EyeSys System 2000 Software
Operator's Manual

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Classification

Class 1	Protected against electric shock by connecting the equipment to protective earth ground
Type B	Meets the leakage current requirements and the patient applied part is isolated from the equipment
IPXO	Ordinary protection against harmful ingress of water
MODE OF OPERATION	Intermittent — turn off when not in use

O I   OFF/ON (Main Supply)

Protective Earth (GROUND)

Type B Manufacturer Label

ALTERNATING CURRENT (AC)

FOR IDENTIFYING "CRITICAL" INFORMATION

Eyesys 2000 Specifications

Size: 16.75" x 17.25" x 4" (W x D x H)—Base

19.5" x 11.25" x 16.5" (W x D x H)—Manipulator

Weight: 25.5 lbs.—Base

26.5 lbs.—Manipulator

Calibration: 0.25 Diopter

Input Power: 100 - 240 VAC, 50 - 60 Hz, 1.5A

Storage: Temperature Range   5 C - 50 C

              Relative Humidity   20% - 95% rH

              Pressure   500 - 1060 hPa

EyeSys System2000
Software Version 4.0
Operator's Manual

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Introduction

Congratulations on acquiring your new, advanced EyeSys System 2000. We know you are ready to start using your new system. If you are an experienced computer user, you may want to go directly to Chapter 4 of this manual to learn how to start the examination process.

If you have little or no experience with computers, we urge you to read the next two chapters to learn about your system. Chapter 2 acquaints you with your system's hardware: the videokeratoscope, the computer, and printer. Chapter 3 covers the basics of using your system, from powering on to using your EyeSys software and working with screens.

If you using Windows 95 and need to install the EyeSys software on your system, proceed to Appendix A for detailed installation instructions. Although the software will run with either Windows 95 or Windows 3.1, EyeSys recommends Windows 95 due to its capability to run 32-bit applications. If you are using Windows 3.1, two functions—3D Cornea Studio and DirectNet—will not be available because these are 32-bit applications. If you are using Windows 3.1, contact EyeSys Customer Support for installation instructions.

Getting Help When You Need It

EyeSys is committed to providing you with help when you need it. There are three places you can turn for fast access to information:

♦ Online help is available from virtually every screen in your system

♦ This *EyeSys System 2000 Operator's Manual* provides step-by-step instructions on each task

♦ The EyeSys Technical Support Hotline offers knowledgeable, qualified professionals ready to answer technical questions

Online Help

Located on each screen you will find a button with a question mark on it.

This is the Help button. You can click on it anytime to look up information about the screen you are using, a command, or a task you want to perform. Follow these instructions:

1. Click on **?.** A pop-up Help window appears.

   You may click anywhere outside the window to cancel.

2. Click on Index. The Help Index window appears.

   The pointing device arrow turns into a hand when you move over topics in the index.

3. Click on the topic you are interested in. A Topic window appears on top of the Index window.

4. When you are finished reading the topic, click anywhere on the screen. The Topic window closes, revealing the Index window.

5. You may click on Quit to close the Index window or you may choose another topic to review.

Customer Support

Before calling customer support, make sure you know the version number of the software you are using. The version number is displayed on the bottom of every exam display.Eyesys Premier trained service technicians (or anyone trained in an Eyesys Premier Systems course) should contact Customer Support for circuit diagrams, component parts lists, or other documentation to service those parts of the System 2000 Topographer designated as reparable.

The customer support telephone numbers are as follows:

♦ Locally or outside the USA
   6:00AM - 5:00PM Pacific Time

   714-859-0656

♦ Elsewhere in the USA

   1-800-553-0302

Transportation

In the event the system is to be shipped to another location (this does not include moving within the facility), the system must be disassembled and stored in the appropriate shipping cartons.

Follow these procedures:

1. Turn the power on switch to the OFF position and unplug the unit from the wall AC outlet.

2. Disconnect all interconnecting cables.

3. Carefully repack the Base and Manipulator into the appropriate shipping cartons and include all interconnecting cables.

4. Never allow the system to be exposed to temperatures above 58°C.


ⓘ   **Caution**

This equipment weighs more than 20kg. Make sure that you have the proper personnel available to package or move the system to another location. The system must be properly lifted to avoid personal injury.

Getting to Know Your System

EyeSys offers two versions of accurate and reliable corneal topography examination and viewing software. The System 2000 software is used for examinations and viewing, while the ViewStation software is used for viewing only. Both versions of the software can operate in a standalone or networked environment.

A standalone system would consist of a single computer running the System 2000 or ViewStation software. A networked system, as shown below, would consist of one computer running the System 2000 software and one or more computers running the ViewStation software.

In either case, standalone or networked, the computer running the System 2000 software must have an EyeSys Image Acquisition Unit attached for examinations. You will find the hardware reliable, precise, and compact, and the software powerful, customizable, and easy to use. The Primary functions are listed below.
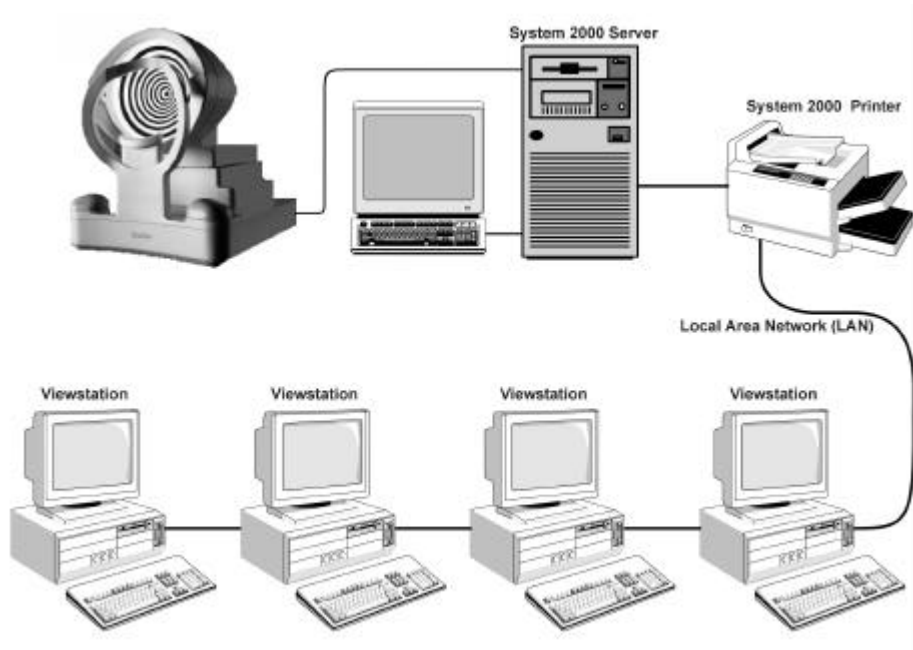
Screen 2-1 Networked System 2000

Primary Functions

- ♦ Captures a high resolution eye image
- ♦ Processes the eye image for accurate exam data
- ♦ Processes exam data into informative color displays
- ♦ Generates displays to show from 1-5 data maps
- ♦ Verifies Focus and Automatic Calibration
- ♦ Exchanges patient data over the Internet with other System 2000 or ViewStation users.

Additional Functions

In addition the system also has provisions for these functions:

- ♦ Saving and managing the exam data in an organized database
- ♦ Exporting and Importing patient data from other EyeSys software versions
- ♦ Reviewing and analyzing saved exam data
- ♦ Using the STARS, Holladay Diagnostic Summary, Difference, Four Map Trend, and 3D Cornea Studio displays.
- ♦ Setting and changing system parameters
- ♦ Customizing exam protocols and displays
- ♦ Contact Lens Fitting

This chapter describes the main parts of your system—the Image Acquisition Unit and the computer. Chapter 3 discusses the basics of using your system, including how to use the keyboard and pointing device.

Image Acquisition Unit (IAU)

An Image Acquisition Unit is attached to the System 2000 computer to record the reflected placido mires on your patient's cornea. Since the ViewStation software cannot collect eye examination data, an IAU is not connected to the ViewStation computer. The IAU features automatic focusing and calibration and consists of four basic parts:

♦ Videokeratoscope

- Backlit conical placido disk

- Three high resolution CCD video cameras

♦ Precision, motorized optical stage manipulator

♦ Precision chin rest assembly

♦ Power base

Computer

The computer required to operate as a System 2000 or a ViewStation consists of the following components:

♦ Pentium processor

♦ Super VGA color monitor

♦ Internal hard drive

♦ 3½-inch diskette drive

ⓘ	**Note**
Under normal operating conditions, this equipment has the potential to produce electromagnetic radiation which may interfere with the proper operation of other equipment. Avoid the use of this equipment where such interference will cause other equipment to operate improperly.	

Floppy Diskette
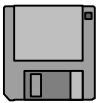
The system floppy drive uses 3½-inch, 1.44-megabyte floppy diskettes, which can store two patient eye images. The diskettes must be formatted before use. Refer to "Formatting Floppy Diskettes" in Appendix C.

System Data Storage

The System 2000 and ViewStation software stores information on the storage drive of the System 2000 computer. This could be the internal hard drive, removable disk, or floppy diskette. This table lists the information stored on the system disks:

Internal Hard Drive Contents	**Storage Drive Contents**

System 2000 software
Microsoft Windows software
Patient Directory
   Patient Personal Data:
     • Name, ID, Sex, DOB
     • Physician, Diagnosis
     • Referring Party, Group
   Patient Exam Data:
     • Exam #, Eye, Date, Time
     • Volume, Comments
	Patient Exam Data Files:
	     • Patient Photo
	     • Eye Image
	     • Pupil data
	     • Curvature data
	     • Side View Eye Image

You can change the drive location of the Storage Drive by referring to "Changing Data Storage and Backup Options" in Chapter 8.

Normally the Storage Drive is either the internal drive or a removable hard or optical disk because these drives are capable of storing the large amounts of data required by the patient exam data files. You can, however, set the Storage Drive to be a floppy diskette if this fits your requirements.

> ⓘ   **Important**
>
> When you perform the various operations in the System 2000 software, it is important that you have the disk containing the correct patient exam data files inserted into the Storage Drive.
>
> The patient exam list on the Patient Locator screen lists the disk volume where the exam is stored. The volume of a disk is the name or label you assign to the disk. You should use the volume to organize your patient exam data files. The volume is added to the disk during formatting. Refer to Appendix C for information about formatting and volumes.

Interconnection of Equipment

This equipment is designed for connection only to other components and systems that have the appropriate medical-grade safety certification for use in a Type B system in accordance with IEC 601-1-1.

> ⓘ   **Caution**
>
> Do not connect this system to any equipment that has not been evaluated, tested, and certified while connected to a patient, or while the equipment is in the vicinity of a patient.

Cleaning of Equipment

It is recommended that the cleaning of the equipment should be done on a periodic basis. Use a soft cloth or sponge and a disinfectant type of cleaner to wipe the unit down. Do not spray cleaner into the vent ports on the sides of the power supply base. Use spectracide, bacterin, or similar product. Follow the directions on the label and DO NOT immerse the unit in liquid to clean.

Learning the Basics

This chapter covers the basics of using the System 2000 or Viewstation software. For new computer users, this chapter is especially helpful to get you going quickly on your new system. This chapter includes the following information:

♦ Your EyeSys software

♦ Using the Screens and Commands

♦ Using Your Keyboard

♦ Powering the System On and Off

♦ Using a Pointing Device

♦ Printing

♦ Using a Joystick

Your EyeSys Software

When started, the software is automatically configured to perform the full functioning System 2000 or the viewing only Viewstation. The difference between the two is immediately noticeable as shown by the Main menus below:

3
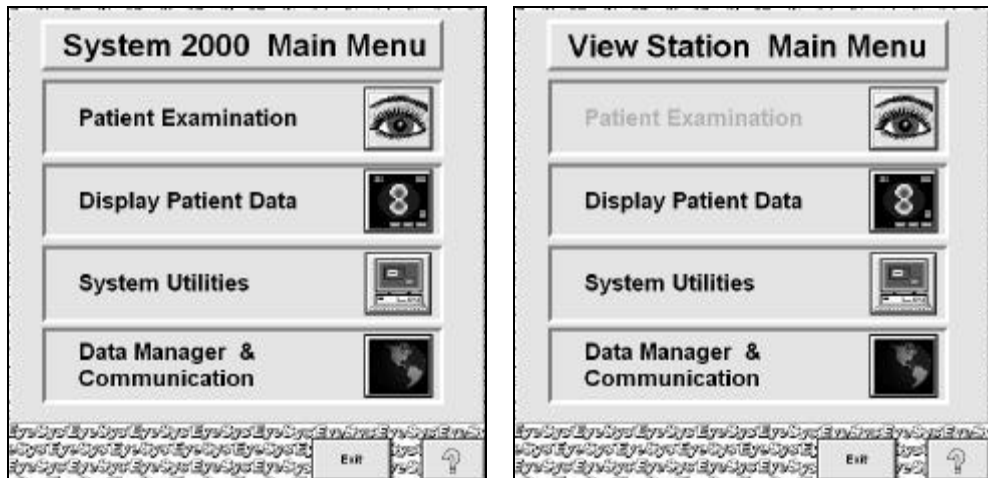
Screen 3-1 System 2000 and Viewstation Main Menus

Refer to Appendix for installation instructions.

The EyeSys software operates within the Microsoft Windows environment. It is designed to minimize your need for software knowledge so you can concentrate on your patients while performing examinations. This is accomplished by providing four natural paths to the operation you want to perform. The four main operations are outlined below:

Patient Examination

The Patient Examination software provides you with all the necessary functionality to perform the following:

♦ Select an exam protocol

♦ Add exam comments

♦ Capture a patient's eye image data

♦ Detect the Apex, Rings, and Pupil

♦ View patient exam displays

♦ Print patient exam displays

♦ Save patient exam data

♦ Perform topography based contact lens design for Rigid Gas Permeable (RGP) lenses

♦ Perform contact lens fitting using a simulated fluorescein map

♦ Print contact lens prescriptions

♦ Select Soft, Soft Toric and RGP lenses from a worldwide database

♦ Review and keep track of the soft lenses you use

Display Patient Data

Display Patient Data allows you to:

♦ Select existing patients and exams from the database

♦ Capture a patient's photo ID

♦ Review and print patient exam data using different displays such as STARS, Holladay Diagnostic Summary, Difference, and Four Map Trend

♦ Perform contact lens fitting

♦ View and print corneal data in various 2D and 3D displays (Win 95 only)

♦ Import patient exam data from previous software versions

System Utilities

With System Utilities you can:

♦ Calibrate the image processing components

♦ Set image processing and display Options

♦ Backup, restore, or rebuild the patient directory

♦ Set data storage and backup options

♦ Perform patient file and directory management

♦ Customize exam Displays, Protocols, and Comments

Data Manager & Communication

The Data Manager and Communication module allows you to:

♦ Sort, delete, edit, or join patient records

♦ Delete, edit, move, or export patient exams

♦ Reprocess exam data

♦ Import patient exam data from previous software versions

♦ Utilize the Internet to export and import all versions of patient exam data (Win 95 only)

Using Your Keyboard

The keyboard features a standard PC design and touch that makes data entry fast, efficient, and comfortable. The software uses these main keys:

Figure 3-2 Keyboard

TAB key – located in the top left quadrant of the keyboard, the **TAB** key is used to jump from field to field or from button to button.

SPACE bar – Is used for executing a selected command. For instance, if the **TAB** key were used to select a button, the **SPACE** bar could be pressed to execute that function.

Arrow keys (cursor keys) – used for moving the cursor or highlight up, down, left, and right. The cursor indicates your position in a text entry field and takes the form of a blinking vertical bar. The highlight indicates a selection that you made.

To adjust the keyboard for a comfortable typing angle, turn it over and snap open the two self-locking legs on the bottom.

Using a Pointing Device

Your system will have either a mouse, trackball, or pen mouse for pointing to different items on the screens. This is referred to as your pointing device. The pointing device offers an efficient means for selecting patients, exams, and commands.

Figure 3-3 Mouse

As you become proficient with the software, you will find yourself effortlessly switching back and forth between the pointing device and keyboard.

Figure 3-4 Trackball

As you move the pointing device, a corresponding movement of an arrow or cursor occurs on your screen. The following terms are used to instruct the use of the pointing device:

Point − means to move the pointing device until the arrow is on top of the item you want to select.

Click − means to point to the item you want to select and then press and release the left pointing device button.

Drag − means to point to the item you want to select, press and hold the left button, move the pointing device horizontally or vertically to select additional adjacent items, and then release the left button.

Figure 3-5 Pen Mouse

Double-Click − means to press and release the left mouse button twice in rapid succession.

Using a Joystick

The joystick is used to operate the motorized positioning mechanisms of the Image Acquisition Unit when capturing a patient's photo ID or eye image.

You can perform four operations by moving the joystick. The joystick is spring loaded to return it to the center position when you let go. A description of each operation follows:

Figure 3-6 Joystick

To move the image left or right, move the joystick in the left or right direction.

To move the image up or down, twist the joystick counter-clockwise or clockwise.

To focus the image, move the joystick to the front or back.

To capture an image, press and release the acquisition button on top of the joystick.

Using the Screens and Commands

You will find the screens in the EyeSys software uncluttered and virtually self-directing. Each time you click on a button, the system displays a new screen or window explaining what is happening. This provides you with positive feedback for each action you perform within the screen.

Each screen includes a Help button to provide on-line information if you are unsure about how to proceed. Almost all screens have a Return button that can be used to go back to a previous screen.

Printing

You may print from two places within the software:

Patient Examination

Refer to "Printing the Display" in Chapter 4 to print a patient display during the examination process. From this screen you can select portrait or landscape views, or print to a file.

Display Patient Data

Refer to "Printing the Display" in Chapter 5 to print a patient display while reviewing stored patient examination data. From this section you can select portrait, landscape, or print to a file.

Powering the System On

To turn *ON* the system power, follow these steps:

1. Make sure there is no floppy diskette in the diskette drive.

2. Locate the power switch for the printer and move it to the *ON* position.

3. Locate the power switch on the transformer and move it to the *ON* position.

   The transformer is a multi-outlet square box that the System 2000 IAU, computer, and monitor are plugged into. It provides the equipment with isolation protection from power surges.

4. Locate the power switch on the computer and move it to the *ON* position.

5. Allow the system to warm up for five minutes before examining patients. This ensures that the videokeratoscope's camera is ready.
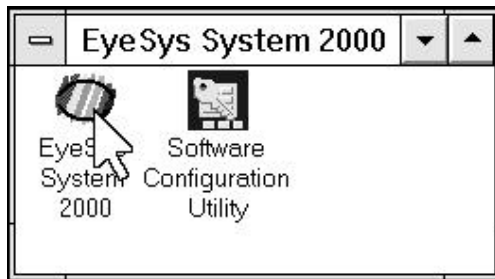
Starting the Software

After powering the system *ON* the computer will start either Microsoft Windows 3.1 or Windows 95.

If you installed the EyeSys software to "automatically run" when Windows starts, the software will start and display the Main Menu. To begin examining patients, proceed to Chapter 4, "Patient Examination".

If you installed the EyeSys software to NOT "automatically run" when Windows starts, follow the instructions below for the operating system you are using. After the software starts, the Main Menu will be displayed. To begin examining patients, proceed to Chapter 4 "Patient Examination".

Window 3.1

To start the software in Windows 3.1, double-click on the EyeSys System 2000 icon in the EyeSys System 2000 Program Group, as shown below:

Screen 3-7 EyeSys System 2000 Program Group

Windows 95

To start the software in Windows 95, double-click on the System 2000 icon located on the desktop, as shown below:

Screen 3-8 EyeSys System 2000 Icon

Powering the System Off

To turn *OFF* the system power, follow these steps:

1. Save any files and exams, and exit the EyeSys software by returning to the Main Menu.

2. From the Main Menu, click Exit to return to Windows.

   If you are using Windows 3.1, click File in the upper left corner, then click Exit.

If you are using Windows 95, click Start and then Shut Down., Select Shut down the Computer and then click OK.

3. Remove and safely store any floppy diskettes from the system. Removable hard and optical disks should remain in the system.

4. Move the power switch on the computer to the *OFF* position.

5. Move the transformer power switch to the *OFF* position.

6. Move the printer power switch to the *OFF* position.

Patient Examination

After you have turned on the power to the System 2000 and let it warm up for five minutes, you are ready to perform an examination. The patient should be present throughout the examination process in case you need to retake the eye image. With a properly calibrated machine and a little practice, the exam process takes only a few minutes. This chapter takes you through the following procedures:

♦ Beginning the Exam

♦ Entering Exam Comments

♦ Capturing the Patient's Eye Image

♦ Examining the Apex

♦ Verifying Focusing and Processing

♦ Retaking the Eye Image

♦ Verifying the Rings

♦ Examining the Pupil

♦ Viewing the Exam Display

♦ Changing Map Options

♦ Printing the Exam

♦ Completing the Exam

Before proceeding with the examination process, you may need to add a new patient to the patient directory or locate an existing patient. If you are a new System 2000 user, you add all of your patients as new patients at first, but after a while you will need to look up existing patients.

4

ⓘ   **Attention New System 2000 Customer!**

You may need to convert patients from your earlier EyeSys software versions to this version. If you have patient records in EyeCon, EyeCon+, or DOS software, refer to "Importing Other Patient Data Types" in Chapter 8 to convert these patients.

You do not have to convert Windows Workstation patient exams.

Beginning the Exam

To start the examination process, follow the procedures below:
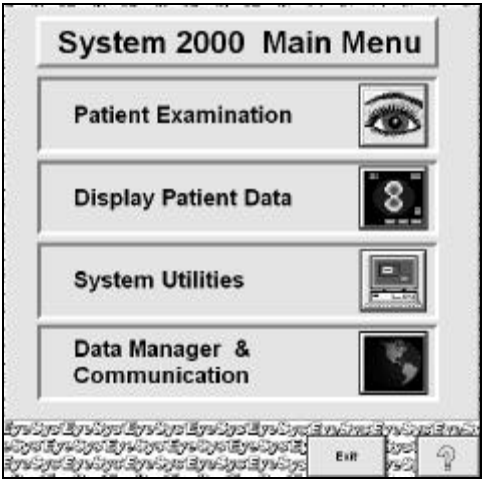
Screen 4-1 System 2000 Main Menu

1. From the Main Menu, click on Patient Examination. The Examination Protocol Selection screen appears. Proceed to "Select the Exam Protocol" below.

   The Exit button closes the EyeSys System 2000 software and returns you to Microsoft Windows.

Select the Exam Protocol
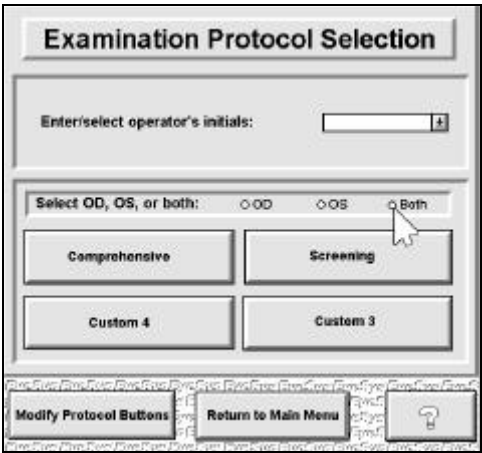
Screen 4-2 Examination Protocol Selection

2. Click within the Enter/Select Operator's Initials box and type your initials.

   If you have previously entered your initials, click on the down arrow to the right of the box. A window appears with a list of initials. Click on your initials. The window closes and your initials appear in the box.

3. Select which eye to examine by clicking on one of the following buttons: OS (left eye), OD (right eye), or BOTH.

EyeSys Corneal Analysis System

On the Protocol Selection screen there are four major buttons that start the examination protocol of your choice. Examination protocols are the procedures that the system follows to execute a patient examination. The System 2000 software is installed with four default exam protocols. They are:

Protocol Name	Display Used		
	Single Eye	Both Eyes	
	OD or OS	OD	OS
Axial Map	1. Axial	1. Axial	2. Axial
Shape + Optics	1. Tangential 2. Axial	1. Tangential 2. Axial	3. Tangential 4. Axial
Contact Lens	1. Tangential 2. Numeric	1. Tangential 2. Numeric	3. Tangential 4. Numeric
Overview	1. Axial 2. Tangential 3. Absolute 4. Keratometric	1. Tangential 2. Axial	3. Tangential 4. Axial

ⓘ **Note**

You can customize exam protocols. You can design your own or modify and delete any existing protocol by following the steps in the section "Designing Custom Exam Protocols" in Chapter 10.

4

4. Click on the exam protocol you desire. The Patient Directory screen appears. Proceed to "Entering New Patients" or "Locating Existing Patients" below.

    If the protocol name you want is not on one of the protocol buttons, go to "Protocol Button Assignment" below.

    ⓘ **Note**

    The protocol you selected may require you to Select an Existing Patient, Add a New Patient, or take a Photo ID.

Protocol Button Assignment

Each of the four protocol buttons can be assigned a particular protocol. If you have designed custom exam protocols and want to assign them to the protocol buttons or if you want to assign different protocols to the buttons, proceed with the following steps:

1. From the Examination Protocol Selection screen click on Modify Protocol Buttons. The Protocol Buttons Setup screen appears.

Protocol Buttons Setup

Capture button 1	Comprehensive
Capture button 2	Custom Protocol # 1
Capture button 3	Custom Protocol # 2
Capture button 4	Custom Protocol # 3

OK
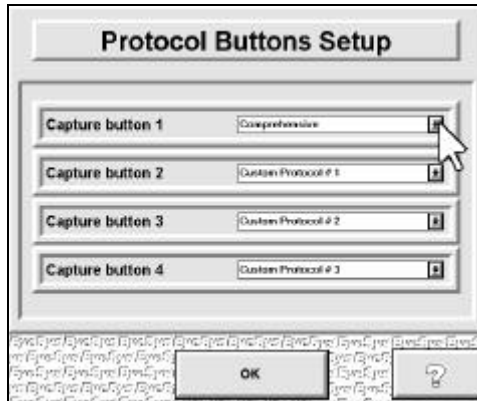
This screen shows Capture Buttons 1-4. The buttons are located on the Examination Protocol Selection screen (Screen 5-2) as follows:

| Capture button 1 | Capture button 2 |

| Capture button 4 | Capture button 3 |
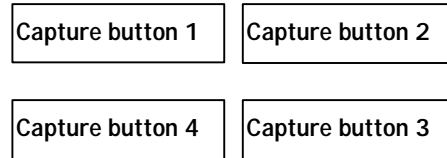
Screen 4-3 Protocol Buttons Setup

2. Click on the down arrow next to each protocol button that you want to re-assign. A window opens listing the protocols.

3. Click on the protocol that you want to assign to the button. The selected protocol appears at the top of the window.

4. Click on OK. The Examination Protocol Selection screen reappears with the protocol buttons reassigned. Go back to step 3 in "Select the Exam Protocol" above to select an exam protocol.

Entering New Patients

When examining new patients, you will need to take a few moments to enter the patient's name and ID on the new patient screen and to take the patient's photo ID using an adapter on the videokeratoscope.

> **ⓘ   A Word About Patient IDs**
>
> The Patient ID can be a social security number, billing
> account number, or any other patient numbering system
> you want to install. The ID can be any combination of
> alphanumerical characters no longer than 15 characters.

You may also want to enter additional information to keep in your records about the
patient or the examination, such as male or female, birth date, physician, diagnosis,
referring party, and group.

To enter new patient data and capture the photo ID, follow these procedures:

Screen 4-4 Patient Directory
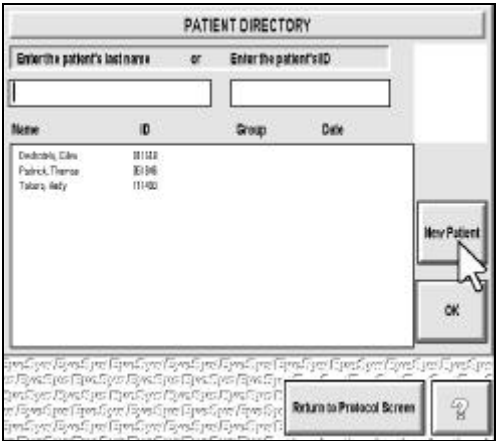
5. From the Patient Directory screen,
    click on New Patient. The Patient
    Information screen appears.

4

Screen 4-5 Patient Information

6. Enter the new patient's full name and ID number.

7. Optionally enter the following information from the table below.

   When you type in a new entry, the system adds it to the list of choices.

Optional Information	What to Enter
Sex	Click on Male or Female
Birth date	Enter the patient's birth date in the same format as the current date on the screen
Physician	Click on Physician to display choices. Click on your choice or type the last name of the physician.
Diagnosis	Click on Diagnosis to display choices. Click on your choice or type the diagnosis.
Referred By	Click on Referred By to display choices. Click on your choice or type the name of the referring party.
Group	Click on Group to display choices. Click on your choice or type the group (8 characters only).

8. Click on Save to add the patient to the database. The Patient Photo Capture screen appears. Proceed to "Taking a Photo ID" below.

Taking a Photo ID

Screen 4-6 Patient Photo Capture

9. Insert the Patient Photo Adapter into the center of the Videokeratoscope and position the patient facing the photo adapter. The patient's image will appear on the Patient Photo Capture screen.

10. Using the joystick bring the patient's face into focus and press the acquisition button on top of the joystick. The Patient Photo Save screen appears.

Screen 4-7 Patient Photo Save

11. **If the patient's photo is acceptable,** click on the Save Image button. The Exam Comments screen appears (Screen 5-7).

    If the photo needs to be recaptured, click on the Retake button and repeat step 2.

    To bypass taking the photo ID, click the Skip Photo button. You can add the photo later, if desired. Refer to "Taking the Patient's Photo ID" in Chapter 8.

4

You are now ready to proceed with the examination. Go to "Entering Exam Comments" below.

Locating Existing Patients

When examining patients who have already been added to the patient database, you will need to locate their current records before proceeding with the examination. You can locate a patient by last name or patient ID.

> ⓘ   **A Word About the Patient's Photo ID**
>
> If you insert the disk that has the patient's data file and photo ID, the photo ID will be displayed on the Patient Directory screen when the patient is selected.
>
> If using a new disk for an existing patient, you will have to recapture the photo ID and save it to the new disk. Refer to "Taking the Patient's Photo ID" in Chapter 8.

To Locate a Patient by Last Name:

1. On the Patient Directory screen, enter the patient's last name.

    As you type, the system will highlight the first name in the list that matches what you type.

2. **If the desired patient is not highlighted,** click the pointing device on the patient to be examined. If you have a large database, you may have to scroll through the list of names before locating the patient.

