

Humphrey Field Analyzer

■ II-/series System Software Version 5.1



User Manual



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Document Applicability

This document applies to the HFA II-/series instrument, System Software Version 5.1 or higher, unless superseded.

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You are about to use the most advanced automated perimeter available, the Humphrey® Field Analyzer II-*i* series (HFA™ II-*i*). This introductory section covers general information about the HFA II-*i*, including a brief discussion of visual fields and a summary of important instrument features.

After reading this chapter you will be familiar with:

- the importance of visual field testing
- general principles of perimetry
- unique features of the HFA II-*i*
- installation and safety precautions
- connecting the printer and optional external devices

Intended Use

The Carl Zeiss Meditec, Inc. Humphrey Field Analyzer II-*i* is an automatic perimeter which is intended to be used to measure the visual field of the eye.

Indications for Use

The Humphrey Field Analyzer II-*i* is an automated perimeter intended to identify visual field defects for the purposes of screening, monitoring and assisting in the diagnosis and management of ocular diseases such as glaucoma, and related neurological disorders.



Note: These perimetry results are an aid to interpretation, not a diagnosis. The doctor's judgment is still the most important element in determining the clinical significance of the results, including considering the limitations of the statistical package.

Essential Performance

The Essential Performance of the instrument is to provide accurate visual field measurements.

Patient Population

The Humphrey Field Analyzer II-*i* may be used on all adults and children over the age of six in need of diagnostic evaluation of the eye. This includes (but is not limited to) patients with the following disabilities or challenges:

- Wheelchair user
- Very low or not measurable visual acuity
- Postural problems
- Fixation problems
- Deafness
- Large body, but not those above 99th percentile based on anthropomorphic data

There is a general requirement that the patient be able to sit upright and be able to place their face in the chin and forehead rest of the instrument (with or without supplemental human or mechanical support).

Part of the Body

The Humphrey Field Analyzer II-*i* physically interacts with the patient's forehead and chin. The patient's hand and fingers (or similar ability) are also required to press the Patient Response button.

Application

The Humphrey Field Analyzer II-*i* is designed for continuous use, although it is expected that most sites operate the instrument for 10 hours or less per day, indoors, within a medical office or hospital setting. This setting shall have clean air free of soot, vapors from adhesives, grease, or volatile organic chemicals. Other Operating Environment specifications are given in [Appendix \(A\), "Product Specifications,"](#). Application related warnings are given in [Chapter \(1\), "Introduction & Instrument Setup,"](#) and elsewhere.

User Profile

We assume that users are clinicians with professional training or experience in the use of ophthalmic equipment, and in diagnostic interpretation of the test results. Specific assumptions regarding the profiles of individuals performing instrument operation or data interpretation are given below. This manual contains information that will aid in the proper instrument operation and interpretation of the resultant data.

Instrument Operation

Demographic

The user should be adult, and at least one of the following:

- Ophthalmologist
- Optometrist
- Nurse

- Certified Medical Technician
- Ophthalmic Photographer
- Non-certified Assistant

Occupational Skills

The user should be able to perform all of the following tasks:

- Power on the instrument
- Enter, find, and modify patient identifying data
- Clean surfaces that contact patient
- Position patient with the instrument, including moving the patient, the instrument, the table height, and the patient's chair
- Select and initiate a test
- Review and save a test or try again
- Generate an analysis report
- Review the analysis report for completeness
- Save, print, or export an analysis report
- Archive data
- Power off the instrument

Data Interpretation

Demographic

The user should be one of the following:

- Ophthalmologist or other Medical Doctor
- Optometrist or equivalent

Occupational Skills

The user should have the following skills:

- See [Instrument Operation](#) above
- Ability to work with elderly patients and those with disabilities

Job Requirements

The user should have training and certification in the analysis and treatment of ophthalmic diseases or other eye-related medical issues as required by governing bodies.

Purpose of This User Manual

Carl Zeiss Meditec designed this User Manual to serve as a training, usage and reference guide. While we offer training in the use of the HFA II-*i*, we do not offer instruction in diagnostic interpretation. This manual does not attempt to do so.

To fully appreciate the capabilities of the HFA II-*i* and to develop good testing techniques, we recommend that you rely on this User Manual as your training and reference guide. It has been designed to make learning easy. The concise step-by-step instructions and accompanying illustrations help you get started quickly and with more confidence.

We think you will enjoy working with the HFA II-*i*. The friendly touch control makes it inviting to learn and easy to operate. For optimum results:

- Read your User Manual in the order written.
- Read it while sitting at the instrument.
- Practice using the HFA II-*i* by first testing staff members, before using it with patients.



Note: HFA II-*i* series system software Ver. 5.x has updated the style of the user interface without altering the button locations, functions, and text from the prior software version. This manual depicts the screens in the prior software style. Regardless of style, text and buttons on screen images depicted in this manual are identical to those in the Ver. 5.x software screen images.

Model Differentiation

This guide contains instructions for Models 720*i*, 740*i*, 745*i* and 750*i*. Although much of the information is relevant to all models, some information applies only to particular models. When a feature or function applies only to specific models, this guide specifies the model number(s), often in parentheses, in a prominent location. An example of this is found in the discussion of [“SWAP \(Blue-Yellow\) Testing \(Models 745i and 750i\),” on page 1-21](#). Conversely, model numbers are not specified when information is standard or optional on all models. You can find the model number of your instrument on the rear panel of the HFA II-*i* or you may access this information via the “*i*” button located in the upper, left-hand corner of the screen (see [“The Information Button,” on page 2-3](#)). Refer to [Appendix \(B\), “Product Features,”](#) if you are unsure about the particular capabilities of your instrument.

Text Conventions

The terms “select,” “choose,” “touch,” and “press” are used interchangeably. Each term means to initiate an operator action using the touch screen, external keyboard, glidepad, trackball, or mouse. The terms “hard disk” and “hard drive” are used interchangeably, in reference to the data storage device standard on all HFA II-*i* models.

UPPER CASE LETTERS are reserved for references to specific command buttons found on the touch screen. The exceptions to this are messages on test printouts, the words STATPAC, SITATM, SWAP, HFA II-*i*, and headings.

Italicized words are used to identify the icon buttons on the right border of the screen, the titles of figures, pictures, tables, and special notes in this manual.

Bold words are used to highlight **warnings** and section headings.

This manual means "left-click" when it says, "click," except where "right-click" is specified.

Chains of menu items are indicated with the use of the ">" symbol between items. For example, "*File>Exit*" directs you to select Exit in the File menu.

Access Menu Options

To access the options offered through each menu, click on the menu headings. Then click on an option to select it. Click outside all menu options to make the options disappear.

- Some menus are fields tagged with a down-arrow (drop-down lists). To access these menu options, click on the down-arrow.
- Grayed-out menu options or buttons are not available.

Electronic User Manual Access

The HFA II-*i* User Manual in Acrobat PDF format for use on a computer is on the HFA II-*i* User Documentation CD included in the instrument accessory kit. If you do not have Adobe Reader installed, go to www.adobe.com to download and install the free Adobe Reader.

Additional References

The User Manual cannot possibly cover every situation you may encounter with the HFA II-*i*, especially interpretation questions. Your HFA II-*i* comes with a copy of *Essential Perimetry*, which provides an overview of visual field results. *Automated Static Perimetry, Second Edition*, by Douglas R. Anderson and Vincent Michael Patella (Mosby, Inc., St. Louis), is recommended for in-depth information and analysis of visual fields.

Symbols and Labels



WARNING



CAUTION



Must follow Instruction for Use



Type B applied parts



Alternating Current



Fuse



CAUTION: Hot Surface



Manufacturer



Date of Manufacture



Authorized European Community Representative



Serial number



Catalog number / part number



Model number



Patent



System Software USB Flash Drive



Calibration Software USB Flash Drive



GPA Sample Data USB Flash Drive



European Conformity



Disposal of the Product within the EU. Do not dispose via domestic waste disposal system or communal waste disposal facility.



Additional symbols appearing on the HFA II-*i*:

	Power On		Power Off
	Projector Lamp		Brightness
	Air Intake Filter		VGA Video Port
	Serial RS-232 Communication Port		Keyboard/Mouse Port
	Printer		Network Port
	USB Port		Patient Response Button
			DO NOT USE

Figure 1.1 : Additional HFA II-*i* Symbol Definitions

Protective Packing Symbols

The protective packing symbols on the shipping carton specify the handling requirements and the transport and storage conditions for the HFA II-*i* as it is shipped from the factory. Note these symbols in the event that your HFA II-*i* must be stored for a period of time, prior to its set up and use.

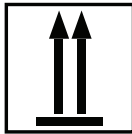
Handling Requirements



Fragile, Handle with Care



Keep Dry

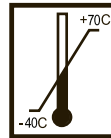


This end up

Transport and Storage Conditions



Relative Humidity (10% to 100%, including condensation)



Temperature (-40 to +70 deg. C)



Atmospheric Pressure Limits (500 hPa to 1060 hPa)

Instrument Disposition

When it comes time to upgrade the HFA, please contact Carl Zeiss Meditec to inquire about trade-in or upgrade values we may offer. Should you not wish to trade in the instrument, please see the Disposal section below.

Disposal



CAUTION: This product contains electronic components. At the end of its lifetime, the product should be disposed of in accordance with the relevant national regulations.



Disposal of the Product within the European Union (EU)

In accordance with applicable EU guidelines at the time at which the product was brought onto the market, the product specified on the consignment note is not to be disposed of via the domestic waste disposal system or communal waste disposal facilities.

For further information on disposal of this product, please contact your local dealer or the manufacturer or its legal successor company. Please read the latest internet information provided by the manufacturer.

Where the product or its components are resold, the seller must inform the buyer that the product must be disposed of in accordance with the currently applicable national regulations.

User Changes to Software or Hardware

The HFA II-*i* is a medical device. The software and hardware have been designed in accordance with U.S., European and other international medical device standards designed to protect clinicians, users and patients from potential harm caused by mechanical, diagnostic or therapeutic failures.



WARNING: Unauthorized modification of HFA II-*i* software or hardware (including peripherals) can jeopardize the safety of operators and patients, the performance of the instrument, and the integrity of patient data; it also voids the instrument warranty.

Approved Software

Use of software supplied or approved by Carl Zeiss Meditec for the HFA II-*i* is authorized. For the current list of approved software call Carl Zeiss Meditec Customer Care: In the U.S., call 800-341-6968. Outside the U.S., contact your local Carl Zeiss Meditec distributor.



Note: Carl Zeiss Meditec does not provide technical support for the use of unapproved third party software.

Instrument Installation

Only an authorized Carl Zeiss Meditec service representative should install the HFA II-*i*. In consultation with the buyer, Carl Zeiss Meditec schedules one free on-site installation appointment after instrument delivery. System installation and operator training require approximately one-half business day.

Care in Handling

Use extreme care when handling and transporting the HFA II-*i* shipping boxes. The instrument contains fragile optics that have been precisely aligned at the factory.

Installation Requirements

- The HFA II-*i* should operate on a dedicated power outlet. Based on your specification, we configure your HFA II-*i* at the factory to use either 100V, 115V, or 230V line voltage.
- An isolation transformer is required when connecting peripheral devices that are not Medical Device approved (i.e., printer, USB drive, etc.) within 1.5 meters (4.9 feet) away from the patient, such that the patient cannot touch a peripheral device with any part of his or her body while being examined.

Tips to Avoid Damage



Note: Users are not authorized to dismantle or modify the HFA II-*i* hardware. To transport the instrument outside the office, you must consult with a Carl Zeiss Meditec service technician. Failure to do so voids all warranties offered with the HFA II-*i*.

- **Only Carl Zeiss Meditec authorized technicians should disassemble or service this instrument.** In the case of malfunction, error messages or operational problems, call Carl Zeiss Meditec Customer Care: In the U.S., call 800-341-6968. Outside the U.S., contact your local Carl Zeiss Meditec distributor.

- This instrument has no special measures to protect against harmful ingress of water or other liquids (classified IPX0—ordinary equipment). Do not place containers of liquid on or near the instrument, nor use aerosols on or near it.
- In case of emergency related to the instrument, unplug the power cord from the wall outlet and call for service immediately.
- With the exception of the main power fuses and keyboard, there are no user-replaceable parts in the instrument. For the replacement of any component, accessory, or peripheral, except fuses or the keyboard, call Carl Zeiss Meditec Customer Care: In the U.S., call 800-341-6968. Outside the U.S., contact your local Carl Zeiss Meditec distributor.
- Although this instrument is designed for continuous operation, it should be turned off when not in use for an extended period.
- This instrument operates according to specifications under standard indoor office (fluorescent) lighting conditions, without exposure to any direct sunlight.

HFA II-/Embedded License

Each HFA II-/i is issued with an embedded VxWorks® operating system license.

Product Compliance



Complies with 93/42/EEC Medical Device Directive.



Complies with US and Canadian medical electrical system safety requirements.

Product Safety

This instrument is classified as follows:



- **Class I Equipment** – Protection against electrical shock.
- **Type B** – Degree of protection against electric shock of applied part (chin and forehead rests, and patient button).
- **Ordinary Equipment (IPX0)** – Degree of protection against ingress of liquids (none).
- **Continuous Operation** – Mode of operation.

General Safety Requirements

- Although the HFA II-/i is designed for continuous operation, it should be turned off when not used for an extended period of time. The HFA II-/i should be used in a cool, dry dust-free setting.
- Use the instrument cover to protect the HFA II-/i at all times when it is not in use.
- Do NOT place the cover over the instrument when the HFA II-/i is turned on, as loss of proper airflow can cause overheating and damage to sensitive components.
- Do NOT connect or disconnect cables while power is on.
- Do NOT place any objects on top of the instrument.
- Do NOT place any container holding liquid near the instrument.
- Use only a stand or table recommended by Carl Zeiss Meditec.

Warnings and Cautions



WARNING: Do NOT block the ventilation openings. These allow for the release of heat generated during operation. A buildup of heat due to ventilation opening blockage can cause failures which may result in a fire hazard.



WARNING: To prevent electric shock, the instrument must be plugged into an earthed ground outlet. Do not remove or disable the ground pin. Only an authorized Carl Zeiss Meditec service representative may install the instrument.



WARNING: Do not use the printer or the instrument or the optional power table with an extension cord or a power strip (multiple portable socket outlet). For additional safety, do not plug the printer and the instrument (or the optional power table) into the same wall outlet. Failure to observe this warning could result in electrical shock to the patient and/or examiner.

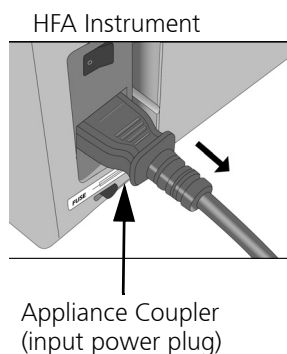


WARNING: Do not open the instrument covers. Opening the instrument covers could expose you to electrical and optical hazards.



WARNING: If the instrument is externally connected to non-medical peripheral devices (i.e. printer, storage devices, etc.), the complete system must comply with the system requirements in standard IEC 60601-1. This standard requires the usage of an Isolation Transformer to power the non-medical peripheral device(s) if located within 1.5 m from the patient. If the peripheral device is located outside the patient environment (beyond 1.5 m) and is connected to the HFA, a separation device must be used or there shall be no metal to metal connection between the non-medical peripheral device and the HFA.

The person or the responsible organization connecting additional devices or reconfiguring the system must evaluate the complete system to ensure compliance to the applicable IEC 60601-1 requirements. The instrument operator must not attempt to touch the patient and the peripheral device simultaneously.



WARNING: Do not reconfigure system components on the table, nor add non-system devices or components to the table, nor replace original system components with substitutes not approved by Carl Zeiss Meditec. Such actions could result in failure of the table height adjustment mechanism, instability of the table, tipping and damage to the instrument, and injury to operator and patient.



CAUTION: The appliance coupler (shown on the left) is the main disconnect device of the instrument. Position the instrument in such a way to have easy access to disconnect the appliance coupler in case of an emergency.



CAUTION: In case of an emergency, disconnect the appliance coupler.



WARNING: This instrument may cause ignition of flammable gases or vapors. Do NOT use in the presence of flammable anesthetics such as nitrous oxide, or in the presence of pure oxygen.



WARNING: Avoid tipping. Do not use the instrument on an uneven or sloped surface. Do not roll the table in deep pile carpet or over objects on the floor such as power cords. Failure to observe these precautions could result in tipping of the instrument and/or table and resulting injury to operator or patient and damage to the instrument.

Electromagnetic Compatibility (EMC)



Note: The HFA II-/i needs special precautions regarding EMC and needs to be installed and put into service according to the EMC information provided herein.



Note: Portable and mobile RF communications equipment can affect medical electrical equipment.



WARNING: The use of accessories, transducers and cables other than those specified may result in increased emissions or decreased immunity of the equipment.



WARNING: The HFA II-/i should not be used adjacent to or stacked with other equipment. If adjacent or stacked use is necessary, the equipment or system should be observed to verify normal operation in the configuration in which it will be used.



Guidance and manufacturer's declaration - electromagnetic emissions

The HFA II-*i* is intended for use in the electromagnetic environment specified below. The customer or user of the HFA II-*i* should ensure that it is used in such an environment

Emissions Test	Compliance	Electromagnetic environment - guidance
RF emissions CISPR 11	Group 1	The HFA II- <i>i</i> uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
RF emissions CISPR 11	Class A	The HFA II- <i>i</i> is suitable for use in all establishments, other than domestic and those directly connected to the public low-voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Class A	
Voltage fluctuations/ flicker emissions	Complies	

Guidance and manufacturer's declaration - electromagnetic immunity			
The HFA II- <i>i</i> is intended for use in the electromagnetic environment specified below. The customer or user of the HFA II- <i>i</i> should ensure that it is used in such an environment			
Immunity Test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Electrostatic Discharge (ESD) IEC 61000-4-2	± 6 kV contact ± 8 kV air	± 6 kV contact ± 8 kV air	Floors should be wood, concrete, or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	± 2 kV for power supply lines ± 1 kV for input/output lines	± 2 kV for power supply lines ± 1 kV for input/output lines	Mains power quality should be that of a typical commercial or hospital environment.
Surge IEC 61000-4-5	± 1 kV differential mode ± 2 kV common mode	± 1 kV differential mode ± 2 kV common mode	Mains power quality should be that of a typical commercial or hospital environment.
Voltage dips, short interruptions, and voltage variations on power supply input lines. IEC 61000-4-11	$<5\% U_T$ ($>95\%$ dip in U_T) for 0.5 cycle $40\% U_T$ (60% dip in U_T) for 5 cycles $70\% U_T$ (30% dip in U_T) for 25 cycles $<5\% U_T$ (95% dip in U_T) for 5 sec.	$<5\% U_T$ ($>95\%$ dip in U_T) for 0.5 cycle $40\% U_T$ (60% dip in U_T) for 5 cycles $70\% U_T$ (30% dip in U_T) for 25 cycles $<5\% U_T$ (95% dip in U_T) for 5 sec.	Mains power quality should be that of a typical commercial or hospital environment. If the user of the HFA II- <i>i</i> requires continued operation during power mains interruptions, it is recommended that the HFA II- <i>i</i> be powered from an uninterruptible source.
Power Frequency (50/60 Hz) magnetic field IEC 61000-4-8	3 A/m	3 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Note: U_T is the a.c. mains voltage prior to application of the test level.

Guidance and manufacturer's declaration - electromagnetic immunity

The HFA II-*i* is intended for use in the electromagnetic environment specified below. The customer or user of the HFA II-*i* should ensure that it is used in such an environment

Immunity Test	IEC 60601 test level	Compliance level	Electromagnetic environment - guidance
Conducted RF IEC 61000-4-6	3 Vrms 150 kHz to 80 MHz	3 V	Portable and mobile RF communications equipment should be used no closer to any part of the HFA II-<i>i</i>, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter. Recommended separation distance $d = 1.17\sqrt{P}$ $d = 1.17\sqrt{P} \quad 80 \text{ MHz to } 800 \text{ MHz}$ $d = 2.33\sqrt{P} \quad 800 \text{ MHz to } 2,5 \text{ GHz}$ where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in meters (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey,^a should be less than the compliance level in each frequency range.^b Interference may occur in the vicinity of equipment marked with the following symbol: 
Radiated RF IEC 61000-4-3	3 V/m 80 MHz to 2,5 GHz	3 V/m	

Note 1: At 80 MHz and 800 MHz, the higher frequency applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

^a Field strengths from fixed transmitters, such as base stations for radio (cellular/cordless) telephones and land mobile radios, amateur radio, AM and FM broadcast, cannot be predicted theoretically with accuracy. To assess the electromagnetic environment due to fixed RF transmitters, an electromagnetic site survey should be considered. If the measured field strength in the location in which the HFA II-*i* is used exceeds the applicable RF compliance level above, the HFA II-*i* should be observed to verify normal operation. If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the HFA II-*i*.

^b Over the frequency range 150 kHz to 80 MHz, field strengths should be less than 3 V/m.

Recommended separation distances between portable and mobile RF communications equipment and the HFA II-*i*

The HFA II-*i* is intended for use in an electromagnetic environment in which radiated RF disturbances are controlled. The customer or the user of the HFA II-*i* can help prevent electromagnetic interference by maintaining a minimum distance between portable and mobile RF communications equipment (transmitters) and the HFA II-*i* as recommended below, according to the maximum output power of the communications equipment.

Rated maximum output power of transmitter W	Separation distance according to frequency of transmitter m		
	150 kHz to 80 MHz	80 MHz to 800 MHz	800 MHz to 2,5 GHz
	$d = 1.17 \sqrt{P}$	$d = 1.17 \sqrt{P}$	$d = 2.33 \sqrt{P}$
0,01	0.117	0.117	0.233
0,1	0.370	0.370	0.737
1	1.170	1.170	2.330
10	3.700	3.700	7.368
100	11.700	11.700	23.300

For transmitters rated at a maximum output power not listed above, the recommended separation distance *d* in metres (m) can be estimated using the equation applicable to the frequency of the transmitter, where *P* is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer.

Note 1: At 80 MHz and 800 MHz, the higher frequency applies.

Note 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

Accessory Equipment



WARNING: Accessory equipment connected to the analog and digital interfaces must be certified according to the respective IEC standards (e.g., IEC 60950 for data processing equipment and IEC 60601-1 for medical equipment). Furthermore, all configurations shall continue to comply with the applicable system requirements of IEC 60601-1 standard. Any person who connects additional equipment to the signal input part or signal output part configures a medical system, and is therefore responsible for ensuring that the complete system complies with the applicable system requirement of IEC 60601-1 standard. If in doubt, consult the technical service department or your local representative.

About Visual Fields

When asked to assess one's own vision, the average person often will confidently reply, "I see 20/20", "20/100" or whatever the result of their visual acuity test. Fortunately, doctors appreciate the complexities involved in evaluating visual function and rely on an extensive and varied battery of diagnostic tests and instruments as part of the ocular examination. Without question, one of the most essential tools in the modern ophthalmic office is the automated perimeter, used to evaluate the visual field.

The purpose of visual field testing, or perimetry, is to provide information critical to:

- diagnosing ocular diseases, especially glaucoma
- evaluating neurological diseases
- monitoring the progress of ocular and neurological diseases

Visual field testing can lead to early detection and treatment of disease. In the case of glaucoma, visual fields play a major role in identifying visual field defects and evaluating the efficacy of the therapy used to control the disease process.

What Visual Field Tests Measure

When evaluating visual performance, clinicians are primarily interested in two retinal functions: resolution and contrast sensitivity. Resolution is the ability to identify discrete forms (letters, numbers, symbols), and is commonly measured with the visual acuity test. Resolution rapidly diminishes with increasing distance from the fovea and is, therefore, a poor indicator of overall visual performance.

A better means of evaluating visual function—especially those areas less sensitive than the fovea—is contrast sensitivity testing. Contrast sensitivity is the ability to detect a stimulus (spot of light or other target) against a darker or brighter background. Humphrey perimetry may be thought of as contrast sensitivity testing applied throughout the peripheral visual field.

In perimetry, the term "threshold" is used to describe a very specific level of stimulus detection. The threshold represents the point at which a stimulus is seen 50% of the time and missed 50% of the time. The assumption is that all stimuli brighter than the threshold value will be seen and all stimuli dimmer will be missed. Reviewing the threshold value at each point tested in the visual field is an important part of the diagnostic process.

Visual field tests can yield information that is general in nature, as with screening tests, or more exacting and quantitative, as with threshold tests. In deciding which test type is most appropriate for a patient, the practitioner is influenced by many factors, including the patient's presenting complaint, family history, age, degree of cooperation, and time available to run the test.

Normal Versus Pathologic Fields

The visual field normally extends more than 90° temporally, 60° nasally and superiorly, and about 70° inferiorly. That means a person can potentially perceive stimuli within this range while staring at a fixed point.

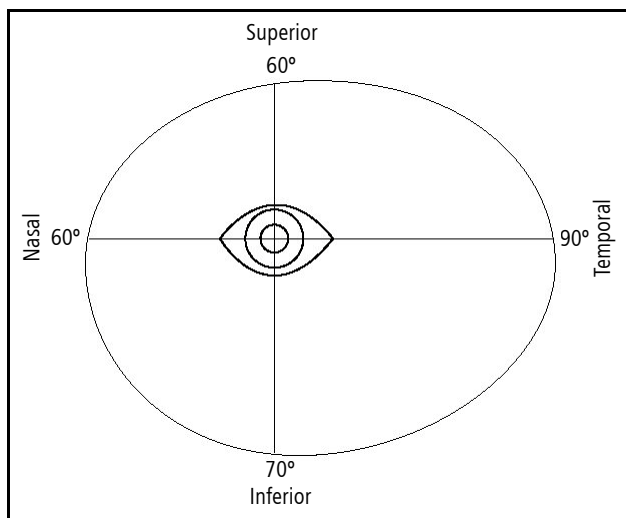


Figure 1.2 The Boundaries of the Normal Visual Field

A more comprehensive understanding of the normal field takes into account that visual sensitivity is not constant (or equal) throughout the range. As previously stated, vision is most acute at the fovea and decreases toward the periphery of the retina. It is easy to see why the visual field is often expressed as a “hill of vision in a sea of darkness”.

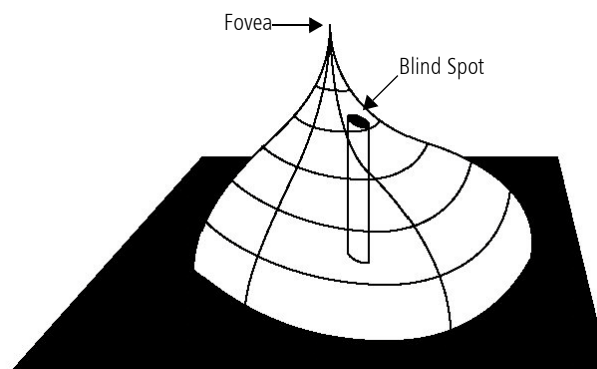


Figure 1.3 The Normal Hill of Vision

Several factors affect the normal hill of vision, causing variations in its overall height and shape. Among them are a patient's age, ambient light, stimulus size, and stimulus duration. In general, deviations from the normal hill of vision are viewed as visual field defects and caused by some pathological change.

A visual field defect, or scotoma, is categorized as either relative or absolute. A relative defect is an area that has depressed vision or less than normal sensitivity; an absolute defect is an area where the perception of light is absent. The point at which the optic nerve enters the retina is referred to as the blind spot, and is an example of an absolute scotoma.

Some defect patterns are characteristic of certain diseases, a fact which makes visual field testing a valuable part of the diagnostic process. Furthermore, by having patients repeat the same tests at later dates, practitioners gain insight into the progression of the disease and the effectiveness of treatment.

Methods of Testing the Visual Field

Over the years, visual field testing devices have varied in size, complexity, and testing methodology. The fundamental premise has remained the same, however; patients must respond when they see a stimulus.

Static threshold testing evaluates retinal function. The term “static” refers to a stationary stimulus being used. In static testing, predefined test locations in the visual field are probed. Through a series of stimulus presentations of varying brightness intensities, the threshold value is determined for each test point. When evaluating static test results, clinicians are looking at the topography or contour of the hill of vision, and whether depressions are evident.

In a second type of retinal evaluation, called kinetic testing, a light stimulus of fixed characteristics is moved into the visual field from a non-seeing area, until it is detected by the patient. Typically, the stimulus is brought toward the center from several directions and the operator marks the location at which the patient first detects the stimulus (threshold point).

Kinetic test results can only be reliably related to specific parts of the visual field if points are joined to form an isopter, or ring of equal contrast sensitivity. Targets of varying size and brightness are used during one kinetic test, and for each different target, a different isopter is mapped. When reviewing several isopters, the clinician is visualizing different tiers in the hill of vision.

Patient Fixation and Test Reliability

In order for any visual field test to be useful clinically, it must yield reliable results. One important factor affecting reliability is the steadiness of patient fixation. Unless the eye being tested fixates accurately on the target while responding to stimuli, the results are unreliable.

Other factors adversely affecting reliability are:

- patient fatigue and anxiety
- poor test instructions
- patient discomfort
- improper near vision correction for central testing

Benefits of Computerized Perimetry

Certainly the advancements in microprocessor technology within the last 20 years have had a profound effect on perimetry. Perimeters have evolved into a more precise measuring tool yielding highly repeatable results.

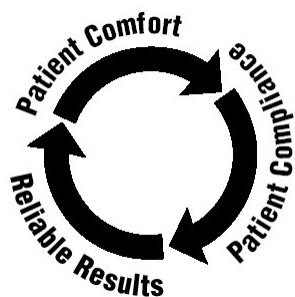
These changes are better appreciated by examining the benefits computerized perimeters bring to both patient and professional:

- Reproducible testing conditions
- Data storage capability; results can be compared over time and analyzed using expert-system software

- More sensitive testing; advances in algorithm development has made static perimetry superior to the kinetic method for identifying defects
- Ease of operation; menu-driven software makes automated perimeters easy to learn and use

The Humphrey Advantage

Over 25 years of advancements in research, design and development are reflected in the Humphrey Field Analyzer II-*i*. Equally important, the latest models represent improvements suggested by users from around the world who generously have shared their best ideas with Carl Zeiss Meditec. With tens of thousands of Humphrey Field Analyzers in use worldwide, Carl Zeiss Meditec took on the challenge of improving the testing experience for the patient, the operator, and the practitioner. Here are some of the features which differentiate the HFA II-*i* from other autoperimeters that are available.



Ergonomic Design

The HFA II-*i* relieves many physical discomforts associated with visual field testing. The chin rest and bowl shape allow patients to assume a more natural and relaxed sitting position when taking tests. The power table improves patient comfort by permitting the HFA II-*i* to adjust to the patient instead of the patient adjusting to the instrument. This especially is important for wheelchair bound patients.

The patient response button is easy to operate, especially for patients who have limited use of their hands; for instance, patients with arthritis. The uniquely-shaped button may be placed on a knee, lap or the arm of a chair for better leverage. The cord angles away from the patient for greater comfort. The response button beeps each time it is pressed to give immediate feedback to the patient and to the operator.

Easy Operation

Sophisticated instrumentation need not be complicated. The HFA II-*i* offers a number of features intended to make the instrument easier to use:

- Touch screen design speeds data input.
- Menu and icon commands simplify operation.
- On-screen video eye monitor is standard on all models.
- Confirmation screens reduce unintentional data loss.
- A keyboard, glidepad, trackball or mouse can be connected to the HFA II-*i* as optional data input devices.
- An optional keyboard with built-in glidepad is available for HFA models that were not delivered with one.

Rapid Testing

Carl Zeiss Meditec's SITA (Swedish Interactive Thresholding Algorithm) testing strategies allow precise visual field measurements with unprecedented speed. SITA is a rapid, reliable, state-of-the-art autoperimetric technology that is available only with the Humphrey Field Analyzer. With the SITA strategies, users can obtain visual field information in half the time it takes using conventional testing algorithms without compromising accuracy. For further explanation of the SITA testing strategy, refer to [Appendix \(K\)](#).

Sophisticated Data

The Humphrey Field Analyzer's statistical software, STATPAC, provides immediate expert analysis of visual field test results. With STATPAC, you can analyze test results at the time of examination, store test results and analyze them at your convenience, or recall previously stored tests to analyze for comparative purposes.

STATPAC includes several exclusive features to help you identify visual field change:

- Using results from a single test, STATPAC can point out suspicious areas that otherwise might not be evident until subsequent tests were done.
- STATPAC can identify areas that look suspicious but which, in fact, compare favorably with normals data.
- Using results from a series of tests, STATPAC provides a highly sensitive and informative analysis of changes in the patient's visual field over time.
- The Glaucoma Hemifield Test (GHT) compares points in the superior and inferior hemifields to provide a plain language analysis of test results.
- The HFA II-/i provides separate, clinically validated, age-normative databases for STATPAC analysis. These include databases for SITA and SITA-SWAP™, in addition to the original databases for Full Threshold and FastPac™ test results.
- Another database consisting of stable glaucoma patients is used with the Guided Progression Analysis (GPA™) for following change in the progress of the disease. Refer to [Chapter \(8\), "Guided Progression Analysis \(GPA\),"](#) for further details.

SWAP (Blue-Yellow) Testing (Models 745/ and 750/)

Blue-Yellow perimetry is also known as Short-Wavelength Automated Perimetry, or SWAP, (available with Models 745/ and 750/). It has performed better than standard computerized perimetry for the early detection of glaucomatous changes, according to published longitudinal studies.

Blue-Yellow perimetry differs from standard static white-on-white perimetry only in that a carefully chosen wavelength of blue light is used as the stimulus, and a specific color and brightness of yellow light is used for the background illumination. The ability to use SITA for SWAP testing greatly reduces the time involved. See [Chapter \(9\), "Short-Wavelength Automated Perimetry \(SWAP\),"](#) for more information on SWAP and SITA-SWAP.

Automatic Fixation Monitoring

The HFA II-/i employs several methods for ensuring that patients maintain proper fixation of the target during testing. All models are equipped with a video eye monitor which presents a view of the patient's eye on-screen so that users can ensure proper patient fixation. Every HFA II-/i also offers standard Heijl-Krakau blind spot monitoring.

Models 740/ i, 745/ and 750/ also offer Gaze Tracking: a patented, high precision system which uses real-time image analysis to verify the patient is looking at the fixation target and not looking around. The Gaze Tracking device is unaffected by the patient's head position. A continuous record of fixation is available on the test screen for monitoring during the test. The Gaze Track graph is included on the printout to provide a permanent record of the patient's fixation.

For patients who require a trial lens, the Model 750*i* uses Head Tracking and Vertex Monitoring to help ensure that the patient's eye is both centered behind the lens and is held at the proper distance from the lens. These features help to eliminate the trial lens as a possible source of unreliable visual field results.

Data Protection Features

Visual field results need to be saved and protected for future use. The HFA II-*i* offers you a number of data storage methods to file the results. Five USB ports are provided for connection to USB devices, two of which may be used simultaneously with USB storage devices. Floppy disk data storage is available with an optional USB floppy disk drive. Using HFA-NET Pro, you can either archive or back up vital test results to a network file server in your office. There are a number of additional data protection features that work internally to safeguard your data from loss or serious damage. This manual describes in great detail the procedures for creating extra copies of your data. Refer to [Chapter \(11\), "Database Management,"](#) for further information on database security. Refer to [Chapter \(14\), "Networking,"](#) for further information about connecting your HFA II-*i* into your office computer network.

Risks of Internet Connectivity



CAUTION: When connected to the Internet, the HFA instrument may be vulnerable to serious security risks, including viruses and worms that could disable your system or adversely affect its performance. Internet connectivity enables third party software drivers and updates to be downloaded to your system, either automatically or intentionally. Installation of any unapproved software, including drivers, could degrade the performance of the instrument and/or lead to corrupted diagnostics or therapeutic information and may void the instrument warranty.

Networking Features

HFA II-*i* series perimeters offer many useful networking capabilities for patient data, test data, and image files. These include:

- export patient data, test results, and image files (PDF and TIFF format) to a file server
- synchronize databases on two or more HFA II-*i* perimeters via archiving and retrieval
- back up patient data and test results to a file server for safe external storage
- restore patient data and test results from a network file server to an HFA II-*i*
- import work lists from non-DICOM and DICOM EMR/PMS systems
- import patient information and exam data from a DICOM system (DICOM Gateway 2.0 only)
- export patient data, image files, and test results to non-DICOM and DICOM EMR/PMS systems
- export raw exam data and reports to a DICOM system (DICOM Gateway 2.0 only)

Information on the Internet

New information about your HFA II-*i* may be found on the Carl Zeiss Meditec web site. The internet address is: www.meditec.zeiss.com/hfa.

System Components

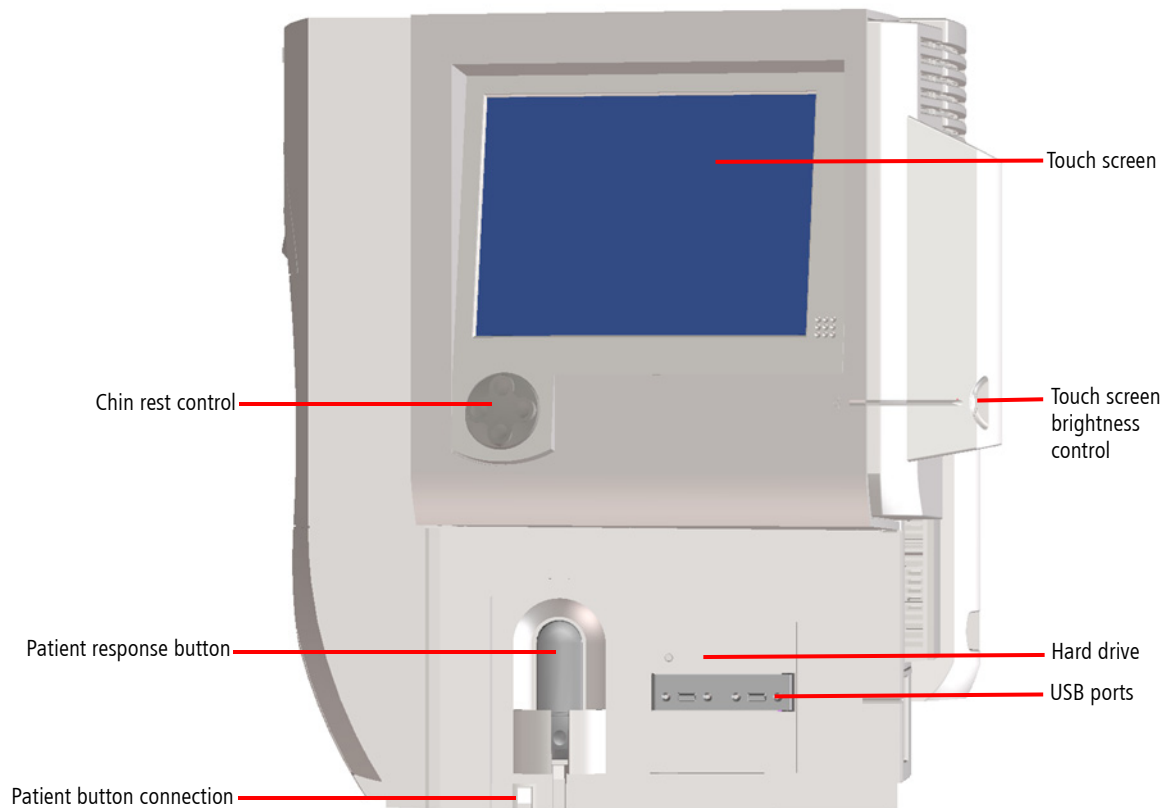


Figure 1.4 The HFA II-i – Side View

Power On

The power switch is located on the rear panel of the instrument (Figure 1.5). The room lights should be dimmed or off when turning on the HFA II-*i*. Once it is powered up, the HFA II-*i* begins performing a self-diagnostic checkup. In the event that the internal computer detects a problem, a message will appear on the start-up screen. Call Carl Zeiss Meditec Customer Service, if necessary.

Should you need to unplug any component from the HFA II-*i*, remember to first turn off the power to the HFA II-*i*. Disconnection procedures are the opposite of the sequence listed in this section. Whenever there is a question as to whether the HFA II-*i* is running properly or if there is any question about electrical or fire safety: **TURN OFF AND UNPLUG THE INSTRUMENT** and call Carl Zeiss Meditec customer care as soon as possible: 1-800-341-6968. Outside the U.S., contact your local Carl Zeiss Meditec distributor.

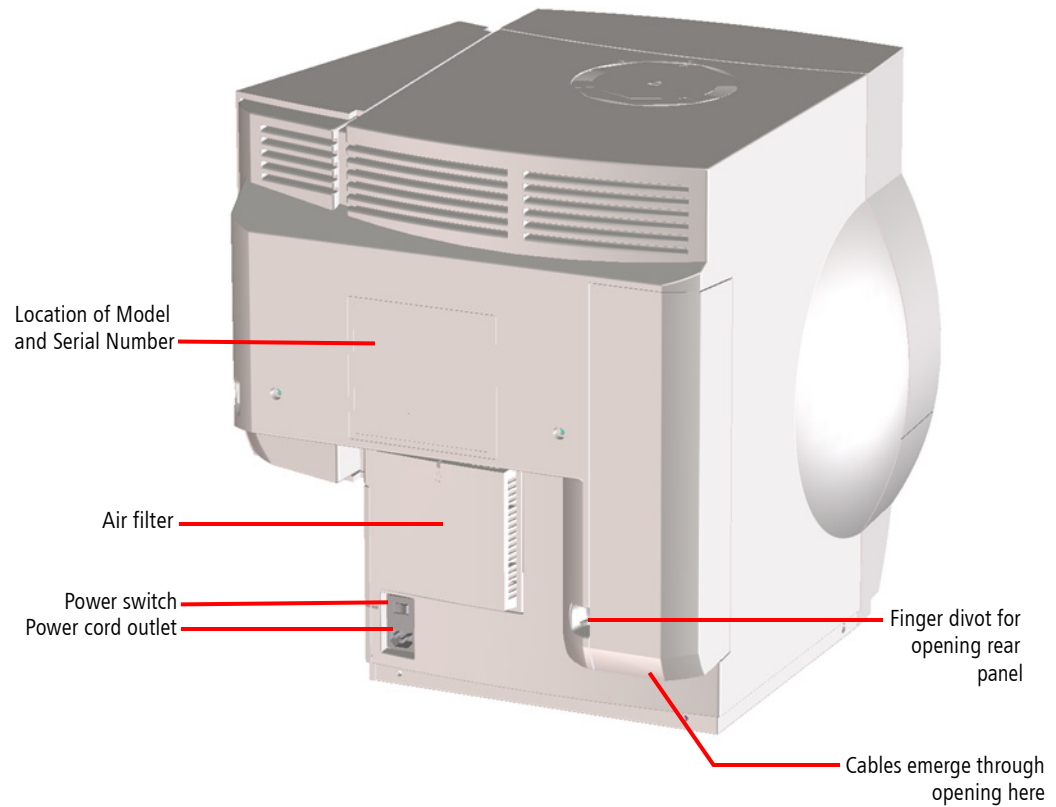


Figure 1.5 The HFA II-i – Rear View

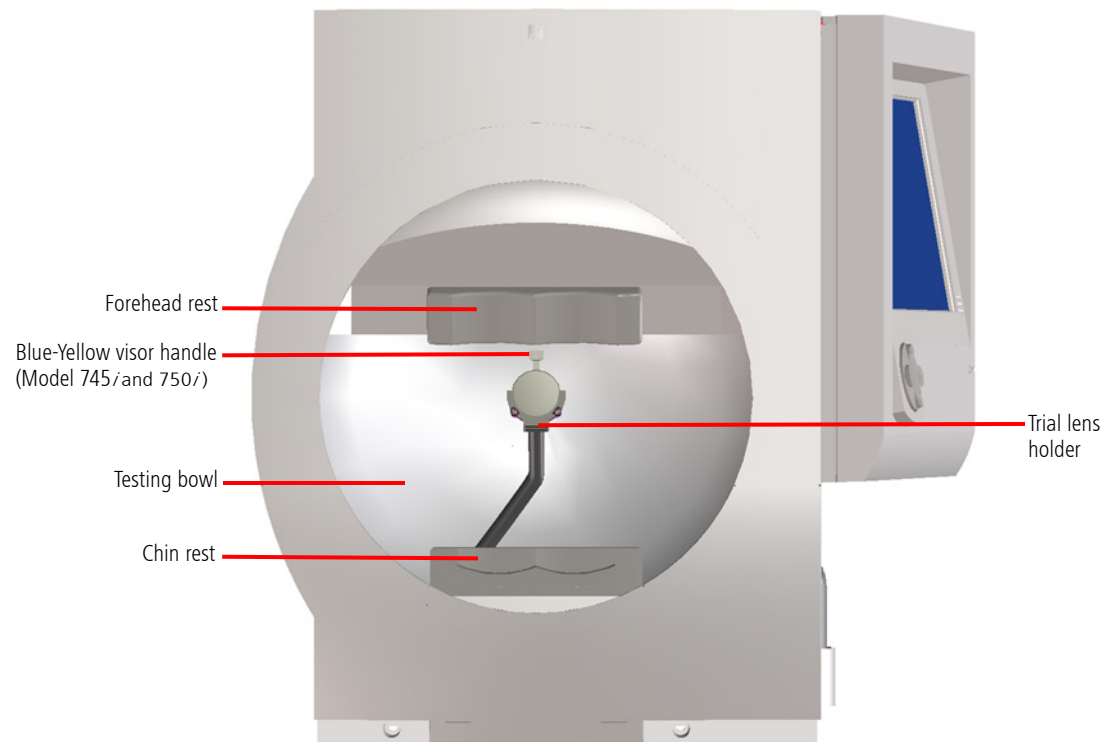


Figure 1.6 The HFA II-i – Front View



Figure 1.7 Power Table for the HFA II-i

Additional Components

Many external devices are available to help operate your HFA II-*i*. The following is a description of these devices and how to attach them to the HFA II-*i* properly.

Printers

External printers are available for the HFA II-*i*. Many HFA II-*i* instruments print to the standard Printrex printer. Some offices prefer a stand-alone printer for the laser-quality and the standard size paper printout. You can designate the printer type to be used with your instrument. The choices are Printrex, HP® LaserJet®, HP DeskJet®, and Shared (see ["Printer,"](#) on page 2-11). There are two ways to print from the HFA—through the parallel port or a shared printer on a network. Selecting Shared selects a shared printer on a network. The other printer type selections all use the parallel port on the HFA. Basic instructions for connecting a printer to the HFA II-*i* are given below.



Note: The list of parallel port supported printers changes over time, as older printers are discontinued by their manufacturers and newer models take their place. Contact your local Zeiss customer care representative for a list of currently available HFA II-*i*/parallel port supported printers. For a shared printer, most PCL®-3 and PCL-5 printers will work.



CAUTION: Carl Zeiss Meditec has tested and verified the operation of the parallel port supported printers. It is the HFA II-*i* owner's responsibility to ensure that any unsupported printer that is used with the HFA II-*i* in their medical environment satisfies the appropriate medical directives and International Safety Standards.



Note: Carl Zeiss Meditec periodically creates and releases upgrades of the system software used on its instruments, including the HFA II-*i* perimeters. It is not possible to verify the operation of these upgrades with all makes and models of currently available commercial printers. As a result, the operability of unsupported printers may be affected adversely by such future software upgrades.

Printrex: Table-Mounted and Stand-Alone Model

Use the following steps to set up your Printrex printer.

1. With power off to the table and HFA II-*i*, connect the printer interface cable to the Printrex printer and to the Printer port on the HFA II-*i*. Attach the power cord to the special outlet below the table for the table mounted Printrex printer. Refer to [Figure 1.8](#), [Figure 1.9](#), and [Figure 1.10](#).
2. Insert the roll of printer paper that is provided. Refer to ["Loading Paper," on page 15-9](#).
3. Turn on power to the table. Turn on power to the Printrex printer.
4. Turn on power to the HFA II-*i*.
5. From the System Setup screen, select PRINTREX from the PRINTER drop-down box. See ["Setting Up Printing," on page 2-22](#) for more information.

Hewlett-Packard LaserJet

Before you start, check that you have the following supplies:

- HP LaserJet printer • HP printer manual • Printer paper
- Interface cable • Toner cartridge

1. With power off to the HFA II-*i*, connect the interface cable to the Printer port on the HFA II-*i* (refer to [Figure 1.8](#) and [Figure 1.9](#)) and the printer (refer to Hewlett-Packard printer manual).
2. Install the toner cartridge.
3. Insert paper supply.
4. Connect the printer power cord to the wall outlet.
5. Turn on power to the printer and the HFA II-*i*.
6. From the System Setup screen, select HP LASERJET from the PRINTER drop-down box. See ["Setting Up Printing," on page 2-22](#) for more information.

External Keyboard

The HFA II Model 750-*i* comes standard with an external keyboard and glidepad combination. This factory keyboard/glidepad is also available as an option for any of the other models of HFA II-*i* perimeters. The keyboard easily plugs into the back of the HFA II-*i* (refer to [Figure 1.8](#) and [Figure 1.9](#) for the location of the connector) with the use of the included PS/2 splitter adapter. Use these steps to connect the keyboard:

1. Power off the HFA II-*i* (keyboard will not work if connected with power already on).
2. Plug in the beige PS/2 connector on the PS/2 splitter adapter into the HFA Keyboard/Mouse port.

3. Plug in the purple PS/2 connector on the PS/2 splitter adapter into the purple PS/2 cable connector from the keyboard, and the green PS/2 connector on the PS/2 splitter adapter into the green PS/2 cable connector from the keyboard.
4. Power on the HFA II-*i*. The HFA will recognize the external keyboard automatically.

While many standard PC-type keyboards (must have PS/2-style plug) may be plugged into the HFA II-*i* and should work, Carl Zeiss Meditec can only guarantee full compatibility if you use the factory keyboard. Please refer to [“Using the External Keyboard,” on page 2-6](#) for further details regarding keyboard use.

Removable USB Storage Devices and USB Floppy Drives

The HFA II-*i* has five USB ports for connecting removable USB storage devices (USB flash drives and/or USB hard drives) and USB floppy drives. The side of the HFA II-*i* has two USB ports (see [Figure 1.4](#)), and the rear has three USB ports on the cable connections panel (see [Figure 1.8](#)). All removable USB storage devices and USB floppy disk drives are hot-swappable—they can be connected and removed without needing to restart the HFA II-*i*. Up to five USB storage devices can be connected, but only two can be available to use. When you insert a USB storage device, the device is automatically connected and its device name appears in a button or drop-down list for selection. If two or more USB storage devices are already connected to the HFA II-*i*, you must remove all of them and then insert the new one for it to be available for use.



CAUTION: Only remove a USB storage device or USB floppy drive when it is not reading or writing data. Wait for the HFA progress bar to complete and/or the device's activity light to cease. Otherwise, you may damage or corrupt data on your USB device.



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



CAUTION: To protect your HFA data from unauthorized access, use dedicated USB devices for storage of HFA data. Do not use these USB devices for any other data or application. HFA data is not encrypted.



CAUTION: Health care providers have responsibility for the protection of patient health information (PHI), both hardcopy and electronic. To protect patient confidentiality of your electronic HFA data, the use of encryption is recommended and is the responsibility of the user.



Note: The HFA is only compatible with USB storage devices formatted in FAT (FAT16) or FAT32. NTFS or exFAT (FAT64) cannot be used and will report an “Unrecognized format” error. Also, the HFA can only see and access the first partition of the USB storage device.



Note: Some USB hard drives may require connection to two USB ports or their own external power supply to work correctly.



Note: An optional USB floppy disk drive should only be used for backwards compatibility. It is highly recommended to use USB storage devices instead of floppy disks. Floppy disks may not be available in the near future.

Carl Zeiss Meditec USB Flash Drives

HFA II-/series System Software Version 5.1 comes with five USB flash drives as shown in the table below. Two user backup USB flash drives are provided for your convenience.

Table 1.1 HFA II-i Carl Zeiss Meditec USB Flash Drives^a

PN	Quantity	Size (GB)	Label	Descriptions
2660021140638	1	2	SW	System Software Version 5.1
2660021140639	1	2	CAL	Calibration Software (Do not use without technical support)
2660021140640	1	2	GPA	GPA Sample Data
2660021140637	2	4	None	User Backup

a. Item part numbers and descriptions are subject to change.

Glidepad, Mouse, Trackball, or Other Input Device

It is usually possible to use a Microsoft®-compatible serial mouse, trackball, glidepad or other external input device with your HFA II-*i*. These devices may be used as an alternative to pressing the touch screen. They may be used in conjunction with the optional external keyboard. The keyboard is not necessary to utilize these devices. For simplicity in describing the feature, the term "glidepad" will be used to represent any compatible input device. The serial mouse or trackball is connected to the green PS/2 connector on the PS/2 splitter adapter that is plugged into the HFA. The HFA II-*i* must be turned off when attaching or removing any input device. See [Chapter \(2\), "General Operation,"](#) for further information regarding use of the external input devices.

External VGA Monitor

Your HFA II-*i* allows you to connect an external VGA monitor. This can be very useful for training purposes, where you wish to allow easier viewing for large groups of people. Commands issued with the keyboard and glidepad can be seen on the external screen. Touch screen capability is not available on the external monitor. The HFA II-*i* touch screen remains available for use when using the external monitor. Output to the external monitor will display in black & white, even when using a color monitor. Connection of the VGA monitor is made to the VGA video port found on the back of the HFA II-*i*. Refer to [Figure 1.8](#) and [Figure 1.9](#).

Surge Protectors

Carl Zeiss Meditec recommends the use of surge protectors or UPS (Uninterruptible Power Supply) systems to help isolate the HFA II-*i* from power surges or fluctuations. The HFA II-*i* is very sensitive to line voltage changes and may experience database problems if subjected to brownouts, power outages or surges of voltage. Hospitals, surgery centers, and offices with instruments which consume large amounts of power, such as surgical lasers, especially should be careful to plug the HFA II-*i* *directly* into a UPS or adequate surge protector. Plugging the power table into the UPS may not be adequate protection. For the HFA II-*i*, exclusive of the Power Table, Carl Zeiss Meditec recommends a surge protection system with a rating of 450 volt amps or greater.

Connection of External Devices

External devices connect to the HFA II-*i* at the rear of the instrument and are hidden from view behind a panel. [Figure 1.4](#), [Figure 1.8](#), and [Figure 1.9](#) show the location and identification of many of the connectors that previously were mentioned. On the rear of the HFA II-*i*, a diagram next to the cable connections panel helps to identify each port. External input devices such as the glidepad, trackball, mouse and the keyboard require a PS/2 style plug for connection to the HFA II-*i*. Use the Serial Data Transfer port to plug in an older Model HFA I or HFA II for serial transfer of data. Use the Network (LAN) port for connection of PC-based communications and networking. Use the USB ports to connect USB storage devices and/or USB floppy disk drives. Use the VGA video port for connection of any external VGA monitor.

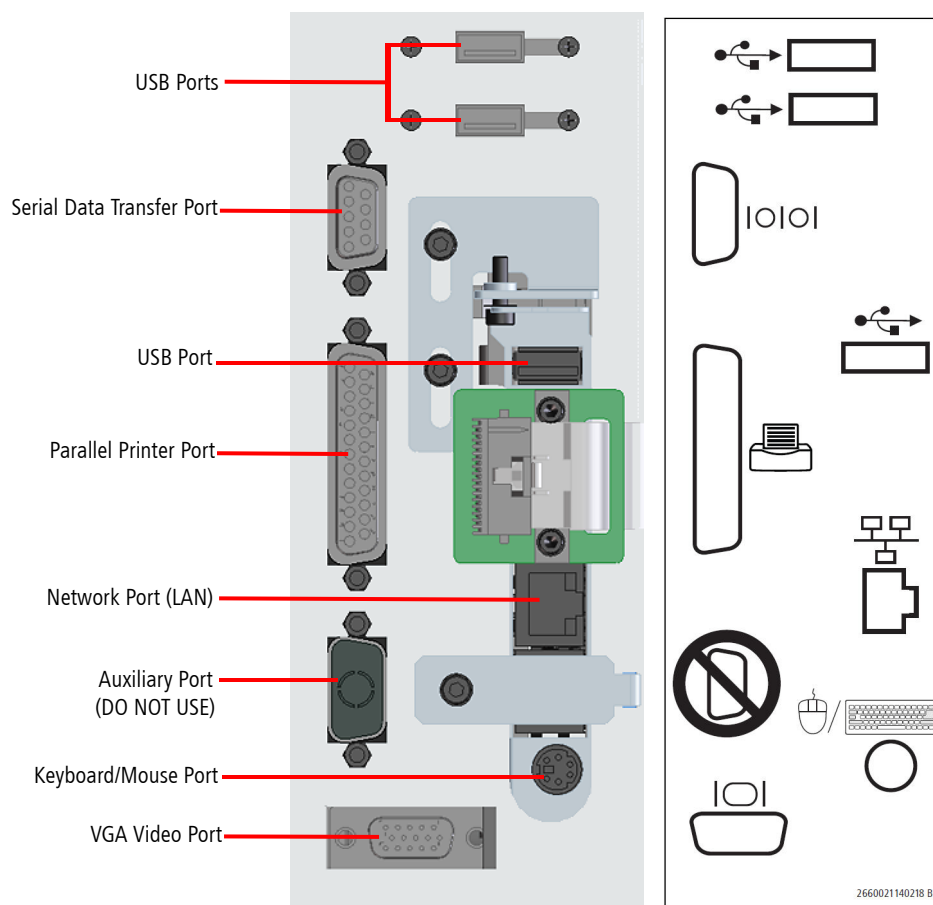


Figure 1.8 Enlarged View of Cable Connections Panel and Label on Rear of HFA II-i

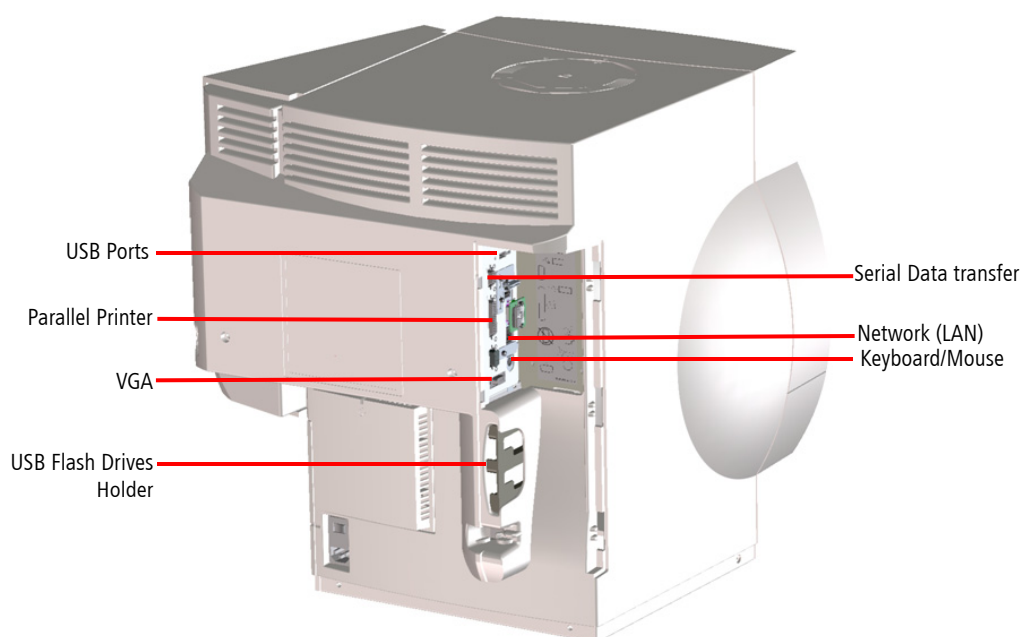
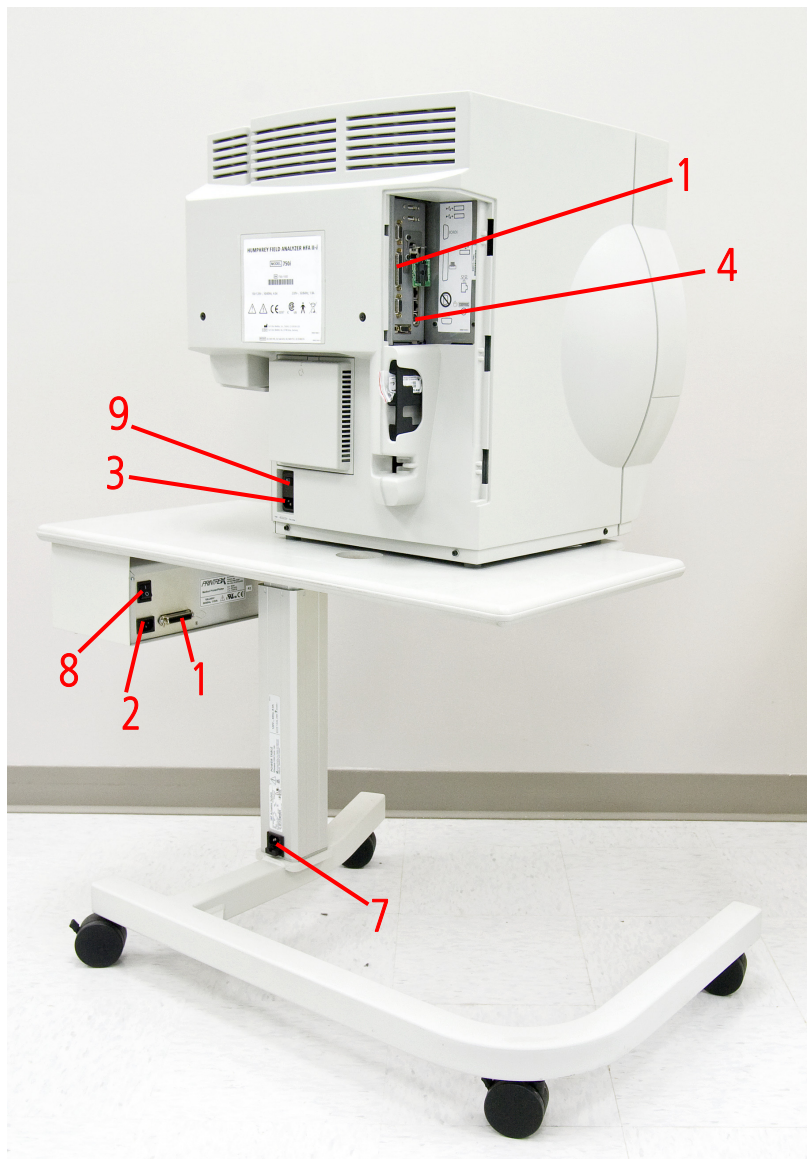


Figure 1.9 Rear View of the HFA II-i with Panel Removed

System Assembly



- 1 Open the panel on the back of HFA II-*i*. Connect the printer cable to the Printrex printer and to the HFA II-*i* at rear of the unit (see close-up view in [Figure 1.8](#)).
- 2 Attach Printrex power cord to special outlet on underside of table.
- 3 Connect power cord from back of HFA II-*i* to power outlet on underside of table.
- 4 Attach PS/2 splitter adapter and then keyboard, glidepad or mouse to connectors on adapter, if desired.
- 5 Replace rear panel, being careful to run cables out through slot at bottom (see [Figure 1.5](#)).
- 6 Attach Patient Response Button see [Figure 1.4](#) for connector location).
- 7 Attach power cord at base of table and connect to wall outlet.
- 8 Turn on power to the Printrex printer.
- 9 Turn on power to the HFA II-*i*.

Figure 1.10 The HFA II-i – Rear View of Power Table

(2) General Operation

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This section covers general operation of the HFA II-*i*. It describes how to execute commands, input information, and customize the HFA II-*i* to suit your needs.

After reading this chapter you will be familiar with:

- command buttons and icons on the HFA II-*i* screen
- using the Main Menu screen to select tests
- personalizing printouts with the name of your practice
- setting the internal clock and calendar
- customizing the test buttons displayed on the Main Menu screen
- using the optional keyboard

General Information

Operating Environment

For optimal testing results, the HFA II-*i* should be operated in a dimly lit room with minimal distractions. The patient should be in a comfortable position throughout testing.

Screen Simplicity

Almost every screen is divided into three areas: the Title Bar, the Screen Body, and the Icon Buttons.

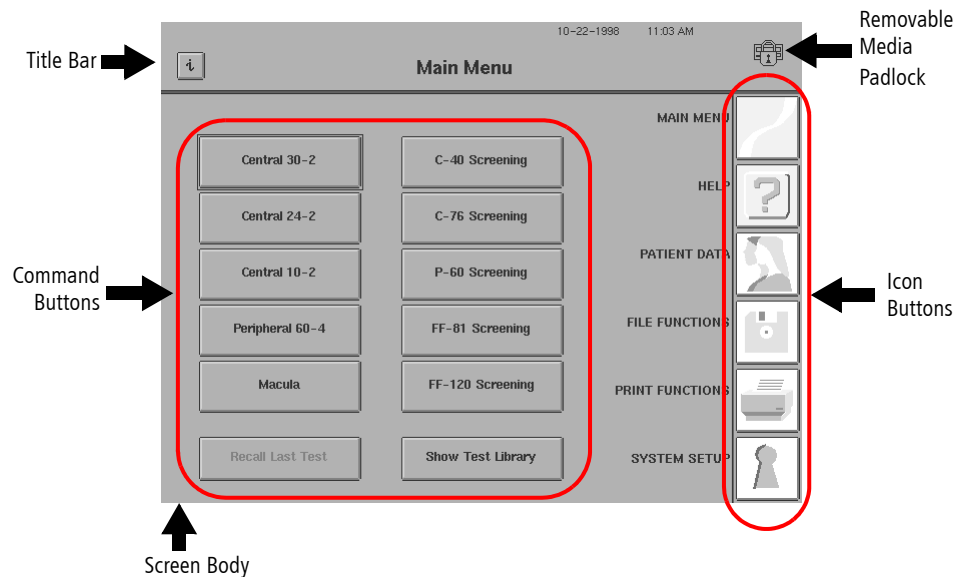


Figure 2.1 Main Areas of the HFA II-*i* Screen



Note: HFA II-/series system software Ver. 5.x has updated the style of the user interface without altering the button locations, functions, and text from the prior software version. This manual depicts the screens in the prior software style. Regardless of style, text and buttons on screen images depicted in this manual are identical to those in the Ver. 5.x software screen images.

The Title Bar

This area is the top portion of every screen. The middle of the title bar displays the name of the screen in bold type. The left side shows the system software version and the “**i**” button. More information about the “**i**” button appears later in this section. The right side displays the current date, time, and a picture that shows if removable media is in use.



CAUTION: Do not remove removable media when the padlock is displayed on the screen as is shown in [Figure 2.1](#).

Operator messages may appear in the top right corner of the Title Bar or the center of the Screen Body to inform you of a condition or alert you to a problem. “Printer is not connected or Off Line” and “Uninitialized Disk” are examples of operator messages. Multiple messages may appear stacked and overlapping in the upper right corner. Touching the top message collapses it, revealing the previous message.

The Screen Body

The Screen Body comprises the largest part of every screen. This is where most of the commands are issued via command buttons. The contents of the Screen Body change after every command. The Screen Body is referred to as the “screen” throughout the User Manual. Frequently, a button will appear dimmed, or “ghosted,” or “grayed out.” This indicates either that the button function cannot be activated from that screen or that the button represents a feature that is not available on the HFA II-/model being used. For example, the CUSTOM TESTS button on the Model 720/has been ghosted because this option is not available on the Model 720/and is, therefore, nonfunctional.

Icon Buttons

These buttons occupy the right side of most screens. Each has a unique function that can be accessed at any time, unless there is a pop-up window present or the icon buttons are ghosted. See “Pop-Up Windows,” on [page 2-4](#) for more details.

The HFA II-/s icon buttons are shown below along with a brief description of their function.

MAIN MENU



The *MAIN MENU* icon allows you to return to the Main Menu screen from other system screens.

HELP



The *HELP* icon gives brief explanations of certain features and procedures available on the HFA II-/. You should always consult this Manual for further information.

PATIENT DATA

PATIENT DATA leads you to the Patient Data screen where you may enter or recall the patient's name, date of birth, I. D. number, trial lens information, and diagnostic data prior to testing. Individual Main Menu test buttons also automatically lead you to the Patient Data screens.

