light up.	The CENTERFIELD is not connected to the mains supply.	Plug the mains cable into the power outlet or the inlet connector for the main power on the CENTERFIELD.
	There has been a power failure or the power outlet is not active.	Inform your electrician.
	The control panel unit or the serial cable of the PC is not correctly connected.	Check that the plug has been correctly connected.
	The unit's fuses are defective.	Replace the fuses (cf. chap. 10.3).
No function after turning on the mains switch, but the mains switch lights up.	The unit was turned on and immediately off again.	Wait 5 seconds between turning the unit on and off again.
The printer does not print.	The connection cable of the printer/PC is not correctly plugged in.	Connect the plug again.
	The ink/toner cartridge is empty.	Replace the cartridge.
The hand-held control unit does not respond when pressed.	The hand-held control unit is not correctly plugged into the socket of the unit and screwed into place.	Check the connection, plug in the plug again and screw it into position.
The camera image is too dark.	The settings for camera brightness are erroneous.	Reset the brightness (cf. chapter 7.2.4.3 and chapter 7.2.10).
The background illumination is not on.	The device is in standby mode.	Move the mouse or press any key.
	The CENTERFIELD program (examination program) is not started.	Start the examination program as described in chapter 7.2.
	The lamp is defective.	Replace the background lamp (cf. chapter 10.2).

11 Terms of Warranty and Service

11.1 Terms of Warranty

In purchasing this unit you have acquired an OCULUS quality product.

The unit was built with care, using high-quality materials and modern production techniques.

You have a 1 year warranty on this unit, beginning from the date of purchase. This warranty includes all defects and malfunctions caused by materials or construction.

Not included in this warranty are malfunctions and defects due to improper use and outside influences.

However, should you have reason for justified complaints within the warranty period, they will be repaired without charge.

These warranty services are valid only if the bill of sale with the date of purchase is included.

All warranty claims are cancelled if manipulations of the unit are undertaken by non-authorized persons, since considerable danger to the user and the patient can ensue from incorrect changes and maintenance.

In case of damage during shipment, please notify the shipping company at the time of delivery or immediately thereafter and have it confirm the damage on the bill of lading, in order that the damage can be correctly processed and repaired.

Our terms of business and delivery apply in the version which is valid on the date of purchase.

11.2 Liability for Malfunction or Damage

OCULUS considers itself responsible for the safety, reliability and serviceability of the unit only if the unit is used in accordance with this Instruction Manual.

The unit contains no parts which require maintenance or repair by the user.

Only the replacement of the bulb and the fuses can be carried out by you. This is described in Chapters 10.2 and 10.3.

No liability whatever is possible on the part of OCULUS if assembly work, additions to the unit, readjustments, maintenance work, alterations, or repairs are carried out on the unit by non-authorized persons or if the unit is improperly cared for or handled.
If the above-mentioned work is carried out by authorized persons, these persons must certify the type and extent of their repair work, including details on changes made in the ratings or the capacities of the unit if required. The certification must bear the date on which the work was carried out as well as the name of the service company and must be signed.

If desired, OCULUS will provide authorized persons with circuit diagrams, replacement parts lists, additional descriptions, and adjustment instructions for this purpose.

OCULUS accepts no responsibility for the ability to function of the examination software running on computers which have not been supplied through OCULUS.

11.3 Manufacturer's and Service Address

You can receive additional information from our service department or from our authorized representatives.

Manufacturer's and Service Address:

OCULUS Optikgeräte GmbH
Münchholzhäuser Str. 29
35582 Wetzlar-Dutenhofen
Tel.: + +49 641/2005-0
Fax.: + +49 641/2005-255
E-Mail: sales@oculus.de

12 Appendix

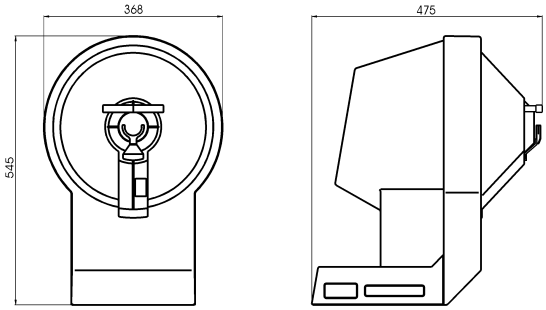
12.1 Technical Data

Mains connection
115 or 230 V AC
47 - 63 Hz
110 VA

Fuses
2x 1.25 AT - 230 V
2x 2.5 AT - 115 V

Weight
10 kg (Centerfield)
14 kg (Centerfield Plus)

Dimensions
(WxDxH) 545x368x475 mm



Interface:
RS 232 / V 24, Sub D

Bowl radius
R = 300 mm (projected)

Meridian
Adjustable from 0°-360°

Eccentricity
To 36°,
to 70° with fixation shift (optional)

Test point Ø
Goldmann III

Test point luminance Ls
Goldmann 1a to 4e and
continuous from 0,1 - 318 cd/m²

Test point color
White
Blue (480 nm)

Presentation duration
0.2 s / 0.5 s / 0.8 s / freely adjustable

Interval duration
0.6 s / 0.9 s / freely adjustable

Bowl luminance Lb
Goldmann-10 cd/m² (32 asb)

Background color
White
Yellow 590 nm (optional)

Classification acc. to IEC Norm 601-1
Type of protection against electr. shock:
Safety class 1
Degree of protection against electr. shock:
Type B
Degree of waterproofing IP 20

Operating conditions
Temperature +10°C to +40°C,
Humidity 30% to 75%,
Air pressure 700 hPa to 1060 hPa

Transport- and storage conditions
(acc. to IEC 601-1)
Ambient temperature -40° C...+70° C
Relative humidity 10%...100%
Including condensation
Air pressure 500 hPa...1060 hPa

12.2 Minimum PC requirements

CPU:	486 DX4 100 MHz
Operating system:	Windows 3.1 or higher
On-board memory	16 MB
Graphic card:	1 MB

12.3 Declaration of Conformity

We declare in our responsibility that this product complies with the following norms or normative documents:

- EN 60601-1
- EN 60601-1-2
- EN ISO 12866

as stipulated by Guideline No. 93/42/EEC for medical devices.

CE

Diploma'd Engineer Rainer Kirchhübel

Managing Director,
OCULUS Optikgeräte GmbH

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