    When the desired patient is highlighted, click on the OK button. The Exam Comments screen appears (Screen 5-7).

You are now ready to proceed with the examination. Go to "Entering Exam Comments" in Chapter 5, "The Examination Process."

To Locate a Patient by Patient ID:

1. On the Patient Directory screen, enter the patient's ID number.

    As you type, the system will resort the directory and highlight the first number that matches what you type.

2. **If the desired patient is not displayed,** repeat step 1 or scroll through the list of patients.

    When the desired patient is highlighted, click on the OK button. The Exam Comments screen appears (Screen 5-7).

You are now ready to proceed with the examination. Go to "Entering Exam Comments" below.

Entering Exam Comments

If the exam protocol chosen above includes the exam comments option, the Exam Comments screen appears. The Exam Comments screen is used to enter comments about the examination, such as exam type, prescription information, diagnosis, and more. These comments are displayed on the:

♦ Exam listing of the Patient Locator screen (Screen 6-1) when you display patient data

♦ Patient File Management screen (Screen 8-3) when you perform file management

♦ Bottom of the exam data displays

The comments are a good tool to help you quickly locate a particular exam for a patient. This section describes how to enter exam comments.

> ⓘ **Note**
>
> You can enter exam comments later, if desired. Refer to "Edit Patient Exam Data" in Chapter 8.
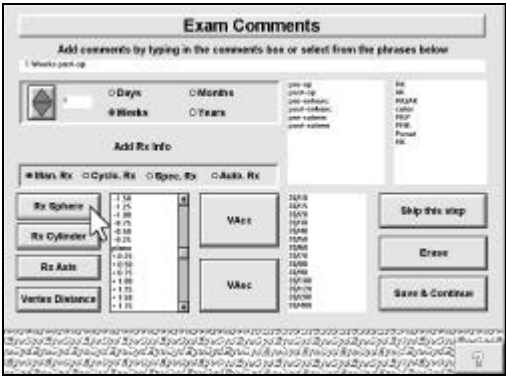
Screen 4-8 Exam Comments

If you do not want to add comments now, click on the Skip This Step button and continue with "Capturing the Patient's Eye Image" below.

The Exam Comments screen provides two methods for entering comments:

♦ Point-and-click (default) − EyeSys provides built-in comments you can point to with your pointing device and click to enter automatically.

♦ Keyboard method − Type your own comments.

> ⓘ **Note**
>
> **You can design your own custom comments that use the point-and-click method. Refer to "Designing Custom Comments" in Chapter 11.**

Point-and-Click (Default)

To enter default comments provided by EyeSys using the point-and-click method, follow these steps:

1. Click on the desired options to enter information in the comments box. A table of default comments and corresponding ranges follows:

Comment Type	Comment	Range
Time Period	days weeks months years	0 to 999 0 to 999 0 to 999 0 to 999
Procedure Descriptor *	pre-op post-op pre-enhance post-enhance pre-suture rem post-suture rem	None
Procedure Performed *	RK AK RK/AK Cataract PKP PRK RGP SCL Corneal Scar	None

Continued on the next page

Comment Type	Comment	Range
Refraction Types	Man. Rx Cyclo. Rx Spec. Rx Auto. Rx	None
Refraction Measurements	Rx Sphere Rx Cylinder Rx Axis Vertex Distance	+20.0 to -20.0 +20.0 to -20.0 0° to 180° 7 mm to 19.5 mm
Visual Acquity *	VAcc VAsc	20/10 to 20/400 HM,LP 20/10 to 20/400 HM,LP

* These comments may be customized, refer to Chapter 11.

2. **To delete comments,** do one of the following:

    *   Place the cursor at the beginning of the data to be deleted and drag the cursor to the end of the data to be deleted, and press Delete.

    *   Click Erase at any time to clear the comments box.

    When the comments are acceptable, click on the Save & Continue. The Capture Eye Image screen appears.

Keyboard Method

To enter comments by typing, do the following:

1. Click within the comments box and type the desired comments.

2. **To erase comments,** use the **BACKSPACE** key to delete information or click on the Erase button to clear the comments box and start over.

    When the comments are acceptable, click on the Save & Continue. The Capture Eye Image screen appears. Proceed to "Capturing the Patient's Eye Image" below.

Capturing the Patient's Eye Image

ⓘ	**Note**

Insert the proper disk containing the patient exam data
files before starting this procedure.

Capturing quality eye images and preserving patient confidence requires that the
patient be relaxed and comfortable in front of the video-keratoscope. Accurate
surgical planning and diagnoses relies on proper centering and focus of the eye
image.

Position the patient and take the eye image as follows:

1. Place the patient's forehead against the forehead rest with the chin resting
   comfortably on the chin rest. Raise or lower the chin rest if necessary.

2. Turn the head slightly so that the eye being captured faces the videokeratoscope
   directly. This eliminates nose shadow.

3. Have the patient do the following:

   - Keep both eyes open during the procedure. If the patient has difficulty
     maintaining both eyes open, an assistant should hold the patient's upper
     eyelid open with a cotton swab being careful not to touch or apply any
     pressure to the cornea. You may also use an occluder to cover the eye **not**
     being examined.

   - Fixate on the green flashing light in the center of the placido rings. If the
     patient has difficulty fixating on the green light, place an eyepatch over the
     eye **not** being examined.

Screen 4-9 Capture Eye Image
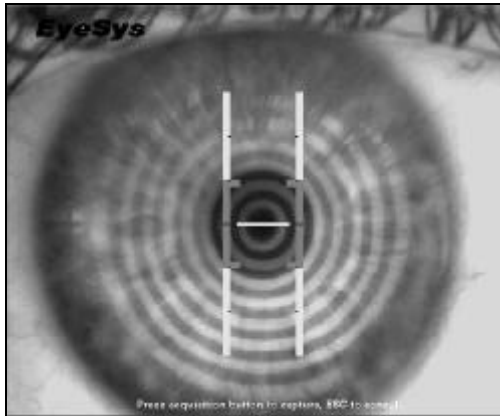
4. Watch your monitor. A continuous video image of the patient's eye is displayed as shown.

5. Using the joystick, adjust the image until the pupil is centered in the centering box.

6. Using the joystick, adjust the focus until the blue line is centered horizontally (even with the centering marks) within the green box.

For more information on using the joystick, refer to Chapter 3.

7. Press the acquisition button on top of the joystick. The system will capture the eye image. Proceed to "Examining the Apex" below.

If the patient is unable to remain motionless for the length of time it takes to focus perfectly, press the spacebar to capture the image when the focus is optimal. The system will capture the eye image and correct for small, out-of-focus conditions. Proceed to "Examining the Apex" below.

ⓘ	**Note**
The system focuses the eye image automatically for precise repeatable results.	

4

Examining the Apex

The operator should examine the detected apex for possible editing or even retaking the image.

Screen 4-10 Apex Verification
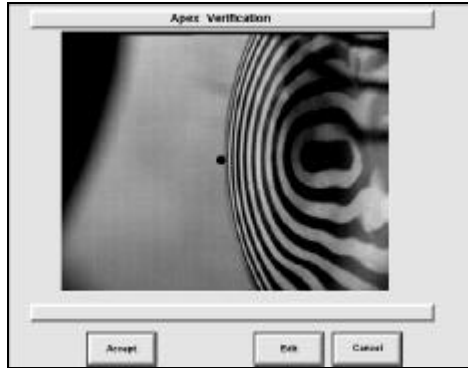
1. Look at the detected apex. You should find a red square located on edge of the apex.

    If the square is not located on the edge, perform step 2 to edit the apex.

    If the square is located properly, proceed to step 3.

2. Click on Edit. Point to the red square and click and hold the left pointing device button. Move the red dot so that it intersects the apex at the center of the eye, then release the pointing device button.

3. Click on Accept. The system processes the eye image, locates the rings, and displays the results on the Focusing and Processing Verification screen.

IF A WARNING MESSAGE APPEARS DURING PROCESSING:

The system may have trouble processing a center point if the patient's cornea is very distorted or the center ring mire is very small. In this case, a warning message window appears alerting the operator to this difficulty. If this happens, perform the following procedure:

1. Click OK on the Warning window. A pencil appears on the screen.

2. Using the pointing device, position the point of the pencil on the center of the image and click the left button.

    Result: The system reprocesses the eye image, locates the rings, and displays the results on the Focusing and Processing Verification Screen. Continue with the next section, "Verifying Focusing and Processing" below.

Verifying Focusing and Processing
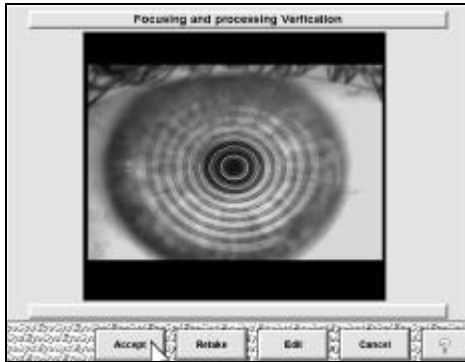
At this point, the operator should examine the resulting rings and pupil for possible editing or even for retaking the image. You should do this with the patient present in case you need to retake the eye image. Once you've done it a few times, this procedure only takes about one minute.

Screen 4-11 Focusing and Processing Verification

Focusing and Centering Guidelines

Before examining the rings, make sure that the system found the proper center and that the eye image is in proper focus. Check the image as follows:

- Make sure the center was found by checking the red dot. It should be placed *in the center of* the red and yellow rings. The red dot should *not be outside of* the innermost placido mire.

- Make sure the red and yellow concentric rings alternate. The red rings should be located on the outer edge of the black rings and the yellow rings should be located on the outer edge of the white rings.

If any of these visual checks look wrong, the eye image should be retaken. Go to "Retaking the Eye Image" below.

If the visual checks are acceptable, go to "Verifying the Rings" to examine the rings for possible editing. It is not necessary to edit every eye image.

4

Retaking the Eye Image

If you need to recapture the eye image, follow these steps:

1. From the Focusing and Processing Verification screen, click on Retake. The Contrast Level screen appears.
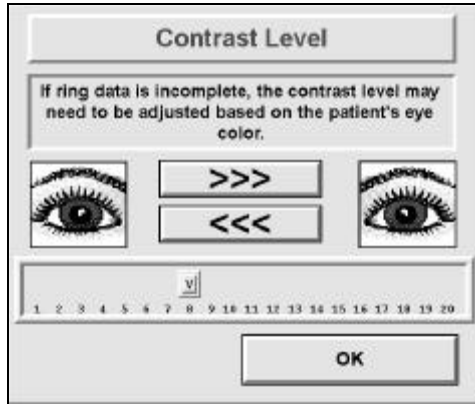
2. Click on the large arrow buttons to adjust the contrast level towards the patient's eye color. As you click on the arrow button, the pointer at the bottom of the screen moves in the direction of the arrow. Blue eyes should be adjusted until the pointer is at 2. Other eye colors should be adjusted to be in the range of 4-12.

Screen 4-12 Contrast Level

This adjustment changes the value of the edge threshold located on the Image Processing Options screen (Screen 8-12.)

3. After adjusting the contrast level, click on OK. The Capture Eye Image screen reappears.

4. Repeat "Capturing the Patient's Eye Image," "Examining the Apex," and "Verifying Focusing and Processing."

EyeSys Corneal Analysis System

Verifying the Rings

1. Examine the rings on the Focusing and Processing Verification screen. Look for any of these conditions:

   - Check if any rings or data points extend into areas of brow or nasal shadow. These may need to be removed.

   - Check for a limbal line. If the system picked up a limbal line, it will appear as a ring detected at the outer edge of the eye image. This is not a valid ring and should be removed.

   - Check for critically incomplete rings. These should be reconstructed.

2. **If the rings need editing,** continue with step 3.

   If these visual checks are acceptable, you do not need to edit the rings. Click on Accept. The system reprocesses the eye image and displays the pupil on the Pupil Verification screen. Go to the next section, "Examining the Pupil."

3. Click Edit on the Focusing and Processing Verification screen. The Processed Ring Editor screen appears.

4. **To add ring data points with the arrow tip,** point to where ring points should be added and drag the pointing device.

   To erase points, point to the ring points that need to be removed and drag the pointing device.

   Release the button when finished.

Screen 4-13 Processed Ring Editor

5. When editing is complete, click the Finished button. The Focusing and Processing Verification screen re-appears.

6. Re-examine the processed rings.

   If more editing is required, click the Edit button and repeat the editing process (steps 1-6).

EyeSys Corneal Analysis System   4-17

If the eye image looks properly captured and processed, click the Accept button. The system processes the eye image and displays the pupil on the Pupil Verification screen. Proceed to "Examining the Pupil" below.

Examining the Pupil

During the final step of capturing an eye image, the system performs pupil detection. If the pupil is smaller than 0.5 mm or is extremely irregular, the system may have trouble locating the pupil. In this case, the following message appears:

If you want the system to use a standard 3 mm pupil centered 0.2 mm temporally from the ring mire center, click on Yes and continue with step 1 below.

If you want the system to discard the pupil and save no pupil data, click on No and proceed to "Viewing the Exam Display" below.
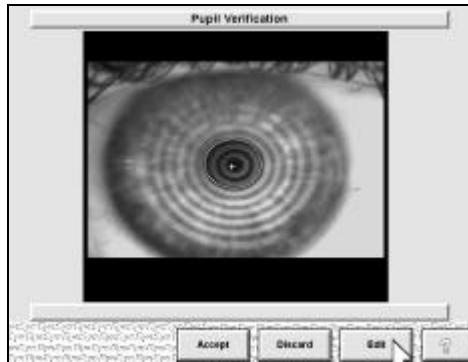
Screen 4-14 Pupil Verification

1. Check the pupil contour to make sure it is accurately located on the inner edge of the visible iris.

   If the contour missed part of the pupil edge, either because of poor lighting or a very irregular pupil (i.e., iridectomy) then it will have to be edited. Continue with step 2.

   If the pupil image looks properly captured and processed, skip to step 7.

2. Click the Edit button. The Pupil Editor screen appears.

Screen 4-15 Pupil Editor
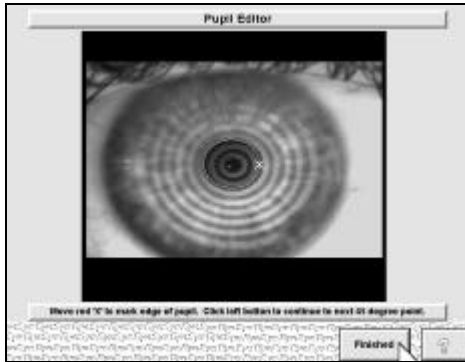
When the Pupil Editor screen appears, you will notice a red cross located outside the pupil contour at zero degrees (three o'clock.) You can drag the red cross to change the shape of the pupil contour. As you drag the red cross, you will notice the pupil contour rubber-banding to match your movements.

3. Move the red cross until the pupil contour lies on the edge of the pupil. The pupil contour will move along with the red cross.

4. Release the left pointing device button when the contour is in the correct position. The red cross will advance by 45 degrees counter-clockwise around the angular scale.

5. Repeat steps 3-4 until the red cross has gone a full 360 degrees.

6. Click on Finished. The Pupil Verification screen reappears.

   If more editing is required, click the Edit button and repeat the editing process (steps 3-6).

   If you are dissatisfied with the pupil, click the Discard button to abandon the pupil and proceed to "Viewing the Exam Display" below. The system abandons the pupil and saves none of its data.

   When editing is complete, continue with step 7.

7. Click on Accept when you are satisfied with the pupil image.

   The next screen depends on whether or not you are finished with the examination process:

   If you are examining both eyes, the system returns to the Exam Comments screen. Refer to "Entering Exam Comments" above and repeat the process for the second eye.

   If you are finished with the exam, the Exam Display appears. Go to "Viewing the Exam Display."

Viewing the Exam Display

On Exam Displays that contain a map image, a special function is available to help you examine the data. This special function, Crosshair Data, is described below:

Crosshair Data

You will notice a cross located at the detected center of the eye and a box of data in the lower right of the screen. The data corresponds to the center of the cross as follows:

♦ Power (PWR) in diopters

♦ Radius (RAD) in millimeters

♦ Distance to the center (DIS) in millimeters

♦ Axis in degrees

You can move the cross to examine data in different parts of the image, as described below:

1. Point to the cross and drag the pointing device.

2. While holding the button down, move the cross to the desired position in the eye. As you move the cross, the data in the lower right of the screen changes to reflect measurements at the new location.

Screen 4-16 Exam Display

Before clicking on Done/Save/Print to end the examination, you can click on Options to change display options such as map types, map layers. Go to "Changing Map Options" below.

If you are finished viewing the display, click on Done/Save/Print. The Print Options screen appears. From the Print Options screen you have the option of printing the display or skipping the printing process entirely. Go to "Printing the Exam" below.

> ⓘ **Note**
>
> The system saves the exam data and eye image when you click Done/Save/Print.

Changing Map Options

Follow these procedures to select map options for customizing the Exam Display:
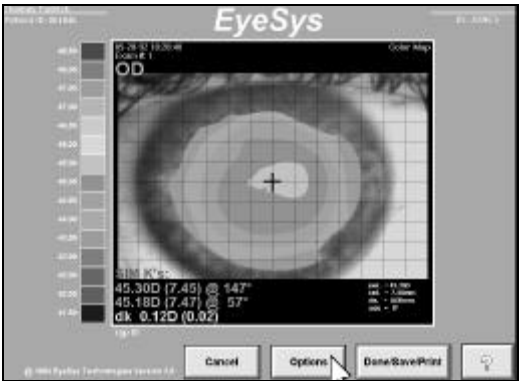
Screen 4-17 Exam Display
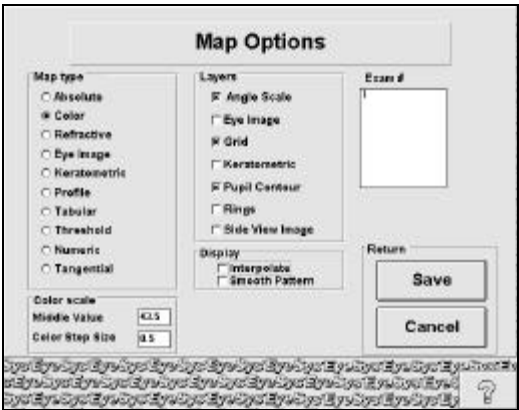
1. From the Exam Display click the Options button. The Map Options screen appears.

Screen 4-18 Map Options

2. Click the desired Map Type.

   If you change your mind, just click on another Map Type. Only one Map Type can be selected at a time.

   For descriptions of Map Types, refer to Appendix B.

4

3. Select each Layer you want to display on the Data Map. Multiple layers can be displayed concurrently. For descriptions of Map Layers, refer to Appendix B.

4. Click on the square box next to Interpolate if you want the system to fill in black areas or holes in the Axial Map Display. The system will interpolate across areas of missing data. However, the system will not display areas that are not surrounded by data.

5. Click on the square box next to Smooth Pattern if you want to view the color maps with less resolution. This will help extract the relative pattern from the display and reduce the granularity.

6. **If you selected the Axial, Threshold, Refractive, or Tangential map types**, you can change the color scale range. The normalized color scale range in the data maps can be changed to a specific range. The parameters are the middle value and the color step size. There are 15 colors to work with.

    To change the color scale range, click within the Middle Value box and Step Size box and type new values. A new color scale range will be defined.

    Example: If the Middle Value is 42 diopters and the Color Step Size is 1 diopter, then the range covered by 15 colors would be 35 to 49 diopters.

7. **If you selected the Profile or Tabular map types**, you can change the map axis of the flattest and steepest meridian.

    If you selected the Threshold map type, you can change the high and low thresholds.

8. When finished selecting Map Options, you have two choices:

    To save the changes and go back the Exam Display, click on Save. The Exam Display reappears with the selected map type and layers.

    To cancel the changes and go back to the Exam Display, click on Cancel. The Exam Display reappears without changing the map options.

9. **If everything on the Exam Display looks acceptable,** click the Done/Save/Print button. The Print Options screen appears. From the Print Options screen you have the option of printing the display or skipping the printing process entirely. Go to "Printing the Exam" below.

    If the Exam Display is unacceptable and you want to perform a new examination, click Cancel. The current data will not be saved and you will need to repeat the examination process. The Exam Complete screen appears. Go to "Completing the Exam" below.

Printing the Display

Use the Print Options screen to print a hard copy of the exam display or to copy the exam display to a file. If you copy to a file, the data normally sent to the printer will be stored in the disk drive and filename you provide. The file will be stored in ".BMP" (bitmap) format.

Screen 4-19 Print Options
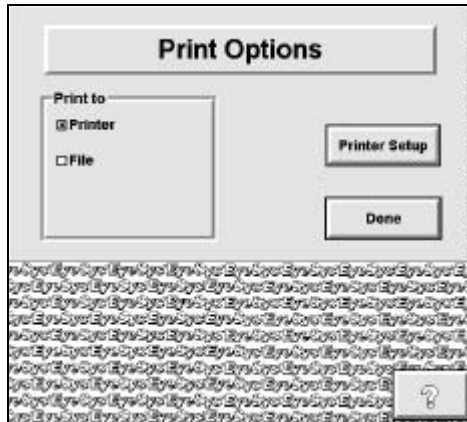
1. Select Printer or Print to a File in the Print To box.

    If you do not want to print at this time, deselect both Printer and File in the Print To box.

2. Click on Printer Setup to select the printer or paper size, source, and orientation. Portrait provides a vertical page orientation. Landscape provides a horizontal page orientation.
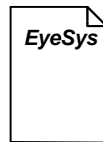
Portrait   Landscape

3. Click on OK. The Print Options screen reappears.

4. Click on Done. The exam display is printed, sent to a file, or saved with no print action taken. After the chosen action is performed, The Exam Complete screen appears. Go to the next section, "Completing the Exam."

If you click Cancel, the exam display is not saved.

Completing the Exam

The Exam Complete screen provides several options depending on what action you intend to take.
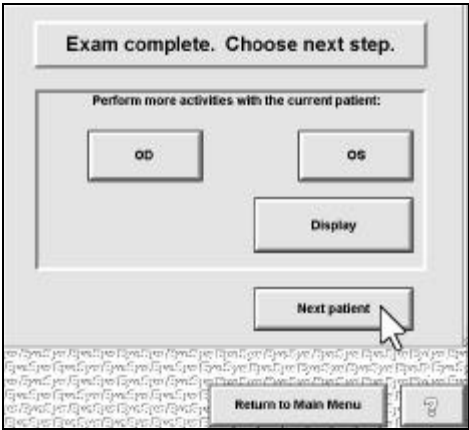
Use the table below to determine your next step:

Screen 4-20 Exam Complete

If you...	Click on	Result
Are finished with this patient and there are no other patients to be examined	Return to Main Menu	The Main Menu appears (Screen 5-1).
Are finished with this patient but want to examine a different patient	Next Patient	The Examination Protocol Selection screen appears (Screen 5-2).
Want to examine the patient's other eye or retake the eye image	OD or OS button	The Exam Comments screen appears (Screen 5-7).
Want to change the display type or perform contact lens fitting	Display	The Select Display screen appears (Screen 6-2).

Display Patient Data

This chapter describes how to review, change, and print exam displays. The following tasks are included:

♦ Selecting an EyeSys System 2000 Software patient to review

♦ Selecting an Exported, EyeCon+, EyeSys DOS, or EyeCon patient to review

♦ Selecting a single exam or group of exams to display

♦ Selecting exam displays

♦ Changing data map options

♦ Printing the display

Selecting EyeSys Patients

An EyeSys patient is a patient whose examination data was saved in the System 2000 Software patient exam data files. To view patient exam data files saved by a previous software version or any exported exam data files, skip to "Selecting Other Patient Data Types."

ⓘ	**Note**
Make sure you insert the proper disk containing the patient exam data files before starting this procedure.	

1. From the Main Menu, click on Display Patient Data. The Patient Locator screen appears.

5

Screen 5-1 Patient Locator

2. Select a patient from the Patient Locator screen or locate a patient using one of the methods below.

   When a patient is selected, a list of the patient's exams appears at the bottom of the screen.

   If the patient's photo ID was previously captured, it will be displayed.

To Locate a Patient by Last Name:

3. On the Patient Locator screen, enter the patient's last name. As you type, the system highlights the first name in the list that matches what you type.

4. **If you have a large database,** you may have to scroll through the list of names before locating the desired patient.

   When the patient is highlighted, a list of the patient's exams appears at the bottom of the screen and the photo ID appears if it was previously captured.

Continue with "Selecting Exams" later in this chapter.

To Locate a Patient by Patient ID:

1. On the Patient Locator screen, enter the patient's ID number. As you type, the system displays patient ID numbers and highlights the first number that matches what you type.

2. **If the desired patient is not displayed,** repeat step 1 or try to locate the patient by last name.

   When the patient is highlighted, a list of patient exams appears in a box at the bottom of the screen and the photo ID appears if it was previously captured.

Continue with "Selecting Exams" later in this chapter.

Selecting Other Patient Data Types

Follow these procedures to view patient exam data files that were exported or saved with a previous EyeSys software version (EyeCon+, EyeCon, or EyeSys DOS). You can retrieve these files from a local drive, network drive, or any System 2000 connected to the Internet through an Internet Service Provider. EyeSys DirectNet is the easiest way to import patient data files from the Internet. However, if the sender does not have access to DirectNet, standard email software can be used to transfer files. Refer to Chapter 9, for information on DirectNet. Follow the topic below that fits your situation.

Local and Network Drives

ⓘ	**Note**
	Before starting this procedure, make sure you insert the proper disk containing the patient exam data files.

1. From the Main Menu, click on Display Patient Data. The Patient Locator Screen appears.

2. Click on Other EyeSys Patient Types. The Other EyeSys Patient and Exams screen appears as shown in
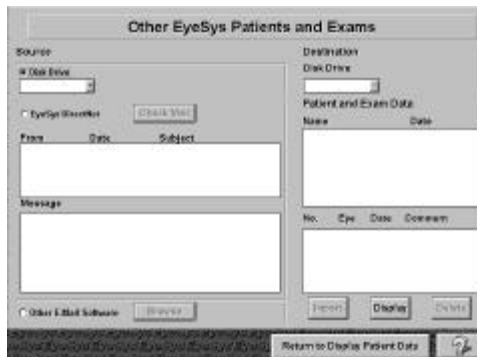
Screen 5-2 Other EyeSys Patients and Exams

2. Click within the radio button next to Source Disk Drive. A black dot appears indicating that the source is a local or networked drive.

3. Click within the Disk Drive box and then click on the drive letter you want from the drop down menu that appears. Patients from the drive you selected are listed under Patient and Exam Data on the right hand side.

4. Click on the desired patient. The patient's exams are displayed in the exam box at the bottom of the screen.

Continue with "Selecting Exams" below.

Selecting Exams

When you locate a patient, a list of exams appear. You can select either a single exam or group of exams to review:

1. Click on each exam you desire. Each exam you click on will stay highlighted. You can select up to four exams.

   If you need to deselect an exam, click on the highlighted exam.

2. Verify that the Drive box contains the correct drive letter (i.e., floppy diskette, removable hard disk, internal hard disk, or optical disk) for the exams you selected. If it does not, click on the correct drive letter.

3. Click Display. The Select Display screen appears.

4. Go to "Selecting an Exam Display" below.

Selecting an Exam Display

Exam displays are a convenient way of showing patient exam data on one or more data maps. There may be up to five data maps on each display. Each data map can be a particular type with different layers turned on or off. EyeSys provides fourteen default displays for you to work with.

This procedure begins at the Select Display menu, which appears after locating the patient and selecting one to four exams.

Screen 5-3 Select Display
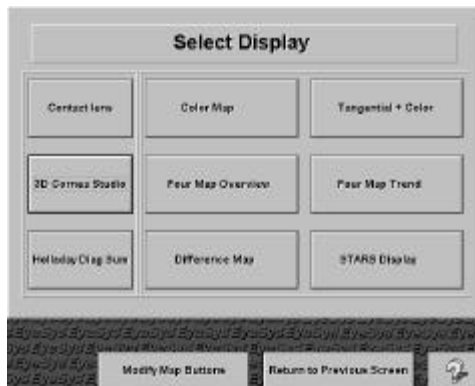
From the Select Display menu you can:

- Display patient exam data

- Modify button titles to change the type of display activated

- Start contact lens design

To display patient exam data, go to "Displaying Patient Exam Data" below.

To modify which displays are activated by the buttons, follow the procedures in the next section.

Modifying Display Button Titles

The Select Display screen shows six Map buttons. You can change which displays are activated by these buttons by following this procedure:

1. From the Select Display screen, click on Modify Map Buttons. The Map Buttons Setup screen appears.

2. The map button numbers on this screen correspond to the map buttons on the Select Display screen, as follows:

Map button 1	Map button 2
Map button 3	Map button 4
Map button 5	Map button 6

Screen 5-4 Map Buttons Setup

3. Determine which map button you want to change. Click on the corresponding down arrow button. A window of different map types appears. Click on the Map Type you desire.

4. Repeat step 2 to change another button. When finished changing buttons, click on Return to Select Display Menu. The Select Display screen reappears with the buttons reassigned. Continue with "Displaying Patient Exam Data" below.

5

Displaying Patient Exam Data

On Exam Displays that contain a map image, a special function is available to help you examine the data. This special function, **Crosshair Data,** is described below:

Crosshair Data

You will notice a cross located at the detected center of the eye and a box of data in the lower right of the screen. The data corresponds to the center of the cross as follows:

♦ Power (PWR) in diopters

♦ Radius (RAD) in millimeters

♦ Distance to the center (DIS) in millimeters

♦ Axis in degrees

You can move the cross to examine data in different parts of the image, as described below:

1. Point to the cross and drag the pointing device.

2. While holding the button down, move the cross to the desired position in the eye image. As you move the cross, the data in the lower right of the screen changes to reflect measurements at the new location.