FILE FUNCTIONS

Through *FILE FUNCTIONS* you can access the patient test results that have been saved as well as perform various database management procedures.

PRINT FUNCTIONS

PRINT FUNCTIONS allows you to print out hard copies of test results in various formats.

SYSTEM SETUP

SYSTEM SETUP lets you define certain user settings. Examples of these are time and date, printer type, visual acuity format, and practice name and address on printouts. Access to the *SYSTEM SETUP* icon is available only from the Main Menu screen. This icon also allows you access to the Additional Setup screen.

UNDO

The *UNDO* icon takes you back to the previous screen. In some cases pressing the *UNDO* icon will appear to take you back two screens. This occurs when the previous screen is a pop-up window. The *UNDO* icon is not available on the Main Menu screen.

The Information Button

The *"i"* button can be found in the upper left corner of most screens (you must turn OFF the video eye monitor in some cases). Pressing this button opens the Unit Configuration screen to display information useful when contacting Carl Zeiss Meditec Customer Service.

The following information is displayed when you press the *"i"* button:

- Model Number
- Serial Number
- Operating System-Revision Number
- Language
- Hardware Options
- Personalized Information such as user's name, address, and telephone number.
- Software Options
- Licensed Software Features

You may print the Unit Configuration information ([Figure 2.2](#)) by pressing the PRINT/SAVE button and then pressing the PRINT button. To save the configuration information to a USB storage device press PRINT/SAVE, then SAVE, and then select the USB device name from the dialog that appears. The configuration information is saved as a text file with the name "config.txt" to the ".../hfa/log" folder of the selected USB storage device. If a previous configuration information file had been

saved to this USB storage device, old logs will be renamed “config.bk1”, “config.bk2”, etc. All files can be opened with a standard text editor. To return to a previous screen, select CANCEL.

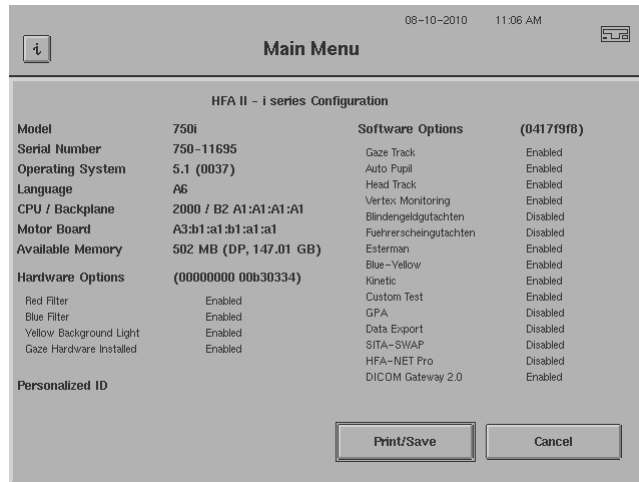


Figure 2.2 The Unit Configuration Screen

Touch Screen

Operation of the HFA II-/i literally is at your fingertips. You can perform all functions, whether entering data or selecting a test, simply by touching a command button on the touch screen. An audible beep will alert you to successful button activation.



Note: While using the touch screen, the HFA II-/i is activated when your finger is **removed** from the button you select. Be careful not to pound or press too hard against the touch screen. A light touch works best.

If you have difficulty activating the touch screen, consider re-calibrating it. Details on calibrating the touch screen are found in [“Additional Setup,” on page 2-30](#), as well as in [“Touch Screen Calibration,” on page 15-11](#).

Pop-Up Windows

Frequently, when you select an option from a screen, a smaller screen opens and is superimposed over the original screen (Figure 2.3). This additional screen is called a “pop-up” window. It may provide information or require data input. In either case, only command choices (buttons) appearing within the pop-up window are active at that time. You cannot select an icon button when a pop-up window is open.

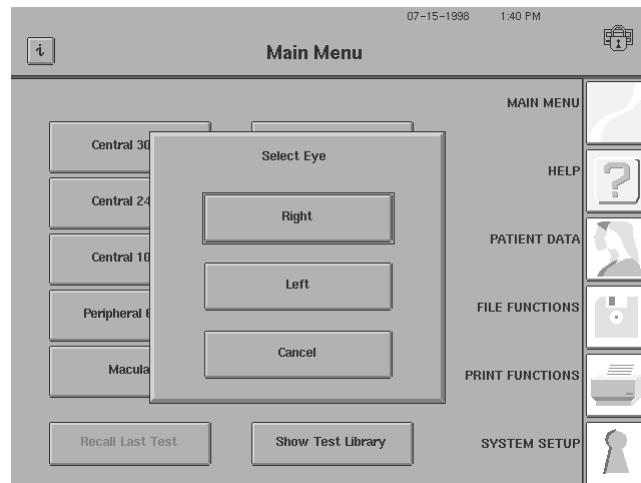


Figure 2.3 Example of a Pop-Up Window

Drop-Down Menus

A “drop-down” menu (Figure 2.4) reveals settings for you to choose from. You can easily identify a drop-down menu by its characteristic arrow positioned within the command button. The current selection is visible to the left of the arrow. To open the menu and reveal the options, touch the current selection. To change the selection, touch any item on the drop-down menu. The menu will collapse. To keep the original selection, simply touch the top selection.

Examples of HFA II-/drop-down menus are found on the Screening Parameter Setup screen shown in Figure 2.4. A closer look at the Test Speed drop-down menu reveals the two available selections, NORMAL and SLOW.

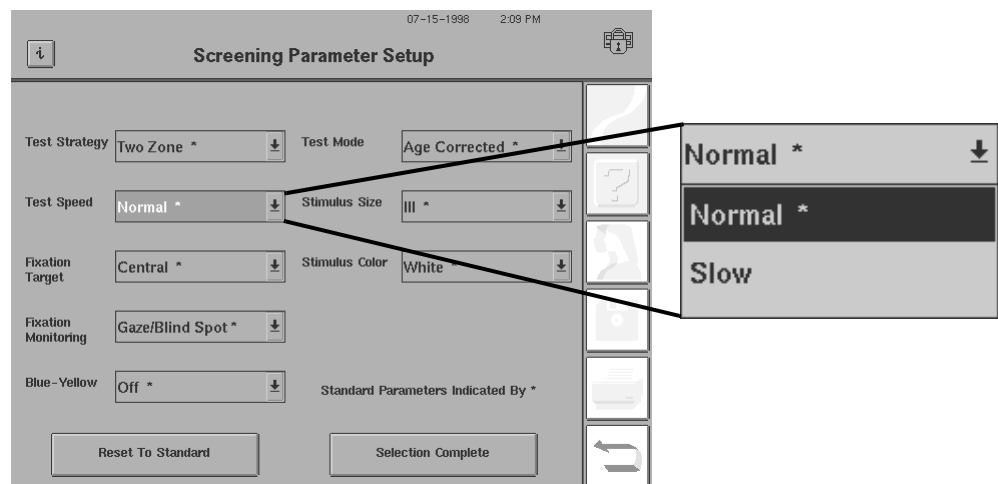


Figure 2.4 Example of a Drop-Down Menu

Using the External Keyboard

The external keyboard will operate many of the buttons on the HFA II-*i* screen. An outline (or highlight) surrounding the active button indicates the action to be performed. The example below shows the highlight around the PATIENT NAME button. Pressing the ENTER key or SPACE BAR will activate the highlighted button. The TAB key allows you to move the highlight from button to button in a forward direction. Holding the SHIFT key down while pressing the TAB key will cause the highlight to move in the opposite direction.

You can use the arrow keys, in most cases, to move the highlight from button to button. They mimic the action of the TAB and SHIFT-TAB keys for moving the highlight. Like the TAB key, both the DOWN and RIGHT arrows move the highlight forward. The UP and LEFT arrows reverse the direction of the highlight as the SHIFT-TAB combination does.

The arrow keys will not advance the highlight on screens having drop-down menus (for example, the Parameter Setup and System Setup screens). Instead, use the TAB or SHIFT-TAB keys to move the highlight around the screen. Use the arrow keys to select the choice within the window, as described below.

You must press the PAGE DOWN key on the external keyboard if you wish to change the setting on a drop-down list with the external keyboard. This applies to all of the fields on the Parameter Setup screens, the drop-down lists at the top of the System Setup screen, and the Disk Options windows. For example, if you wish to change the fixation target from CENTRAL to LARGE DIAMOND by using the external keyboard, you would first use the TAB key to move the highlight to the FIXATION TARGET drop-down menu. Press PAGE DOWN to activate the selection feature. The UP and DOWN arrow keys will scroll the highlight through the choices on the selection menu. Choose the highlighted selection by pressing the ENTER key.

You may use the keyboard to enter patient data. You can enter both uppercase and lowercase letters with the keyboard. You may find that it is more efficient to use the keyboard in combination with the touch screen, especially for applications such as entering trial lens data.

The screenshot shows the 'Patient Data 1' screen. At the top, it displays the date '08-20-2009' and time '3:30 PM'. The screen is divided into two main sections. The left section contains input fields for 'Patient ID' (1234), 'Patient Name' (Zeiss Carl Joseph Dr. MD), 'Date of Birth' (09-22-1943), 'Gender' (Male), 'Sphere', 'Cylinder', 'Axis', 'Trial Lens', 'Right Eye Comments', and 'Left Eye Comments'. The right section contains buttons for 'Clear Patient Data', 'Recall Patient Data', 'Patient Folder', 'More Patient Data', and 'Proceed'. A vertical strip of icons is located on the far right, including a question mark, a magnifying glass, a floppy disk, a printer, and a double arrow. The 'Patient Name' field is currently highlighted with a black border.

After you enter data (such as PATIENT NAME), the highlight will remain around the button just activated. To advance to the next button, you simply press the TAB key.

You may also choose to navigate through the system with the help of the keyboard function keys. F1 through F6 serve as keyboard equivalents of the icon buttons. The function keys and the associated icon buttons they activate are listed below:

- F1 *HELP*
- F2 *MAIN MENU*
- F3 *PATIENT DATA*
- F4 *FILE FUNCTIONS*
- F5 *PRINT FUNCTIONS*
- F6 *SYSTEM SETUP / UNDO*

Using the Keyboard Glidepad

The external keyboard that is standard on the Model 750*i* also is optionally available for the Model 720*i*, 740*i*, and 745*i*. This keyboard is fitted with a built-in glidepad that serves a mouse-like function, without requiring the adjoining working space and separate connecting cord that a mouse would. By touching the glidepad with your fingertip and moving your fingertip around, you can select screen items just as you would with a mouse. The left key that is on the part of the keyboard that is closest to the user serves the same way that the left key on a mouse would. By using your fingertip in conjunction with the left key, you can duplicate the actions of using a finger to activate the touch screen. The right key is inactive.

The glidepad is used in conjunction with a cursor, which appears as a small, movable square on the video screen of the HFA II-*i*. The cursor moves as you move your finger across the glidepad. Items are selected by moving the cursor to the desired item and pressing (or clicking) the left-most button. To ensure that you select the appropriate item, make sure that the cursor is completely within the boundary of the desired item.

To select an item on a drop-down menu, move the cursor to the desired drop-down box. Click the glidepad button. The drop-down menu will appear. Drag the cursor down to the desired item until that item is highlighted. Press the glidepad button again. The drop-down menu will disappear and the selected item will appear in the drop-down box, indicating that it has been selected. This procedure is identical to selecting menu items on many popular computer programs.



Note: The cursor may not always be visible. To locate the cursor, either move the glidepad or press a keyboard button. We recommend that you do not press the SPACE BAR or RETURN key, as these will activate the highlighted screen button.

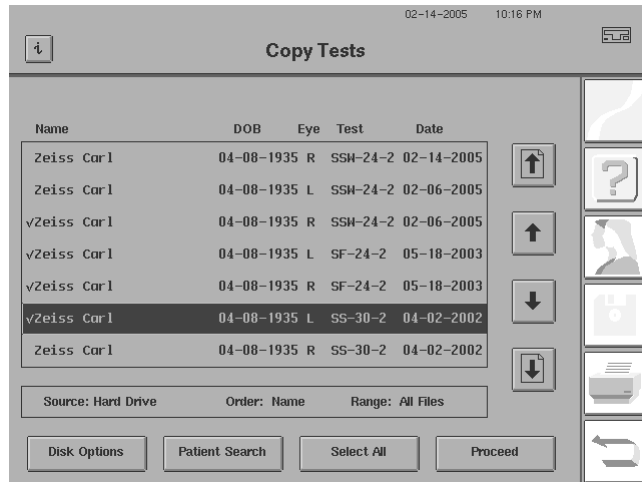
Hint: Use your fingertip on the glidepad to select the button or other screen object of your choice. Then, lift your fingertip free of the glidepad before clicking on the left glidepad button. This prevents the simultaneous motion of both hands from accidentally resulting in the cursor moving before the click can take effect.

Using a Trackball, Mouse or Other Input Device

It may be possible to use a Microsoft®-compatible serial trackball, mouse, or other external input device that is connected to the included PS/2 splitter adapter or the keyboard/mouse port on your HFA II-*i*. USB keyboards or mice will not work when connected to a USB port, but may work if connected to the keyboard/mouse port with a USB to PS/2 adapter. These devices may be used as an alternative to pressing the touch screen. They may be used in conjunction with the optional external keyboard, although the keyboard is not necessary to utilize these devices. For simplicity in describing this feature, the term “glidepad” will be used to represent any compatible input device. (Refer to [“Additional Components,” on page 1-25](#), for directions for connecting the trackball or mouse.)

Using a trackball with the HFA II-*i* is very similar to using this device with a business or personal computer. Trackballs vary, so experiment with your trackball to determine which button to use. If using a mouse, only the left-most button is active. Other buttons do not function with the HFA II-*i*.

Using the File Directory



A file directory appears whenever you want to perform a specific function with previously saved tests. Buttons such as VIEW TESTS, COPY TESTS, and CHANGE PATIENT DATA will bring up file directories. To select specific items on a directory, move the cursor to the desired item. Then, either select with your fingertip or click the glidepad button to highlight the item. If you can select more than one item, such as with the COPY TESTS feature, a check mark (✓) will appear next to an item to indicate that it has been selected.

You can select several items in a row at one time. To do so, either touch the first item and drag your fingertip down the list, or hold down the glidepad button, drag the cursor to highlight and check (✓) several items, and then release the button. After dragging with either method, only the last item will remain highlighted; however, each item selected will have a check mark next to it.

To deselect a chosen item with your finger, just touch the item you wish to deselect. The check mark next to the item will disappear. For the glidepad, move the cursor to a highlighted or checked (✓) item and click the glidepad button.

Screen Saver

The HFA II-*i* features a screen saver to extend the life of the video screen. It activates after the HFA II-*i* has been idle for 10 minutes. Once the screen saver is activated, the display of the HFA II-*i* becomes dark. To reactivate the display you only need to press a fingertip to the top of the touch screen. Try to avoid touching the center of the touch screen because this could activate a hidden command key. For example, many messages include a CANCEL button. If there is an ongoing operation and you press near the middle of the screen, you may unintentionally cancel the operation.

You may also move the glidepad or press most keys on the external keyboard to reactivate the display. Make sure you do not press the ENTER / RETURN key or the SPACE BAR to wake-up the display. These keys will activate any command buttons hidden by the darkened touch screen.

The Main Menu Screen

When the HFA II-*i* is turned on, it will go through its start-up sequence. The first screen displayed after that is the Main Menu screen. Its primary functions are to display a series of test buttons (from which you initiate the testing procedure), to allow recall of the last test performed, and to provide access to the System Setup screen. A further explanation of Main Menu functions follows.

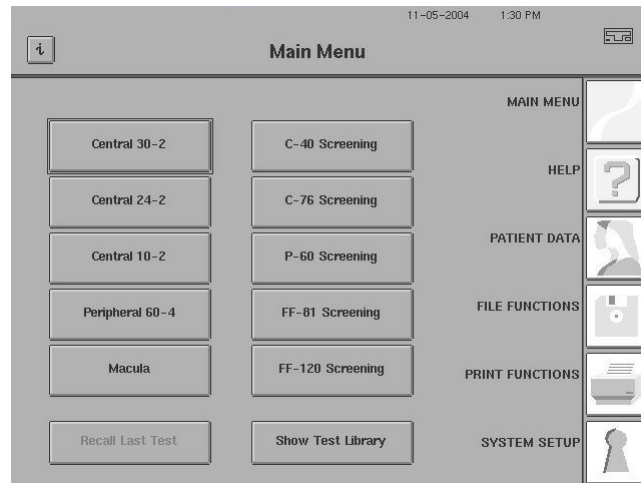
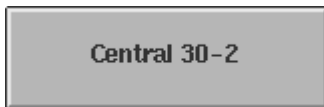


Figure 2.5 The Main Menu Screen

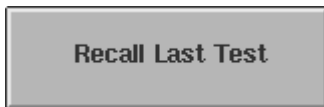
Command Buttons

Test Button



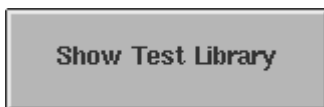
Each test button displays the name of a test. Pressing the test button allows you to choose the eye to be tested. See ["Using Test Buttons," on page 3-2](#), for more information.

Recall Last Test



This button accesses the temporary memory storing the results from the last right and left eye tests performed. When the HFA II-*i* is first powered on, this button appears ghosted until a test is run. This temporary memory of the last tests performed is cleared when you turn off the instrument.

Show Test Library



This button leads to a list of all available test patterns, including Screening, Threshold, Specialty, Custom, and Kinetic tests. When you want to select a test not found on the Main Menu screen, choose the SHOW TEST LIBRARY button. See ["Test Library," on page 3-4](#), for details.

You may customize the Main Menu test buttons to reflect your needs. You may place any test found in the Test Library on the Main Menu screen. You also may remove buttons which are not used very often. You can add a second line of text to test buttons to differentiate tests with the same name but having different parameters. See ["Altering the Main Menu Screen," on page 2-26](#), for additional information.

System Setup



You access the System Setup screen by selecting the *SYSTEM SETUP* icon that is located on the Main Menu screen. You may choose from a variety of selections on the two System Setup screens: the main System Setup screen shown in [Figure 2.6](#) and the Additional Setup screen illustrated in [Figure 2.9](#). Your selections will determine the mode in which your HFA II-*i* will power-up. An explanation of the System Setup functions and procedures to alter the settings are described below.

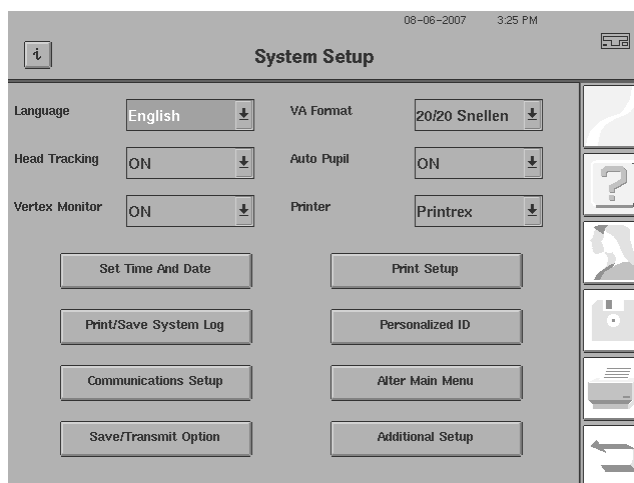


Figure 2.6 The Main System Setup Screen

Language



The HFA II-*i* allows you to choose among English, German, Spanish, French, Italian, Japanese, Portuguese, and Swedish languages. If you select a different language from the current language set, the HFA II-*i* will reboot in that language automatically. The original language must be re-selected in order to be reactivated.

Head Tracking (Model 750*i* only)



When Head Tracking is turned ON, the instrument moves the chin rest during a test to keep the patient's eye centered behind the trial lens holder. This action helps to reduce trial lens artifacts (test points being blocked from the patient's view by the edge of the trial lens). This feature only works if Gaze Tracking has been initialized successfully and the trial lens holder is in the Up position. For more information, see "[Head Tracking \(Model 750i\)](#)," on page 5-5.

Vertex Monitor (Model 750*i*)



When the Vertex Monitor is turned ON, a beep sounds and a message displays if the patient's head is too far back from the trial lens during a test. This helps to eliminate the trial lens as a source of visual field defects. This feature works only if Gaze Tracking has been initialized successfully and the trial lens holder is in the Up position. For tips on using this feature, see "[Vertex Monitor \(Model 750i\)](#)," on page 5-6.

Set Time And Date**Set Time and Date**

This allows you to reset the instrument's internal clock and calendar in a format appropriate for your geographic region. Accurate date information is critical for correct STATPAC analysis, age-corrected screening tests, and proper trial lens calculations.

Print/Save System Log**Print/Save System Log**

The system log keeps track of the instrument serial number and configuration options along with messages occurring in the HFA II-*i*. This feature is designed to assist Carl Zeiss Meditec Field Service Engineers. It can be printed out or saved as a text file to a USB storage device. Should you experience a problem with your instrument, it is a good idea to print out the system log before calling Carl Zeiss Meditec Customer Service.

Communications Setup**Communications Setup**

This option opens the Communications Setup screen. The Communications Setup screen allows you to set up networking on your HFA II-*i*. Refer to [Chapter \(14\), "Networking,"](#) for more details regarding use of the Communications Setup screen.

Save/Transmit Option**Save/Transmit Option**

This option allows you to change the function of the SAVE button on the End of Test screen. Pressing this button opens the Save/Transmit Option window, allowing you to set up a variety of options for saving and printing your test results. Further details regarding use of the Save/Transmit Option screen are provided, beginning with ["Setting the Save/Transmit Options,"](#) on page 2-17.

20/20 Snellen**VA (Visual Acuity) Format**

Select 20/20 Snellen, 6/6 Metric, or 1.0 Decimal as the visual acuity format used when entering patient data.

ON**Auto Pupil (Model 750i/only)**

If Auto Pupil is set to ON, the HFA II-*i* will automatically take a measurement of the patient's pupil diameter and enter the finding on the Patient Data 2 screen. An asterisk (*) is added whenever the measurement was made automatically. The measured pupil size will also appear on the display screen. Manual pupil measurement input displays without an asterisk. The pupil diameter will also appear on the printout. This feature only works if Gaze Tracking has been successfully initialized. For more information on Gaze Tracking, see ["Gaze Tracking \(Models 740i, 745i, 750i\),"](#) on page 5-4.

Printrex**Printer**

To print to a printer you can designate the printer type to be used with your instrument. The choices are Printrex, HP LaserJet, HP DeskJet, and Shared. There are two ways to print from the HFA—through the parallel port or a shared printer on a network. Selecting Shared selects a shared printer on a network. The other printer type selections all use the parallel port on the HFA. For parallel port printers, it is the owner's responsibility to ensure that any make and model of printer that is used in a medical environment meets the appropriate medical directives and International Safety Standards. For an updated listing of HFA II-*i*/parallel port supported printers, call Carl Zeiss Meditec Customer

Care at 1-800-341-6968. Outside the U.S., contact your local Carl Zeiss Meditec distributor. For a shared printer, most PCL-3 and PCL-5 printers will work.



Note: Only PCL-3 or higher HP DeskJet or compatibles work with the HFA II-PPA DeskJets, also known as “Winprinters”, do not work.

For further information on printing, refer to [“Print Setup,” on page 2-12](#), [“Setting Up Printing,” on page 2-22](#), [Chapter \(5\)](#), [“Testing,”](#) and [“Printing To a File,” on page 14-36](#).

Print Setup

Print Setup

This option opens the Print Setup screen which allows you to set up a shared printer, and set Print-To-File and default GPA print options. For further information on printing, refer to [“Setting Up Printing,” on page 2-22](#), [Chapter \(5\)](#), [“Testing,”](#) and [“Printing To a File,” on page 14-36](#).

Custom Printer Setup

Allows you to designate and set up a shared printer on your network to use with your instrument. After set up, select SHARED from the Printer drop-down menu to select the shared printer (see [“Printer,” on page 2-11](#) and [“Set up a Shared Printer \(Optional\),” on page 2-23](#)).

Print-To-File Setup

With HFA-NET Pro networking software registered, you can export an image as a TIFF (Tagged Image File Format) or PDF (Portable Document Format) file to the network server (Data Export Host), a floppy disk, or the EMR/PMS Host. With the DICOM Gateway 2.0 software licensed, DICOM Archive also becomes an option. You also can print a hard copy of the file as a part of the process of exporting it. If you wish to print a hard copy, it will print on the printer you designated in the first half of this description (see [“Choose the Print Destination and Options,” on page 2-24](#)).

Default GPA Print Options

Allows you to set and save default GPA print options (if GPA is licensed on your HFA II-). When you select the *PRINT FUNCTIONS* icon from the Main Menu to print GPA reports, these defaults will be selected (see [“Set Default GPA Print Options,” on page 2-22](#)).

Personalized ID

Personalized ID

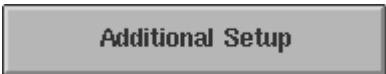
This allows you to customize hard copy printouts with 5 lines of text (*e.g.*, practice name, address, and telephone number) (see [“Personalizing Hard Copy Printouts,” on page 2-26](#)), and enter an Issuer of ID for your HFA (see [“Specifying Your Practice’s Issuer of ID,” on page 14-40](#)). This information is also shown when you select the **i** button, found in the upper left corner of most screens (see [“The Information Button,” on page 2-3](#)).

Alter Main Menu

Alter Main Menu

This allows you to customize the Main Menu screen by adding test buttons which normally are only accessible through the test library, by deleting test buttons which are not often used, or by altering test buttons to power-up with your preferred testing parameters. You may include additional text to further describe the parameters or usage of customized buttons. See [“Altering the Main Menu Screen,” on page 2-26](#).

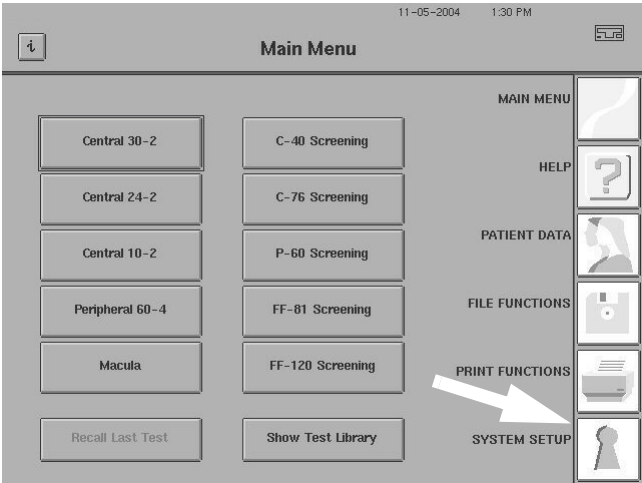
Additional Setup



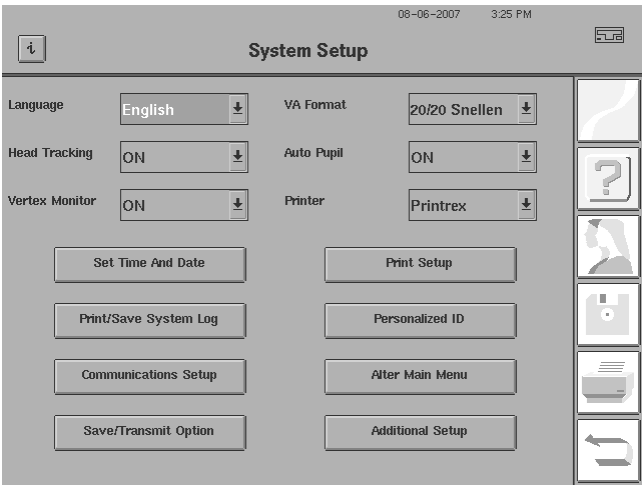
This button allows you to access additional System Setup functions that are found on the Additional Setup screen. See [“Additional Setup,”](#) on page 2-30.

Accessing the System Setup Screen

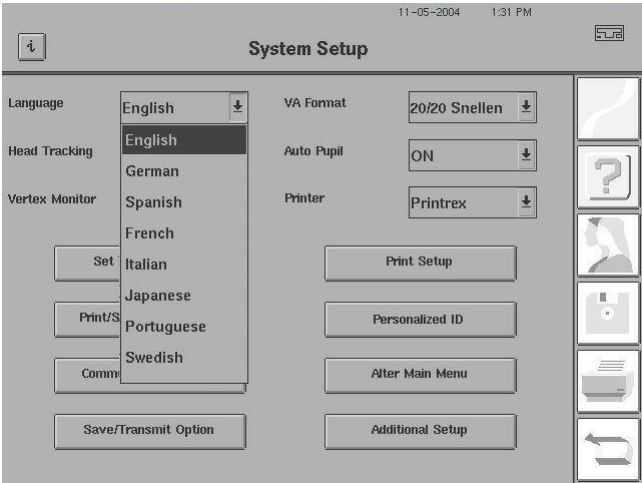
1 From the Main Menu, select the *SYSTEM SETUP* icon.



2 Choose the desired function, as is described in the text that follows.

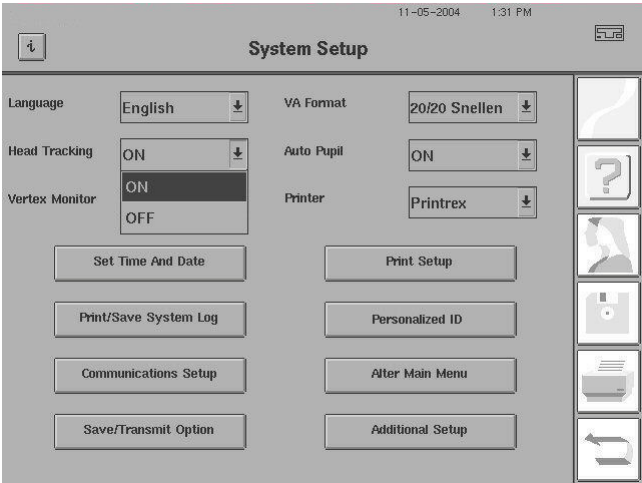


Changing the Language



- 1 Start at the System Setup screen. Select the Language drop-down menu.
- 2 Choose from ENGLISH, GERMAN, SPANISH, FRENCH, ITALIAN, JAPANESE, PORTUGUESE, or SWEDISH.
- 3 Once you select a language, a dialog will be displayed informing you that the language will change. Select OK to change the language, or CANCEL to stay in the current language.

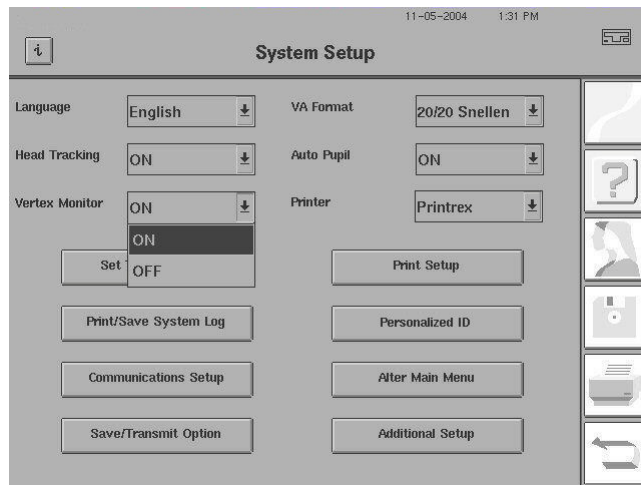
Accessing Head Tracking (Model 750i only)



- 1 Start at the System Setup screen. Select the Head Tracking drop-down menu.
- 2 Choose either ON or OFF.



Note: If Head Tracking is turned on during testing and the patient moves, the instrument will adjust the chin rest in small (0.3 mm) increments until the patient returns to the original position. This feature only works if Gaze Tracking has been initialized successfully and the trial lens holder is in the Up position. For additional information, see [“Head Tracking \(Model 750i\),” on page 5-5.](#)

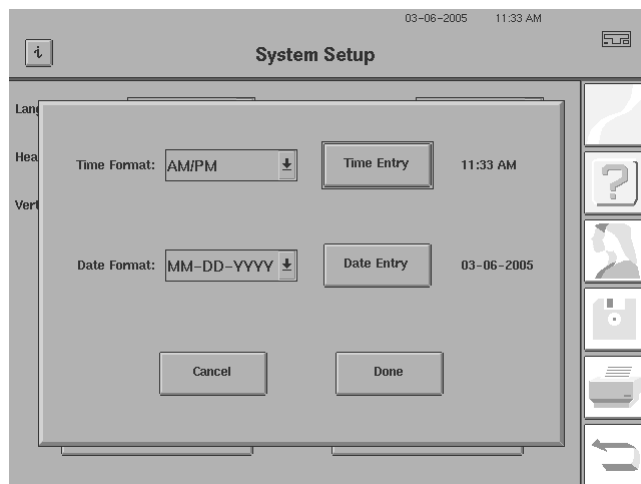
Accessing the Vertex Monitor (Model 750/only)

1 Start at the System Setup screen. Select the Vertex Monitor drop-down menu.

2 Choose between ON and OFF.



Note: When the Vertex Monitor is turned on, a beep will sound if the patient backs away from the trial lens during testing. Although the test will not pause, a message will remain on the screen until cleared by the operator. This feature only works if Gaze Tracking has been initialized successfully and the trial lens holder is in the Up position. For additional information, see ["Vertex Monitor \(Model 750i\)," on page 5-6.](#)

Setting the Time and Date

1 Start at the System Setup screen. Select SET TIME AND DATE.

2 Select the Time Format drop-down menu.
Choose 24 HOURS or AM/PM from the drop-down menu.

3 Press TIME ENTRY. Input the correct time on the keypad, then press ENTER.



Note: If you have selected the AM/PM format, you must enter either AM or PM with your time entry.

4 Select Date Format. Choose MM-DD-YYYY, DD-MM-YYYY or YYYY-MM-DD from the drop-down menu.



Note: MM=Month, DD=Day and YYYY=Year.

5 Select DATE ENTRY. Input the correct date from the keypad, then press ENTER.



Note: The time and date display appears in the upper right-hand corner of the screen, in the format specified above.

Printing or Saving the System Log

- 1 Start at the System Setup screen. Select PRINT/SAVE SYSTEM LOG.
- 2 The instrument will automatically start to print the System Log if you press PRINT.



Note: The length of time to print the log will vary, depending on the size of the system log.

The System Log can also be saved to a USB storage device as a text file, which can be read on a computer.

- 1 Start at the System Setup screen. Select PRINT/SAVE SYSTEM LOG.
- 2 Insert a USB storage device into a USB port on the HFA II-*i*.
- 3 Press SAVE. A dialog appears prompting you to select a USB storage device (Figure 2.7).

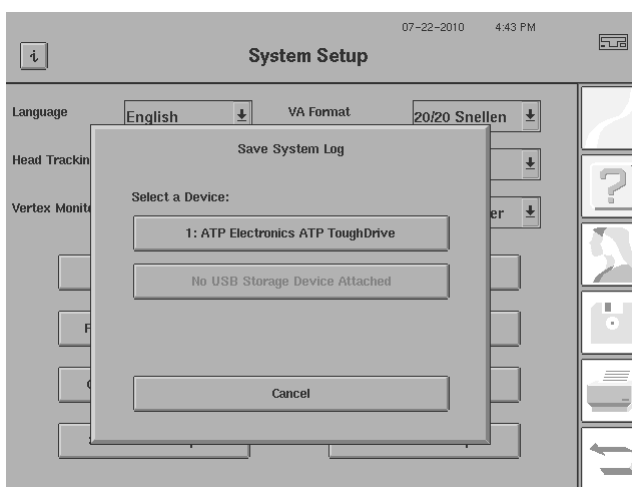


Figure 2.7 Save System Log Dialog

- 4 Select the desired USB storage device by pressing the button with its device name.
- 5 The System Log is saved as a text file with the name "syslog.txt" to the ".../hfa/log" folder of the selected USB storage device. If a previous System Log has been saved to this USB storage device, old logs will be renamed "syslog.bk1", "syslog.bk2", etc. All logs can be opened with a standard text editor.

Setting Up Networking Communications

The ability to connect your HFA II-*i* into your office network is an option that is available through Carl Zeiss Meditec, using the HFA-NET Pro software. Please refer to [Chapter \(14\), "Networking,"](#) for further information on available networking features, as well as how to license the software.

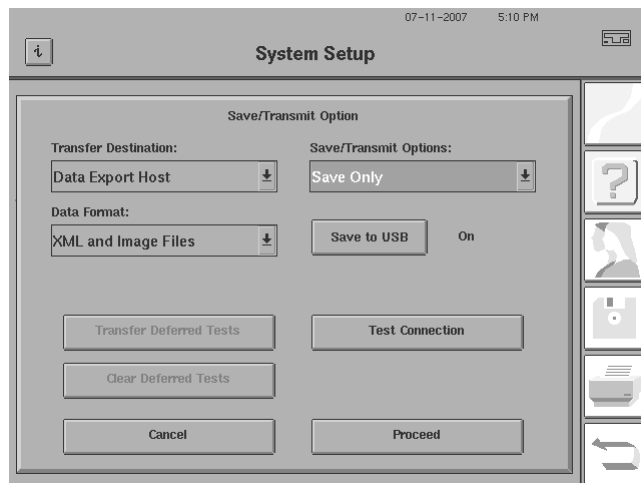
The specific details are available, beginning with ["Setting Up Your HFA Network,"](#) on page I-4.

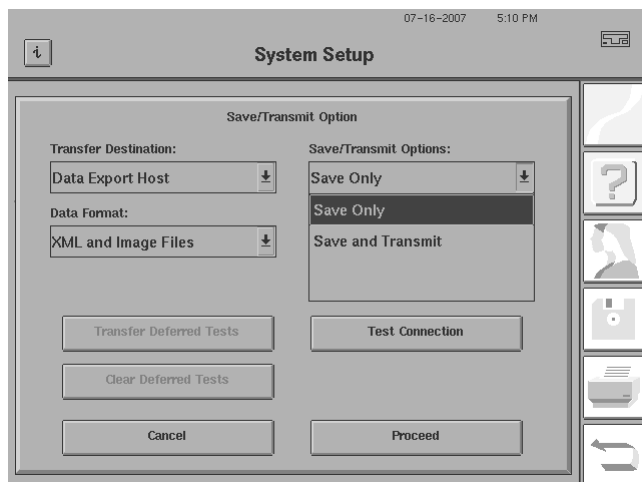
Setting the Save/Transmit Options

The Save/Transmit options specify what the HFA II-*i* will do with your data upon completion of a patient's visual field examination. The standard action would be to save the results to the hard disk and a USB storage device, if one is inserted into a USB port at the time the test is completed. You also have the option to link two HFA II-*i* instruments together via serial cable with the proper settings. See ["How to Transfer Tests from One HFA II-i to a Second HFA II-i via Serial Cable,"](#) on [page 10-23](#) for transmitting configurations and limitations. If you have the HFA-NET Pro software licensed on your HFA II-*i*, the Save/Transmit options include the ability to transmit a copy of the exam results to your office network file server or to an EMR/PMS/DICOM system. If you have purchased and licensed the DICOM Gateway 2.0 software on your HFA II-*i*, the Save/Transmit options include the ability to transmit a report to a DICOM Archive. See [Chapter \(14\), "Networking,"](#) for further networking details.

Use the following procedure to set the Save/Transmit Options for your HFA II-*i* perimeter:

- 1 Start at the System Setup screen. Select SAVE/TRANSMIT OPTION to open the Save/Transmit Option screen that is shown to the left.





2 Select the down arrow of the Save/Transmit Option drop-down box to open the list shown in the illustration to the left of this step. Choose one of the following options:

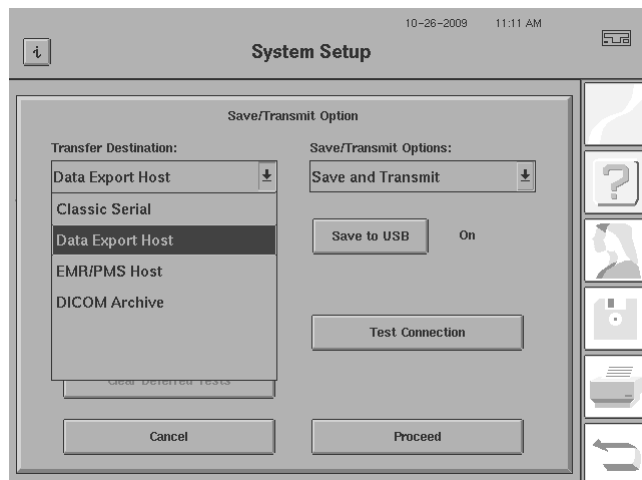
Save Only - Saves your completed exam to the hard drive at the end of testing when you prompt to save. This will also save your completed exam data to a USB storage device if the Save to USB option is on (it is on by default), and a USB storage device is present or inserted into a USB port at the time the test ends.

Save and Transmit - Saves your completed exam to the hard drive and transmits the exam data at the end of a test to the "Transfer Destination" you specify in Step 3. This will also save your completed exam data to a USB storage device if the Save to USB option is on (it is on by default), and a USB storage device is present or inserted into a USB port at the time the test ends.



Note: Automatic saving at end of test to a floppy disk is no longer available. Use Copy Tests to save tests to a floppy disk with an optional USB floppy disk drive.

Chapter (10), "File Functions," has additional details on serial transfer of data between the various models of the HFA. Refer to Chapter (14), "Networking," for further details about networking on the HFA II-*i*.



3 Press the down arrow at the right-hand end of the Transfer Destination drop-down box. Select one of the following choices (as illustrated to the left of this text):

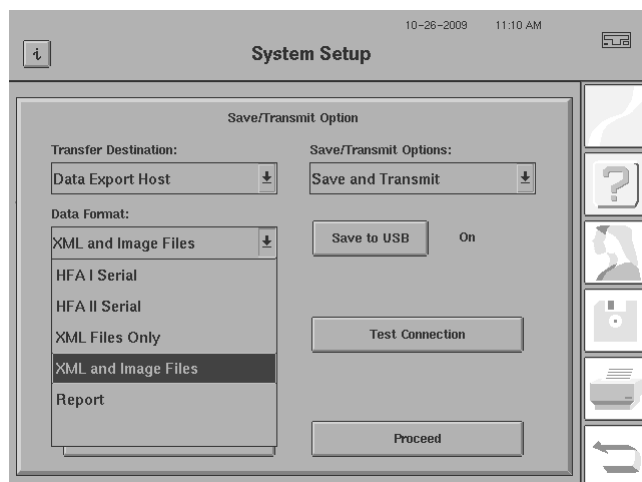
Classic Serial - Pick this option if you wish to transfer your data out via the serial port (to an HFA II-*i* instrument).

For Networked HFA II-*i* instruments only:

Data Export Host - This option is only available in the listing if you have licensed the HFA-NET Pro, or XML Data Export networking software on your HFA II-*i*. Otherwise, this option will not appear in the Transfer Destination drop-down box. On a licensed HFA II-*i*, this option allows you to export patient data, test data, and exam printouts to your network file server (the Data Export Host) via ethernet cable.

EMR/PMS Host - This option is only available in the listing if you have licensed the HFA-NET Pro networking software on your HFA II-*i*. Otherwise, this option will not appear in the Transfer Destination drop-down box. Select this option if you are using your HFA II-*i* in conjunction with separate Electronic Medical Records (EMR) or Patient Management System (PMS) software.

DICOM Archive - This option is only available in the listing if you have licensed the DICOM Gateway 2.0 software on your HFA II-*i*. Otherwise, this option will not appear in the Transfer Destination drop-down box. Select this option if you are using your HFA II-*i* in conjunction with a separate DICOM system.



4 After choosing your transfer destination, press the down arrow at the right-hand end of the Data Format drop-down box. Select from one of the following options:

HFA I Serial - The data format that was used by an HFA I. This does not transfer SITA exam data.

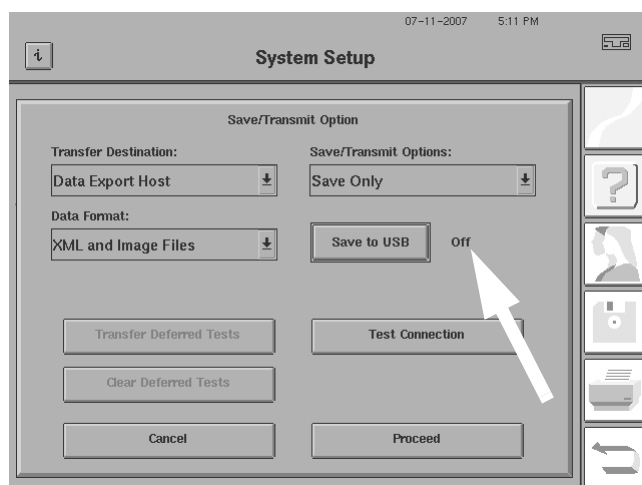
HFA II Serial - The data format that is used by an HFA II. This is used to transmit exam data to an HFA II-/or HFA II, including SITA exams. The receiving HFA II must have the correct software update for this to occur.

For Networked HFA II-/instruments only:

XML Files - This choice will only appear if you have HFA-NET Pro, or XML Data Export software licensed on your HFA II-/i perimeter. Otherwise, this option will not appear in the Data Format drop-down box. Use this format to transfer textual information (patient data and test results) to a network file server.

XML and Image Files - This choice will only appear if you have HFA-NET Pro, or XML Data Export software licensed on your HFA II-/i. Otherwise, this option will not appear in the Data Format drop-down box. Use this format to transfer both textual information and graphics (a TIFF image file of the test printout) to a network file server.

Report - This choice will only appear if you have DICOM Gateway 2.0 software licensed on your HFA II-/i. Otherwise, this option will not appear in the Data Format drop-down box. This format will be automatically selected and cannot be changed when you select DICOM Archive in the Transfer Destination drop-down box. A report is an Encapsulated PDF—a DICOM formatted PDF file transmitted via DICOM protocols.



Save to USB Option

5 The Save to USB function allows for automatic saving to a USB storage device when a test is saved (see [“Saving the Test,”](#) on page 5-13 for more information). By default, saving to a USB storage device is turned on.

You have the option to disable the Save to USB function when saving exams. To turn off saving to a USB storage device, select the SAVE TO USB button. A warning message will be displayed. Select YES to turn off saving to a USB storage device. The Save/Transmit Option screen will be displayed showing the SAVE TO USB button labeled off.

When the Save to USB function is on, a Save to USB Storage Device dialog (Figure 2.8) appears prompting you to select a USB storage device when adding/recalling a patient (selecting PROCEED on the Patient Data 1 screen) or saving a test if:

- a patient has not been added or recalled since the HFA has been turned on.
- the USB storage device previously selected for the Save to USB function has been removed.

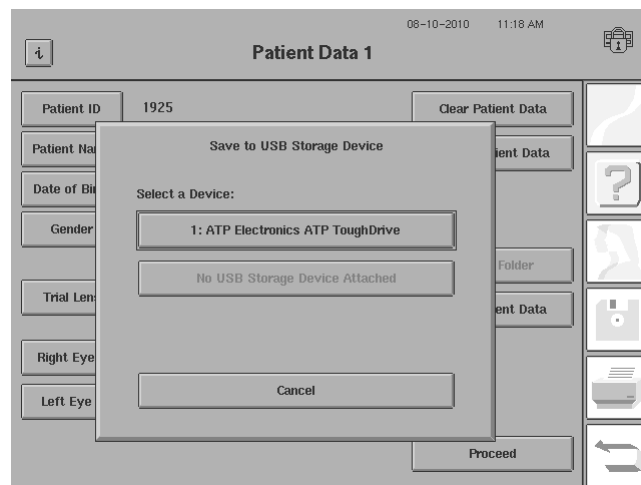


Figure 2.8 Save to USB Storage Device Dialog

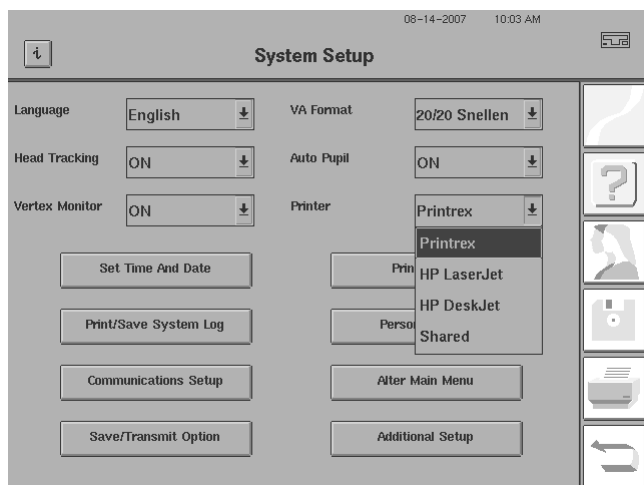
Select the desired USB storage device by pressing the button with its device name. The patient/test will then be saved to the device. The HFA will remember the selected USB storage device, and will automatically save the patient/test to the device without presenting a selection dialog if you do not remove the device or turn off the instrument.

It is recommended to leave the Save to USB function turned on (the default), and keep the selected USB storage device inserted into a USB port for automatic saving of all patient information and tests.

Setting Up Printing

Getting your printer set up to print is a three or four step process. The following instructions will show you how to:

- Choose the Printer to print from
- Set up a Shared Printer (optional)
- Set Default GPA Print Options
- Choose the Print Destination and Options



Choose the Printer to Print From

1 Start at the System Setup screen. Touch the down-arrow of the PRINTER drop-down box to select the printer for hard copy printouts. Select PRINTREX, HP LASERJET, HP DESKJET, or SHARED. Selecting SHARED selects the Shared Printer (see ["Set up a Shared Printer \(Optional\),"](#) on page 2-23).

Refer to ["Printer,"](#) on page 2-11 for additional information.

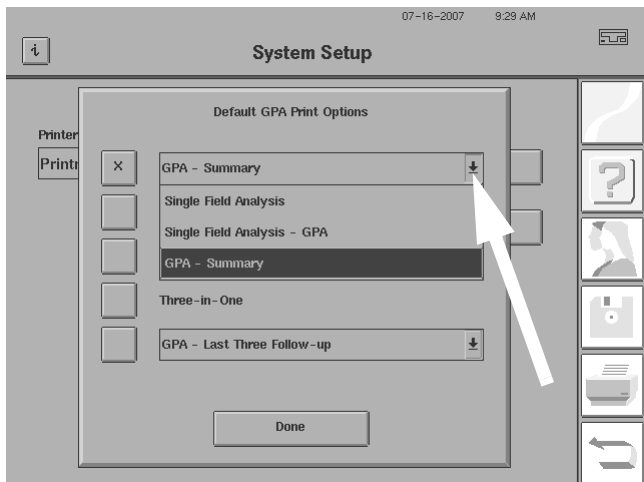
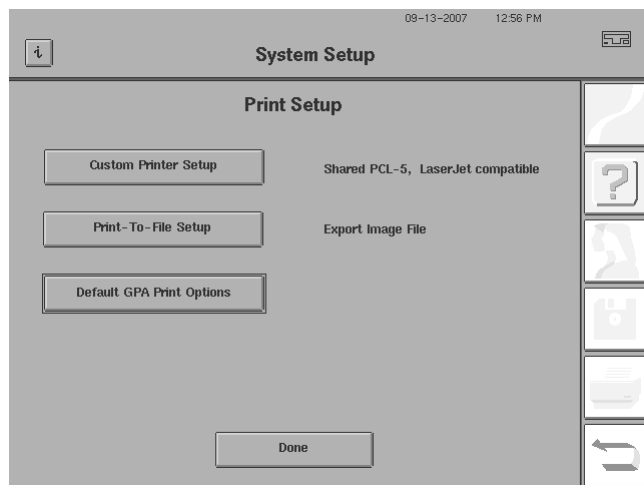
Set Default GPA Print Options

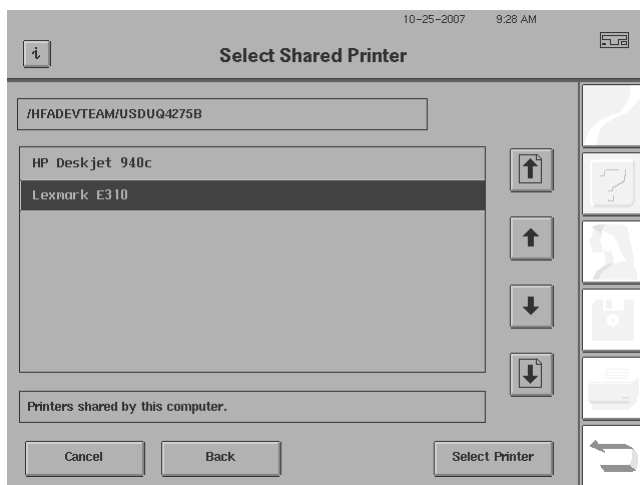
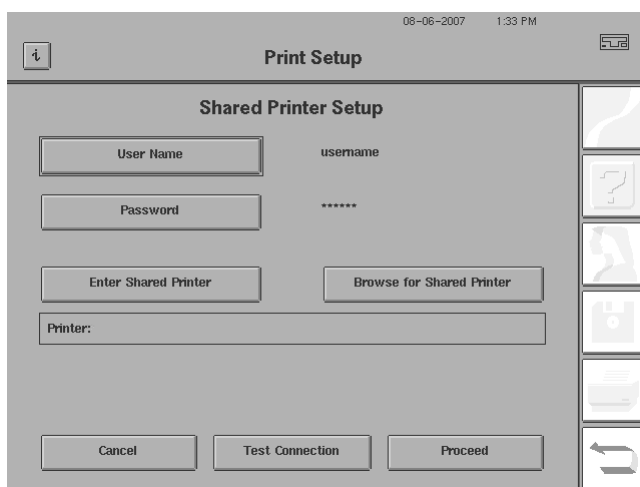
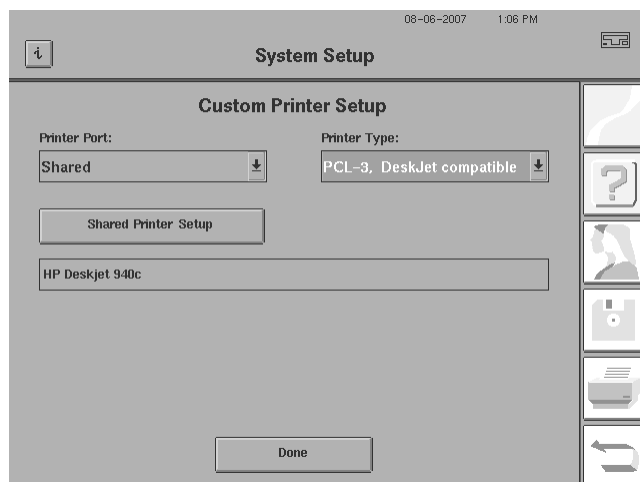
2 From the System Setup screen, select the PRINT SETUP button to open the Print Setup screen that is shown on the left.

3 Select the DEFAULT GPA PRINT OPTIONS button to set and save default GPA print options (if GPA is licensed on your HFA II-). When you select the *PRINT FUNCTIONS* icon from the Main Menu to print GPA reports, these defaults will be selected.

Select the GPA reports you want by clicking in the button next to the report so that an **X** is displayed in the button. For the first and last buttons, select the report from the drop-down menus. See [Chapter \(8\), "Guided Progression Analysis \(GPA\),"](#) for additional information about Guided Progression Analysis.

4 Select DONE to save your default GPA print options and return to the Print Setup screen.





Set up a Shared Printer (Optional)



Note: It is strongly recommended that you use the *EasyConnect™* Remote Configuration Tool (RCT) (see [Appendix \(G\)](#), "*EasyConnect RCT 1.0*") instead of manually configuring shared printers on your HFA II-/instruments.

5 To set up a shared printer, from the Print Setup screen select the CUSTOM PRINTER SETUP button to display the Custom Printer Setup screen shown on the left.

6 Touch the down-arrow of the PRINTER TYPE drop-down box to select the printer type. Select PCL-5, LASERJET COMPATIBLE, or PCL-3, DESKJET COMPATIBLE.

7 Select the SHARED PRINTER SETUP button to display the Shared Printer Setup screen shown on the left.

8 Enter the USER NAME and PASSWORD for the file server.

9 Select either ENTER SHARED PRINTER, to enter the printer name and location manually, or BROWSE FOR SHARED Printer, to search the directories of the network computer for the shared printer that you wish to use.

To enter a shared printer manually:

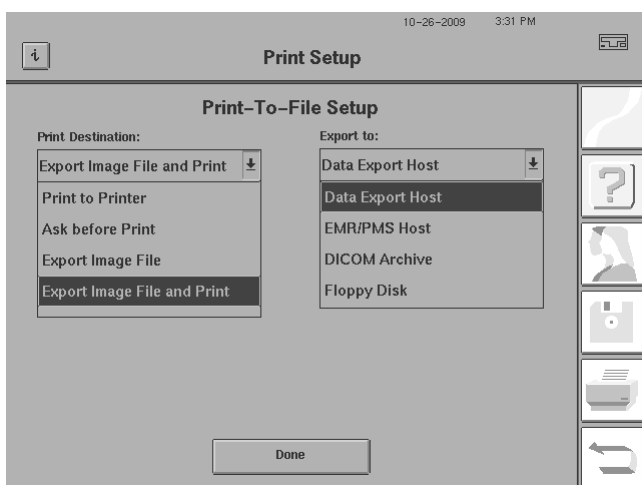
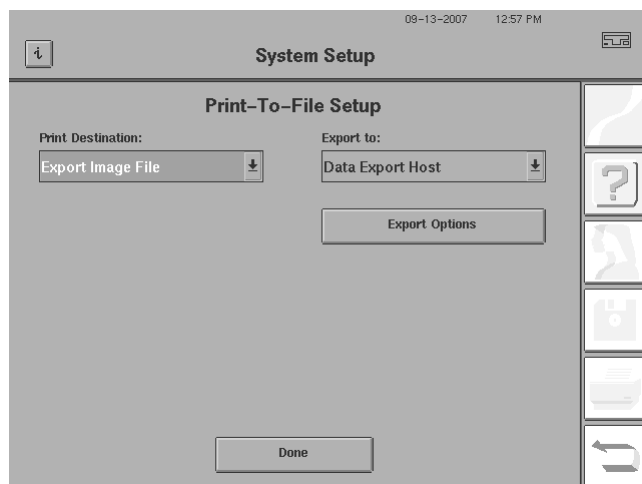
1. When you select ENTER SHARED PRINTER, a pop-up keyboard will appear. Use it to enter the name of the Workgroup/Domain to use. Then, select ENTER.
2. A second keyboard will open to allow you to specify the Computer to use and to specify the path to the shared printer that you wish to use. Key in the needed information and press ENTER.

To browse for a shared printer:

1. When you first select the BROWSE FOR SHARED PRINTER button, a "Select Shared Printer" screen will open, listing Windows Workgroups/Domains. Select a Workgroup/Domain, then select PROCEED.
2. The next browsing screen lists available computers/servers in the selected Workgroup/Domain. Select your desired computer/server and press PROCEED.
3. A screen will appear listing the all possible shared printers for the computer you specified in the previous step.
4. Select a shared printer and then select SELECT PRINTER.

10 The name and location of the shared printer will appear in the outlined box below the ENTER SHARED PRINTER button.

11 Select PROCEED to save your Shared Printer Setup.



Choose the Print Destination and Options

12 To choose your print destination and options, from the Print Setup screen, select the PRINT-TO-FILE SETUP button to display the Print-To-File Setup screen shown on the left.

13 Select the down-arrow of the PRINT DESTINATION: drop down box. Select from:

- PRINT TO PRINTER (to generate hard copy paper printout).
- ASK BEFORE PRINT (if you wish to be asked if you want to print out test results, upon the completion of each examination).
- For Networked HFA II-*i* instruments only:
 - EXPORT IMAGE FILE (if you wish either to save an image file to floppy disk or to export it via the network).
 - EXPORT IMAGE FILE AND PRINT (if you wish to print both a hard copy paper printout and export an image file via the network).

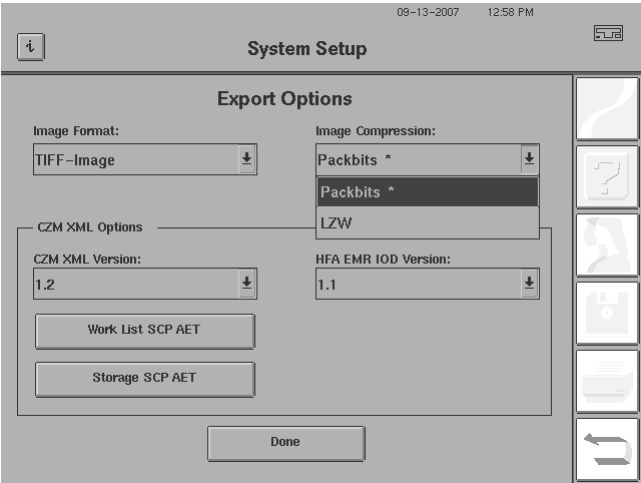
14 If you selected ASK BEFORE PRINT, EXPORT IMAGE FILE or EXPORT IMAGE FILE AND PRINT in previous step, press the down-arrow of the EXPORT TO: drop-down box to specify a destination for your image file. Select your image file destination as DATA EXPORT HOST, EMR/PMS HOST, DICOM ARCHIVE, or FLOPPY DISK. Refer to [Chapter \(14\), "Networking,"](#) for more information regarding the Print Setup screen and other networking features.



Note: The Data Export Host or EMR/PMS Host option will not appear on the list if you have not licensed HFA-NET Pro software on your HFA II-*i*. The DICOM Archive option will not appear if you have not licensed the DICOM Gateway 2.0 software on your HFA II-*i*. Refer to [Chapter \(14\), "Networking,"](#) for further details regarding these network features.

15 If you selected an image file destination in the previous step, select the EXPORT OPTIONS button to display the Export Options screen shown on the left.

16 Select an image format in the IMAGE FORMAT: drop down box. You can select TIFF-IMAGE (Tagged Image File Format, TIFF version 6.0) or PDF-DOCUMENT (Portable Document Format, PDF 1.2/Acrobat 3.x).

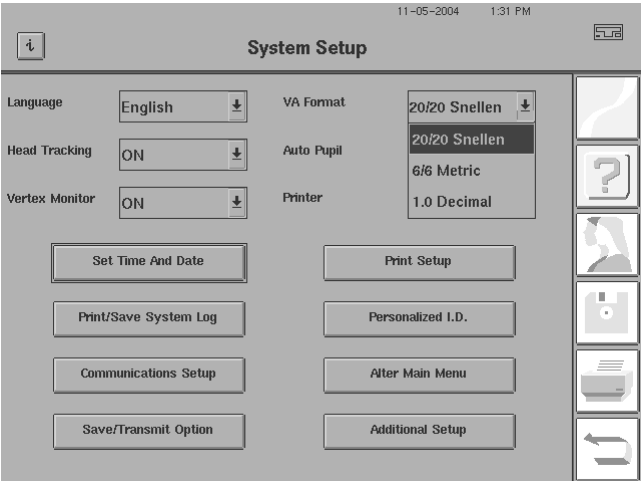


17 If you selected TIFF-IMAGE, you can specify the compression used for the image. Select an image compression in the IMAGE COMPRESSION: drop down box. You can select PACKBITS or LZW. If you selected PDF-DOCUMENT, the only compression available is ZIP.

18 If you are using an EMR/PMS System with you HFA II-; consult your documentation for required settings to enter into the CZM XML Options fields.

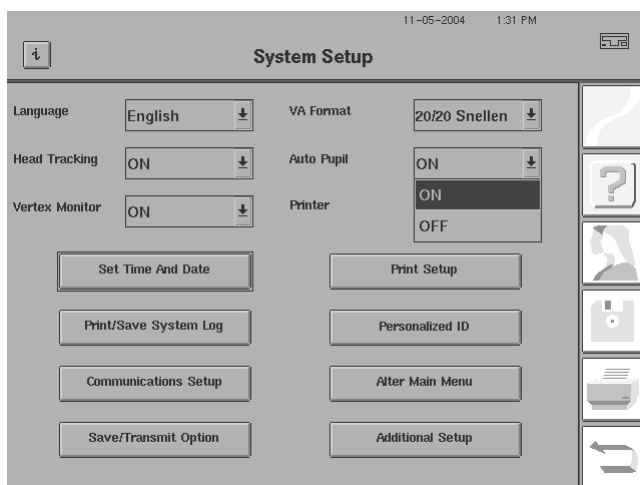
19 Select DONE to save your Export Options and return to the Print-To-File Setup screen.

Selecting a Visual Acuity Format



1 From the System Setup screen, select the VA Format drop-down menu.

2 Choose from 20/20 SNELLEN, 6/6 METRIC, or 1.0 DECIMAL.

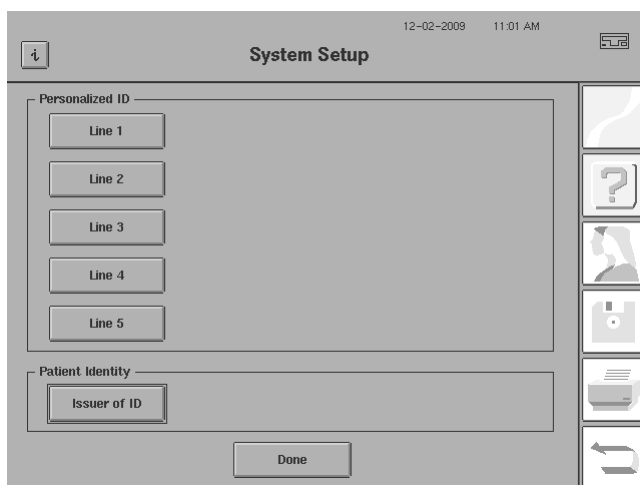
Selecting Auto Pupil (Model 750i/Only)

1 Start at the System Setup screen. Select the Auto Pupil drop-down menu.

2 Choose either ON or OFF.



Note: Auto Pupil only works if Gaze Tracking has been initialized. For information on Gaze Tracking, see ["Gaze Tracking \(Models 740i, 745i, 750i\),"](#) on page 5-4.

Personalizing Hard Copy Printouts

1 Start on the System Setup screen. Select PERSONALIZED ID.

2 Select the line button where you wish to enter text.

3 Enter the desired text (maximum of 40 characters per line).

4 Repeat steps 2-3 for other lines.

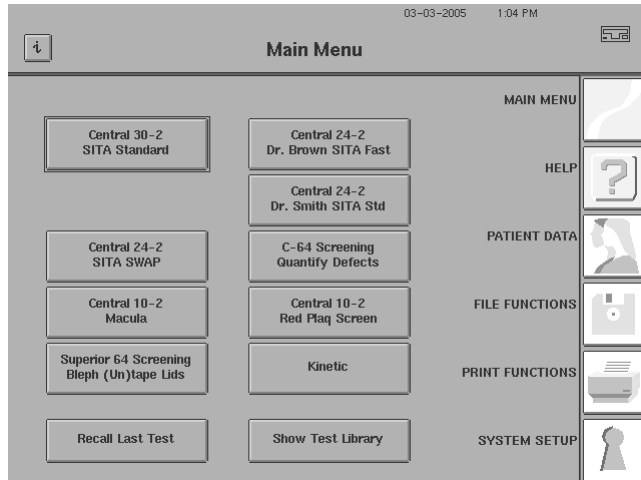
5 Press DONE.



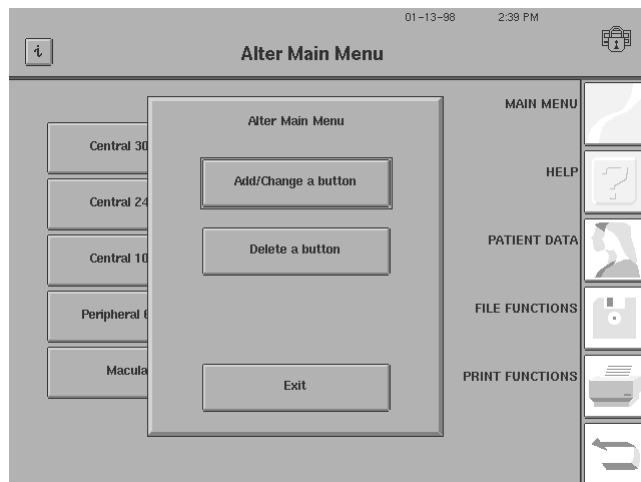
Note: This information is also shown when you select the ["i"](#) button, found in the upper left corner of most screens (see ["The Information Button,"](#) on page 2-3).