Display Patient Data

To display patient exam data, follow the procedures below:

1. Click on a display name from the Select Display screen. The selected display appears.

   Example: If you select Four Map Overview from the Select Display screen, you can see four maps at once. An example of a Four Map Overview is shown:

5
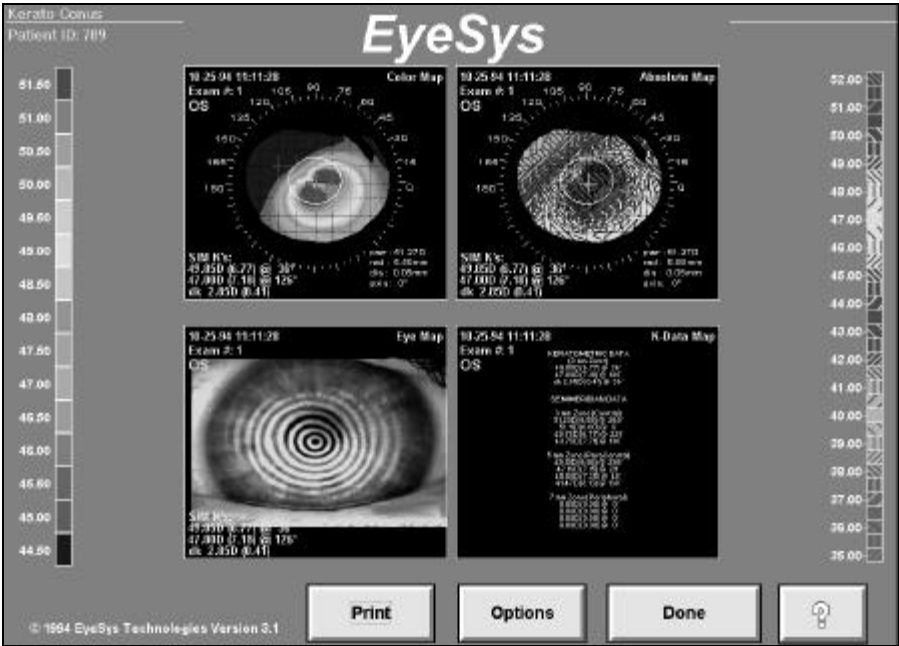
Screen 5-5 Four Map Overview Display

2. After viewing the display, choose an action from the following table:

If you want to...	Action	Result
Change map options	Click on Options. Go to "Changing Map Options" below.	The Display Options (Screen 6-6) or the Map Options (Screen 6-7) screen appears.
Print the display	Click on Print. Go to "Printing the Display" in this chapter.	The Print Options screen appears (Screen 6-8).
Exit	Click on Done. Select another display or exit to the Main Menu.	The Select Display screen reappears (Screen 6-3).

5

Changing Map Options

You can change map options such as map types, map layers, or exams for each map on the display.

Refer to Appendix B for detailed information about map types and layers.

If you are viewing a multi-map display and click Options, the first screen to appear is the Display Options screen. This screen is used to select which map you want to change.

If you are viewing a single map display, the first screen to appear is the Map Options screen. Proceed to step 2 below.

The procedures below describe how to change map options for a Four Map Overview display.

After clicking Options from the Four Map Overview display, the Four Map Display Options screen appears.
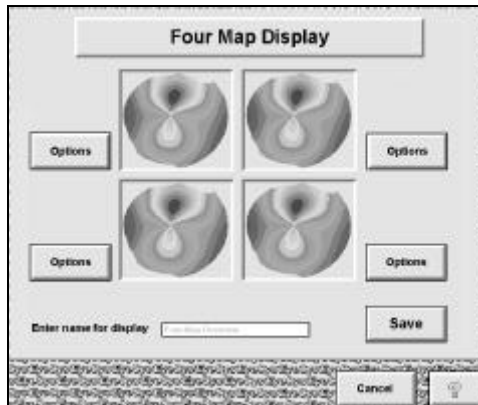
1. Click on the Options button next to the map you want to change. The Map Options screen appears.

Screen 5-6 Four Map Display

Screen 5-7 Map Options

2. Select a Map Type by clicking within the small circle next to the name you want.

   Map types are described in Appendix B, "Topographic Data Displays."

3. Select one or more Map Layers by clicking within the small box next to the name you want.

Map layers are described in Appendix B, "Topographic Data Displays."

4. Click on the square box next to Interpolate if you want the system to fill in black areas or holes in the color map display. The system will interpolate across areas of missing data. However, the system will not display areas that are not surrounded by data.

5. Click on the square box next to Smooth Pattern if you want to view the color maps with less resolution. This will help extract the relative pattern from the display and reduce the granularity.

6. If desired, change the color scale range. The normalized color scale range used in the data maps can be changed to a specific range. The parameters for controlling the range are the middle value and the color step size. There are 15 colors to work with.

   To change the color scale range, click within the Middle Value box and Step Size box and type new values. A new color scale range will be defined when you go back to the Exam Display screen.

   Example: If the middle value is 42 diopters and the step size is 1 diopter, then the range covered by 15 colors will be 35 to 49 diopters.

7. If desired, change the exam associated with this data map. The box in the upper right of the screen displays the exams you selected for the currently viewed patient. To change exams, click on the desired exam. Refer to "Selecting Exams" earlier in this chapter for additional information.

5

8. **When you have chosen all the options you want,** click on Save to implement the changes and return to the Map Display screen.

    To return to the Map Display screen without making changes, click on Cancel.

9. Repeat steps 1 - 7 for each map you want to change. When you are finished changing map options, go to step 9.

10. From the Four Map Display screen, click Save. The Four Map Overview display reappears with the map options you selected.

11. Go back to the table on page 6-8 to determine your next action.

Printing the Display

You can print a hard copy of the display data or print to a file. If you print to a file, the data normally sent to the printer will be stored on the disk drive in a filename you provide. The file will be stored in ".BMP" (bitmap) format. To print the display currently being viewed, follow these procedures:

Screen 5-8 Print Options
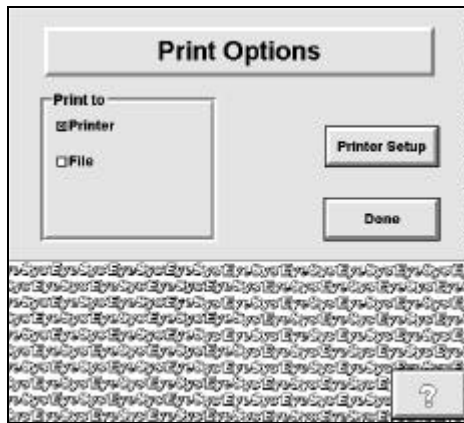
1. From the Map Display screen, click on Print. The Print Options screen appears.

2. Select Print to the Printer or Print to a File.

    If you do not want to print at this time, deselect both Printer and File in the Print to box.

3. Click on Printer Setup to select the printer or paper size, source and orientation. Portrait provides a vertical page orientation. Landscape provides a horizontal page orientation.
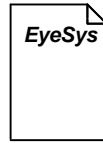
Portrait   Landscape

4. Click on OK. The Print Options screen reappears.

5. Click on Done. The Display screen reappears and the exam display is printed or sent to a file.

6. Go back to the table on page 6-8 to determine your next action.

STARS Display

The Standard Topographical Analysis for Refractive Surgery (STARS) display provides a retrospective view of the cornea and helps in analyzing surgical results while tracking the healing process.

To view a STARS display, you must select a pre-op, post-op, and follow-up exam. An example of the STARS display follows:

5
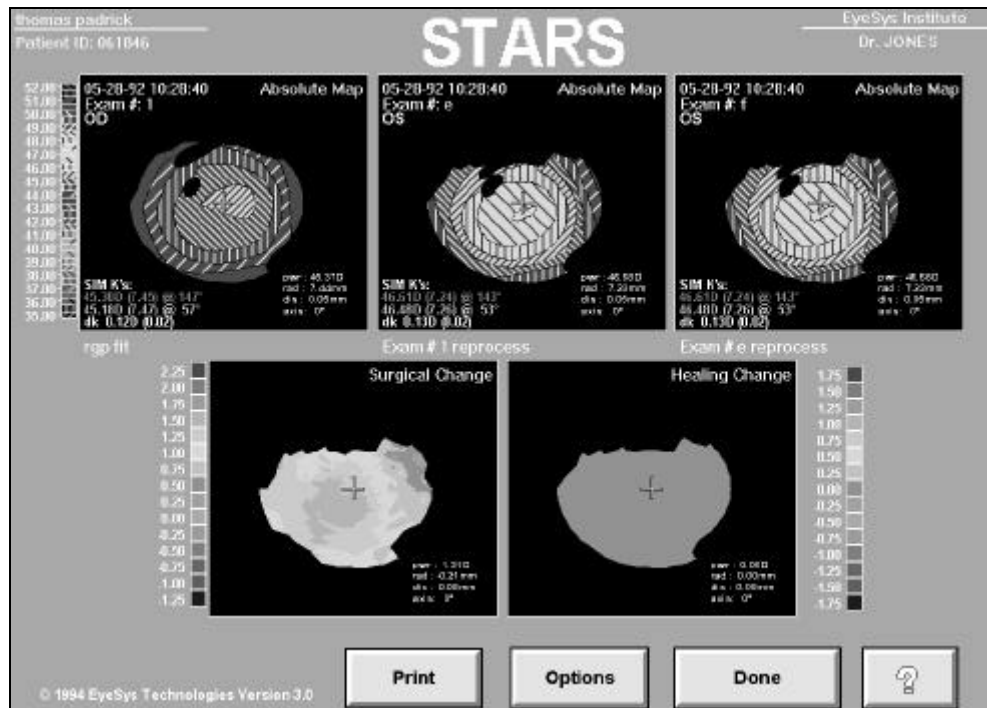
Screen 5-9 STARS Display

The STARS display shows the pre-op, post-op, and follow-up data maps at the top and the Surgical Change and Healing Change difference maps at the bottom. Some characteristics of the STARS display are:

- A single, standard scale is used for all examinations.

- The difference map scales are optimally adjusted and centered on the mean difference in central "K" values.

To print the STARS display, click Print and follow the procedures in "Printing the Display" above.

To change map options, click on Options and follow the procedures in "Changing Map Options" above.

To go back to the Select Display screen, click on Done. The Select Display screen reappears (Screen 6-2).

Difference Display

The Difference Map is an adjustable map of corneal curvature which is derived by a subtractive analysis of two examinations. The map is used to analyze changes in the corneal curvature over time. The difference scale is centered on 0.0 diopters and utilizes 0.5 diopter steps.

An example of the Difference Display follows:
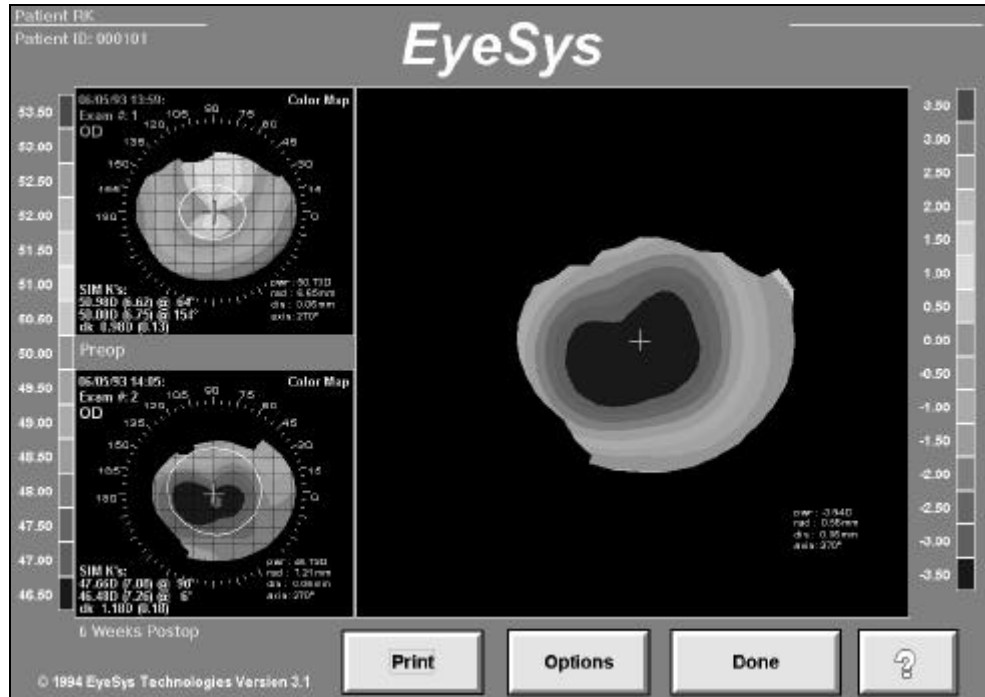
Screen 5-10 Difference Display

Four Map Trend Display

The Four Map Trend Display shows a historical sequence of patient exams using color maps. Four sequential exams of one eye or two exams of each eye can be shown.

An example of a Four Map Trend Display is shown below:
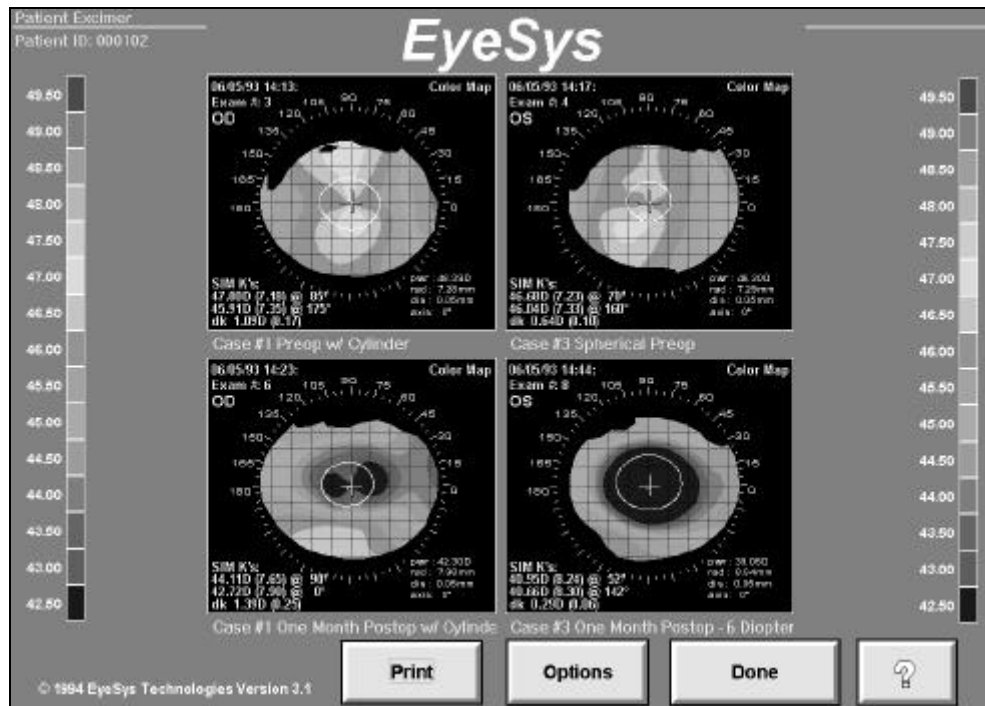
Screen 5-11 Four Map Trend Display

3D Cornea Studio Display

The 3D Cornea Studio Display displays the Corneal data in a variety of 2-dimensional (2D) and 3-dimensional (3D) views. Dragging the mouse over the data yields local numeric information about the cornea, such as curvature, sagittal height, and semi-meridian eccentricity values. In 3D view, the cornea can be rotated via on-screen controls.

In both 2D and 3D views, the following maps and corresponding numeric legends can be viewed:

- Axial Radius of Curvature

- Sagittal Height

- Sagittal Height Difference from a Reference Surface

An example of the 3D Cornea Studio displaying a 3D wire frame of sagittal height difference from an aspherical reference surface is shown below:
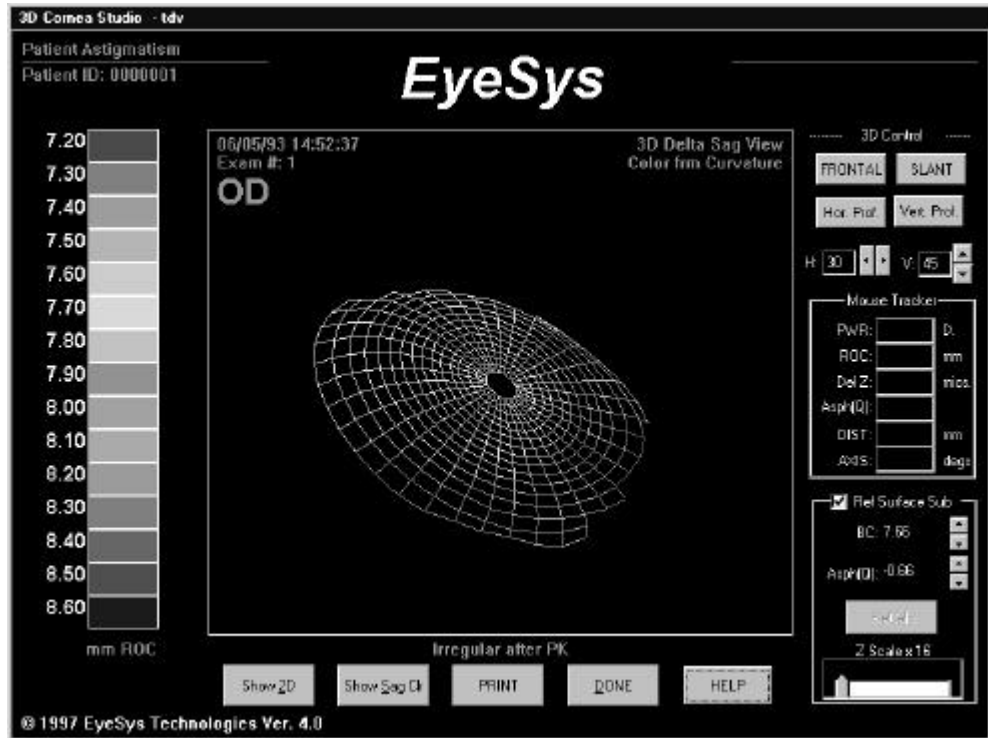
Screen 5-12 3D Cornea Studio

3D Cornea Studio Main Screen Controls

You can use the following controls to change the way corneal data is displayed on the 3D Cornea Studio display. Each control is explained below.

3D Position Controls

Located in the upper right of the display, these controls allow the user to position the cornea in any spatial orientation. There are two types of controls, buttons and spinners. The spinners allow direct specification of the display orientation angles, in 5 degree increments. The range is -90 to 90 degrees in each direction. The buttons allow viewing the cornea in the following pre-determined positions:

♦ FRONTAL—presents the data in frontal view

♦ SLANT—presents the data in a slanted view

♦ Hor. Prof.—presents the data from the side, with the cornea "pointing" upwards, in sag view. In delta sag view, the plot points upward if the cornea is steeper than the reference surface and downwards otherwise.

♦ Vert. Prof.—presents the data from the side, with the cornea "pointing" to the right, in sag view. In delta sag view, the plot points to the right if the cornea is steeper than the reference surface and to the left otherwise.

Show 3D / 2D Toggle Button

Located in the lower left, this button instantly redisplays the cornea in a 2D or 3D format.

Color=Curv./Color=Sag Toggle Button

This button instantly redisplays the cornea using color information according to the following legend:

♦ Sagittal View—the map's color represents sagittal height. Blue is flattest, red is steepest, with respect to the corneal Apex plane.

♦ Sagittal Difference View—the map's color represents sagittal height difference from the reference surface. Blue is where the cornea is flattest with respect to the reference surface (above), and red is steepest (below). Note that the corneal and reference surfaces are registered at the corneal apex.

♦ Curvature View—the map's color represents corneal curvature. Blue is flattest and red is steepest. Note that the legend can be displayed in Diopters, or mms.

Recalc Button

In 2D View, you must click this button to redisplay the data, if you make changes to the Reference Surface subtraction parameters. Otherwise, it redraws the same map.

In 3D View, the Recalc button is inoperative, since the data is redrawn automatically after every parameter change.

Reference Surface Subtraction

If the Ref. Surface Sub checkbox, located in the lower right, is selected, and the Color mode is Sagittal, then the map displayed represents the sagittal height difference between the cornea and a standard aspheric surface (an elliptical surface) where:

$$Z = \frac{- X * X}{BC + \sqrt{BC * BC - (1 - E * E) * X * X}}$$

When this data is first displayed, the base curve of the reference surface is made equal to the cornea's central curvature on the first ring at the zero-degree meridian, and its eccentricity is set to that of the cornea's horizontal semi-meridian.

The user can alter the Base curve and eccentricity of the reference surface via the spinner (arrow) controls.

The user can also alter the scale factor in the Z direction, via the Z-scale slider control. This helps magnify the "Surface Detail", by scaling the data in the Z direction with a scale factor that is proportionately larger than in the X-Y directions. This relative scale factor is the number displayed above the slider control. This is called asnisotropic plotting.

For Example: If the scale factor is 10, then the data is amplified by a factor of 10 along the Z dimension, with respect to the X-Y dimensions, so that 1mm in the X or Y dimension (grid square) corresponds to 0.1mm in the Z direction.

Note that a positive delta Sag value at a particular point in the corneal vertex plane means that the corneal surface is above the reference surface.

5

Setting Program Options

This dialog is invoked with a right mouse click, and allows the user to permanently alter the following settings:

♦   Use Diopters, instead of mm for the curvature map. If this is selected, the numbers on the color legend represent axial curvature in Diopters. Otherwise, the radius of curvature in mm is displayed.

♦   Display mm Grid. When selected, this displays a mm grid in either 3D or 2D views. In 3D view, the grid is always parallel to the Corneal vertex plane. In sagittal display mode, the grid is at a distance of 1.7 mm below the cornea vertex (towards the retina). In sagittal difference mode, the grid is in the Corneal vertex plane.

5

Pro-Fit™ Contact Lens Fitting

This chapter describes the basic procedures on how to use the EyeSys System 2000 *Pro-Fit* Contact Lens Fitting Software.

For more detailed information about contact lens fitting, refer to the booklet *Contact Lens Fitting with the EyeSys System 2000 Pro-Fit Software* by Beth A. Soper, that was included with your system. The following topics are covered in this chapter:

♦ Accessing and Starting Contact Lens Fitting

♦ Fitting Soft Contact Lenses

♦ Trial Fitting Soft Lenses

♦ Ordering Soft Lenses

♦ Fitting RGP Lenses

♦ Using the Simulated Fluorescein Procedure

♦ Ordering RGP Lenses

♦ Tracking Soft Lens Usage

♦ Clinic Name, Address, and Telephone Number

The first two sections of this chapter explain how to access contact lens fitting and update your contact lens database. If you are already familiar with these actions, proceed to "Starting Contact Lens Fitting" below.

Accessing Contact Lens Fitting

Contact lens fitting procedures can be accessed from either the Examination Process path or the Patient Exam Review path of the System 2000 Pro-Fit Software. Details on how to access contact lens fitting from both paths are provided below. Select a procedure, depending on your current location in the System 2000 Software.

6

> ⓘ **Notice**
>
> Patient files from other EyeSys software such as EyeCon+, EyeCon, EyeSys DOS or Exported must first be imported into the System 2000 database before performing contact lens fitting. Refer to "Importing Other Patient File Types" in Chapter 8 to convert these patients.

Examination Process Path

If you are performing a patient examination, use this procedure to access contact lens fitting for that patient:

1. After you have captured the patient's eye image, processed the eye image, and printed the exam display, as described in Chapter 4, the Exam Complete screen appears.

2. From the Exam Complete screen (Screen 4-20), click on Display. The Select Display screen (Screen 5-3) appears.

3. Go to "Starting Contact Lens Fitting" below.

Display Patient Data Path

Use this procedure to access contact lens fitting from the Patient Exam Review path. These steps have been shortened for brevity. For complete details on each step, refer to Chapter 5.

1. From the Main Menu (Screen 4-1), click on Display Patient Data. The Patient Locator Screen (Screen 5-1) appears.

2. Select a patient, then select an OD exam, OS exam, or both and click on Display. The Select Display screen (Screen 5-3) appears.

3. Go to "Starting Contact Lens Fitting" below.

6

Starting Contact Lens Fitting

Perform the steps below to begin contact lens fitting:

1. From the Select Display screen (Screen 5-3), click on Contact Lens. The Patient Evaluation screen appears (Screen 6-1).

   The Patient Evaluation screen displays the following information for each OD or OS eye exam you selected earlier:

   - Current date

   - Patient ID number and name

   - Exam number and date

   - Keratomy data in millimeters and diopters

   - Corneal eccentricity

   The keratomy data and corneal eccentricity are derived from the captured eye image data.

2. Complete the Patient Evaluation screen by following the instructions in the sections "Selecting a Fitting Protocol," "Entering the Spectacle Refraction," and Selecting the Lens and Correction Type."

   If you want to update the contact lens database, refer to "Updating the Contact Lens Database" below.

   If you want review soft lens usage, refer to "Tracking Soft Lens Usage" later in this chapter.

6

Screen 6-1 Patient Evaluation

Updating the Contact Lens Database

When the Patient Evaluation screen is first displayed, the contact lens database version, source, and whether it is current is shown near the bottom of the screen. You can use the Subscription Info button to provide information about acquiring or updating the database.

The Subscription Information screen (Screen 6-2), shown below, displays a list of distributors for each country.

To determine your distributor, use the scroll bar and click on your country. The address and telephone number of the nearest EyeSys distributor appears to the right. Contact EyeSys at the address shown to update your database.

Screen 6-2 Subscription Information

Proceed to "Selecting a Fitting Protocol" below.

Selecting a Fitting Protocol

Contact lens fitting preferences or fitting protocols may be selected by following these procedures:

1. From the Patient Evaluation screen, click on the arrow next to the box labeled "Select a Fitting Protocol." A list of Fitting Protocols appears.

2. Click on the Fitting Protocol you desire. The selected Fitting Protocol is displayed. Proceed to "Entering the Spectacle Refraction" below.

    If you did not find the Fitting Protocol you want or you want to change, review, or delete an existing Fitting Protocol, proceed to "Customizing Fitting Protocols" below.

Customizing Fitting Protocols

To change, review, or delete an existing fitting protocol or design a new one, follow these procedures:

1. From the Patient Evaluation screen, click on Protocol. The Customized Fitting Specification screen appears.

6

Screen 6-3 Customized Fitting Specification

2. Enter a new Fitting Protocol name or select an existing Fitting Protocol.

3. Select one of the five RGP Back Surface Designs. This data is used later during "Selecting an RGP Lens."

4. Select the format you want to use for refraction data—Plus or Minus Cylinder.

5. Select the units you want to use for Base Curves—Millimeters of Radius or Diopters.

6. Select as your general preference the RGP lens type you want to use— Manufacturer Stock or Custom. This data is used later during "Selecting an RGP Lens."

7. In the Lens Defaults window at the bottom left of the Fitting Protocol screen, select the:

    • RGP Custom Lens Diameter Criteria—Constant Diameter, or Millimeters less than the Horizontal Visible Iris Diameter.

    • RGP Custom Lens Name and Diameter. Use the scroll bar and click on your selection.

    • RGP Manufacturer Stock Lens Name and Diameter. Use the scroll bar and click on your selection.

    This data is used later during "Selecting an RGP Lens."

8. On the bottom right of the Fitting Protocol screen, set the sagittal tear depth of the RGP lens/cornea relationship. The sagittal tear depth can be varied from 0 to 60 microns.

    If you want to increase the sagittal tear depth, click on the Steeper arrow or move the sliding button to the right and click on Recalculate Fluorescein.

    If you want to decrease the sagittal tear depth, click on the Flatter arrow or move the sliding button to the left. and click on Recalculate Fluorescein.

9. Click on Save. The new or changed protocol is saved. Continue with step 2 of "Selecting a Fitting Protocol" above.

> ⓘ **Note**
>
> If you want to delete a Fitting Protocol, perform steps 1 and 2 above and then click on Delete.

6

Entering the Spectacle Refraction

To enter the patient's latest spectacle refraction data on the Patient Evaluation screen, follow these steps:

1. Use the table below to enter spectacle refraction data.

Screen 6-4 Spectacle Refraction

Field	Action
Sphere	Enter the patient's spherical refraction in diopters. If the spherical value is plano, then 0.00 must be entered or press the **TAB** key.
Cylinder	Enter the patient's cylindrical refraction in diopters. If the patient's prescription is spherical only, 0.00 must be entered or press the **TAB** key.
Axis	Enter the cylinder axis in degrees. If the patient's prescription is spherical only, 0.00 must be entered or press the **TAB** key.

2. You may need to enter the following optional information in the Spherical Rx box:

Vertex	Enter the vertex distance of refraction. The system uses 12.00 mm as a default.
Vis. Iris Dia.	Enter the diameter of the visible iris. The system uses 12.00 mm as a default.
Near Add	Enter the bifocal add power.

Go to the next section to select the lens type.

Selecting the Lens and Correction Type

Follow these steps to select the lens and correction type. After entering the spectacle refraction, the Predicted Residual Astigmatism (PRA) is calculated and displayed for each lens type on the Patient Evaluation screen. PRA is the amount of uncorrected astigmatism that may be present based upon the spectacle refraction and corneal toricity.

Lens Type

In the lens type area shown below, select the lens type as follows:

LENS	PRA
O RGP	-0.75 × 016
O Soft	-0.50 × 180
⊛ Soft Toric	-0.00 × 180
O RGP Toric	

Screen 6-5 Lens Type

1. Using the calculated PRA as a guide, select the appropriate lens type—RGP, Soft, or Soft Toric by clicking within the button next to the name.

Correction Type

If you entered a bifocal add power in the spectacle refraction area, the Correction Type selection area appears as shown below. Select a correction type as follows:

Correction Type
⊛ Distance   O Monovision   O Bifocal

Screen 6-6 Correction Type

2. Click within the button next to the correction type you desire.

   If you select Distance, go to step 4.

If you select Monovision, the Near Lens selection area appears as shown below. Go to step 2.

─Near Lens─
⊛ OD O OS   % of Near Add in Lens [100%] ⬇

Screen 6-7 Near Lens Selection

3. Select which eye (OD or OS) is to have the near vision power correction.

6

4. Select what percentage of the bifocal add power is to be used for calculation of the reading lens.

5. Go to the next section as directed below:

    If the lens type you chose was soft, continue with "Fitting Soft Lenses" below.

    If the lens type you chose was RGP, proceed to "Fitting RGP Lenses" later in this chapter.

Fitting Soft Lenses

The Soft Lens Selection screen, on the next page, displays the following information:

♦ Patient name, ID number and current date

♦ Exam number, date, and vertex distance

♦ Simulated Keratomy data in diopters and millimeters

♦ Visible Iris Diameter

♦ Bifocal add power and corneal eccentricity

The simulated keratomy data and corneal eccentricity are derived from the captured eye image data. Proceed to "Selecting a Wearing Option" below.
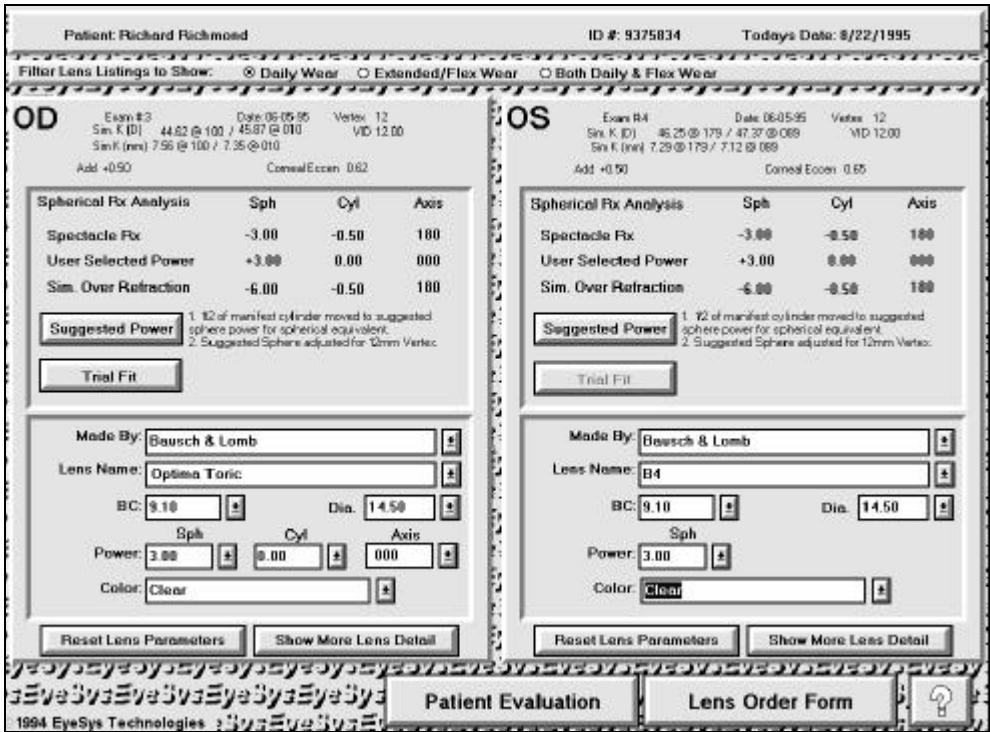
Screen 6-8 Soft Lens Selection

Selecting a Wearing Option

When you choose an wearing option, the software limits the manufacturers and lenses to those that meet the option you selected. You may choose from the following wear options:

- ♦ Daily
- ♦ Extended/Flex
- ♦ Both Daily and Extended/Flex

To choose a wearing option, use the following procedure:

1. Select which wearing option you desire by clicking within the button next to your choice at the top of the screen. Proceed to "Selecting a Soft Lens".

6

EyeSys Corneal Analysis System

Selecting a Soft Lens

The following information is displayed in the Lens Analysis area of the Soft Lens Selection screen to help you select a soft lens.

Data	Definition
Spectacle Rx	These values are the same values entered on the Patient Evaluation screen.
Suggested CL Power	A spherical equivalent calculation that is compensated for vertex distance and/or monovision when applicable.
Simulated Over Refraction	The predicted phoropter over refraction for optimum **distance** acuity.

You may select a lens by specifying the manufacturer and then the lens name or you may specify the lens name. In this case the manufacturer will be filled in automatically. You may view detailed information about each lens to help you make your selection.

To select a soft lens, follow these procedures:

Screen 6-9 Lens Parameters

2. Click on the arrow next to Made By or Lens Name box and select a manufacturer or lens name.

   If you select a manufacturer, click on the arrow next to lens name and select a lens name from the list.

   If you select a lens name, the manufacturer will be filled in automatically.

   Before entering the lens parameters, you can view detailed information from the manufacturer about the lens you chose by clicking on Show More Lens Detail and following the instructions in "Viewing Lens Information" below.

3. Click on the arrow next to the BC box and select one of the base curves available for the lens you chose.

4. Click on the arrow next to the Dia. box and select one of the diameters available for the lens you chose.

5. Click on the arrow next to the Spherical box and select one of the power values available for the lens you chose.

    If you chose toric lenses, also select values in the Cylindrical and Axis boxes.

    Use the Suggested CL Power data and the calculated Simulated Over Refraction data in the Lens Analysis area of the screen as a guide for choosing power values for the selected lens.

    After you enter a power value, Suggested CL Power changes to User Selected Power. The User Selected Power and the calculated Simulated Over Refraction data change to reflect the entered power value.

6. Follow the table below for your next action:

If you want to ...	Then click on ...
Recall the previous Suggested CL Power data	Suggested Power
Reset your lens choice	Reset Lens Parameters
Perform a trial fit of the soft toric lenses	Trial Fit and go to "Performing a Trial Fit" below
Order lenses	Click on Lens Order Form and go to "Ordering Soft Lenses" later in this chapter
View detailed information about the lens you chose	Click on Show More Lens Detail and go to "Viewing Lens Information" later in this chapter

Performing a Trial Fit

If you selected a toric soft lens for your patient, you have the option of performing a trial fit using the manufacturer trial lens set or the actual lens dispensed to the patient. To perform a trial fit, follow these procedures:

6

1. Select a lens from the manufacturer trial lens set closest to the refractive axis of the patient or use the lens dispensed to the patient.

> ⓘ **Note**
>
> Make a note the Lens Rotation and Orientation of the scribe marks as if you were looking directly at the patient.

Screen 6-10 Trial Fit

2. Click on the arrows next to Lens Rotation and Orientation and enter the lens data.

3. Click on OK.

4. Place the lens on the patient's eye and refract again.

5. Change the lens fitting specifications, if necessary.

When you have finished with the trial fitting, click on Lens Order Form and go to "Ordering Soft Lenses" below.

Viewing Lens Information

After clicking on Show More Lens Detail, you may view the following detailed lens information:

♦ Lens Name, Class, Design, Material, Mfg. Method, DK, and H_2O Content (Soft) or Wetting Angle (RGP)

♦ Lens Care, Wearing Schedule, Life Expectancy

♦ Customizing and Manufacturer Information

♦ Fitting Guide (Soft)

♦ Current Lens Parameters (Soft)

If you are fitting soft lenses, you can enter lens parameters in the following screens. Refer to steps 2-4 of "Selecting a Soft Lens" Any changes you make to these parameters will automatically update the values in the Lens Selection window of the Soft Lens Selection screen (Screen 6-8). These parameters are not available when fitting RGP lenses.

If you want the values updated, click on OK.

If you do not want the values updated, click on Cancel.

To view detailed lens information, perform the following procedures:

1. After clicking on Show More Lens Detail. The Lens Information screen appears.

Screen 6-11 Lens Information

If you want to view customizing information, click on Custom Info. The Custom Information screen appears.

6
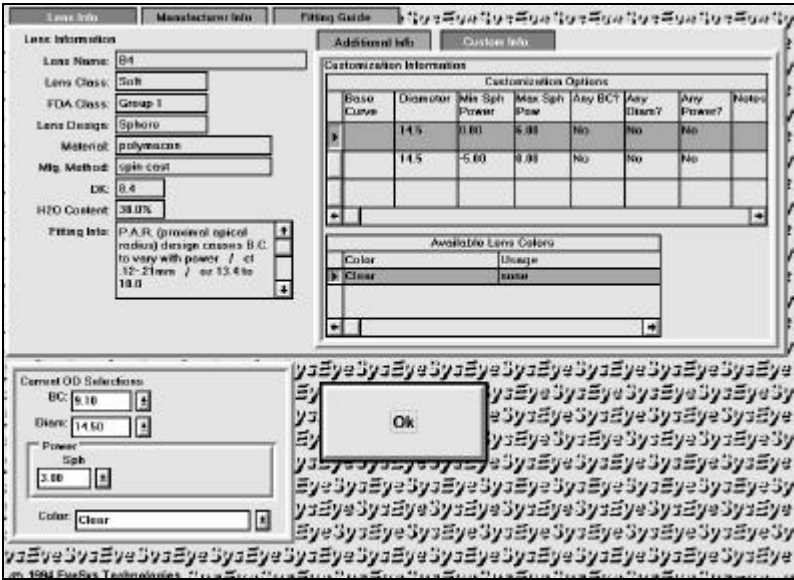
Screen 6-12 Custom Information

If you want to view the manufacturer information, click on Manufacturer Info.
The Manufacturer Information screen appears.
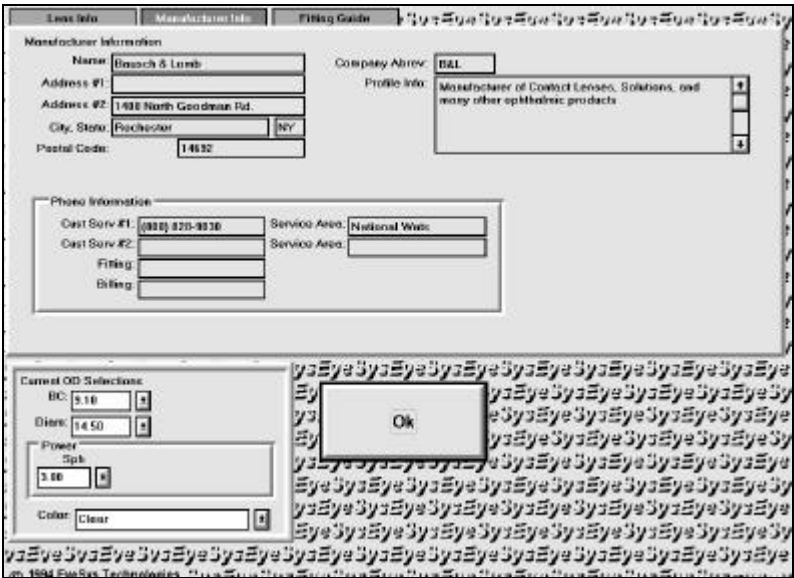
Screen 6-13 Manufacturer Information

If you want to view the Fitting Guide for a soft toric lens, click on Fitting Guide.
The Fitting Guide screen appears.
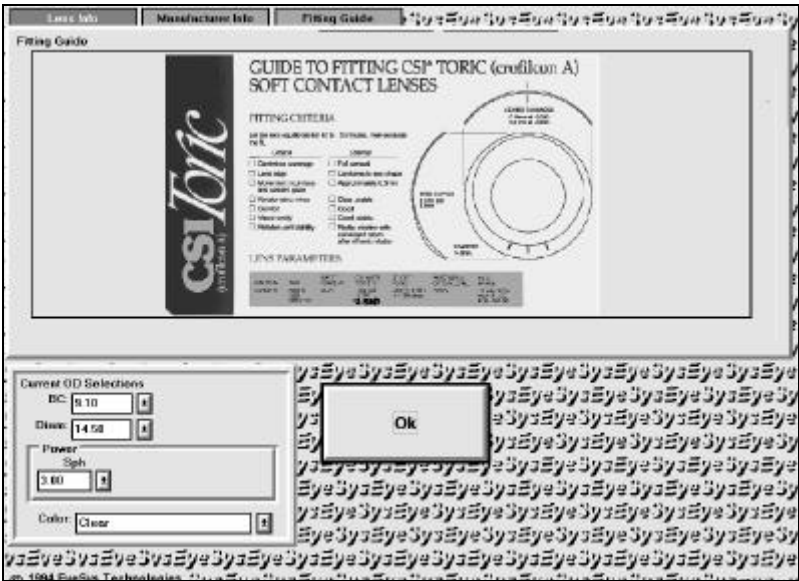
Screen 6-14 Fitting Guide

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2. **If you did not change the soft lens parameters**, go back to step 2 of "Selecting a Soft Lens" on page 6-12.

   If you changed the lens soft parameters, go back to step 5 of "Selecting a Soft Lens" on page 6-12.

   If you are fitting manufactured RGP lenses, go back to step 2 of "Manufactured Lenses" in the "Selecting an RGP Lens" section on page 6-20.

   If you are fitting custom RGP lenses, go back to step 3 of "Custom Lenses" in the "Selecting an RGP Lens" section on page 6-20.

Ordering Soft Lenses

When you click on Lens Order Form from the Soft Lens Selection screen, the Soft Lens Order Form screen appears:

Screen 6-15 Soft Lens Order Form

Follow these procedures to complete the Soft Lens Order Form:

1. Click within the information boxes that you want to complete and type the data.

2. Click within the Include OD or OS boxes to select which lens order form is to be printed.

3. Click on Print Order. The Soft Lens Order Form is printed.

4. Click on Return to go back to the Patient Evaluation screen.

Fitting RGP Lenses

The RGP Lens Selection screen below displays the following information:

♦ Patient Name and ID number

♦ Current Date

♦ Exam Number and Date

♦ Simulated Keratomy Data in Millimeters and Diopters

♦ Effective Add Power and Visible Iris Diameter

♦ Corneal Eccentricity and Predicted Residual Astigmatism Calculation

♦ Patient's Spectacle Refraction
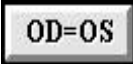
The Simulated Keratomy data and Corneal Eccentricity are derived from the captured eye image data. Proceed to "Selecting an RGP Lens" below.

6
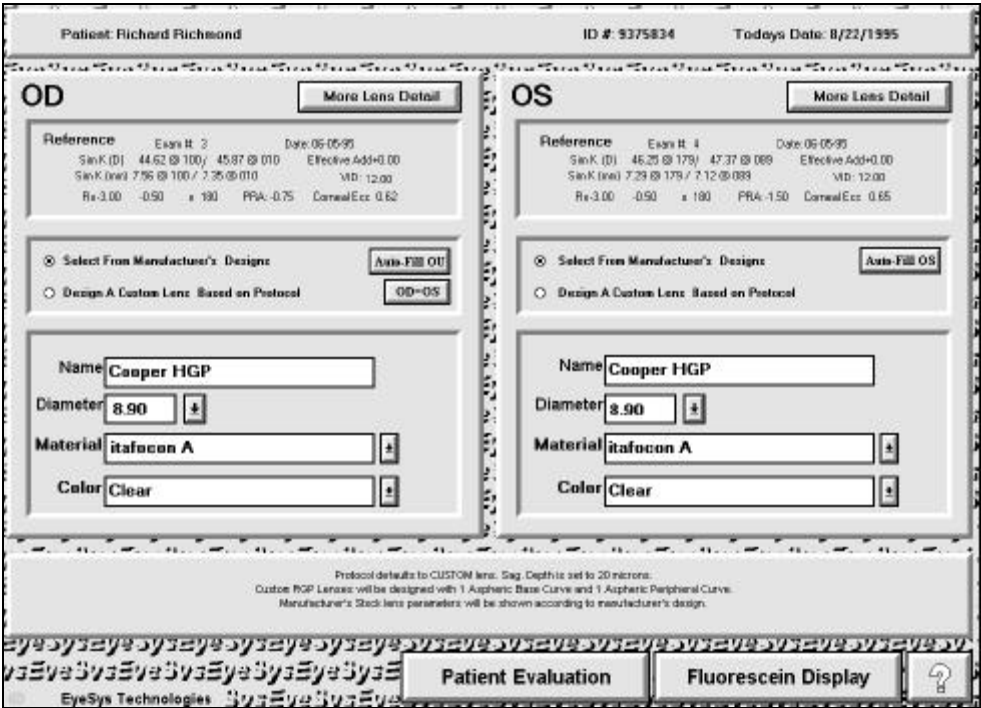
Screen 6-16 RGP Lens Selection

Selecting an RGP Lens

You may perform RGP lens fitting by selecting a lens from a variety of
manufacturers or by custom fitting a lens using EyeSys topography-based software
algorithms. Either method provides a base curve that achieves the desired lens-to-
cornea relationship specified in the Fitting Protocol. Data from the Fitting Protocol
is displayed at the bottom of the screen. Proceed to the type of RGP lens you want to
select.

> **ⓘ**   **Note**
>
> **If you are fitting lenses for both eyes**, you may copy the lens information to the other eye by clicking the copy button.
>
>   `OD=OS`
>
> **If you want to use the RGP lens preferences from the Fitting Protocol you used**, click on the Auto-Fill button shown to the right.
>
>   `Auto-Fill`

Manufacturer Lenses

Manufacturer stock designs are comprised of proprietary information that may not be disclosed to the general public. To select a manufacturer lens, follow these procedures:

1. Click on the arrow next to the Name box and select a lens name.

   To view detailed information about the lens you chose, click on Show More Lens Detail and go to "Viewing Lens Information" above.

2. Click on the arrow next to the Diameter box and select a diameter.

3. Click on the arrow next to the Material box and select a material.

4. Click on the arrow next to the Color box and select a color. Proceed to "Using the Simulated Fluorescein Screen" below.

Custom Fit Lenses

Custom fit lenses are based on the Fitting Protocol's Back Surface Design. The peripheral curve corneal edge clearance is calculated to achieve as close to 0.08 mm as allowed by each patient's topographical information. To specify a custom fit lens, follow these procedures:

1. Click on the arrow next to the Diameter box and select a diameter.

2. Click on the arrow next to the Material box and select a material.

   To view detailed information about the lens you chose, click on Show More Lens Detail and go to "Viewing Lens Information" above.

3. Click on the arrow next to the Color box. Select a color and proceed to "Using the Simulated Fluorescein Screen" below.

6

Using the Simulated Fluorescein Screen

The Simulated Fluorescein screen, shown on the next page, provides the following:

♦ Displays the current RGP contact lens design parameters

♦ Displays a simulated fluorescein pattern for the current lens

♦ Allows the operator to change any contact lens design parameter and view the resulting change in the fluorescein pattern

♦ Displays the sagittal and circumferential sagittal tear depths

♦ Allows the operator to pan and tilt the lens over the eye surface and view the resulting change in the fluorescein pattern
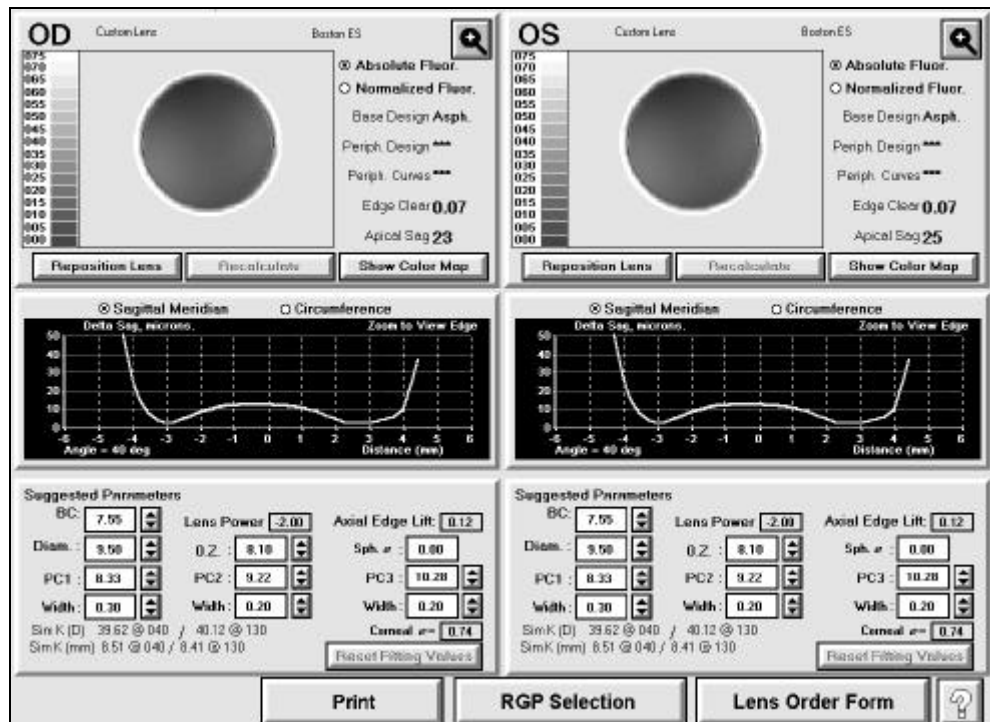
Screen 6-17 Simulated Fluorescein Pattern

To take full advantage of the Simulated Fluorescein screen, review the following four functional sections.
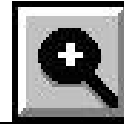
Simulated Fluorescein Map

The pattern at the top of the screen displays the thickness, in microns, of the
simulated fluorescein fluid between the cornea and the contact lens. The values of
the absolute color bar on the left are from zero to 75 microns. For most cases, these
values have been determined to be the most realistic for simulated fluorescein. The
fluorescein values are displayed using either an absolute or normalized scale.

You may change the scale used by following the step below:

1. 1.   Click within the button next to Absolute or Normalized.
    The appropriate pattern will appear.

Tear Depth Profile Plot

The graph in the middle of the screen displays either the Meridian or Circumferential
Sagittal profile plot.

To switch between the two plots, follow this step:
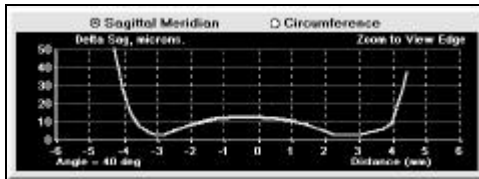
2. Click within the button next to
    Sagittal Meridian or
    Circumferential.

    The appropriate plot will appear.

Screen 6-18 Sagittal Meridian Plot

The Sagittal Meridian profile plot displays the tear film thickness, in microns,
that is across an axis meridian. Initially the flat axis meridian is used. You can
change the meridian by pointing and clicking the left pointing device button on
any axis within the Simulated Fluorescein pattern display.

The Circumferential Sagittal profile plot displays the thickness of the tear film
in a 360° circle. The initial display is at the center of the lens (0.0 mm.) You can
change this reading by pointing and clicking the left pointing device button at

6

any distance from the lens center desired within the Simulated Fluorescein pattern display.

Reposition Lens

To pan or tilt the position of the lens on the eye surface, click on the Reposition Lens button. The Lens Positioning Controls screen appears.

1. Follow the table below to pan or tilt the lens on the eye surface.
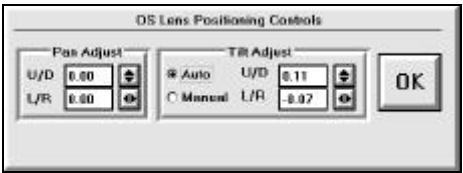
Screen 6-19 Lens Positioning Controls

This table describes the Pan and Tilt positioning controls for the Simulated Fluorescein Map:

Position Control	**Units**	**Description**
Pan R/L	Millimeters	Moves the lens right or left in 0.1 mm increments
Pan U/D	Millimeters	Move the lens up (superior) or down (inferior) in 0.1 mm increments
Tilt Auto/Manual	None	Turns on Auto or Manual Tilt control. Auto is the default
Tilt R/L	Degrees	Tilts the lens right or left in 0.02° increments
Tilt U/D	Degrees	Tilts the lens up or down in 0.02° increments

2. Click on OK for the change to take place.

6

Contact Lens Parameters

The bottom of the screen displays the current contact lens parameters. You may change the following parameters and view the result on the Simulated Fluorescein pattern:

♦ BC

♦ Diameter

♦ Peripheral Curve

♦ Width

♦ Optical Zone

Lens Power, Axial Edge Lift, and CL eccentricity are provided for information only.

To change the values of these parameters and view the resulting fluorescein pattern, follow these steps:
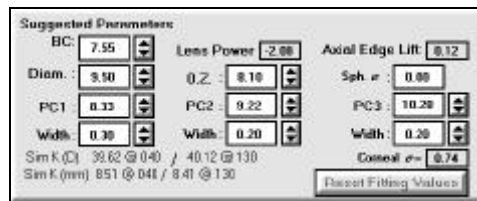
1. Click within the box or click the arrow next to the parameter you want to change and select or enter a new value.

2. Click on Recalculate for the changes to take place.

Screen 6-20 Contact Lens Parameters

Color Map

To display a color map for the eye you are fitting, follow these instructions:

1. Click on Show Color Map. A Color Map is displayed next to the Simulated Fluorescein pattern.

6
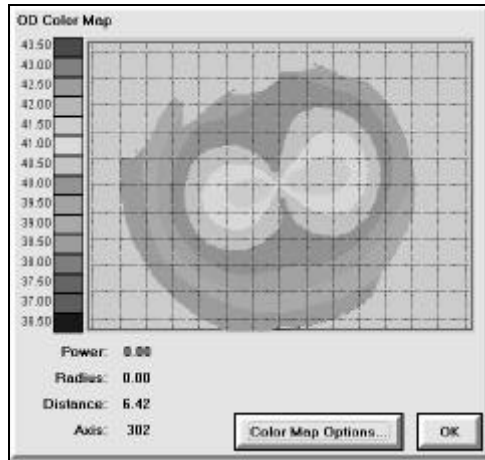
Screen 6-21 Color Map

The Color Map uses color to depict corneal curvature. It is derived using an axial (sagittal) radius of curvature.

Tip: Pay close attention to the color scale's middle value and step size when evaluating a cornea. The normalized scale can sometimes cause extreme corneas to look normal and normal to look extreme.

If you want to change the color map layer options, click on Color Map Options.

2. To return to the previous screen, click on OK.

Modifying an RGP Lens

To modify the fit of an RGP lens, follow these procedures:

1. Observe the simulated fluorescein pattern.

2. Adjust the contact lens parameters and position controls to modify the contact lens fit as desired.

   Use the Meridian Sagittal Profile and the Circumference Sagittal Profile plots to view the tear film thickness.

   To correlate the patient's corneal topography and the simulated fluorescein patterns use the Color Map and center the lens over the steepest portion of the map.

3. When satisfied with the contact lens fit, you may print the Simulated Fluorescein screen or proceed to ordering the RGP lenses.

   To print the Simulated Fluorescein screen, click on Print at the bottom of the screen. A message notifies you that the screen will be printed upon exit.

To order the RGP lenses, click on Lens Order Form in the lower, right of the screen. The RGP Lens Order Form screen appears and the Simulated Fluorescein screen is printed if Print Screen on Exit were enabled.

Proceed to "Ordering RGP Lenses" below.

Ordering RGP Lenses

When you click on Lens Order Form from the Simulated Fluorescein screen, the RGP Lens Order Form screen appears:

Screen 6-22 RGP Lens Order Form

Follow these procedures to complete the RGP Lens Order Form:

1. Click within the information boxes that you want to complete and type your data.

2. Click within the box next to Include OD or OS until an X is displayed to select which lens order form is to be printed.

3. Click within the appropriate button to dot a lens.

4. Click on Print Order. The RGP Lens Order Form is printed.

5. Click on Patient Evaluation to go back to the Patient Evaluation screen.

Tracking Soft Lens Usage

The System 2000 software can track and display the usage of soft lenses and sort the data by the following:

♦ Times Used

♦ Access Date

♦ Lens Name

♦ Manufacture

This data is useful when analyzing inventory control, buying patterns, and financial data. From the Soft Lens Usage screen, you can view, sort, or reset lens usage information.

You can also enter information about your clinic. Refer to "Clinic Name, Address and Telephone Number" below to enter this data.

To display soft lens usage, follow these steps:

1. From the Patient Evaluation screen, click on Defaults. The Soft Lens Usage screen appears as shown on the next page.

6

Soft Lens Usage

Lens Name	Manufacturer	Times Used	Last Access
Aqua-Sphere 53	Aqua-Site	4	6/27/96
Ideal Soft	Ideal Optics	3	6/27/96
Accugel Sphere	Accugel Labs	2	6/27/96
AL-47 Sphere	Alden Optical	2	6/27/96
AOSoft	CibaVision Corp.	2	6/27/96
B3	Bausch & Lomb	2	6/27/96
Biocurve Soft	BioCurve Soft Lenses	2	6/27/96
Celusoft	Fashion Contacts	2	6/27/96
CLL 38	Contact Lens Labs of	2	6/27/96
CO Soft DW	California Optics	2	6/27/96
Continental 45 Sphere	Continental Soft Lens,	2	6/27/96
Cooper Clear	CooperVision	2	6/27/96
Epcon Soft Lens	Epcon Labs	2	6/27/96
Firesoft DW	Firestone Optics, Inc.	2	6/27/96
Flexlens Custom Sphere	Flexlens, Inc.	2	6/27/96
Kontur 55 Sphere	Kontur Kontact Lens	2	6/27/96
Multiflex Custom	Eyecon, Inc.	2	6/27/96

View This Screen By

⊙ Times Used

○ Access Date

○ Lens Name

○ Manufacturer

Usage Values

Reset All To Zero

Clinic

Name EyeSys Institute
Address 2776 Bingle Road
Houston, TX 77055
Phone (713) 465-1921

Accept

Done

Screen 6-23 Soft Lens Usage

2. **To sort the soft lens usage data**, click within the button next to Times Used, Access Date, Lens Name, or Manufacturer. The list of soft lenses is sorted according to your selection.

   To reset the soft lens usage data, click on Reset All to Zero. The soft lens usage data is reset.

   > ⓘ **Note**
   >
   > If you change manufacturers or lens preferences, it could take time for new usage data to move to the top of the list. In this case, you might consider resetting the soft lens usage data.

3. When finished viewing the soft lens usage data, click on Done.

6

Clinic Name, Address, and Telephone Number

To have your clinic name, address, and telephone number appears on your printed output, follow these steps.

1. From the Patient Evaluation screen, click on Defaults. The Soft Lens Usage screen (Screen 6-23) appears as shown earlier.

2. Click within the clinic name, address, and phone fields to enter your clinic's information.

3. When finished entering the information, click on Accept.

   If you changed the data, a message window appears confirming your intention.

6

Calibration

Calibrating your system is simple, takes only a few minutes, and ensures the accuracy and repeatability of your data. This chapter provides a recommended calibration schedule, and describes the following procedures:

♦   Starting the calibration

♦   Verifying the calibration of the Videokeratoscope

♦   Calibrating the Videokeratoscope and imaging processing electronics

To insure the same accuracy of data collection for all of your patients, follow these procedures exactly and on a timely basis.

Calibration Schedule

To determine when to verify the calibration or calibrate the system follow this table:

What to Perform	When to Perform
Verify Calibration	On a weekly basis and after every calibration
Calibrate	On a monthly basis, or Whenever the system is moved, or Whenever the lighting conditions change

Calibration Guidelines

When performing either of the calibration procedures, ensure the following guidelines are met:

♦ Make sure the table is stationary.

♦ Use the same lighting conditions as when taking an exam.

♦ Make sure no bright lights are reflecting off the calibration spheres.

♦ Power on the Videokeratoscope and the computer at least 5 minutes before beginning to ensure the cameras are stabilized.

♦ Make sure the calibration object is free from dust and fingerprints.
To clean the calibration object, use alcohol and wipe with a clean, soft, lint-free cloth.