Altering the Main Menu Screen

You can customize the 10 Main Menu screen test buttons to organize your visual field tests according to the specific needs of your office. All of these buttons may be altered. Any Screening, Threshold, Specialty, Custom, or Kinetic test may be added or configured on the Main Menu.

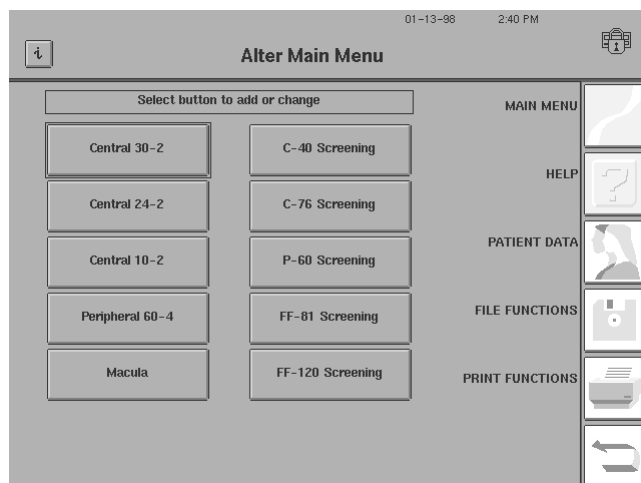


Here is an example of an altered Main Menu screen. Some buttons have the same test pattern but different strategies (Ex: Both a SITA Fast™ 24-2 and a SITA Standard™ 24-2 test button are seen). Tests normally found only in the Test Library have been added to the Main Menu screen (Ex: Superior 64 Screening). You can save time by customizing a button for a frequently used test with special parameters (Ex: Central 10-2 with a red stimulus). Additional details pertaining to the test have been added on a second line of text. Tests may be removed to create space between buttons. If you wish to have additional customized buttons, you will need to delete some of the standard buttons. Though some tests have been removed from the Main Menu, the tests can still be accessed from the Test Library.



1 Start at the System Setup screen. Select ALTER MAIN MENU.

2 Press ADD/CHANGE A BUTTON.

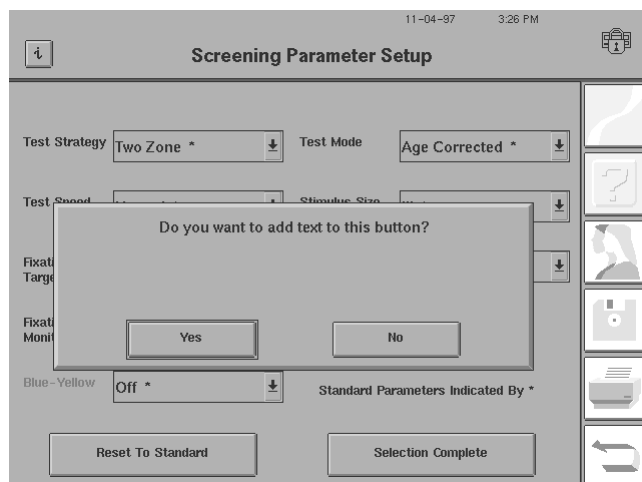


3 Select the button position where the change is to take place.

4 Choose from any test type, including SCREENING, THRESHOLD, SPECIALTY, CUSTOM, and KINETIC tests. After selecting, the same Test Library screens that are normally accessed through the Main Menu screen will appear.

5 Select the test pattern that you wish to add or change. The Parameter Setup screen will appear. All test buttons start with standard parameters.

6 Change the existing parameters to suit your needs. Finalize your choices by pressing SELECTION COMPLETE.



7 You may add a second line of text to the button to differentiate it from other buttons. This line will appear below the name of the test.

If you want to add a second line of text, press YES when prompted. Use the pop-up or external keyboard to type the additional information. Both keyboards allow for the use of lower-case letters.

Examples of identifying remarks are "SITA Standard," "SITA-SWAP," or "Dr. Brown's Test." Refer to the illustration at the start of ["Altering the Main Menu Screen,"](#) on page 2-26 to see an example of a Main Menu screen displaying personalized test buttons with additional text.



Note: The Humphrey test pattern name (Central 24-2, C-40 Screening, etc.) cannot be altered.

8

Repeat this process for each button that you wish to change

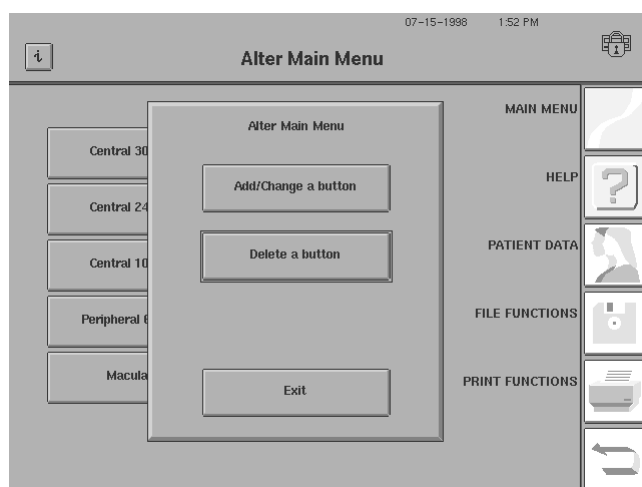
9

Press EXIT when you are finished altering the Main Menu buttons.



Note: Buttons which have not been altered through the Alter Main Menu sequence will continue to use standard testing parameters. Testing parameters which are changed via the CHANGE PARAMETERS button during a particular test revert back to the parameters assigned to that button once that visual field test is completed, unless you select TEST OTHER EYE.

Deleting a Button

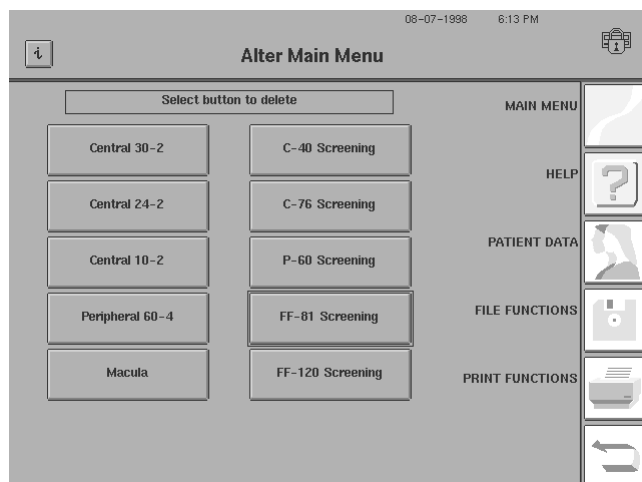


1

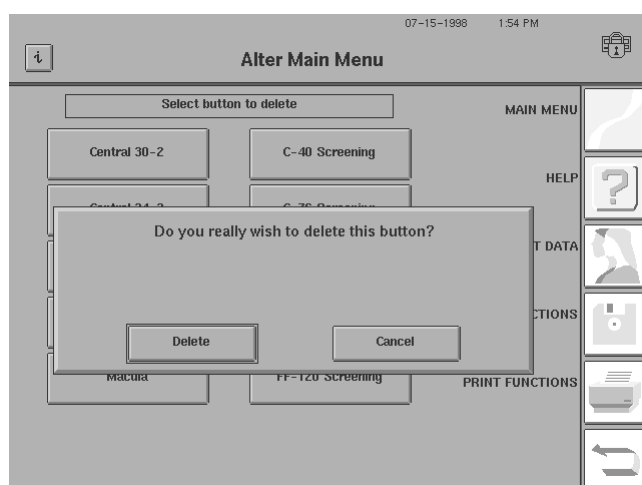
Start at the System Setup screen. Select ALTER MAIN MENU.

2

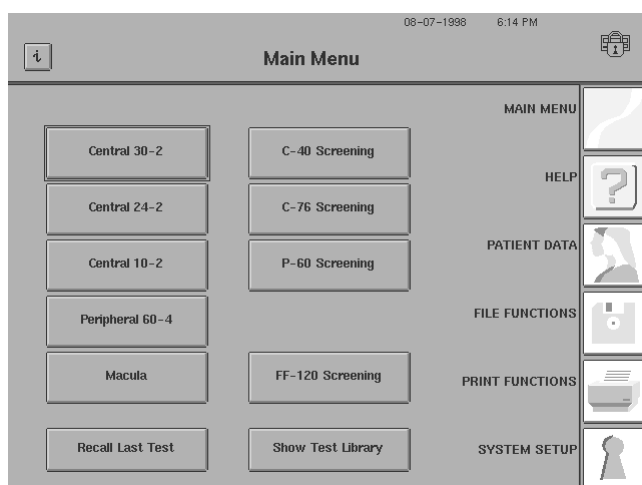
Select DELETE A BUTTON.



3 Choose the button you wish to remove.



4 If you want to delete a button, press DELETE when prompted.



5 An example of an altered menu is shown to the left of this text. In this example, the fourth button from the top in the right-hand column has been removed. Note that deleted buttons will appear blank on the Main Menu screen as shown; however, they will be marked "Test Position Now Blank" on the Alter Main Menu screen.

 Note: Any test you remove from the Main Menu screen still can be accessed through SHOW TEST LIBRARY. Standard parameters will be in effect when using a test from the Test Library unless CHANGE PARAMETERS is selected before you begin testing.

 Note: It is recommended you create a Configuration Backup to save your unique Main Menu when you are finished. See ["Backing Up Configurations to a USB Storage Device,"](#) on page 11-6.

Adding Text To an Existing Button

There is no direct method for adding text to an existing button without going through the sequence that is described in ["Altering the Main Menu Screen," on page 2-26](#). Be sure to note the test type and parameters used on the existing button before selecting ADD/CHANGE A BUTTON. Designate the same test along with the same testing parameters. When the "Do you want to add text to this button?" dialog box appears, press YES.

Additional Setup

You access the Additional Setup screen by pressing the ADDITIONAL SETUP button located on the lower right-hand side of the System Setup screen. Brief descriptions of the functions available on this screen are cited below.

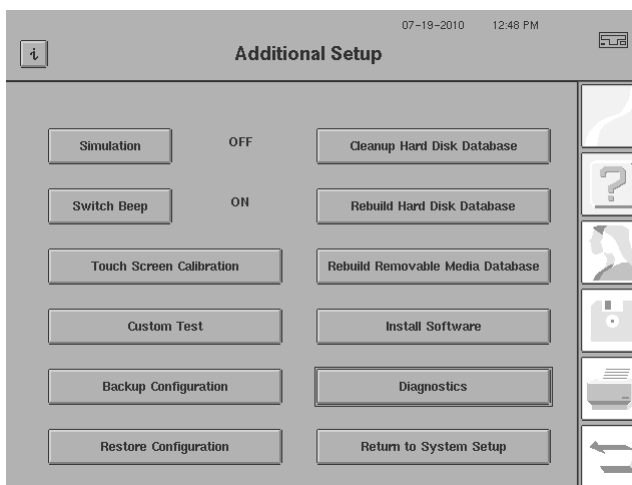


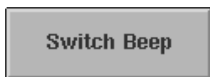
Figure 2.9 Additional Setup Screen

Simulation



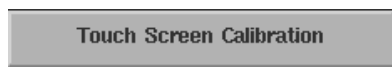
You use this button to demonstrate and verify proper software function. Press the button to change between ON and OFF. If a test runs while simulation is ON, sample threshold data will appear on the screen in a matter of seconds. Turn simulation OFF before running any tests on patients. Simulation automatically turns OFF when the instrument is powered off.

Switch Beep



The patient response button is designed to give audio feedback every time the button is pressed. Press the SWITCH BEEP button to change between ON and OFF. SWITCH BEEP may be turned OFF temporarily, prior to a test, by pressing this button.

Touch Screen Calibration



Occasionally, pressing the touch screen will activate the button next to the one you intended to press. You can reset the touch screen alignment by pressing this button and following the instructions that appear on the screen. See ["Touch Screen Calibration," on page 15-11](#).

Custom Test

Custom Test

This button opens the Custom Test Options pop-up screen. That screen allows you to create or delete a Custom test pattern. For more information, see [“Custom Testing,” on page 12-1](#).

Backup Configuration

Backup Configuration

You may save your customized Main Menu buttons (created by [“Altering the Main Menu Screen,” on page 2-26](#)), Custom test patterns, software licensing, and network settings (such as IP addresses and folder names) to a USB storage device. Using this function protects your information in case of a hard disk problem. For the steps used to back up your system configuration, see [“Backing Up Configurations to a USB Storage Device,” on page 11-6](#). Refer to [Chapter \(14\), “Networking,”](#) for further networking information.



Note: If you have HFA-NET Pro licensed on your HFA II-*i*, you will require one unique USB storage device per HFA to back up the network settings.

Restore Configuration

Restore Configuration

This function allows you to restore the information that was saved using the BACKUP CONFIGURATION button. See [“To Restore Configurations from a Floppy Disk or USB Storage Device,” on page 11-8](#) for details.



CAUTION: Restoring a configuration will change the original Main Menu configuration. It also replaces all custom tests in the Custom and Kinetic test libraries.

Clean Up Hard Disk Database

Cleanup Hard Disk Database

This feature deletes files containing patient data with no associated test data. This can occur when patient data is entered, but a test is not saved. This can also happen when patient data is entered early in the day for convenience, but the patient does not take the visual field test. Pressing the CLEANUP HARD DISK DATABASE button will remove all of the “unassociated” data from the database. See [“Cleanup Hard Disk Database,” on page 11-23](#), to use this feature.



Note: This cleanup process can be time consuming if you have a large database on your hard drive.

Rebuild Hard Disk Database

Rebuild Hard Disk Database

You can use the rebuild function in the event of a database failure. Rebuilding the patient database may take several hours to complete, depending on the number of files present. Therefore, it is best to perform this function at the end of a day or over a weekend. See [“Hard Drive Failure: REBUILD HARD DISK DATABASE,” on page 11-17](#), for more information.

Rebuild Removable Media Database

Rebuild Removable Media Database

This allows you to rebuild the database on a USB storage device or a floppy disk with an optional USB floppy disk drive. A full floppy disk may take several minutes to rebuild. Refer to [“Removable Media Failure: Using the Rebuild Removable Media Database Button,” on page 11-21](#), for details.

Install Software

Install Software

This feature allows supplemental testing software to be installed on the HFA II-*i* from a Carl Zeiss Meditec USB flash drive. It also allows you to enter software licensing information for such products as GPA, SITA-SWAP, or HFA-NET Pro. Further details for installing software are provided, beginning with “[Installing & Licensing HFA II-i Software](#),” on page J-1.

Diagnostics

Diagnostics

This feature requires password access and is available only to Carl Zeiss Meditec personnel. It leads to a variety of tests that are used for system calibration and repair.

Return to System Setup

Return to System Setup

This button returns you to the main System Setup screen.

Help Screens

The HFA II-*i* is equipped with help screens to assist you with a number of topics concerning the instrument’s operation. You may press the *HELP* icon at almost any time to access the on-screen Help menu. The *HELP* icon is not available when a pop-up window is displayed. You must complete the action within the pop-up window, or cancel the action, to access the Help menu. When pressing the *HELP* icon, the Help Topics screen that is shown in [Figure 2.10](#) appears:

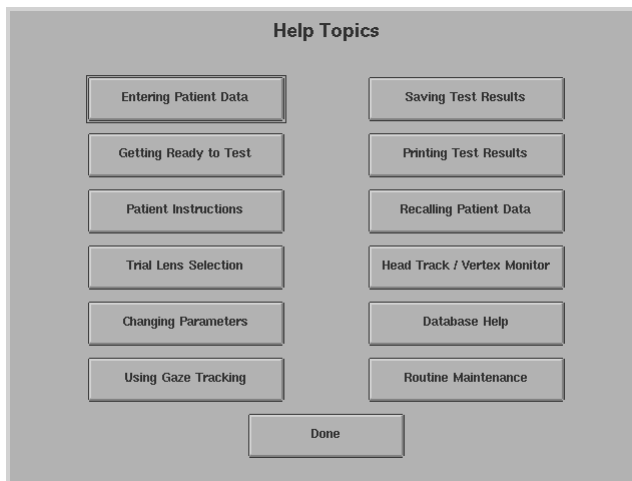


Figure 2.10 Help Topics Screen

Make your selection from the list of 12 topics. Topics that require more than one screen of information will have buttons at the bottom of the screen for advancing to the next screen (or for returning to the previous screen). Refer to [Figure 2.11](#) for an example of a Help screen.

Each topic displayed may be printed by pressing the PRINT button at the bottom of the Help screen. The entire text of the subject being viewed will print. Topics requiring more than one screen, such as "Printing Test Results", will have the complete text printed, not just the screen you are viewing.

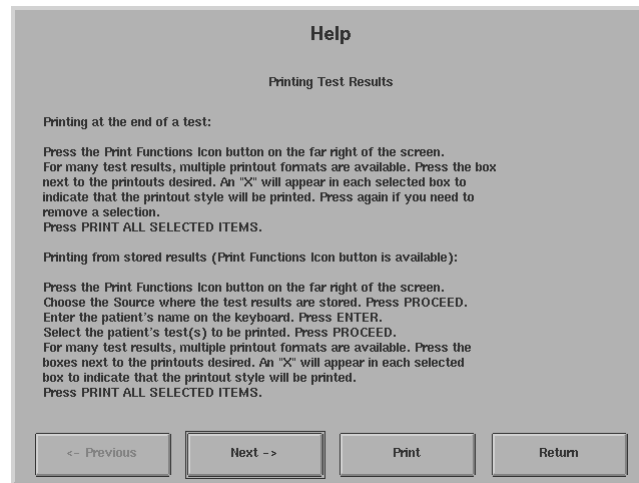


Figure 2.11 Example of a Help Screen

When you have finished with the help topic, press RETURN to return to the Help Topics screen. Pressing DONE on the Help Topics screen will return you to the screen where you first pressed the *HELP* icon. For example, if you were at the "End of Test" screen when you originally pressed the *HELP* icon, you will return to the same "End of Test" screen when you press DONE on the Help Topics screen.

Consult this User Manual for additional information on the subject of interest. The following is the list of on-screen Help topics and the main areas within this User Manual to find additional information:

- Entering Patient Data – [Chapter \(3\), "Setting-Up Tests"](#)
- Getting Ready to Test – [Chapter \(3\), "Setting-Up Tests"](#)
- Patient Instructions – [Chapter \(3\), "Setting-Up Tests"](#)
- Trial Lens Selection – [Chapter \(3\), "Setting-Up Tests"](#)
- Changing Parameters – [Chapter \(4\), "Test Parameters and Strategies"](#)
- Using Gaze Tracking – [Chapter \(5\), "Testing"](#)
- Saving Test Results – [Chapter \(5\), "Testing"](#)
- Printing Test Results – [Chapter \(7\), "STATPAC Analysis & Printing"](#)
- Recalling Patient Data – [Chapter \(3\), "Setting-Up Tests"](#)
- Head Tracking/Vertex Monitor (Model 750/only) – [Chapter \(5\), "Testing"](#)
- Database Help – [Chapter \(11\), "Database Management"](#)
- Routine Maintenance – [Chapter \(15\), "Care and Cleaning"](#)

(3) Setting-Up Tests

Selecting the Test Pattern and Test Eye	3-1
Entering Patient Data	3-7
Using Trial Lenses	3-20
Preparing the Patient	3-24

Pre-test activities are broken down into the steps listed above. This section covers each step in detail so that you can perform all of them competently and efficiently.

Also included:

- A complete listing of available tests and their applications
- The proper use of trial lenses
- Patient testing instructions
- Hints on positioning the patient comfortably

Selecting the Test Pattern and Test Eye

The Main Menu screen is the starting point for performing all tests. From here you select tests with one of two methods:

- Using test buttons.
- Using the test library.

For details on each test, see [“Test Library,” on page 3-4](#). After a test is chosen, you enter patient data, as described in [“Entering Patient Data,” on page 3-7](#).

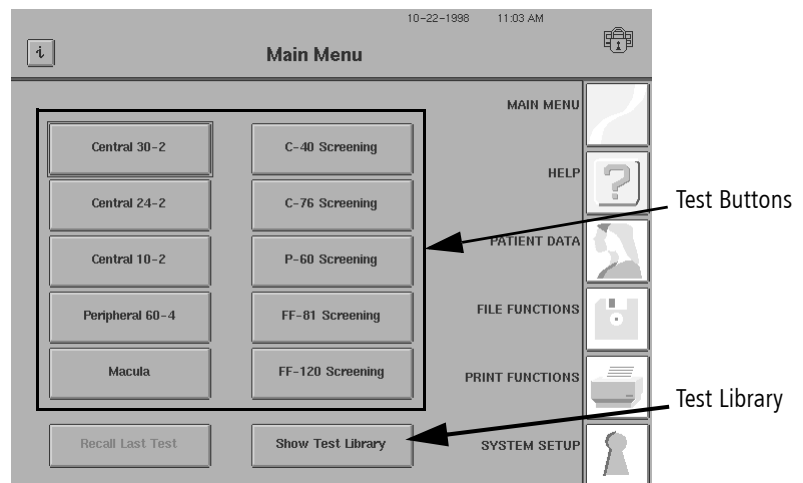
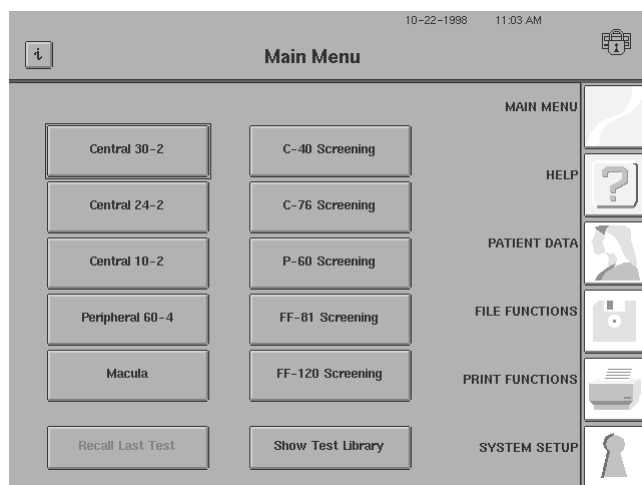


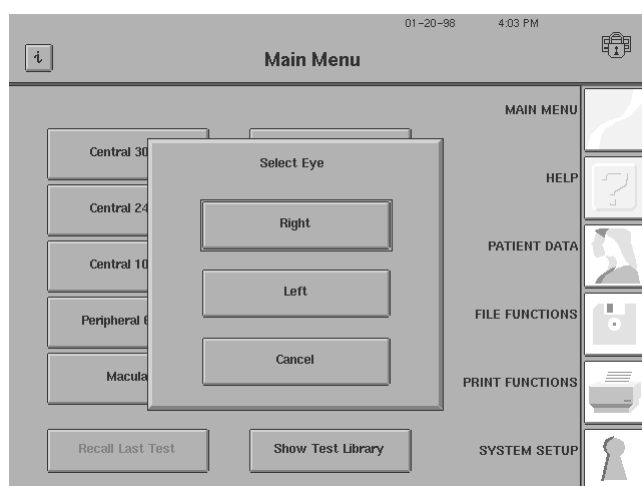
Figure 3.1 Selecting Tests from the Main Menu Screen

Using Test Buttons

Using Test Buttons is the most convenient method of selecting tests. Your new HFA II-/i has test buttons that are preset with the most commonly used tests. However, you can change them to suit your clinical needs. See [“Altering the Main Menu Screen,”](#) on page 2-26.



1 From the Main Menu screen, choose a test by pressing a test button.



2 Select the test eye. Choose RIGHT or LEFT to proceed, or CANCEL to go back to the Main Menu screen.

3 Refer to [“Entering Patient Data,”](#) on page 3-7 to continue test setup.

Using the Test Library

Use this method to select a test that does not appear on one of the test buttons.

1 From the Main Menu screen, choose SHOW TEST LIBRARY.

2 Select the test type. Choose from SCREENING, THRESHOLD, KINETIC, SPECIALTY or CUSTOM.

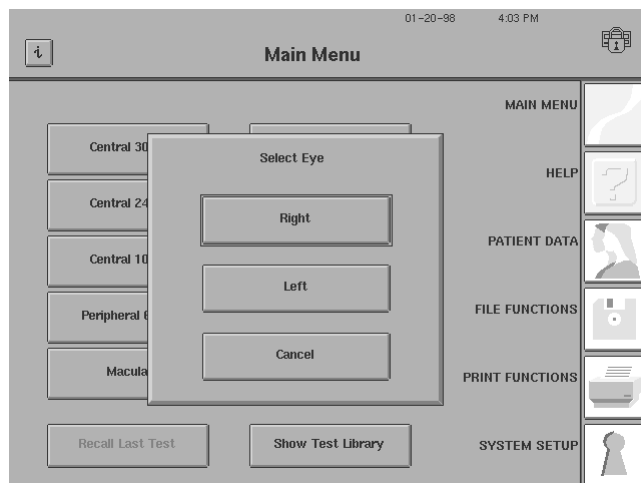
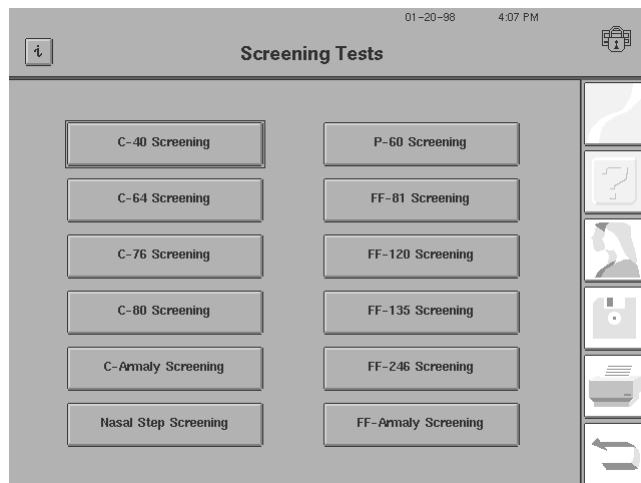
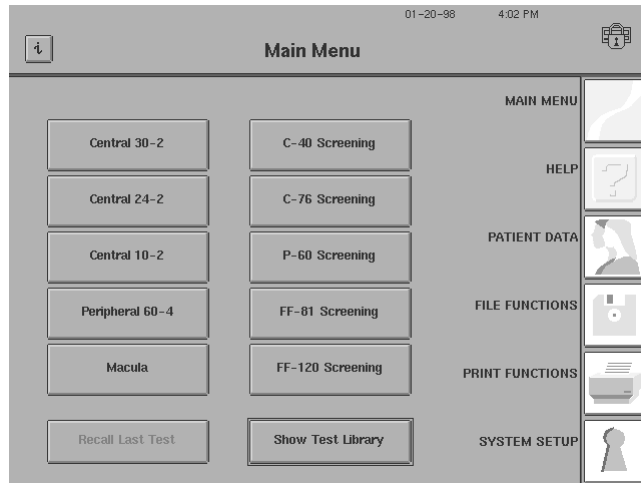
In this example, SCREENING is chosen.

3 Select the test pattern. There are many test patterns from which to choose.

Refer to [“Test Library,” on page 3-4](#) for information on each pattern.

4 Select the test eye. Choose RIGHT or LEFT to proceed, or CANCEL to go back to the Test Library.

5 Refer to [“Entering Patient Data,” on page 3-7](#) to continue test setup.



Test Library

The HFA II-*i* offers a variety of screening and threshold test patterns that meet most clinical needs. [Table 3.1](#) suggests which test strategies may be best suited for specific disease categories. [Table 3.2](#), [Table 3.3](#), and [Table 3.4](#) describe each test pattern in order to assist you in choosing the one best suited to the patient's needs. [Appendix \(F\), "Test Patterns"](#) contains diagrams of all the available test patterns.

Screening tests serve an important clinical function by quickly surveying the visual field and flagging areas that are highly suspect. They answer the question, "Is there a problem?" Abnormal test results warrant additional threshold testing. See [Table 3.2](#) for available Screening tests.

Threshold tests more precisely define the problem by calculating the actual sensitivity level at each test point. They uncover early depressions and subtle changes in retinal sensitivity. See [Table 3.3](#) for details about the various Threshold tests.

Specialty tests are specially designed screening tests for specific purposes. See [Table 3.4](#) for details about the Specialty tests.

Models 740*i*, 745*i* and 750*i* allow you to create and store your own Custom test patterns. In addition, the HFA II Model 750*i* offers Kinetic testing (optional on 740*i* and 745*i*). See [Chapter \(12\), "Custom Testing,"](#) and [Chapter \(13\), "Kinetic Testing,"](#) for more information on these testing options.

Table 3.1 Quick Reference to Tests Applicable for Specific Disease Categories

Disease Category	Test(s) Recommended
General Screening	Central 64 ^a , Central 76 Full Field 81, Full Field 120
Peripheral Screening	Peripheral 60
Full Field Screening	Full Field 81, Full Field 120
Glaucoma Suspect or Ocular Hypertension	30-2 SITA Standard or SITA Fast 24-2 SITA Standard or SITA Fast 24-2 SITA-SWAP
Glaucoma	30-2 SITA Standard or SITA Fast 24-2 SITA Standard or SITA Fast 24-2 SITA-SWAP 10-2 SITA for Advanced Glaucoma Central 76, Nasal Step ^a Central Armaly ^a , Armaly Full Field ^a Full Field 81, Full Field 120
Drug Toxicity	10-2
Neurological Damage	Central 64 ^a , Central 76 ^a Full Field 81 or Full Field 120 Peripheral 60 (plus a central exam)
Macular Degeneration	10-2 SITA, Macula
Ptosis	Superior 64, Superior 36

a. Not available on the HFA Model 720*i*.

Table 3.2 The Screening Test Library

Screening Test Library	Extent of Visual Field Tested / Number of Points Tested	Application
Central 40	30 degrees/40 points	General screening
Central 64 ^a	30 degrees/64 points	General, glaucoma, neurological
Central 76	30 degrees/76 points	General, glaucoma, neurological
Central 80	30 degrees/ 80 points	General Screening
Central Armaly ^a	30 degrees/84 points	Glaucoma
Peripheral 60	30 to 60 degrees/60 points	General, neurological with central exam, retinal, glaucoma
Nasal Step ^a	50 degrees/14 points	Glaucoma
Armaly Full Field ^a	50 degrees/98 points	Glaucoma
Full Field 81	55 degrees/81 points	General, retinal, glaucoma, neurological
Full Field 120	55 degrees/120 points	General, retinal, glaucoma, neurological
Full Field 135	87 degrees/135 points 87 degrees temporally	Full Field Screening
Full Field 246 ^a	60 degrees/246 points	Full Field Screening

a. Not available on the HFA Model 720i.

Table 3.3 The Threshold Test Library

Threshold Test Library	Extent of Visual Field Tested / Number of Points Tested	Application
10-2	10 degrees/68 point grid	Macula, retinal, neurological, advanced glaucoma
24-2	24 degrees/54 point grid	Glaucoma, general, neurological
30-2	30 degrees/76 point grid	Glaucoma, retinal, neurological, general
60-4	30 to 60 degrees/60 points	Retinal, glaucoma
Nasal Step ^a	50 degrees/14 points	Glaucoma
Macula	5 degrees/16 points 2 degrees spacing	Macula

a. Not available on HFA Model 720i.



Note: Test-point patterns are illustrated in [Appendix \(F\), "Test Patterns."](#)

Table 3.4 The Specialty Test Library

Specialty Test Library	Extent of Visual Field Tested/Number of Points Tested	Application
Esterman Monocular	75 degrees temporal 60 degrees nasal/100 points	Functional disability
Esterman Binocular	150 degrees bitemporal/ 120 points	Functional disability
Superior 36 ^a	60 degrees, superior hemifield/36 points	Superior Field Screening, Ptosis
Superior 64 ^a	60 degrees, superior hemifield/64 points	Superior Field Screening, Ptosis

a. Uses the Bottom LED fixation target.



Note: Test-point patterns are illustrated in [Appendix \(F\), "Test Patterns."](#)

Test Library Notes

There are a number of different uses for the tests included with your HFA II-*i*. Some have special settings or conditions that are important to understand if you are to perform the test correctly.

- The Bottom LED fixation target is automatically used by the HFA II-*i* in order to test all points of the Superior 36 point or Superior 64 point Screening Test. Remember to direct the patient's fixation to this lower target. If you manually set the Central target to be used with either of the Superior Field tests, some of the most superior points will be omitted from the test pattern. These two tests should be run in the Single Intensity mode with the stimulus set to 10 dB. If you use these tests often, refer to ["Altering the Main Menu Screen," on page 2-26](#), for information on how to place the test on the Main Menu with the 10 dB stimulus permanently set.
- The Full Field tests are run in two parts: first the central portion and then the peripheral portion. If a trial lens is necessary for the central portion, the HFA II-*i* recognizes that the trial lens holder is in the up position and pauses the test at the completion of the central portion. An alert advises you to remove the trial lens and put the trial lens holder in the down position. You may then start the peripheral portion of the exam. If the patient does not require a trial lens correction at the start of the exam (trial lens holder in the "down" position), the Full Field test will run to completion, testing both the central and peripheral visual field without pausing.
- The Full Field 135 Screening Test will not display all tested points on the screen. However, the HFA II-*i* will test all points and they may be viewed on the printout.
- To better view the central portion of any completed Full Field test, use the ZOOM button located on the End of Test or View Test screen.
- Any Full Field test that has had its central 30 degrees tested, may be saved, printed, and later recalled from disk without completing the peripheral portion of the test.
- The Central 76 point test grid is identical to that of the 30-2 Central threshold test. This allows you to follow up screening tests with threshold testing at the same points. Similarly, the Peripheral 60 screening test has the same test pattern as the 60-4 threshold test.

Esterman Functional Tests

Much like the Snellen scale for central acuity, the Esterman scale is especially useful for evaluating visual capability or disability in industry, law, and government (workers' compensation, motor vehicle, aviation, and military). The Esterman test is listed as an option for many disability screenings. Carl Zeiss Meditec is grateful to the American Academy of Ophthalmology for providing us with the rights to offer the Esterman test for your use.

The Esterman test scores are based on a relative value scale, which is divided into unequal units of 100 for monocular tests and 120 for binocular tests. Each unit is equated to one test point and is given a value of 1% in the monocular field and 0.83% in the binocular field. The inequality in the size and distribution of the units, with greater unit density in more important areas, makes the scale functional. The HFA II-/automatically yields the functional score as a percentage and prints it in the lower corner of the printout.

Monocular tests incorporate 100 points and extend 75 degrees temporally and 60 degrees nasally. Binocular tests incorporate 120 points and extend 150 degrees bitemporally. Each stimulus duration is 400 milliseconds with a single intensity Goldmann stimulus of III 4 E (10 dB). These settings have been standardized by international agreement and may not be altered by the user. You may only change the test speed. Refer to [Chapter 5](#) for special testing instructions.

Entering Patient Data

Once you have selected the test and test eye, you will be ready to input patient data. You can input a variety of information about your patient each time he or she takes a visual field test. The patient data section is divided into two main screens: Patient Data 1 displays demographic and trial lens information; Patient Data 2 displays diagnostic information. The required entries on the Patient Data 1 screen are Patient ID, Patient Name and Date of Birth. You need not enter all information requested; however, always enter a patient ID, a name and date of birth since they are required for trial lens calculations, data analysis, and saving the test to disk. If a Patient ID is not entered, one is automatically created. Also Gender will default to UNKNOWN.



Note: The HFA II-/ 5.x database is different from previous software versions in what determines patient uniqueness. To be compatible with EMR/PMS/DICOM systems, a Patient ID is now required. In the 5.x database, a patient is determined to be unique by only two fields—Patient ID and Issuer of ID. A Patient ID is required, but the Issuer of ID is optional. Issuer of ID (Issuer of Patient ID) is a DICOM data field to specify the assigning authority of the Patient ID. See [“Patient Uniqueness—Patient ID and Issuer of ID,”](#) on page 14-39, and [“Specifying Your Practice’s Issuer of ID,”](#) on page 14-40.

Entering Patient ID, Patient Name, Date of Birth, Gender, & Comments

1 From the Patient Data 1 screen, choose PATIENT ID.

The Patient ID stores the Patient ID with the test data and is displayed on the printout.

 Note: If you do not enter a Patient ID, a unique 29-character Patient ID such as "1966.1207.786F.C555.B6B9.473F" will be automatically created for the patient from the patient's name and date of birth. Also an HFA specific Issuer of ID will be entered for the patient (1.2.276.0.75.2.2.30.2).

2 Input up to a total of 64 Patient ID characters and spaces from the pop-up keyboard. You can use any character found on your keyboard. Pressing the CAPS key will allow you to switch between upper and lower case letters. Press ENTER. You will automatically be returned to the Patient Data 1 screen.

3 From the Patient Data 1 screen, choose PATIENT NAME. For DICOM software compatibility, you can have up to five name fields to enter patient names. In order, the field name descriptions are Family Name, Given Name, Middle Name, Name Prefix, and Name Suffix. The first name field is the Family Name (Last name). Each time you press ENTER the next name field will be displayed. You can enter the complete patient's name in this first field, or enter a name in one or more of the other name fields. However, it is recommended to enter at least the Family Name (Last name) and Given Name in their respective fields for the patient as it is required by many EMR/PMS/DICOM systems.

Enter the patient's family name

Zeiss

Enter the patient's given name

Carl

Enter the patient's middle name

Joseph

Enter the patient's name prefix

Dr.

Enter the patient's name suffix

MD

For example, if you enter a name in each name field as shown on the left, the final name will be displayed on one line with spaces separating the name fields (for each name entered) in the complete name that is displayed on the Patient Data 1 screen, as shown below left. Even though it will be displayed this way in your HFA II-; the full name will be displayed in the correct order in your EMR/PMS/DICOM application.

08-20-2009 3:22 PM

Patient Data 1

Patient ID 1234

Patient Name Zeiss Carl Joseph Dr. MD

Date of Birth

Gender Unknown

Sphere Cylinder Axis

Trial Lens

Right Eye Comments

Left Eye Comments

Proceed

Clear Patient Data

Recall Patient Data

Patient Folder

More Patient Data

4 Input a total of up to 60 characters and spaces for at least one of the name fields, using the pop-up keyboard. Pressing the CAPS key will allow you to switch between upper and lower case letters. Press ENTER.

5 Choose DATE OF BIRTH.

08-20-2009 3:26 PM

Patient Data 1

Patient ID 123

Patient Name Zei

Date of Birth

Gender Unk

Sph

Trial Lens

Right Eye Comments

Left Eye Comments

Proceed

Clear Patient Data

Recall Patient Data

Patient Folder

More Patient Data

Enter Date of Birth

9-22-43

Cancel

Clear

MM-DD-YYYY

1 2 3

4 5 6

7 8 9

0

Back - Enter

6 Key in the Month, Day, and Year from the pop-up keypad, including dashes (-) between entries. You may enter the year as either two digits or all 4 numbers. The year will be displayed in the 4 digit format.

After typing in the needed information, press ENTER.



Note: September 22, 1943 should be entered as 9-22-43. The patient is assumed to be less than 100 years old if you enter the year as a two digit number.

The screenshot shows the 'Patient Data 1' screen with a date of 08-20-2009 and time of 3:29 PM. A 'Select Gender' dialog box is open, displaying four buttons: 'Female', 'Male', 'Other', and 'Unknown'. The background screen has fields for Patient ID, Patient Name, Date of Birth, Gender, Trial Lens, Right Eye Comment, and Left Eye Comment. On the right side, there are buttons for 'Clear Patient Data', 'Recall Patient Data', 'Patient Folder', 'Store Patient Data', and a 'Proceed' button at the bottom.

7 Choose GENDER.

8 Select the appropriate gender button: FEMALE, MALE, OTHER, UNKNOWN (default).



Note: It is recommended to enter the correct gender for the patient as it is required by many EMR/PMS/DICOM systems.



Note: If you have HFA-NET Pro or DICOM Gateway software licensed on your HFA II-/i for use with EMR/PMS/DICOM software, it is recommended to only change the gender on the EMR/PMS/DICOM system, and not on the HFA, to avoid possible patient conflicts. This is because if the gender is changed on the HFA, a new patient could be created on the EMR/PMS/DICOM system.

The screenshot shows the 'Patient Data 1' screen with a date of 12-02-2009 and time of 3:56 PM. An 'Enter Comment For Right Eye' dialog box is open. It features a text input field containing 'small pupil', a 'Cancel' button, and a 'Clear' button. Below the input field is a numeric keypad (0-9), an alphanumeric keypad (Q-Z, W-X, E-C, R-V, T-B, Y-N, U-M, I-, O-, P-/), and a bottom row with 'Backspace', 'Caps', 'Space', ':', and 'Enter' buttons.

9 Choose RIGHT EYE COMMENTS.

10 Key in up to 2 lines of text from the keyboard. Press ENTER.

11 Repeat Steps 7-8 for LEFT EYE COMMENTS. Comments appear on the test results printout.



Note: You may enter comments either before testing or after testing is completed. If you are adding comments after a test is completed, be sure to save the test results so that the new comments will be saved.

Entering Trial Lens Data

Many people with a refractive error will need to use trial lenses in order to perform central field tests or the central portion of Full Field tests accurately. The HFA II-*i* will automatically calculate the proper trial lens prescriptions for the patient, or you can input any other trial lens selection manually. For whichever method chosen, the trial lens data will be displayed on the Patient Data 1 screen.

Refer to the appropriate section below:

- Automatic Trial Lens Calculation
- Manual Trial Lens Input

Automatic Trial Lens Calculation:

The screenshot shows the 'Patient Data 1' screen. At the top, it displays the date '08-20-2009' and time '3:30 PM'. The patient information includes: Patient ID '1234', Patient Name 'Zeiss Carl Joseph Dr. MD', Date of Birth '09-22-1943', and Gender 'Male'. There are buttons for 'Clear Patient Data', 'Recall Patient Data', 'Patient Folder', and 'More Patient Data'. The 'Trial Lens' section has a dropdown menu currently showing 'small pupil'. Below this are fields for 'Right Eye Comments' and 'Left Eye Comments', and a 'Proceed' button at the bottom right.

1 From the Patient Data 1 screen, select TRIAL LENS.

This screenshot shows the same 'Patient Data 1' screen, but with a 'Select One' dialog box open in the center. The dialog box contains three options: 'Calculate Trial Lens', 'Manual Trial Lens Input', and 'Cancel'. The background screen is partially obscured by the dialog box.

2 Choose CALCULATE TRIAL LENS.

3 For the right eye, select SPHERE.

The trial lens cannot be calculated without you providing the patient's date of birth. If you have not entered the patient's date of birth, enter it at this screen by pressing DATE OF BIRTH.



Note: The Date of Birth button is disabled when recalling patients from any source.

4 Enter the patient's distance sphere correction. Always remember to enter a plus (+) or minus (-) as the first character. Press ENTER.

If the patient has no sphere correction (plano), you must enter zero (0) so that the proper trial lens calculation occurs.

5 Enter correction for cylinder and axis, if needed.

6 Repeat Steps 4-5 for the left eye.



Note: You may choose SPHERE, CYLINDER, and AXIS in any sequence. To correct entries, reselect the command button and then enter the correct data.

7 Select CALCULATE TRIAL LENS.

The screenshot shows the 'Patient Data 1' screen. At the top, it displays the date '08-20-2009' and time '4:52 PM'. The patient information includes: Patient ID: 1234, Patient Name: Zeiss Carl Joseph Dr. MD, Date of Birth: 09-22-1943, Gender: Male. The trial lens data is shown for both Right and Left eyes. For the Right eye, the Sphere is +5.00, Cylinder is +2.25, and Axis is 180. For the Left eye, the Sphere is +6.00. A note 'small pupil' is visible under the Right Eye Comments. On the right side, there are buttons for 'Clear Patient Data', 'Recall Patient Data', 'Patient Folder', 'More Patient Data', and 'Proceed'. A vertical toolbar on the far right contains icons for help, search, and other functions.

8 The calculated trial lens data will automatically appear on the Patient Data 1 screen, as is shown in the illustration to the left of this step.

For Manual Trial Lens Entry:

1. From the Patient Data 1 screen, select TRIAL LENS.
2. Choose MANUAL TRIAL LENS INPUT.
3. Repeat Steps 3-6 in the preceding process.
4. Choose ENTRY COMPLETE. The manually entered trial lens data is automatically entered on the Patient Data 1 screen.



Note: For guidelines on selecting the proper trial lens (for manual input), refer to ["Using Trial Lenses,"](#) on page 3-20 and ["Examples of Trial Lens Correction,"](#) on page 3-21.

Clearing Patient Data

Often you will want to enter information for a new patient on a blank Patient Data screen. To remove all information on the Patient Data 1 and Patient Data 2 screens, use CLEAR PATIENT DATA.

The screenshot shows the 'Patient Data 1' screen with a confirmation dialog box overlaid. The dialog box asks 'Are you sure you want to clear patient data?' and has two buttons: 'Clear Data' and 'Don't Clear'. The background screen shows the same patient information as the previous screenshot, but the trial lens data is not visible. The 'Clear Patient Data' button is highlighted in the top right corner of the screen.

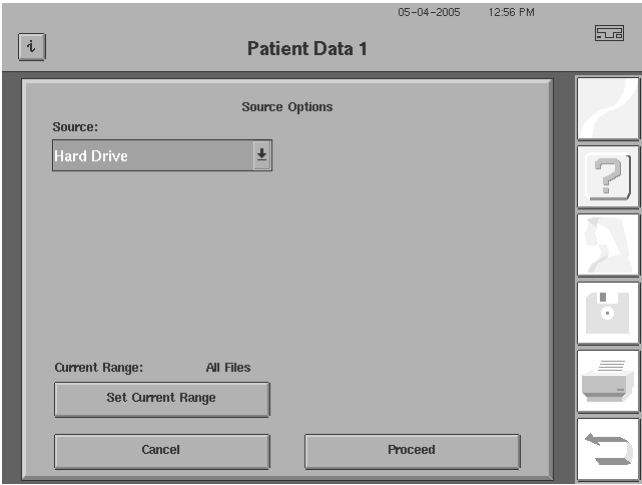
- 1 From the Patient Data 1 screen, choose CLEAR PATIENT DATA.
- 2 Read the confirmation question and answer appropriately.



Note: Clearing Patient Data only deletes information from the screen. It does not delete information from the database, if the patient data was previously saved.

Recalling Patient Data

When patients return for follow-up testing, you save time and ensure consistency by recalling previously entered patient data from stored files.



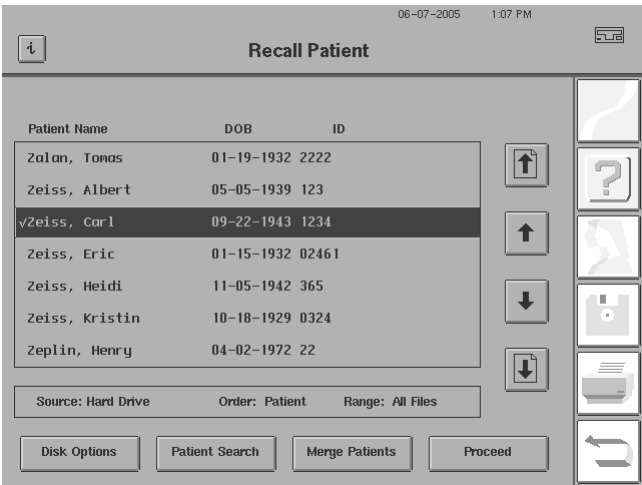
1 From the Patient Data 1 screen, choose RECALL PATIENT DATA to automatically transfer patient information from the hard drive or a USB storage device to the patient data screen.

If you have licensed HFA-NET Pro or DICOM Gateway (1.0 or 2.0), you can transfer patient information from a work list. See [“Importing Work Lists from Non-DICOM EMR/PMS Systems and DICOM Systems using DICOM Gateway 1.0,”](#) on page 14-45, or [“Importing Work Lists from DICOM Systems using DICOM Gateway 2.0,”](#) on page 14-48. If you have purchased and registered DICOM Gateway 2.0, you can also transfer patient information from a DICOM Archive. See [“Recall Patients, View, or Print Tests from a DICOM Archive \(DICOM Gateway 2.0 only\),”](#) on page 14-54.

2 Select the Source from HARD DRIVE, a USB storage device, WORK LIST (HFA-NET Pro or DICOM Gateway only), or DICOM ARCHIVE (DICOM Gateway 2.0 only). Choose PROCEED.

 Note: When recalling patients, the last source of patient data is remembered by the HFA.

3 For the Hard Drive Source, the keyboard appears. Type a few letters of the name you wish to find. Press ENTER.



4 Choose the patient file you want to retrieve. Use scroll arrow buttons, if necessary, to locate the file (see arrow illustrations below). Press PROCEED.

If you see two files that belong to the same patient and you wish to combine them, you may use the MERGE PATIENTS button. See [“Merging Patient Files,”](#) on page 10-12 for details.



The “Page Up Arrow” scrolls up a full screen of patients.



The “One Up Arrow” scrolls up one patient.



The “One Down Arrow” scrolls down one patient.



The “Page Down Arrow” scrolls down a full screen of patients.

To locate a patient’s test quickly, access the PATIENT SEARCH button below the File Directory box. Enter the patient’s name in the ENTER NAME TO FIND screen and press PROCEED. The HFA II-/ will search the database for that patient’s tests. If the name cannot be found, the name which follows alphabetically will appear. The PATIENT SEARCH command regards names with multiple spaces or different punctuation as identical.

5 Edit patient information, as necessary. If the patient has been recalled from the hard drive, you can edit the Patient ID, Patient Name, Date of Birth, Gender, and Patient Folder. When selecting the Patient ID, Patient Name, or Date of Birth button, the Change Patient Data for All Tests function is launched. Select a field to edit. After completing entry of the selected field, the keypad closes, but the Change Patient Data dialog remains, with your entry displayed in the New Entry section. You can then edit the other two identity fields if you wish. Press PROCEED to save the edits and update the Patient Data 1 screen. Press CANCEL to discard the changes and return to the Patient Data 1 screen (see [“To Change Patient Data:,”](#) on page 10-14).

Note: If you change the Patient ID, then the Issuer of ID will change to what is stored in the system (see [“Specifying Your Practice’s Issuer of ID,”](#) on page 14-40).

Note: If you are using an EMR/PMS/DICOM system, you should only change the Patient ID, Patient Name, or Date of Birth on the EMR/PMS/DICOM system, and not on the HFA, to avoid patient conflicts.

Note: The Patient ID, Patient Name, and Date of Birth buttons are disabled when recalling patient data from any source other than the HARD DRIVE (i.e., a USB storage device, WORK LIST, or DICOM ARCHIVE).

Choose MORE PATIENT DATA to verify, change or add data on the Patient Data 2 screen.

Choose PROCEED to go to the test screen.

Patient Folder

Patient Folders only apply if you have licensed the HFA-NET Pro networking software. Select PATIENT FOLDER to manually create a patient folder name for the selected patient. See [“Manually Creating a Patient Folder with the Patient Folder Button,”](#) on page 14-26 for more information.

Patient Data 2 Screen

The Patient Data 2 screen contains diagnostic data fields. When using the external keyboard to enter data, press the TAB key to move to the next data field. The values you enter for visual acuity and pupil diameter will appear on screen as well as on the printout with the test results.

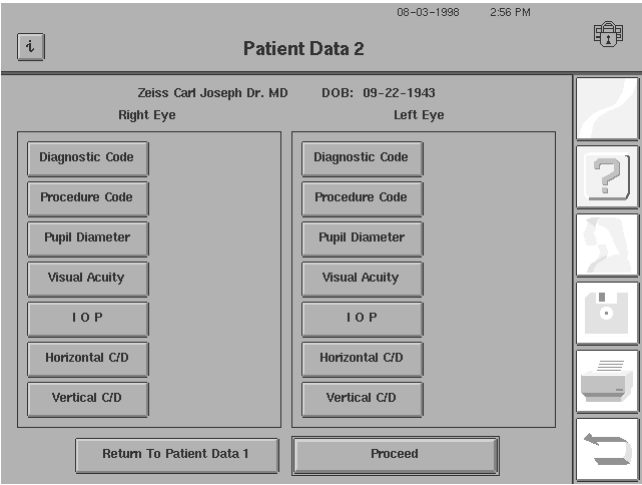


Figure 3.2 The Patient Data 2 Screen

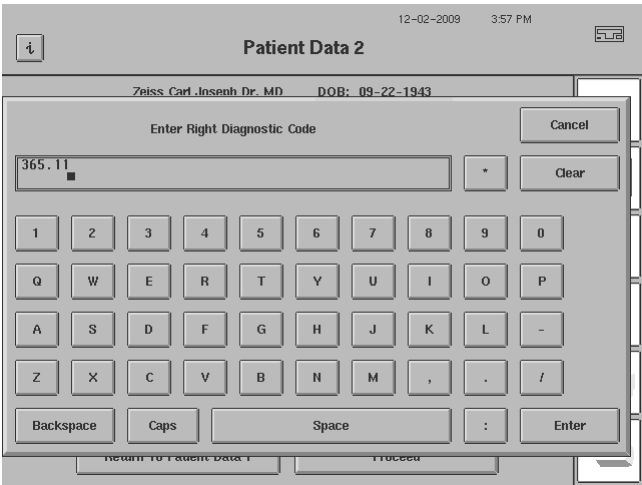
Entering Diagnostic and Procedure Codes

1 From the Patient Data 2 screen, choose DIAGNOSTIC CODE.

2 Enter up to 14 characters from the pop-up keyboard, then ENTER.

3 Repeat Steps 1-2 for the other eye.

4 From the Patient Data 2 screen, choose PROCEDURE CODE.



5 Enter up to 14 characters from the pop-up keyboard, then ENTER.

6 Repeat Steps 4-5 for the other eye.

Entering Pupil Diameter and Visual Acuity

1 From the Patient Data 2 screen, choose PUPIL DIAMETER.

2 Enter up to 4 characters (0 to 14.5; a decimal point counts as one character) from the pop-up keypad, then ENTER.

3 Repeat Steps 1-2 for the other eye. The pupil diameter value will also appear on the printout.



Note: If you are using the Autopupil feature (Model 750i only), you need not enter a pupil diameter. The automatic pupil measurement will be entered and noted with an asterisk (*) on the Patient Data 2 screen. You must have initialized Gaze Tracking for Autopupil to work.

4 From the Patient Data 2 screen, choose VISUAL ACUITY.

The screenshot shows the 'Patient Data 2' screen with a date of 08-03-1998 and time of 3:01 PM. A pop-up menu titled 'Enter Right Visual Acuity' is displayed in the center. The menu contains a grid of buttons for visual acuity levels: 20/25, 20/15, 20/60, 20/20, 20/80, 20/25, 20/100, 20/30, 20/200, 20/40, 20/400, 20/50, and >20/400. There are 'Cancel', 'Clear', and 'Enter' buttons. The left sidebar shows a list of test categories: Diagnostic, Procedure, Pupil Diameter, Visual Acuity, I O P, Horizontal C/D, and Vertical C/D. The right sidebar contains icons for help, patient selection, test selection, and printout.

5 Select the appropriate acuity level from the pop-up menu. Press ENTER.

6 Repeat Steps 4-5 for the other eye. The visual acuity measurement will also appear on the printout.

Entering Intraocular Pressure (IOP)

The screenshot shows the 'Patient Data 2' screen with a date of 08-03-1998 and time of 3:02 PM. A pop-up keypad titled 'Enter Right IOP' is displayed in the center. The keypad has a numeric keypad (0-9) and 'Back' and 'Enter' buttons. The left sidebar shows a list of test categories: Diagnostic Code, Procedure Code, Pupil Diameter, Visual Acuity, I O P, Horizontal C/D, and Vertical C/D. The right sidebar contains icons for help, patient selection, test selection, and printout.

1 From the Patient Data 2 screen, choose IOP (intraocular pressure).

2 Enter up to 2 characters (0 to 75) from the pop-up keypad. Press ENTER.

3 Repeat Steps 1-2 for the other eye.

Entering Cup/Disk (C/D) Ratios

The screenshot shows the 'Patient Data 2' screen with a date of 08-07-1998 and time of 6:10 PM. On the left, a vertical menu lists: Diagnostic Code, Procedure Code, Pupil Diameter, Visual Acuity, I O P, Horizontal C/D, and Vertical C/D. The 'Horizontal C/D' option is selected. A central keypad titled 'Enter Right Horiz C/D' displays '0.7' in its top field. The keypad includes buttons for digits 1-9, a decimal point, a minus sign, and 'Back', 'Enter', 'Cancel', and 'Clear' buttons. A 'Return' button is at the bottom left. On the right, a vertical toolbar contains icons for help, back, forward, and other navigation functions.

- 1 From the Patient Data 2 screen, choose HORIZONTAL C/D (cup/disk ratio).
- 2 Enter a decimal point and up to 2 characters (.00 to.99) from the pop-up keypad, then press ENTER.
- 3 Repeat for the other eye.
- 4 Repeat Steps 1-3 to enter a VERTICAL C/D.

When you have finished entering data on the Patient Data 2 screen and are ready to test, choose PROCEED. This takes you to the test screen where you can set test parameters, if desired, before beginning the test (see [Chapter \(4\), "Test Parameters and Strategies"](#)).

Here is an example of a Patient Data 2 screen with a number of completed data fields. Remember, it is not necessary for you to complete every field for each patient. Refer to ["Entering Patient Data," on page 3-7](#).

The screenshot shows the 'Patient Data 2' screen for 'Zeiss Carl Joseph Dr. MD' with a date of 08-03-1998 and time of 3:07 PM. The patient's DOB is 09-22-1943. The screen is divided into two columns: 'Right Eye' and 'Left Eye'. Each column contains fields for Diagnostic Code, Procedure Code, Pupil Diameter, Visual Acuity, I O P, Horizontal C/D, and Vertical C/D. The 'Right Eye' fields are filled with: Diagnostic Code 365.11, Procedure Code 92083, Pupil Diameter 4.0, Visual Acuity 20/25, I O P 24, Horizontal C/D 0.70, and Vertical C/D (empty). The 'Left Eye' fields are filled with: Diagnostic Code 365.11, Procedure Code 92083, Pupil Diameter 4.5, Visual Acuity 20/30, I O P 21, Horizontal C/D 0.55, and Vertical C/D (empty). At the bottom, there are 'Return To Patient Data 1' and 'Proceed' buttons. The right toolbar is identical to the previous screenshot.

Figure 3.3 A Completed Patient Data 2 Screen

Using Trial Lenses

All patients requiring near vision correction should use trial lenses while taking central field tests and the central portion of full field tests. For your convenience, the HFA II-/automatically calculates the proper trial lens for your patient, if you know the patient's distance prescription and date of birth (refer to ["Entering Patient Data,"](#) on page 3-7).

If you are not using the automatic trial lens calculation, refer to the following guidelines for selecting trial lenses.

Guidelines For Trial Lens Selection:

1. Ignore cylinders of 0.25 D or less.
2. For cylinder errors below 1.25 D use the spherical equivalent. Use the full cylinder correction for cylinder errors of 1.25 D or more.
3. Refer to [Table 3.5](#) for hyperopic or emmetropic patients, or [Table 3.6](#) for myopic patients, to determine the power of the spherical trial lens that you need to use.
4. Verify that the patient can see the fixation light clearly through the trial lens before beginning testing. Young myopes may need additional minus power if the target appears blurry to them, prior to beginning testing. Many 30-40 year olds may not need the full trial lens correction.

How to Calculate the Spherical Equivalent

The spherical equivalent is equal to half of the power of the cylinder (DC) correction. For example, the spherical equivalent of +1.00 DC is +0.50 D. The spherical equivalent of -0.50 DC is -0.25 D. You add the spherical equivalent of the cylinder power to the original spherical power to get the overall spherical equivalent. Refer to the ["Examples of Trial Lens Correction,"](#) on page 3-21 for additional examples.

Table 3.5 Spherical Trial Lens Correction for Central Visual Field Testing of Hyperopic and Emmetropic Patients

Age	Hyperopic Distance R _x is Greater than Zero	Emmetropic Distance R _x is Zero (Plano)
	Distance R _x only	No correction
Under 30		
30 - 39	(Dist. R _x) + (1.00 D) = trial lens	+1.00 D trial lens
40 - 44	(Dist. R _x) + (1.50 D) = trial lens	+1.50 D trial lens
45 - 49	(Dist. R _x) + (2.00 D) = trial lens	+2.00 D trial lens
50 - 54	(Dist. R _x) + (2.50 D) = trial lens	+2.50 D trial lens
55 - 59	(Dist. R _x) + (3.00 D) = trial lens	+3.00 D trial lens
60 & Over	(Dist. R _x) + (3.25 D) = trial lens	+3.25 D trial lens

Table 3.6 Spherical Trial Lens Correction for Central Visual Field Testing of Myopic Patients

Age	Distance R _x is -0.50	Distance R _x is -1.00	Distance R _x is -1.50	Distance R _x is -2.00	Distance R _x is -2.50	Distance R _x is -3.00	Distance R _x is over -3.00
Under 30	No trial lens needed	No trial lens needed	No trial lens needed	No trial lens needed	No trial lens needed	No trial lens needed	(Dist. R _x) + (+3.25 D) for trial lens
30 - 39	+0.50 D	No trial lens needed	No trial lens needed	No trial lens needed	No trial lens needed	No trial lens needed	(Dist. R _x) + (+3.25 D) for trial lens
40 - 44	+1.00 D	+0.50 D	No trial lens needed	No trial lens needed	No trial lens needed	No trial lens needed	(Dist. R _x) + (+3.25 D) for trial lens
45 - 49	+1.50 D	+1.00 D	+0.50 D	No trial lens needed	No trial lens needed	No trial lens needed	(Dist. R _x) + (+3.25 D) for trial lens
50 - 54	+2.00 D	+1.50 D	+1.00 D	+0.50 D	No trial lens needed	No trial lens needed	(Dist. R _x) + (+3.25 D) for trial lens
55 - 59	+2.50 D	+2.00 D	+1.50 D	+1.00 D	+0.50 D	No trial lens needed	(Dist. R _x) + (+3.25 D) for trial lens
60 & Over	+2.75 D	+2.25 D	+1.75 D	+1.25 D	+0.75 D	No trial lens needed	(Dist. R _x) + (+3.25 D) for trial lens

Examples of Trial Lens Correction

The following are examples of trial lens corrections using [Table 3.5](#) for hyperopic or emmetropic patients, or [Table 3.6](#) for myopic patients:

Example A (Emmetropic)

For an emmetropic (plano) 70 year-old patient, use [Table 3.5](#). Follow the Distance R_x is Zero (Plano) column to the 60 & Over row. The trial lens correction for this patient is +3.25 D.

Example B (Hyperopic)

For a 61 year-old hyperopic patient with a distance refraction of +1.50 +0.50 X 60, use [Table 3.5](#). First calculate the spherical equivalent (+1.75). Then follow the Hyperopic Distance R_x is Greater than Zero column to the 60 & Over row where you are instructed to add +3.25 to the distance R_x of +1.75. The trial lens correction for this patient is +5.00 D.

Example C (Hyperopic)

For the 35 year-old hyperopic patient with a distance refraction of +2.00 +1.50 X 90, refer to [Table 3.5](#). Use a +1.50 D cylinder lens and rotate the axis to 90 in the trial lens holder. Follow the Hyperopic Distance R_x is Greater than Zero column to the 30-39 row where you are instructed to add +1.00 to the distance R_x of +2.00. The trial lens correction for this patient is +3.00 +1.50 X 90.

Example D (Myopic)

For a 30 year-old myopic patient with a distance refraction of -3.00 +0.25 X 90, use [Table 3.6](#). The 0.25 cylinder is ignored. Follow the -3.00 column to the Age 30-39 row. The column entry signifies that this patient does not need a trial lens correction, as the bowl will be in focus with no correction.

Example E (Myopic)

For a 63 year-old myopic patient with a distance refraction of $-3.00 +2.00 \times 75$, refer to [Table 3.6](#). Use a $+2.00$ cylinder lens and rotate the axis to 75 in the trial lens holder. Follow the -3.00 sphere column to the 60 & Over row. The column entry indicates that the patient does not require a spherical correction. Use only the cylinder trial lens correction.

Example F (Myopic)

For a 25 year-old myopic patient with a distance refraction of -4.00 , use [Table 3.6](#). Follow the Distance Rx is Over -3.00 column to the Under 30 row where you are instructed to add $+3.25$ to the distance Rx. The correct trial lens is -0.75 .

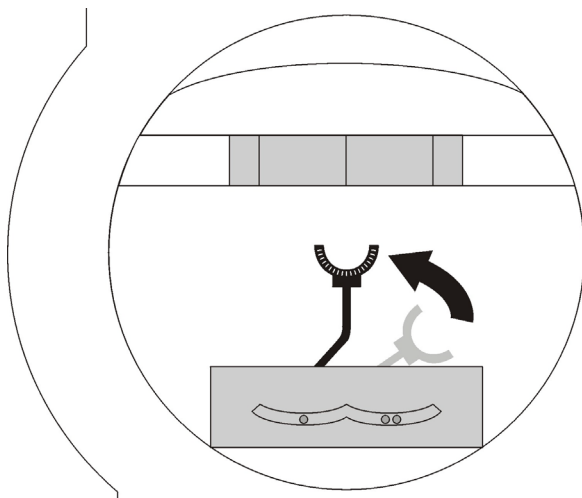
Remember, you only need to use a trial lens when testing the central part of the patient's visual field. The trial lens must be removed for the peripheral portion of any Full Field test. A trial lens is not used for either Superior Field screening test or any Peripheral threshold or screening test.



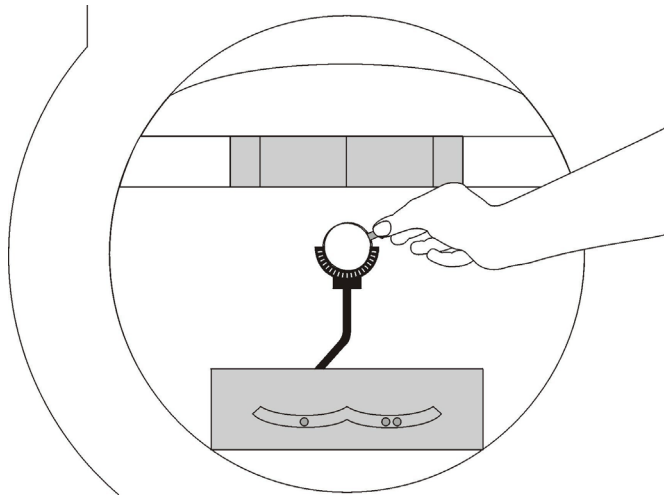
Note: If your patient is aphakic or needs a high refractive power such as $+8.00$ D, contact lenses may provide the best visual field testing conditions.

No Trial Lenses Required for Esterman Monocular/Binocular Tests

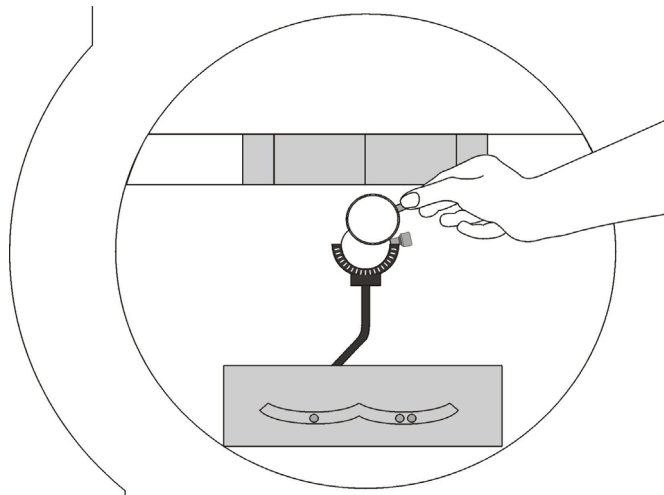
This test is used to assess the level of a patient's functional visual disability. The Esterman tests are designed to be done using a patient's everyday correction. If the patient does not require glasses to function normally, perform the test without correction. If the patient does wear glasses to function normally, perform the monocular or binocular test using the patient's glasses. **Do not use trial lenses.** You still must use the eye patch when testing with the Monocular version of the Esterman test. Comprehensive testing instructions are provided in the section entitled "[Esterman Testing,](#)" on [page 5-19](#).