Starting the Calibration

To start either of the calibration procedures, follow these steps:

1. From the Main Menu, click on the System Utilities button. The System Utilities Menu appears.
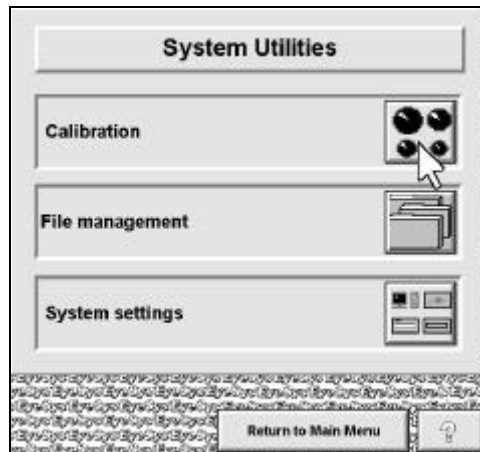
Screen 7-1 System Utilities

2. Place the stem of the calibration object in the hole in the center of the chin rest. The guides ensure that the calibration spheres are squarely facing the placido dish.

   Be sure to pivot back the plastic protective cover which flips over to the back side of the object. If present, remove the clear plastic shipping cover.

3. Raise or lower the chin rest until the small hole in the stem of the chin rest is aligned with the lower edge of the forehead rest ring.

EyeSys Corneal Analysis System

4. Click on the Calibration button. The Calibration Menu appears.

Screen 7-2 Calibration Menu
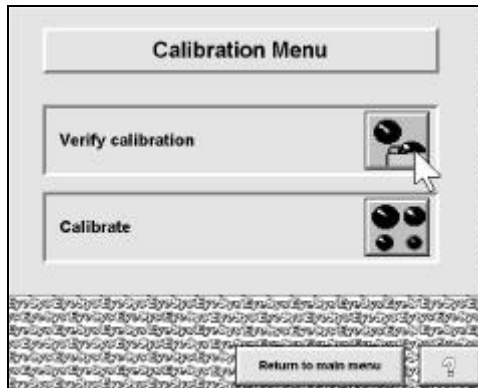
5. You can proceed to "Verifying the Calibration" or "Calibrating the System" below.

Verifying the Calibration

This procedure describes how to verify that the calibration is precise. The actual calibration procedure follows later in this chapter.

Screen 7-3 Calibration Verification Instructions
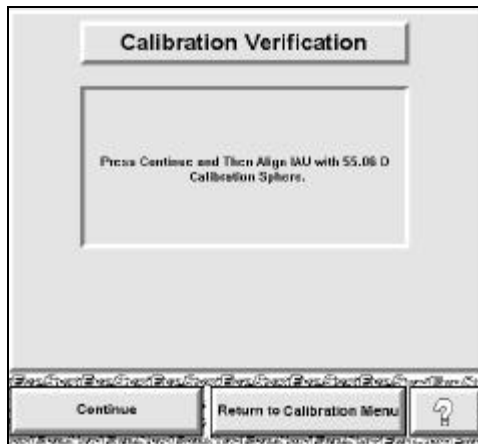
1. From the Calibration Menu, click on Verify Calibration. The Calibration Verification Instructions screen appears.

2. Observe the instructions on the screen and click on Continue. The Calibration Verification Live Image screen appears.
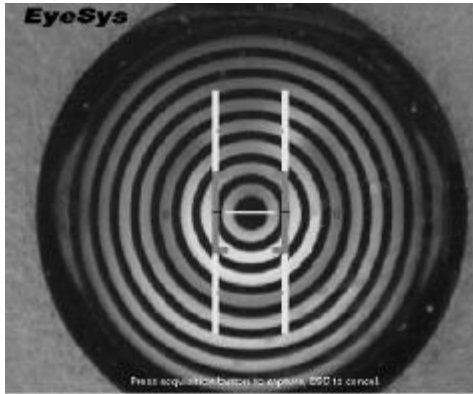
Screen 7-4 Calibration Verification Live Image

3. Align the 55.06 diopter (6.13 mm) calibration sphere.

   Using the joystick, adjust the image until it is centered in the centering box.

4. When the calibration sphere is centered, press the acquisition button on top of the joystick.

The system automatically moves to the 42.51 diopter calibration sphere, centers it within the centering box, focuses, and processes the image to find the rings.

After the system has located the rings, the Calibration Verification Rings Located screen appears.
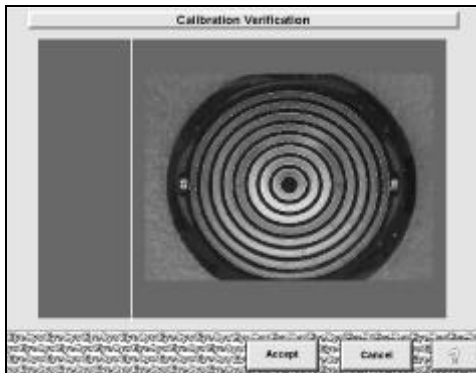
Screen 7-5 Calibration Verification Rings Located

5. Look at the image and verify that the rings were located properly and are complete.

   Make sure the red and yellow concentric rings alternate. The red rings should be located on the outer edge of the black rings and the yellow rings should be located on the outer edge of the white rings.

If the rings look OK, Click on Accept. The Calibration Verification Color Map screen appears. Go to step 7 below.

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If the rings were not located properly or are incomplete, click on Cancel. The system moves back to the 55.06 diopter calibration sphere and the Calibration Menu reappears. From this point you may follow the list below and repeat "Verifying the Calibration" or perform system calibration by proceeding to "Calibrating the System" below.

- Clean the calibration spheres by wiping them with a clean, soft, lint-free cloth that has been slightly dampened with alcohol.

- Check the lighting conditions. Ensure that no bright lights are reflecting off the calibration spheres.

- Check the image processing parameters in the section "Changing Image Processing Options" later in this Chapter. The default values for these options are listed.
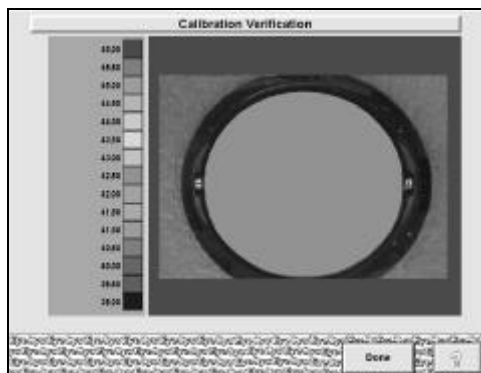
6. Observe the color map that was placed over the calibration sphere image. No color changes within the color map indicate that the curvature values are within ± 0.25 diopters and you do not need to calibrate the system.

If you see no color changes, click on Done.

Screen 7-6 Calibration Verification Color Map

If you see color changes, the calibration is not within the curvature values. Click on Done and go to "Calibrating the System" below.

Calibrating the System

The EyeSys System 2000 contains image capture and processing optics and electronics that must be precisely calibrated. In an effort to provide patients with consistent and accurate corneal analysis, EyeSys has developed a calibration process that is completely automatic.

Follow these procedures to start the automatic calibration process:

1. From the Calibration Menu, click on Calibrate. The Automatic Calibration screen appears.

2. Click on Continue. The System Calibration screen appears.
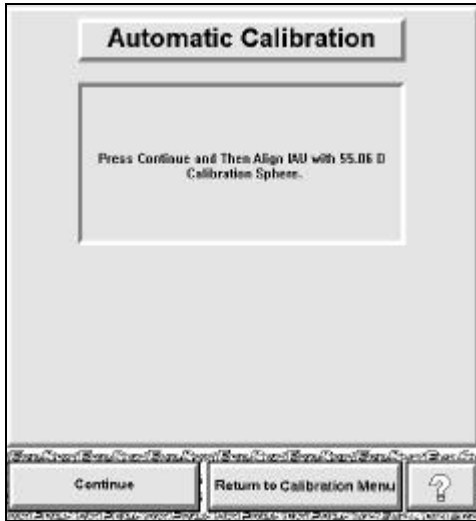
Screen 7-7 Automatic Calibration Screen

3. Align the 55.06 diopter calibration sphere.

   Using the joystick, adjust the image until it is centered in the centering box.

4. Press the acquisition button on top of the joystick. The system will automatically perform the calibration process described below.
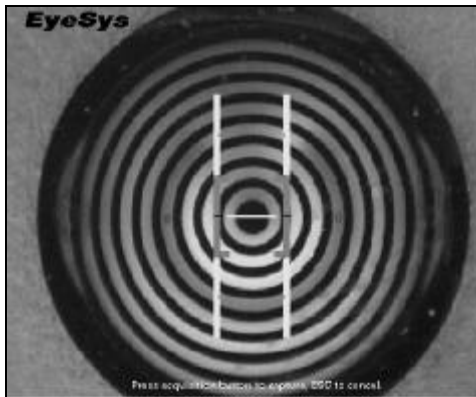
Screen 7-8 System Calibration

Automatic Calibration Process

It takes the system about 20 minutes for the system to perform this process, as outlined below. No further operator attention is required until it is finished.

ⓘ	**CAUTION**
Do not touch the system while performing calibration.	

A. The system moves toward and focuses the 42.51 diopter calibration sphere.

B. The system performs automatic histogram adjustment.

C. This step adjusts the internal image capture and processing electronics to the ambient lighting conditions.

D. The system moves to and focuses the 55.06 diopter calibration sphere.

E. The system calibrates with the 55.06 sphere.

F. The system repeats steps 3 and 4 for each of the three remaining calibration spheres.

G. The system then automatically repeats the process two more times to recalibrate the automatic focus correction capability of the system.

H. When the calibration process finishes, the following message appears.

System 2000
New Calibration data has been created. Press ENTER to continue.
OK

1. Click OK. The Calibration Menu reappears. System calibration is complete.

Screen 7-9 Calibration Completed

If any problems arise during the above procedures, you may want to follow the checklist below to solve the problem.

- Clean the calibration spheres by wiping them with a clean, soft, lint-free cloth that has been slightly dampened with alcohol.

- Check the lighting conditions. Ensure that no bright lights are reflecting off the calibration spheres.

- Check the image processing parameters in the section "Changing Image Processing Options" below. The default values for these options are listed.

- Verify that the chin rest is positioned high enough so that the lower spheres are available during the calibration process.

- Verify that there is nothing covering the spheres such as the clear plastic shield or the bubble-like shipping cover.

This completes "Calibrating the System."

Changing Image Processing Options

Image Processing options are defined as follows:

Processing Option	Description
Arc Gap Length	The maximum number of missing pixels the system will fill in when detecting ring edges. Default value = 20
Center Threshold	The maximum number of missing data points allowed on the center ring before invoking center editing. Default value = 20
Edge Threshold	The minimum amount of contrast that the system recognizes as a ring edge. Default value = 4
Minimum Arc Length	The minimum arc length that the system will accept as a ring. Default value = 45
Pixels per millimeter	The pixels/mm of magnification of the system's camera. This value is factory set and cannot be changed**.** Default value = 365
Surface Curvature	Convex

To change these options, follow these procedures:
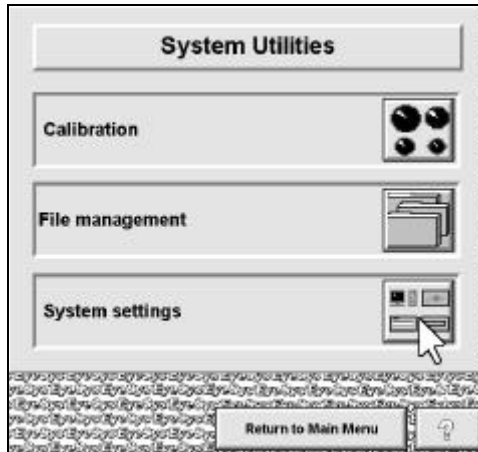
1. From the Main Menu, click on System Utilities. The System Utilities Menu appears.

Screen 7-10 System Utilities

2. Click on System Settings. The System Settings Menu appears.

7

Screen 7-11 System Settings Menu

3. Click on Image Processing Options. The Image Processing Options screen appears.

Image processing options

Arc gap length [20]

Center threshold [20]

Edge threshold [4]

Minimum arc length [45]

Pixel per mil [365]

Surface curvature
⦿ Concave   ○ Convex

Save

Cancel   ❓

Screen 7-12 Image Processing Options
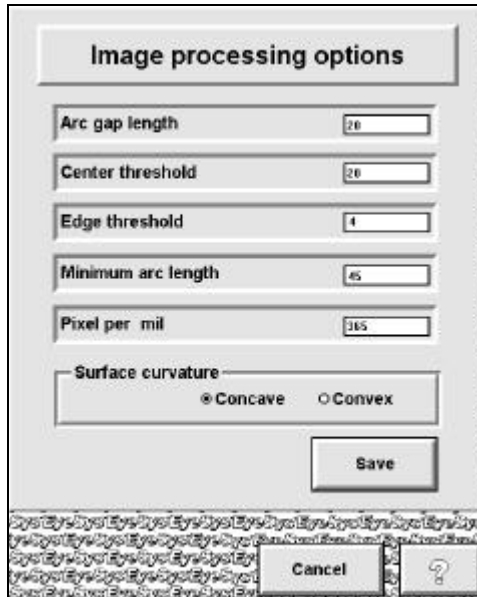
4. Click within the data field you want to change and type in the new values.

5. Click on Save.

   To exit without saving your changes, click on Cancel.

Changing Display Options

This operation allows you to change these display options:

♦ The institution's name on the data maps

♦ The Display Curvature Scale in diopters or millimeters

♦ Whether or not the patient's name is displayed on data maps

To change the display options, follow these procedures:
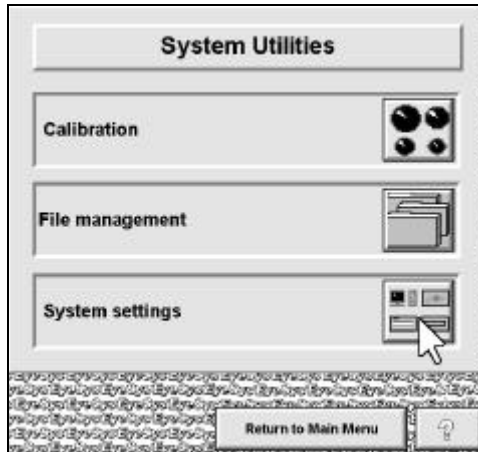
1. From the Main Menu, click on System Utilities. The System Utilities Menu appears.

Screen 7-13 System Utilities

2. Click on System Settings. The System Settings Menu appears.

7

Screen 7-14 System Settings Menu

3. From the System Settings Menu, click on Display Options. The Display Options screen appears.
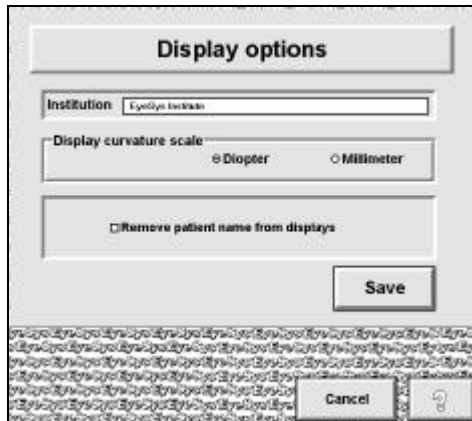
Screen 7-15 Display Options

4. Click within the Institution box and type the institution's name. Leave the box blank if you do not want the institution's name displayed on the map.

5. Choose a Display Curvature Scale.

6. Select whether you want to remove patient names from the data maps.

Processing Option	Default
Institution	Blank
Display Curvature Scale	Diopter
Remove Patient Name	Disabled

7. Click on Save.

   To exit without saving your changes, click on Cancel.

Patient File Management

In this chapter you will learn how to manage patient files, including::

♦ Sorting the Patient Directory

♦ Importing EyeSys DOS, EyeCon, EyeCon+, and Exported patients

♦ Editing, deleting, and joining EyeSys System 2000
   patient records

♦ Capturing a patient's photo ID

♦ Moving, copying, deleting, editing, and reprocessing EyeSys System 2000
   patient exams

To start any of these procedures, follow the steps on the next page:

8

1. From the Main Menu (Screen 4-1), click on System Utilities. The System Utilities Menu appears.

Screen 8-1 System Utilities

2. Click on File Management. The File Management menu appears.
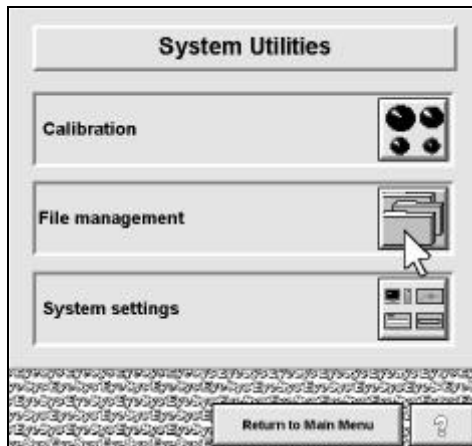
Screen 8-2 File Management
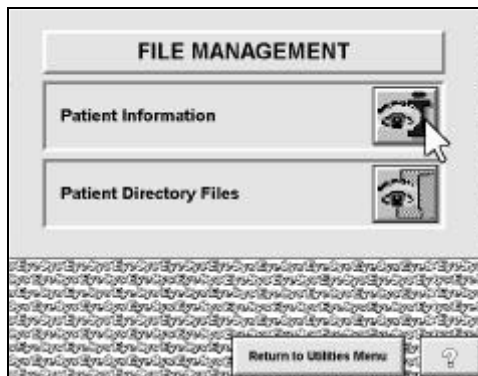
3. Click on Patient Information. The Patient File Management screen appears.
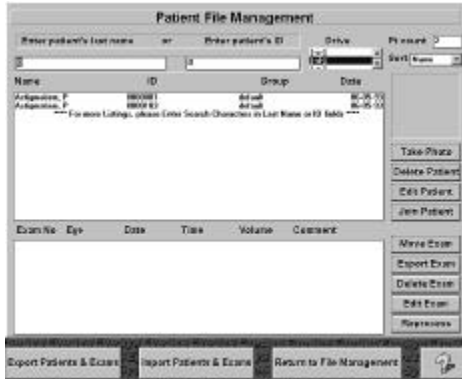
Screen 8-3 Patient File Management

4. **If you want to sort the Patient Directory**, go to "Sorting the Patient Directory" below.

   If you do not need to sort the directory, you may proceed to "Selecting EyeSys Patients" in this chapter.

Sorting the Patient Directory

You may want to sort the Patient Directory to help you find the desired patient. You can sort by the following attributes:

♦ Patient's last name

♦ Patient's ID number

♦ Group

♦ Date of last exam

To sort, follow these procedures:

1. On the Patient File Management screen, locate the Sort box and the down arrow button next to it. Click the down arrow. A list of attributes appears.

2. Click on the desired attribute. The system re-sorts the Patient Directory using the sort key you selected.

Selecting EyeSys Patients

An EyeSys patient is a patient whose examination data was saved on the System 2000 storage drive. To perform file management on exported patient data or on patient data saved by a previous software version, skip to "Importing Other Patient Data Types."

ⓘ	**Note**
	Insert the proper disk containing the patient exam data files before starting this procedure.

When performing File Management procedures, you need to locate a patient to work with before proceeding. You can locate a patient by entering the last name or patient ID.

To Locate a Patient by Last Name:

1. On the Patient File Management screen, enter the patient's last name. As you type, the system highlights the first name in the list that matches what you type.

2. **If you have a large database,** you may have to scroll through the list of names before locating the desired patient.

   When the patient is highlighted, a list of the patient's exams appears at the bottom of the screen and the photo ID appears if it were previously captured.

Go to the section below that you want to perform.

To Locate a Patient by Patient ID:

On the Patient File Management screen, enter the patient's ID number. As you type, the system displays patient data and highlights the first number that matches what you type.

3. **If the desired patient is not displayed,** repeat step 1 or try to locate the patient by last name.

   When the patient is highlighted, a list of patient exams appears at the bottom of the screen and the photo ID appears if it was previously captured.

Go to the section below that you want to perform.

Selecting Patient Exams

After selecting the patient, you may need to select the exams desired.

To select exams, click on each exam you want. As you click, the exams will stay highlighted.

To de-select an exam, click on the highlighted exam.

Importing Other Patient Data Types

To perform File Management on exported patient data or on patient data that was saved to a disk drive with a previous EyeSys software version (EyeCon+, EyeSys DOS, or EyeCon), they will have to be added to the System 2000. You can also import patient files over the Internet from another System 2000 or Viewstation computers. To import patient files over the Internet, refer to Chapter 9.

> ⓘ **Note**
>
> Insert the proper disk containing the patient exam data files before starting this procedure.

To import patients and exam data files to the System 2000 from a local or networked disk drive, follow these procedures:

1. From the Patient File Management screen, click on Import Patients and Exams. The Import Patients and Exams screen appears.
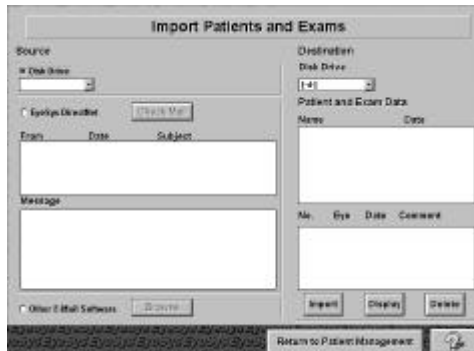
Screen 8-4 Other EyeSys Patients and Exams

2. Click within the radio button next to Source Disk Drive. A black dot appears indicating that the source is a local or networked drive.

3. Click within the Disk Drive box and then click on the drive letter you want from the drop down menu that appears. Patients from the drive you selected are listed under Patient and Exam Data on the right hand side.

5. Click on the desired patient. The patient's exams are displayed in the exam box at the bottom of the screen.

6. Select the exams you want to import. Refer to "Selecting Patient Exams."

7. Click on Import. The patient and exams are imported.

Taking the Patient's Photo ID

You may take a patient's photo ID from the Patient File Management screen. This photo will appear whenever you select that patient throughout the System 2000 Software. If a photo already exists, the new photo will replace the old photo.

Follow the procedures below to capture and save the photo ID:

1. From the Patient File Management screen, select the patient by last name or ID number. Refer to the "Selecting EyeSys Patients" section.

2. Insert the Patient Photo Adapter into the center of the Videokeratoscope and position the patient facing the photo adapter. The patient's image will appear on the Patient Photo Capture screen.

3. Using the joystick, bring the patient's face into focus and press the acquisition button on top of the joystick.

   The patient's photo will be captured and the Patient Photo Save screen appears.

Screen 8-5 Patient Photo Capture

EyeSys Corneal Analysis System

Screen 8-6 Patient Photo Save

4. **If the patient's photo is acceptable,** click on the Save Image button. The Patient File Management screen reappears.

   If the photo needs to be re-captured, click on the Retake button and repeat steps 3 and 4.

8

Deleting Patient Records

ⓘ **WARNING**

Once a patient's records are deleted, you cannot undo the deletion. Verify that this is what you want to do.

You can delete entire patient records using the Patient File Management screen. If you want to delete individual exams, refer to "Deleting Patient Exams".

ⓘ **Note**

Insert the proper disk containing the patient exam data files before starting this procedure.

---

1. Select the patient by last name or ID number. Refer to "Selecting EyeSys Patients" earlier in this chapter.

2. Click on Delete Patient. A confirmation window appears.

3. Click on Delete again. This deletes the selected patient's exam records from the System 2000.

Editing Patient's Personal Data

The Patient File Management screen allows you to edit the following patient personal data in the Patient Directory:

- ♦ Name and ID Number
- ♦ Sex and Date of Birth
- ♦ Physician and Diagnosis
- ♦ Referring Party and Group

> ⓘ **Note:**
> If you want to edit patient exam data, go to "Editing Patient Exam Data" on page 9-16.

Follow this procedure to edit a patient's personal data:

1. Select the patient by last name or ID number. Refer to the "Selecting EyeSys Patients" section.

2. Click on Edit Patient. The Patient Information screen appears.

Screen 8-7 Patient Information

3. To change required information, click within the appropriate box and edit the Patient's Last Name, First Name, Middle Initial, or ID Number.

4. Select from the table below to change or add optional data:

Important: If you are changing the patient's group, be sure to insert the disk containing the patient exam data files prior to changing the group.

Options	What to Enter
Sex	**M** (male) or **F** (female)
Birth date	Enter the birth date in the same format as the Current Date on the screen
Physician	Click on Physician and enter data in the box
Diagnosis	Click on Diagnosis and enter data in the box
Referred By	Click on Referred By and enter the information in the box
Group	Click on Group and enter data in the box

8

5. When finished, click on Save. The patient's personal data in the Patient Directory is updated and saved.

Joining Patient Records

In the event that a patient was inadvertently entered twice into the Patient Directory database, follow these steps to join the patient's records into one:

1. Click on Join Patient. The Join Patient screen appears.
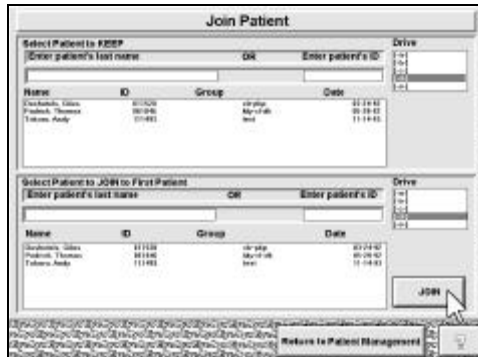
2. In the Drive box, enter the proper drive letter where the data is stored.

3. In the Select Patient to Keep box, enter the patient's last name or ID number. The screen displays a list of patients, with the first name on the list matching the entered last name.

Screen 8-8 Join Patient

4. If the desired patient is not highlighted, click on the correct patient. The patient to keep is highlighted.

5. Repeat steps 3-4 for the box labeled Select Patient to Join to First Patient.

6. Click on Join. The patient's records are joined and saved in the Patient Directory under the selected patient to keep.

Moving Patient Exams

This procedure *moves* a patient's exams from one drive to another. This is different from *copying* patient exams. Moving an exam **deletes** it from the source drive and **moves** it to the destination drive. To **copy** patient exams, see the next section, "Exporting Patient Exams."

1. Select the patient by last name or ID number. Refer to the "Selecting EyeSys Patients" section.

2. Select the exams you want to move. Refer to "Selecting Patient Exams."

3. At the top of the screen, highlight the drive where the desired exams are located.

4. Click on Move Exam. The Moving Patient Exams screen appears.

5. Verify the source drive letter in the From Drive box and verify or click on the destination drive letter in the To Drive box. If the source drive is incorrect, return to the previous screen and highlight the correct From Drive.

6. Click on Move. This moves the selected Patient Exams to the destination drive and deletes them from the source drive.
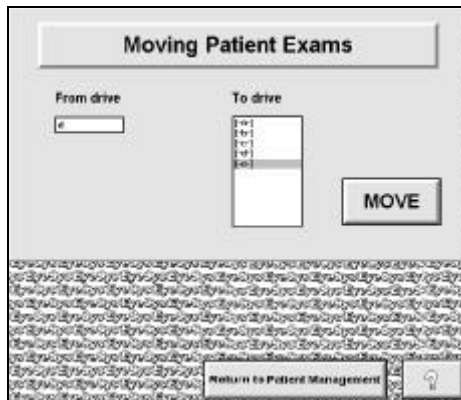
Screen 8-9 Moving Patient Exams

Exporting Patient Exams

The Patient File Management screen can be used to export or *copy* a patient's exams from one drive to another or to an Email address. Exporting an exam copies the exam data files to the destination drive while keeping them intact in the source drive. This procedure is used to send a copy of a patient's file to another site for review or study. It is not intended for backup.

5.   Select the patient by last name or ID number. Refer to the "Selecting EyeSys Patients" section.

6.   Select the exams you want to export. Refer to "Selecting Patient Exams."

7.   Click on Export Exam. The Exporting Patient Exams screen appears.

8

> | ⓘ | **Note** |
> | :-- | :-- |
>
> If exporting exams to a floppy diskette, make sure that the diskette has an appropriately descriptive volume label. Refer to "Changing a Disk Volume Label" in Appendix C.

Screen 8-10 Exporting Patient Exams
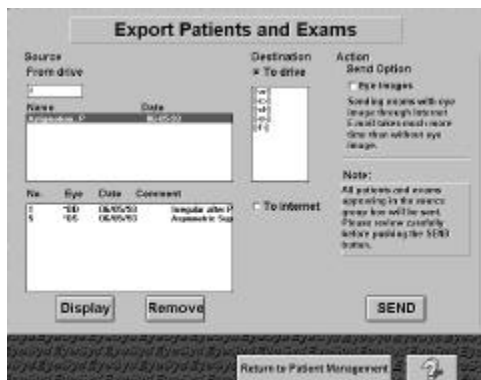
8.   Verify or enter the source drive in the Source From Drive box and verify or click on the destination drive in the Destination To Drive box.

9.   Click on Send. The selected patient exam data files are copied to the destination drive or Internet and remain intact on the source drive.

Deleting Patient Exams

<table>
<tr><td>ⓘ</td><td>WARNING</td></tr>
<tr><td colspan="2">Once a patient's exams are deleted, you cannot undo the deletion. Verify that this is what you want to do.</td></tr>
</table>

You can delete patient exam data files from the System 2000 without disturbing the patient's personal data by following these procedures:

1. Select the patient by last name or ID number. Refer to the "Selecting EyeSys Patients" section.

2. Select the exams you want to delete. Refer to "Selecting Patient Exams."

3. Click on Delete Exam. A confirmation window appears.

4. Click on Yes. This deletes the selected patient's exam data files from the System 2000.

   Click on No if you do not want to delete the patient exam data files.

Editing Patient Exam Data

This section describes how to edit patient exam data in the Patient Directory, as follows:

♦ Change or add the Drive or Disk Volume and Technician's Initials

♦ Change or add the Exam Date and Time

♦ Change or add the Patient's eye that was examined

♦ Change or add Exam Comments

Follow these steps to edit patient exam data:

1. Select the patient by last name or ID number. Refer to the "Selecting EyeSys Patients" section.

2. Select a single exam. You cannot edit more than one exam at a time. Refer to "Selecting Patient Exams."

3. Click on Edit Exam. The Edit Exam Information screen appears.

Screen 8-11 Edit Exam Information

4. Click within the appropriate box to add or change data.

    The contents of the Comments box may be changed by clicking on Comments. This displays the Exam Comments screen. Refer to "Entering Exam Comments" in Chapter 4 if you need additional instructions on editing exam comments.

8

5. When finished editing the patient exam data, click on Save. The changes are saved.

Reprocessing an Exam

When an eye exam is initially captured and processed, the curvature calculations are based on the calibration file and the pixel/mm magnification of the camera in use at that time. If the eye image is reprocessed on another system or on the same system with a different calibration file or pixel/mm setting, the curvature calculation could be different. The calibration file and pixel/mm setting change whenever the system is calibrated.

> *   **CAUTION**
>
> Changes in the calibration file or the pixel/mm setting can have adverse effects on image reprocessing.

You may reprocess an eye image as follows and then cancel it if the results are not acceptable:

1. Select the patient by last name or ID number. Refer to the "Selecting EyeSys Patients" section in this chapter.

2. Select a single exam. You cannot reprocess more than one exam at a time. Refer to "Selecting Patient Exams" in this chapter.

3. Click on Reprocess. One of two responses occur:

- The system checks the exam and calibration date and displays a warning if the system was calibrated after the exam was processed. You may proceed or cancel the reprocessing.

- The system reprocesses the eye image and detects the apex and displays it on the Apex Verification screen.

Please read the following notice:

ⓘ **IMPORTANT**

Reprocessing eye image data follows the same path as described in Chapter 4 starting with "Examining the Apex" except for a few deviations. Before you go to Chapter 5 to follow the procedures, you should become familiar with the these deviations:

If you do not like the results of the reprocessing, you may click on Cancel during any of the procedures in Chapter 4. The system goes back to the Patient File Management screen.

If you click on OK from the Contrast Level screen (Screen 4-12), the system goes back to the Patient File Management screen. You may start reprocessing again with the new contrast adjustments.

When you click on Done from the Print Options screen (Screen 4-19), the system goes back to the Patient File Management screen.

---

4. Go to "Examining the Apex" in Chapter 4 and follow the procedures. When you are finished with reprocessing, the Patient File Management screen reappears. You may continue with other Patient File Management or exit to perform other functions.

Communications

The System 2000 includes DirectNet, an Internet E-mail application that allows you to send and receive E-mail messages. DirectNet can be started independently or from within the System 2000 software. Since DirectNet is similar to other major E-mail software, it is very easy to use for E-mails and transferring patient exams.
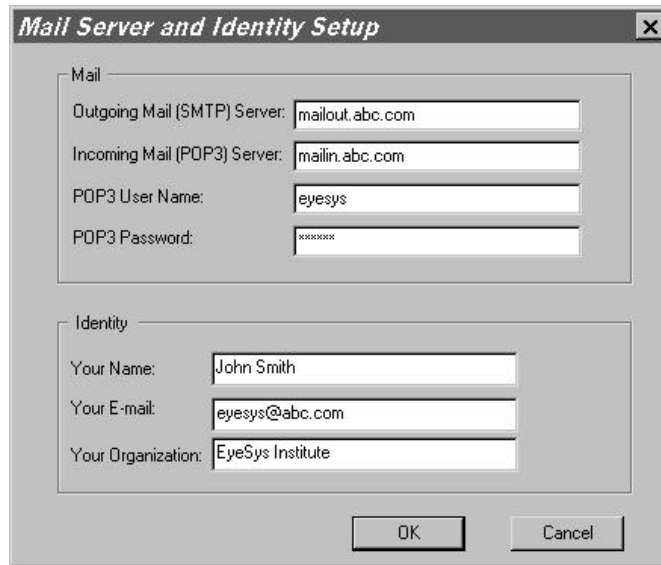
The main features of DirectNet are:

♦ Ease of use—DirectNet is seamlessly integrated into System 2000 software

♦ Multiple patient selection—users can select exams from different patients

♦ Patient and exam review before sending— the selected patients and exams can be reviewed and displayed before transmission.

♦ Sending the eye image is optional—the eye image file is quite large and therefore optional when sending through Internet e-mail. Sending without eye image is default.

♦ Internet-based transfer—the receiving party does not need to be informed before the sender can send EyeSys patient exams.

♦ Internet provider independence—you can use any Internet Service Provider that supports SMTP, POP3 and MIME.

♦ Address book—the Address book keeps a list of all correspondence

♦ Internet flexibility—can handle exported patient exams retrieved by other e-mail software, however DirectNet will only retrieve E-mail messages which are sent by DirectNet.

♦ Attachments—automatically compresses patient exams into a single file (patdata.zip) and attaches this file to the e-mail message.

♦ Drag and drop—you can drag an e-mail and drop it into a folder

♦ Sorting e-mail message—the user can sort messages in a folder by Date, Subject, Receiver or Sender.

9

Configure System 2000 DirectNet

Before you can use DirectNet, personal information, mail servers and the dial-up server need to be set up properly. To setup DirectNet, follow these steps:

1. Open DirectNet by double-clicking on the icon.

2. Click Option, and then Mail Servers. The Mail Server and Identity Setup screen appears.

Mail Server and Identity Setup

Mail

Outgoing Mail (SMTP) Server: mailout.abc.com

Incoming Mail (POP3) Server: mailin.abc.com

POP3 User Name: eyesys

POP3 Password: xxxxxx

Identity

Your Name: John Smith

Your E-mail: eyesys@abc.com

Your Organization: EyeSys Institute

OK   Cancel

Screen 9-1 Mail Server & Identity Setup Screen

3. Enter the appropriate data into each field and click OK. The DirectNet main screen reappears.

   Your Internet Service Provider can supply all the information needed. Your Name and Your Organization are optional.

4. Click Option, and then Dial-Up Server. The Dial-Up Server Setup screen appears.

Dial-Up Server Setup　　　　　　　　　　　　　　　　　**⊠**

┌─ Connecting to Internet Mail ─────────────────────────

　　Dial using following site automatically

　　┌───┬───┐
　　│ ABC　　　　　　　　　　　　　　　　　　　 │ ▾ │
　　└───┴───┘

　　Username and password required for dialup session

　　Username:　┌──────────────────────────────────┐
　　　　　　　　│ eyesys　　　　　　　　　　　　　　　│
　　　　　　　　└──────────────────────────────────┘

　　Password:　┌──────────────────────────────────┐
　　　　　　　　│ ××××××　　　　　　　　　　　　　　 │
　　　　　　　　└──────────────────────────────────┘

└──

　　　　　　　　　　　┌────────────┐　　┌────────────┐
　　　　　　　　　　　│　　OK　　　 │　　│　Cancel　　 │
　　　　　　　　　　　└────────────┘　　└────────────┘
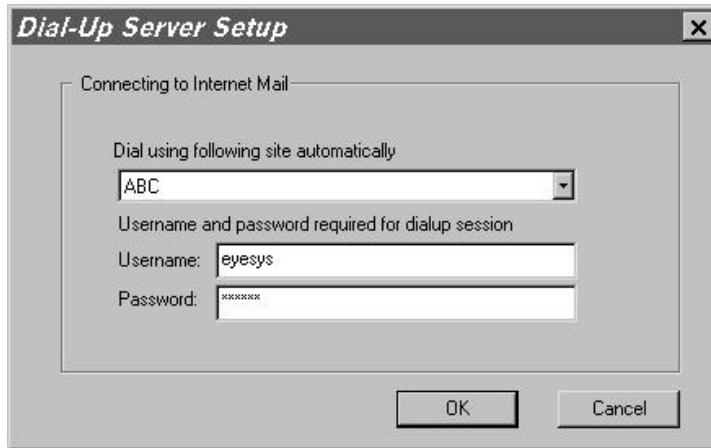
Screen 9-2 Dial-Up Server Setup Screen

5. Use the down arrow to select the Dial-Up Connection that connects to your Internet Service Provider. If you do not have a Dial-Up Connection, ask your Internet Service Provider to help you create one.

6. Enter the Username, Password, and click OK.

Starting DirectNet

You can start DirectNet from the System 2000 software or the Windows 95 desktop. However, if you start DirectNet from the desktop, you will not be able to send patient exams.

To start DirectNet from the Windows 95 desktop, follow this instruction.

1. Double-click the DirectNet icon. DirectNet loads and displays the DirectNet Main screen as shown below:

   Refer to this screen when instructed by topics below to perform operations from the DirectNet Main screen.

9
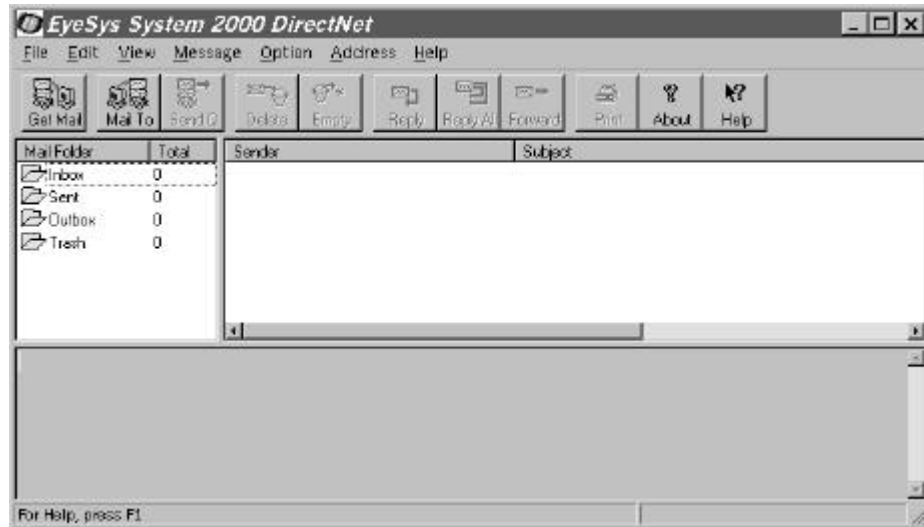
Screen 9-3 DirectNet Main Screen

To start DirectNet from within the EyeSys System 2000 software, follow the steps in the "Sending Patient Exams and E-mail" and Retrieving Patient Exams and E-Mail" topics below.

Quitting DirectNet

To quit DirectNet, follow this step:

1. Click File and then Exit. Alternatively you can click the Close button in the upper-right corner.

   If you have queued messages, in the Outbox, you are given the option to send them.

Getting help for DirectNet

In addition to the On-line Help and user manual, you can get your questions answered by:

♦ Ask your Internet Service Provider for setup information

♦ Send an e-mail to eyesys@neosoft.com. Please indicate that you want technical support for DirectNet.

♦ Call EyeSys Technical Support at 1-800-553-0302

Sending Patient Exams and E-mail

To send patient exams and E-mail, follow these steps:

1. From the System 2000 Main menu, click on the Data Manager & Communication button. The Patient File Management screen appears.

2. From the Patient File Management screen, click on the the patients and exams you want to send. You can select multiple patients and exams.

3. Click Export Patients & Exams. The Export Patients and Exams screen appears.

4. Select Internet under Destination and if desired, select Eye Images.

5. Click Send. DirectNet loads and displays the Message Sender screen as shown below:
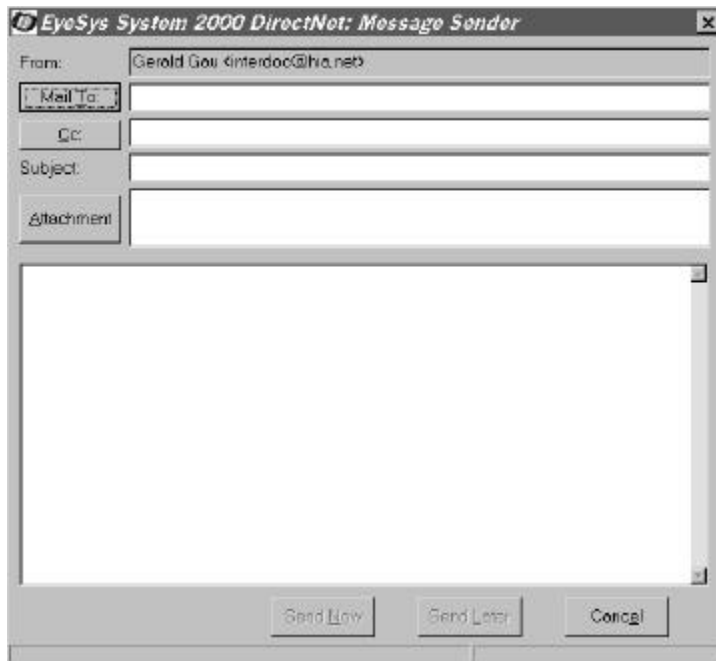
Screen 9-4 Message Sender

6. Click Mail To. The Address Book appears.

7. Highlight the name of the recipient and click Mail To. The recipient is entered in the Mail To field of the Message Sender.

   If you want to copy the patient exam to other recipients, click Cc, select a recipient, and then click Add Cc. Repeat this process for each recipient you want to copy.

   If you want to add a note to the patient exam, click within the message area and enter your message.

   If you want to attach a file to the patient exam, click Attach, select the file you want to send, and then click Open.

8. **If you want the patient exam to be sent immediately**, click Send Now. The patient exams are sent and placed in the Sent folder.

   If you want the patient exam to be sent later, click Send Later. The patient exams are queued and placed in the Outbox folder. When you are ready to send the patient exam, click File, then Send Outbox Queue or click on the Send Q button. After you send the patient exam, it is placed in the Sent Folder.

9. Close DirectNet.

   If you close DirectNet without sending the patient exam, a message appears asking if you want to send the patient exam.

Sending E-mail without patient exams

To send E-mail without patient exams, follow these steps:

1. From the DirectNet Main screen, click the Mail To button in the upper left of the screen. The Message Sender screen appears.

   Alternatively you can click File, then Send New Mail or you can click Address, click Address Book, select a recipient, and then click Mail To.

2. From the Message Sender screen, select the recipient if not already displayed, enter your message, and then click Send Now or Send Later.

Retrieving Patient Exams and E-mail

To retrieve patient exams and E-mail, follow these steps:

1. From the System 2000 Main menu, click on the Data Manager & Communication button. The Patient File Management screen appears.

2. From the Patient File Management screen, click Import Patients and Exams. The Import Patients and Exams screen appears.

3. Select EyeSys DirectNet under Source, and then click Check Mail. DirectNet loads and checks your E-mail.

4. Close DirectNet and return to the Import Patients and Exams screen. Retrieved E-Mail is listed. The ![icon] icon next to a listed E-mail indicates that an exam is present.

5. Highlight an E-mail. The E-mail message appears in the box below.

    If the E-mail has a patient exam attached, patient and exam information is displayed in the boxes to the right. You can import the patient by clicking Import or Display the exam data by clicking Display. If you import the data, be sure you select the Destination drive you want.

Retrieving Patient Exams and E-mail with Other E-mail Software

To retrieve patient exams and E-mail with other E-mail programs, follow these steps:

1. Start your E-mail program, check and read your mail. Any patient exams sent to you will be attached to your E-mail as a file with the filename PATDATA.ZIP.

2. From the System 2000 Main menu, click on the Data Manager & Communication button. The Patient File Management screen appears.

3. From the Patient File Management screen, click Import Patients and Exams. The Import Patients and Exams screen appears.

4. Select Other E-mail Software under Source, and then click Browse. The Open File screen appears.

5. Locate the directory where your E-mail software places attached files, highlight the PATDATA.ZIP file, and then click Open. The Import Patients and Exams screen reappears with the patient and exam information displayed in the boxes to the right. You can import the patient by clicking Import or Display the exam data by clicking Display. If you import the data, be sure you select the Destination drive you want.

9

Forwarding Retrieved E-mails

To forward a retrieved E-mail to another person, follow these steps:

1. From DirectNet click on the Forward button. The Message Sender screen appears.

    Alternatively you can right-click and select Forward or click on Message and click Forward.

2. Click Mail To, select a recipient, click Mail To, and then click Send Now or Send Later.

If a patient exam was attached, it is automatically attached to the E-mail you are forwarding.

Reply to a Retrieved E-mail

To reply to a retrieved E-mail, follow these steps:

1. From DirectNet click on the Reply or Reply All button. The Message Sender screen appears.

    Alternatively you can right-click and select Reply or Reply All or you can click on Message and click Reply or Reply All.

    Reply sends the reply to the original sender. Reply All sends the reply to all recipients of the original E-mail.

2. Enter your reply and then click Send Now or Send Later.

    If a patient exam was attached, it is not automatically attached to the reply.

Organizing DirectNet E-mail Folders

DirectNet initially opens with four default folders—Inbox, Sent, Outbox, and Trash. You can add and delete E-mail folders and move, sort, and delete E-mails. Follow the table below for the operation you want to perform.

Operation	Action
Add E-mail Folder	Click Edit and then Add Folder
Delete E-mail Folder	Highlight the folder you want to delete, Click Edit, and then Delete Folder. Default folders cannot be deleted.
Empty the Trash Folder	Click Edit and then Empty Trash Folder
Move E-mail	Highlight the E-mail you want to move and drag it to the new folder. You cannot move E-mail into the Inbox, Outbox, and Sent folders.
Sort E-mail	Click Message, Sort By, and then choose one of the sorting criteria. Alternatively you can click on the title bars above the list of E-mails.
Delete E-mail	Highlight the E-mail you want to delete and then—click the Delete button, type Delete on your keyboard, click Message, then Delete Message, or right-click on the E-mail and select Delete.

9

Patient Directory Management

The patient directory is an index stored on your internal hard drive to help you locate a particular patient or exam. The patient directory does not contain the actual patient exam data files. Refer to "System Data Storage" in Chapter 2 for more information on where data is stored.

In this chapter you will learn how to perform these patient directory management functions:

♦ Back up the patient directory from your internal hard drive to a removable disk

♦ Change Data Storage and Backup options

♦ Restore the patient directory from a disk to the internal hard drive

This table provides a recommended schedule for performing these procedures:

What to Perform	When to Perform
Back up the patient directory	On a daily basis
Restore the patient directory	If the hard drive or patient directory is corrupted

You can have the system prompt you to perform the backup on a regular basis and you can change the disk drive letter used to backup and restore the patient directory. Refer to "Changing Data Storage and Backup Options" later in this chapter.

Follow these steps to start the backup or restore procedures:

1. From the Main Menu, click on the System Utilities button. The System Utilities Menu appears.
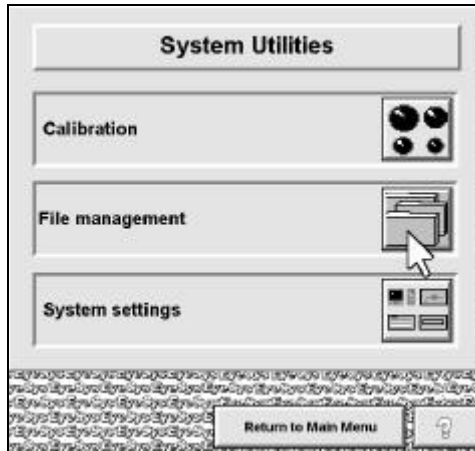
Screen 10-1 System Utilities

2. Click on File Management. The File Management Menu appears.
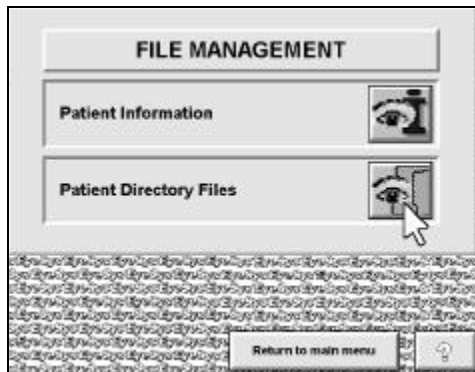
Screen 10-2 File Management

3. Click on Patient Directory Files. The Patient Directory Management Menu appears.

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Screen 10-3 Patient Directory Management
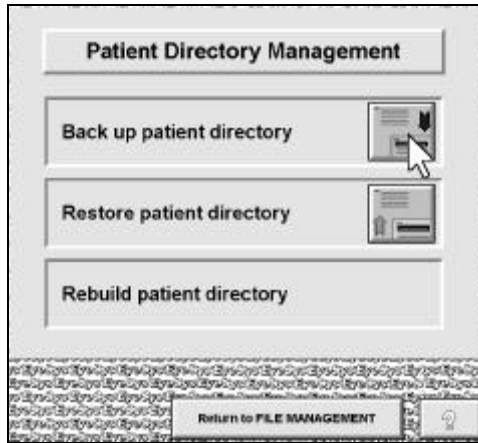
From this menu, you can Back up or Restore the patient directory.

To perform these operations, go to the corresponding section below.

Backing Up the Patient Directory

This function backs up the patient and exam directory from the internal hard drive to a removable hard disk or optical disk. It does not back up your actual patient exam data files. The Patient Directory listings are only locators used to find the actual data files stored on the removable disks.

It is a good idea to back up the Patient Directory daily. This precaution will provide you with a current copy of your Patient Directory should anything happen to the existing directory on your hard drive.

The backup requires a minimum of 5 megabytes. For this reason a standard floppy diskette cannot be used. It is recommended that you back up to a removable hard disk. If your system does not have a removable hard disk, you will have to backup to the internal hard drive.

This procedure requires that you do the following before you begin:

♦ Format a removable disk using DBBACKUP as the label (refer to Appendix C for formatting instructions).

♦ Specify the disk drive letter on the Data Storage and Backup Menu (refer to "Changing Data Storage and Backup Options" later in this chapter). Most systems default to drive **E:**.

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Follow this step to back up the Patient Directory:

1. Place a formatted disk into the Backup Drive and from the Patient Directory Management Menu, click on Back up Patient Directory. The system backs up or saves the Patient Directory onto the disk.

Restoring the Patient Directory

This operation restores a backed up patient and exam directory to the internal hard drive. This operation should be performed only if your current patient directory on the internal hard drive were corrupted.

*	WARNING
Restoring the directory completely replaces the Patient Directory currently stored on the internal hard drive. Consequently, patients that were added or edited in between backups will be lost until they are re-entered.	

1. Place the backup disk into the backup drive and from the Patient Directory Management Menu, click on Restore Patient Directory. The system replaces the current patient directory on the hard drive with the Patient Directory on the backup disk.

Changing Data Storage and Backup Options

The options on the Data Storage and Backup screen are defined as follows:

Option	Description
Backup Interval	The number of days between backing up the *Patient Directory* located on your internal hard drive. A system prompt appears when it is time to backup. EyeSys recommends that you set this to 1 to prompt you for a daily backup of the Patient Directory.
Backup Drive	The drive letter (i.e., a:, b:) of the diskette drive used to store and retrieve the *Patient Directory*.
Storage Drive	The drive letter (i.e., a:, b:) of the disk drive used to store and retrieve *patient exam data files*.

To change these options, follow these procedures:

1. From the System Settings Menu, click on Data Storage and Backup Options. The Data Storage and Backup screen appears with the date of the last backup displayed on the screen.
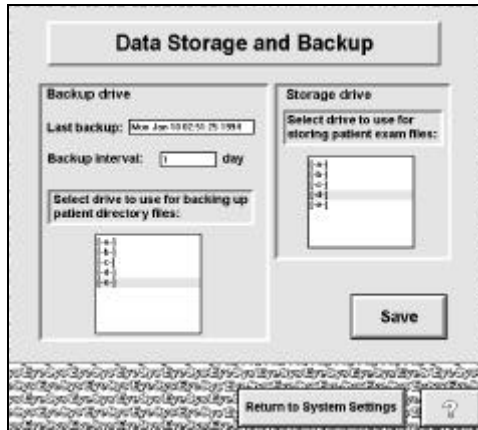
2. Click within the Backup Interval box and type the number of days desired in between backups of the Patient Directory.

3. In the Backup Drive box, click on the disk drive letter used to back up the Patient Directory from the hard drive.

4. In the Storage Drive box, click on the disk drive letter used to store patient exam data files.

5. Click on Save.

If you want to perform an actual backup of the Patient Directory, refer to "Backing Up the Patient Directory" earlier in this chapter. No backup of patient exam data files is available, however, you can Export the patient exam data files to make a copy of them. Refer to "Exporting Patient Exams" in Chapter 8.

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Diagnostic Tool Design

In this chapter you will learn how to change existing diagnostic tools or design your own. The following procedures are included:

♦ Designing Custom Displays

♦ Designing Custom Exam Protocols

♦ Designing Custom Comments

To start any of these procedures, follow these steps:

1. From the Main Menu, click on System Utilities. The System Utilities Menu appears.
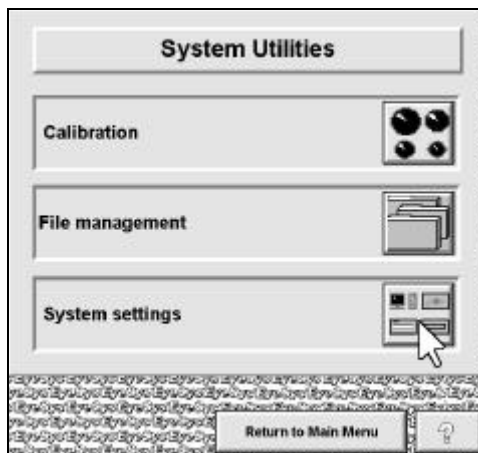
2. Click on System Settings. The System Settings Menu appears.

Screen 11-1 System Utilities

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Screen 11-2 System Settings Menu

From the System Settings Menu, choose any of the following operations:

- Custom Display Design

- Custom Exam Protocol Design

- Custom Comment Design

To perform any of the above procedures, go to the corresponding section below.

Designing Custom Displays

The System 2000 Software provides default exam displays to use for your patient examinations. You also have the option of designing your own custom exam displays.

This section describes how to define new single-exam and multiple-exam displays or modify existing ones. Each display contains from one to five data maps. Each type of data map displays information in a different way.

For each type of display, you can define the map type and map layers to be displayed. Difference maps are a specific type of map. Therefore, when they are included in the display, their options are limited to layer options.

Map and layer definitions can be found in Appendix B.

Follow these procedures to customize exam displays:
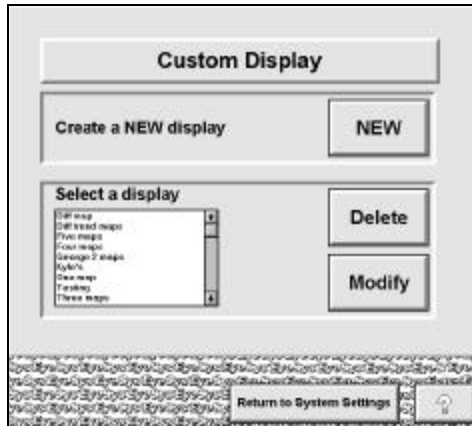
Screen 11-3 Custom Display

1. From the System Settings Menu, click on Custom Display Design. The Custom Display screen appears.

2. Select one of the tasks from the table below:

If you want to...	Then	Result
Delete a display	Click on the display you want to delete and click Delete	The display is deleted.
Modify a display	Click on the display you want to modify and click Modify	The selected display appears for you to modify. Proceed to step 4.
Create a custom map display	Click on NEW	The Custom Display Creation screen appears, as shown below. Continue with step 3.

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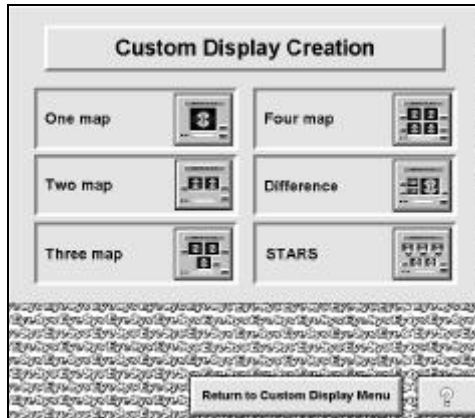
Screen 11-4 Custom Display Creation

3. Click on the type of single exam or multiple exam display you want to create:

- One Map
- Two Map
- Three Map
- Four Map
- Difference
- STARS

For example, if you click on Three Map, the Three Map Display screen appears showing boxes where the individual data maps will be located. Next to each map, is an Options button for customizing.
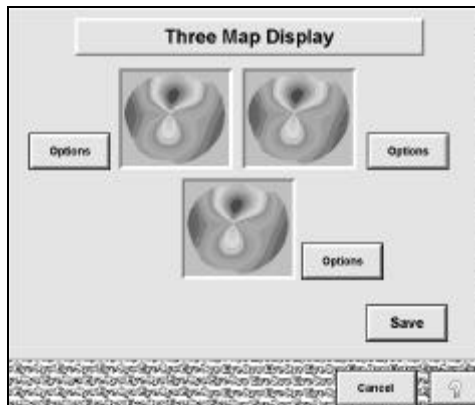
Screen 11-5 Three Map Display

4. Click on the Options button for each map display you want to customize. The Map Options screen appears.

11
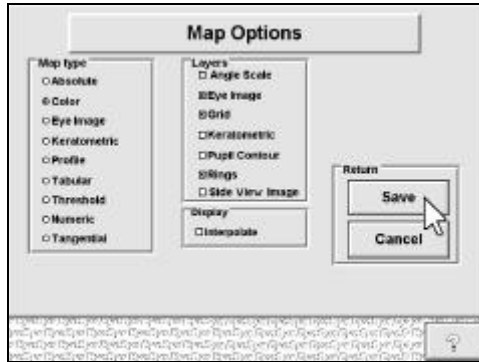
Screen 11-6 Map Options

5. Select the Map Type and Map Layers desired. Only one Map Type can be selected. Multiple Map Layers may be selected. When each Option button is clicked, a new Option screen will be displayed.

6. When finished customizing all maps, click within the Enter Name for Display box and type a name for the display.

7. Click on Save.

Designing Custom Exam Protocols

The System 2000 Software provides two default examination protocols. You can use the default protocols or design your own custom examination protocols.

This section describes how to modify or delete an existing exam protocol and how to create a new exam protocol. The following options may be selected:

♦ Steps to be taken prior to Capturing the Eye Image

♦ The exam display to be used for viewing

♦ Actions to be performed after viewing the exam display

♦ Name of the new Protocol button located in the Examination Protocol Selection screen

To customize the exam protocol, follow these procedures:

1. From the System Settings Menu, click on Custom Exam Protocol Design. The Custom Exam screen appears.

11
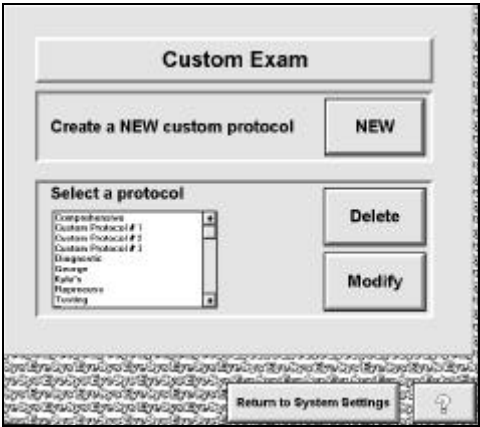
2. Select one of the tasks from the table below:

Screen 11-7 Custom Exam

If you want to...	Then	Result
Delete an exam protocol	Click on the exam protocol you want to delete and click Delete	The exam protocol is deleted. The Reprocess protocol cannot be deleted.
Modify an exam protocol	Click on the exam protocol you want to modify and click Modify	The selected exam protocol appears for you to modify. Continue with step 3.
Create a new custom protocol	Click on New	The Examination Protocol Options screen appears, as shown below. Continue with step 3.