Inserting Trial Lenses Into the Holder

1 Move the trial lens holder into an upright position from its storage position in the bottom of the bowl.



2 Place the cylinder lens in the slot farthest away from the patient and align the axis.



3 Place the sphere lens in the slot closest to the patient (in front of the cylinder lens).



Note: Use only the narrow rimmed type of trial lenses. The wide-rimmed variety will interfere with the patient's peripheral vision and adversely affect test results. It is helpful to move the lens handle towards the patient's temporal side so it does not interfere with the patient's eye brow or nose.

Preparing the Patient

How well your patient understands the test procedure and how comfortable he or she is while taking the test directly influences the reliability of the test results.

Patient Instructions for Static Testing

Explain the test procedure clearly and completely. Answer all patient questions before starting. Use the following patient instructions as a guide, but remember to tailor your instructions to the patient's individual needs.

"This test will measure your central and side vision. It is important that you always look straight ahead at the steady yellow light (Point to yellow fixation light). Other lights will flash one at a time off to the side. Some will be bright, some dim. Press the button whenever you see one of these lights (Give patient the response button). You are not expected to see all of them." For threshold tests: "The test is designed so that you may see fewer than half of them."

"If you want to rest, hold down on the button (demonstrate to patient). The test will resume when you release the button. We test one eye at a time. Blink normally so your eye does not get dry. A good time to blink is whenever you push the response button. When your test is over, you will hear two beeps. You may sit back at that time."



Note: Instructions for Kinetic Testing differ slightly. See [Chapter 13](#) for details.

Occluding the Non-Test Eye

Position the eye patch over the non-test eye so that it completely blocks vision, as shown in the illustration. Make sure nothing interferes with the vision of the test eye. For example, if the patch is secured with an elastic band, position the band above the eyebrow of the test eye as shown.



Seating the Patient

To increase test reliability, take all steps necessary to ensure patient comfort:

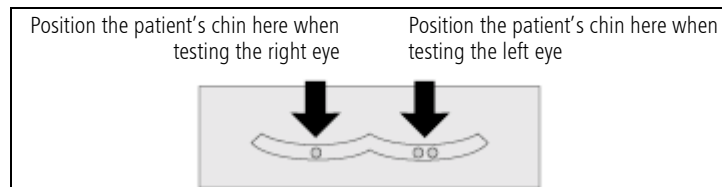
- Adjust the table height.
- Adjust the seat height.
- Slide the instrument towards the patient (if your Power Table is fitted with the optional slider accessory).
- Check that the patient is relaxed and holding the response button.

Dimming the Room Lights

You should perform your testing with the HFA II-/i in a dimly lit room. There should be enough light present to ensure the safety of the user and patient. Any light present during testing should be directed away from the patient and the HFA II-/bowl opening. We also suggest positioning the HFA II-/i away from light sources. Avoid light from doorways or external light sources. Should the room lighting be very bright, the HFA II-/i will post a warning and not allow testing to continue without the lights being lowered.

Positioning the Patient

To facilitate patient positioning, the chin rest is divided into two cups: one designated for right eye testing; the other for left eye testing.



1 Instruct the patient to place his or her chin on the appropriate side of the chin rest, then assist with bringing the forehead against the forehead rest.

Have the patient slide the chair in close to the HFA II-*i*. Adjust the table height to be as high as necessary to keep the patient sitting comfortably erect, rather than bent over or leaning forward.

If available, pull the slider handle out to release the slider. Slide the HFA II-*i* toward the patient to allow improved posture for the test. Release the handle to lock the slider in place.



2 Align the patient's eye on the video eye monitor so that the pupil is centered in the target. Press the chin rest control in the direction you want the patient's eye to move in the video eye monitor.



3 Move the trial lens as close to the patient's eye as possible without touching the lashes.

If you are running a SWAP (Blue-Yellow) test, the visor beneath the forehead rest must be extended. You should also allow the patient to adapt to the yellow bowl for about 3 minutes before testing. See [Chapter \(9\), "Short-Wavelength Automated Perimetry \(SWAP\),"](#) for further details.



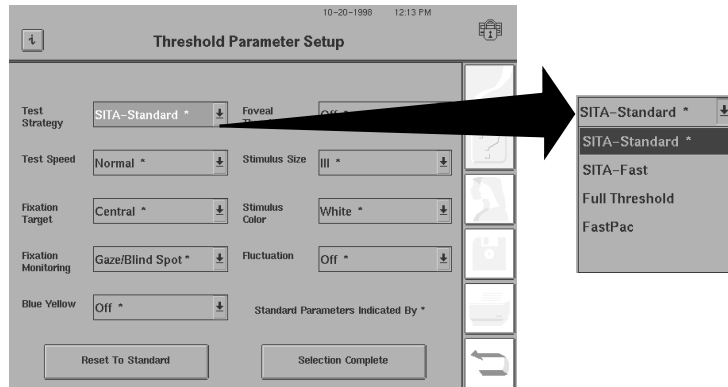
4 Review the patient's position in the video eye monitor. The cross (+) should be in the center of the pupil. Adjust as necessary.

When the patient has been instructed properly and positioned comfortably, you are ready to begin testing.

(4) Test Parameters and Strategies

Setting Test Parameters	4-1
Test Strategies	4-4
SITA Testing	4-10

Your HFA II-*i* has a number of options for using different parameters and testing strategies. This chapter discusses standard and non-standard testing parameters as well as the procedure to modify the parameters for specific patients.



There are a number of test strategies available for Screening tests. For Threshold tests, the primary testing strategy is SITA. SITA, the Swedish Interactive Thresholding Algorithm, has replaced the Full Threshold strategy as the standard for testing.

This chapter answers these and other questions:

- Which parameters are the default parameters?
- What test parameters can I change during the test?
- Can I slow down the test for an elderly patient?
- What are the three test strategies for Screening tests?
- When can I use the SITA testing strategy?

Setting Test Parameters

Test parameters are the testing conditions used during a test (*e.g.*, stimulus size, test strategy, test speed, etc.). While the majority of patients are best examined using “standard” parameters (or default parameters), you can alter the parameter settings to tailor the test to meet particular patient needs.

One example of a test parameter is the fixation target which has four settings: central, small diamond, large diamond, and bottom LED. The central fixation light is the default target. It is suitable for most patients, but you can change it if the patient requires a larger target.

Figure 4.1 The Screening Test Parameter Setup Screen

To Change Test Parameters

You can access the parameter setup screen in two ways:

- From the Start Test screen, using CHANGE PARAMETERS.
- From the Test in Progress and Pause screen. Note that during testing, you can change only test speed and fixation monitoring.

1 Start at the Parameter Setup screen. Depending on whether you selected a Screening or Threshold test, you either will open the Screening Parameter Setup screen (Figure 4.1) or the Threshold Parameter screen (illustrated to the left of this text). Select the parameter you wish to change in either the screening or the threshold screen.

The screenshot shows the 'Threshold Parameter Setup' window. The parameters and their current settings are as follows:

Parameter	Current Setting
Test Strategy	SITA-Standard *
Test Speed	SITA-Fast
Fixation Target	FastPac
Fixation Monitoring	Gaze/Blind Spot *
Blue Yellow	Off *
Foveal Threshold	Off *
Stimulus Size	III *
Stimulus Color	White *
Fluctuation	Off *

Buttons at the bottom: Reset To Standard, Selection Complete.

2 Select the parameter setting. The current setting is highlighted.

3 Repeat steps 1-2 for other parameters, then press SELECTION COMPLETE.

Standard Parameters

One setting for each parameter has been designated by design as the default setting. It is distinguished from the others by the appearance of an asterisk (*) on the parameter button. If you wish to return all settings to their defaults at once, you can select RESET TO STANDARD.

The screenshot shows the 'Threshold Parameter Setup' window with the following standard parameters:

Parameter	Standard Setting
Test Strategy	SITA-Standard *
Test Speed	Normal *
Fixation Target	Central *
Fixation Monitoring	Gaze/Blind Spot *
Blue Yellow	Off *
Foveal Threshold	Off *
Stimulus Size	III *
Stimulus Color	White *
Fluctuation	Off *

Buttons at the bottom: Reset To Standard, Selection Complete.



Note: For the purpose of valid comparison, it is important to keep test parameters consistent among different test visits for the same patient. This will maintain proper comparability when evaluating test results from many visits. Other than test speed and fixation monitoring, you cannot change test parameters once testing has begun.

Test Strategies

One of the most important test parameter settings is test strategy. For both screening and threshold testing, the strategy you use can affect the total test time and the precision to which the measurements are made. The strategy also dictates whether screening test results are displayed as qualitative (symbols) or quantitative (decibels) information. All threshold strategies yield quantitative results. Each measures the threshold at every test point. The test strategies differ as shown in the tables below. Refer to both [Table 4.1](#) and [Table 4.2](#) for a more detailed explanation of the test strategies, as well as for information about the other screening and threshold parameters.

Table 4.1 Screening Test Parameters
(Factory default parameter settings appear in **bold print**.)

Screening Parameters	Parameter Settings	Description
Test Strategy	Two Zone	For each point in the test pattern, a stimulus is presented 6 dB brighter than the expected hill of vision. Printouts display circles (O) for seen stimuli and boxes (■) for missed stimuli. Since screening is done with an intensity 6 dB brighter than the expected threshold, missed points are known to be at least 6 dB deep.
	Three Zone	Same as Two Zone, except each missed point is measured again at a maximum intensity of 10,000 apostilbs (0 decibels) to determine if the defect is absolute. Printouts display circles (O) for seen stimuli, "X's" for relative defects, and boxes (■) for absolute defects.
	Quantify Defects	Same as Two Zone, except the sensitivity at each missed point is measured relative to the expected threshold. Printouts display circles (O) for seen stimuli, and numbers (in decibels) to indicate the depth of any defects. The greater the number, the lower the retinal sensitivity (deeper the defect).
Test Speed	Normal	Two stimulus presentation speeds are available.
	Slow	You may change the test speed while a test is in progress to allow the patient some additional time to respond.

Table 4.1 Screening Test Parameters
(Factory default parameter settings appear in **bold print**.)

Screening Parameters	Parameter Settings	Description
Fixation Target	Central	Yellow light in the center of the bowl.
	Small Diamond	The Small Diamond is located below the Central target, and should be used when a patient cannot see the central fixation light (<i>e.g.</i> macular degeneration). The patient should look in the center of the diamond formed by the four lights.
	Large Diamond	The Large Diamond is located below the Central target and is useful for patients with central scotoma who cannot see either the Central fixation light or the Small Diamond.
	Bottom LED	Some tests have points in the superior visual field that require a lower fixation light than the central target. The target used is the Bottom LED of the Large Diamond. When testing with the Superior 64 or Superior 36 Screening Specialty tests, the Bottom LED is the default fixation target. It is illuminated automatically at the start of a test.
Fixation Monitoring	Gaze/Blind Spot (Model 740i- 750i)	The Blind Spot and Gaze Monitoring system are both activated.
	Gaze Track (Model 740i- 750i)	The Gaze Track system automatically measures gaze direction at the time of stimulus presentation. Refer to “Gaze Tracking (Models 740i, 745i, 750i),” on page 5-4 , for more information.
	Blind Spot (Heijl-Krakau)	The test program periodically presents a stimulus in the patient’s blind spot. If the patient is fixating well, he or she should not see the blind spot check stimulus. The Blind Spot check stimulus always matches the test stimulus size. Refer to “Fixation Losses,” on page 6-4 , for additional information.
	Off	Disables Gaze Track and Blind Spot fixation monitoring. The operator should monitor fixation with the video eye monitor.
Blue-Yellow (SWAP)	OFF/ON	Model 745i and Model 750i (optional on Model 740i) can perform Blue-Yellow (SWAP) testing. SWAP testing uses a Size V blue stimulus presented on a yellow background. Selecting the Blue-Yellow option will cause the system to default to these parameters. Because screening strategies have been designed and optimized for white-on-white testing, it is recommended that screening tests not be performed with the SWAP testing strategy.

Table 4.1 Screening Test Parameters
(Factory default parameter settings appear in **bold print**.)

Screening Parameters	Parameter Settings	Description
Test Mode	Age Corrected	A hill of vision is assigned to the patient based on the patient's age. The expected threshold at the hill's peak, the fovea, is called the central reference level. This central decibel value is indicated on the test screen and the printout. You must enter the patient's date of birth prior to beginning the test. You may use Age-Corrected mode only with standard stimulus size and color (Size III, White). If you select non-standard size and color parameters with Age Corrected Screening, the instrument will default back to the Threshold Related Test Mode upon leaving the Change Parameter Screen.
	Threshold Related	A hill of vision is assigned only after threshold values for 4 primary points are determined. The calculated threshold at the hill's peak, or fovea, is called the central reference level. This value appears on the test screen and the printout.
	Single Intensity	The HFA uses a default intensity level of 10 dB to test the entire visual field. If you desire a different intensity, press CLEAR and enter the desired value on the keypad which appears. Press ENTER. The single intensity value will appear on the test screen (as Stim:) and on the printout as "Stimulus Intensity." You may set the Single Intensity levels only in even increments.
Stimulus Size	I, II, III , IV, V	Five stimulus sizes (diameters) are available on most instrument models. They range from Size I (smallest) to Size V (largest). Model 720/only has the Size III stimulus available for testing.
Stimulus Color	White	White stimulus projected onto white bowl background.
	Red	Red stimulus projected onto white bowl background.
	Blue	Blue stimulus projected onto white bowl background.

The screenshot shows the 'Threshold Parameter Setup' window. At the top, it displays the date '08-03-1998' and time '3:21 PM'. The window contains several dropdown menus for configuring test parameters: 'Test Strategy' is set to 'SITA-Standard', 'Test Speed' to 'Normal', 'Fixation Target' to 'Central', 'Fixation Monitoring' to 'Gaze/Blind Spot', 'Blue Yellow' to 'Off', 'Foveal Threshold' to 'Off', 'Stimulus Size' to 'III', 'Stimulus Color' to 'White', and 'Fluctuation' to 'Off'. There are also 'Reset To Standard' and 'Selection Complete' buttons at the bottom. A vertical toolbar on the right side contains icons for various functions like help, print, and navigation.

Figure 4.2 The Threshold Parameter Setup Screen

Table 4.2 Threshold Test Parameters

(Factory default parameter settings appear in **bold print**.)

Threshold Parameters	Parameter Settings	Description
Test Strategy	SITA Standard	This is the standard testing strategy for the HFA II-/. SITA stands for the Swedish Interactive Thresholding Algorithm, a patented time-saving software feature that is unique to the Humphrey perimeter. SITA Standard cuts testing time in half, relative to the Full Threshold strategy, without compromising test reproducibility. See Appendix (K) for more details.
	SITA Fast	This is a faster version of SITA. SITA Fast cuts testing time in half relative to the FastPac testing strategy without compromising test reproducibility. See Appendix (K) for more details.
	Full Threshold	This is a test strategy that was used in Humphrey automated perimetry, prior to the adoption of SITA. In Full Threshold testing, a "bracketing" technique is used to threshold each test point. An initial stimulus is presented at a level the patient is expected to see. If seen, the stimulus intensity is decreased in 4 decibel steps (0.4 log units) until the patient no longer sees the stimulus; if not seen, it is increased in 4 dB steps until seen. The instrument then changes direction, moving in 2 dB steps until a change in patient response occurs. The last stimulus seen by the patient is recognized as the threshold for that point. The bracketing process described above begins with 4 primary points whose threshold values are determined at the beginning of the test. The results at these points then influence the starting levels for neighboring points in the pattern.

Table 4.2 Threshold Test Parameters
(Factory default parameter settings appear in **bold print**.)

Threshold Parameters	Parameter Settings	Description
	FastPac™	FastPac decreases Full Threshold test time by about 40%. It follows a similar stair-stepping technique as in Full Threshold, but uses 3 dB increments instead of 4 dB and crosses the threshold only once.
Test Speed	Normal	Two stimulus presentation speeds are available.
	Slow	You may change the test speed while a test is in progress to allow the patient some additional time to respond. However, with SITA, the Normal setting adjusts test speed automatically for a slow responding patient.
Fixation Target	Central	Yellow light in the center of the bowl.
	Small Diamond	The Small Diamond is located below the Central target, and should be used when a patient cannot see the central fixation light (<i>e.g.</i> macular degeneration). The patient should look in the center of the diamond formed by the four lights.
	Large Diamond	The Large Diamond is located below the Central target and is useful for patients with central scotoma who cannot see either the Central fixation light or the Small Diamond.
	Bottom LED	Some tests have points in the superior visual field that require a lower fixation light than the central target. The target used is the Bottom LED of the Large Diamond. When testing with the Superior 64 or Superior 36 Screening Specialty tests, the Bottom LED is the default fixation target. It is illuminated automatically at the start of a test.
Fixation Monitoring	Gaze/Blind Spot (Model 740i/750i)	The Blind Spot and Gaze Monitoring system are both activated.
	Gaze Track (Model 740i/750i)	The Gaze Track system automatically measures gaze direction at the time of stimulus presentation. Refer to "Gaze Tracking (Models 740i, 745i, 750i)," on page 5-4 , for more information.
	Blind Spot	The test program periodically presents a stimulus in the patient's blind spot. If the patient is fixating well, he or she should not see the blind spot check stimulus. The Blind Spot check stimulus always matches the test stimulus size. Refer to "Fixation Losses," on page 6-4 , for additional information.
	Off	Disables Gaze Track and Blind Spot fixation monitoring. The operator should monitor fixation with the video eye monitor.

Table 4.2 Threshold Test Parameters
(Factory default parameter settings appear in **bold print**.)

Threshold Parameters	Parameter Settings	Description
Blue-Yellow (SWAP) (SITA-SWAP with 24-2 test)	OFF/ON	Model 745 <i>i</i> and Model 750 <i>i</i> (optional on Model 740 <i>i</i>) can perform SITA-SWAP (Blue-Yellow) testing. A Size V blue stimulus is presented on a yellow background. When a 24-2 test is chosen and the Blue-Yellow option is selected, the SITA-SWAP strategy will be the default strategy. See Chapter (9), "Short-Wavelength Automated Perimetry (SWAP)," for more information.
Foveal Threshold	Off On	A threshold value for the fovea will not be measured. A threshold value for the fovea will be determined at the beginning of the test. The foveal threshold test presents stimuli inside the Small Diamond fixation target; the Small Diamond will automatically be illuminated. Refer to "Foveal Threshold," on page 5-7 , for details on performing this supplemental test.
Stimulus Size	I, II, III, IV, V	Five stimulus sizes (diameters) are available on most instrument models. They range from Size I (smallest) to Size V (largest). Model 720 <i>i</i> has only the Size III stimulus available for testing. SITA Standard and SITA Fast tests only use the Size III stimulus with white-on-white testing. Only the Size V stimulus is used for SITA-SWAP.
Stimulus Color	White Red Blue	White stimulus projected onto white bowl background. SITA Standard and SITA Fast only use the white stimulus. Red stimulus projected onto white bowl background. Blue stimulus projected onto white bowl background.
Fluctuation	On Off	Does not apply to any SITA strategy. Available for Full Threshold and FastPac Tests only. Threshold values for ten (10) pre-selected points are retested to determine the variability of the patient's responses. Threshold values for the retested points are printed on the numeric printout and appear in parentheses directly below the first test result. Fluctuation values which differ significantly from normal are flagged with appropriate "p" (probability) values. Threshold values for pre-selected points will not be determined twice. Some points may be retested even if fluctuation is turned off. Off is the default setting when the Blue-Yellow parameter is set to On. Note: Short-term Fluctuation (SF) and Corrected Pattern Standard Deviation (CPSD) values will not be available if fluctuation is turned off. Neither SF or CPSD are displayed with SITA Standard or SITA Fast tests.

SITA Testing

Perimetry results are critical in the management of glaucoma and other eye diseases. Yet, it can often be difficult to obtain quality results. Threshold tests are often demanding and uncomfortable for patients. They tie-up staff and tire out patients, thus decreasing test reliability. The SITA testing strategy is a major advance over the previous methods used.

Carl Zeiss Meditec developed the two separate SITA testing strategies with two separate goals:

1. SITA Standard: The goal was to design a perimetric thresholding method which collects twice as much information per unit time as the original Humphrey Full Threshold standard algorithm. SITA Standard cuts the test time in half without compromising test reproducibility.
2. SITA Fast: The goal was to design a thresholding method which collects twice as much information per unit time as FastPac. SITA Fast cuts the test time in half relative to FastPac, without compromising test reproducibility.

Tests Available with SITA

Both SITA Standard and SITA Fast are designed to run with only these threshold tests:

- Central 10-2
- Central 24-2
- Central 30-2
- Peripheral 60-4

SITA-SWAP is designed to run with only the following threshold test:

- Central 24-2

File Directory Indicators for SITA Tests

On the File Directory screens, the SITA Standard tests are indicated by the letters "SS," SITA Fast tests are indicated by the letters "SF," and SITA-SWAP are indicated by "SSW." For example: SF-30-2.



Note: Additional information on SITA can be found in ["Threshold Test Printout Formats,"](#) on [page 7-3](#) and [Appendix \(K\), "SITA Normative and GPA Databases"](#).

SITA References

1. Bengtsson B, Olsson J, Heijl A. Evaluation of a new threshold visual field strategy, SITA, in normal subjects. *Acta Ophthalmol. Scand.* 1998; 76: 165-169.
2. Bengtsson B, Heijl A. Evaluation of a new perimetric threshold strategy, SITA, in patients with manifest and suspect glaucoma. *Acta Ophthalmol. Scand.* 1998; 76: 268-272.
3. Bengtsson B, Heijl A. SITA Fast, a new rapid perimetric threshold test. Description of methods and evaluation in patients with manifest and suspect glaucoma. *Acta Ophthalmol. Scand.* 1998; 76: 431-437.
4. Bengtsson B, Olsson J, Heijl A, Rootzen H. A new generation of algorithms for computerized threshold perimetry, SITA. *Acta Ophthalmol. Scand.* 1997; 75: 368-375.

(5) Testing

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During the testing phase, your responsibility shifts to monitoring the patient's progress to ensure a successful outcome and reliable results. This section explores your options that are available during the test. It helps to answer the following questions, and others:



- How do I pause the test to allow the patient to rest?
- If I've chosen the wrong eye to begin testing, how do I switch?
- Can I restart a test once it has begun?
- How do Head Tracking and Vertex Monitoring help when trial lenses are used?
- Must I print the test results immediately following a test?

Start Test Options

After you have chosen a test, specified which eye is to be tested, and entered the patient data, you will arrive at the Start of Test screen. From this screen you can start the test, display a list of all current parameters, change the parameter settings, and change the test eye.

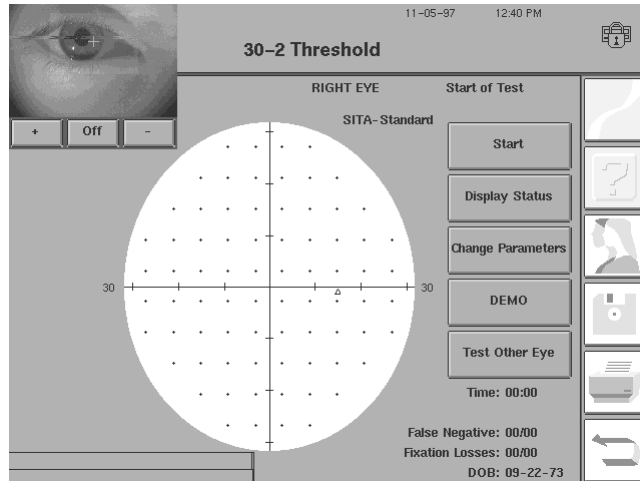
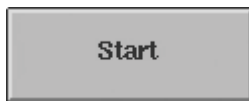


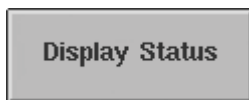
Figure 5.1 The Start of Test Screen

Start



This button initiates the testing sequence. If chosen, the supplemental tests will run prior to the start of the actual testing procedure. Supplemental tests include foveal threshold measurement or initialization of the Gaze Tracking fixation monitoring system (Models 740, 745, and 750). Refer to ["Supplemental Testing," on page 5-7](#) for additional information.

Display Status



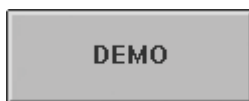
This choice presents a display of all current test parameter settings. Select OK to collapse the pop-up window. You cannot change any settings through DISPLAY STATUS. These settings must be changed by pressing CHANGE PARAMETERS as described in [Chapter \(4\), "Test Parameters and Strategies."](#) The test continues to run when DISPLAY STATUS is selected during a test.

Change Parameters



This function allows you to alter any testing parameter (e.g., test speed, stimulus color) prior to starting the test. Once the test begins, you may change only two parameters: fixation monitoring and test speed. Refer to ["Setting Test Parameters," on page 4-1](#) for more information.

Demo



This feature runs a short practice test. Demo allows the patient to preview what is required during a visual field test. It also allows you to evaluate whether the patient understands your instructions and the use of the patient response button. Patient responses are not recorded during the Demo test. The Demo test starts immediately after you press DEMO.

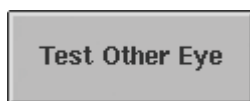
The Demo test will run for one minute, unless you choose to end the Demo test sooner. Once the patient demonstrates competency, press END DEMO to begin the actual test. If you do not press

END DEMO, the pop-up window will disappear after one minute. The test will begin, immediately after the pop-up window disappears.



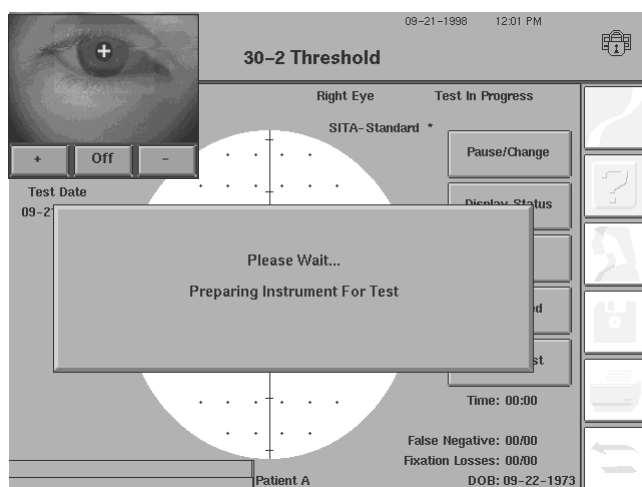
Note: The Demo test runs only after the Foveal Threshold is determined and Gaze Tracking initialization is complete (if utilizing either of these features).

Test Other Eye



This button allows you to switch to the Start of Test screen for the other eye. You will be allowed to add or change patient data at this time.

Internal Diagnostic Alert



Frequently, after selecting START or TEST OTHER EYE, the message "Please Wait... Preparing Instrument For Test" appears on the screen. This is a normal function of your instrument. The HFA II-/is performing a short, self-diagnostic check prior to beginning the test.

Monitoring and Maintaining the Patient's Eye Position

Video Eye Monitor

Proper positioning of a patient's test eye throughout the test process is crucial to obtaining good test results. To aid in accomplishing this task, all HFA II-/models feature a video eye monitor. This monitor, which is automatically visible on the Start of Test screen, enables you to view the patient's test eye during testing to verify that the patient is fixating properly. As is shown above in the screen illustration, when the eye is centered properly, a "cross" or "plus sign" is visible in the middle of the patient's pupil on the screen of the HFA II-/.

Use the video eye monitor to:

- Position the test eye in the center of the trial lens holder.
- Monitor the patient during testing.

Although your HFA II-/ has a number of features described in this chapter to help monitor and maintain the patient's fixation, it is still important to verify the fixation by viewing the eye in the video eye monitor. Staying with the patient and visually monitoring fixation will help create a more reliable test result. Observing the patient during the test and recording information about fixation is important for validating the test results.

The three controls on the video eye monitor are: a plus sign (+) to brighten the image, a minus sign (-) to dim the image, and an OFF button to turn off the eye monitor display. To re-display the monitor, press the upper-left EYE button.

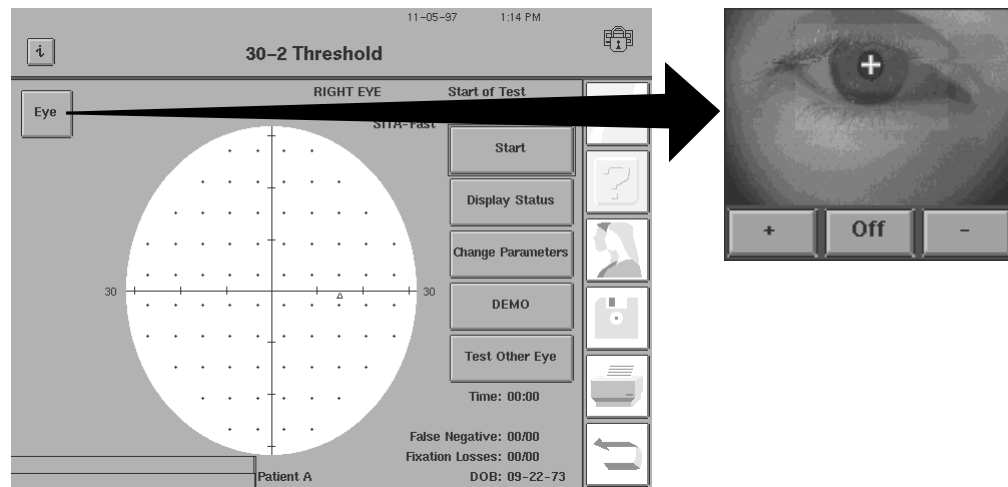


Figure 5.2 The Video Eye Monitor

Gaze Tracking (Models 740i, 745i, 750i)

Gaze Tracking is a unique fixation tracking system that records whether the patient is fixating properly while stimuli are being presented. A brief initialization procedure is required at the start of each test to calibrate and adjust the Gaze Tracker to the patient's eye. It is imperative, therefore, that the patient maintain the same position during gaze initialization and testing. Deviations are recorded and displayed on the test screen and on the printout.



Note: Some patients with small pupils, ptotic lids, interfering lashes, or strong prescriptions may not be good candidates for gaze monitoring.

On the Start of Test screen, you can make changes to the fixation monitoring system, or turn the monitoring system off entirely by pressing CHANGE PARAMETERS and selecting the desired option. You may select Gaze Tracking only at the start of a test; however, it may be turned off at any time *during* the test.

The Gaze Graph

The gaze graph is a useful method for documenting movement of the patient's test eye. A test starts with no markings on the gaze graph. As time progresses, the graph expands from the right, marking eye movement and blinks.

Upward markings indicate that the test eye deviated from the fixation target at the time of stimulus presentation. The higher the marking, the greater the deviation. The direction of deviation from the fixation target is not indicated. Only the magnitude is recorded.

Downward markings indicate that the gaze system could not locate the patient's gaze: small downward markings indicate that the system was unable to detect gaze direction; large markings indicate that the patient blinked while the stimulus was being presented. Minimal deviation of the markings (depicted as a horizontal line) indicates excellent fixation. Refer to [Figure 5.3](#) for a gaze graph that displays an example of good fixation. An example of poor fixation appears in [Figure 5.4](#).

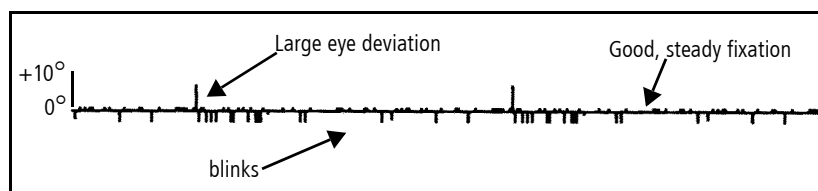


Figure 5.3 Gaze Graph Example: Good Fixation with a Large Number of Blinks



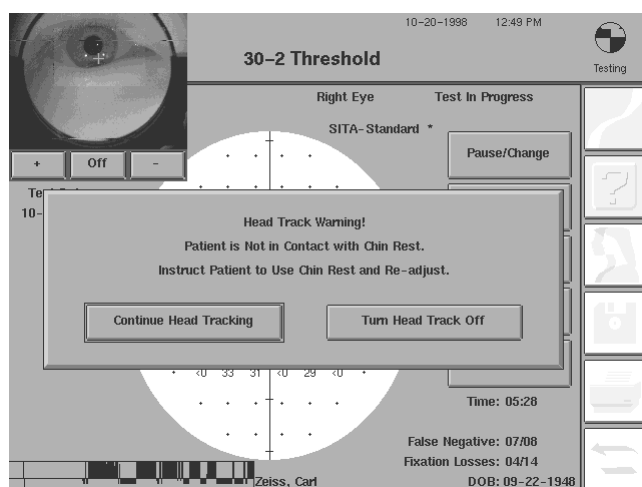
Figure 5.4 Gaze Graph Example: Poor Fixation

Head Tracking (Model 750)

The Head Tracking feature helps maintain proper alignment of the head and eye relative to the trial lens holder. As part of the gaze initialization process, the HFA II-/analyzes and records the patient's eye position. When you activate Head Tracking (turn it ON), the instrument will move the chin rest in increments of 0.3 mm, readjusting the patient to the original Gaze Track initialization position. Maintaining proper alignment during testing reduces trial lens scotoma and increases the reliability and accuracy of test results.



Note: Head Tracking only works when the trial lens holder is in use and Gaze Tracking has been initialized successfully. Head Tracking is necessary only when a trial lens is used. To turn Head Tracking off during a test, press FIXATION to access the Change Fixation Monitoring screen. Head tracking is turned off only for the length of the current test.



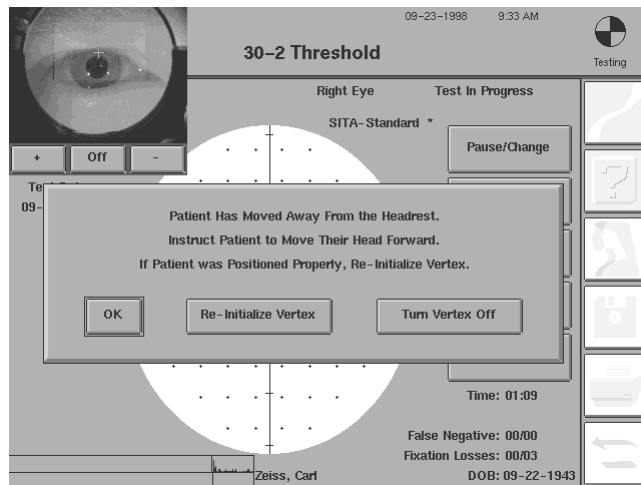
It is possible in certain situations for the Head Tracking feature to “lose its place”. The most common reason for this is a sudden shift of the eye or repositioning of the head. A patient whose head does not move with the chin rest will cause the Head Tracking alert to beep. A pop-up window will appear giving you the opportunity to continue or discontinue using Head Tracking. The HFA II-/continues testing while the message is on the screen. You should re-instruct your patient at this point. Make sure that the chin rest supports the patient's head. This will ensure that the patient's head moves with the chin rest.

Vertex Monitor (Model 750i)

The Vertex Monitor will beep and display a message on the touch screen if the patient backs away more than 7 mm from his or her original position. This helps to eliminate the trial lens as a source of visual field defects. Refer to [“Accessing the Vertex Monitor \(Model 750i only\),”](#) on page 2-15 for instructions on turning on the Vertex Monitor.

The vertex reading is based on the initial patient position in front of the trial lens. To set:

- Make sure that the trial lens holder is in the up position in front of the eye.
- Properly align and instruct the patient.
- Initialize the Gaze Tracking feature.



The Vertex Monitor alarm will beep if the patient has backed away from the trial lens. Testing will continue uninterrupted and a message will remain on the screen until cleared by the operator. Check the position of the patient's forehead and reposition if necessary. If the Vertex Monitor continues to sound, press RE-INITIALIZE VERTEX. The test will pause as the screen displays the Gaze Track initialization sequence. This will reset the Vertex Monitor. You may also turn off the Vertex Monitor from this screen or by pressing FIXATION from the Test in Progress screen. The Vertex Monitor is turned off only for the length of the current test.



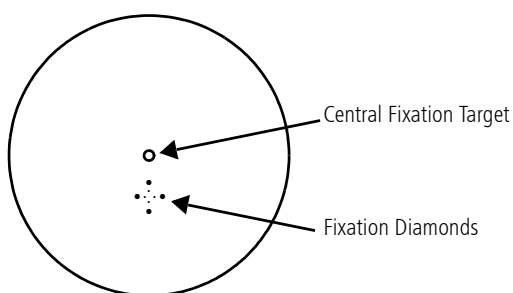
Note: The Vertex Monitor works only when the trial lens holder is in use and Gaze Tracking has been successfully initialized. The Vertex Monitor is necessary only when a trial lens is used.

Supplemental Testing

If selected, the HFA II-*i* performs Foveal Threshold and Gaze Tracking initialization. They are called “supplemental tests.” These optional procedures are run prior to the start of the standard testing.

Foveal Threshold

The Foveal Threshold test measures the sensitivity of the central part of the macula, the fovea. Foveal threshold testing is only available with threshold visual field tests. Whenever the Foveal Threshold parameter is turned ON, the Foveal Threshold test is the first supplemental test procedure. Press CHANGE PARAMETERS to turn Foveal Threshold ON.

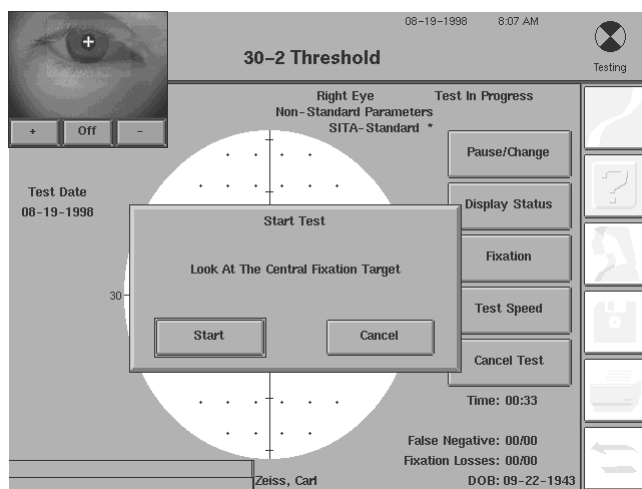


- 1 Press START. The Foveal Threshold test window will appear.
- 2 The small diamond fixation target will light up below the central fixation target. Instruct the patient to look at the center of the lower fixation lights (in the center of the diamond).
- 3 Tell the patient to press the response button whenever he or she sees a light inside of the fixation diamond.
- 4 Press START to begin the Foveal Threshold test.
- 5 When completed, a second pop-up window will appear. The yellow light will return to the central fixation target.

Direct the patient to look at the central fixation target. Press START to begin Gaze Tracking initialization (or begin the test if Gaze Tracking is inactive).



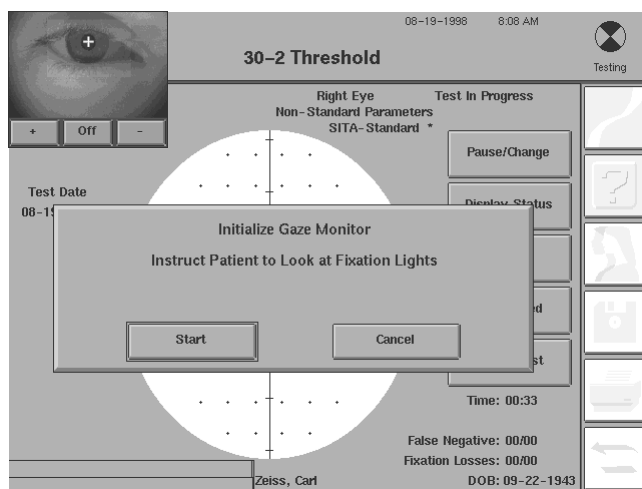
Note: The Foveal Threshold value will display in the center of the visual field on the test screen. It is recorded below the reliability indices on the printout.



Gaze Tracking Initialization

The advantages of Gaze Tracking were explained earlier in this chapter. If gaze monitoring is active, Gaze Tracking initialization will occur before the testing begins.

- 1 From the appropriate testing screen, press the START button.
- 2 When Gaze Monitoring is engaged, you will automatically get the displayed operator message.



- 3 Position the patient so that the patient's test eye is located in the center of the video eye monitor (within the small, central box). Use the chin rest control to adjust the patient. The plus sign should be in the middle of the pupil, as shown.

- 4 Instruct the patient to look at the fixation target and try not to blink. Ask the patient to open his or her eye wide for about a count of twenty, or until you say the process is over.

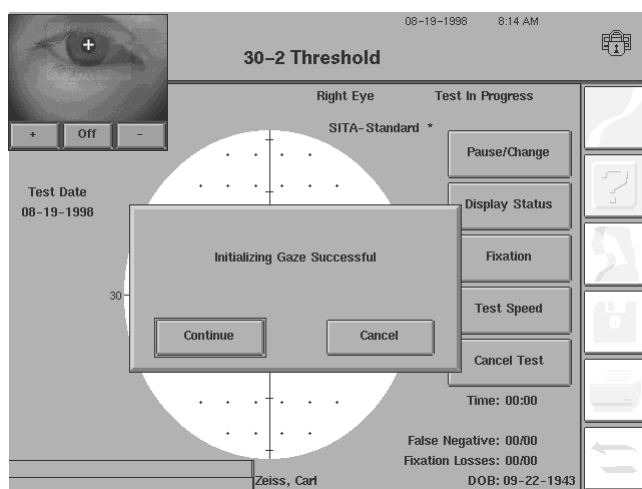
- 5 Press START to initiate gaze setup. Pressing CANCEL returns you to the Start of Test screen.



Note: Patients with droopy eyelids should keep their eyes open as wide as possible. Do not adjust the chin rest during Gaze Tracking Initialization.



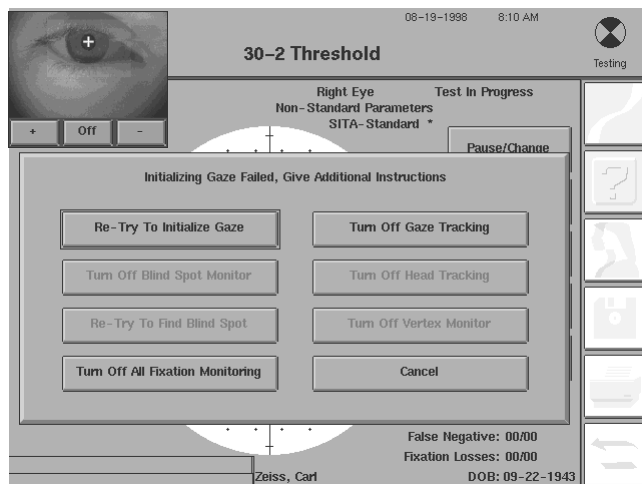
Note: To be effective, Gaze Tracking needs the patient to be looking at the central fixation target. Do not attempt to use Gaze Tracking if using one of the lower fixation targets (Small Diamond, Large Diamond, Bottom LED). Use Blind Spot instead. The blind spot monitor is offset the appropriate amount to compensate for the different angle of fixation when using the lower fixation targets.



- 6 If Gaze Track initialization is successful, press CONTINUE to begin testing.



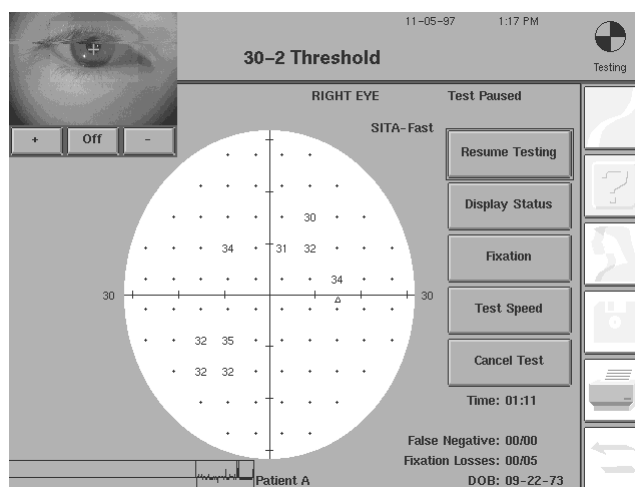
Note: It is important that the patient maintain the same position during gaze initialization and testing.



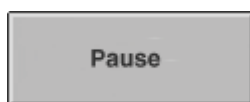
7 If Gaze Track initialization is unsuccessful, press RETRY TO INITIALIZE GAZE. Refer to [“Fixation Monitoring,”](#) on page 5-11, if you experience repeated unsuccessful attempts.

Test in Progress

You have several options while a test is in progress.



Pause

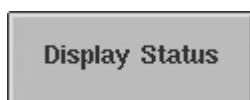


This button halts the test and allows the patient to rest. The patient can also pause the test by continuously holding down on the response button.

Once in the pause mode, you may choose to resume the test, display the current test parameter settings, change the fixation monitoring system, change the test speed, or cancel the test.

If you cancel the test while in the Pause mode, all data collected up to that point will be deleted and the program will return to the Start of Test screen. Non-standard parameters will be retained, if originally chosen. Before the instrument deletes the data, you will be asked to confirm your request.

Display Status



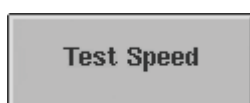
This feature is available to you during testing so that you can verify the current parameter settings.

Fixation



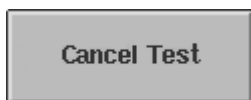
This button gives you the option of changing the fixation monitoring setting during the test. Gaze Tracking cannot be initiated once the test has begun.

Test Speed



During testing, the instrument automatically adjusts the test speed based on how quickly or slowly the patient responds to the stimuli. Nevertheless, if you observe that the pace is too fast, the TEST SPEED button allows you to slow the test manually. Press the SLOW button to change the pace of the test program. The test speed will reset to normal at the completion of the test.

Cancel Test



This choice will discontinue the test, delete all results, and return you to the Start of Test screen. Non-standard parameters will be retained, if originally chosen. Before the instrument deletes the data you will be asked to confirm your request.

Printing Partial Tests

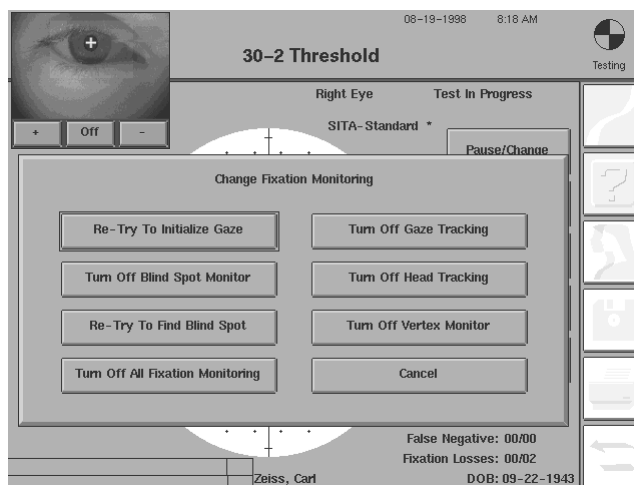


If you pause a test or cannot run it to completion, you may print it out by pressing the *PRINT FUNCTIONS* icon button. You may resume paused tests after printing and save them when completed. You cannot save partial tests in most cases. You may save Full Field tests at the completion of the central part of the visual field.

Fixation Monitoring

The test will pause when you press the FIXATION button. It will remain paused while the fixation monitoring screen is displayed. Pressing any of the available buttons will change the parameter for the remainder of the present test only. All monitoring devices will revert to their previous settings for testing the next eye.

A "ghosted" button indicates either that choice is not available or the feature is not an option with your model HFA II-*i*. After one of the following options is chosen, the test will continue.



Re-try to Initialize Gaze



This will repeat the initialization process for Gaze Tracking. The Head Tracking and Vertex Monitoring systems will be re-initialized at the same time. Appropriate situations to re-initialize gaze are:

- The patient dramatically shifted his or her eye position.
- The Gaze Graph indicates poor fixation even though the patient was fixating in a steady manner.

- Many downward markings appear on the Gaze Graph, indicating that Gaze Tracking was having trouble detecting the patient's gaze direction.
- Head tracking moved the patient's head too far in the wrong direction.
- The vertex monitor alarm was sounding too often, even with good head positioning.

Turn Off Blind Spot Monitor

Turn Off Blind Spot Monitor

Press this button to turn off the Heijl-Krakau method of Blind Spot Monitoring. If you chose Gaze/Blind Spot at the start of the test and Gaze Tracking is initialized, the Gaze Tracking will continue to monitor fixation while the blind spot monitor is turned off. If you turn off both Gaze Tracking and blind spot monitoring, you can assess the patient's ability to fixate by observing him or her with the video eye monitor.

Re-try To Find Blind Spot

Re-Try To Find Blind Spot

This will initiate discovery of the patient's blind spot by using the stimulus to search in the area of the blind spot for the exact location. This is sometimes necessary, for example, when the patient's head tilts during the test.

Turn Off All Fixation Monitoring

Turn Off All Fixation Monitoring

This command will turn off both Gaze Tracking and Blind Spot Monitoring if pressed. In this case, you can monitor the patient's fixation by watching the video eye monitor for the duration of the test. Both Head Tracking and Vertex Monitoring will be turned off as well, when you discontinue Gaze Tracking.

Turn Off Gaze Tracking (Model 740i, 745i, 750i)

Turn Off Gaze Tracking

This will turn off the Gaze Tracking device on all three of these models, as well as the Head Tracking and Vertex Monitoring of the Model 750i, for the current test. Blind spot monitoring is not affected.

Turn Off Head Tracking (Model 750i)

Turn Off Head Tracking

You will turn off only Head Tracking by pressing this button.

Turn Off Vertex Monitoring (Model 750i)

Turn Off Vertex Monitoring

You will turn off only the Vertex Monitor by pressing this button.



Note: If you lower the trial lens holder during the test, you also will turn off the Head Tracking and Vertex Monitoring devices of the Model 750i. You should never put down the trial lens holder after the test has begun unless directed to do so. An example of where this is necessary is prior to the continuation of a Full Field test to test the peripheral portion of visual field.

Cancel

Cancel

This button will resume testing without any changes.

Tips for Gaze Tracking and Head Tracking

Gaze Tracking is available on the HFA II Models 740*i*, 745*i*, and 750*i*. Head Tracking is only available on the Model 750*i*. The keys to successful Gaze and Head Tracking are the same keys that result in successful visual field testing. Make sure that you move the patient's chair close to the instrument. If optional slider is available, remember to slide the instrument toward the patient so the patient can sit in a comfortable, upright position. Make sure the patient opens his or her eyes wide and tries to stay still during the initialization process.

Always monitor and encourage the patient. Early correction of any poor compliance will help to increase the reliability of the visual field results.

Gaze Tracking may not work well in the following situations:

- Very small pupils, droopy eyelids or long eyelashes.
- Excessively large or dilated pupils.
- High powered trial lenses.
- Excessive eye movements or blinking.
- Cloudy media.
- Very dark iris.
- Dry eye.
- Deep-set eyes.

We recommend you attempt to initialize Gaze Tracking at least three times before discontinuing. Ask your patient to blink quickly during the mid-point of a long Gaze Tracking initialization as a drying eye will sometimes cause it not to work. During the test, instruct the patient to blink occasionally when pressing the patient button, as this will greatly reduce interruptions to Gaze Tracking.

Remember, if Gaze Tracking does not initialize successfully, Head Tracking, pupil size measurement, and Vertex Monitoring cannot be utilized. Blind spot monitoring and visual observation are still available to assess the reliability of the test results in these cases. You may wish to enter comments concerning fixation issues on the Patient Data 1 screen or write directly onto the printout.

Test Complete Screen Options

Saving the Test

Two beeps sound to signal the end of the visual field test. Advise the patient the test has finished and that he or she may relax. At this time, you can save the results to the hard disk or a USB storage device, transmit the test, test the other eye, or print a hard copy of the test results. You should always save the test results for each eye before proceeding with other options.

You will be asked to confirm that the patient's name and date of birth are correct (Figure 5.5).

You may:

- Accept the patient data and save the test by pressing YES.
- Change the patient data before saving the test results by pressing CHANGE PATIENT DATA FIRST (see "To Change Patient Data:," on page 10-14). After changing patient data and pressing PROCEED, the test will automatically be saved,
- Return to the Test Complete screen, without saving test data by pressing NO.

When you save the test by pressing YES or the test is saved automatically after changing patient data, the HFA II-*i* will save the test results first to the hard drive, then to a USB storage device if you have the Save to USB Option turned on (see [“Save to USB Option,”](#) on page 2-20).

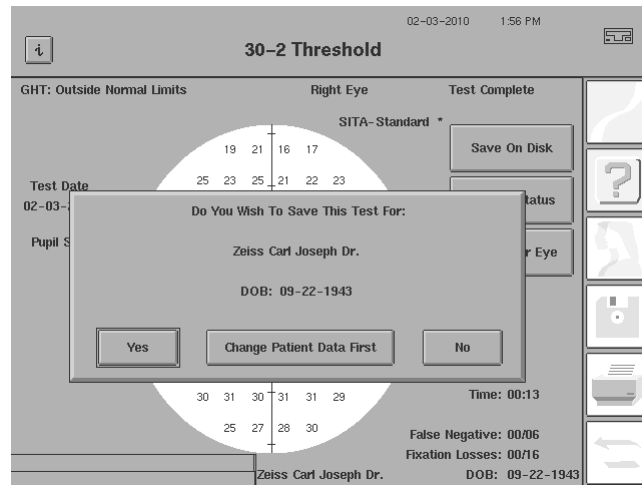


Figure 5.5 Do You Wish to Save this Test?

You can also set up your instrument to automatically transmit exams when saving (see [“Using the Save/Transmit Option,”](#) on page 14-33 and [“Setting Up Save/Transmit for EMR/PMS/DICOM Systems,”](#) on page 14-41). If you have set the Save/Transmit Option to Save and Transmit, then the dialog at the end of the test will look a little different (Figure 5.6).

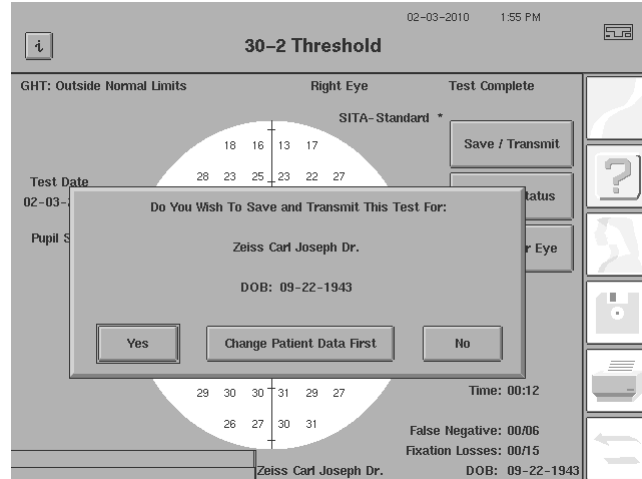


Figure 5.6 Do You Wish to Save and Transmit this Test?

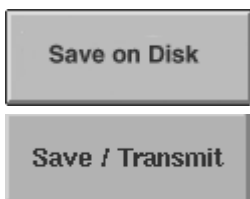


Note: If you have purchased and licensed DICOM Gateway 2.0, you can automatically export raw exam data at the end of an exam by enabling the END OF TEST EXAM DATA EXPORT option on the DICOM Gateway Services screen (see [“Enable/Disable DICOM Gateway Services,”](#) on page H-4).

The Test Complete Screen

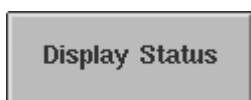
The following buttons are displayed on the Test Complete screen:

Save On Disk or Save /Transmit



You may save the test result with these buttons. It allows you to save a test (and transmit) more than once. This is important if you are saving to more than one USB storage device at the end of a test, for example. This button will also allow you to save a test if you previously had decided not to save it. This may have happened if you pressed the NO button shown in [Figure 5.5](#) or [Figure 5.6](#).

Display Status



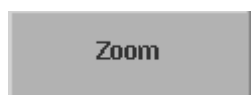
This button is available so that you can verify the parameter settings of the completed test.

Test Other Eye



This choice switches to the Start of Test screen for the other eye. All current test parameters remain in effect.

Zoom



This button is provided at the end of Full Field Screening tests to better display points in the central 30 degrees on the screen. Press ZOOM a second time to expand back to full field size.

Print



To get a printout of the results immediately following a test (or during a pause for partial results), select the *PRINT FUNCTIONS* icon button. This takes you to the Printout Selection screen that is illustrated in [Figure 5.7](#).

The top of the Printout Selection screen shows the current test(s). If you selected the *PRINT FUNCTIONS* icon button before the second eye was tested, or if you intentionally tested only one eye, then only a single test will appear. If test results for both eyes are available, the printouts may be printed at the same time. There are different printout selections for screening and threshold tests.

The two available screening print formats are Screening Test, which prints each test on a separate page, and Both Eyes (or OU), which condenses the two test results to one page. There are several threshold print formats including Single Field Analysis (with or without GPA), Overview, Change Analysis, Three-in-One, GPA Summary, Full GPA, and GPA Last Three Follow-up. Only the Three-in-One is a non-STATPAC format. Refer to [“STATPAC Analysis & Printing,” on page 7-1](#) for a detailed description of each print format and for printing instructions.

You do not have to print results from the Test Complete screen immediately following a test. By saving test results to disk, you have the ability to print at any time it is convenient by using the *PRINT FUNCTIONS* icon button. You also can print the test results of the last right and left eye tested by using RECALL LAST TEST on the Main Menu screen (provided that the instrument was not turned off in the meanwhile). The Test Complete screen will display when viewing a test via RECALL LAST TEST.

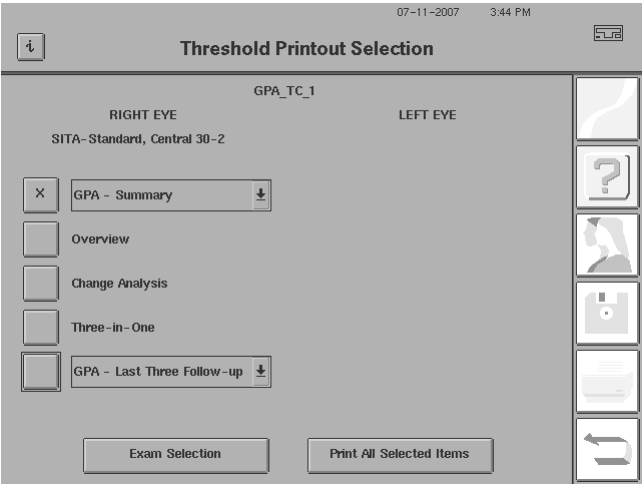
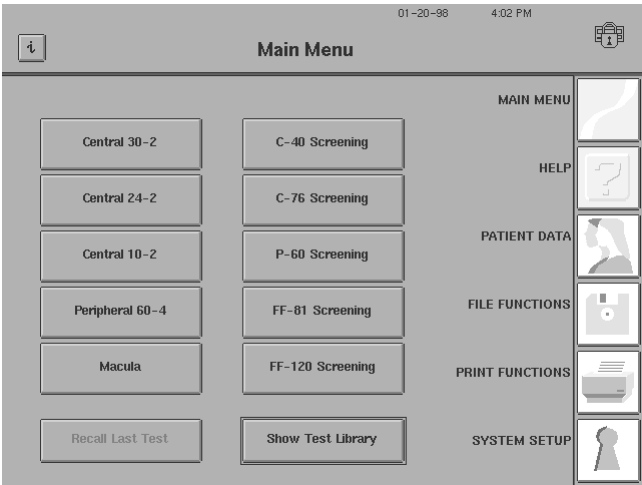
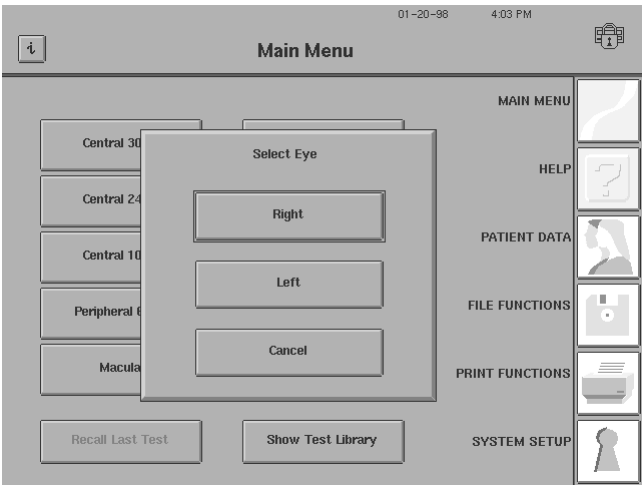


Figure 5.7 The Threshold Printout Selection Screen

Testing: A Step-by-Step Guide



1 At the Main Menu screen, select a test. Choose either one of the test buttons or SHOW TEST LIBRARY.



2 Select a test eye. Choose RIGHT or LEFT to proceed, or CANCEL to return to the Main Menu screen.

Patient Data 1

Patient ID: 1234
 Patient Name: Zeiss Carl Joseph Dr. MD
 Date of Birth: 09-22-1943
 Gender: Male
 Sphere: Cylinder: Axis: Right: Left:
 Trial Lens: small pupil
 Right Eye Comments: Left Eye Comments:
 Proceed

3 Enter patient data. A patient name, date of birth, and Patient ID is required for all of the following: saving to disk, STATPAC calculations, automatic trial lens calculations, and screening tests using Age Corrected mode.

Threshold Parameter Setup

Test Strategy: SITA-Standard *
 Test Speed: Normal *
 Fixation Target: Central *
 Fixation Monitoring: Gaze/Blind Spot *
 Blue Yellow: Off *
 Foveal Threshold: Off *
 Stimulus Size: III *
 Stimulus Color: White *
 Fluctuation: Off *
 Standard Parameters Indicated By *
 Reset To Standard Selection Complete

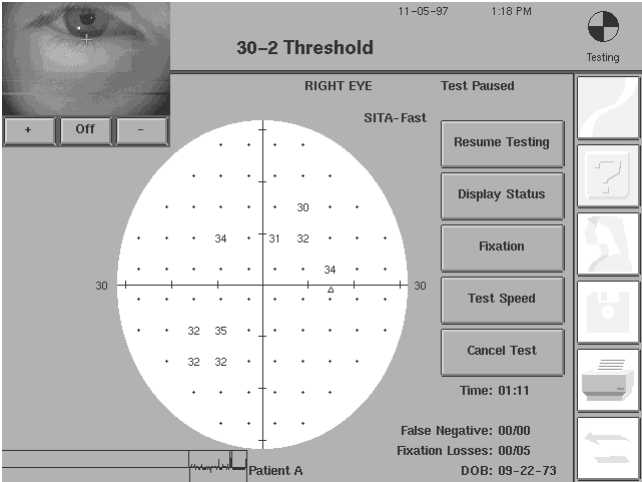
4 Change test parameters. Select the test parameters and the fixation monitoring system to best suit your patient's needs.

5 Patch the non-test eye. Reduce the room illumination. Give the patient test instructions. Adjust the table and perimeter to a comfortable height for the patient. Make sure the patient is sitting comfortably. Refer to ["Preparing the Patient,"](#) on page 3-24 for full details of patient preparation. You also may refer to the Help Menus by pressing the *HELP* icon (question mark icon) on the right-hand side of the screen.

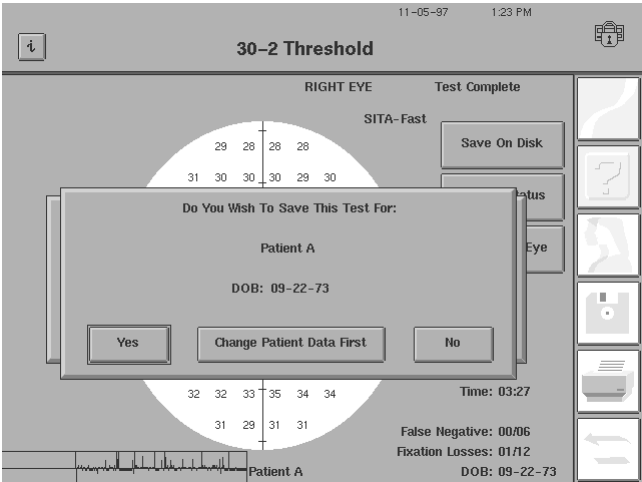
6 Press START.

7 If the Foveal Threshold parameter is turned on, it will activate now. Refer to the discussion of ["Foveal Threshold,"](#) on page 5-7.

8 If the fixation monitoring parameter is set to "Gaze Track" or "Gaze/Blind Spot", follow the on-screen instructions for setup. Refer to ["Gaze Tracking \(Models 740i, 745i, 750i\),"](#) on page 5-4 for details. After gaze monitor initialization, a pop-up window appears and prompts you to start the test. Remember to monitor the patient during the visual field test to insure accurate results.



9 If necessary, PAUSE the test. Pausing the test can improve test results for easily fatigued patients. Check patient alignment through the video eye monitor before resuming the test.



10 When complete, select an end of test option. Be sure to save the test results at this point. Select YES to save the test, or CHANGE PATIENT DATA FIRST if you need to change patient information (see ["To Change Patient Data;" on page 10-14](#)). After changing patient data and pressing PROCEED, the test will automatically be saved.

11 Test the other eye. Retain or change patient data, as necessary. Repeat Steps 4-10.

Esterman Testing

The Esterman test is designed to be conducted using a patient's functional correction. If the patient does not require glasses to function normally, perform the test without correction. If the patient does require glasses to function normally, perform the test using the patient's glasses. **Do not use trial lenses.**

Steps to Perform:

1. Press SHOW TEST LIBRARY.
2. Press SPECIALTY TESTS.
3. Choose either ESTERMAN MONOCULAR or ESTERMAN BINOCULAR.

When performing the Binocular test, the following set of instructions will display on the screen when you press START:

- Move chin rest to the far right position.
- Have patient place chin in the chin cup on the left.
- Do not use the trial lens holder.
- Do not use an eye patch.
- Move patient's head to center eye monitor between patient's eyes.
- Patient may wear spectacles for this test.

After you have followed the instructions, press OK. The test will begin.

When performing the Esterman Monocular test, you will not get a set of instructions. Testing is identical to a standard test, except the patient wears his or her glasses instead of looking through a trial lens. You must still use the eye patch with the Monocular test. You may also use Gaze Tracking if you wish (Model 740*i*, 745*i*, and 750*i*).

(6) Test Reliability

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Visual field testing represents a team effort between the perimetrist and the patient. Success, as measured by reliable test results, is best attained by taking the necessary steps and precautions to help the patient take the test.



Factors Affecting Reliability

Patient Compliance

The importance of the perimetrist reigns above all other factors affecting test reliability. This was true before the advent of automation and still proves to be true with computerized perimetry. The “human factor,” that is, the interaction between the perimetrist and the patient, cannot be overlooked when discussing test reliability.

It is the perimetrist’s job to promote patient cooperation and to motivate the patient to put forth his or her best effort.

Tips for achieving patient compliance:

- **Create the proper environment.**

Do not position the perimeter in a noisy or busy location where the patient can easily be distracted while listening to test instructions or while taking the visual field test. Keep the room temperature cool so the patient is less likely to become drowsy.

- **Foster a relaxed atmosphere.**

Vision tests sometimes make patients anxious, especially if it is a new experience. Allow patients time to relax, use the rest room, or drink water prior to beginning the test.

- **Seat the patient comfortably.**

Use an adjustable office chair (with or without arms) to accommodate tall and short patients. The perimeter and table will accommodate a full-size office chair with arms or a wheelchair. Be sure to adjust the table height and, if available, slide the instrument toward the patient to best meet comfort demands. The patient should be sitting comfortably erect, and not leaning forward excessively.

- **Give clear test instructions.**

Consider the possibility that the patient may not hear well. In such cases, face the patient while explaining the test procedure so that he or she can benefit from lip reading and gestures. Avoid giving instructions while the patient is wearing an eye patch.

Emphasize that it is normal and expected that many stimuli will not be seen. Threshold tests are designed such that fewer than 50% of the stimuli presented will be seen.

- **Keep the patient motivated during the test.**

Pause the test, as necessary, to allow the patient ample rest time. Encourage the patient frequently and assure them, by using verbal confirmations, that they are doing a good job (e.g. “You’re doing fine” or “Keep up the good work”).

Unless the patient has a proven record for reliability, don’t abandon them during testing, especially during the first few minutes. Correcting a problem immediately may prevent having to repeat an entire test.

Patient Fixation

Improper or erratic fixation may make test results meaningless. The perimetrist can play an important role by emphasizing fixation while explaining the test procedure.

Tips for improving patient fixation:

- Choose a fixation target that is appropriate for the patient. When you tell the patient to look at the yellow fixation light, verify that they can see the light by asking, “Do you see the yellow light? Is it clear?”. If the light is not clear, consider modifying the trial lens correction. If the patient cannot see the light, for example, due to macular disease, change to the small or large diamond to help the patient fixate throughout the test.
- Use the Demo test to make sure the patient understands the test and is responding properly. Re-instruct the patient as necessary, especially if he or she is inclined to look around for stimuli.
- Fixation is more difficult with a dry cornea. Encourage the patient to blink normally whenever they press the response button. Lack of blinking can cause part of the visual field to “white out” for some patients.
- Inform your patient in advance that it is normal for the background to seem to change or for the fixation target to seem to move. Barring other problems, they should not let these phenomena distract them. Encourage them to take breaks and pause the test by holding down on the response button if fatigue is a problem.
- Observe the patient by means of the video eye monitor. Encourage correct behavior.
- Record any observations that are relevant to reliability by entering your comments on the patient data screen, or by writing your comments directly on the printout.

Trial Lenses

Using trial lenses incorrectly or using none when one is needed is another source of unreliable test results.

Things to remember about trial lenses:

- Use a trial lens, when necessary. Use only the thin, wire-rimmed variety. Let the automatic calculation program (see [“Entering Trial Lens Data,” on page 3-11](#)) determine the correct lens power to use. Verify with the patient that the fixation light is not blurred.
- Use trial lenses only for central tests (within 30°), or the central part of a full field test. Remove trial lenses and lower the trial lens holder for peripheral tests (beyond 30°). You cannot start the peripheral part of a full field test until the trial lens holder has been lowered.
- Place the sphere correction in the slot closest to the patient’s eye and the cylinder lens behind the sphere. Adjust the trial lens holder so that the lenses are as close to the patient’s eye as comfort will allow, without touching any lashes.
- Tell the patient that it is important to stay close to the trial lens and centered behind it. Model 750i owners should use Head Tracking and Vertex Monitoring to help keep the trial lens centered and set at the proper distance (see [Chapter 5](#)).

Evaluating Reliability

Even with the most careful perimetric technique, sometimes test results are unreliable. To assist with evaluating reliability, the HFA II-/- offers several tools that measure accuracy and consistency. “Catch trials” are special stimuli (or lack of) which are used for monitoring. When the patient exceeds a set limit, a warning will display on the HFA screen and print on all types of printouts.

Fixation Losses

When the fixation monitoring test parameter is set to the blind spot (Heijl-Krakau) mode, proper fixation is checked by projecting 5% of stimuli at the presumed location of the physiological blind spot. Only if the patient indicates seeing the blind spot check stimulus will the instrument record a fixation loss. A high fixation loss score indicates that the patient did not fixate well during the test, or that the blind spot was located incorrectly.

The printout will show the total number of fixation losses followed by the total number of stimuli presented within the blind spot. If fixation losses equal or exceed 20%, “XX” will be printed after the score. In the example shown in [Figure 6.1](#), the patient had 7 fixation losses out of a total of 14 check stimuli presented.

When the test is in progress, the HFA II-/- will beep once if the patient responds to two of the last five fixation checks. If, after hearing the beep, the patient appears to be fixating properly, you may wish to replot the blind spot. High fixation loss scores may be due to an erroneously plotted blind spot, caused by patient head tilt. Straightening the head, or replotting the blind spot, can remedy this situation.

You may use Gaze Tracking as the sole fixation monitor or in conjunction with the Heijl-Krakau blind spot mode described above. If a patient has demonstrated both good fixation and test taking reliability in the past, you may prefer using just Gaze Tracking. Because blind spot monitoring adds time to the test, using the Gaze Tracker alone can shorten test time.

False Positive Errors

Another indication of poor reliability is when a patient responds to catch trials in which no stimulus has been projected or responds faster than is humanly possible. This is referred to as a false positive response and is tracked as a false positive error. A high false positive score may indicate that the patient is overly concerned about not seeing all the stimuli. The “trigger happy” person will need to be re-instructed and reassured that it is normal for many stimuli to be missed.

For SITA tests, the false positive score will be indicated on the printout as a percentage. If false positive errors equal or exceed 15%, the characters “XX” will appear next to the score on the printout to call attention to this result. In addition, the message, “Excessive High False Positives” is printed. A test with 15% or higher false positives will not be able to be used with GPA (see [“GPA Verifies Exam Reliability,” on page 8-3](#)).

In addition to a high false positive finding, trigger happy patients often show threshold results that are abnormally high. An example of this phenomenon is shown in Figure 6.1. Any individual point result of 40 dB or greater indicates a hypersensitive result which can only be due to patient overreaction or guessing when pressing the patient response button. It is best to note the results early in the exam and start the test over rather than to allow the test to run to completion and be completely invalid.

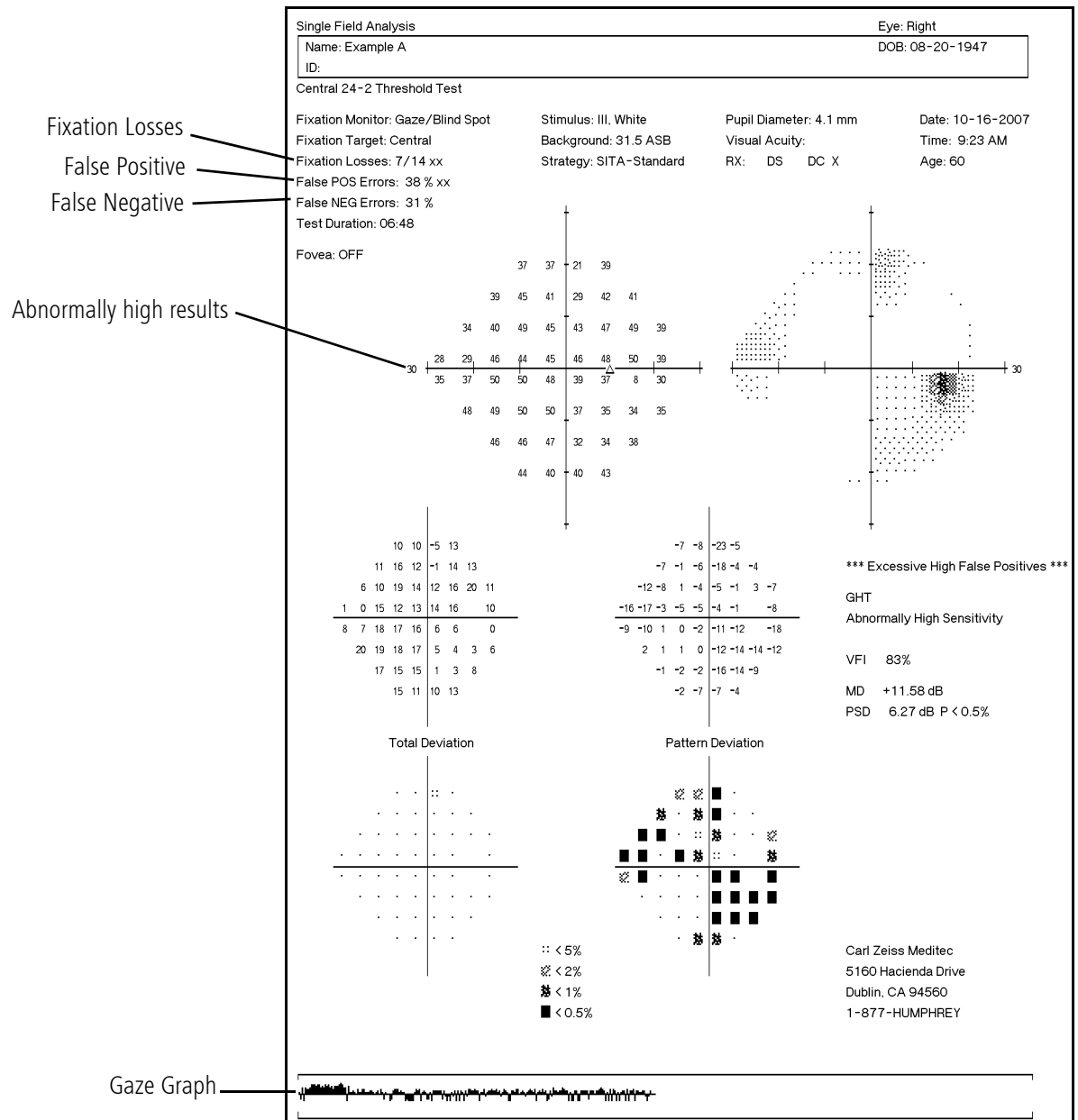


Figure 6.1 Sample Printout Showing Poor Reliability

The example in Figure 6.1 indicates a very unreliable patient. A high number of fixation losses, false positive errors, and false negative errors have been recorded. Poor fixation is indicated by the Gaze Graph. Also note the number of points where threshold results are 40 dB or higher.

False Negative Errors

Occasionally during a test, a stimulus is repeated at a particular location and at a level much brighter than has already been seen. If the patient does not respond to this trial stimulus, a false negative error is recorded. A high false negative score may indicate a fatigued patient, inattentive patient, or a malingerer, but it is also commonly seen in reliable patients who have genuine significant visual field loss.

The HFA screen will display the total number of false negative errors followed by the total number of trials. On the printout, SITA Standard and SITA Fast test results will display False Negative results as percentages. Because the SITA strategies analyze the data at the end of the test before displaying final values, use the False Negative value printed with the results if the displayed and printed out values differ.

Additional information pertaining to the Full Threshold and FastPac testing strategies can be found in [Appendix \(L\)](#).

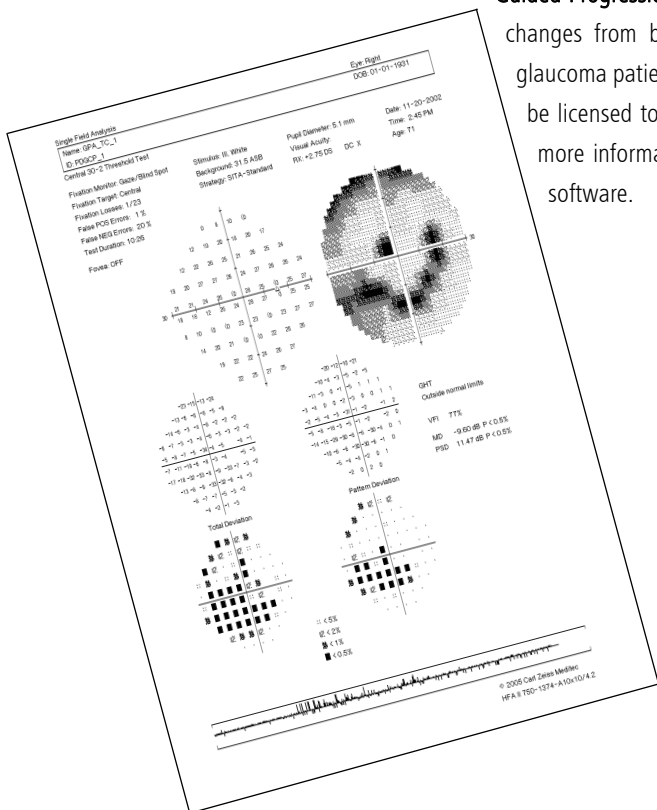
(7) STATPAC Analysis & Printing

Introduction To STATPAC Analysis	7-2
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Humphrey Field Analyzer II-/i printouts provide information important both in diagnosis and continued care. They document a patient's current visual field status as well as changes in sensitivity over time. Coupled with Humphrey's STATPAC software, HFA II-i printouts provide access to sophisticated statistical analysis of visual field results. This chapter describes the standard HFA print formats and how to generate printouts both immediately after testing and from stored files. After reading this section you will be able to answer the following questions:

- How is the Glaucoma Hemifield Test (GHT) result determined?
- What is the difference between the Total Deviation and Pattern Deviation plots?
- How do I print an Overview printout?
- What are the parts of a Change Analysis box plot?
- What steps do I use to print a previously saved test?

Guided Progression Analysis (GPA) is an advanced analysis for visual fields that highlights changes from baseline that are larger than the test-retest variability found in most glaucoma patients. GPA is an optional module: It comes with STATPAC software but must be licensed to be activated. See [Chapter \(8\), "Guided Progression Analysis \(GPA\),"](#) for more information, including contact information to obtain a license or purchase the software.



Introduction To STATPAC Analysis

The Humphrey Field Analyzer II-/s statistical software, STATPAC, provides immediate expert system analysis of threshold visual field test results. With STATPAC you can analyze test results at the time of examination, store test results and analyze them at your convenience, or recall previously stored tests to analyze for comparative purposes.

STATPAC includes several exclusive features to help you judge visual field change.

- Using results from a single test, STATPAC can point out suspicious areas that otherwise might not be evident until subsequent tests were done.
- STATPAC can identify areas that look suspicious but which, in fact, compare favorably with normals data.
- Using results from a series of tests, STATPAC provides a highly sensitive and informative analysis of changes in the patient's visual field over time.
- STATPAC's advanced **Guided Progression Analysis (GPA)** helps you identify and monitor increasing visual field loss due to glaucoma.

Prerequisites for STATPAC Analysis

If you intend to run a STATPAC analysis, always take two important steps during testing:

1. Make sure that the patient's name and date of birth are entered exactly as they were recorded on previous tests. Use the RECALL PATIENT DATA button, as described in ["Recalling Patient Data," on page 3-14](#), to reduce patient-data entry errors.
2. Save the test results to disk (hard drive and a USB storage device).

These steps will avoid errors when using printouts that require multiple files for the same patient. Also, because STATPAC uses an age-adjusted model, the analysis cannot be performed properly unless you provide the patient's date of birth.

STATPAC Threshold Formats

STATPAC offers statistical analysis and printouts in several formats: Single Field Analysis, Overview, Change Analysis, and the Guided Progression Analysis described in [Chapter \(8\), "Guided Progression Analysis \(GPA\)."](#)

The **Single Field Analysis**, as its name implies, analyzes the results of a single threshold test. This is the default printout which provides the most information for a given test.

The **Overview** presents the results of up to sixteen (16) tests for convenient comparison. You may view multiple test results per page for easier analysis.

The **Change Analysis** compares up to sixteen (16) tests and analyzes indices of change in the patient's field over time, flagging significant indicators for your attention.

The **Guided Progression Analysis** highlights changes from a Baseline which are larger than the inter-test variability found in stable glaucoma patients giving you a more accurate assessment of glaucoma progression.



Note: Historical information pertaining to Full Threshold and FastPac printouts or Glaucoma Change Probability Analysis can be found in [Chapter \(L\), "Reference to Older Test Strategies."](#)

Threshold Test Printout Formats

Until this chapter, this User Manual has focused on the use and operation of the HFA II-*i*. In attempting to explain the information provided on printouts, however, we must enter the realm of interpretation of field results.

Reliability Indices

Humphrey Field Analyzer printouts include reliability indices to help you determine the reliability of the patient's responses in interpreting test results. These indices include fixation losses, false positive errors, and false negative errors. Gaze Tracking can also be used for reliability information.

The HFA II-*i* prints "XX" after scores that fall outside the reliability limits used in the normative database. In addition, STATPAC printouts include the message, "Low Test Reliability" with excessive fixation losses and "Excessive High False Positives" when the false positive limit has been exceeded.

Fixation losses are printed as a ratio, such as "3/10". The first number represents the number of errors committed, while the second number represents the number of times the instrument checked for each of these errors. Limits for SITA Standard and SITA Fast are 20% for fixation losses and 15% for false positive errors. There is no limit displayed for false negative errors with SITA testing.

Clinical results having poor reliability, but for which the STATPAC analysis is normal, may well be normal. Results showing poor reliability and for which the STATPAC analysis is outside normal limits require careful analysis. Utilize the Gaze Tracking graph to help determine how steady patient fixation was during the length of the test.

If the only "XX" on a test result applies to fixation losses and you are sure the patient was fixating well, the problem may have been poor blind spot positioning rather than poor patient reliability. High false negative response rates are commonly seen in abnormal fields produced by completely reliable patients. On the other hand, test results may be unreliable at false positive rates lower than the level required to generate the "XX" symbol.



Note: Many patients are more relaxed and better test takers when performing visual fields during a second office visit. This leads to more reliable results, because the patient has a better idea of the task and the time it will take to complete the visual field test. Therefore, repeat testing is recommended for all first-time visual field patients. This is known as the "Learning Effect."

Foveal Threshold

If you used the foveal threshold option when the test was run, the HFA II-*i* will print the measured value just below the test duration. When the patient's foveal threshold is depressed significantly ($p < 5\%$), a probability symbol will appear next to the value shown. This symbol is identical to those used for the probability plots and indicates the deviation from age normal. See the following discussions on Total and Pattern deviations for details.

The Single Field Analysis Printout

The Single Field Analysis is based on the results of a single central threshold test. The top of the page presents patient data, test reliability indices, and the test results in the grayscale and numeric formats. The information that STATPAC adds is found in the lower half of the page.

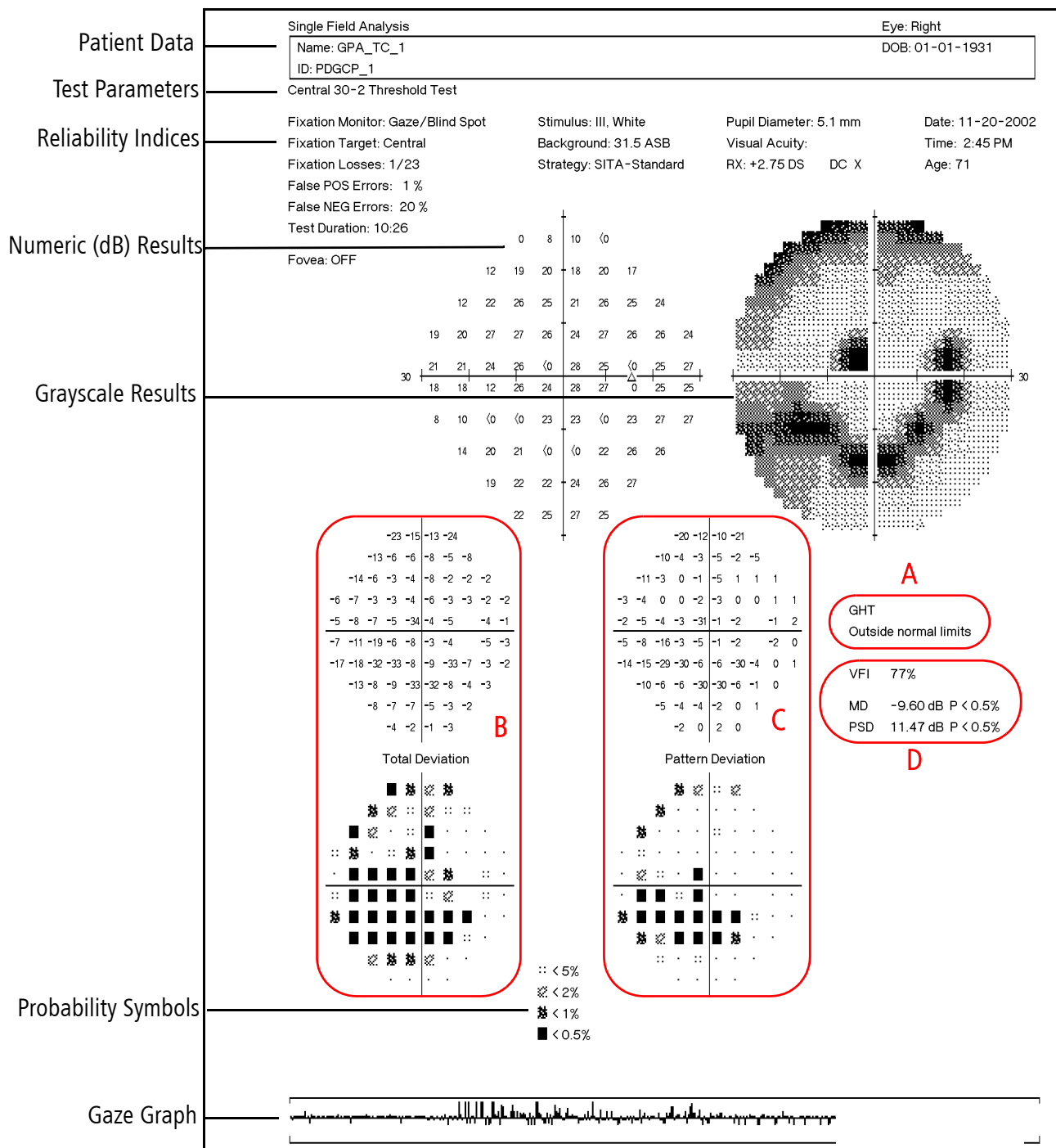


Figure 7.1 The Single Field Analysis Printout

The Glaucoma Hemifield Test

On 24-2 and 30-2 tests, the Glaucoma Hemifield Test (GHT) evaluates five zones in the superior field and compares these zones to their mirrored zones in the inferior field. The GHT evaluates the severity of disturbed points in each zone pair, relative to its normative database, and prints one of these messages: WITHIN NORMAL LIMITS, OUTSIDE NORMAL LIMITS (shown as "A" in [Figure 7.1](#)), or BORDERLINE.

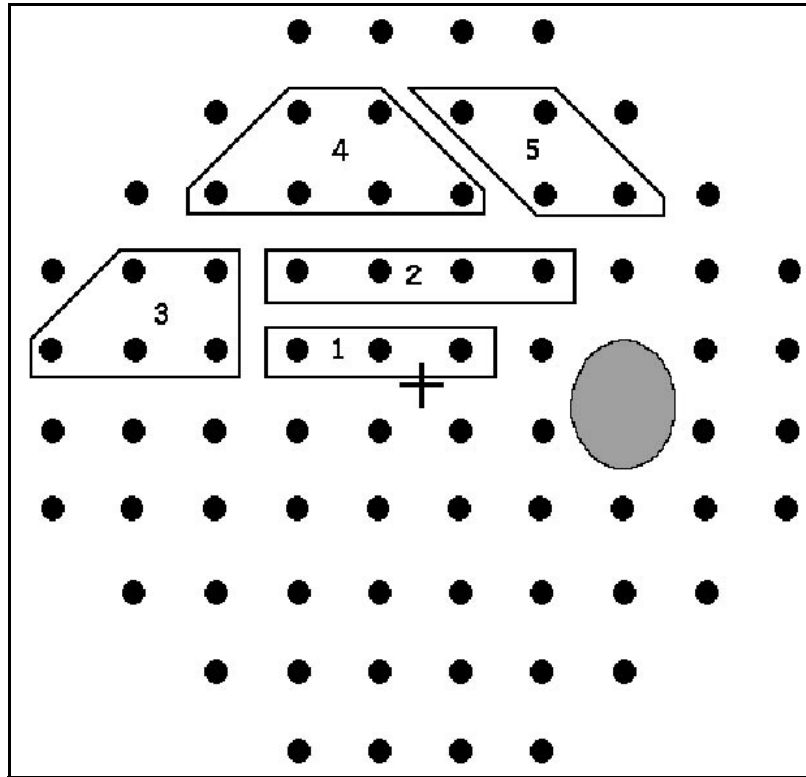


Figure 7.2 Superior Field Zones Used in the Glaucoma Hemifield Test

The primary aim of the GHT is to identify localized visual field loss occurring in a pattern typical of that seen in glaucoma. It also indicates when test results show that the overall field is depressed severely or exhibits suspiciously high sensitivity. The message GENERAL REDUCTION OF SENSITIVITY is printed whenever the field is depressed to a level seen in fewer than 0.5% of the normal population in the patient's age bracket.

Similarly, when the comparison indicates abnormally high sensitivity (a level found in fewer than 0.5% of the normal population of that age), the message ABNORMALLY HIGH SENSITIVITY appears. The GHT does not flag the case where only a few points are abnormally high, but it will catch cases where the overall pattern of patient responses indicates a patient who is overly anxious to push the button. It is always useful to check the false positive and false negative errors, and fixation losses as well.



Note: The GHT is not intended for use in patients being evaluated for diseases other than glaucoma. FastPac tests will not display the GHT result.

Total Deviation Plots

On the left in the lower half of the Single Field Analysis printout is a pair of plots, one above the other, labeled Total Deviation (shown as “B” in [Figure 7.1](#)). The numeric values in the upper portion of these plots represent the difference in decibels (dB) between the patient’s test results and the age-corrected normal values at each tested point in the visual field.

The lower total deviation plot, called a probability plot, translates the values from the upper plot into shaded symbols which indicate the statistical significance of each decibel deviation. These are explained in the legend labeled “Probability Symbols”. The darker the symbol the less likely it is that the field is normal in that location (although the likelihood of abnormality also depends upon the actual prevalence of disease in the patient population). For instance, a totally black square indicates that the deviation from normal found at that point location occurs in fewer than 0.5% of normal subjects. Notice that this probability statement is made on a point-by-point basis, allowing the practitioner to read the results like an isopter plot or graytone.

Pattern Deviation Plots

To the right of the total deviation plots in the Single Field Analysis printout are two additional plots, labeled Pattern Deviation (shown as “C” in [Figure 7.1](#)). These are similar to the total deviation plots, except that here STATPAC has adjusted the analysis of the test results for any changes in the height of the measured hill of vision caused, for example, by cataracts or small pupils. Similarly, STATPAC corrects for any patients who are “supernormal”, adjusting the expected hill of vision upward by the appropriate amount and thereby making the analysis more sensitive to localized scotomas.

Thus, the numeric Pattern Deviation plot shows the deviation in decibels from the age corrected normal values, adjusted for any shift in overall sensitivity. The pattern deviation probability plot indicates the statistical significance of the result at each point. Again, the darker the symbol the more significant the deviation from the normal threshold value.

Removal of Pattern Deviation (PD) and Progression Analysis Plots for Severely Depressed Fields

Pattern Deviation (PD) analysis corrects for the effects of media opacities and other generalized field loss by assuming that at least a few test points are not yet affected by localized scotomas—and thus reflect only generalized loss. For severely depressed fields, when field loss becomes so advanced that almost all points are involved in localized loss, then PD analysis is no longer effective. While it is not possible to precisely predict when PD analysis has lost its usefulness, the effect becomes increasingly prevalent as Mean Deviation (MD) approaches -20dB.

Specifically, when a visual field is severely depressed ($MD \Rightarrow -20dB$):

- The GHT is automatically set to “Outside Normal Limits”.
- The Pattern Deviation plot(s) for that exam will be replaced with “Pattern Deviation not shown for severely depressed fields. Refer to Total Deviation.” This is true for all STATPAC printouts.
- On GPA Printouts, the Progression Analysis plot for that exam will also be replaced with “Pattern Deviation not shown for severely depressed fields. Refer to Total Deviation.”
- The Progression Summary (“Possible Progression”, “Likely Progression”, etc.) will not be printed.

- The plot label ("24-2", "30-2") below the Progression Analysis plot on the SFA-GPA printout will not be printed.
- The GPA symbol legend on the SFA-GPA printout will not be printed.

Global Indices

A short table of Global Indices appears on the far right side of the page (shown as "D" in [Figure 7.1](#)). Here STATPAC has made some calculations to provide overall guidelines to help the practitioner assess the field results as a whole rather than on the point-by-point basis shown in the Total Deviation and Pattern Deviation plots. The global indices are calculated from deviations in the age-corrected normals data. The "p" (probability) values for the global indices, discussed below, do not need to be corrected again for age.

Visual Field Index (VFI): VFI is a measure of the patient's overall visual function as compared to an age-adjusted normal population. It is a weighted average of the ratio of the measured threshold to the age-adjusted normal threshold for all points that have depressions in the Pattern Deviation at the 5% level or higher.

A VFI of 100% means that the portion of the visual field that corresponds to the 24-2 test pattern displays no points that are depressed relative to the age-adjusted normal hill of vision at the 5% level or higher. As visual field loss progresses, the VFI value will fall. A VFI of 0% corresponds to a field with no measured light sensitivity. Because it is based only on points that are significantly depressed in Pattern Deviation, the VFI is relatively insensitive to visual field changes due to cataract.

The VFI is weighted to give increased importance to thresholds near the point of fixation, so that it is a good indicator of changes in functional vision. The VFI for a visual field defect progressing toward the central field will decrease more rapidly than the VFI for a defect that is progressing along the periphery.

Mean Deviation (MD): MD is the average elevation or depression of the patient's overall field compared to the normal reference field. If the deviation is significantly outside the population norms, a "p" value is given. For example, if $p < 2\%$, this means that fewer than 2% of the normal population shows an MD larger than that found in this test. Categories for p values are $p < 10\%$, $p < 5\%$, $p < 2\%$, $p < 1\%$, and $p < 0.5\%$.

A significant MD may indicate that the patient has an overall depression, or that there is significant loss in one part of the field and not in others. MD is best interpreted in relation to the Total and Pattern Deviation plots.

Pattern Standard Deviation (PSD): PSD is a measurement of the degree to which the shape of the patient's measured field departs from the normal, age-corrected reference field. A low PSD indicates a smooth hill of vision. A high PSD indicates an irregular hill and may be due either to variability in patient response or to actual field irregularities. The statistical significance for PSD is indicated using the same categories for "p" as with the mean deviation.

Short term fluctuation (SF) and Corrected Pattern Standard Deviation (CPSD) are indices associated with the now obsolete Full Threshold and FastPac thresholding programs. These indices are discussed in [Appendix \(L\)](#) for older test strategies.



Note: The STATPAC analysis of SITA 10-2 threshold patterns will not include 0.5% limits on the Total or Pattern Deviation plots. In addition, no 0.5% probability limit will be displayed for the global indices MD and PSD.

The Overview Printout

The Overview printout can show the results of up to sixteen (16) tests. It condenses the information shown in a Single Field Analysis and makes it easy to review a series of tests. The tests are automatically printed in chronological order. The patient's name, date of birth, type of test, and eye tested appear at the top of the page. Results from 30-2 and 24-2 tests may be presented in the same printout. STATPAC does not combine 10-2 tests with any other test patterns.

The Overview presents the results of each test in four formats: Graytone, Numeric, total Deviation probability plot, and Pattern Deviation probability plot. The date of each test appears to the upper-left of the Graytone, and the visual acuity and pupil size are printed to the upper right of the Pattern Deviation probability plot. The GHT is printed to the right of the test date. The foveal threshold, fixation losses, false negative errors, false positive errors, and global indices appear below the test results. The legend for the probability symbols appears at the bottom of the printout.

You may print Overviews of 24-2, 30-2, and 10-2 tests after using non-STATPAC stimulus sizes I, II, IV, or V and the non-STATPAC colors Blue or Red. In these cases graytone, numeric thresholds, and defect depth are printed. No probability plots are available. You can also print Overviews of SWAP test results.

Overview printouts cannot consist of a mixture of tests run with different stimulus sizes or colors. You may not mix SWAP tests with any white background test (including tests run with a blue color stimulus). SWAP Overview printouts are labeled as such.

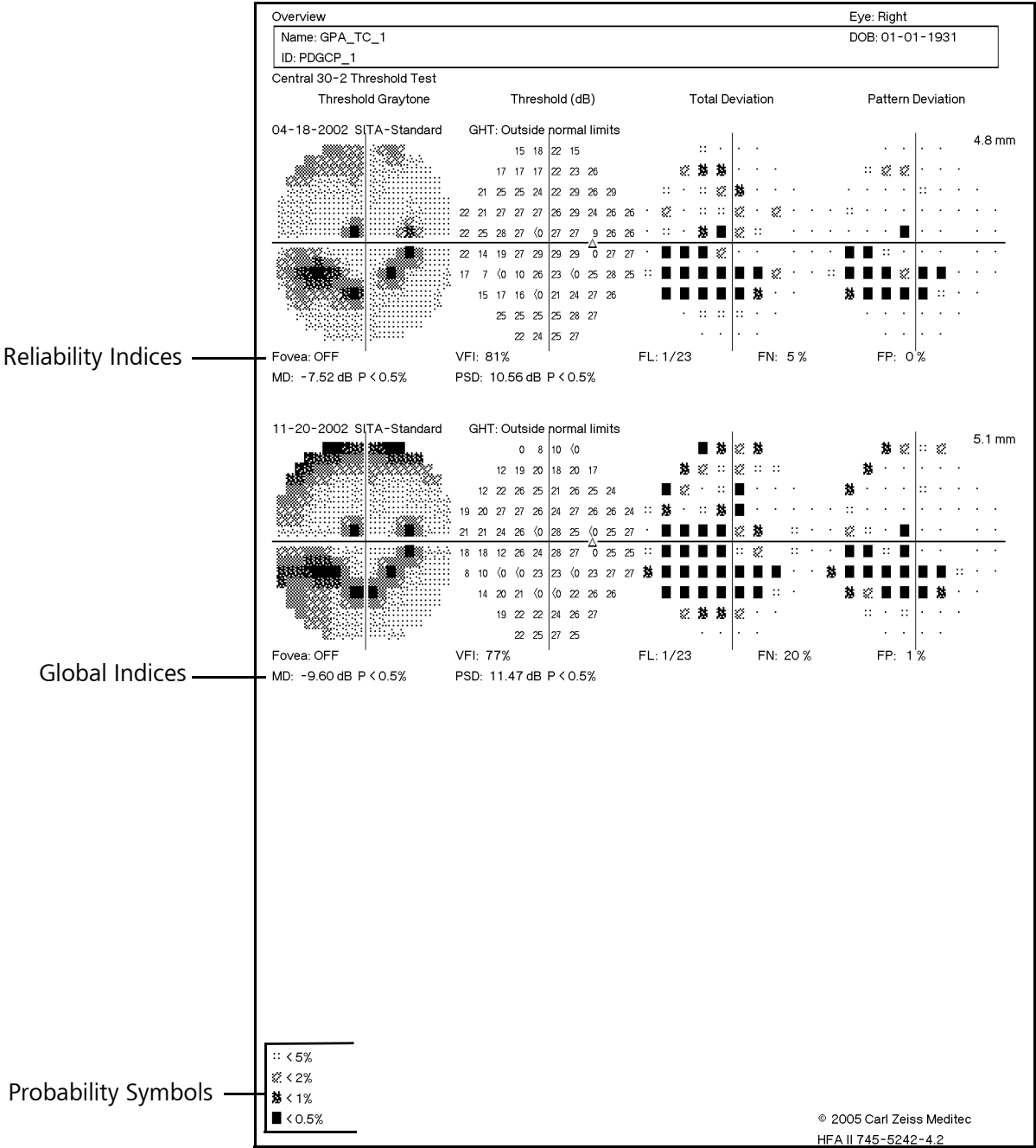


Figure 7.3 The Overview Printout

The Change Analysis Printout

The Change Analysis printout shows analyses of up to sixteen (16) test results on one sheet. With this analysis, STATPAC gives you an analytical summary of changes in the patient’s visual field. The changes are monitored from the time of the earliest test you have included in the summary to the time of the most recent test included.

STATPAC presents the Change Analysis in the form of a box plot analysis of test results, a summary of global indices, and a linear regression analysis of Mean Deviation. The indices are the same ones presented in the Single Field Analysis, but this time they are plotted over time to indicate changes in the patient’s visual field.

The Box Plot

Box plots are helpful in making a quick determination about the nature and extent of visual field changes over time. The box plot is a modified histogram that gives a five-number summary of the test results. It displays a concise summary of the Total Deviation decibel values for each test, showing the median, the two extreme values and the 15th and 85th percentile deviations.

The summary is made up of the differences at each tested point between the patient’s measured field and the STATPAC age-corrected reference field. You can see in Figure 7.4 that STATPAC plots the median difference (the three dark lines shown at (a) inside the box), the 85th and 15th percentile differences (the top and bottom of the box) as well as the extreme values of these differences (the 100th and zero percentile), or the end points of the line shown at (b).

Look at the box plots in Figure 7.4 and Figure 7.5. The three things to note are:

- 1. The overall shape of the box, how elongated or compact it is.
- 2. The location of the three dark lines inside the box that indicate the median (a).
- 3. The top and bottom end points of the line along which the box lies (b).

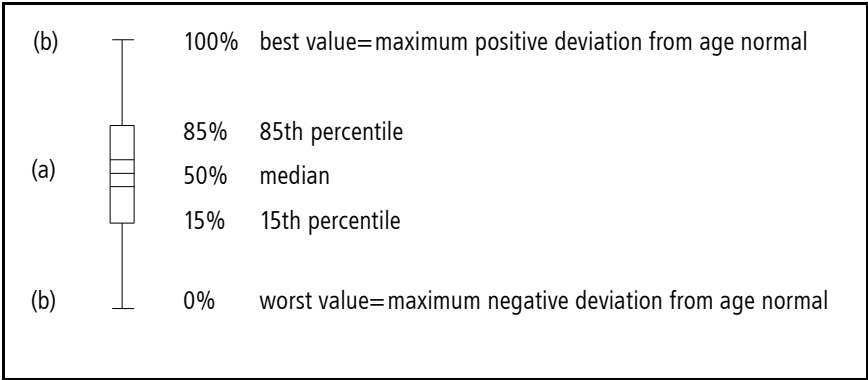


Figure 7.4 The Box Plot

Box Plot or Histogram

Summary of Global Indices

Linear Regression

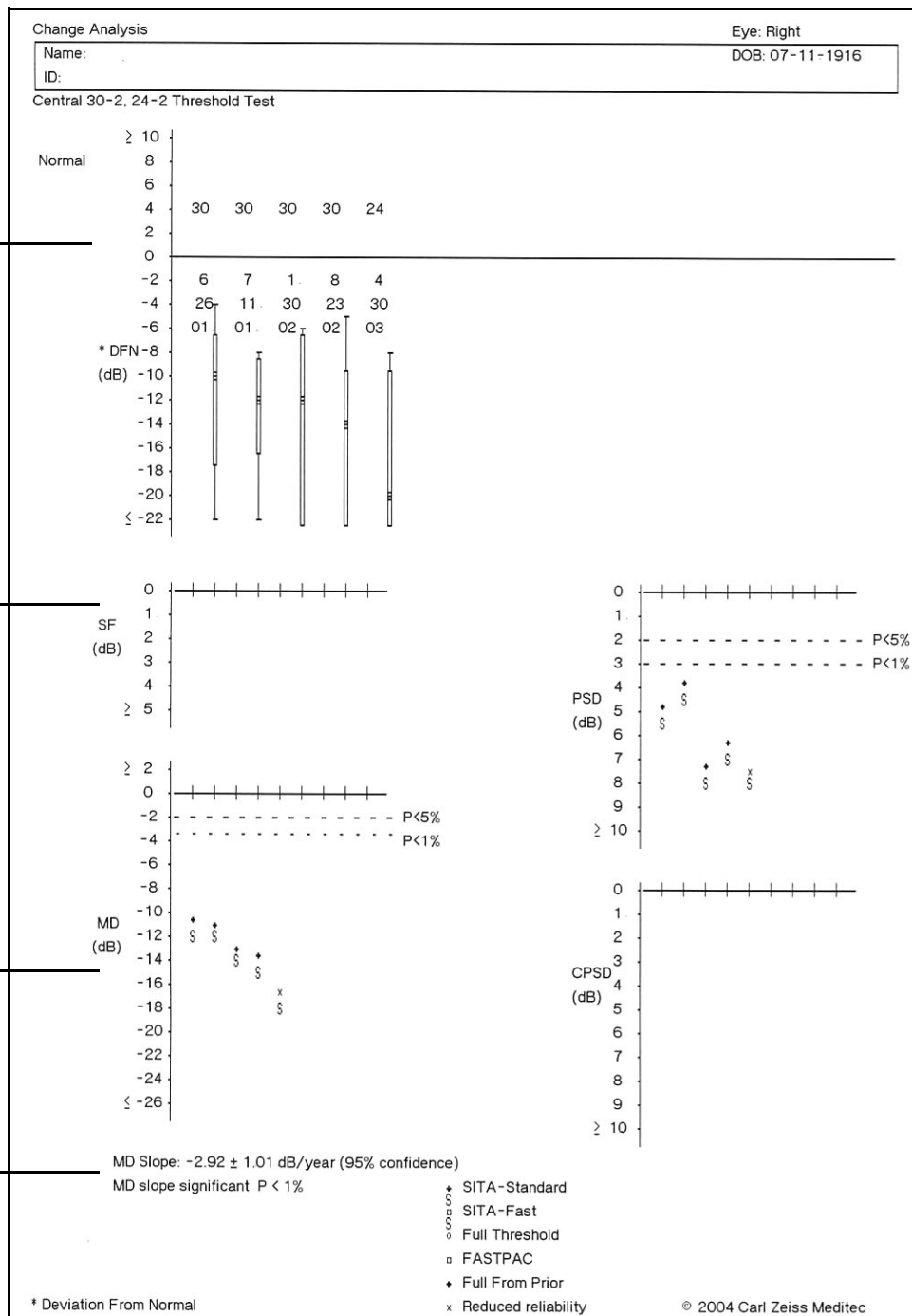


Figure 7.5 The Change Analysis Printout

In cases where the patient is suffering from a cataract, the visual field is depressed more or less evenly. The only change from test to test and from the normal box plot is a general depression over time. Therefore, the shape of the box plot remains fairly normal, but the whole symbol is moved downward on the graph.

A visual field with a deep scotoma covering a small number of points will result in a box plot in which the box is more or less normal and there is a long tail. When a scotoma deepens over time, the length of the tail increases.

If the scotoma enlarges to involve more than 15% of the points tested, the lower limit of the box will be further depressed, and depending on the extent and gravity of the field loss, the boxes may be very elongated.

The box plot section of the Change Analysis printout gives the dates of the tests included in the analyses. The Change Analysis printout is available for the 24-2 and 30-2 test patterns, as well as combinations of 24-2 and 30-2 tests, but not for the 10-2 pattern. If 24-2 and 30-2 tests are mixed in the Change Analysis printout, the box plots and global indices are calculated only on the 24-2 portion of the 30-2 test results.

Change Analysis Summary Of Global Indices

The lower half of the Change Analysis printout displays summaries of the global indices MD (Mean Deviation) and PSD (Pattern Standard Deviation). The summary results are presented chronologically and in the same order as in the box plots. Thus, test dates may be taken from the box plot.

To facilitate interpretation, the $p < 5\%$ and $p < 1\%$ limits for the normal population are shown as dashed reference lines. If, for example, the symbol indicating a test appears above the 5% line, the index value on the test is not significant at the 5% level. If it falls below the 5% line, the index value is significant at the 5% level. Similarly, if the symbol falls below the 1% line, the index value is significant at the 1% level; that is, less than 1% of the normal population has an index value as large as or larger than that found in the test.

Linear Regression

If five or more fields are analyzed on a Change Analysis printout, and all test results to be analyzed were run with the same strategy, STATPAC will automatically perform a linear regression analysis of mean deviation (MD). One of two messages, MD SLOPE NOT SIGNIFICANT or MD SLOPE SIGNIFICANT, will be printed below the MD plot when a linear regression analysis has been performed. The calculated slope of MD in decibels per year and a tolerance for that slope, expressed as a p value, will also be printed.

A "significant" message means that it is likely that mean deviation has changed in the direction of the estimated slope, and the lower the "p" value, the more likely it is. However, it remains for the clinician to establish whether this indication on the test results is caused by progressive field loss or by other factors.

A linear regression analysis tests the hypothesis that a slope is zero; that is, that there have been no changes in the patient's visual field. If this hypothesis is rejected after analysis at the $p < 5\%$ level, the slope is said to be significant and the analysis continues at the 1% and 0.1% levels of significance. The result is then displayed as being significant at $p < 5\%$, $p < 1\%$, or $p < 0.1\%$.

Not only is the significance level of the slope important but also the magnitude of the slope. If, for example, the MD slope is -3.6 dB per year, plus or minus 0.9, this means that there is a 95% confidence level that the slope is between -2.7 and -4.5 dB per year. The slope is significant at a "p"

level of less than 1%. This is a slope magnitude on the order of more than thirty times the rate of change due to aging in the normal population. A slope of only one or two tenths of a decibel per year would be viewed with considerably less concern, as it is similar in magnitude to the age correction which has already been applied to the data.

If the hypothesis that the slope is zero is not rejected, that is, that there has been no change in the patient's visual field, then the message NOT SIGNIFICANT appears. This indicates that the slope was not significant at the largest "p" value STATPAC is programmed to consider, 5%.

The larger the number of tests analyzed, the more easily the small changes in MD are detected. A low number of observations involves a higher risk that the analysis will fail to detect a deterioration over time. This is the reason that STATPAC will not perform an analysis on fewer than five test results.

The application of the linear regression analysis means that the following assumptions have been made:

1. The true MD changes linearly with time.
2. The differences between the measured and the true MD are independent, and identically and normally distributed.

The STATPAC linear regression of mean deviation, accompanied by the message "MD Slope Significant" or "Not Significant" appears on the Change Analysis printout as well as on the Guided Progression Analysis printout.

On the Change Analysis printout, STATPAC modifies this regression analysis whenever marked learning effects are present. When at least five tests are chosen for analysis, the modified STATPAC regression analysis discards the first test result in a series if its mean deviation is significantly out of line with, and worse than, the trend shown in later tests ($p < 5\%$).

On Statistics and Probability

When considering the probability statements in this statistical package, it is important to be conscious of what they do and do not mean. They are an aid to interpretation, not a diagnosis. The doctor's judgement is still the most important element in determining the clinical significance of perimetric findings.

The probability statements are based on the distribution seen in the normal population. Saying that less than 5% of the normal population deviates from the norm by a certain amount means just that and nothing more. It does not mean that there is only a 5% chance that the result is normal.

The positive predictive rate depends, of course, on the prevalence of defective fields in the population studied. The probability that a given result is abnormal depends on the relative prevalence in the population of defects caused by disease versus the prevalence of the same field "defect" in normals. If a certain field result is seen 5% of the time in normals, and similar glaucomatous field defects are seen in 0.5% of the population, then the result is ten times as likely to be associated with normality as with disease.

Certainly one should also be aware that some patients commonly seen in a clinical practice may not meet the criteria of normality (for example, visual acuity) which had to be applied in creating a

normals database. These patients may fall outside normal limits established in this statistical package for reasons other than field loss, such as cataracts.

A Note of Caution

Rules of common sense must be applied when using STATPAC. This statistical package represents an attempt to aid the practitioner in making medical decisions. There will be situations where it will not give the proper analysis either because of its own limitations or because it was applied to inappropriate data. Obviously, the practitioner must bear the ultimate responsibility for all decisions and must use STATPAC with its limitations in mind. In cases of uncertainty, consultation with sub-specialists is often the prudent course.

Three-in-One Printout

If you have selected a threshold test pattern or test parameters that do **not** meet the criteria for STATPAC analysis, results are presented on the Three-in-One printout. The Three-in-One printout includes a graytone, numeric, and defect depth presentation of the results of a single test on one page. The numbers which appear outside each quadrant of the numeric grid are called "quad totals" and represent a summation of the threshold values determined in each quadrant. These numbers, which even in normals will not be the same for each quadrant, can be useful in comparing several tests on the same patient over time. This format is available for 10-2, 24-2, 30-2 central field tests, and for the peripheral 60-4 test.

The nasal step threshold test printout differs from other Three-in-One printouts. Only threshold and defect depth data are shown. All graytone data is omitted.

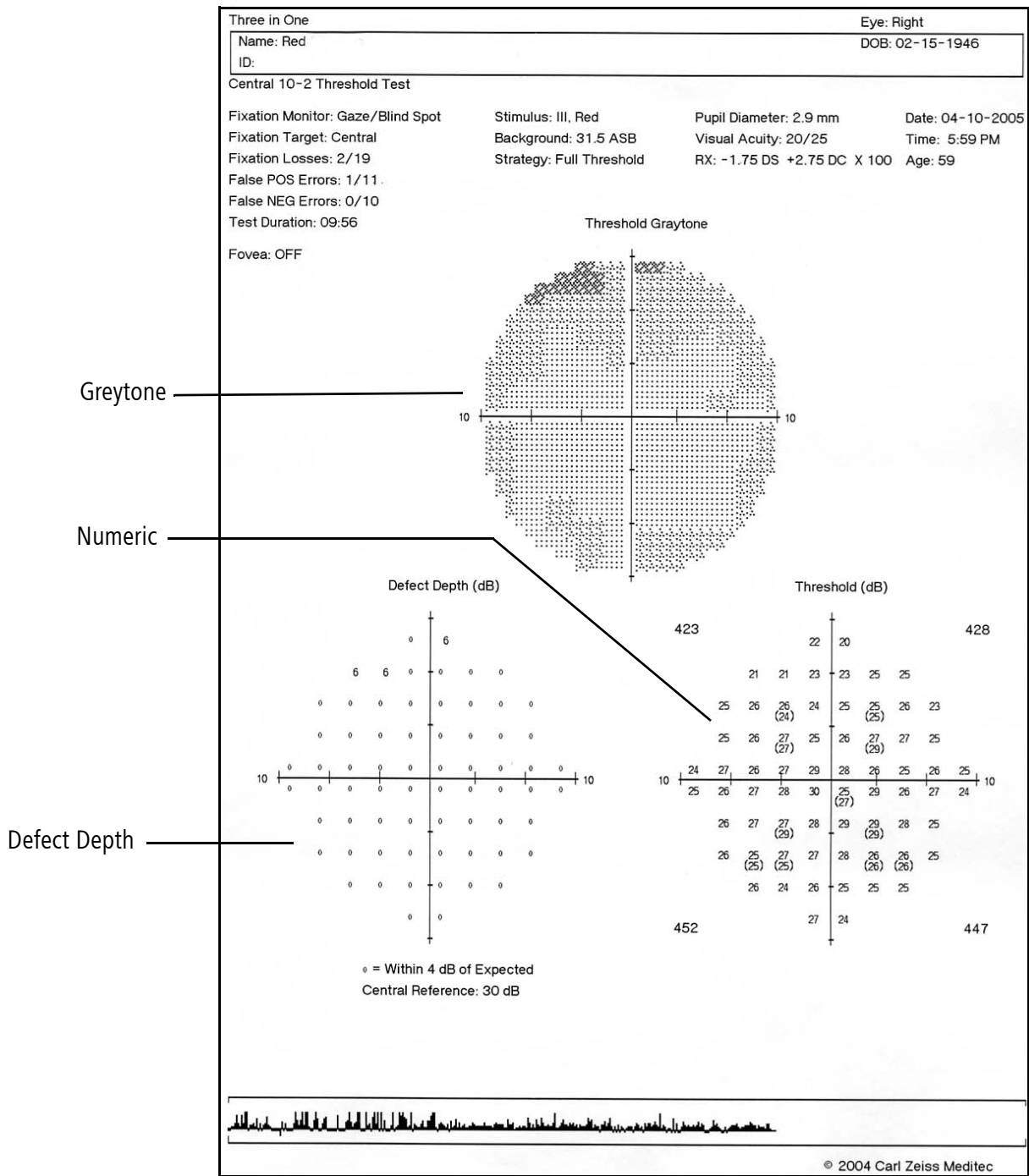
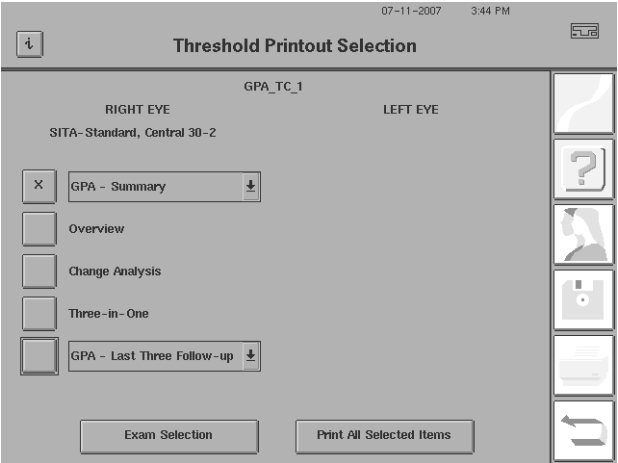


Figure 7.6 Three-In-One Printout

Printing Current Threshold Test Results

At the end of a threshold test, you can print the results in any or all of the STATPAC formats that apply to your test parameters, as well as in the Three-in-One format. If GPA has been activated, then GPA reports will also be available (see “Overview of GPA Reports,” on page 8-4).



To print results, select the *PRINT FUNCTIONS* icon. The printout selection menu will appear with print options. If both eyes have just been tested, it is possible to choose different printouts for right and left eye; the selections need not be the same for both.

If STATPAC criteria have been met, the print menu will display with Single Field Analysis highlighted. If GPA has been activated, the print menu will display with GPA - Summary highlighted. For additional formats, touch the box next to the desired selection. An “X” appears within the box of all selected printouts. Touching the box a second time clears your selection.

When you have made your printout selection(s), choose PRINT ALL SELECTED ITEMS. The information has now been sent to the printer; you can proceed with your next command immediately. To leave the Printout Selection screen without printing, press the *UNDO* icon.



Note: You may also print any of these items using the Print-to-File process, if you have licensed and set up networking on your HFA II-*i*. Using Print-to-File on your office network allows you to save the information to your network file server. For further details, see “Printing To a File,” on page 14-36.

Screening Printout Formats

It is the test strategy used in each screening test that determines the format of the printed test results (see Table 7.1).

Table 7.1 Screening Printout Formats: All Screening Test Patterns

Strategy	Format Description
Two Zone	Points seen O Points missed ■
Three Zone	Points seen O Relative defect X Absolute defect ■
Quantify Defects	Points seen O Numbers (in dB) show depth of defect

When you have tested both the right and left eyes for the same patient, you have the option of printing a single screening test per page (referred to as “Screening Test” on the printout selection menu), or a combination of the right and left eye on one page (referred to as “Both Eyes”). To obtain

the screening printout for both eyes, screening tests may be central or peripheral but not full field patterns (see [Figure 7.7](#)). The printout of both eyes is also known as the "O. U. Printout".

The Quantify Defects Full Field screening test is printed on two pages. The first page consists of the Full Field printout. The second page is an enhanced view of the Central 30 degrees, allowing for easier reading of the central portion of the printout. If there are no defects quantified in the Central 30 degrees, the printout will only be one page long. The printout will be in the full field format.

Screening Test Printouts

The type of test and test parameters are printed at the top of the printout along with the patient data, test date and test time. Like threshold test printouts, screening printouts include reliability indices to help you determine the reliability of the patient's responses.

When a screening test uses the Threshold Related testing mode, the central (and peripheral) reference level values are determined from patient responses and appear on the printout and test screen. When the Age Corrected mode is used, the central (and peripheral) reference levels display values based on the patient's age.

Screening Printout
Symbols

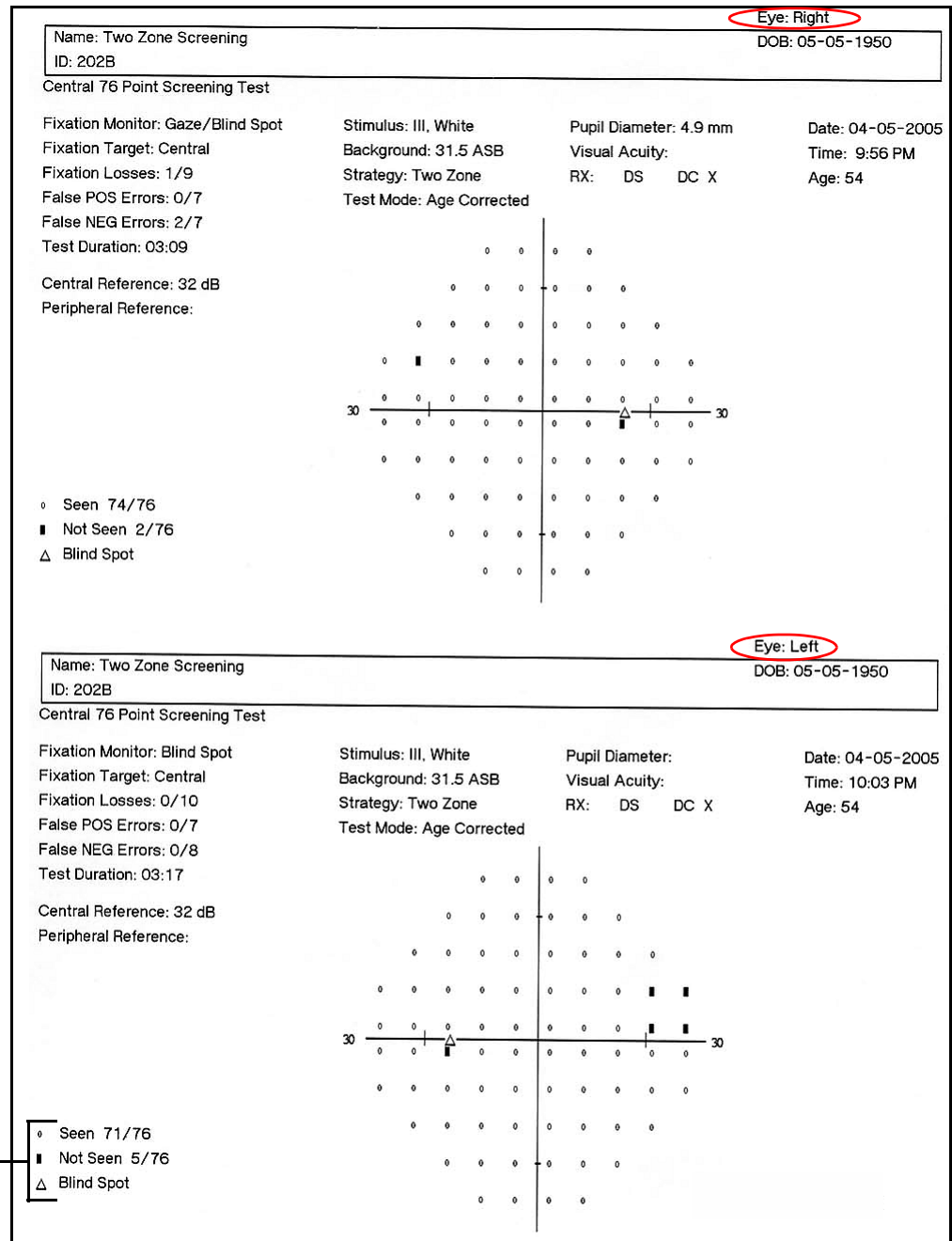


Figure 7.7 Screening Printout Showing Results for Both Eyes (The O. U. Printout)

Printing Current Screening Test Results

At the end of a screening test you can print the results for the one eye immediately, or you can wait until the second eye has been tested and print both results on one page.

1. Make any additions or corrections to patient data.
2. From the test complete screen, select the *PRINT FUNCTIONS* icon. This takes you to the printout selection menu.
3. Select the format(s) for one or both eyes, then choose PRINT ALL SELECTED ITEMS.

Printing Previously Saved Test Results

Printing Stored Test Results

For tests stored on the HFA hard drive, floppy disk, DICOM Archive, or a USB storage device, follow these steps to make printouts:

1. Select the *PRINT FUNCTIONS* icon from any screen where the *PRINT FUNCTIONS* icon is active. The Disk Options screen appears.
2. Choose the Source (HARD DRIVE, FLOPPY, DICOM ARCHIVE, or a USB storage device) from the drop-down menu and press PROCEED. This opens the File Directory and a keyboard. Use the keys and press ENTER to search by last name.

Select the desired patient(s) and test(s) from the directory and press PROCEED. The program will either start printing or present additional options, depending on the type of tests (screening or threshold) selected. Refer to [Table 7.2](#) below for more details.

Table 7.2 Printing Selection Options

If you select:	The print program:
1. One screening test	Goes to Screening Printout Selection screen. The print format depends on the screening strategy used. Press PRINT ALL SELECTED ITEMS.
2. Two screening tests for the same patient, one for right eye and one for left eye	Presents the printout selection menu. Screening tests are printed one per page or both on one page.
3. One threshold test OR Two threshold tests for the same patient, one for right eye and one for left eye	Presents the printout selection menu. • If you select Single Field Analysis or the Three-in-One format, the program starts printing immediately. • If you select Overview, Change Analysis, or Glaucoma Change Probability, the program prints all available tests. If you wish to limit the number of tests included, press EXAM SELECTION. • If you select GPA Summary, Full GPA, or GPA Last Three Follow-up, see “Step 2: Select Reports from Threshold Printout Selection Screen,” on page 8-31.
4. Two or more tests for different patients or for the same eye of one patient	Starts printing immediately. Threshold tests that qualify for GPA are printed using the GPA Summary report or SFA GPA, depending on which report is selected in the Default GPA Print Options (see “Default GPA Report Options,” on page 8-29.) Threshold tests that do not qualify for GPA, but do qualify for STATPAC, are printed using the Single Field Analysis report. Threshold tests that do not qualify for STATPAC (e.g., Full Threshold tests) are printed in the Three-in-One format. Screening tests are printed one page per eye.



Note: If you wish to print an Overview printout and include all available tests, select only **one** test from the File Directory screen. See Step 3 in [Table 7.2](#) above. If you select more than one test, you

will get Single Field Analysis printouts instead of the desired Overview printout, as described in Step 4 in [Table 7.2](#) above.



Note: For Change Analysis, Glaucoma Change Probability, and GPA, if you want to combine 24-2 and 30-2 results on one printout, STATPAC will analyze only the Central 24 degrees. If you want an analysis of the Central 30 degrees, do not combine 24-2 and 30-2 results for these printouts. The 10-2 test cannot be used in conjunction with 24-2 or 30-2 tests, and is not available in the Change Analysis, Glaucoma Change Probability, or Guided Progression Analysis format.

Printing from Recall Last Test

The HFA II-*i* holds in temporary memory the last right eye and left eye tested (they need not be for the same patient) until the instrument is powered off, at which time the temporary memory is cleared.

1. From the Main Menu screen, select RECALL LAST TEST.
2. Select the test eye (right or left) or CANCEL.
3. Follow the instructions previously outlined for printing current test results.

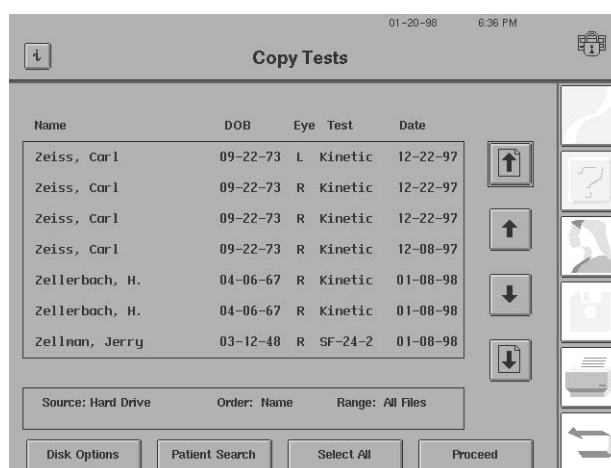
Printing from View Test

You can print any file you have retrieved through the View Test feature.

1. From the Main Menu screen, select the *FILE FUNCTIONS* icon.
2. Select VIEW TEST.
3. Designate the Source and Directory Order, then press PROCEED.
4. Select the test you want to retrieve.
5. Choose PROCEED to display the test results.
6. Follow the instructions previously outlined for printing current test results.

Printing Delay

Whenever the File Directory Box is open (see example), printing will not occur.



If you have started a printing function, and a File Directory box is on the screen, finish your selection or press the *MAIN MENU* icon in order to allow printing to continue.

Grayscale Symbols

The grayscale representation of the patient’s visual field provides an immediate idea of the size and depth of any field defects present. Each variation of the pattern corresponds to a 5 dB change in sensitivity. The comparative scale that is shown below in Table 7.3 displays the ten (10) grayscale patterns and relates them to decibels and apostilbs. An explanation of the relationship between these units of measurement can be found in Appendix (E), along with Goldmann conversion tables.



Note: SWAP printouts use the same relationship between grayscale symbol and decibel values as white-on-white testing. The grayscale will look significantly darker with SWAP testing in most cases. This is because SWAP testing normally generates lower threshold sensitivity values than does white-on-white testing. Note that the maximum (0 dB) stimulus in SWAP testing is 6 foot-lamberts, not 10,000 apostilbs.

Table 7.3 The Grayscale Shades Found on HFA II-i Printouts and Their Numerical Equivalents in Apostilbs (ASB) and Decibels (dB).

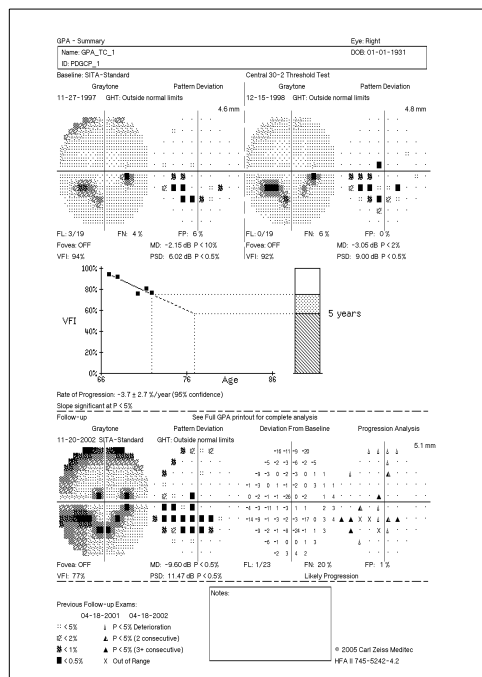
SYM										
ASB	.8 1	2.5 1	8 3.2	25 10	79 32	251 100	794 316	2512 1000	7943 3162	≥ 10000
DB	41 50	36 40	31 35	26 30	21 25	16 20	11 15	6 10	1 5	≤0

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Humphrey Guided Progression Analysis (GPA) is an advanced software module that assists practitioners with detection of statistically significant progressive visual field loss in SITA Standard, SITA Fast and Full Threshold visual field tests. Several report formats are available, including the new GPA Summary report that includes an overview of the patient's entire visual field history in a one-page report.

This version of GPA is compatible with HFA models 740*i*, 745*i* and 750*i*. The GPA license must be activated prior to use. Instructions for activating GPA can be found at the end of this chapter. This chapter addresses these and other questions:

- What information does GPA provide to me?
- How do I interpret this information?
- What GPA report formats are available to me?
- How do GPA reports indicate the progression of glaucoma?
- How does my initial selection of a SITA test determine what tests are available for GPA analysis?
- What criteria does GPA use to determine which tests may be unreliable?
- Can GPA results be displayed on a Single Field Analysis printout?
- How do I print GPA reports?
- How do I change which visual field exams to include in a GPA analysis?
- How do I activate GPA on my HFA II-*i*?

Introduction to GPA

Guided Progression Analysis (GPA) is a software package for the Humphrey Field Analyzer that is designed to help practitioners identify and quantify statistically significant progressive visual field loss in glaucoma patients. The software is designed for use with SITA Standard, SITA Fast and Full Threshold exams, but not SITA-SWAP exams.

The analysis highlights any changes from baseline that represent larger than expected clinical variability, and it provides simple plain-language messages whenever changes show consistent and statistically significant loss. GPA adjusts for ocular media effects in order to help the practitioner differentiate between the localized losses typical of glaucoma and overall depressions caused, for example, by progressive cataract.

GPA is based on knowledge that was gained through extensive multi-center clinical trials in North America, Europe, and Asia. The plain-language analysis is based on the criteria used in the Early Manifest Glaucoma Trial (EMGT). GPA incorporates the Visual Field Index (VFI), a new summary measurement of a patient's visual field status, expressed as a percent of a normal age-adjusted visual field. The VFI regression analysis is based on recent work by Bengtsson and Heijl.⁴

GPA Adds Value to Your Practice

The GPA analysis provides value because it:

- Simplifies and standardizes analysis for change in glaucomatous visual fields.
- Provides both trend analysis and event analysis in one report.
- Is based upon visual field testing experience gained in multi-center clinical trials.
- Provides simple plain-language messages whenever changes show consistent and statistically significant loss.
- Adjusts for cataract and other media effects.
- Easily applies to a series of visual fields already stored in HFA II-/instruments.
- Streamlines workflow and improves clinical confidence.

Event Analysis

GPA provides event analysis with the Progression Analysis Plot. This plot is based on significance limits for test-retest variability in Pattern Deviation at each point in the central visual field. The Pattern Deviation measurement technique is designed to filter out most changes in the general height of the hill of vision helping to differentiate between localized glaucoma damage and other sources of vision degradation, such as changes in pupil size or developing cataracts.

Trend Analysis

GPA provides trend analysis with the VFI regression analysis. The VFI is based only on points that are significantly depressed in Pattern Deviation, is thus relatively insensitive to visual field changes due to cataract, and therefore a more robust metric for assessing progression. The VFI values are plotted to quantify the Rate of Progression (ROP) and provide a visual trend of the progression pattern.