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Screen 11-8 Examination Protocol Options

3. Select which optional steps you want to perform during the patient examination.

    The table below defines the steps you may select:

Optional Step	Description
Find or Add a Patient to the Database	This option includes the Patient Directory screen in the examination process. Refer to "Beginning the Exam" in Chapter 4 for more information about the Patient Directory screen.
Take a Photo ID	This option includes the Capture Photo ID screen in the examination. Refer to "Adding a New Patient" in Chapter 4 for more information about the Capture Photo ID screen.
Add an Exam Comment	This option includes the Exam Comments screen in the examination. Refer to "Entering Exam Comments" in Chapter 4 for more information about the Exam Comments screen.

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4. Select which display type you want to use when viewing the data maps. Click on the down arrow across from Name of Single Eye Display. A window lists the displays available. Click on your selection. Perform the same procedure with the Name of Two Eye Display.

   Exams will not save properly if valid displays are not selected.

5. Select the steps you want to perform after the exam display is viewed. The selections are as follows:

Optional Step	Description
Save Exam Data	Saves the exam data automatically when Done is selected.
Save Eye Image	Saves the eye image automatically when Done is selected.
Print Map	Displays the Print Options screen when Done is selected.

6. Click within the Protocol Button Name box and type a name for this protocol set-up. This name will appear in the list of protocols that can be assigned to buttons on the Protocol Selection screen. Refer to Chapter 4, "Beginning the Exam."

7. Click on Save. The customized exam is saved.

Designing Custom Comments

The System 2000 Software provides a typical screen setup for the Exam Comments screen. This screen appears during the examination process to enable you to enter comments about the exam.

This section describes how to customize comments on the Exam Comments screen. This allows you to enter the information you will most likely need for your exams.

To design a custom Exam Comments screen, follow these procedures:

1. From the System Settings Menu, click on Custom Comment Design. The Custom Exam Comments screen appears.
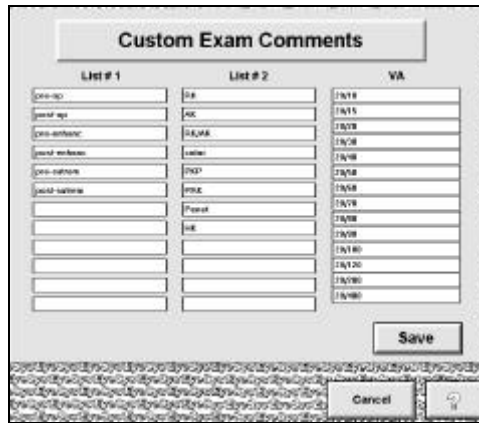
Screen 11-9 Custom Exam Comments

The Custom Exam Comments screen shows three columns labeled:

- List # 1

- List # 2

- VA

List 1 and 2 correspond with the two lists of text to the right of the time period area on the Exam Comments screen.

VA corresponds to the Visual Acquity values in the box to the right of VAcc (Visual acuity with correction) and VAsc (Visual acuity without correction).

An example of the Exam Comments screen is shown below.
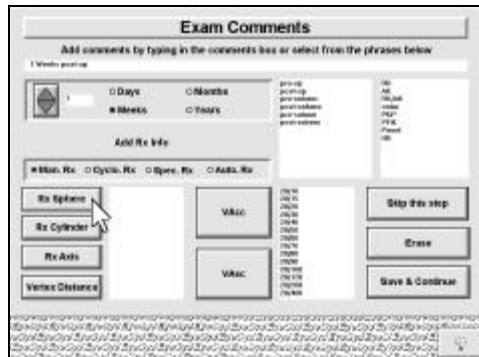
Screen 11-10 Exam Comments

2. Click within each box or column and enter the words, phrases, or values that you want on the Exam Comments screen.

3. Click on Save.

   The next time you use the Exam Comments screen, you will be able to point-and-click on the comments used most frequently without having to type them.

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Installation Instructions

This software can be installed on a system using Windows 95 as a new installation, or as an update of a previous version, provided that the system requirements outlined in "System Requirements" are met. If you are using Windows 3.1, or have any installation problems, contact EyeSys Customer Support at 1-800-553-0302.

There are two types of installation diskettes:

♦ The main System 2000 Install Disks—these serve to do standalone and server-side installations.

♦ The Client System 2000 Install disks—these serve to do the installation on a Client machine. This is included for networks only.

Each of these installations will be discussed in two sections below.

To begin, locate the System 2000 software disks, and then power on the System 2000. (Refer to Chapter 3 for proper power on procedures.)

System Requirements

♦ IBM PC or 100 % Compatible 486 processor, or higher.

♦ 16 Mbytes of RAM minimum.

♦ 30 Mbytes of available hard disk space minimum

♦ System 2000 Topographer Hardware (except for ViewStation-only Installations)

♦ Windows 95 Operating System

♦ Screen resolution of 800 x 600

♦ Screen Color mode: 256-color, High Color or True Color mode (See "Upgrading Windows 95 Screen Color Mode."

Main System 2000 Installation

If you are installing the software to a computer system that is not connected to a Topographer (IAU), you will need the EyeSys Configuration diskette to complete the installation. To install the Main System 2000 software, follow these steps:

1. Insert Disk 1 into your floppy disk drive.

2. Click on the Windows 95 Start button.

3. Click Run. The Run screen appears as shown below:
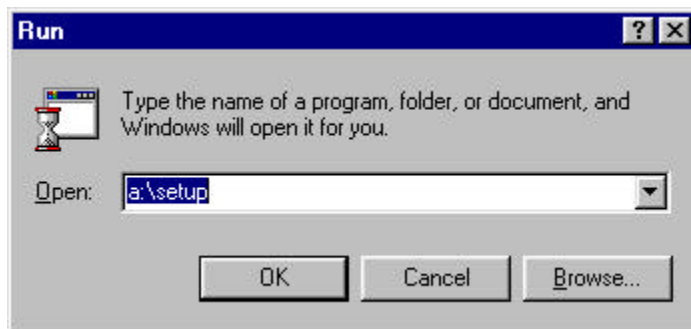
Screen A-1 Run Screen

4. Type A:\SETUP in the field to the right of Open on the Run screen.

5. Click on the OK button. The System 2000 Welcome screen appears as shown below:

Screen A-2 System 2000 Welcome Screen

6. Click on the Next button. The Select Destination Directory screen appears.
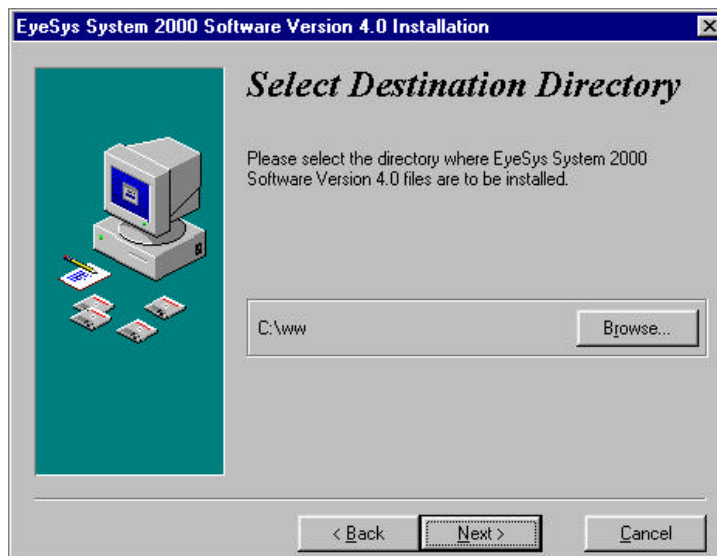
Screen A-3 Select Destination Directory Screen

7. To accept the default installation directory (C:\ww), click on the Next button. Otherwise, click on the Browse button, select the directory of your choice and then click the Next button. The Ready to Install screen appears.

ⓘ	**Caution**
You can only install the System 2000 software under the root (base) directory of the drive of your choice (e.g. c:\WW40, or d:\WW40, but NOT c:\Programs\WW40)	
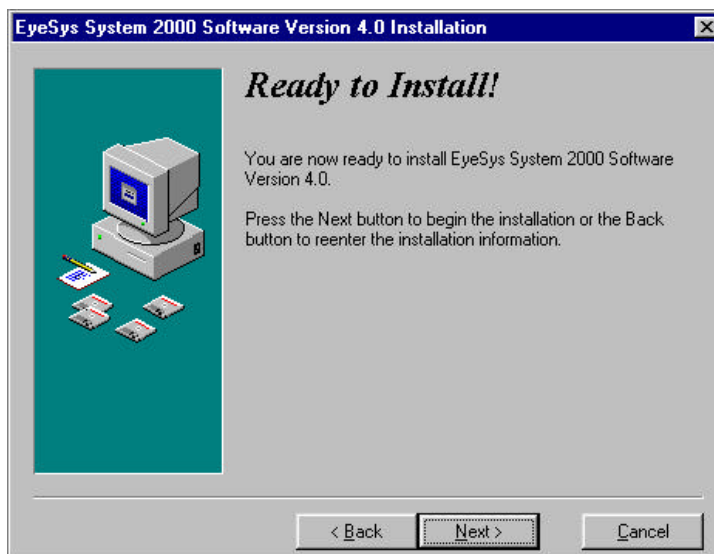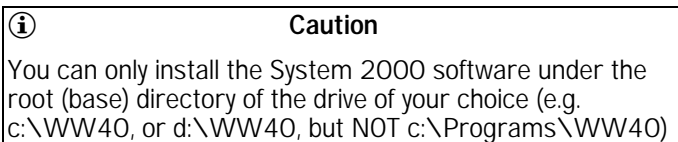
Screen A-4 Ready to Install Screen

8. Click on the Next button to proceed with the installation.

9. During the installation you are prompted to insert diskettes 2 through 5 with the following Insert New Disk screen.
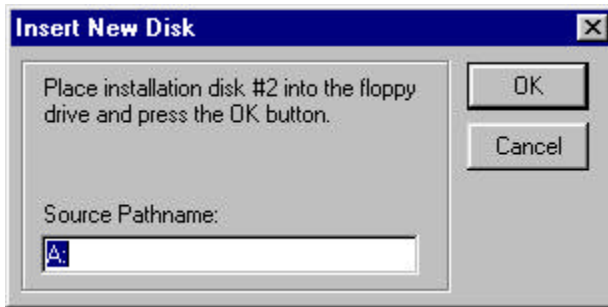
Screen A-5 Insert New Disk Screen

10. Once you insert the requested diskette, click on the OK button.

11. When the installation is complete, the Installation Completed screen appears.

Screen A-6 Installation Completed Screen

12. Click on the Finish button. The Restart Windows 95 screen.
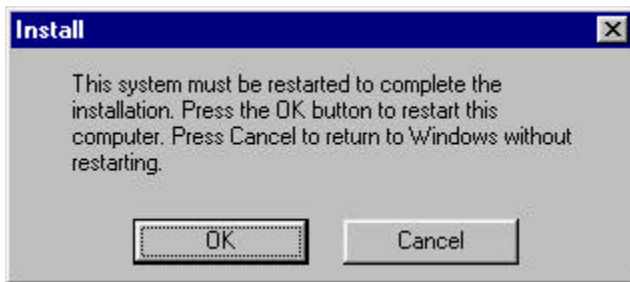
Screen A-7 Restart Windows 95 Screen

13. Click on the OK button. Windows 95 will automatically shut down and restart.
    You are now ready to run the System 2000 software by clicking on the System
    2000 icon on your desktop.

Screen A-8 System 2000 Icon

Windows 95 Client System 2000 Software Installation

If you are installing the software to a computer system that is not connected to a
Topographer (IAU), you will need the EyeSys Configuration diskette to complete the
installation. To install the Client System 2000 software on a client machine, follow
these steps:

1. Insert Disk 1 of Client System 2000 Install disks into your client machine floppy
   disk drive.

2. Click on the Windows 95 Start button.

3. Click Run. The Run screen appears as shown below:

EyeSys Corneal Analysis System
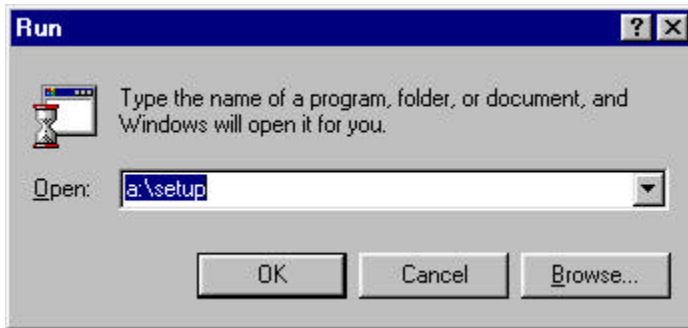
Screen A-9 Run Screen

4. Type A:\SETUP in the field to the right of Open on the Run screen.

5. Click on the OK button. The Welcome screen appears as shown below:
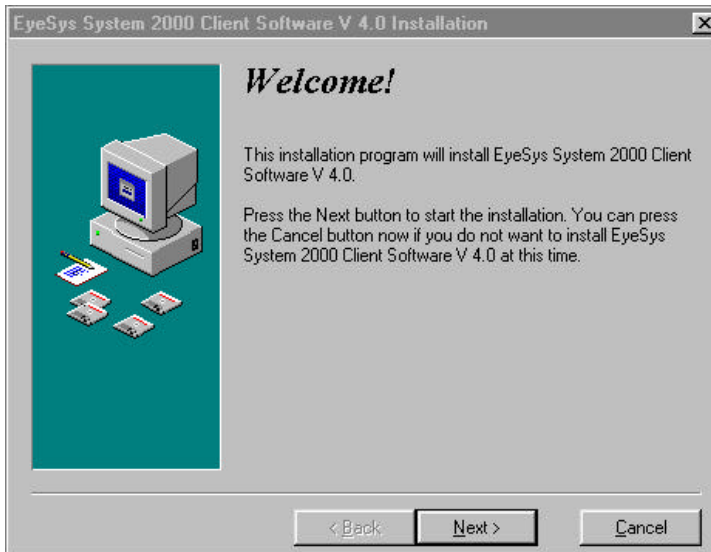
Screen A-10 Welcome screen

6. Click on the Next button. The Installation Progress screen appears as shown below:

EyeSys Corneal Analysis System   A-7
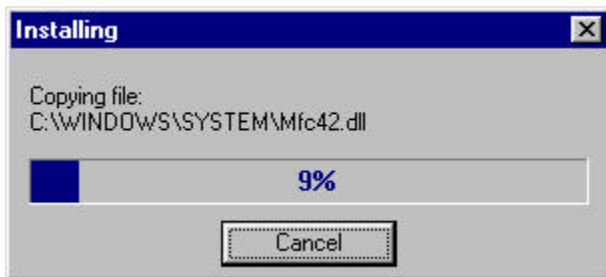
Screen A-11 Installation Progress screen

7. During the installation you are prompted to insert the installation diskettes, with the following Insert New Disk screen:

Screen A-12 Insert New Screen

8. Once you insert the requested diskette, click on the OK button.

9. When the installation is completed, the Installation Completed screen appears:
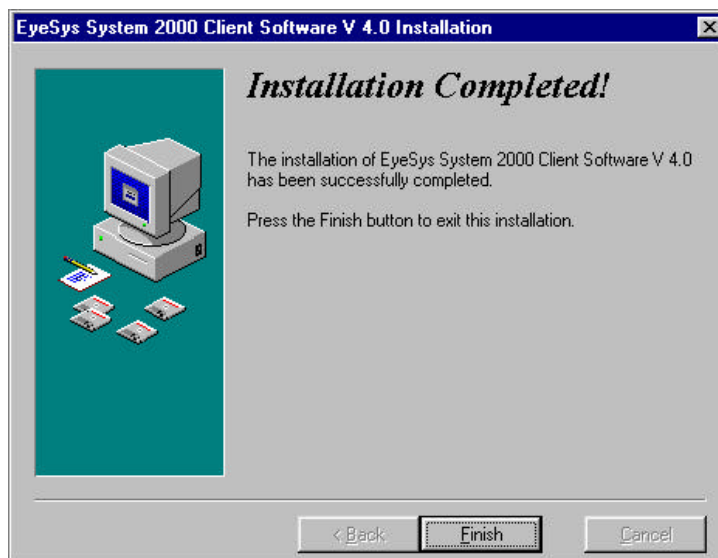
Screen A-13 Installation Completed Screen

10. Click on the Finish button.

11. You now need to create a shortcut for the System 2000 application, WW.EXE.
    This assumes that you have already installed the main System 2000 software on
    your server. See "Main System 2000 Installation" above.

12. To create the shortcut, right-click on the desktop, click New, and then click
    Shortcut. The Create Shortcut screen appears:
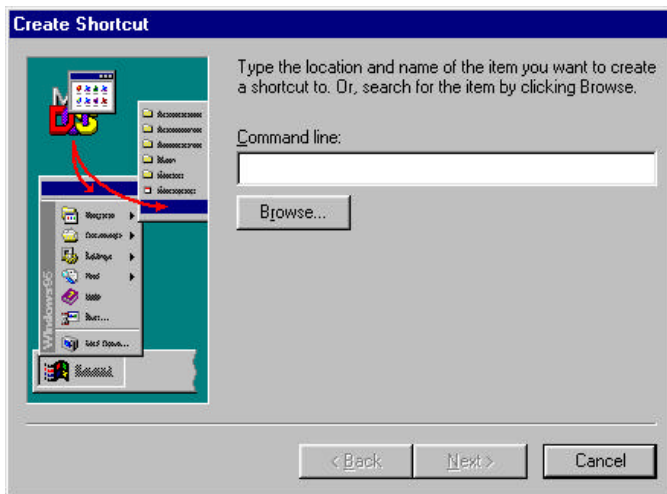
Screen A-14 Create Shortcut Screen

13. Click on the Browse button. The standard Windows 95 File browsing window displays. Select the mapped server drive on which you installed the main System 2000 software. Double-click on WW.EXE from the installation directory.

14. Click the Next button. The Select Title screen appears as shown below:
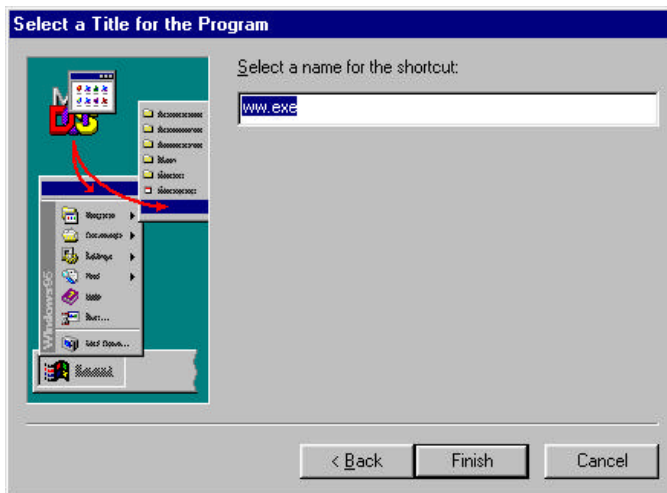
Screen A-15 Select Title Screen

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15. Replace the displayed WW.EXE shortcut name with "EyeSys System 2000 Client V4".

16. Click the Finish button. The System 2000 icon appears on the desktop:

A

Screen A-16 System 2000 Icon

17. You are now ready to run the software by double-clicking on the System 2000 icon.

Upgrading Windows 95 Screen Color mode

Depending on the capabilities of your display card and your monitor, you may be able to run Windows 95 in High color or True color mode, rather than the standard 256 color mode. This results in better color rendition of application background and screen colors, but does not alter system functionality in any way.

To find out whether you can run at the higher color resolution, perform the following:

1. Click the right mouse button anywhere on the Windows 95 desktop.

2. Click on Properties. The Display Properties screen appears:
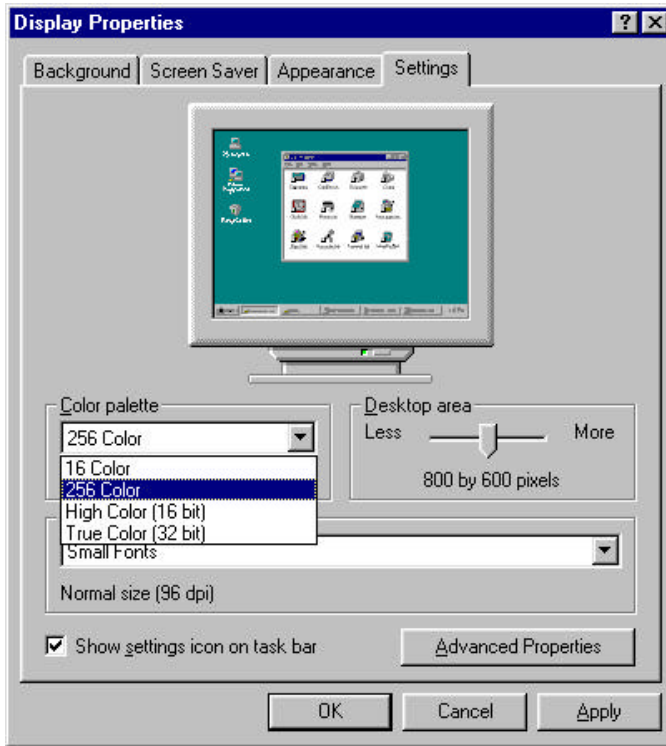
Screen A-17 Display Properties Screen

3. Click on the Settings tab.

4. If the Color Palette list box entry reads "High Color (16 bit)" or "True Color 24 bit", you are already running a high color resolution mode. Click on the Cancel button.

5. If the Color Palette list box entry reads "256 Color", then click on the down arrow.

6. If the list box contains both the "High Color (16 bit)" the "True Color 24 bit" entry, select the latter. Otherwise, if the list box contains the "High Color 16 bit" entry only, select it, then click the OK button. Follow the instructions on the screen, as you may have to reboot your system, depending on which version of Window 95 you are running. If neither entries are available, then your system does not have the capability to operate in any mode higher than the standard 256 color mode. Click on the Cancel button.

Data Maps and Displays

This appendix describes data map types and map layers.

Data Map Interpretation Tools

Before proceeding to the descriptions of each data map, you should review the following common interpretation tools:

Color Scale

The color scale on the left side is normalized by setting the middle value represented by green to the average curvature. The color scale defaults to 0.5 diopter steps, but if 98% of the data is greater than 8 diopters, the step size will increase to 1.0 diopter. You can use Map Options to change the middle value and step size.

Crosshair Data

You will notice a cross located at the detected center of the eye and a box of data in the lower right of the screen. The data corresponds to the center of the cross as follows:

♦ Power (PWR) in diopters

♦ Radius (RAD) in millimeters

♦ Distance to the center (DIS) in millimeters

♦ Axis in degrees

You can move the cross to examine data in different parts of the image, as described below:

1. Point to the cross and drag the pointing device.

2. While holding the button down, move the cross to the desired position in the eye. As you move the cross, the data in the lower right of the screen changes to reflect the measurements at the new location.

Axial (Sagittal) Radius

The axial (sagittal) radius can be thought of as a "steel ball" equivalent radius. The radius at any point would be equal to that of an equivalent steel ball whose center lies on the videokeratograph axis. The axial radius is commonly used by most corneal topographers and keratometers.

Map Layers

Angle Scale

A circular scale surrounding the cornea half of which is numerically marked in degrees. The numbers depict the angular displacement from the zero degrees position on the right side (three o'clock).

Eye Image

The digitized image of the patient's cornea with reflections of the placido mires.

Grid

A one millimeter square grid overlay. Very useful for determining dimensions when zooming.

Keratometric

A semimeridian analysis that provides information about the regularity of the patient's astigmatism. Very regular astigmatism will be depicted by an unbroken line passing through each zone while an irregular astigmatism will be identified by steep or flat semimeridians located less than 180º apart. The irregularity comes from the change in axis from one side of a zone diameter to another.

Pupil Contour

A white ring representing the circular boundary or contour of the pupil.

Rings

The boundaries of the placido mires reflecting off the cornea are indicated by red and yellow rings.

Side View Image

The digitized side view image of the patient's cornea with reflections of the placido mires.

Data Map Types

Absolute Map

The Absolute Map is a standard topographic map of corneal curvature derived using an axial (sagittal) radius of curvature. The map is created by combining colors and patterns to represent corneal curvature. This map provides the user with a method for performing color-coded diagnosis and comparison between the patient's cornea and the population average.
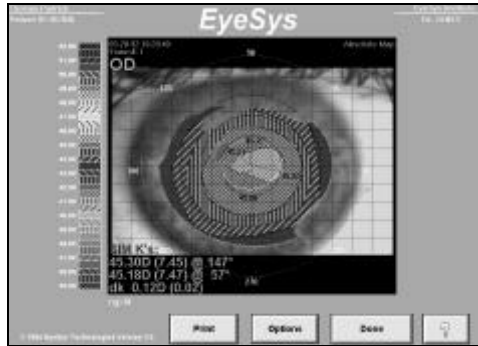
Screen B-1 Absolute Scale Map

Tip: If there is a large area of 52.0 diopter red or 35.0 diopter blue, it is very likely the absolute map is saturated. Another method such as the Axial Map should be used to obtain greater detail.

Axial Map

The Axial Map is an adjustable map that uses color to depict corneal curvature. It is derived using an axial (sagittal) radius of curvature.

Tip: Pay close attention to the color scale's middle value and step size when evaluating a cornea. The normalized scale can sometimes cause extreme corneas to look normal and normal to look extreme.

Screen B-2 Axial Map
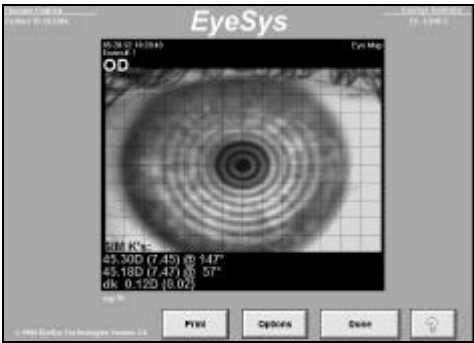
Eye Image Map

This map is a reproduction of the original video image of the patient's eye. An important quality maintenance feature is that the individual placido rings are included in this display.

Screen B-3 Eye Image Map

Keratometric Map

This map displays information similar to that provided by a Keratometer. The System 2000 Software analyzes data from the patient's cornea examination to provide simulated Keratometric, Semimeridian, and Astigmatic data. The top part of the screen displays Keratometric data for a zone that is approximately 3 mm in diameter.

Screen B-4 Keratometric Map

This zone is calibrated to 3 mm for a 42.5 diopter spherical surface. It will vary slightly for surfaces with different curvatures. All meridian data points in the zone are averaged to find the steepest meridian. The flat meridian is the one found to exist at a 90º separation. The steep and flat meridians are displayed in red and blue text respectively and are described by power (diopters), radius of curvature (mm), and axis. The astigmatism or $\triangle$K for the zone is calculated by subtracting the flat meridian from the steep meridian and is displayed in green text below the primary Meridians.

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The Semimeridian Data describes the patient's Central, ParaCentral, and Peripheral zones using semimeridians (half meridians). These zone diameters are also calibrated for a 42.5 diopter spherical surface and will vary slightly for surfaces with different curvatures. The system identifies a particular zone's steepest semimeridian by examining data points of the ring closest to the zone boundary. The system then examines the data points in the other half of the zone to find the next steepest semimeridian. This process is repeated for the flattest and next flattest semimeridian. These semimeridians are also described by power, radius, and axis. The steep and flat semimeridians are displayed using red and blue respectively and appear in order from steepest to flattest in each of the zones. The system will not display a semimeridian for a particular zone if more than 20° of ring data is missing from the ring closest to the zone boundary.

Profile Map
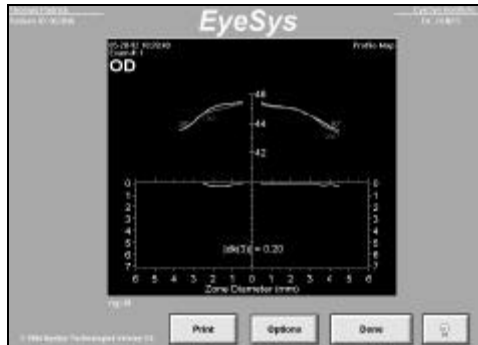
This map plots diopter changes over the cornea surface. The upper part of the graph shows the diopter changes for the absolute steepest meridian and the absolute flattest meridian. These two plots differ from Keratometric Map plots in that the Keratometric plots assume a 90° separation between axes and this map calculates the absolute steepest and flattest meridians.

Screen B-5 Profile Map

The vertical axis represents diopters and the horizontal axis represents corneal zone diameters. The lower part of the map is the astigmatism plot. It displays the difference between the steepest and flattest meridians. The astigmatism value ($\triangle K$) for the 3 mm zone is displayed in the center of the graph. The legend for this graph is in the upper, left, corner. The steepest and flattest meridians are shown in green and blue respectively and their corresponding axis in degrees.

The quadrant abbreviations for each meridian are listed to the right of the axis, separated by a colon. The quadrant abbreviations are:

SUP	=	Superior
INF	=	Inferior
TMP	=	Temporal
NAS	=	Nasal
S-T	=	Supra-Temporal
S-N	=	Supra-Nasal
I-T	=	Infero-Temporal
I-N	=	Infero-Nasal

Hint: Straight (horizontally flat) green astigmatic plots indicate very "regular" astigmatisms. Wavy astigmatic plots indicate irregular or asymmetric astigmatisms.

Tabular Map
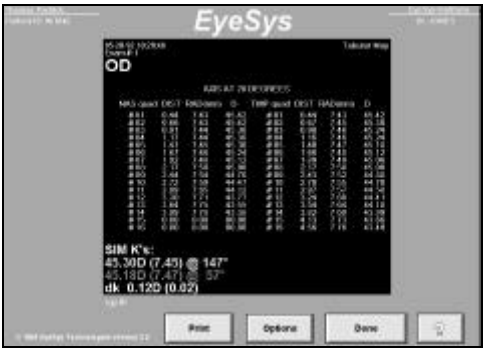
This map tabulates the diopters, radius of curvature in millimeters, and distance from the center point for each of the calculated data points.