GPA Was Clinically Developed

GPA relies on detailed empirical knowledge of the threshold visual field variability that typically is found in everyday glaucoma patients. Two tests are averaged to establish a Baseline, and up to fourteen (14) Follow-up tests may be compared to the Baseline. Those fields that repeatedly and consistently show changes exceeding what is known to represent the expected range of test-retest variability are identified as having possible or likely progressive visual field loss.

Precisely quantifying the actual range of variability was critical to the development of GPA. Hundreds of glaucoma patients, covering the full disease spectrum from early to advanced glaucoma, were enrolled at numerous centers worldwide. Each patient attended clinic four times in the space of one month, and underwent three visual field tests at each visit—one using SITA Fast, one using SITA Standard, and one using the Full Threshold strategy. Variations seen from visit to visit were used to define the expected and normal test-retest reproducibility for glaucomatous visual fields.

GPA Is Easy To Use

GPA is Designed for Compatibility and Flexibility

A major GPA design goal was to simplify the process of incorporating progression analysis into everyday practice. The GPA is compatible with SITA Standard, SITA Fast and Full Threshold testing strategies. Your GPA software uses your current database of patient test results.

GPA Provides Automated Exam Selection

The GPA software is designed for easy use and implementation. Default test selection is automated. To assist you in getting exactly the analysis you want, you may modify the test selection at any time. Once GPA is set up for a patient, the software retains the settings and produces a new analysis after every new SITA Follow-up exam.

GPA Verifies Exam Reliability

The GPA software is designed to account for and compensate for random patient variability; however, high quality exams produce the best analysis. If the Fixation Loss reliability index exceeds acceptable tolerances, the GPA software will warn you by generating and printing out a ****Low Test Reliability**** message (see [Figure 8.4](#)). Tests showing excessive False Positive response rates (15% or greater) are automatically excluded from GPA analysis and are marked with an exclamation point ("!") in the Exam Selection dialog. The printout will include the notation "*** Excessive High False Positives ***".

GPA Is Easy To Understand

GPA Features Familiar and Simple Reports

GPA reports are designed to look very similar to your other HFA printouts. The Full GPA report is based on the familiar Overview format and includes a Graytone Plot, a Pattern Deviation Plot, Deviation from Baseline Plot, a Progression Analysis Probability Plot and key global indices such as MD, PSD, and VFI (see ["Global Indices," on page 7-7](#) for a description of the VFI index). The Single Field Analysis printout (SFA GPA) incorporates a GPA Progression Analysis Probability Plot. The GPA Summary, Full GPA, and GPA Last 3 Follow-up reports also include the VFI Plot—an easy-to-interpret trend analysis of the overall visual field, featuring the new VFI index.

GPA Event Analysis Includes Progression Indicators

The Progression Analysis Probability Plot uses a simple set of symbols in the Progression Analysis Probability Plot, providing an intuitive indicator of glaucoma progression.

 Small open triangle – Identifies any test point that has worsened by an amount that exceeds the variability expected in all but the most variable 5% of glaucoma patients having similar visual field status ($p < 0.05$). This symbol is used when the change was not seen on the previous Follow-up test.

 Half-filled triangle – Identifies a point changing by an amount that is significant at the $p < 0.05$ level and that is repeated in *two* consecutive Follow-up exams.

 Filled triangle – Identifies a point changing by an amount that is significant at the $p < 0.05$ level and that is repeated in *three* consecutive Follow-up exams.



Note: If you use the now superseded Glaucoma Change Probability (GCP) analysis to analyze Full Threshold tests, the GCP also uses an open triangle in its analysis. In the GCP, the open triangle indicates a point that has improved, not a point that has progressed. Be careful not to confuse these two differing uses of the open triangle symbol in your analyses.

GPA Event Analysis Uses Plain Language Interpretation – The GPA Alert

Progression is defined as statistically significant change that is also clinically repeatable and consistent. When statistically significant degradation is seen in the same three or more points on *two consecutive Follow-up tests*, the GPA software interprets the patterns for you and automatically alerts you to: **Possible Progression**.

A statistically significant change from Baseline in the same three or more points in *three consecutive Follow-up tests* will alert you to: **Likely Progression**.



Note: The points need not be clustered together to satisfy either criterion.

Overview of GPA Reports

This section provides an overview of the different GPA reports that are available. Later sections of this chapter will provide detailed descriptions of important information in these reports and instructions on how to select each one for export or printing.

GPA Summary Report

The new GPA Summary report is pictured in [Figure 8.1](#). This powerful one-page report provides an overview of the patient's entire visual field history. At the top of the report, Graytone and Pattern Deviation Plots are shown for both chosen GPA Baselines, along with key indices such as VFI, MD, and PSD. In the center of the page, a trend plot called the "VFI Plot" with linear regression analysis (when appropriate) of the VFI is shown for all exams included in the analysis. Next to the VFI Plot is the VFI Bar, a histogram that provides a graphical representation of the patient's current VFI value along with a 2-5 year projection of the VFI regression line. Results for the current visual field exam are shown at the bottom of the GPA Summary report, including the Graytone Plot, Pattern Deviation Plot, Deviation from Baseline Plot and the Progression Analysis Probability Plot. The GPA Alert will appear here as well.

GPA Summary Report Example

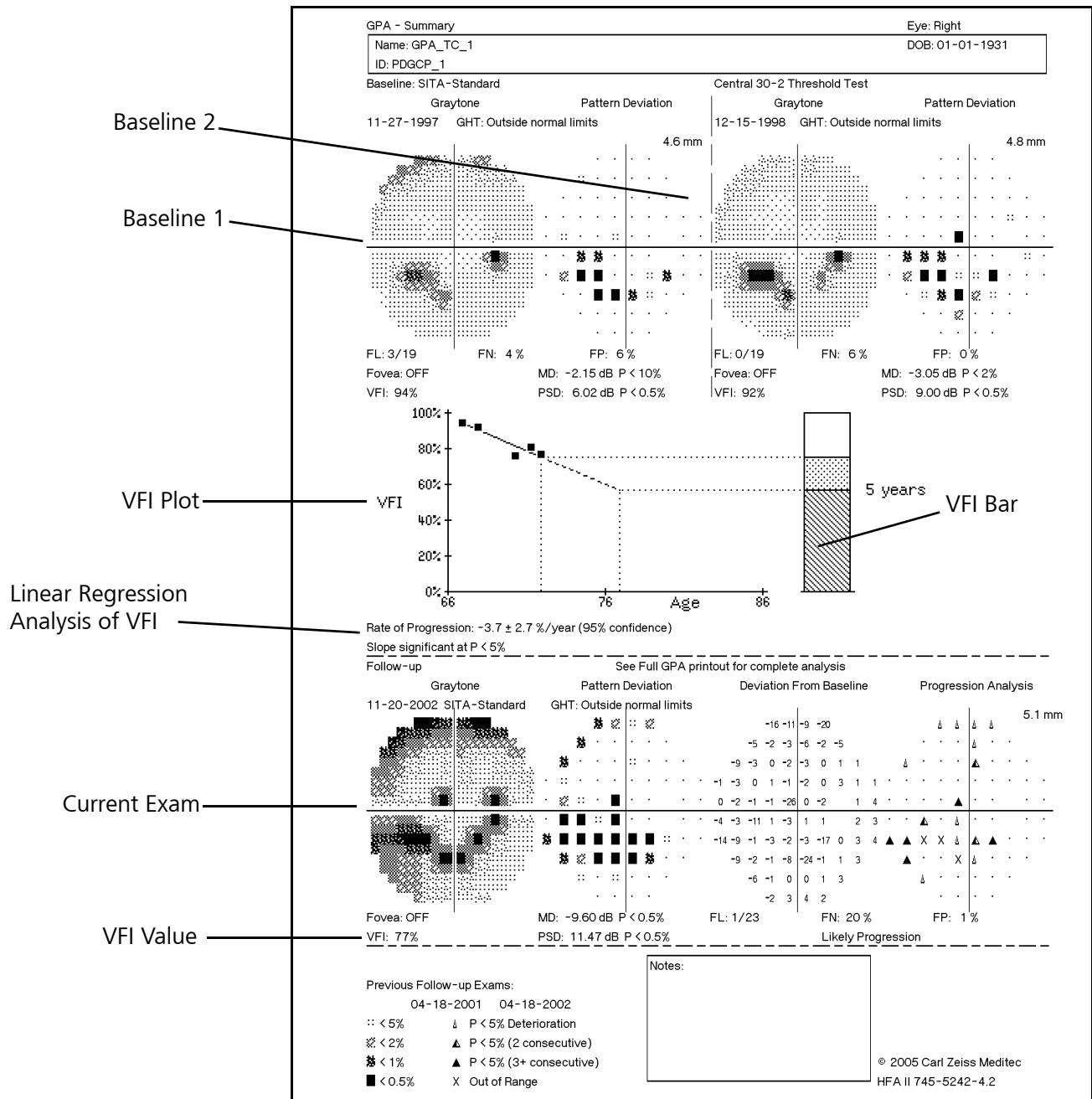


Figure 8.1 GPA Summary Report

Single Field Analysis with GPA (SFA GPA)

The SFA GPA, a Single Field Analysis printout that includes GPA results, is pictured in [Figure 8.2](#). The GPA information box includes the Progression Analysis Probability Plot for this test, along with the exam dates for the GPA Baseline exams and the two previous Follow-up exams. The GPA Alert, VFI, MD, and PSD values are also displayed here.

Full GPA Report

The Full GPA report is a multi-page overview of the patient's entire history, comprised of a Baseline page ([Figure 8.3](#)) followed by multiple Follow-up pages ([Figure 8.4](#)). The Baseline page provides detailed information on the two GPA Baseline exams, including Graytone Plot, Threshold (dB) Plot, Total Deviation Plot, Pattern Deviation Plot, and key indices including VFI, MD, and PSD. The VFI Plot and VFI Bar are shown at the bottom of the first page of the Full GPA report. Subsequent pages of the Full GPA report show three Follow-up exams per page in the format: Graytone, Pattern Deviation, Deviation from Baseline, Progression Analysis, and key indices. Up to 14 Follow-up exams may be included.

GPA Last 3 Follow-up Report

The GPA Last 3 Follow-up report follows the same format as the Full GPA report, but includes only the three most recent Follow-up exams. This report is always two pages long when printed.

Single Field Analysis with GPA (SFA GPA) Example

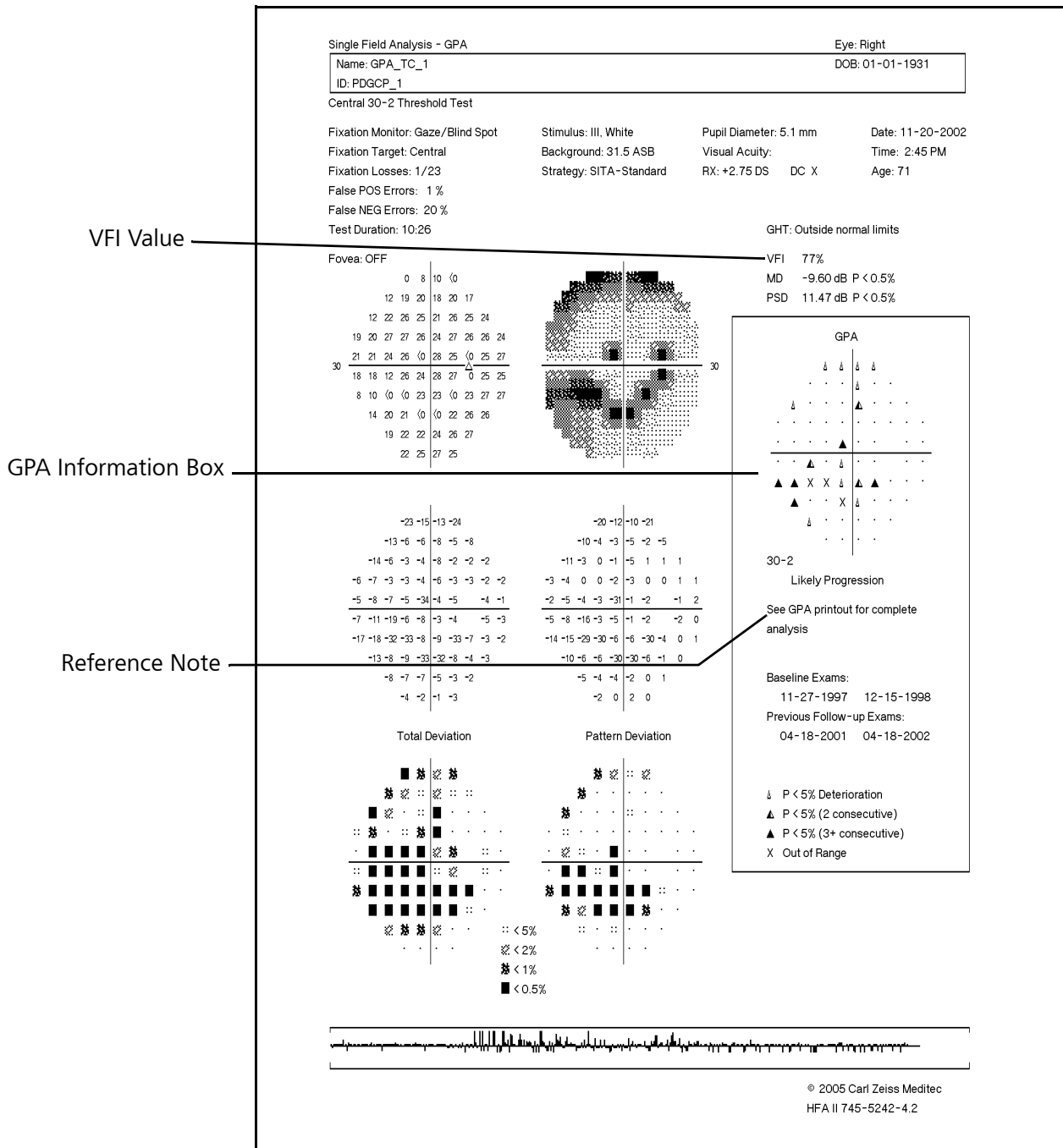


Figure 8.2 Single Field Analysis with GPA (SFA GPA)

Full GPA Report Example – Baseline Page

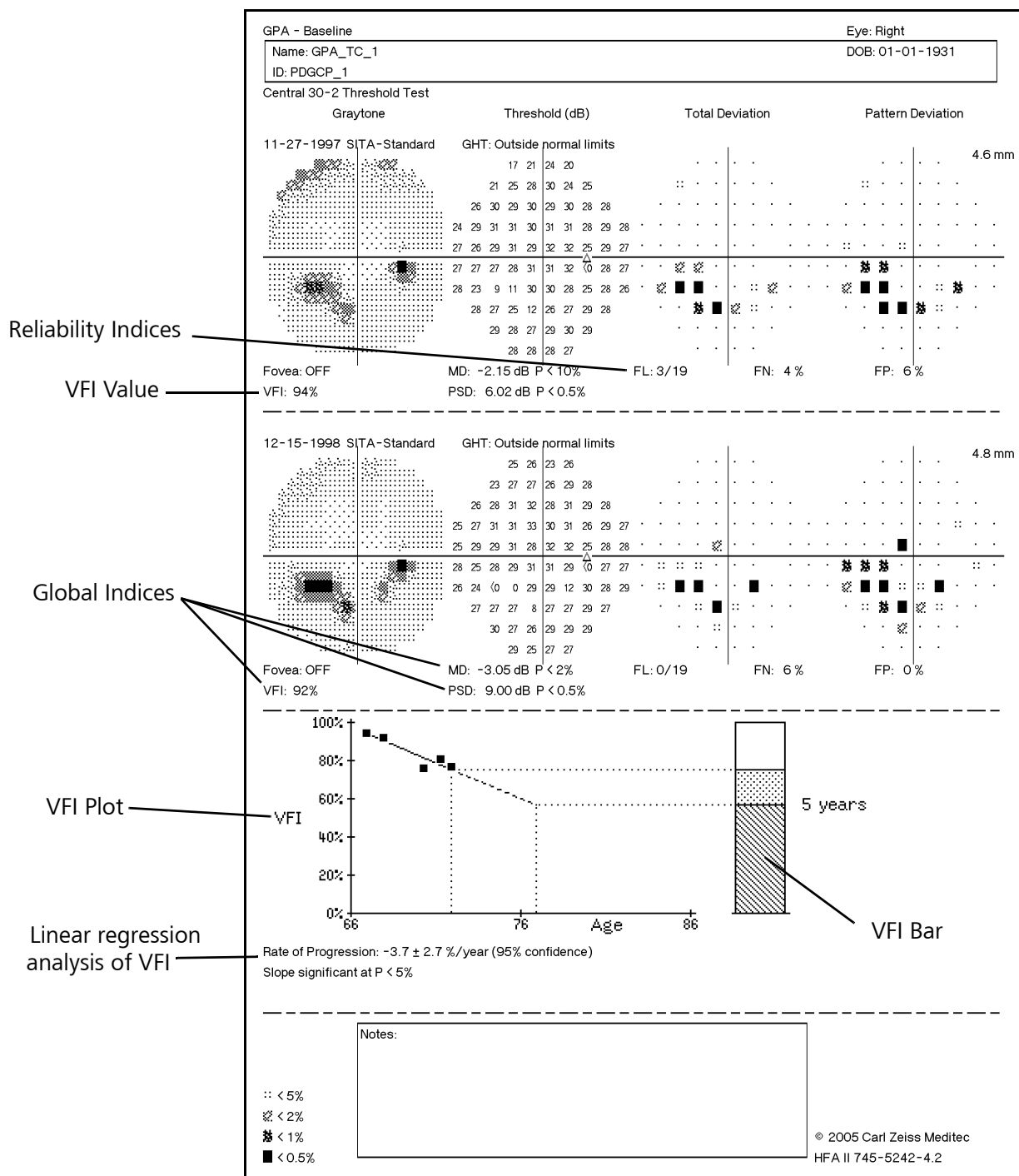


Figure 8.3 GPA Baseline Test Results from the Full GPA Report

The Full GPA Report (Figure 8.3) includes similar patient information to that appearing on other HFA printouts. The Baseline data presentation mirrors the Overview printout in its four columns: Graytone, Threshold (dB), Total Deviation Probability Plot, and Pattern Deviation Probability Plot. A trend plot with regression analysis (when appropriate) of the VFI is provided for each test included in the analysis.

Understanding GPA Reports

GPA reports (GPA Summary, SFA-GPA, Full GPA and GPA Last 3 Follow-up) provide information in addition to the familiar Graytone Plot, Pattern Deviation Plot, and key indices such as VFI, MD and PSD. They also provide information that is unique to GPA, including the Deviation From Baseline Plot, the Progression Analysis Probability Plot (commonly referred to as the "GPA Triangle Plot"), the GPA Alert and the VFI Plot (with VFI Bar). These features are described below.

Deviation from Baseline Plot

The Deviation from Baseline Plot compares the pattern deviation of the Follow-up test to the average of the pattern deviation values of the two Baseline tests, and indicates changes at each tested point, in dB notation. For example, a value of -6 means that the tested point was 6 dB lower than the pattern deviation value for the same point in the Baseline. A zero (0) means there was no change from Baseline.

Progression Analysis Probability Plot

The Progression Analysis Probability Plot gives the statistical significance of the decibel changes shown in the Deviation from Baseline Plot. It compares the changes between the Baseline and Follow-up exams to the inter-test variability typical of stable glaucoma patients and then shows a plot of point locations which have statistically changed.

- A single, solid dot • indicates a point not changing by a statistically significant amount.
- A small open triangle  identifies a degree of deterioration expected less than 5% of the time at that location in stable glaucoma patients; that is, deterioration at the 5% level ($p < 0.05$). Since we are measuring at the 5% level, an average of 2 to 3 triangles can be expected by chance (out of the 76 stimuli in a 30-2 exam) in any given comparison of a Follow-up exam to the Baseline exams. While it is important to follow these points, scattered open triangles are not uncommon in stable glaucoma patients.
- A half-filled triangle  indicates statistically significant deterioration at that point in two consecutive tests.
- A solid triangle  indicates statistically significant deterioration at that point in three consecutive tests.
- An **X** signifies that the data at that point was out of range for analysis. For data that is out of range, GPA cannot determine whether or not the encountered deviation at that point is statistically significant. This occurs mainly with field defects that were already quite deep at Baseline, such that even the maximum available stimulus brightness is within the range of normal variability, but can also occur when the measured threshold is *higher* than the Baseline.

GPA Alert

The GPA Alert (Figure 8.4) assists you in recognizing deterioration in consecutive tests. Note that the GPA Alert pertains to the eye as a whole, not to specific points in the visual field. In cases where 3 or more points show statistically significant deterioration in at least 2 consecutive tests, the progression analysis indicates "Possible Progression." In cases where 3 or more points show statistically significant deterioration in at least 3 consecutive tests, the progression analysis indicates "Likely Progression." When neither of the foregoing conditions applies, a message of "No Progression Detected" is displayed.

VFI Plot

The VFI Plot (Figure 8.3) graphs the VFI values of all exams included in GPA analysis as a function of the patient's age. VFI values from Full Threshold exams are represented by open squares, and VFI values from SITA exams are represented by filled squares. Located in the center of the GPA Summary report or the lower-left portion of the Baseline page of the Full GPA and GPA Last 3 Follow-up reports, the VFI Plot provides a linear regression analysis of the VFI over time when appropriate. A minimum of 5 exams over 2 years or more must be included in GPA for the linear regression results to be presented. In addition, the linear regression line will not be drawn if the slope of the line is positive. Finally, this line will also not be drawn when the 95% confidence limit on the measured slope is greater than 5%.



Note: The regression line slope may be positive due to statistical uncertainty or the learning effect.

To the right of the VFI Plot is the VFI Bar, a histogram that indicates the patient's current VFI value. In addition, when the results of the regression analysis are displayed, the VFI Bar will also graphically indicate the 2 to 5 year projection of the linear regression line, shown as a broken line. The length of projection is equal to the number of years of GPA data that is available, up to a maximum projection time of 5 years.

Establishing the GPA Baseline

The Baseline is the average of two tests chosen as representative of the patient's baseline status. Subsequent Follow-up tests are compared with these two tests in order to help you monitor the progression of glaucomatous change. This monitoring process can be useful for determining the effectiveness of the patient’s therapeutic regimen in slowing or halting the progression of the disease.

GPA Baseline – Follow-up Configurations

By default, GPA selects the Baseline and Follow-up tests for you, but you can easily change the selection. Any given exam that you wish to print serves as a Key Exam that dictates: 1) the printed report options, and 2) the tests included in the multi-exam reports. Multi-test reports will allow only tests that occurred up to the date of the Key Exam and not after. Only SITA Standard and SITA Fast tests will offer GPA reports as options. Choosing a SITA Standard Key Exam will only allow SITA Standard and Full Threshold exams in the GPA reports, not SITA Fast exams. Choosing a SITA Fast Key Exam will only allow SITA Fast and Full Threshold exams in the GPA reports, not SITA Standard exams. More information on Permitted Tests for GPA are outlined in [Table 8.1](#).

Table 8.1 Permitted Baseline–Follow-Up Configurations for GPA

If the Key Exam is:	And if the Baseline Exams are:	Follow-up Exams must be:
SITA Standard	SITA Standard	All SITA Standard
SITA Standard	Full Threshold	Any combination of SITA Standard and Full Threshold
SITA Fast	SITA Fast	All SITA Fast
SITA Fast	Full Threshold	Any combination of SITA Fast and Full Threshold



Note: GPA supports the inclusion of Central 30-2 and 24-2 in the same analysis. GPA will analyze all tests in this case as if they were 24-2 tests. GPA does not support FastPac tests or Central 10-2 tests for either Baseline or Follow-up.

Default Baseline Selection Rules

GPA software will automatically select Baseline exams for you. The oldest two exams of the same type are automatically selected unless there are more than 14 Follow-up exams, in which case it selects the first pair of exams of the same strategy immediately preceding the 14 Follow-up exams. **It is critical, however, that you ensure that tests included in the Baseline are representative of the patient’s actual Baseline status.**

GPA software assists you in identifying potentially unreliable exams and will remove them from the GPA analysis, as follows:

- **Learning Effect:** It is not uncommon for the measured thresholds in a patient’s initial visual field exams to be suppressed relative to subsequent exams because the patient has not yet become proficient at taking a visual field exam. This is known as the “Learning Effect.” If the results of a patient’s earliest selected Baseline exam indicate a significant learning effect, and there is another exam of the same type available to use as a Baseline, then the first exam will

be removed from the GPA analysis. If there is no appropriate replacement exam of the same type, then the following message will appear on the GPA Baseline printout:

"First examination should not be used as Baseline due to marked learning effects."

We recommend that you exclude this exam from the Baseline, choose a more representative Baseline, and then reprint the GPA.

- **False Positives of 15% or more:** If an exam has false positives that are equal to or greater than 15%, it is not eligible for use in GPA, and will be marked with an exclamation point (!). In this case, the SFA GPA printout will include the notation "*** Excessive High False Positives ***".

Using the VFI Plot To Select Consistent Baseline Exams

The VFI Plot, which graphs the VFI values of all exams included in GPA analysis as a function of the patient's age, may be used to help choose the correct tests to use for the Baseline. Located in the center of the GPA Summary report, or the lower-left portion of the Baseline page of the Full GPA and GPA Last 3 Follow-up reports (see [Figure 8.6a](#)), the VFI Plot can be used to verify the "similarity" of the two Baseline visual fields. If there is a large difference in the VFI values, the two Baseline tests may not accurately reflect the patient's true Baseline status. In addition, if the VFI of the first Baseline is significantly below the VFI of the second Baseline, then the first exam may not be a reliable measure of the patient's visual function due to the learning effect (see Learning Effect on [8-12](#)). In either case, it is often desirable to replace one of the Baseline exams with a different exam from the series.

Choosing to Re-Baseline a Patient

It is prudent to periodically review the current Baseline exam choices, particularly when either of the following events occur during the course of managing a patient's disease:

- There is a change in the course of therapy, such as a surgical intervention or a change in medication.
- If learning effects are suspected or retrospectively identified ("[GPA Case 2: Learning Effect](#)," on [page 8-19](#)).

Step-by-step instructions for how to change the Baseline can be found in section "[Step 3: Modify the GPA Exam Selection \(Optional\)](#)," on [page 8-32](#).

Clinical Interpretation of GPA Results

The GPA software identifies statistically significant change whenever it appears—in the form of small triangles on the Progression Analysis Probability Plot. However, clinically significant progression is best defined by repeatable, consistent change; for instance, as identified by the GPA Alert and preferably confirmed by other clinical observations.

Test-retest variability of perimetry results depend on a number of factors. These include scotoma depth and location, overall visual field status (as estimated by Mean Deviation), the test strategy used, and patient experience. GPA software takes into account and corrects for test point location, defect depth, and overall visual field status in determining whether or not change at a particular test point location is within or outside known statistical variability. New mathematical methods

were invented to calculate the expected variability ranges, and the resulting significance limits have been independently validated.

In the example shown in Figure 8.5, the arrow on the left indicates a point with the value -6 on the Deviation from Baseline Plot that is not flagged (see right arrow). A neighboring point to the lower right with a lesser deviation value (-4) is flagged. Knowledge of the complex patterns of test variability is built into the GPA analysis.

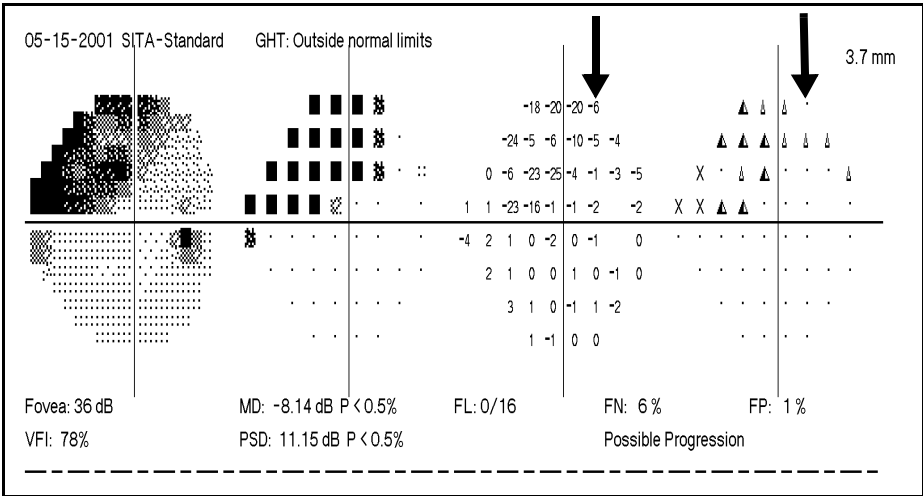


Figure 8.5 Significance of Change Depends on Test Point Location

Out-of-Range Points

Some points in the GPA are not eligible for analysis. These are marked with an “X” on the Progression Analysis Probability Plot and considered to be “out-of-range” points. In these cases, GPA is unable to determine whether the change from Baseline is statistically significant. Most points that fit these criteria are points that are quite depressed to begin with. Any change from the depressed Baseline values may be indistinguishable from the amount of change that might be due to the normal variability experienced in a visual field test. Often the “out of range” points are found to be points that have reached threshold values that are at maximum brightness (< 0 dB). Occasionally, points marked with an “X” are due to a selection of Baseline tests that are not truly representative of the patient’s visual field status. Sometimes the points can be analyzed with a change of Baseline tests. See the case examples that follow.

A Note of Caution

When considering the probability statements in this statistical package, it is important to be conscious of their limitations. They are an aid to interpretation, not a diagnosis. The doctor’s judgment is still the most important element in determining the clinical significance of perimetric findings.

You must always apply clinical judgment when using these tools. This software represents an attempt to aid the practitioner in making medical decisions. There will be situations where it will not give the proper analysis, either due to its own limitations or because it was applied to inappropriate data. Obviously, the practitioner must bear the ultimate responsibility for all decisions and diagnoses. In cases of uncertainty, consultation with sub-specialists is often the prudent course of action.

GPA Case Studies

GPA Case 1a: Unilateral Progression – Right Eye

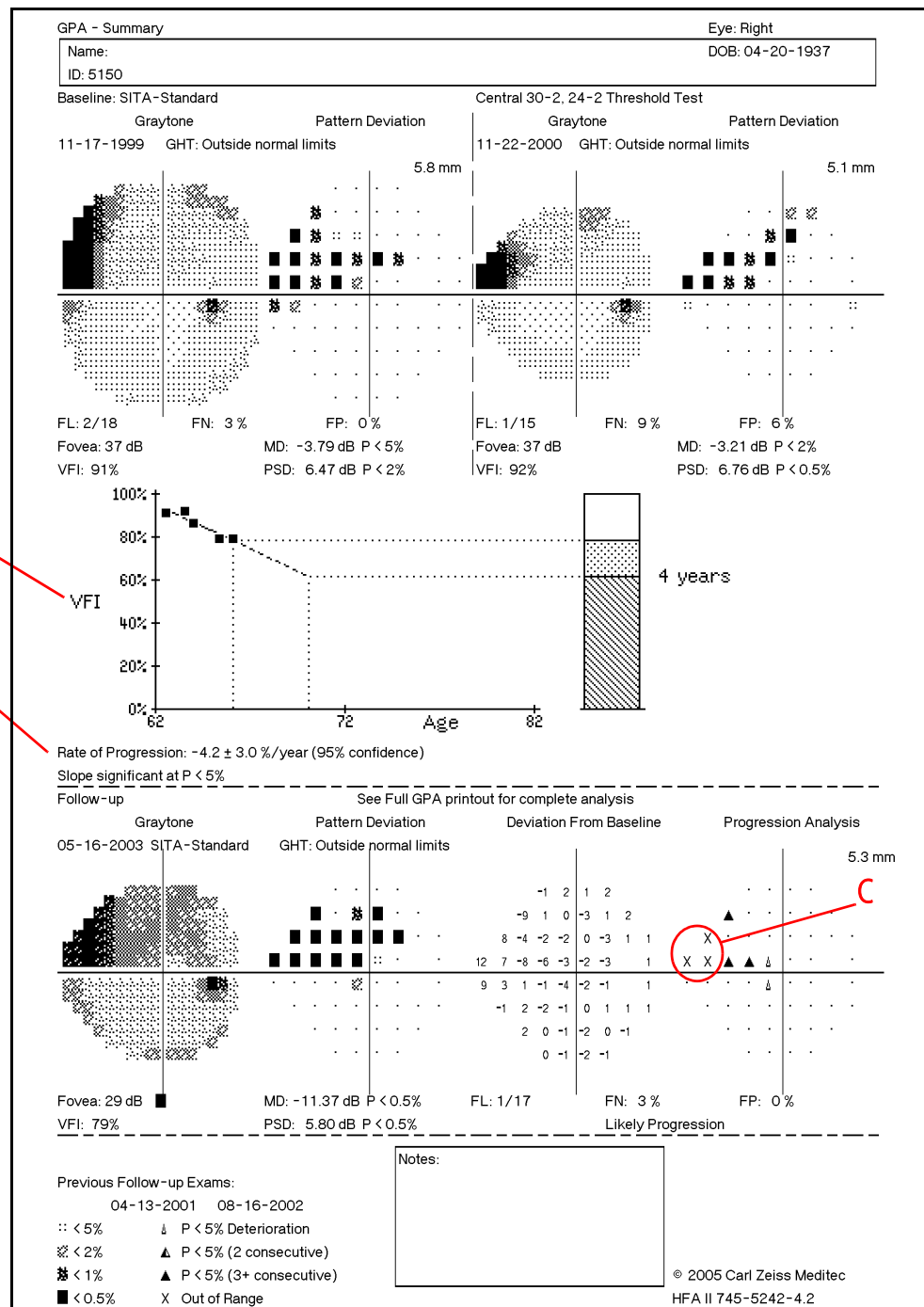


Figure 8.6a Progressing Right Eye – GPA Summary

Here is a GPA example showing visual field loss progression in a patient with moderate glaucomatous field loss. Progression can be recognized on the GPA Summary page by looking at the VFI Plot A and VFI Slope B. Note that out of range points C correspond to Baseline threshold values of < 0 dB.

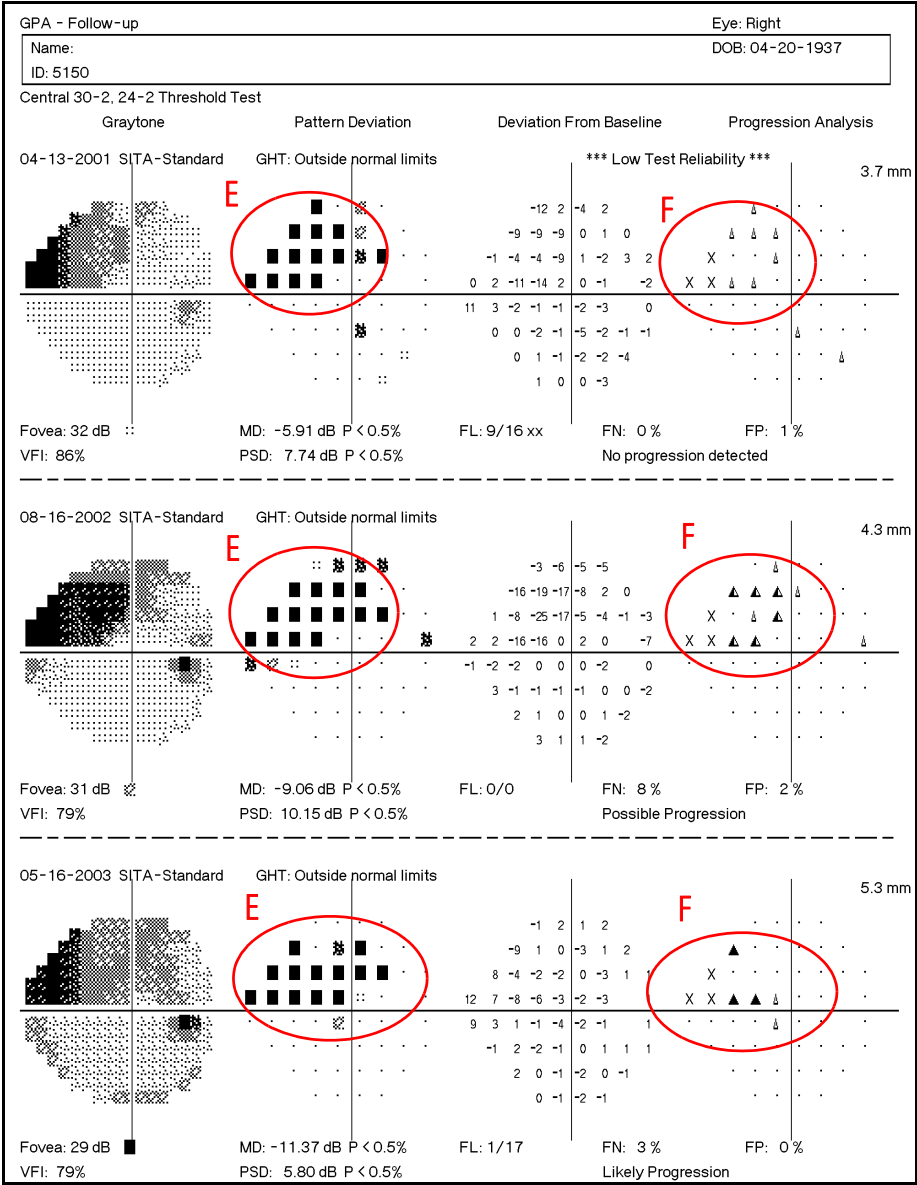


Figure 8.6b Progressing Right Eye – Follow Up

On this Follow-up page of a Full GPA report, numerous points are flagged with progression triangles across the three Progression Analysis plots **F**. GPA Alerts for “Possible Progression” and “Likely Progression” appear, indicating at least three points show deterioration over the second and third consecutive tests.

One advantage of using GPA is that it can demonstrate change in points that have already been flagged at the highest probability level relative to normal (black squares, **E**). In the same area on the Progression Analysis plots **F**, the GPA progression indicator triangles identify the changing points. Previously, doctors would resort to looking at the pattern deviation numbers and make comparisons of previous values to attempt to discover change in the 0.5% points. Now, the GPA calls out these progressing points and applies its statistical knowledge of expected inter-test variability to highlight points with statistically significant change.

GPA Case 1b: Unilateral Progression – Left Eye

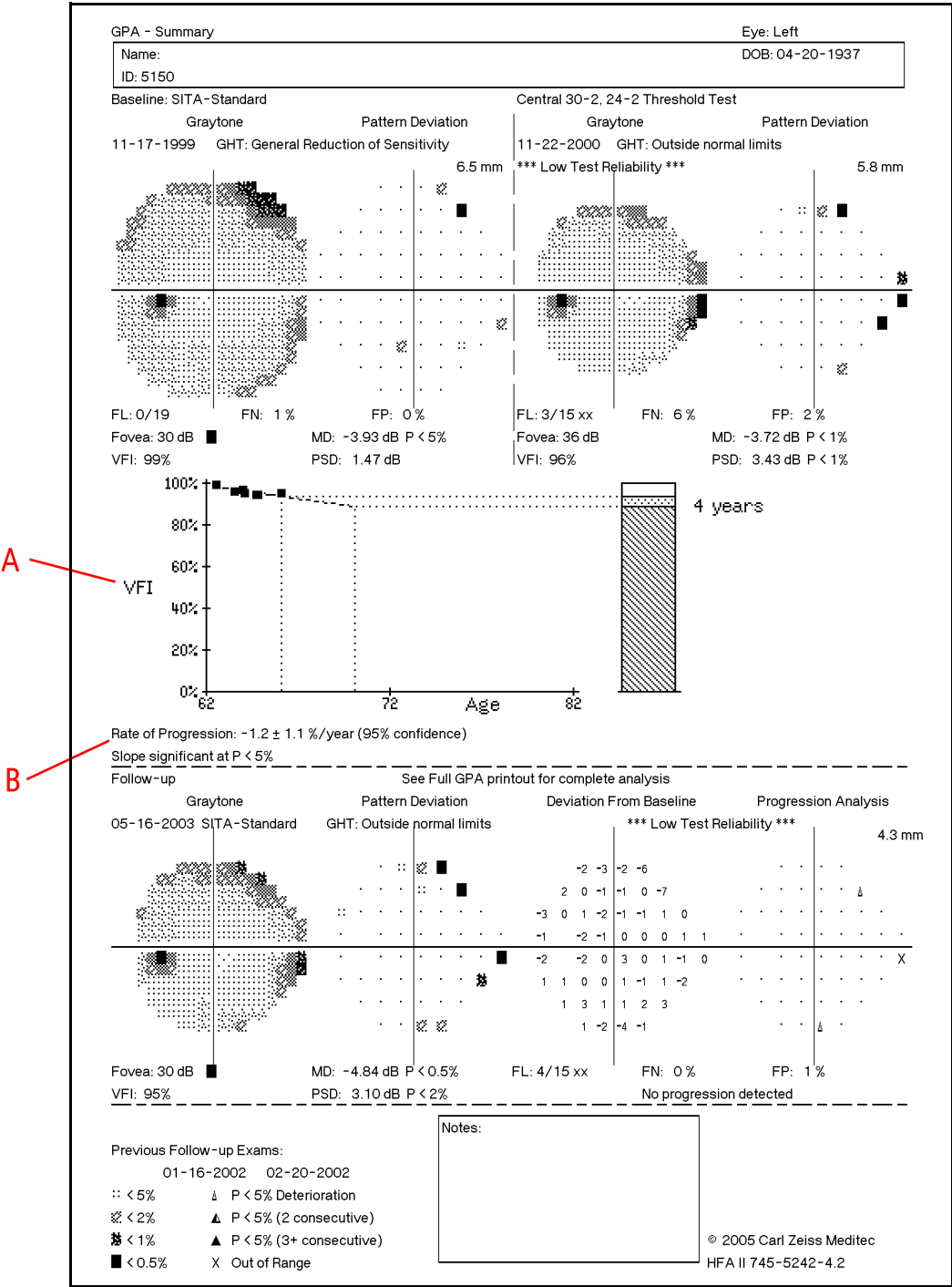


Figure 8.7a Stable Left Eye – GPA Summary

The example on these two pages shows the GPA printouts of visual fields for the previous patient's left eye. Looking at the VFI Plot **A** and the VFI Slope **B** there appears to be mild progression.



Note that the two Baseline tests consist of a 30-2 test and a 24-2 test. These two test patterns may be combined but, if so, the analysis will only consider the points within the 24-2 pattern.

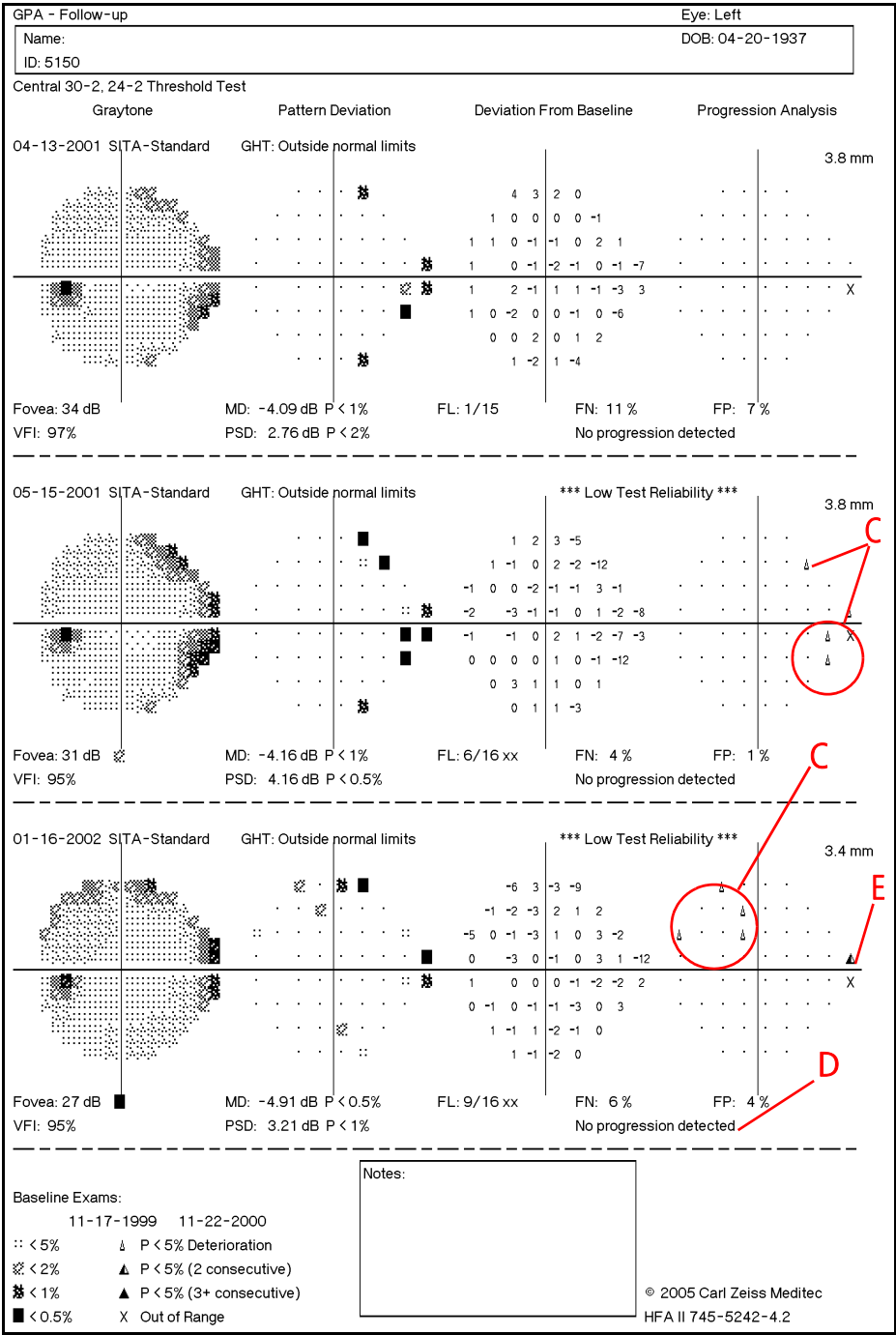


Figure 8.7b Stable Left Eye – Follow Up

Looking at the Follow-up printout on this page, there are a small number of points flagged on the Progression Analysis plots **C** but no GPA Alerts indicating progression **D**. The flagged points are in different parts of the visual field except for the point **E**. Recall that 3 or more points flagged with a progression triangle on two consecutive tests are required to trigger the "Possible Progression" GPA Alert. Only one point is highlighted for a second time. The GPA event analysis finds no evidence of consistent visual field progression, hence a GPA Alert message of "No Progression Detected."

GPA Case 2: Learning Effect

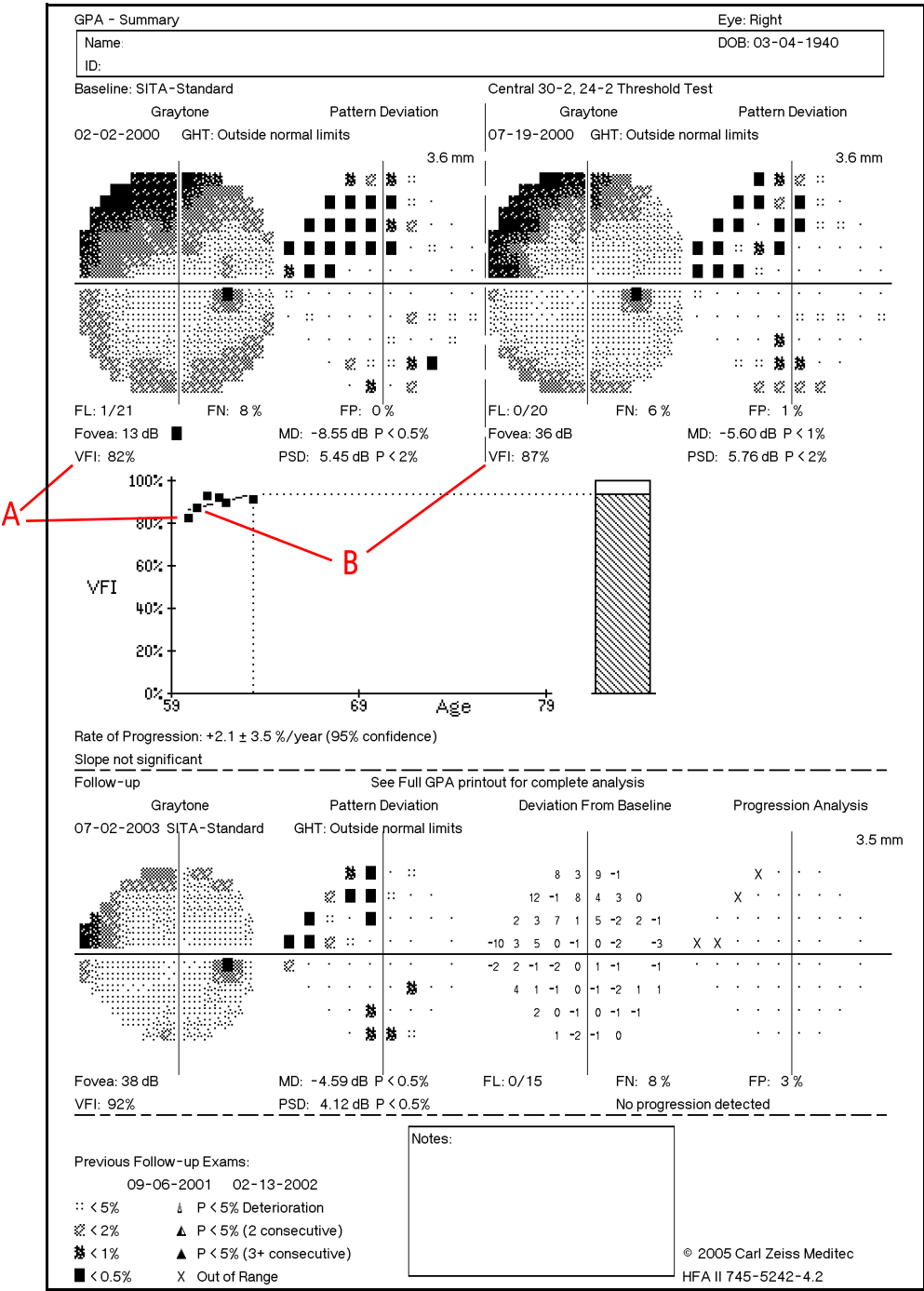


Figure 8.8 Patient Learning Effect – Right Eye

This case illustrates the learning effect. Many patients do better on threshold testing the second or third time tested. In many cases, GPA automatically removes the first exam in a series because it shows the learning effect. However in this case, as can be seen in the VFI Plot, the remaining Baseline still shows a learning effect because exam B has a significantly higher VFI value than exam A. Therefore, exam A, and perhaps even exam B, should be removed from the GPA analysis.

GPA Case 3: Full Threshold as Baseline and Follow-up

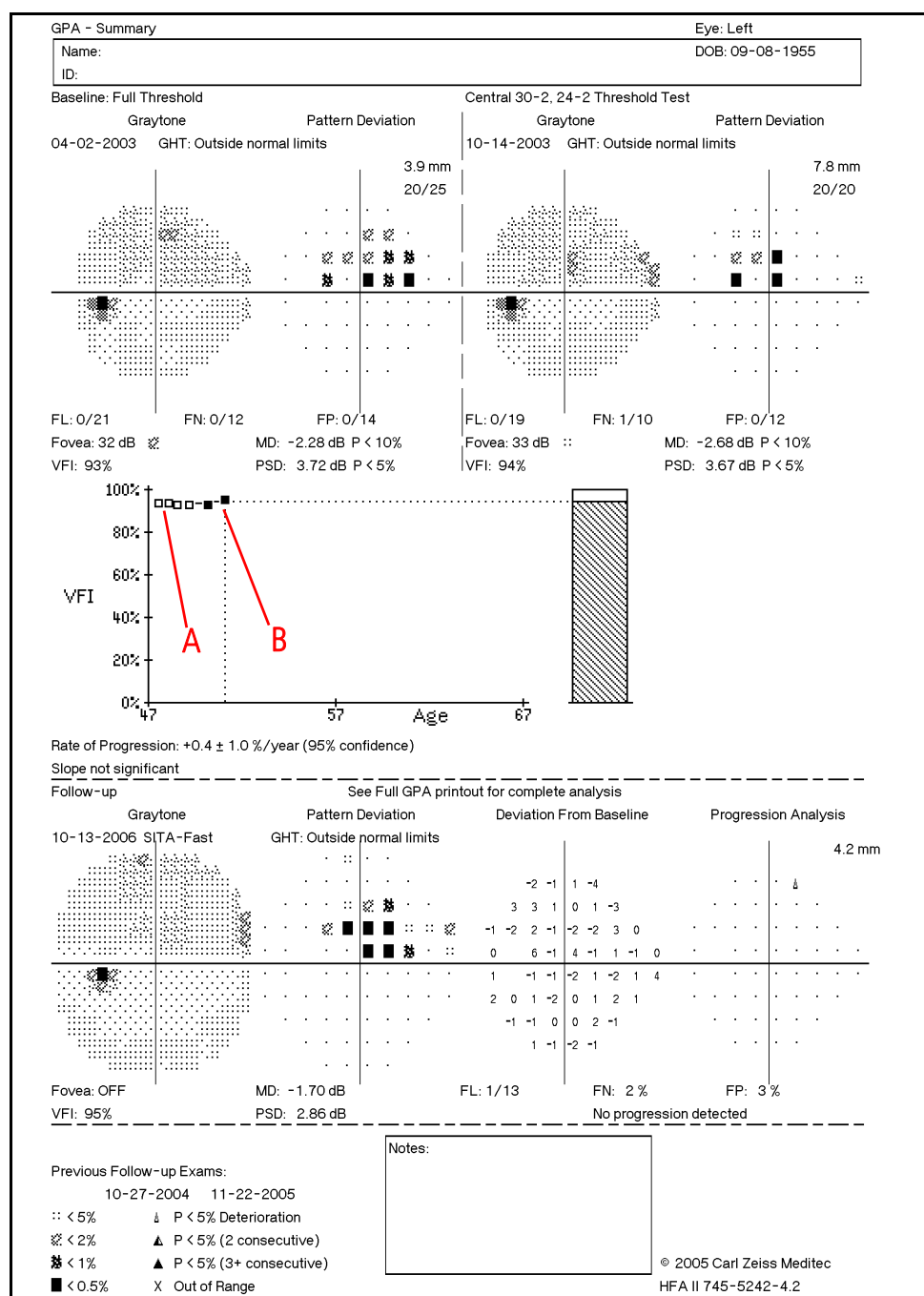


Figure 8.9 Using Full Threshold Tests for a Baseline

This report shows an example of Full Threshold tests being used as the Baseline. When Full Threshold tests are used for the Baseline, Full Threshold tests are eligible to be used as Follow-up tests. In the VFI Plot open squares signify Full Threshold tests **A**. Closed squares signify SITA Follow-up tests **B**. Remember that the Key Exam must always be a SITA Standard or SITA Fast test to include Full Threshold tests in GPA.

GPA Case 4a: Poor Quality Default Baseline

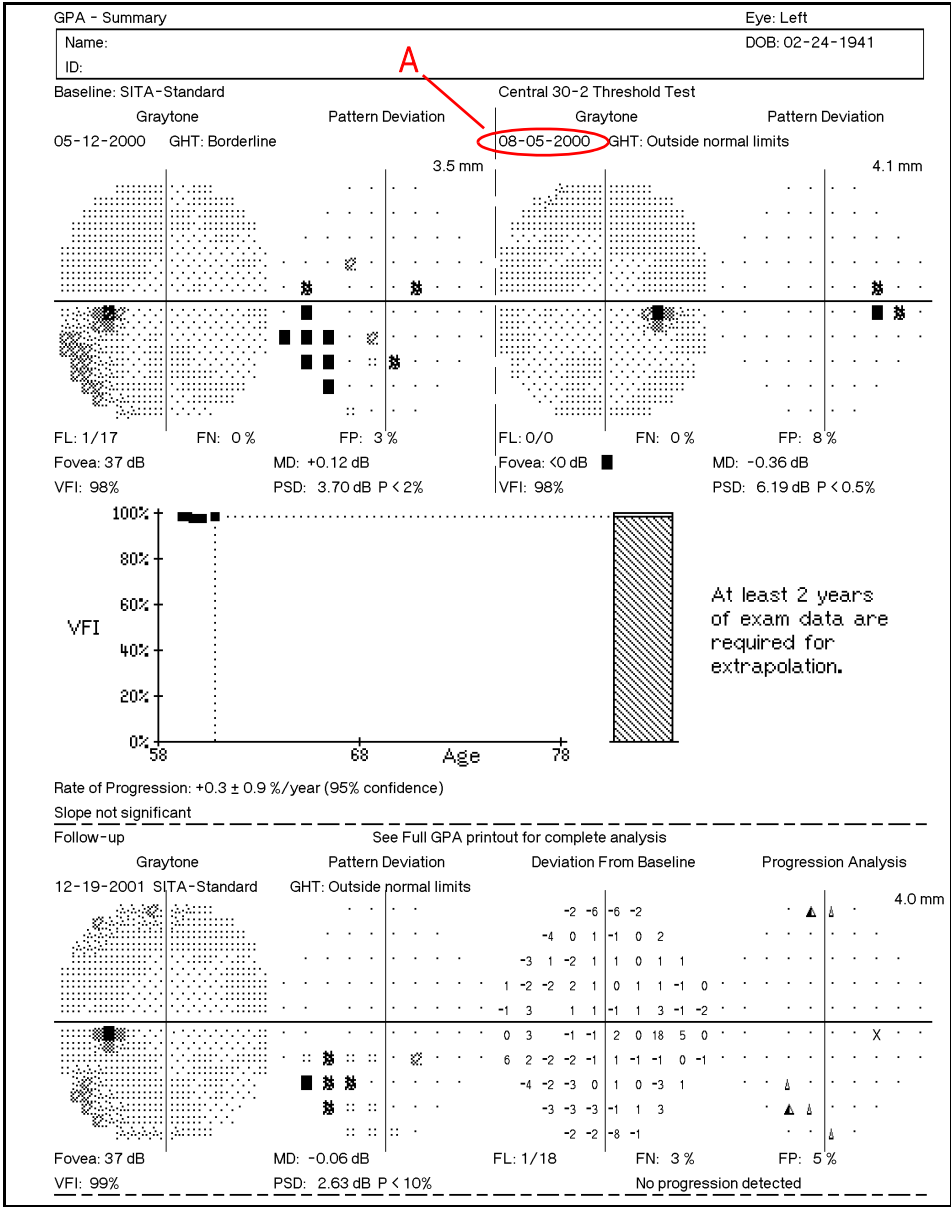


Figure 8.10a Poor Quality Default Baseline

Here is an excellent example of why the doctor should always verify that the chosen Baseline tests properly represent a stable condition. In the above example, an incorrect Baseline test **A** was created when the technician mistakenly tested the patient's right eye as if it were his left eye. Note the Blind Spot demarcated on the right-hand side of the visual field in the second Baseline test **A**.

GPA automatically selected the first and second oldest exams to act as the Baseline. The HFA has no way of recognizing that the second Baseline test was incorrectly saved as a left eye test. Thus, it is imperative that the doctor check the validity of the Baseline tests prior to making decisions based on GPA Follow-up findings.

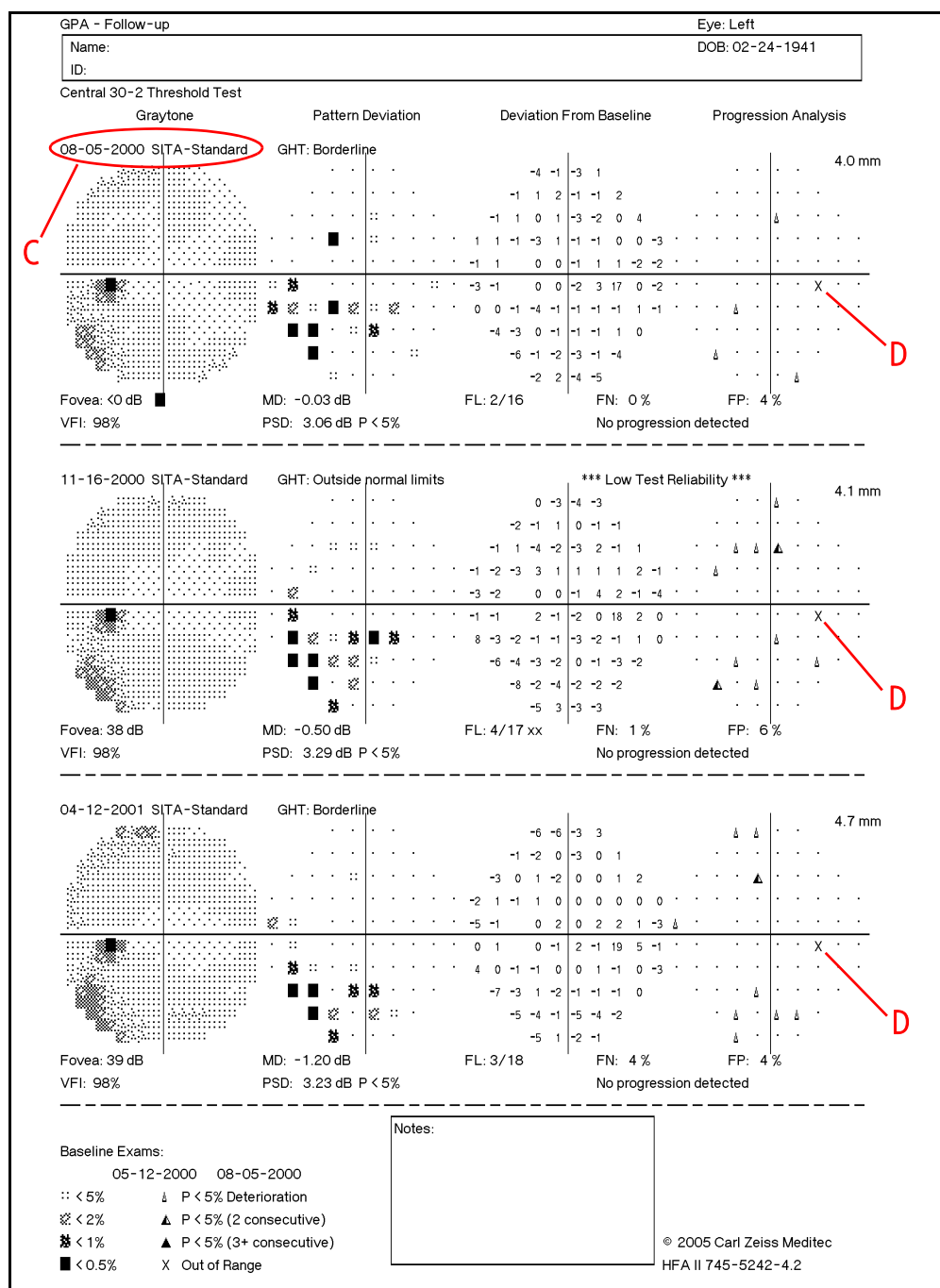


Figure 8.10b Poor Quality Default Baseline – Follow Up

On this Follow-up printout, you can see by the date of the first Follow-up test **C** that it was done on the same day as the incorrect second Baseline test **A** seen on the previous page. The technician had corrected the mistake by having the patient redo the test. Unfortunately, the incorrect test was not removed from the GPA list.



Note the X in the Progression Analysis plot pointed out by the arrow **D**. This point corresponds to the false scotoma created by the Blind Spot of the second Baseline test **B**. The proper thing to do is to remove the second Baseline test from the GPA list and have the HFA re-process the GPA.

GPA Case 4b: Poor Default Baseline Corrected

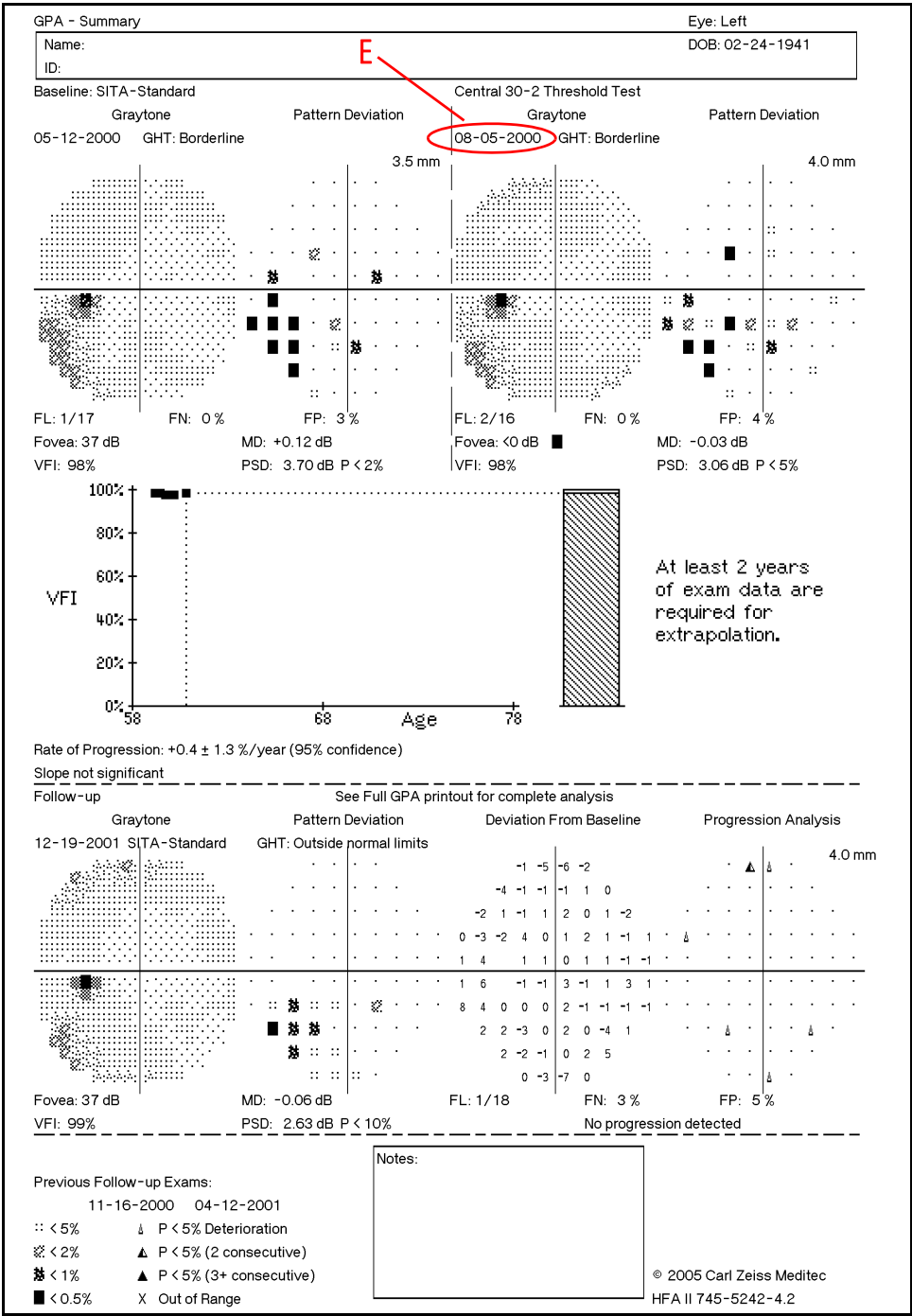


Figure 8.11a Correction of a Poor Quality Default Baseline

The repeated (correct) test on 8/5/2000 C is now used as the second Baseline test E in this new example. Note the similarity in the two Pattern Deviation plots and VFI values between these two Baseline tests. This similarity is the key to well-chosen Baseline tests. Now compare the large Pattern Deviation differences in the two Baseline tests shown in Figure 8.10a.

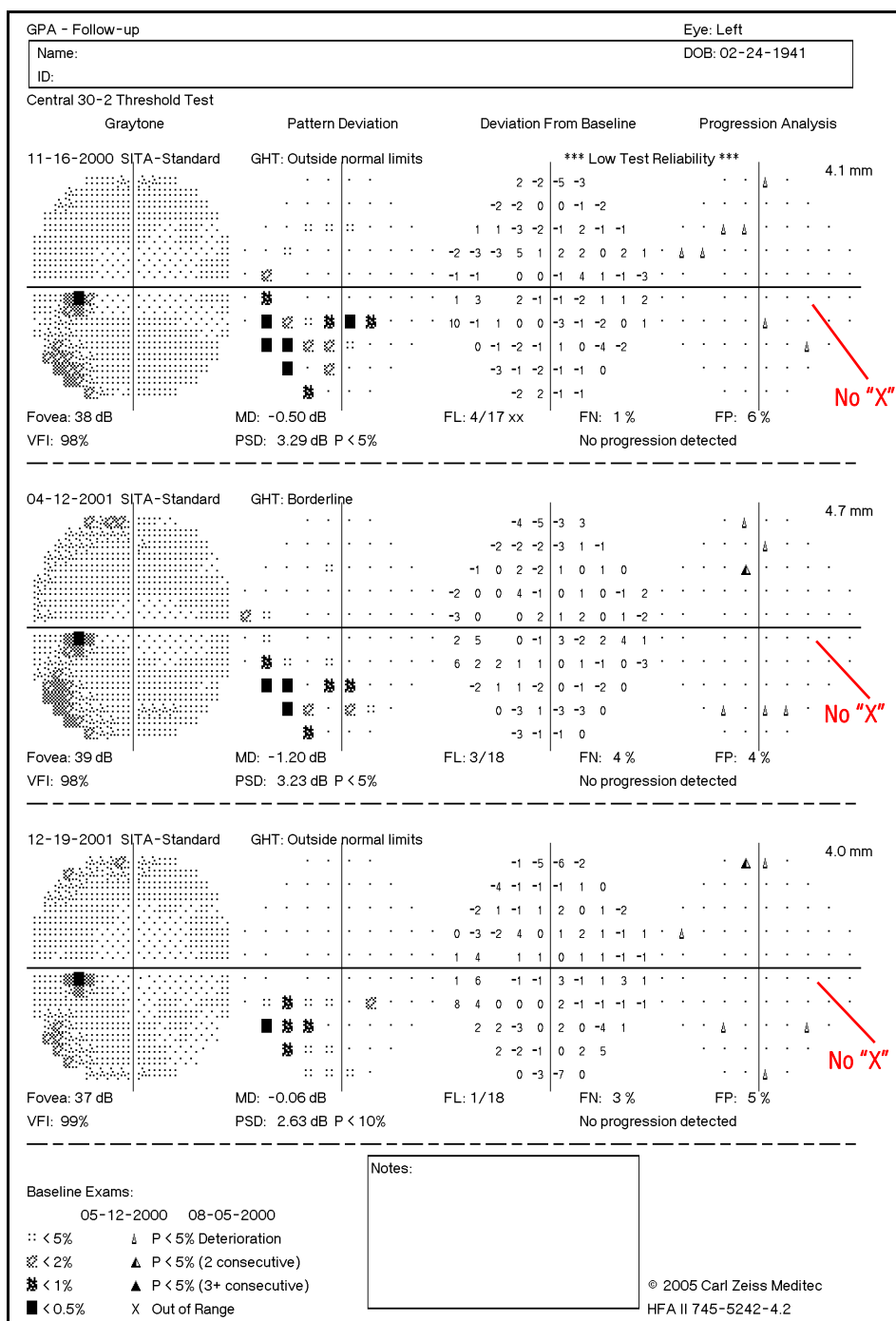


Figure 8.11b Correction of a Poor Quality Default Baseline – Follow Up

The Out of Range "X" is no longer present where the blind spot from the other eye had been (as shown by the arrows pointing to the former location of the "X" in three different spots on this illustration). There are a few scattered points flagged in the Progression Analysis Probability Plot for each test, but they are not repeatable enough to raise the GPA Alert.

GPA Case 5a: Changing the Baseline to Improve "Out of Range" Points

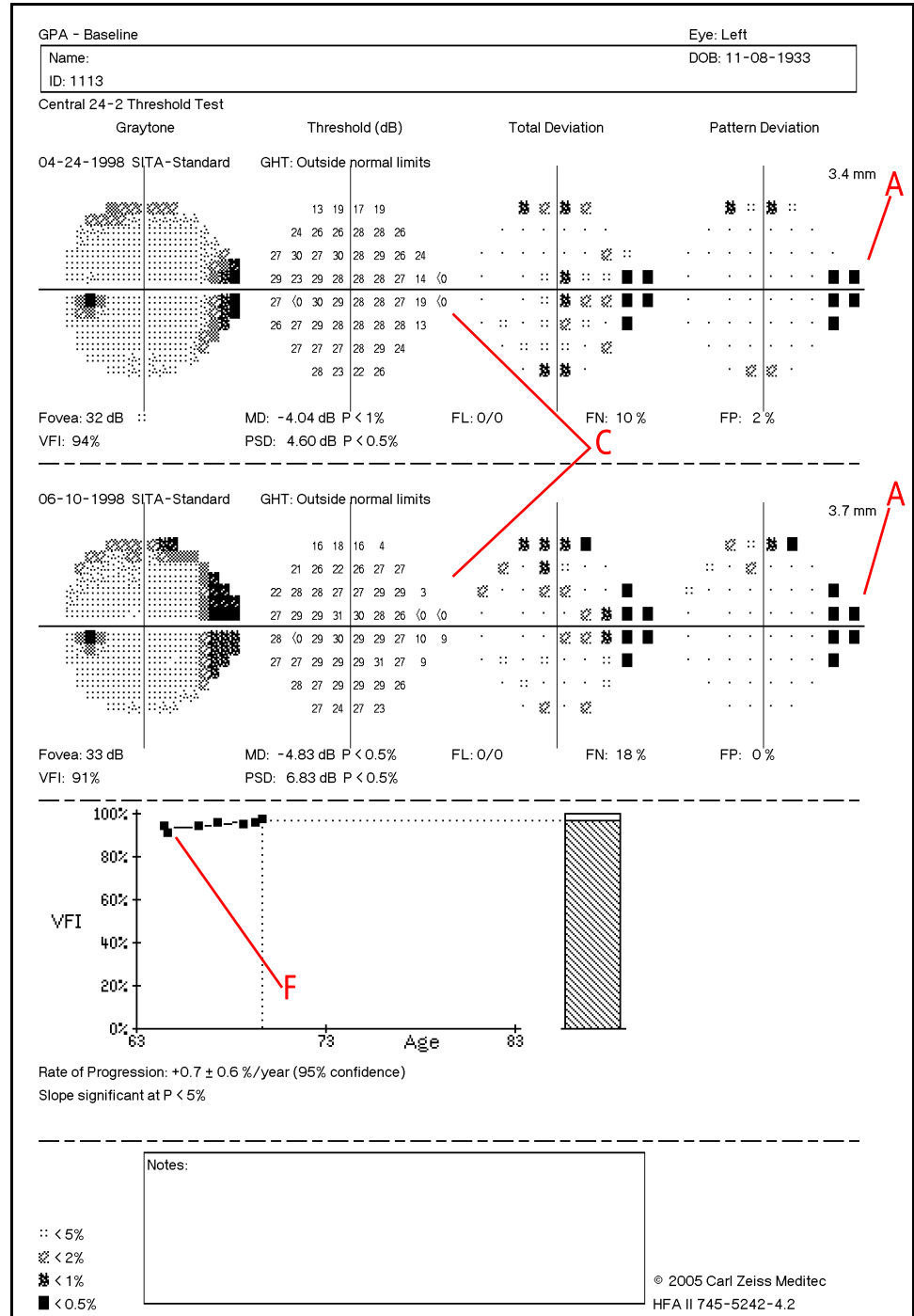


Figure 8.12a Improving Out of Range Points – Baseline 1

In this example, the patient appears to have a deep scotoma in the nasal area of the left visual field as indicated on this Baseline page. Note the < 0.5% indicators on the Pattern Deviation Probability plot **A**, as well as the first Follow-up visual field (see opposite page **B**). Review of the two Baseline exams indicate maximum brightness (< 0) values at some of these points **C**.

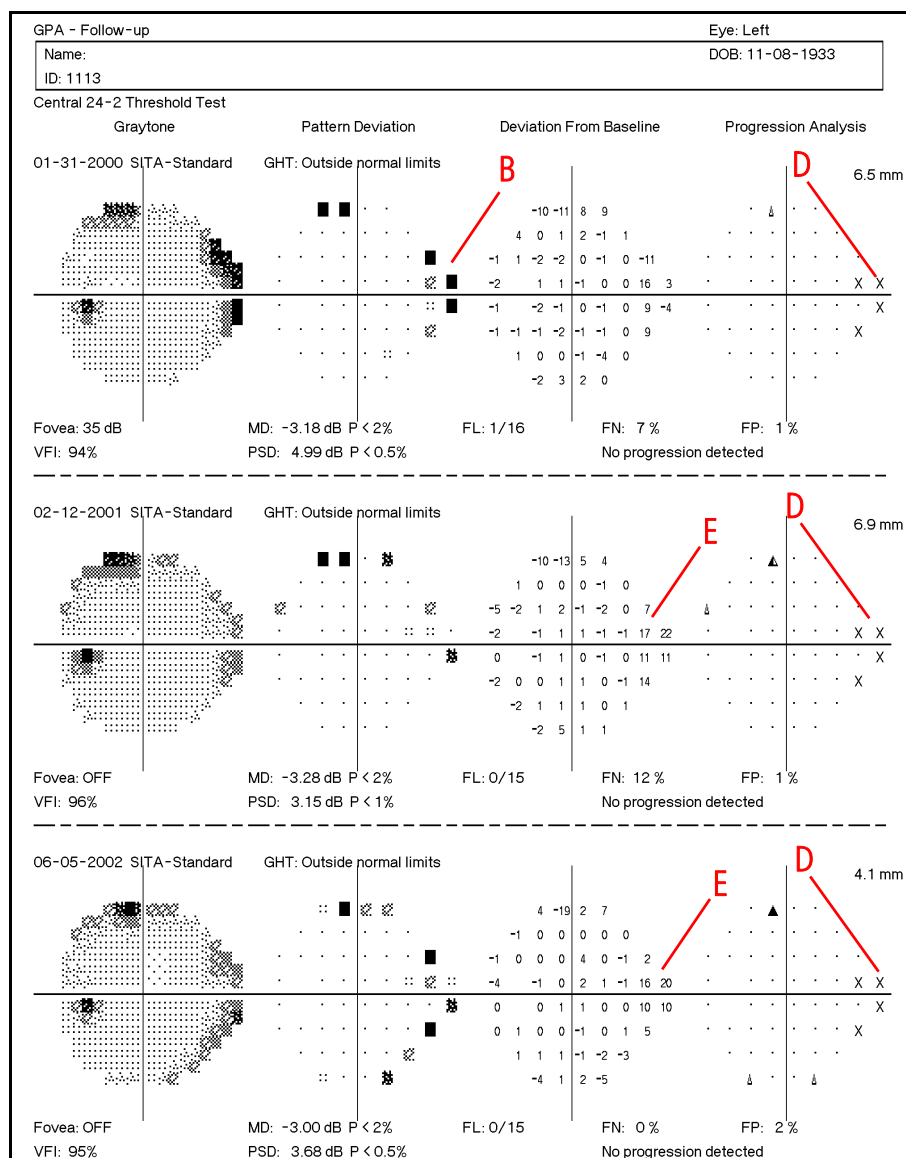


Figure 8.12b Improving Out of Range Points – Follow Up 1

On subsequent Follow-up visits, these points **D** are appropriately marked as “Out of Range”. Reviewing the Deviation From Baseline chart for the second and third Follow-up visual fields indicates large positive values for these points **E**. This suggests improvement in the Pattern Deviation values at these points. This amount of improvement is unlikely and probably indicates either learning by the patient or a trial lens artifact that was present during the Baseline tests but which had been rectified in later tests.

An additional hint is provided by the VFI Plot seen below the Baseline visual fields in Figure 8.12a. The plot shows the first two tests in the sequence (the two tests chosen by the HFA as the default Baseline tests) with a reduced VFI compared to the later tests **F**. This may help you see how the first two tests may have been affected and their subsequent effect on the Follow-up tests. In this case, the result created points marked as “Out of Range”. Changing the original Baseline to a more appropriate pair of Baseline tests resolves this situation. See next page.

GPA Case 5b: Changed Baseline Improves "Out of Range" Points

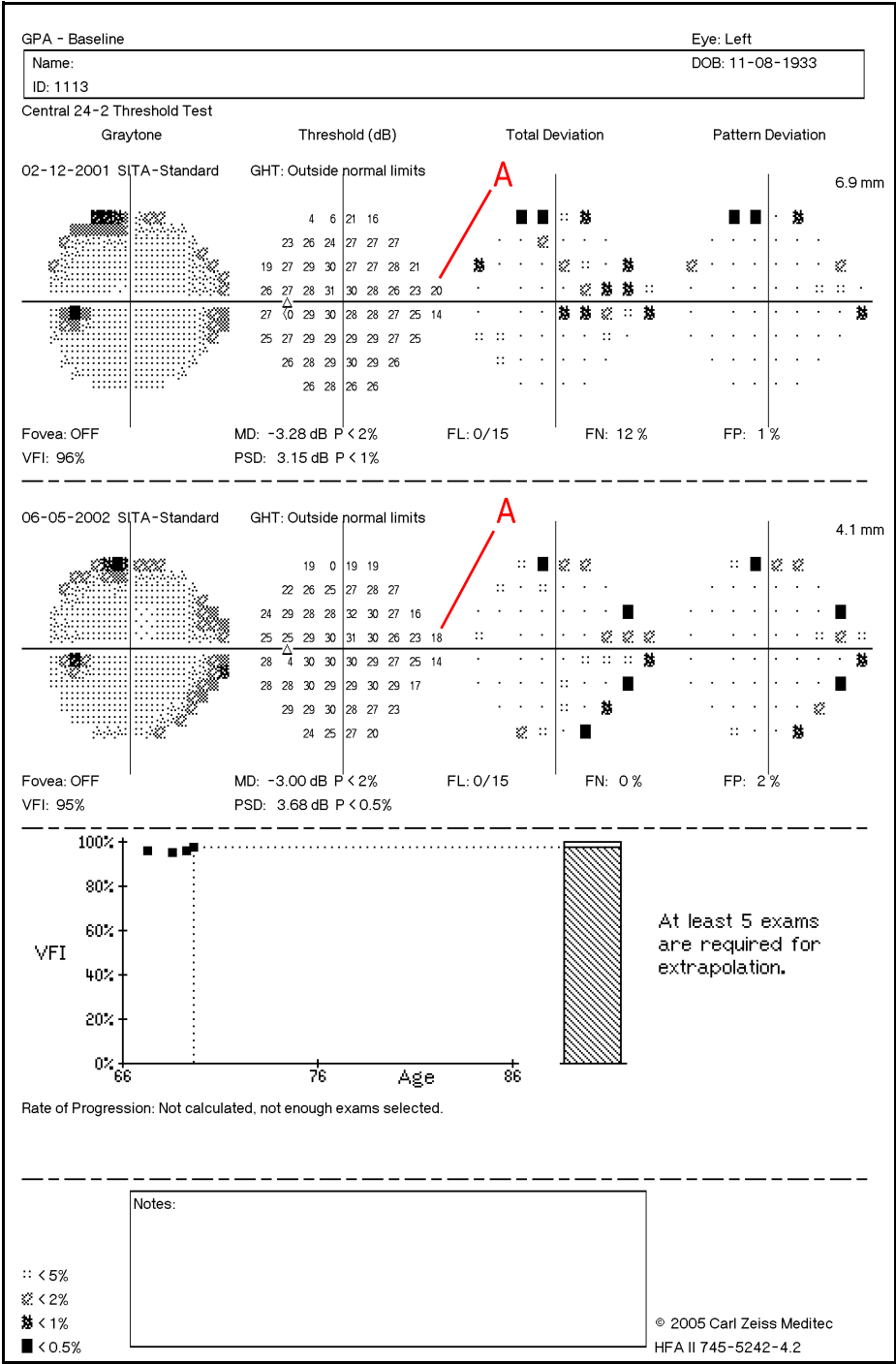


Figure 8.13a Improving Out of Range Points – Baseline 2

Here the Baseline is changed to utilize the 4th and 5th visual fields available. This allows the nasal step points to be evaluated in the GPA Follow-up. Note how the nasal step points **A** are no longer < 0. Refer to **C** in Figure 8.12a.

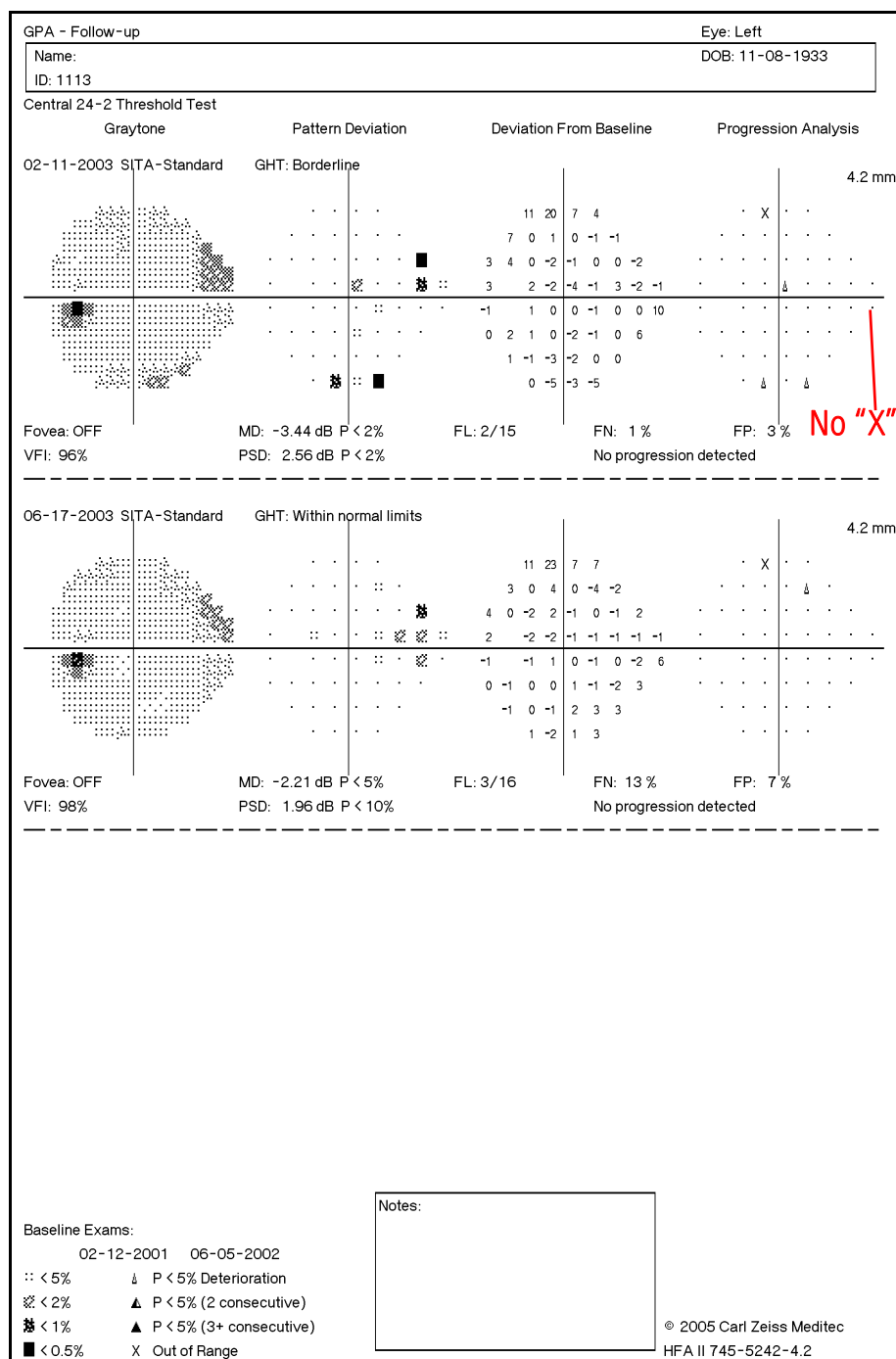


Figure 8.13b Improving Out of Range Points - Follow Up 2

The nasal step is still apparent on the Pattern Deviation plot. Now the points no longer are marked "Out of Range," but are considered stable. Should progression occur in the future, GPA will be available to assist in recognizing any change at these nasal step points.

How To Print GPA Reports

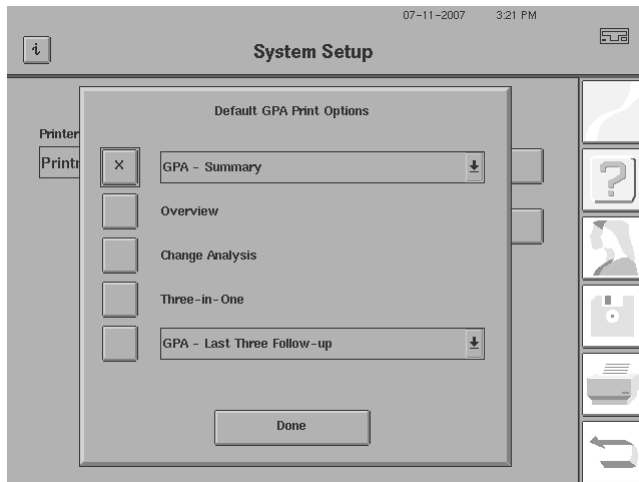
Before you can print GPA reports, you must have a GPA license and it must be activated. See [“How to Activate GPA Software on the HFA II-i,”](#) on page 8-35 for instructions on how to acquire and activate a GPA license. Once your GPA license is activated, the basic steps to print GPA reports are:

- **Step 1: Select a valid Follow-up exam.** See [“Step 1: Select a Valid Follow-Up Exam,”](#) on page 8-30. The exam you select is the “Key Exam.” Full Threshold, SITA Standard, and SITA Fast exams can all be used as Follow-up exams depending on the Key Exam chosen.
- **Step 2: Select reports from the Threshold Printout Selection Screen.** See [“Step 2: Select Reports from Threshold Printout Selection Screen,”](#) on page 8-31. You may print the report at this time, or continue to Step 3.
- **Step 3: Modify the GPA Exam Selection (Optional).** Change the Baseline selection and add/remove exams from Follow-up. See [“Step 3: Modify the GPA Exam Selection \(Optional\),”](#) on page 8-32. You may choose to print at the end of this step.

If a GPA report is not available (i.e., if there are not enough exams for the selected patient and eye), you will be returned to the print menu to make another selection.

Default GPA Report Options

After your GPA software has been licensed, the GPA Summary will be printed by default. To change which reports are selected by default whenever you enter the Threshold Printout Selection menu, do the following:



1 From the Main Menu screen, select *SYSTEM SETUP>PRINT SETUP>DEFAULT GPA PRINT OPTIONS*.

2 On the Default GPA Print Options screen, select which report(s) you would like to be selected by default by clicking in the button next to the report so that an **X** is displayed in the button. For the first and last buttons, select the report from the drop-down menus.

3 Press Done.

Your selection will be retained until you change it again.

Step 1: Select a Valid Follow-Up Exam

You can select a valid Follow-up exam for a GPA report in four ways, each of which is described below. The exam you select is the "Key Exam."

Criteria for a Valid GPA Follow-up Exam

To generate a GPA report, the selected exam must be a valid Follow-up exam. A valid GPA Follow-up exam meets all the following criteria:

- A single SITA test (per eye) from one patient is selected.
- The selected exam was not previously de-selected from the GPA analysis for that patient and eye. If it was de-selected, you must re-select it before it will be valid again for GPA.
- The selected exam does not pre-date either of the current Baseline exams. If it does pre-date either Baseline exam, you must change the Baseline exam selections, if possible.

If these criteria are not met, you will only be able to get non-GPA reports, such as the Classic Single Field Analysis.

Selection Method 1: Select Follow-up Exam from Current Test Results at End of Exam

To create a GPA printout from the current test results:

1. At the end of a SITA Standard or SITA Fast test, select the *PRINT FUNCTIONS* icon.
2. The Threshold Printout Selection screen appears with print options. See ["Step 2: Select Reports from Threshold Printout Selection Screen," on page 8-31](#). If you have just tested both eyes, it is possible to choose different printouts for right and left eye; the selections need not be the same for both.

Selection Method 2: Select Follow-up Exam from Stored Tests

Follow these steps to print a GPA printout using stored tests:

1. Select the *PRINT FUNCTIONS* icon from any screen where the *PRINT FUNCTIONS* icon is active. The Disk Options screen appears.
2. Choose the Source (HARD DRIVE, FLOPPY, DICOM ARCHIVE, or a USB storage device) from the drop-down menu and press PROCEED. The keyboard appears. Use the keys and press ENTER to search by last name.
3. From the File Directory, select for one patient one SITA test (24-2 or 30-2) for either or both eyes and press PROCEED.



Note: The exam you select is the one for which the GPA Summary or SFA GPA will be printed, if you have chosen one of these report formats.

4. The Threshold Printout Selection screen will appear with print options. See ["Step 2: Select Reports from Threshold Printout Selection Screen," on page 8-31](#).

Selection Method 3: Select Follow-up Exam from Recall Last Test

The HFA holds in temporary memory the last right eye and left eye tested (they need not be for the same patient) until the instrument is powered off, at which time the memory is cleared.

If a test held in memory is a SITA test, you can generate a GPA printout as follows:

1. From the Main Menu screen, select RECALL LAST TEST.

2. Select the test eye (right or left).
3. Select the *PRINT FUNCTIONS* icon.
4. The Threshold Printout Selection screen appears with print options. See ["Step 2: Select Reports from Threshold Printout Selection Screen,"](#) on page 8-31.

Selection Method 4: Select Follow-up Exam from View Test

You can print any test you have retrieved through the View Test feature.

1. From the Main Menu screen, select the *FILE FUNCTIONS* icon.
2. Select VIEW TEST.
3. Designate the Source and Directory Order, then press PROCEED.
4. Select the SITA test you want to retrieve.



Note: The exam you select is the one for which the GPA Summary or SFA GPA will be printed, if you have chosen one of these report formats.

5. Choose PROCEED to display the test results.
6. Select the *PRINT FUNCTIONS* icon.
7. The Threshold Printout Selection screen appears with screen options.

Step 2: Select Reports from Threshold Printout Selection Screen

When the Threshold Printout Selection screen appears ([Figure 8.14](#)), the reports you have selected as your default reports in the GPA Default Print Options screen will automatically be selected. An "X" appears within the box of all selected printouts. Touching the box a second time clears the selection.

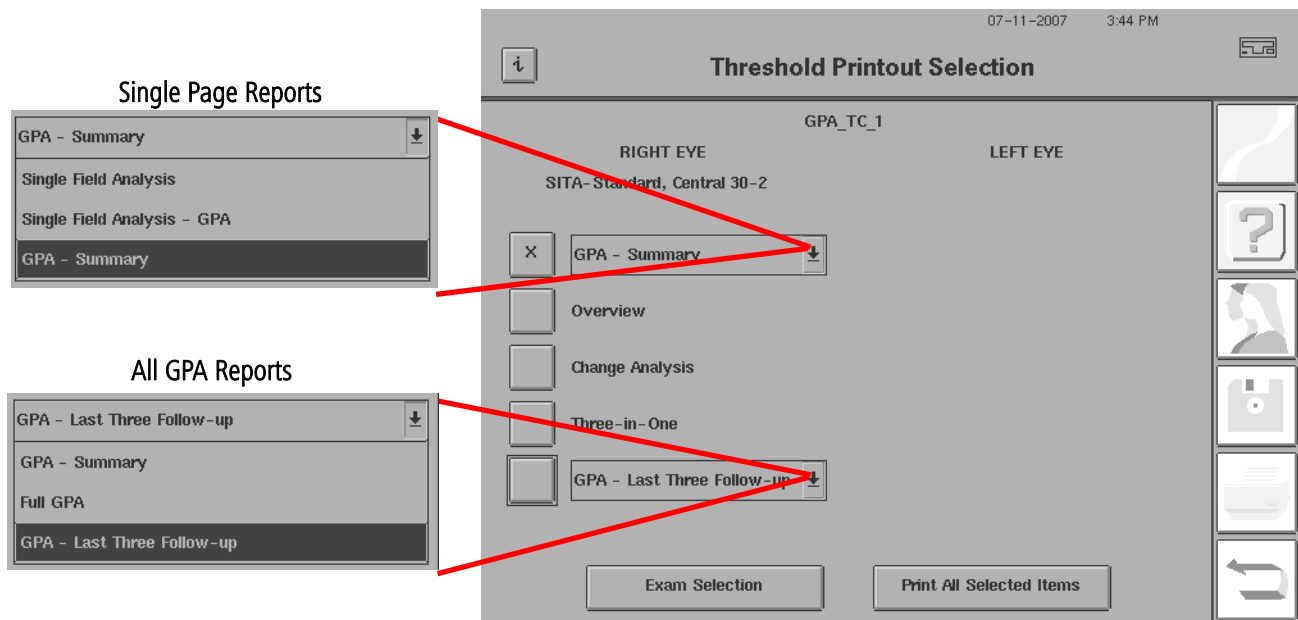


Figure 8.14 Threshold Print Screen

You have three single-page report formats available:

- Single Field Analysis (without any GPA results)
- SFA GPA

- GPA Summary

You may also simultaneously print one of three GPA-specific reports:

- GPA Summary
- Full GPA
- GPA Last Three Follow-up



Note: If you select GPA Summary in both the single-page reports drop-down and the GPA reports drop-down, it will be printed only once.

At this time you also have the option to print any of the following non-GPA reports:

- Overview
- Change Analysis
- Three-In-One

To begin printing immediately without modifying the GPA Baseline and Follow-up selections, you may press PRINT ALL SELECTED ITEMS.

Step 3: Modify the GPA Exam Selection (Optional)

If you selected any GPA report in Step 2, the EXAM SELECTION button will be available (Figure 8.14). If not, the EXAM SELECTION button will be grayed out. If you wish to change the Baseline selection or change which exams are selected for inclusion in the analysis, press EXAM SELECTION to display the Exam Selection – GPA screen (Figure 8.15).

Name	DOB	Eye	Test	Date
>GPA_TC_1	01-01-1931	R	SS-30-2	11-20-2002
>GPA_TC_1	01-01-1931	R	SS-30-2	04-18-2002
>GPA_TC_1	01-01-1931	R	SS-30-2	04-18-2001
*GPA_TC_1	01-01-1931	R	SS-30-2	12-15-1998
*GPA_TC_1	01-01-1931	R	SS-30-2	11-27-1997

Full Threshold exams are allowed as follow-up when the baseline is Full Threshold.

> Follow-up 3 ! Excessive False Positives 0
* Baseline 1 SITA-Standard

Selection Mode Follow-up Select Default Proceed

Figure 8.15 Exam Selection – GPA Screen

GPA makes default selections of Baseline (*) and Follow-up (>) exams. Exams with too many false positives (>15%) are marked with an exclamation point (!) and are not available for inclusion in the GPA analysis. See “Permitted Baseline-Follow-Up Configurations for GPA,” on page 8-12 and “Default Baseline Selection Rules,” on page 8-12 for more information on automatic default Baseline selection.

After making changes on the Exam Selection – GPA screen (see [Add or Remove an Exam from GPA](#) and [Change the Baseline Selection](#) below), press PROCEED and printing will begin. If you have selected more than one eye, the Exam Selection – GPA screen will appear for the other eye. Repeat your selections for the remaining eye.

At any time, you can select the SELECT DEFAULT button to return the exam selection to GPA’s default selection.

Selection Mode Button

The selection mode of the Exam Selection – GPA screen is always in either Follow-up or Baseline Mode. Follow-up Mode allows you to add or remove exams for GPA analysis. Baseline Mode allows you to select a different Baseline. Select the SELECTION MODE button to toggle between Follow-up and Baseline mode.

Add or Remove an Exam from GPA

By default, when you enter the Exam Selection – GPA screen, the Selection mode is Follow-up. To add or remove exams from GPA, enter Follow-up mode and click on each exam that you want to add or remove. Clicking an exam toggles it between selected and not-selected. A right arrow (>) indicates the exam is selected for GPA. A minus sign (-) indicates the exam has been removed from GPA, as shown in [Figure 8.16](#). Exams with no symbol preceding the name are not included because they are not valid Follow-up exams for the currently selected Baseline.

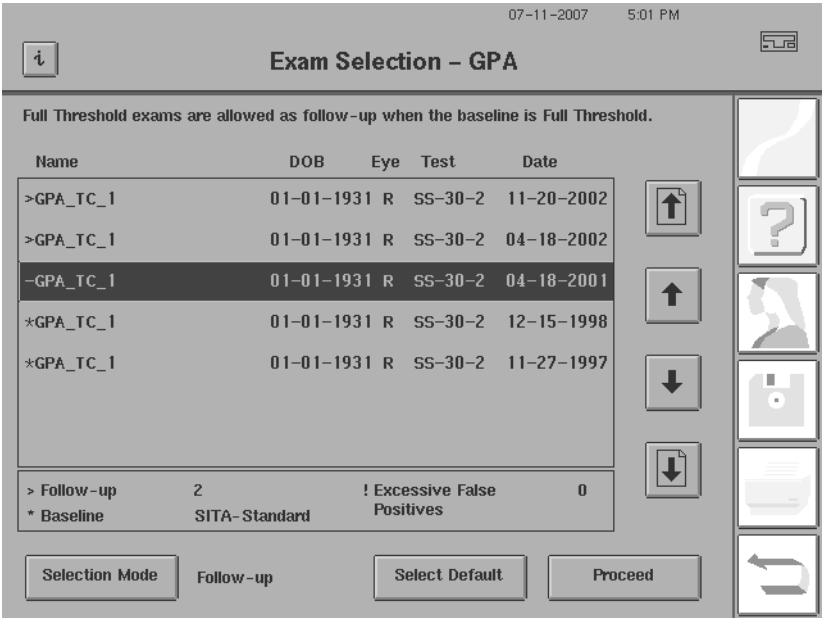


Figure 8.16 Exam Selection – Follow-Up Selection Mode

Change the Baseline Selection

By default, when you enter the Exam Selection – GPA screen, the Selection mode is Follow-up. Select the SELECTION MODE button to toggle between Follow-up and Baseline mode. To change the Baseline selection for GPA, enter Baseline mode and click on each exam that you want to be part of the new Baseline selection. An asterisk (*) indicates the exam is selected for a Baseline as shown in Figure 8.17. Only the two most recently selected Baseline exams will be selected as Baselines, so when you click on an exam to make it a Baseline, the oldest previous Baseline will be removed as a Baseline and from selection.

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Exam Selection – GPA

Full Threshold exams are allowed as follow-up when the baseline is Full Threshold.

Name	DOB	Eye	Test	Date
>GPA_TC_1	01-01-1931	R	SS-30-2	11-20-2002
>GPA_TC_1	01-01-1931	R	SS-30-2	04-18-2002
*GPA_TC_1	01-01-1931	R	SS-30-2	04-18-2001
*GPA_TC_1	01-01-1931	R	SS-30-2	12-15-1998
GPA_TC_1	01-01-1931	R	SS-30-2	11-27-1997

> Follow-up 2 ! Excessive False Positives 0
* Baseline SITA-Standard

Selection Mode Baseline Select Default Proceed

Figure 8.17 Exam Selection – Baseline Selection Mode

GPA Exam Selection Features and Constraints

To ensure that GPA results are valid, GPA has features that constrain exam selection in the following ways:

At Least 3 Compatible Tests Are Required

To run a GPA analysis requires two Baseline tests of the same strategy and at least one Follow-up exam of a compatible SITA strategy—see Table 8.1, "Permitted Baseline–Follow-Up Configurations for GPA," on page 8-12. The following message will appear if you have selected a GPA printout and if the tests you selected do not fit this criterion:

Not enough qualified exams exist to perform GPA for the right eye.

Print Classic SFA Return to Print Menu

Select PRINT CLASSIC SFA to print a Classic SFA report, or select RETURN TO PRINT MENU to return to the Print Menu. You cannot run GPA until you have a sufficient number of compatible tests for that eye.

GPA Recalls Previous Test Selections

For a given patient, once a set of Baseline and Follow-up tests has been selected, either automatically by GPA or manually by the user, the exam selection is remembered. This feature saves you from having to re-select the desired Baseline and Follow-up tests each time you run GPA for the same patient and eye.



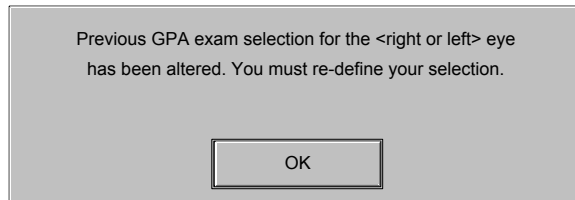
Note: When you transfer exams from one HFA instrument to another using a direct serial cable connection, the GPA exam selection will not be transferred. In these cases, you must re-select the Baseline and Follow-up tests in the destination instrument. However, if you transfer exams via floppy disk or a USB storage device using Copy Tests or Move Tests, the GPA exam selection will be transferred as usual.



Note: When synchronizing with HFA-NET Pro, the most recent change to the GPA exam selection list will be duplicated on each instrument. For example, if you change the Baseline exams on HFA II-*i* "B", then the new Baseline exams will be indicated on HFA II-*i* "A" after synchronization.

New tests are added to the list of selected Follow-up tests automatically. However, the maximum number of Follow-up tests is 14. This means that if 14 tests were already selected, GPA automatically adds the new test and removes the earliest test from the list of selected Follow-up tests. To change the default selection, you must do so via the Exam Selection – GPA screen.

If after having performed GPA for a given patient, you import or delete exams, then the remembered exam selection may no longer be valid. In such cases, the following message will appear:



Press OK to go to the Exam Selection – GPA screen. A default selection of Baseline and Follow-up tests will be made, but you can re-select the desired Baseline and Follow-up tests.

How to Activate GPA Software on the HFA II-*i*

The GPA software comes factory-installed on all new HFA II-*i* instruments except the Model 720*i*. However, you must activate the GPA software for it to function on your HFA II-*i*.

To obtain a GPA license, you must contact Carl Zeiss Meditec:

In the U.S.: Call Carl Zeiss Meditec at 1-800-341-6968.

Outside the U.S.: Contact your local Carl Zeiss Meditec distributor.

Once you have obtained your license, you can activate it using the procedure that is provided in [Appendix \(J\)](#) beginning with "Licensing GPA, SITA-SWAP, HFA-NET Pro, or DICOM Gateway 2.0," on page J-5.

GPA References

1. Bengtsson B, Patella VM, Heijl A. Prediction of glaucomatous visual field loss by extrapolation of linear trends. *Arch Ophthalmol*. Dec 2009;127(12):1610-15.
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12. Heijl A, Lindgren A, Lindgren G. Test-retest variability in glaucomatous visual fields. *Am J Ophthalmol*. 1989;108:Aug 1989. P. 130-135.

(9) Short-Wavelength Automated Perimetry (SWAP)

Introduction to Short-Wavelength Automated Perimetry	9-1
SITA-SWAP Testing	9-3
Printing Out SITA-SWAP Results	9-8
SITA-SWAP Case Studies	9-10
Licensing SITA-SWAP on Your HFA	9-14
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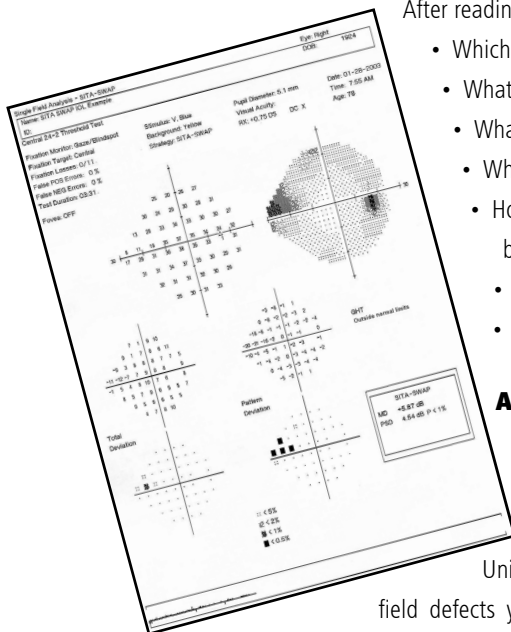
Introduction to Short-Wavelength Automated Perimetry

Short-Wavelength Automated Perimetry, or SWAP, is also known as Blue-Yellow perimetry. SWAP differs from standard automated static perimetry in that blue light is used as the stimulus, and yellow light is used for the background illumination. SWAP is still a static threshold perimetry test in which standard Goldmann stimuli are presented in the standard way.

SITA-SWAP is a unique threshold testing strategy specifically designed to incorporate the efficiency of SITA testing into SWAP. This strategy is available as a licensed option on the HFA II-*i* (Models 745*i* and 750*i*) and HFA II (Models 745 and 750). SITA-SWAP is available only for use with the 24-2 Threshold test pattern. SITA-SWAP testing usually takes between three and six minutes to complete. SITA-SWAP has its own normative database and the STATPAC analyses for SITA-SWAP are presented in the traditional Single Field Analysis style, providing all the advantages of the STATPAC statistical analysis.

After reading this chapter, you will be able to answer the following questions:

- Which patients should be tested using SWAP?
- What test pattern can be run with SITA-SWAP?
- What additional steps are required to set up a SITA-SWAP test?
- Why is the Size V stimulus used for SITA-SWAP testing?
- How long does the patient need to adapt to the yellow background illumination before performing a SWAP test?
- What printouts are available for SWAP results?
- How do I license SITA-SWAP testing on my HFA?



Advantages of Testing with SWAP

In several published longitudinal studies, SWAP has performed much better than standard computerized perimetry in the early detection of glaucomatous change. Working independently, researchers from University of California Davis, and University of California San Diego found that SWAP identified early glaucomatous visual field defects years before they could be detected using standard white-on-white perimetry. In separate work, the Davis and San Diego teams also found that SWAP detected progression in glaucomatous field loss significantly earlier than did white-on-white perimetry. Other papers have found SWAP to be superior in managing ocular hypertensives and in detecting neurological disease. References to these publications are provided at the end of this chapter.

How SWAP Works

SWAP isolates and measures Blue-Yellow ganglion cell function. The carefully chosen bright yellow background desensitizes the green and red cones, while having little effect on blue cone function. The narrow-band 440 nanometer blue stimulus falls right on the peak sensitivity of blue cones. In addition, the larger Size V stimulus is used to help expand the dynamic range of the procedure. Thus, SWAP preferentially tests the blue cones and their ganglion cell connections.

There are at least two theories as to why SWAP provides earlier diagnosis. One theory suggests that the Blue-Yellow ganglion cells are damaged selectively in early glaucoma, and thus earlier SWAP diagnosis is just a function of testing the part of the visual system which is damaged first. A second theory suggests that early diagnosis is achieved simply because SWAP tests one of several pathways of the visual system; if only one pathway of the system is tested, there is less redundancy to mask damage, allowing a loss to be discovered earlier.

Patient Selection for SWAP Perimetry

SWAP has been found to be appropriate for early glaucoma detection in:

- ocular hypertensives
- glaucoma suspects
- glaucoma patients with mild to moderate field loss.

For neurological and systemic disease:

Studies have demonstrated that SWAP testing may be an appropriate and useful test in various neurological, retinal, and systemic diseases. With greater clinical experience, SWAP testing may become the primary perimetric testing method in neurological disease; for the present, however, it should be used as an adjunct to standard perimetry.

Patients who may not be candidates:

There are some patients who may not respond well to SWAP. These include patients with significant cataracts or advanced white-on-white field loss.

For additional information on the SITA-SWAP database see [Appendix \(K\), "SITA Normative and GPA Databases"](#).

SITA-SWAP Testing

The SITA-SWAP test applies the faster testing capabilities of the SITA strategies to SWAP testing. Please note that only the 24-2 pattern is available for testing using the SITA-SWAP option.

It is important to demonstrate to new patients what he or she will see during testing. The stimulus may initially appear as a deep blue light projected against the yellow bowl. As the testing proceeds, the blue spot may change and often becomes a localized color change with fuzzy edges (from violet to off-yellow) or sometimes appears as a colorless spot. The patient needs to be instructed to pay close attention as the threshold stimuli are very subtle. The Demo feature or the Foveal Threshold test may be used to show patients what the new stimulus looks like before testing.

Unlike the use of the conventional white-on-white testing process, SWAP testing requires a period of time for the patient's vision to adapt to the yellow illumination of the bowl, in order for the required isolation of the blue cones to take effect. The recommended retinal adaptation period is a minimum of three minutes, prior to beginning testing. As a practical matter, adaptation may be accomplished while the perimetrist is entering the required patient data, prior to the start of testing.

The typical SITA-SWAP testing procedure follows:

- 1 From the Main Menu, choose a 24-2 test.
- 2 Choose the test eye.
- 3 Enter the appropriate patient data. To run the test, you must enter at least the patient's date of birth. If you wish to save the test results, you must enter the patient's name as well.
- 4 On the Start of Test screen, press CHANGE PARAMETERS to open the Threshold Parameters screen.

The screenshot shows the 'Threshold Parameter Setup' window. At the top, it displays the date '02-07-2005' and time '10:14 AM'. The window contains several dropdown menus and checkboxes for configuring the test parameters. The 'Test Strategy' is set to 'SITA-SWAP', 'Test Speed' to 'Normal', 'Fixation Target' to 'Central', 'Fixation Monitoring' to 'Gaze/Blind Spot', 'Blue-Yellow' to 'On', 'Foveal Threshold' to 'On', 'Stimulus Size' to 'V', 'Stimulus Color' to 'Blue', 'Fluctuation' to 'Off', and 'Standard Parameters Indicated By' to 'On'. A 'Selection Complete' button is located at the bottom right of the parameter area. On the right side of the window, there is a vertical toolbar with icons for various functions like back, forward, and help.

Figure 9.1 Threshold Parameters Screen, Selecting SWAP Testing

5 For the Blue-Yellow field, select ON (Figure 9.1) in the drop-down box to turn on SWAP testing. When you turn on Blue-Yellow testing, the following changes occur automatically:

- The Test Strategy changes to SITA-SWAP.
- The Stimulus Size and Blind Spot Check Size change to Size V.
- The Stimulus Color changes to Blue.
- The bowl illumination changes from white to yellow.

6 Press SELECTION COMPLETE to go to the Start of Test screen. That screen now will indicate both Blue-Yellow testing and SITA-SWAP near the top of the screen. It also will remind you that you must extend the Blue-Yellow visor before beginning the testing (Figure 9.2).

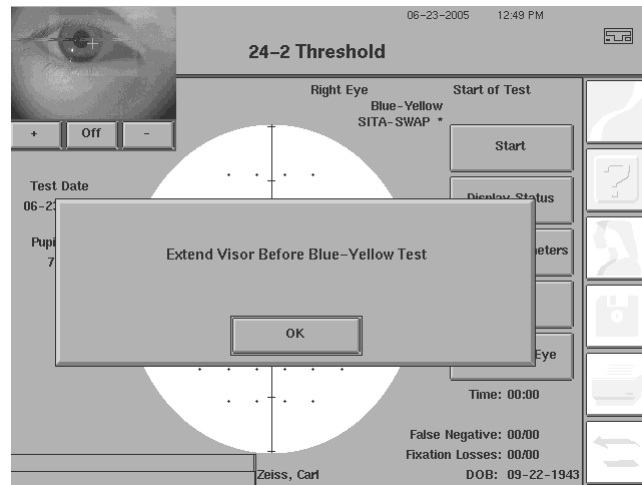


Figure 9.2 Reminder to Extend the Visor Before Beginning a SWAP Test



Note: As with white-on-white perimetry, room illumination should be greatly reduced or turned off prior to beginning testing. This is to prevent significant amounts of stray light from falling on the bowl and adversely affecting the SWAP test conditions.

- 7 Locate the visor handle that is located just below the forehead rest (see [Figure 9.3](#)). Slide the handle toward the back of the bowl (away from the patient).

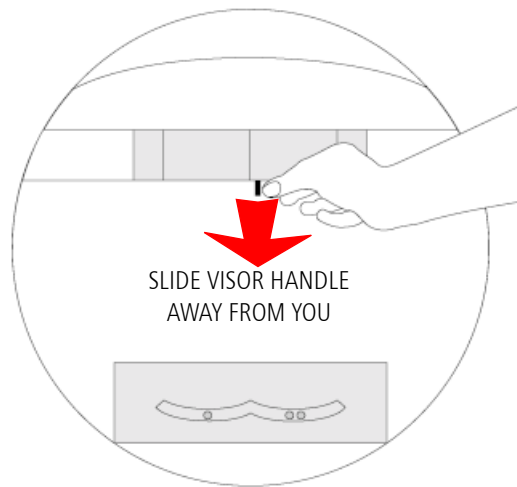


Figure 9.3 Extending the Blue-Yellow Visor Prior to Testing



Note: The visor helps shield the patient's eyes from the glare produced by the yellow bowl-illumination lamp.

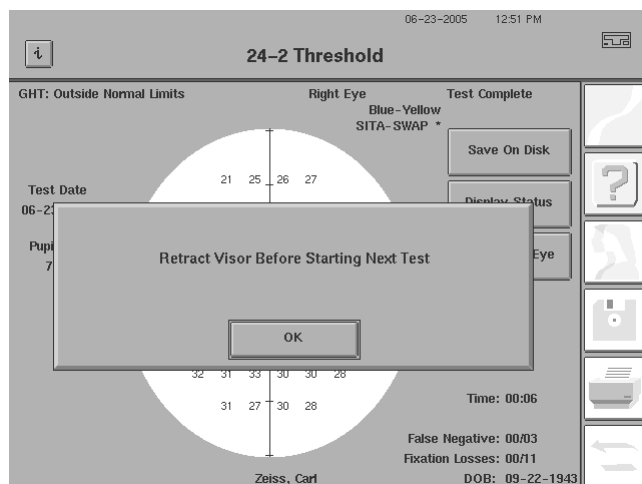
- 8 Follow the standard testing procedures that normally are used for white-on-white perimetry for setting up and explaining the test. The patient's test eye should adapt to the yellow bowl illumination for approximately **three (3) minutes** before beginning the test. Having the patient look into the bowl, while you enter patient data and explain the test, will help to save time. Repeat the 3 minute adaptation period for the second eye. You must allow this adaptation period prior to beginning every SWAP test.



Note: It is important to remind the patient to blink often during the test, preferably when she/he presses the patient response button. Staring at the bowl for long periods of time can cause the peripheral visual field to fade (the "Troxler Effect") altering the results.



Note: The Size V Blind Spot check may cause artificially high blind spot fixation check errors on certain patients. You may wish to turn off the blind spot monitor and utilize only Gaze Tracking to monitor fixation.



9 At the conclusion of SWAP testing, slide the visor back into the forehead rest. See [Figure 9.4](#).

A message will remind you to replace the visor beneath the forehead rest. Move the visor handle toward you (away from the test bowl). If the visor is not retracted, stimuli in the superior visual field may not be seen beyond 35 degrees during white-on-white testing.

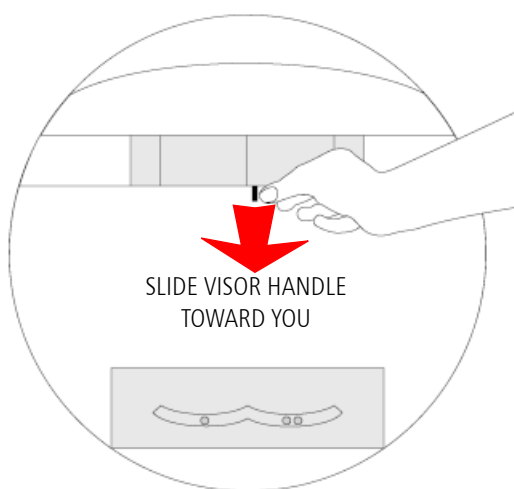


Figure 9.4 Returning the Visor to the Retracted Position

Additional Notes on SITA-SWAP

1. If you intend to perform SITA-SWAP testing routinely, we recommend that you use the Alter Main Menu feature to customize a Main Menu button for this application. The customized button will make access to this specialized form of testing faster and more convenient. Refer to [“Altering the Main Menu Screen” on page 2-26](#) for more information.
2. Be careful to check the instrument before starting the first test of the day to see that the visor is placed in the retracted position. The visor reminder is not displayed at start up.
3. When beginning the first SITA-SWAP test of the day, the HFA will go through an extensive self-calibration cycle before you can begin the test. This delay may last up to two minutes and is normal. It is suggested that you set up the first SITA-SWAP test before you seat the patient. Many offices do this when they first turn on the instrument for the day. Be sure to have the room lights very low or off during the initial SITA-SWAP warm-up.

4. As with white-on-white perimetry, we recommend that you confirm any abnormal findings before making a diagnosis that is based on the visual field results. Patients often exhibit a “learning effect” and may be better prepared for the SITA-SWAP testing routine on a second visit. This leads to an improved recognition of the blue stimulus, as well as better pacing of patient responses. These factors combine to provide more accurate test results.
5. It is possible to use the Full Threshold and FastPac testing strategies to do SWAP. However, we do not recommend that you use these strategies, as the test times can be two or three times longer than those of a SITA-SWAP test. Further information on Full Threshold and FastPac test strategies is presented in [Appendix \(L\)](#).

Printing Out SITA-SWAP Results

The results of a SITA-SWAP test print in the Single Field Analysis (SFA) printout style (Figure 9.5). All of the traditional STATPAC features are available to review, including the Glaucoma Hemifield Test (GHT). There is a box outlining the global indices and the term “SITA-SWAP” is found in the lower right-hand portion of the printout. This helps to differentiate this printout from the standard white-on-white SFA printout. The Overview printout also is available to view multiple SITA-SWAP tests.

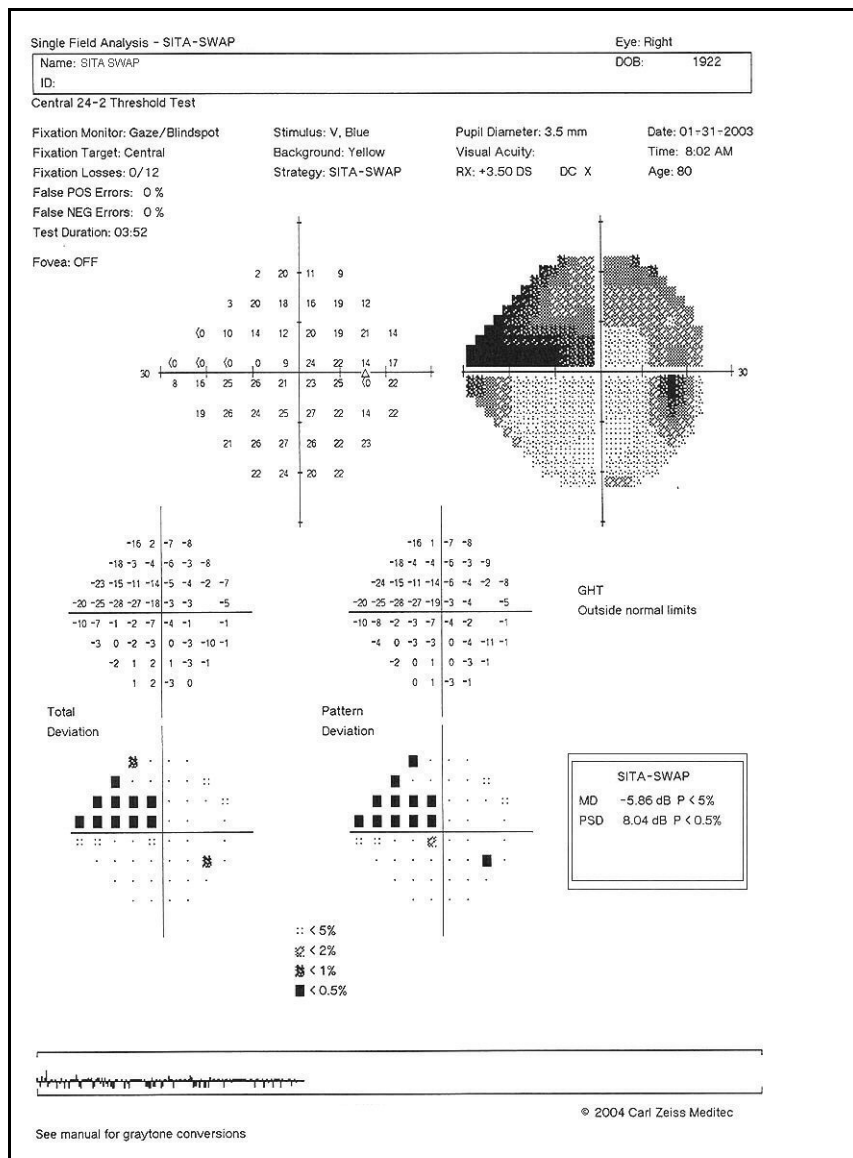


Figure 9.5 An Example of a Single Field Analysis Printout for SITA-SWAP

SITA-SWAP printouts use the same grayscale format as is used with White-on-White testing. However, the SITA-SWAP grayscale will frequently look significantly darker. This is because SITA-SWAP testing often generates lower threshold sensitivity values than White-on-White testing.



Note: It is particularly important to pay more attention to the STATPAC probability plots than to the traditional grayscale plots. This is because reviewing the SWAP grayscale images using traditional white-on-white rules may lead to a misinterpretation of the SITA-SWAP test results.



Note: SITA-SWAP test results and white-on-white test results cannot be printed on the same Overview printout.

Blind Spot Monitoring with SITA-SWAP

The SITA-SWAP test uses the Size V spot size for both the stimulus and the blind-spot check. The Size V stimulus is four times the angular size of the traditional Size III stimulus used with White-on-White testing. It is common for patients to produce blind spot fixation errors with SITA-SWAP testing, even when fixating well, due to the larger Size V stimulus. Therefore, fixation losses that exceed 20% are not marked with the “XX” on the printout for SITA-SWAP tests, as is done for white-on-white tests. In addition, the “Low Test Reliability” indication will not be displayed for high fixation losses on the printout.

During the test, the HFA will still beep when the poor fixation level is surpassed, to alert you to potential fixation problems. Attempting to re-find the blind spot during the test may help to lower the number of fixation losses recorded and to silence the audible tone.

It is up to the clinician to determine whether the number of fixation losses is an indication of poor patient fixation or an invalid blind spot indication. We recommend visually verifying whether the patient’s fixation is stable during the SITA-SWAP test. Checking the Gaze Tracking graph will help to verify patient fixation during and after the test.

Specificity of SITA-SWAP Testing

Specificity is the ability of a diagnostic technique to produce normal results in normal patients. STATPAC for SITA-SWAP was designed to provide the same level of specificity for SITA-SWAP as is currently enjoyed in standard white-on-white Humphrey perimetry.

The original SWAP research protocols called for laborious determination of the yellowness of the crystalline lens. One conclusion of these protocols was that such measurements added little if anything to the diagnostic power of the procedure. Measurement of the crystalline lens does add information about the overall height of the hill of vision, but most of the visual field information used in glaucoma diagnosis has to do with localized sensitivity loss, not with general sensitivity. From a practical point of view, crystalline lens measurements do not appear to be justified.

SITA-SWAP Case Studies

The following examples illustrate various aspects of SITA-SWAP analyses.

Case 1: Classic Nasal Step

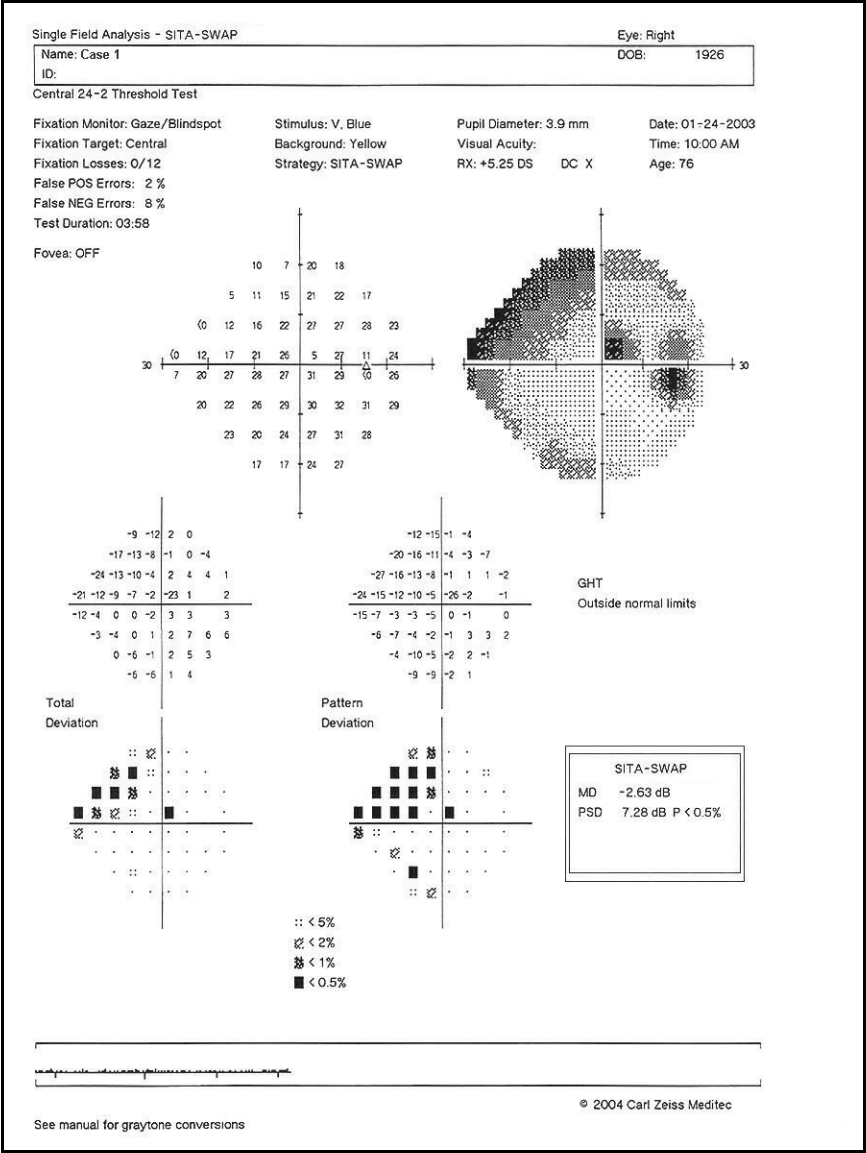


Figure 9.6 Nasal Step Seen in SITA-SWAP Printout

In this example, you can see a significant nasal step and arcuate scotoma in the superior visual field of this patient's right eye on the SITA-SWAP printout. Reliability indices and Gaze Tracking indicate the patient was a reliable perimetric subject. The Glaucoma Hemifield Test (GHT) indicates the visual field is "Outside Normal Limits." Although the Mean Deviation (MD) is not significant, the Pattern Standard Deviation (PSD) is flagged at the $P < 0.5\%$ level indicating a significant localized visual field defect as indicated in the Pattern Deviation probability plot.

Case 2: Comparing a SITA-SWAP Test with Standard White-on-White Testing

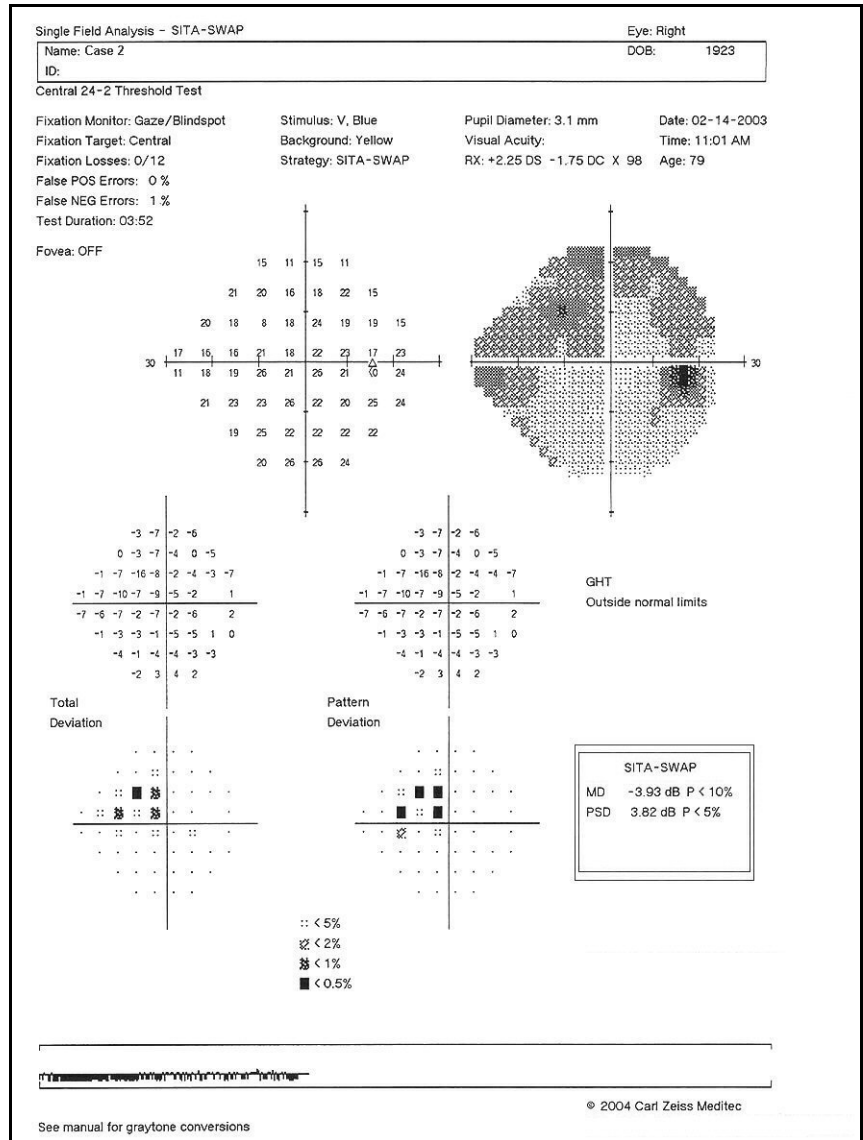


Figure 9.7a Glaucomatous Visual Field Defect Discovered with SITA-SWAP

In this case, an early paracentral visual field defect is seen with SITA-SWAP in the superior hemifield of the patient's right eye. The GHT indicates "Outside Normal Limits". Both the MD and PSD global indices are flagged, with the PSD marked at the $P < 5\%$ limit.

This printout is a good example of why you should avoid referring to the grey tone diagram with SWAP testing. A larger area of the superior visual field appears to be affected. Yet, the Total and Pattern Deviation probability plots show a much smaller but important area to be significantly depressed relative to normal limits.