Screen B-6 Tabular Map

Threshold Map
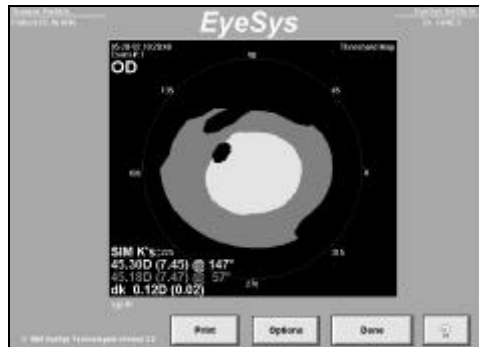
Screen B-7 Threshold Map

This map shows the calculated corneal curvature in two colors. All the values above a certain threshold are displayed in red. All the values below are shown in blue. The default threshold is the middle value of the Normalized Color Scale. Changing the threshold allows the operator to screen for keratoconus and examine the size and centering of refractive changes induced in the cornea by RK and Excimer ablation procedures.

Numerical Map

Screen B-8 Numerical Map

The numeric map is a color-coded, numerical representation of corneal curvature. It is derived using an axial radius of curvature. The radius of curvature values are shown in a radial pattern along meridians that are spaced 15° apart. Data values emanate from the calculated center to the edge. The values are shown in a color gradient. Blue is the flattest and red is the steepest.

The table to the right of the display depicts:

♦ Average corneal curvature for the entire cornea

♦ Average corneal curvatures along the periphery of different optic zones (displayed in 1 mm increments)

♦ Corneal eccentricity value (displayed as e=xx)

A 5 mm optic zone would include data points around a 2.5 mm perimeter from the center of the rings.

Tip: Can be helpful in difficult post surgical eyes.

Refractive Map

This map uses Snell's Law to provide true corneal power information. The standard scale provides simple, color-coded diagnoses.

Screen B-9 Refractive Map

Tangential Map

The Tangential Map is an adjustable map of corneal curvature which is derived using a tangential radius of curvature. Unlike the color map, the tangential map is not axis dependent. Therefore, it reads as though the videokeratoscope was realigned for every point on the cornea.

Screen B-10 Tangential Map

For a particular cornea, the color map and the tangential map are very similar near their centers (along the videokeratoscope's axis), but may differ by several diopters near the periphery.

Tip: The tangential radius of curvature can provide a more accurate shape analysis for peripheral corneal powers and is therefore best for keratoconus, contact lens wearers, and irregular or post surgical corneas.

Displays

Holladay Diagnostic Summary 2000
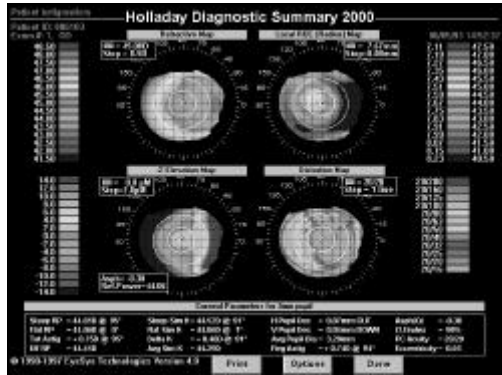
The Holladay Diagnostic Summary 2000 provides a comprehensive view of the cornea's power, shape, elevation, and optical quality. This is achieved by combining four maps of your patient's exam into a single informative display.

Screen B-11 Holladay Diagnostic Summary 2000

Definitions for each of the data maps follow:

Refractive Map - Standard Scale

This map uses Snell's Law to provide true corneal power information. The standard scale provides simple, color-coded diagnoses.

Refractive Map - Auto Scale

This map uses Snell's Law. The auto scale provides a more detailed analysis of corneal power.

Refractive Map - User-Defined Scale

This map uses Snell's Law. The user-defined scale allows the user to directly define the middle value and the step size of the color legend display.

Profile Difference Map

The Profile Difference Map generates a "normal" asphere custom tailored to your patient's central cornea. Sophisticated algorithms depict your patient's corneal shape as power differences from the generated "normal" $(Q = -.26)$ aspheric shape.

Z-Elevation Map

This map shows the difference in sagittal height between the current cornea and an aspheric reference surface.

Distortion Map

The Distortion Map measures the optical quality of the corneal surface in Snellan equivalent values and predicts your patient's visual acuity relative to the cornea as the limiting factor.

Local ROC Map

This map displays the local radius of curvature information

Corneal Parameters

The following corneal parameters are listed at the bottom of the display:

- Meridional refractive powers (RP)—true corneal power values

- Simulated keratometric values (Sim K's)—standard K values

- Pupilary measurements—measurements of decentration and size

- Asphericity (Q)—corneal shape factor

- Corneal Uniformity Index—uniformity of the cornea optical quality

- Predicted Corneal Acuity (PCA)—predicts corneal acuity

- I-S Value—Rabinowitz-McDonnell dioptric power calculation of the difference between the average inferior power and the average superior power of the cornea. The standard deviation of this value is 0.78. Any value greater that two times the standard deviation, (1.56), is abnormal and suspicious of keratoconus.

User Options

Some of the options are persistent—they stay active beyond the current display. Some of the options are transient—they remain active only for the current display. The following options are available by clicking the Options button:

- Toggle between a Profile Difference or Z-Elevation Map. This is a transient option.

- Refractive Map can be toggled between a standard, auto, or user-defined scale. This is a transient option.

- Radius Map can be displayed using a standard, auto, or user-defined scale. This is a transient option.

- Z-Elevation Map Flattest Refractive Power, Step Size, Optic Zone, and Max Value can be changed. Max Value changes are transient.

To print the Holladay Diagnostic Summary, click on Print and follow the procedures in "Printing the Display" in Chapter 7.

To go back to the Select Display screen, click on Done. The Select Display screen reappears.

You cannot change map options for the Holladay Diagnostic Summary.

STARS Display
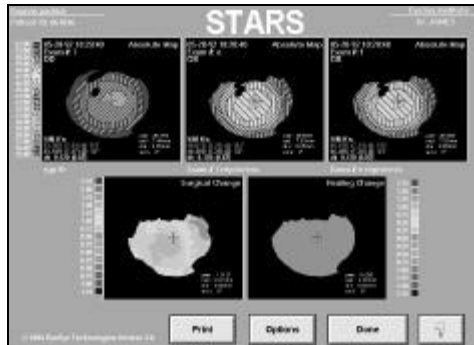
Screen B-12 STARS Display

The Standard Topographical Analysis for Refractive Surgery (STARS) display provides a retrospective view of the cornea and helps analyze surgical results while tracking the healing process.

To view a STARS display, you must select a pre-op, post-op, and a follow-up exam.

B

The STARS display shows the pre-op, post-op, and follow-up data maps at the top and the Surgical Change and Healing Change difference maps at the bottom. The Surgical Change map is derived by a subtractive analysis of the 1st and 2nd exams. The Healing Change map is derived by a subtractive analysis of the 2nd and 3rd exams.

Some characteristics of the STARS display are:

• A single, standard scale is used for all examinations

• The difference map scales are optimally adjusted and centered on the mean difference in central "K" values

To print the STARS display, click Print and follow the procedures in "Printing the Display" above.

To change map options, click on Options and follow the procedures in "Map Options" above.

To go back to the Select Display screen, click on Done. The Select Display screen reappears (Screen 6-2).

Difference Display

The Difference Map is an adjustable map of corneal curvature which is derived by a subtractive analysis of two examinations. The map is used to analyze changes in the corneal curvature over time. The difference scale is centered on 0.0 diopters and utilizes 0.5 diopter steps.
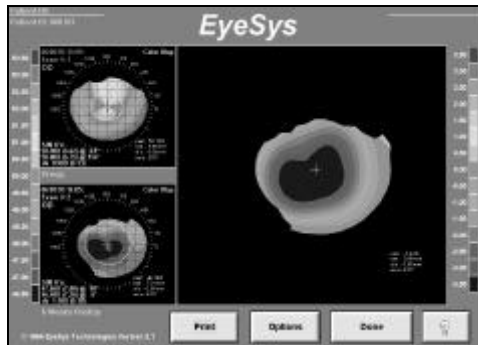
Screen B-13 Difference Display

When analyzing a difference map of two examinations, the warmer colors (reds) represent areas of the cornea which have steepened, while cooler colors (blues) represent areas of the cornea which have flattened.

Tip: The difference map is best utilized for evaluating corneal changes induced by refractive surgery, contact lens wear or corneal transplants.

Four Map Trend Display

The Four Map Trend Display can be used to show a historical sequence of patient exams using color maps. Four sequential exams of one eye or two exams of each eye can be shown.
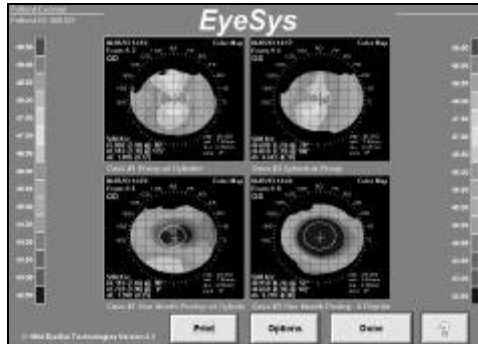
Screen B-14 Four Map Trend Display

3D Cornea Studio Display
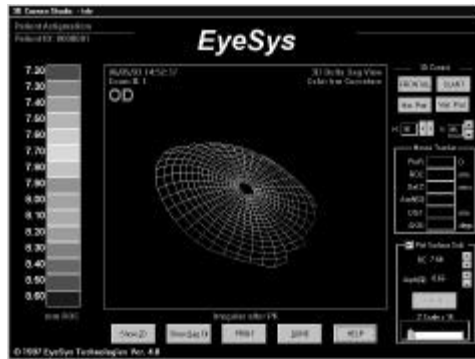
The Four Map Trend Display displays the Corneal data in a variety of 2D and 3D views. Dragging the mouse over the data yields local numeric information about the cornea, such as curvature, sagittal height, and semi-meridian eccentricity value. In 3D view, the cornea can be rotated via on-screen controls.

Screen B-15 3D Cornea Studio Display

In both 2D and 3D views, the following maps and corresponding numeric legends can be viewed:

- Axial Radius of Curvature
- Sagittal Height
- Sagittal Height Difference from a Reference Surface

Removable Disk Operations

This appendix provides the steps to do the following:

♦ Format a 3½-inch floppy diskette

♦ Format a removable hard disk

♦ Format an optical disk

♦ Change a disk volume label

Formatting a Floppy Diskette

Before performing these procedures, make sure that you have a 3½-inch, double-sided, high-density diskette. A high-density diskette can be identified by the two small square holes at the bottom. If you purchase diskettes that are already formatted in the IBM format, you do not need to perform this procedure.

To format a diskette:

1. Insert the diskette in the floppy drive **A**: with the metal end first and the label side up.

2. From the EyeSys System 2000 Main Menu, click Exit.
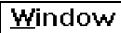
If you are using Windows 3.1, the Microsoft Windows Program Manager appears.

If you are using Windows 95, the Microsoft Windows Desktop appears.

3. Follow the step below under "Windows 3.1" or "Window 95" below.

C

Windows 3.1

1. Follow the table below. Click or double-click as indicated:

From the...	**Click on**	**Result**
Menu Bar	Window	A window appears with a listing of program groups.
Window Menu	Main	The Main Program Group appears.
Main Program Group	**Note: Double-click** 目 File Manager	The File Manager appears.
File Manager Menu Bar	Disk	The Disk Menu appears.
Disk Menu	Format Disk...	The Format Disk Menu appears.

2. Make sure that Drive A: is displayed in the Disk In box. If Drive A: is not displayed, then click on the down arrow until Drive A: is showing.

3. Click on OK.

A warning dialog box appears asking you if you want to continue. Formatting the diskette erases all data on the diskette.

4. Click on Yes. The system formats the disk.

5. Double-click on the Menu Control Box of File Manager to close it. The Program Manager appears.

6. Double-click on the EyeSys System 2000 Software icon. The EyeSys System 2000 Software reloads.

   If the EyeSys System 2000 Software icon is not visible, then click on Window from the Program Manager Menu Bar and then click on EyeSys System 2000 Software.

Windows 95

1. Follow the table below and perform the action indicated:

From the...	Action	Result
Desktop	Double-click My Computer	A program group appears.
Program Group	Right-click 3½ Floppy (A:)	A drop down menu appears as shown below.

Open
Explore
Find...

Copy Disk...
System Information
ℕ Norton Copy Disk...
ℕ Norton File Manager
Add to Zip

Format...

Paste

Create Shortcut

Properties
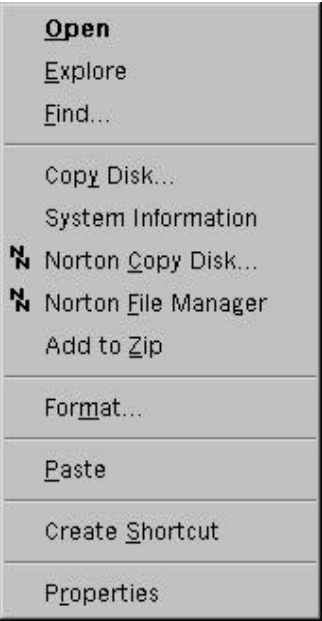
Screen C-1 31/2 Floppy Drop Down Menu

2. From the drop down menu, click on Format. The Format screen appears as shown below:
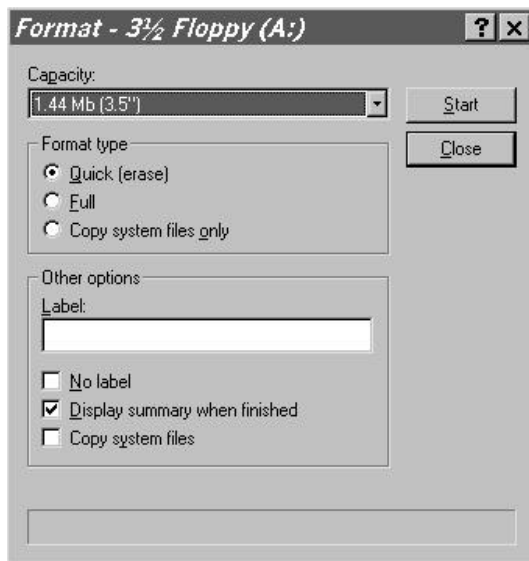
Screen C-2 Format Screen

3. Use the Capacity down arrow to select either 1.44M or 720K.

4. Select Full Format type and enter a Label name. Refer to "Changing a Disk Volume Label" in this appendix for information about labels, however, do not follow the steps.

5. Click Start. The disk is formatted. After formatting, the Format Results screen appears as shown below:
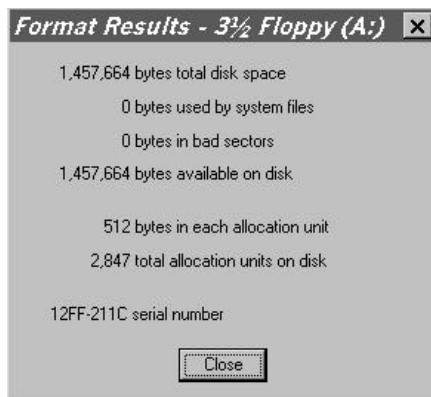
Screen C-3 Format Results Screen

EyeSys Corneal Analysis System

6. From the Format Results screen, click Close. The Format screen reappears.

7. From the Format screen, click Close. The Program Group reappears.

8. Close the Program Group by clicking on the X in the upper right.

9. Double-click on the EyeSys System 2000 Software icon. The EyeSys System 2000 Software reloads.

Formatting a Removable Hard Disk

Follow these steps to format a SyQuest removable hard disk and enter the volume label. If you have another brand of hard disk, refer to your user's guide for formatting and labeling instructions.

1. From the Windows Program Manager, locate the SyQuest Utility Program Group.

   If you cannot locate the SyQuest Utility Program Group, click on **Window** from the Program Manager Menu Bar. Highlight SyQuest

   Utility and click on OK. The SyQuest Utility Program Group appears.
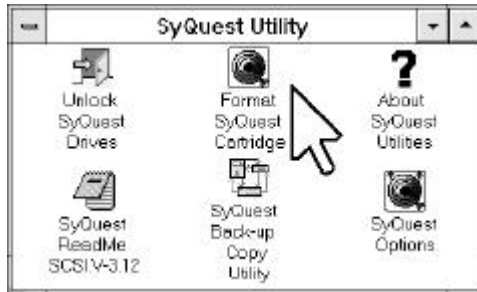
2. From the SyQuest Utility Program Group, double-click on the Format SyQuest Cartridge icon. The SyQuest Format window appears.

Screen C-4 SyQuest Utility Program Group
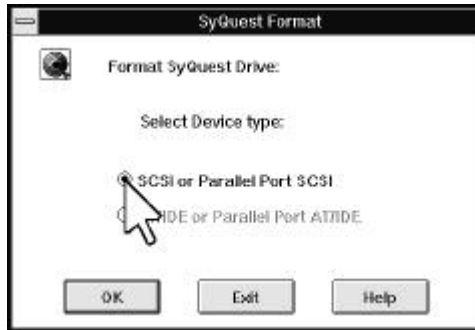
Screen C-5 SyQuest Format Window

3. From the SyQuest Format window, select SCSI or Parallel Port SCSI and click OK. The DOS program, SQPREP, starts.

4. From the SQPREP SCSI Drive Table screen, use the cursor keys to select the appropriate drive and press **ENTER**. The program asks you to verify that the activity light is illuminated on the SyQuest drive.

   If the activity light is on, type Y.

   If the activity light is off, type N and:

   • Make sure the SyQuest cartridge is inserted into the SyQuest drive

   • Make sure the correct drive was selected

5. Select the Partition/Format Cartridge for DOS option, and press **ENTER**.

6. Select Custom DOS Partitions, and press **ENTER**.

7. Press **ENTER** to select the default value for Volume Size.

8. Enter an appropriate Volume Label for the disk, such as:

   SYQUEST1, DISK1, or DBBACKUP (if you are labeling this cartridge to be used as a backup cartridge).

   At this point, the system returns to the last menu, and the process is complete.

9. Press **ESCAPE** until you return to the software.

Formatting an Optical Disk

To format an optical disk:

1. Insert the optical disk in the optical drive.

2. From the Main Menu, click Exit. The Microsoft Windows Program Manager appears.

3. Double-click on the Menu Control Box (looks like a minus sign) in the extreme, upper left corner of the window. A warning dialog box appears asking you to verify that you want to end Microsoft Windows.

4. Click OK.

5. At the DOS prompt, type **c:** and press **ENTER**.

6. Type **cd coreldrv** and press **ENTER**.

7. Type **cformat** and press **ENTER**. The formatting screen appears and prompts you for formatting information.

8. Enter the following information when the prompt appears and press **ENTER** after each:

   >Select Format Option=**format media**

   >Select Drive=**e**

   >DOS and OS/2 Compatibility=**DOS compatibility only**

   >Confirm Low Level Format=**begin low level format**

   >Select Cartridge compatibility option=**ms/pc-dos 4.x, 5.x, dr-dos 5+, and os/2 (but not dos3.x)**

   >Choose # Volumes=**1**

   >Size (millions)=**483**

   >Cluster Size=**16384**

   >Sector Size =**1024**

   >Ready to Begin High Level Format=**begin high level format process**

   >Abort to Begin High Level Format – is this OK?=**Yes**

   >Select Format Option=**Exit**

C

Changing a Disk Volume Label

The EyeSys System 2000 Software uses volume labels to identify disks that have patient exam data files stored on them. When you add or change a volume label, be thoughtful about the label you choose. Meaningful volume labels are an excellent tool for maintaining patient files.

Follow these steps to change a disk volume label:

1. From the Main Menu, click on Exit.
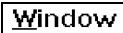
   If you are using Windows 3.1, the Microsoft Windows Program Manager appears.

   If you are using Windows 95, the Microsoft Windows Desktop appears.

2. Insert the diskette in the floppy drive **A**: with the metal end first and the label side up.

3. Follow the step below under "Windows 3.1" or "Window 95" below.

Window 3.1

1. Follow the table below. Click or double-click as indicated:

From the...	Click on	Result
Menu Bar	<u>W</u>indow	A window appears with a listing of program groups.
Window Menu	Main	The Main Program Group appears.
Main Program Group	**Note: Double-click** File Manager	The File Manager appears.
File Manager	**Note: Click on the drive you want to change.** a b c d	The tree and directory of the drive selected appears.

Continued on the next page

From the...	Click on	Result
File Manager	**Note: Click on the drive you want to change.** `—a —b c d`	The tree and directory of the drive selected appears.
File Manager Menu Bar	Disk	The Disk Menu appears.
From the Disk Menu	Label Disk	The Label Disk window opens.

2. Type a volume label of your choice and then click OK.

3. Double-click on the Menu Control Box of the File Manager to close it. The Program Manager appears.

4. Double-click on the EyeSys System 2000 Software icon. The EyeSys System 2000 Software will reload.

   If the EyeSys System 2000 Software icon is not visible, click on Window from the Program Manager Menu Bar and then click on EyeSys System 2000 Software.

> ⓘ **CAUTION**
>
> Do not change the volume label of a disk that contains patient exam files. The EyeSys System 2000 software uses the volume label when it searches for exams.

C

Windows 95

1. Follow the table below and perform the action indicated:

From the...	Action	Result
Desktop	Double-click My Computer	A program group appears.
Program Group	Right-click 3½ Floppy (A:)	A drop down menu appears as shown below.

Open
Explore
Find...

Copy Disk...
System Information
ℕ Norton Copy Disk...
ℕ Norton File Manager
Add to Zip

Format...

Paste

Create Shortcut
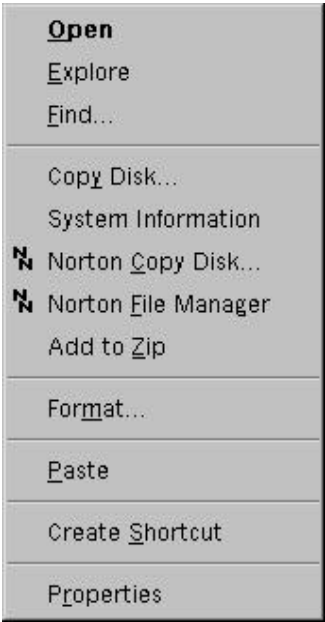
Properties

Screen C-6 31/2 Floppy Drop Down Menu

2. From the drop down menu, click on Properties. The Properties screen appears as shown below:

3½ Floppy (A:) Properties

General | Tools | Compression | Norton |

Label: TEST

Type: 3½ Inch Floppy Disk (FAT)

■ Used space: 0 bytes 0 bytes
□ Free space: 1,457,664 bytes 1.38MB

Capacity: 1,457,664 bytes 1.38MB

Drive A

OK   Cancel   Apply
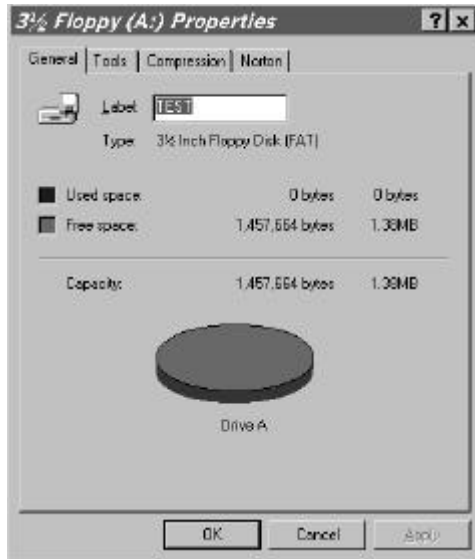
Screen C-7 Format Screen

3. Enter a Label name. Refer to "Changing a Disk Volume Label" in this appendix for information about labels, however, do not follow the steps.

4. Click OK. The disk is labeled. The Program Group reappears.

5. Close the Program Group by clicking on the X in the upper right.

6. Double-click on the EyeSys System 2000 Software icon. The EyeSys System 2000 Software reloads.

Checking Disk Space with Windows 95

You can check the available disk space for any disk in your system by following the procedures in "Windows 95" under "Changing a Disk Volume Label" above. After you click on Properties, a capacity graphic appears as shown in Screen C-7 above.

Table of Screens

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Absolute Scale

An EyeSys standard scale where each color always corresponds to a fixed 0.5 diopter range. There are 35 colors, covering the range of 35 to 52 diopters. This scale is used by the Absolute Map.

Alignment Fitting

One of three methods of fitting contact lenses that the program uses. It fits a standard spherical tri-curve design, and relies on fitting a contact lens on-K.

Apex

The center outside edge of the cornea side view.

Apical Clearance Fitting

One of three methods of fitting contact lenses that the program uses. It fits a standard spherical tri-curve design, and relies on fitting a contact lens steeper-than-K to provide some apical clearance.

Archive Drive

The disk drive the system uses to back-up or restore the patient directory.

Aspherical Fitting

One of three methods of fitting contact lenses that the program uses. If fits an aspheric base-curve lens with one spheric peripheral, and relies on an estimation of the corneal eccentricity from the topography data to compute the contact lens eccentricity.

Autotracking

The action of the system controlling the optical stage manipulator to automatically center, focus, and capture an eye image.

Calibration

A procedure that must be performed on a regular basis to ensure continued measurement accuracy of the videokeratoscope.

G

CCD (Charge Coupled Device)

A semiconductor device with an array of cells that transform light energy into electrical energy.

Click

A term used for the pointing device. It means press and release to position the cursor or make a screen selection. When using a mouse, the left mouse button is used to click.

Color Map

A map of the eye in which color is used to depict curvature data.

Cursor

The pointer on a screen or menu usually in the shape of an arrow. The cursor is used to indicate your position on a screen.

Data Map

A representation, usually graphical, of corneal data. A three map display has three distinct areas of corneal data.

Dioptric Map

A generic term which refers to a color-coded display where each color represents a range of dioptric (or radius of curvature) values. Warmer colors (i.e., towards red) indicate higher curvatures, while cooler colors (i.e., towards blue) correspond to lower curvatures.

DirectNet

An EyeSys software application that allows you to send and receive E-mails and patient exams. Refer to Chapter 10.

Distortion Map

An exam data map that measures the optical quality of the corneal surface in Snellan equivalent values and predicts the patient's visual acuity relative to the cornea as the limiting factor.

Double-click

A term used for the pointing device. It means press and release twice in rapid succession to make a selection. When using a mouse, the left mouse button is used to double-click.

Drag

A term used for the pointing device. It means to press and hold the pointing device button, and move the device vertically or horizontally to select adjacent items, and then release. When using a mouse, the left mouse button is used to drag.

Exam Display

A collection of from one to five data maps.

EyeCon, Eye Con +, and EyeSys DOS

Previous versions of EyeSys software.

Floppy Diskette

The 3½-inch diskette used to store and retrieve information. Available in 1.44 megabytes. The diskette can store approximately four eye images.

Fluorescein

A synthetic crystalline compound used to determine the distance between the outer surface of the cornea and the inner surface of a contact lens.

Format

Formatting prepares a disk so that information can be stored on it and retrieved from it.

Holladay Diagnostic Summary

An exam display that provides a comprehensive view of the cornea's power, shape, and optical quality. This display was developed by Jack T. Holladay, M.D., in conjunction with EyeSys Technologies.

IAU

The abbreviation for Image Acquisition Unit. The IAU is the hardware that contains the videokeratoscope, positioning motors, and power base.

Joystick

G

An electro-mechanical device used to operate the optical stage manipulator.

Keratometric Data

Information similar to that provided by a keratometer. Average dioptric power is displayed for a 3 mm central zone. In addition, the patient's flat and steep semi-meridian fractions are displayed graphically, together with their corresponding power. The fractions correspond to the central, paracentral and 5-7 mm peripheral zone. This display is useful for detecting irregular and astigmatic astigmatism.

Megabyte

A term for one million bytes or characters of information.

Normalized Scale

A 15-color scale where each color corresponds to a fixed 0.5 or 1.0 diopter range. The range of the scale is automatically centered around the range of the map being displayed.

OD

The abbreviation for the Latin word Oculus Dexter which stands for the right eye.

Optical Stage Manipulator

A part of the Image Acquisition Unit (IAU) that contains motors for positioning control of the videokeratoscope.

OS

The abbreviation for the Latin word Oculus Sinister which stands for the left eye.

Patient Exam Data Files

A group of files on the storage drive that contain the patient's photo ID, eye image, pupil data and curvature data. Also called exam data files.

Patient Directory

A master file stored on the internal hard drive that contains all of the patient and exam demographic data.

Patient ID

A string of alphanumeric characters used to identify a patient. The ID can be the patient's social security number, account number, or any other user numbering system.

Patient Photo Adapter

A tubular lens arrangement that fits into the center of the videokeratoscope to allow the capturing of a patient's face.

Patient Record

All data associated with a patient. The patient record contains the Patient Directory and the Patient Exam Data Files.

Pointing Device

The mouse, trackball, or pen mouse used with the computer to move the cursor on a screen and make screen selections.

Power Base

The base or bottom unit of the Image Acquisition Unit (IAU). The power base contains all of the electronics needed to control and interface the IAU with the system computer.

Profile Difference Map

An exam data map that generates a normal asphere custom tailored to the patient's central cornea.

Pupil Contour

The outside edge or shape of the pupil.

Refractive Map

A data map that uses Snell's law to provide corneal power information.

Removable Hard Disk

A hard disk encased in a hard plastic shell that allows it to be removed from a removable hard drive in the same way as a floppy diskette is removed from a floppy drive.

G

Removable Optical Disk

> An optical disk encased in a hard plastic shell that allows it to be removed from a removable optical drive in the same way as a floppy diskette is removed from a floppy drive.

Rings

> The points along the inner and outer edges of placido mires reflected off the cornea.

Semi-meridian

> Semi-meridians, or half meridians, are half circles placed over the cornea by the EyeSys software. The system examines data points along semi-meridians to locate the absolute steepest and flattest values for the cornea.

Smooth Pattern

> A map option that smoothes or reduces the resolution so that the granularity is less visible.

STARS (Standard Topographical Analysis for Refractive Surgery)

> An exam display that provides a retrospective view of the cornea to track surgical results and the healing process. This display was developed by Daniel S. Durrie, M.D. and Robert T. Spector, M.D. in conjunction with EyeSys Technologies.

Storage Drive

> The disk drive that the system uses to store patient exam data files.

SyQuest Drive

> A removable hard drive whose media is removable.

Videokeratoscope

> A conical-shaped structure with placido mires that is used to record the reflected placido mires off a cornea. It is backlit and fitted with high resolution CCD video cameras.

G

VK Axis

The located center of the rings, also know as the fixation point.

Volume Label

The user-defined name for a floppy diskette, internal hard disk, or removable disk. The volume label is written to the disk.

Z-Elevation Map

Shows the difference in sagittal height between the current cornea and an aspheric reference surface.

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EyeSys Corneal Analysis System

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EyeSys Corneal Analysis System

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