Case 2: (Continued)

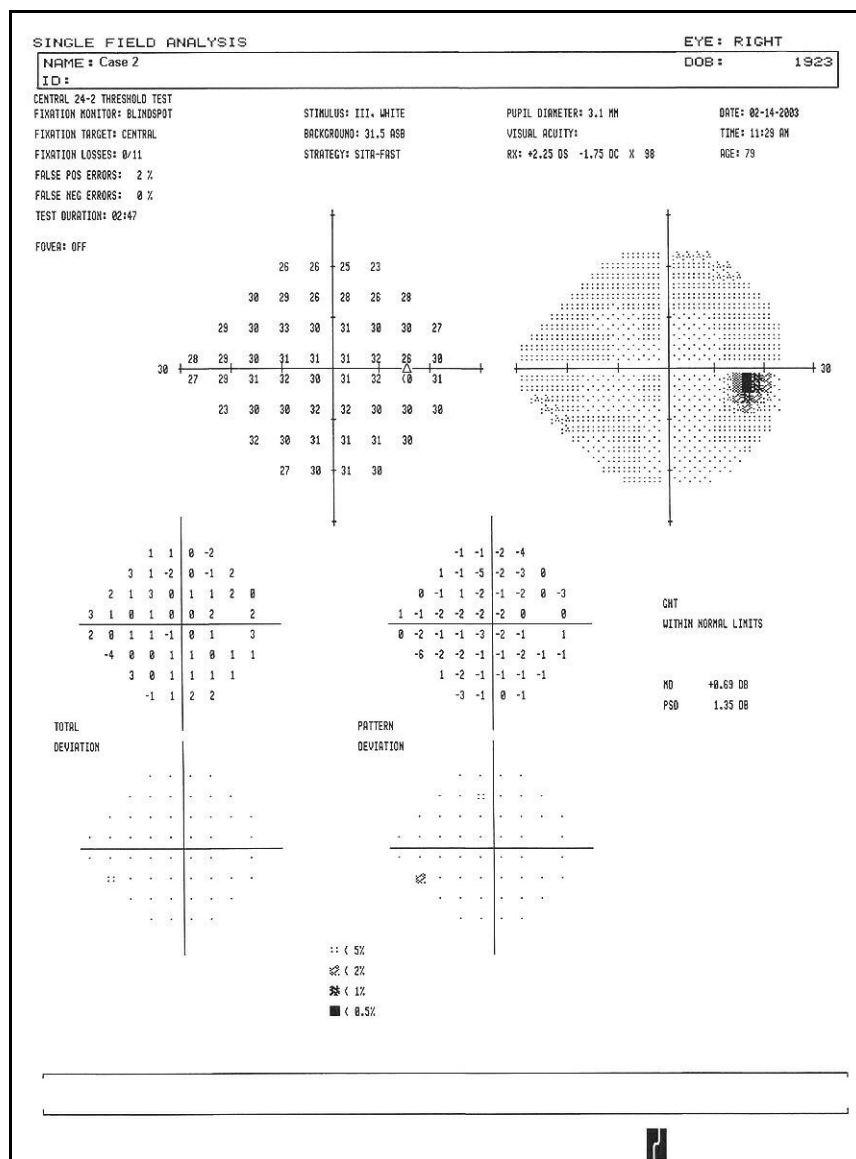


Figure 9.7b Standard White-on-White Results for the SITA-SWAP Patient Shown in Figure 9.7a

This is the standard white-on-white visual field printout for this patient as discussed on the opposite page. Here the GHT indicates the visual field is "Within Normal Limits" while the SITA-SWAP indicates "Outside Normal Limits". This patient was confirmed to have glaucomatous changes that were recognized early with SITA-SWAP testing.

Case 3: Effect of an Intra-Ocular Lens on SITA-SWAP Results

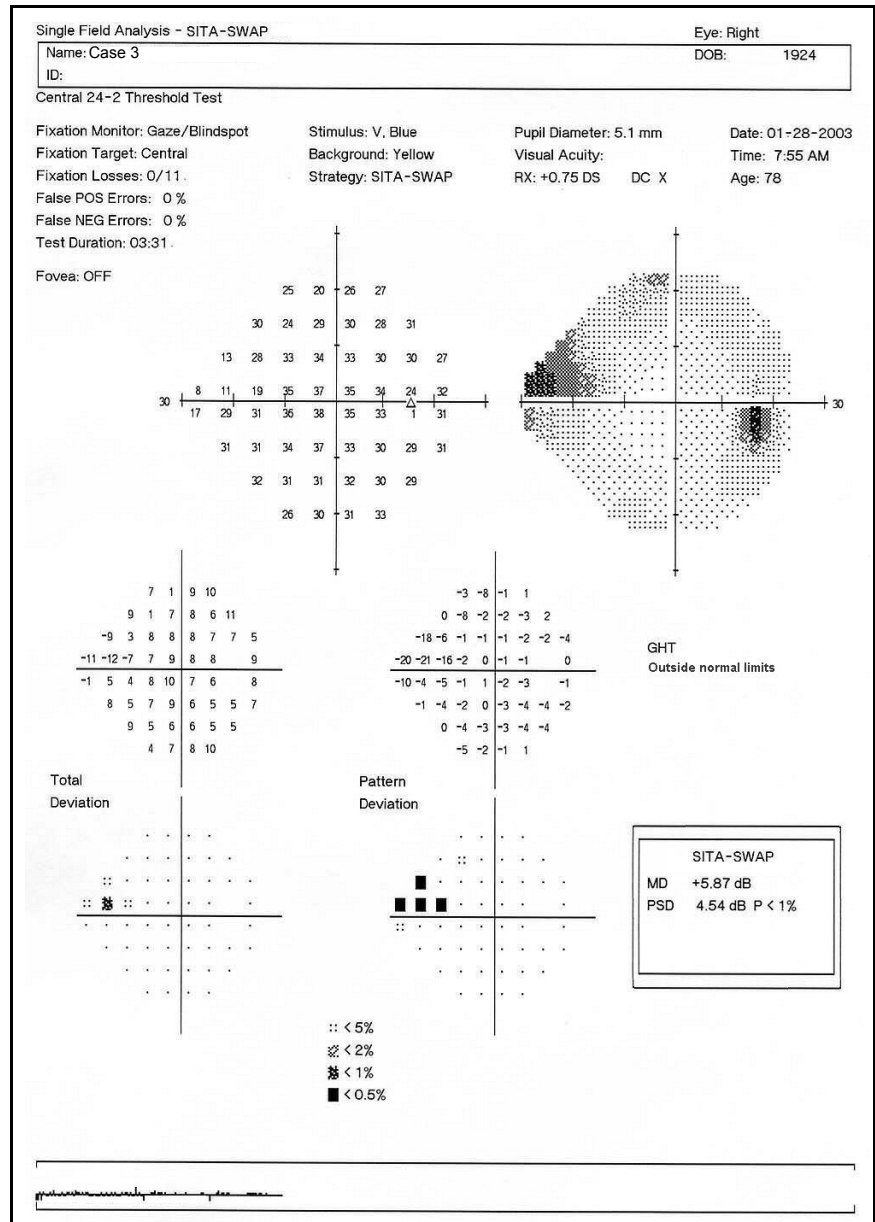


Figure 9.8 Effect of an IOL on Probability Plots and MD in Patient with Early Glaucoma

This patient had cataract surgery and has an intra-ocular lens (IOL) in place of the crystalline lens. Because the SITA-SWAP database contains normal subjects that had various degrees of lenticular change in this age group, the patient has a mean deviation (MD) that is much higher than the norm. A significant nasal step scotoma can be seen in the pattern deviation probability plot that does not stand out as clearly on the total deviation plot. The GHT indicates "Outside Normal Limits". This patient has early glaucoma.

It is not unusual to see positive MD values with SITA-SWAP in patients that have IOL's. Although their SITA-SWAP visual fields will often be supernormal for their age group, these patients' visual field defects can still be determined with the SITA-SWAP testing strategy.



Note: The “Abnormally High Sensitivity” alert will be seen on the SITA-SWAP printout if the false positive rate exceeds 15%. However, it will not be triggered if only the overall height of the hill of vision is elevated.

Licensing SITA-SWAP on Your HFA

The primary benefit to be gained from using SITA-SWAP testing is the ability to conduct SWAP testing more quickly than would be possible when using standard SWAP testing. To add this time advantage to your own HFA II-*i*, contact Carl Zeiss Meditec to purchase the required license for SITA-SWAP software.

To obtain a SITA-SWAP license, you must contact Carl Zeiss Meditec:

In the U.S.: Call Carl Zeiss Meditec at 1-800-341-6968.

Outside the U.S.: Contact your local Carl Zeiss Meditec distributor.

Once you have obtained your license, you can activate it using the procedure that is provided in [Appendix \(J\)](#) beginning with “[Licensing GPA, SITA-SWAP, HFA-NET Pro, or DICOM Gateway 2.0,](#)” on [page J-5](#).



Note: On an HFA II (Rev. 14.0 or higher system software) or HFA II-*i* (Rev. 4.0 or higher system software), if SITA-SWAP is not licensed, you still can view/print SITA-SWAP exams that are generated on a licensed HFA, but you cannot administer them.



Note: For offices with more than one HFA, if you import a SITA-SWAP exam to a recipient HFA that carries a lower software revision (that does not acknowledge SITA-SWAP), attempted printouts of SITA-SWAP data will be blank.

SWAP References

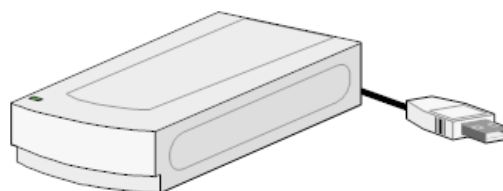
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16. Sample PA, Martinez GA, Weinreb RN. Short-wavelength automated perimetry without lens density testing. *A. J. Ophth*, 1994 Nov; 118(5):632-41.

17. Johnson CA, Adams AJ, Casson EJ, Brandt JD: Blue-on-Yellow perimetry can predict the development of glaucomatous field loss. *Arch Ophthalmol.* 1993; 111:645-650.
18. Sample PA, Taylor JDN, Martinez GA, Lusk M, Weinreb RN: Short-wavelength color visual fields in glaucoma suspects at risk. *Am. J. Ophthalmol.* 1993; 115:225-233.
19. Johnson CA, Adams AJ, Casson EJ, Brandt JD: Progression of early glaucomatous visual field loss as detected by blue-on-yellow and standard white-on-white perimetry. *Arch. Ophthalmol.* 1993; 111:651-656.

(10) File Functions

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At the end of every test you have the opportunity to save the test data. When you elect to save, the test results and associated patient data are stored with all previously stored tests on either an internal hard disk, a USB storage device, or the hard drive of a network server with the HFA-NET Pro or DICOM Gateway 2.0 option. This packet of stored information is called a file, and for each right eye and each left eye tested there is a separate file.



Once saved, tests can be backed up, restored, archived, retrieved, edited, copied, moved to another storage medium, or deleted. These activities are part of the File Functions menu. The entire collection of tests on a hard disk, floppy disk, network file server, or USB storage device is referred to as a *database*.

It is absolutely essential that you routinely make backup copies of all of your databases in case they become lost or damaged.

File Functions Menu

The File Functions menu lists the main activities you can perform with your stored patient data and tests. It is accessed by selecting the *FILE FUNCTIONS* icon. A more detailed explanation of each function appears below [Figure 10.1](#).

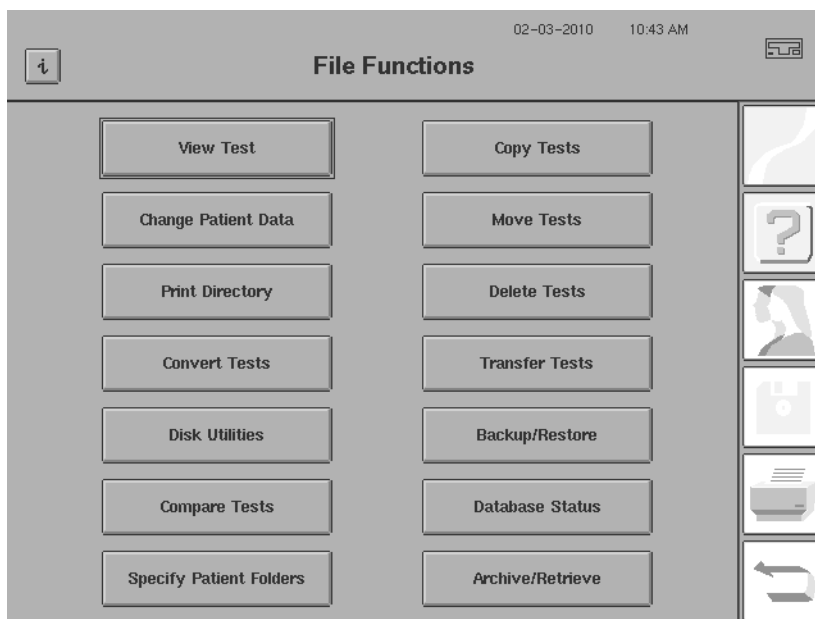


Figure 10.1 The File Functions Menu

View Test	VIEW TEST allows you to recall patient test results. Retrieving one test at a time, it displays the completed test on the screen. While results are being displayed, you can also select the <i>PRINT</i> icon to get a hard copy printout of the test results.
Change Patient Data	CHANGE PATIENT DATA is used to add or change some of the entries on the Patient Data 1 and Patient Data 2 screens. You may choose whether changes made to patient data fields will affect the retrieved test only, or whether they will change all stored tests for that patient. You may also change an individual test date with this feature.
Print Directory	PRINT DIRECTORY allows you to print a directory listing the tests stored on the hard disk, a USB storage device, or on a floppy disk. You may print a directory listing of every test saved on the disk or you may designate specific tests to include in the directory printout.
Convert Tests	CONVERT TESTS saves tests to a floppy disk in a format that can be read by all HFA II-/system software versions prior to version 5.0, and HFA II system software Ver. A6 or later.
Disk Utilities	DISK UTILITIES contains the DUPLICATE FLOPPY and INITIALIZE FLOPPY functions. You can make duplicate copies of floppy disks using an optional USB floppy drive through DUPLICATE FLOPPY. This procedure copies all test data from one floppy disk to another. You can also duplicate floppy disks using any IBM PC compatible computer equipped with a 1.44 MB 3.5" floppy disk drive. You must always start with and use formatted disks. You rarely will need to initialize a floppy with INITIALIZE FLOPPY. Remember: if you initialize a disk that already contains data, all data on that disk will be erased. You can also initialize floppy disks using any IBM PC compatible computer.

Compare Tests

The COMPARE TESTS feature subtracts the results of two threshold tests and indicates the decibel difference at each point. This comparison is useful, for instance, for tracking the deterioration in a patient's visual field on tests for which STATPAC is not available. The results are displayed on the screen and may be printed.

Specify Patient Folders

The SPECIFY PATIENT FOLDERS feature provides one of four possible methods that you can use to create Patient Folders for a network. Patient Folders allow you to organize computerized patient data in a way that is similar to using manila file folders to organize a file cabinet full of printed out test results. For further details regarding all the possible methods for creating Patient Folders, please refer to the Networking chapter section entitled ["Using Patient Folders," on page 14-25](#).

Copy Tests

The COPY TESTS command copies any number of tests from one storage medium to another. This can provide a simple method for moving a small number of files from one perimeter to another.

Move Tests

The MOVE TESTS function transfers tests from one storage medium to another. Unlike the Copy function, this function deletes the selected test(s) from the source disk at the same time that it moves them to the destination disk.

Delete Tests

The DELETE TESTS function permanently erases tests from a storage medium. A confirmation window will appear prior to your final deletion of the data. This allows you to cancel the operation if necessary.

Transfer Tests

Use the TRANSFER TESTS capability to move tests from an older Humphrey Field Analyzer model (either the HFA I or an earlier HFA II) to the HFA II-/series instruments. You may also transfer tests between an HFA II-/i and a second HFA II-/i. You can do this using the instrument's network connection or by connecting a serial cable to the Data Transfer ports of two HFA's. Once your network or serial cable connection is made, you can use the TRANSFER TESTS command. The proper serial cable connection is required to connect the instruments directly. You can transfer approximately 1,440 tests per hour at a 9600 baud rate, using a direct cable connection between two HFA's. For further details, refer to ["Serial Transfer of Tests Between HFA I, HFA II or HFA II-i Instruments," on page 10-19](#).

Backup/Restore

The BACK UP/RESTORE function allows you to back up or save tests stored on the hard disk to either a USB storage device or a network file server. Neither backup method allows the user to pick and choose which tests should be backed up. The entire database will be backed up. Use this same feature to restore information to the hard disk from a floppy disk, USB storage device, or network file server, if necessary. Extensive information on the BACK UP/RESTORE feature is found in [Chapter \(11\), "Database Management."](#) Be sure you use only formatted disks. **It is important to backup all of your databases regularly, to ensure that you can access all of your tests even if the originals become damaged or lost.**



Note: Backing up tests will erase previous database backup information on the destination and replace it with the information from the source.

Note: Restoring tests from a floppy disk, USB storage device, or network file server will erase all test and patient database information on the hard disk and will replace it with the information from the source. Data from the USB storage device, network file server, or backup floppy disks may be merged onto the hard drive to add tests that do not exist on the hard drive. See [“Merging Databases,” on page 11-22](#).



WARNING: Every patient has an identifier that consists of Name, Date of Birth, Patient ID, and Issuer of ID. To avoid unintentional automatic merging of patient records, **VERIFY** a unique combination of Name, Date of Birth, Patient ID, and Issuer of ID exists when patients are copied, transferred, retrieved from an archive, or restored from a back up. There is no way to separate the combined records of erroneously merged patients. Automatic merging of patient records occurs when a patient exists in the local database with the **EXACT SAME** Name, Date of Birth, Patient ID, and Issuer of ID as a patient that is copied, transferred, retrieved from an archive, or restored from a back up.

For example, consider the following scenario:

Patient A: This patient is currently on the local HFA database and was automatically assigned a unique Patient ID by the instrument because it was a blank field prior to a software upgrade to V5.x software or during an import to the HFA through a copy, transfer, retrieval from archive, or a restore from backup.

Patient B: This patient is about to be transferred to the local HFA database and has the same Name and Date of Birth as Patient A, but does not have a Patient ID (i.e. field is blank). When Patient B is copied, transferred, retrieved from an archive, or restored from a back up to the local HFA database, Patient B will automatically be assigned the same Patient ID and Issuer of ID as Patient A, and Patient B will be merged with Patient A.

Database Status

Using DATABASE STATUS gives you information on the number of tests and the number of patients found on the hard disk or on a floppy disk.

Archive/Retrieve

The Archive/Retrieve button allows you to manually archive and retrieve. The archiving and retrieval functions only are available if you have licensed HFA-NET PRO on your HFA II-*i*. For full details of the Archive/Retrieve functions and how to set them up, please refer to [“Archiving Data,” on page I-14](#). For information on manually archiving and retrieving, see [“Manually Archiving Data,” on page 14-21](#), and [“Manually Retrieving Archived Data,” on page 14-22](#).

Retrieving the File Directory

Selecting a particular File Function is only the first step in accomplishing the chosen task. The next step involves calling up the directory of tests. The directory is a list of tests contained on a specified storage medium. It is from the directory that you select the test or tests to be included in the particular File Function.



WARNING: Only remove a USB device when it is not reading or writing data. Wait for the HFA progress bar to complete and/or the device’s activity light to cease. Otherwise, you may damage or corrupt data on your USB device.



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



CAUTION: To protect your HFA data from unauthorized access, use dedicated USB devices for storage of HFA data. Do not use these USB devices for any other data or application. HFA data is not encrypted.



CAUTION: Health care providers have responsibility for the protection of patient health information (PHI), both hardcopy and electronic. To protect patient confidentiality of your electronic HFA data, the use of encryption is recommended and is the responsibility of the user.



Note: The HFA is only compatible with USB storage devices formatted in FAT (FAT16) or FAT32. NTFS or exFAT (FAT64) cannot be used and will report an "Unrecognized format" error. Also, the HFA can only see and access the first partition of the USB storage device.



Note: Some USB hard drives may require connection to two USB ports or their own external power supply to work correctly.



Note: An optional USB floppy disk drive should only be used for backwards compatibility. It is highly recommended to use USB storage devices instead of floppy disks. Floppy disks may not be available in the near future.

Disk Options

Before the directory is displayed you are asked to specify certain minimum criteria:

- Source
- Destination (where applicable)
- Directory Order

These are found on the Disk Options screen (Figure 10.2).

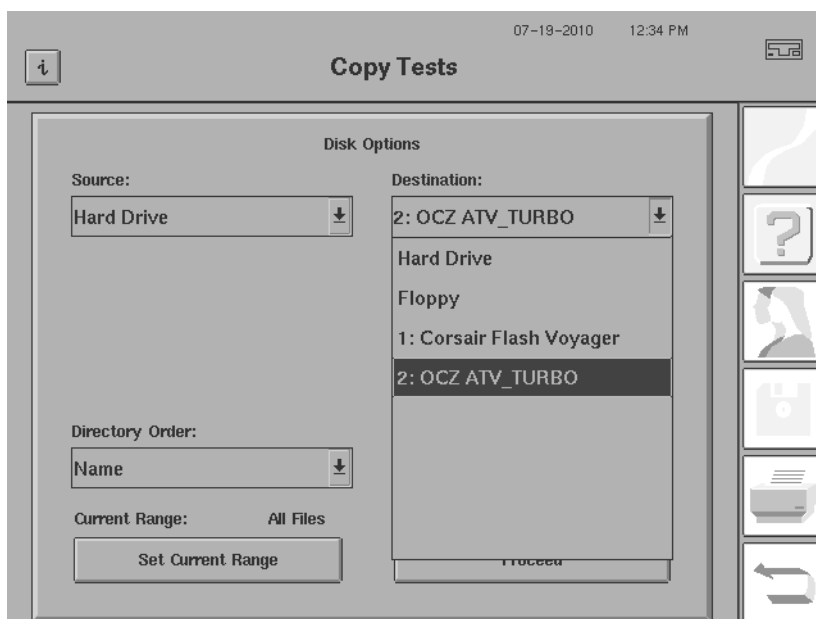


Figure 10.2 The Disk Options Screen (USB Storage Device Selected)

Source

In order to successfully locate the desired tests, you must designate the source of the tests—the location on which they currently are stored. The primary choices are HARD DRIVE, FLOPPY, and up to two USB storage devices. When transferring tests, CLASSIC SERIAL will also appear on the Source list.

With HFA-NET Pro enabled, FILE SERVER also becomes also becomes an option.

When viewing tests, if you purchased and registered DICOM Gateway 2.0, DICOM ARCHIVE can also be selected.

Destination

The Disk Options screen includes a destination choice. Destinations include FLOPPY, HARD DRIVE, CLASSIC SERIAL, and up to two USB storage devices. If HFA-NET Pro is enabled, DATA EXPORT HOST and EMR/PMS HOST are also destinations.

When transferring tests, if you purchased and registered DICOM Gateway 2.0, DICOM ARCHIVE will also be available.

FILE SERVER also becomes also becomes an option with HFA-NET Pro.



Note: Both the Source and the Destination can be set to FLOPPY at the same time. This occurs when you want to copy data from one floppy disk to another. The HFA II-*i* will alert you as to when to insert the Source disk and when to insert the Destination disk into the floppy disk drive. Be careful not to mix up the Source and Destination floppy disks. Data can be lost!



Note: Both the Source and the Destination cannot be set to a USB storage device at the same time.



Note: If two or more USB storage devices are already connected to the HFA II-*i*, you must remove all of them to connect a new one.

Directory Order

Name	↓
Name	
Date	
Patient	

You may display the directory by NAME, DATE, or PATIENT. When you select NAME (Figure 10.5), tests are displayed alphabetically. When displayed by DATE, tests appear chronologically with the most recent test at the top of the directory. When displaying tests by PATIENT, the patients will be displayed in alphabetical order—but the individual tests for each patient are not displayed. Once you have chosen a particular patient, all of the tests for this patient will be displayed in the File Directory. Each test will be listed with Eye, Test Type, Date and Time of test (Figure 10.3 and Figure 10.4).

08-21-1998 5:20 PM

Copy Tests

Patient Name	DOB	I.D.
Zachs, Todd	02-02-1985	
Zalt, Sheldon	11-11-1911	
Zanbrect, Sandy	10-31-1965	
Zapper, Ralph	02-02-1960	
√Zeiss, Carl	09-22-1943	1234
Zeiss, Carl	09-22-1973	1234
Zeplin, Henry	04-02-1972	

Source: Hard Drive
Order: Patient
Range: All Files

Disk Options
Patient Search
Merge Patients
Proceed

Figure 10.3 The File Directory – Sorted by Patient

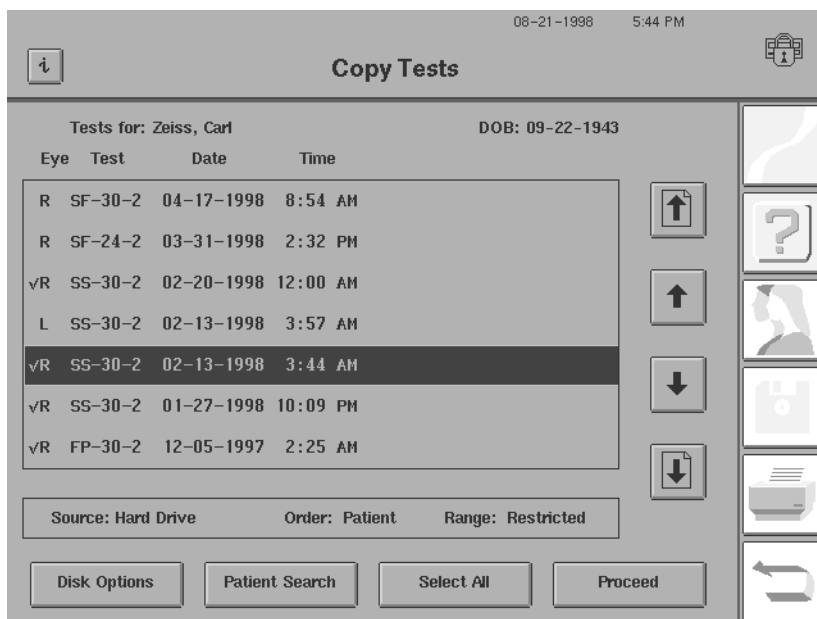


Figure 10.4 The File Directory – Single Patient Test Display

The other buttons found on the Disk Options screen include PROCEED, SET CURRENT RANGE and CANCEL. PROCEED brings up the keyboard to help in finding the patient tests. Enter enough letters on the keyboard to locate the patient. The SET CURRENT RANGE feature helps to limit the number of tests searched or helps to create a subset of tests for database functions. Additional details follow in the next section. Pressing CANCEL on the Disk Options screen returns you to the File Functions menu.

Selecting Tests from the File Directory

After using the keyboard to help locate the desired patient(s), you are ready to use the file directory. First you need to select those tests to be included in the desired function. To select a test, simply touch it. A check mark appears to the left of every selected test. When copying tests, you may choose more than one test. To clear a selection, touch the test a second time.

Often the directory contains more tests than can be displayed on one screen. In fact, no more than seven tests can be shown at one time; however, you easily can move through the directory with the aid of a few command buttons.

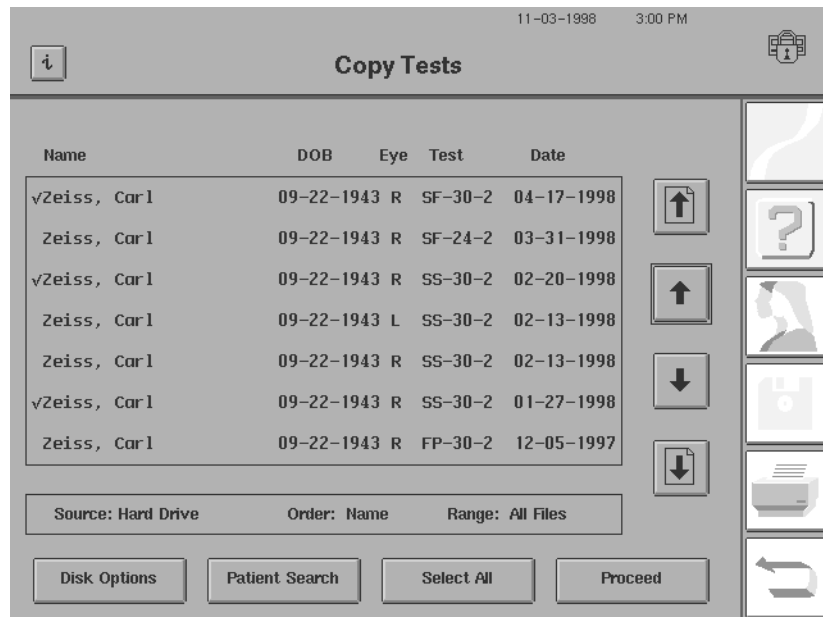


Figure 10.5 The File Directory – Sorted by Name



The page up arrow allows you to scroll one full screen at a time moving in the direction of the top of the directory.



The single up arrow allows you to shift the list one test at a time moving in the direction of the top of the directory.



The single down arrow allows you to shift the list one test at a time moving in the direction of the bottom of the directory.



The page down arrow allows you to scroll one full screen at a time moving in the direction of the bottom of the directory.

There are a number of buttons at the bottom of the File Directory screen which help to simplify the search for the desired patient tests.

Disk Options

To review or change the search criteria as designated on the Disk Options screen, select DISK OPTIONS. See “Disk Options,” on page 10-5 and see Figure 10.2.

Patient Search

When the directory order is set to Name or Patient (alphabetical searches), PATIENT SEARCH allows you quickly to locate a specific test within the directory by entering a name on the popup keyboard. When the directory order is set to Date, PATIENT SEARCH is replaced with DATE SEARCH and you use the keypad to enter the desired date. In both cases, the search is limited to only those tests meeting the search criteria in Disk Options.

Select All

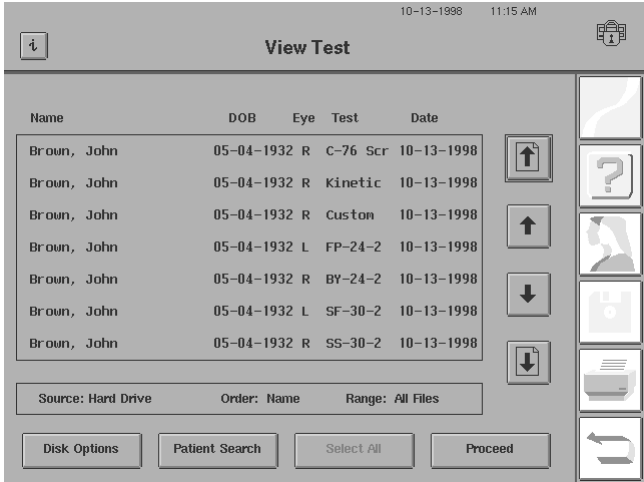
SELECT ALL selects and puts a check mark next to every test in the directory. The SELECT ALL button changes to SELECT NONE allowing you the opportunity to deselect all tests.



Select None

 Note: Pressing SELECT ALL selects all the available tests, not just the seven (7) being viewed on the screen.

After you have selected all the tests necessary for the File Function, choose PROCEED to execute the function. A confirmation screen always will be presented noting how many tests have been selected before any action takes place.



Abbreviations used on the File Directory screen to identify test strategies include:

- SS SITA Standard
- SF SITA Fast
- SSW SITA-SWAP
- Thr Full Threshold
- FP FastPac
- Scr Screening
- BY Blue-Yellow

Figure 10.6 The File Directory – Sorted by Name

Set Current Range

The SET CURRENT RANGE feature allows you to tailor how you search for, display, and print information. You can use this function to limit the total number of tests selected, thereby shortening the amount of time required to perform many tasks. The Set Current Range feature is available when performing Print functions, Printing to a File network operations, Patient Data functions and any File Function other than DUPLICATE FLOPPY, INITIALIZE FLOPPY, or BACKUP/RESTORE.

1 After choosing one of the appropriate File Functions, the Disk Options screen will appear. Select SET CURRENT RANGE to view this screen. Use the FROM and TO buttons to specify the search range.

You may use any of the 3 directory orders when using the SET CURRENT RANGE feature. File ranges may be set to one of the following:

**From Name to Name,
From Test Date to Test Date,
From ID to ID.**

The usefulness of setting the search range is illustrated in the following example:

You have a floppy disk on which you store all tests for patients with last names starting with the letter "A". This disk is now full. To create room, you wish to move all the tests with last names starting with "A" to "Am" to a new floppy disk and leave all the tests with names starting from "An" to "Az" on the current disk. From the File Functions screen select MOVE TESTS. Next, on the Disk Options screen (Figure 10.2), you designate the Source and Destination then press SET CURRENT RANGE.

On the Set Current Range screen (see figure above) select the FROM NAME button and enter "A". Press ENTER. Select the TO NAME button and enter "An". You select "An" instead of "Am" because the TO ranges are non-inclusive. The HFA II- selects everything up to, but not including, the TO field entered. So selecting "An" means the search will stop at "Am" without including names starting with "An". Press PROCEED to access the File Selection box. Only the tests in your designated range will be available. Pressing SELECT ALL will select every test in this range.

When SET CURRENT RANGE is accessed, the following choices are also available:

EYE Choose from **All, Left** or **Right**

TEST TYPE Choose from **All, Threshold, Screening, Kinetic**, or **Custom**

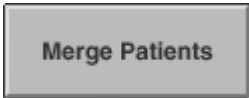
If, for example, you choose "Left" under EYE, only tests done on left eyes in the range you set will be chosen. Furthermore, if you choose "Threshold" under TEST TYPE, then only threshold tests in the selected range will be searched. Of course, you may select "Left" and "Threshold" at the same time if you only want to search for threshold tests performed on left eyes.

Hint: This range-selection feature also is useful if you wish to use the HFA-NET Pro Printing to a File command for a relatively large portion of your database, but do not want to have the HFA II- tied up for too long at a time (the HFA II- will print to a file approximately 400 files per hour, on average). In that event, you can print to a file just those patients whose last name begins with the letter A. Then, you can print to a file the letter B patients, and so forth.

2 After the desired ranges have been specified, press PROCEED. The HFA II-/will now list on the File Directory screen only the tests matching your specified range(s), until you complete or cancel the current operation.

The SET CURRENT RANGE feature is particularly useful if you are using alphabetical floppy disks and you fill a disk (as in the preceding example). By selecting a range of tests to copy or move to a new disk, instead of selecting individual tests, you may use the SELECT ALL button and copy or move the full range selected.

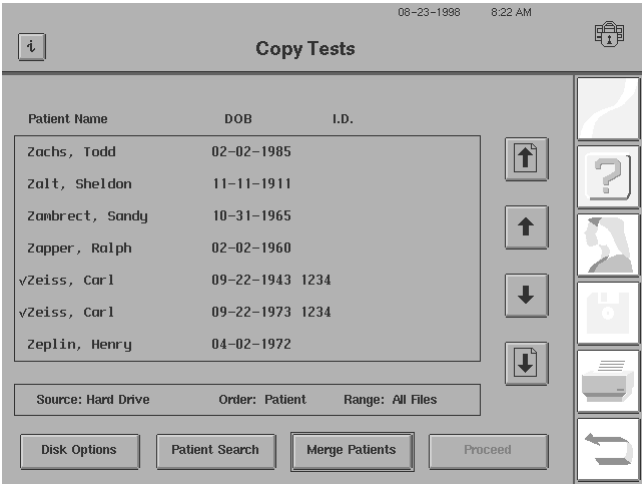
Merging Patient Files



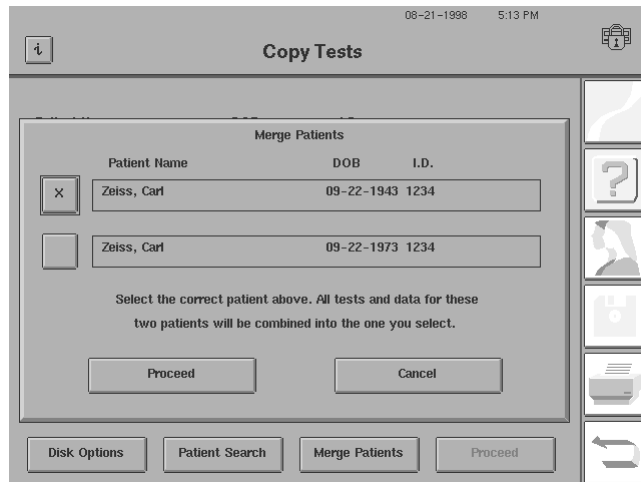
MERGE PATIENTS allows you to resolve any inconsistencies in how you entered the name or date of birth for an individual patient. Slight differences in patient identification over a number of visits can cause the HFA II-/to treat tests taken by the same patient as tests taken by different patients. As a result, some of a patient’s tests may not be included in STATPAC or GPA analysis. For example, if patient Patricia Smith is entered into the Patient Data 1 screen as “Smith, Patricia” on one visit but as “Smith, Patty” on another, the HFA II-/will think that two different patients took these tests.

To help avoid these differences, you should always enter a returning patient’s data via the RECALL PATIENT DATA button. The MERGE PATIENTS feature is available during patient data recall to help clear up extra patient entries. Please review “Recalling Patient Data,” on page 3-14 for additional information.

You may access MERGE PATIENTS on any File Directory screen when the directory displays Patient order.



- 1 Select the desired test function (VIEW TEST, COPY TEST, etc.).
- 2 Select PATIENT from Directory Order. Press PROCEED.
- 3 Choose the two test files you wish to merge. A check mark will appear next to the selected test files once they have been chosen.



4 Press MERGE PATIENTS. A pop-up window will display both choices, including the date of birth and the ID number.

5 Press the button to the left of the name you wish to use as the correct test. An "X" will appear next to that patient.

6 Press PROCEED. All the test results for the two patient entries selected will be combined into the patient file marked with the "X".

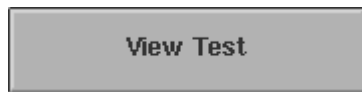
Performing File Functions

To execute most File Functions you follow a similar procedure:

- Choose the function.
- Select the Source (and Destination) of the tests.
- Select a directory order and retrieve the file directory.
- Select the test(s) from the directory for the chosen function.
- Press PROCEED and confirm your choice.

Here are step-by-step instructions for performing each File Function.

To View Previously Saved Tests:



1. Start at the File Functions screen. Select VIEW TEST.
2. Designate the Source and Directory Order, then select PROCEED.
3. Use the keyboard to help select the test you want to view.
4. Choose PROCEED to display the test results.

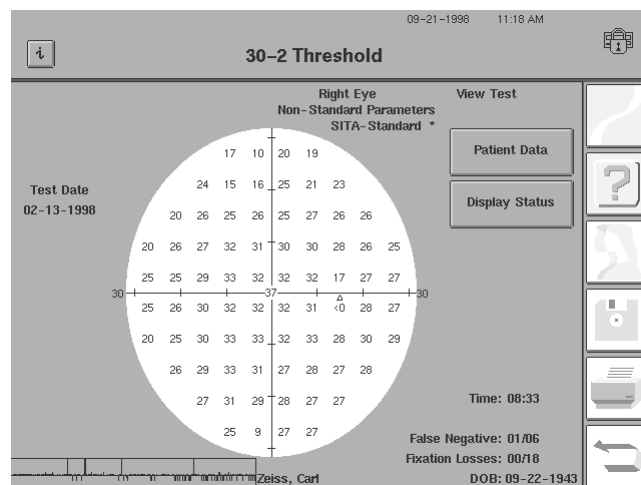


Figure 10.7 The View Test Screen

You can print test results by pressing the *PRINT FUNCTIONS* icon. You can view patient data by pressing the *PATIENT DATA* button. Patient data also can be changed for the test you are viewing on the same screen. The *PATIENT DATA* icon is ghosted during the View Test operation. Test parameters that are in effect during the test may be seen by pressing the *DISPLAY STATUS* button.

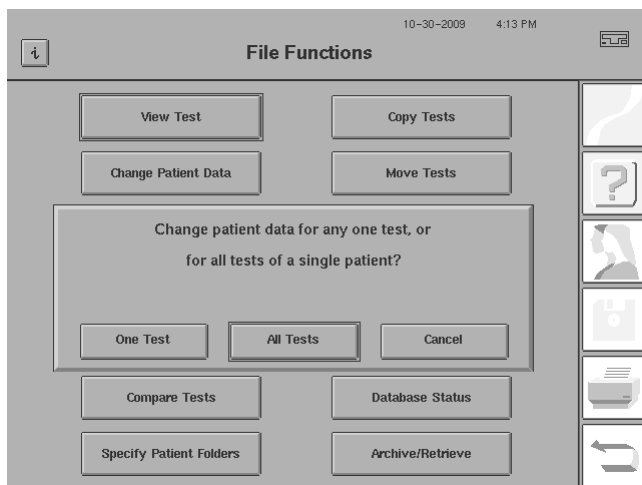
To Change Patient Data:

Change Patient Data

When changing patient data associated with a single test, some of the information contained in the Patient Data 1 or Patient Data 2 screens can be altered, including the test date. This can be a useful feature, for example, if the internal calendar was incorrect at the time of testing. Single test data may also be changed by using View Test, as described above. When changing patient data associated with all tests for a given patient, you may change the Patient ID, Patient Name, and Date of Birth.



Note: The Change Patient Data function should only be used if you do not have HFA-NET Pro or DICOM Gateway software licensed on your HFA II-*i* for use with EMR/PMS/DICOM software. This is because if the Patient ID, Patient Name, or Date of Birth is changed on the HFA, a new patient could be created on the EMR/PMS/DICOM system. It is recommended to only change the Patient ID, Patient Name, or Date of Birth on the EMR/PMS/DICOM, and not on the HFA, to avoid possible patient conflicts.



1 To change data on all of a patient's tests at one time, start at the File Functions screen. Select CHANGE PATIENT DATA, then choose ALL TESTS.

2 Select the desired Source (HARD DRIVE, FLOPPY, or USB storage device). Press PROCEED.

3 Use the keyboard to locate the patient. Choose the patient from the File Directory screen. Press PROCEED.

4 When selecting All Tests, you can edit the Patient ID, Patient Name, and Date of Birth. Select EDIT NAME, EDIT DOB, or EDIT ID to enter a new name, date of birth, or Patient ID with the keyboard. After completing entry of the selected field, the keypad closes, but the Change Patient Data dialog remains, with your entry displayed in the New Entry section. You can then edit the other two identity fields if you wish. Press PROCEED to save the edits. Press CANCEL to discard the edits.



Note: If you change the Patient ID, then the Issuer of ID will change to what is stored in the system (see [“Specifying Your Practice’s Issuer of ID,”](#) on page 14-40).

1 To change patient data on a single test for a given patient, select ONE TEST in Step 1 above. Choose the Source and the Directory Order on the Disk Options screen. Use the keyboard to locate the desired patient and select the desired test.

2 After selecting the test from the directory and pressing PROCEED, the Change Patient Data for This Test 1 screen appears. To move this test to an existing patient, select RECALL PATIENT. To move this test to a new patient, select CLEAR PATIENT DATA to clear the existing patient information, and then enter new patient information. If the patient is changed, all data in the Trial Lens, Patient Data 2 screen, and Eye Comments fields will be cleared. Therefore, the data in these fields should be re-entered after the correct patient is selected, or a new patient created.



Note: If you are changing patient data at the end of a test, the EDIT TEST DATE button and test date are not shown on the Change Patient Data for This Test 1 screen.

To Print a File Directory:

1 From the File Functions menu select PRINT DIRECTORY.

2 Select either HARD DRIVE or FLOPPY to indicate which directory you want to print from. If you wish to print a partial directory of either, or from a USB storage device, choose PARTIAL.

3 If you select HARD DRIVE, a message will appear telling you how many tests will be listed on the directory. Pressing YES will initiate printing the directory in Name order.

If you select FLOPPY, a directory of all tests on the floppy disk will be printed in Name order. If you select PARTIAL, you can then specify either HARD DRIVE, FLOPPY, or a USB storage device as the Source, and either Name or Date as the order. The keyboard and the file directory screen will be displayed to allow you to choose the tests to include in the partial directory. Directories cannot be printed in Patient order. To print a complete chronological (Date) directory, choose PARTIAL and then press the SELECT ALL button on the file directory screen before pressing PROCEED.



Note: You may cancel printing at any time by selecting CANCEL from the print progress pop-up window.

To Convert Tests to Older Database Formats:

Convert Tests

This function converts one or more tests in a format that can be read by all HFA II-/system software versions prior to version 5.0, and HFA II system software Ver. A6 or later. CONVERT TESTS is designed to work only with an empty floppy disk and is intended to allow sharing HFA tests between practices.

1. Start at the File Functions screen. Select CONVERT TESTS.
2. Connect a USB floppy disk drive to a USB port on the HFA II-.
3. Insert an empty floppy disk in the USB floppy disk drive.
4. Select the test(s) you want to convert or SELECT ALL to convert all tests saved on the Hard Drive.
5. Select PROCEED to begin converting and exporting tests.
6. The selected tests will be copied to the floppy disk.



CAUTION: CONVERT TESTS is not designed for routinely sharing tests between HFAs in the same practice because not all the data items in the database are saved during the CONVERT TESTS function. Do not use CONVERT TESTS to copy tests to other HFA instruments running system software version 5.x. Use COPY TESTS instead.

Disk Utilities



Duplicate Floppy

To Duplicate Floppy Disks:

1. Start at the File Functions screen. Select DISK UTILITIES>DUPLICATE FLOPPY.
2. Connect a USB floppy disk drive to a USB port on the HFA II-.
3. Put the Source disk (the disk you want to copy) in the USB floppy disk drive.
4. Select OK to proceed or CANCEL to return to the File Functions menu. If you select OK, the next screen displays, "Reading Source Disk".
5. When instructed to do so, remove the Source disk and put the Destination disk in the USB floppy disk drive. Note that this procedure will erase all old data from the Destination floppy disk prior to copying the information from the Source disk onto it. Press OK to proceed, or CANCEL to abort the procedure and leave the Destination floppy unchanged. If you select OK, the next screen displays, "Writing to Destination Disk".

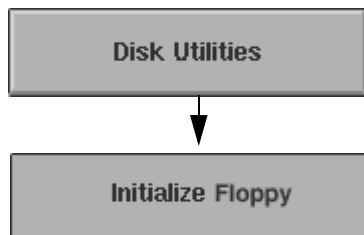


CAUTION: Remember to make sure that the Destination disk has NO valuable information on it before you decide to duplicate information onto it. Everything on the Destination disk will be replaced with all of the information on the Source disk when you use the DUPLICATE FLOPPY function.

- Remove the Destination disk when you see the confirmation message, "Floppy Successfully Duplicated". If the duplication fails, repeat Steps 1-4. If the duplication fails again, repeat Steps 1-4 with a different Destination disk. Direct problems to Carl Zeiss Meditec Customer Service. Duplication may also be done using any PC compatible computer with a floppy disk drive.



CAUTION: Use only High Density (HD) 1.44 MB disks. Regular density (720 K) and 2.88 MB Super High Density (SHD) disks will not work with the HFA II-*i*. You risk losing data if you use anything except High Density floppy disks.



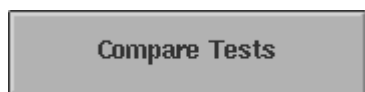
To Initialize a Floppy Disk:

You always must use formatted disks with your HFA II-*i*. The following procedure may be used on new or previously formatted disks.

- Start at the File Functions screen. Select DISK UTILITIES>INITIALIZE FLOPPY.
- Connect a USB floppy disk drive to a USB port on the HFA II-*i*.
- Insert a floppy disk into the USB floppy disk drive.
- Select OK to proceed with the initialization or CANCEL to leave the disk intact and return to the File Functions menu. If you select OK, the next screen displays, "Formatting disk".
Remember that the INITIALIZE FLOPPY function permanently erases ALL information currently stored on the floppy disk.
- Remove the disk when you see the confirmation message, "Floppy Successfully Formatted". If the formatting fails, repeat steps 1-3.



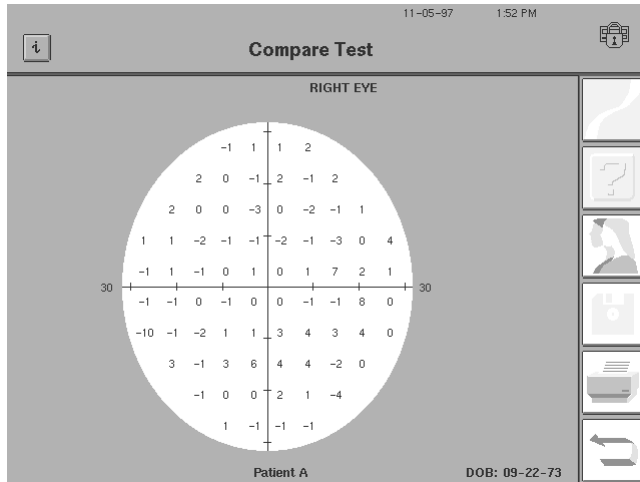
CAUTION: INITIALIZE FLOPPY prepares the floppy disk to record information from the HFA II-*i*. All data previously stored on the disk will be erased during initialization. Duplication and initialization of the floppy disk may also be done using any PC compatible computer with a floppy disk drive. Use only High Density (HD) 1.44 MB disks. Regular density (720 K) and Super High Density (2.88 MB) disks will not work with the HFA II-*i*.



To Compare Test Results:

The Compare feature analyzes the results of two threshold tests to show the change in threshold values. Negative values indicate decreased sensitivity; positive values indicate increased sensitivity.

Tests must be from the same patient, the same eye, the same test type, and must be of the same test pattern with one exception: 24-2 and 30-2 tests may be analyzed together. However, only the points the patterns share in common will be compared. Tests must also be stored on the same source. You may print the results of a COMPARE TESTS by pressing the *PRINT FUNCTIONS* icon. Compared test results cannot be saved.



1 To compare two tests, select COMPARE TESTS from the File Functions menu.

2 Select either HARD DRIVE, FLOPPY, or a USB storage device to indicate your test source. Press PROCEED.

3 Select the two tests that you wish to compare, making sure that they are for the same patient. The order in which you choose them is not important because the calculations are based on the test dates.

4 Press PROCEED. The Compare Test screen will appear. It features a test pattern with the change in sensitivity between the tests at each point in the visual field. As noted above, negative values indicate decreased sensitivity; positive values indicate increased sensitivity.

Copy Tests

To Copy Tests:

This function copies one or more tests from one source to another, leaving the original record unchanged.

1. Start at the File Functions screen. Select COPY TESTS.
2. Designate the Source and Destination disks and Directory Order, then PROCEED.
3. Select the test(s) you want to copy or SELECT ALL to copy all tests saved on the Source.
4. Select PROCEED to begin copying tests.
5. The selected tests will be added to the information on the Destination disk without affecting the information already stored there.

Move Tests

To Move Tests:

This function moves tests to a different destination and then automatically deletes the original record from the source.

1. Start at the File Functions screen. Select MOVE TESTS.
2. Designate the Source, Destination, and Directory Order, then PROCEED.
3. Select the test(s) you want to move or SELECT ALL to move all tests saved on the Source.
4. Select PROCEED to begin moving tests.
5. The selected tests will be removed from the Source and added to the Destination without affecting the information already stored on the Destination.

Delete Tests

To Delete Tests:

This function deletes test records from the designated source.

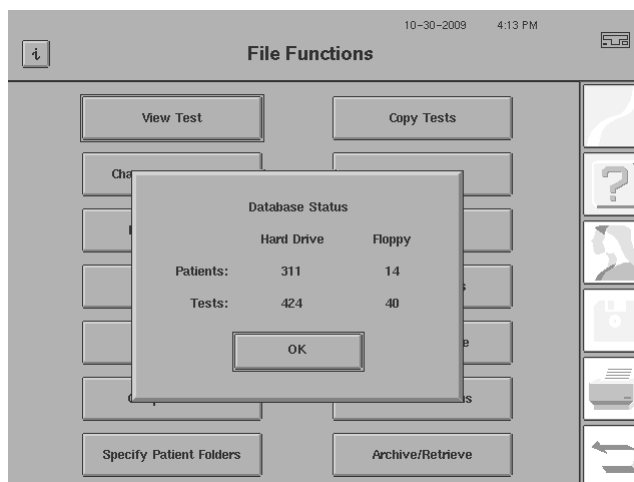
1. Start at the File Functions screen. Select DELETE TESTS.
2. Designate the Source and Directory Order, then PROCEED.
3. Select the test(s) you want to delete or SELECT ALL to delete all tests on the designated Source.
4. Select PROCEED. A pop-up window will ask, "Are you sure?" Choose YES to permanently delete the designated tests or CANCEL to return to the directory.



CAUTION: All tests deleted using the DELETE function are permanently erased from the source. Once the DELETE function has begun, it can be stopped by pressing CANCEL, but tests already deleted before CANCEL was pressed are not recoverable.

Database Status

By pressing DATABASE STATUS you get information on the number of tests and the number of patients found on the hard disk and floppy disk databases. If no floppy disk is in the optional USB floppy disk drive, "No Disk" will be displayed indicating the information is unavailable. Should the HFA II-*i* be unable to access the hard drive, "NA" will be displayed. If you insert a backup floppy disk, the Database Status feature will recognize the floppy and indicate "Backup".



Please note that when patient information has been entered but not saved with test results, the Database Status pop-up window may give a false sense of the true number of patients with tests in the database. See ["Cleanup Hard Disk Database,"](#) on page 11-23 for additional information.

Serial Transfer of Tests Between HFA I, HFA II or HFA II-*i* Instruments

The diagram in [Figure 10.8](#) shows two HFAs that are connected directly by a serial cable. This approach allows data transfer from the Humphrey Field Analyzer I or II to an HFA II-*i*. In addition, two HFA II-*i* instruments can be linked via serial cable to allow data transfer as in [Figure 10.9](#). Using HFA-NET Pro, an HFA II-*i* can connect to a computer network and transfer data to the computer and between other HFAs. This is discussed in [Chapter 14](#).



Note: As is shown by the arrow in [Figure 10.8](#), you only can transfer data out of either an HFA I or HFA II.

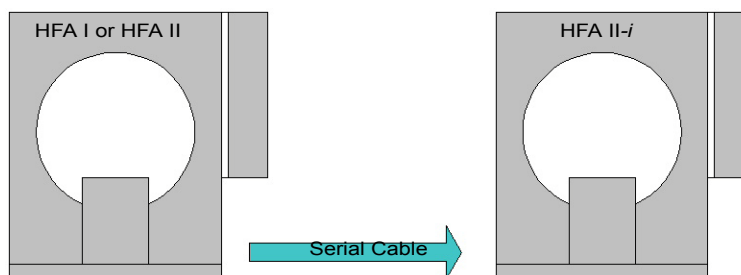


Figure 10.8 Serial Communication Between an HFA I or HFA II and an HFA II-i

You can use a serial cable to transfer data between the three different series of HFA perimeters in the following ways:

- HFA I to an HFA II-i
- HFA II to an HFA II-i
- HFA II-i to and from an HFA II-i (Figure 10.9)

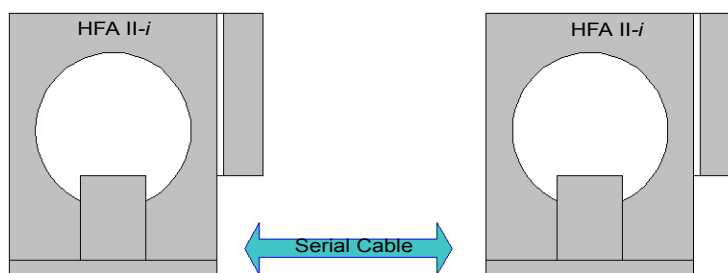


Figure 10.9 Serial Communication Between an HFA II-i to and from an HFA II-i



CAUTION: HFA II-i series system software 5.x and the 15.0 system software release for HFA II instruments create a different database structure than previous versions that is not fully compatible with previous software releases.



WARNING: Every patient has an identifier that consists of Name, Date of Birth, Patient ID, and Issuer of ID. To avoid unintentional automatic merging of patient records, **VERIFY** a unique combination of Name, Date of Birth, Patient ID, and Issuer of ID exists when patients are copied, transferred, retrieved from an archive, or restored from a backup. There is no way to separate the combined records of erroneously merged patients. Automatic merging of patient records occurs when a patient exists in the local database with the **EXACT SAME** Name, Date of Birth, Patient ID, and Issuer of ID as a patient that is copied, transferred, retrieved from an archive, or restored from a backup.

For example, consider the following scenario:

Patient A: This patient is currently on the local HFA database and was automatically assigned a unique Patient ID by the instrument because it was a blank field prior to a software upgrade to V5.x software or during an import to the HFA through a copy, transfer, retrieval from archive, or a restore from backup.

Patient B: This patient is about to be transferred to the local HFA database and has the same Name and Date of Birth as Patient A, but does not have a Patient ID (i.e. field is blank). When Patient B is copied, transferred, retrieved from an archive, or restored from a backup to the local HFA database, Patient B will automatically be assigned the same Patient ID and Issuer of ID as Patient A, and Patient B will be merged with Patient A.

Transferring Tests from the HFA I to the HFA II-*i*

Transferring results between the HFA I and HFA II-*i* is done via serial cable using the TRANSFER TESTS function.

There are certain limitations to which tests will transfer from the HFA I to the HFA II-*i*. A name and date of birth must be included on the original HFA I test in order to transfer it to the HFA II-*i*. The transfer process will not warn you of improperly labeled HFA I tests or test results which are not eligible to be transferred. The following is a list of restrictions specific to the test type being transferred:

Threshold

- Fast Threshold or Master files will not transfer
- Compared, Averaged or Merged tests will not transfer
- Tests originally acquired on the HFA II-*i* (and transferred back from the HFA I) will not transfer

The Macula test: Only the first two threshold values at each point will be displayed and printed.



Note: The Peripheral 30/60-2 test on the HFA I is the Peripheral 60-4 on the HFA II-*i*. The test results will transfer, but the 4 points not found in the 60-4 pattern will not be included.

Screening

All screening tests will transfer from the HFA I to HFA II-*i* except:

- The C-166 Screening test
- A screening test where the user selected the Central or Peripheral Reference Level
- Auto Diagnostic tests



Note: The Peripheral 68 test on the HFA I is the P-60 on the HFA II-*i*. These test results will transfer, but the 8 points not found in the P-60 pattern will not be included.

Custom

Custom Arc and Profile tests will not transfer.

Kinetic

Kinetic test results cannot be transferred from the HFA I.

Transfer Tests

How to Transfer Tests from the HFA I to the HFA II-/Series via Serial Cable

1. Connect the HFA I and HFA II-/series perimeters with an HFA I to HFA II-/Serial Transfer Cable (P/N 52416). Plug the end of the cable with nine (9) pins into the Data Transfer port on the HFA II-/series (refer to diagram in [Chapter \(1\), "Introduction & Instrument Setup,"](#) for port location). Plug the 25 pin connector into the serial port on the back of the HFA I. Refer to ["Additional Components"](#) in [Chapter 1](#) of this manual for a detailed illustration of the ports on the HFA II-/series.
2. Turn both instruments ON.

On the HFA II-/Series:

1. From the System Setup screen, select COMMUNICATIONS SETUP.
2. Select RS-232 SETUP.
3. On the RS-232 Setup screen, set the "Receive Settings" for BAUD RATE to 9600, PARITY to Even, DATA BITS to 7, and STOP BITS to 1.
4. Press PROCEED. The Communications Setup screen will then appear. Press DONE.
5. Press the *FILE FUNCTIONS* icon on the right of the screen.
6. Select TRANSFER TESTS.
7. Select CLASSIC SERIAL as the Source.
8. Choose HARD DRIVE or FLOPPY as the Destination, then press PROCEED.



Note: You do not need to select anything for "Export Format."

On the HFA I:

1. From the Main Menu, select CONFIGURATION MENU.
2. Make sure the BAUD RATE is set to 9600 and the PARITY is set to EVEN on the Configuration Menu screen, then select RETURN (to the Main Menu).
3. Select DISK FUNCTIONS.
4. Select TRANSMIT FILES.
5. Select the disk drive on which the tests you want to transfer are stored.
6. If you want to transmit a limited number of files, highlight those files and choose SELECTION COMPLETE. If you want to transmit all the files on the HFA I disk, do not highlight any files. Just choose SELECTION COMPLETE.

On the HFA II-/Series:

1. A pop-up window will update the user on the progress and success of test transfer.
2. When the "tests transferred" count on the pop-up window has not changed for several seconds, test transfer is complete. Press CANCEL. If you do not press CANCEL within about 10 minutes, the HFA II-/will automatically proceed to the next step.
3. The transferred tests will then be moved from temporary to permanent storage. Press OK when the pop-up window informs you that the transmission is complete.

Transfer Tests

How to Transfer Tests from an Older HFA II to the HFA II-/via Serial Cable

1. Connect the older HFA II and HFA II-/series unit with an HFA II to HFA II-/Serial Transfer Cable (P/N 52417). Plug one end of the cable into the Data Transfer port on the HFA II-/series (refer to diagram in [Chapter \(1\), "Introduction & Instrument Setup,"](#) for the port location). Plug the other 9 pin connector into the Serial port #1 (the first 9 pin serial connector on the left) on the back of the older HFA II. Refer to the *HFA II User's Manual* for a detailed illustration of the ports on the HFA II.
2. Turn both instruments ON and wait until you see the Main Menu screen.

On the HFA II-/Series:

1. From the System Setup screen, select COMMUNICATIONS SETUP.
2. Select RS-232 SETUP.
3. On the RS-232 Setup screen, set the Receive Settings for BAUD RATE to 9600, PARITY to Even, DATA BITS to 7, and STOP BITS to 1.
4. Press PROCEED. The Communications Setup screen will then appear. Press DONE.
5. Press the *FILE FUNCTIONS* icon on the right of the screen.
6. Select TRANSFER TESTS.
7. Select CLASSIC SERIAL as the Source.
8. Choose HARD DRIVE or FLOPPY as the Destination, then press PROCEED.

On the Older HFA II:

1. From the System Setup screen, select SAVE/TRANSMIT OPTION.
2. Select RS-232 OPTIONS.
3. On the RS-232 Options screen, set BAUD RATE to 9600, PARITY to Even, DATA BITS to 7, and STOP BITS to 1.
4. Press PROCEED.
 - a. For HFA II perimeters using system software version 14.0 or higher, the Save/Transmit Option screen will appear. For Export Format, select HFA II SERIAL. Select PROCEED.
 - b. For HFA II perimeters using system software version lower than 14.0, you will need to update to system software version 14.0 or later.
5. Press the *FILE FUNCTIONS* icon on the right of the screen.
6. Select TRANSFER TESTS.
7. Select HARD DRIVE or FLOPPY as the Source.
8. Choose HFA SERIAL CABLE as the Destination.
9. Choose HFA II SERIAL for the Export Format. Press PROCEED.
10. Choose the tests you wish to transfer then press PROCEED to start transferring.

On the HFA II-/Series:

1. A pop-up window will update you on the progress and success of test transfer on both HFA's. Check the HFA II to determine the end of the test transfer. It will also note how many tests transferred. The HFA II-/will also indicate the number of tests successfully transferred. When the "tests transferred" count on the pop-up window has not changed for several seconds on the HFA II-/; the test transfer is complete. Press CANCEL. If you do not press CANCEL within about 10 minutes, the HFA II-/will automatically proceed to the next step.
2. The transferred tests will then be moved from temporary to permanent storage. Press OK when the pop-up window informs you that the transmission is complete.

Transfer Tests

How to Transfer Tests from One HFA II-/to a Second HFA II-/via Serial Cable

1. Connect the two HFA II-/instruments with an HFA II to HFA II-/Serial Transfer Cable (P/N 52417). Plug one end of the cable into the Data Transfer port on each of the HFA II-/series instruments (refer to the diagram in [Chapter \(1\), "Introduction & Instrument Setup,"](#) for the port location).
2. Turn both instruments ON and wait until you see the Main Menu screen.

On each HFA II-/:

1. From the System Setup screen, select COMMUNICATIONS SETUP.
2. Select RS-232 SETUP.
3. On the RS-232 Setup screen, set both the Transfer Settings and the Receive Settings for BAUD RATE to 9600, PARITY to Even, DATA BITS to 7, and STOP BITS to 1.
4. Press PROCEED. The Communications Setup screen will then appear. Press DONE.

On the Destination HFA II-*i*

1. Press the *FILE FUNCTIONS* icon on the right of the screen.
2. Select TRANSFER TESTS.
3. Select CLASSIC SERIAL as the Source.
4. Choose HARD DRIVE or FLOPPY as the Destination, then press PROCEED.

On the Source HFA II-*i*

1. Press the *FILE FUNCTIONS* icon on the right of the screen.
2. Select TRANSFER TESTS.
3. Select HARD DRIVE or FLOPPY as the Source.
4. Choose CLASSIC SERIAL as the Destination.
5. Choose HFA II SERIAL for Export Format. Press PROCEED.
6. Choose the tests you wish to transfer then press PROCEED to start transferring.

Final Steps:

1. A pop-up window will update you on the progress and success of the test transfer on both HFA's. Check the Source HFA II-*i* to determine the end of the test transfer. It will also note how many tests transferred. The Destination HFA II-*i* will also indicate the number of tests successfully transferred. When the "tests transferred" count on the pop-up window has not changed for several seconds on the Destination HFA II-*i*, the test transfer is complete. Press CANCEL. If you do not press CANCEL within about 10 minutes, the HFA II-*i* will automatically proceed to the next step.
2. The transferred tests will then be moved from temporary to permanent storage. Press OK when the pop-up window informs you that the transmission is complete.

Organizing Patient Files

Just as you organize patient tests that are on paper, it is also necessary to organize visual field tests on storage media. Clearly label every removable storage medium in your test library.

Keep a USB storage device connected in a USB port at all times in order to maintain a chronological copy of all tests. Each time you press SAVE ON DISK, the results will be stored on both the hard disk and the USB storage device. Clearly label every USB storage device in your file library with the starting and ending dates contained on that device. Always print a hard copy of test results for all tests not saved. Periodically make copies of the storage media to protect the data.



Note: It is recommended that you store a copy of your HFA II-*i* database outside of the office to protect your data from damage in the event of a fire or other major catastrophe.



Note: Be sure to read [Chapter \(11\), "Database Management,"](#) for more information on the importance of following good data backup procedures.

(11) Database Management

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The Humphrey Field Analyzer II-/i is like a computer in many respects. Its hard drive can “crash” and its floppy disk can “get corrupted”. Because visual field test results represent an important part of your patient’s ophthalmic history, it is imperative that you take steps to safeguard the integrity of the data by creating backup copies of all test results. In addition to patient data, you can protect Custom test patterns, Main Menu button definitions, network settings (if you have licensed HFA-NET Pro), and System Setup selections against loss in the event of a hard disk failure. Maintaining up-to-date backup copies of your patient database is insurance against loss.



After reading this section you will be familiar with:

- recommended backup techniques
- how to back up and restore menu configurations
- how to deal with database failures
- how to keep a similar database on multiple HFA II-/s
- proper handling of USB storage devices, USB floppy disk drives, and floppy disks



CAUTION: Never turn off the HFA II-/i or remove a USB storage device or USB floppy disk drive while the hard drive or USB device is reading or writing data. Wait for the HFA progress bar to complete and/or the USB device’s activity light to cease. This may cause permanent loss of valuable data.



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



CAUTION: To protect your HFA data from unauthorized access, use dedicated USB devices for storage of HFA data. Do not use these USB devices for any other data or application. HFA data is not encrypted.



CAUTION: Health care providers have responsibility for the protection of patient health information (PHI), both hardcopy and electronic. To protect patient confidentiality of your electronic HFA data, the use of encryption is recommended and is the responsibility of the user.



Note: The HFA is only compatible with USB storage devices formatted in FAT (FAT16) or FAT32. NTFS or exFAT (FAT64) cannot be used and will report an "Unrecognized format" error. Also, the HFA can only see and access the first partition of the USB storage device.



Note: Some USB hard drives may require connection to two USB ports or their own external power supply to work correctly.



Note: An optional USB floppy disk drive should only be used for backwards compatibility. It is highly recommended to use USB storage devices instead of floppy disks. Floppy disks may not be available in the near future.

Introduction to Database Management

Database errors are inevitable. Human error, power surges, temperature changes, and mechanical failure can disrupt the proper operation of removable media, and prevent you from successfully saving or retrieving data. The information on removable media can be damaged by static electricity and strong magnets.

Database management is not difficult and should not consume much time. **Carl Zeiss Meditec strongly recommends that all HFA customers make extra copies of their patient database and setup configurations. In the event of a database problem, and you need to restore your database, you will have the solution at hand.**

For the sake of simplicity, this manual separates database management into two categories: functions which manipulate data (Copy Tests, Delete Tests, and Change Patient Data, for example), and functions which preserve database integrity (Backup Configuration, Rebuild Hard Disk Database, etc.). This chapter discusses preserving database integrity. For additional information on the other database management functions listed below, refer to [Chapter \(10\), "File Functions."](#)

Database Integrity Functions

Functions associated with preserving database integrity can be found on both the File Functions and Additional Setup Menus. These functions are outlined below.

On the File Functions Menu

Duplicate Floppy

Creates an exact copy of a floppy disk; used for duplicating patient database information onto additional floppy disks.

Backup/Restore

Backup: Creates a restorable file from patient files on the hard disk and is saved to a USB storage device or a network file server.

Restore: Restores patient files from a USB storage device, a network file server, or floppy disks to the hard drive. Used in the event of a hard disk failure. The Source and Destination you choose determines whether you are backing up or restoring data.

Database Status

Provides information on the number of tests and the number of patients found on the hard drive and floppy disk databases. It can also identify a backup floppy disk (refer to [Chapter \(10\), "File Functions"](#)).

On the Additional Setup Menu**Backup Configuration**

Copies Custom Test Patterns, Main Menu button definitions, network settings, and System Setup selections to a USB storage device.

Restore Configuration

Reinstates Custom Test Patterns, Main Menu button definitions, network settings and System Setup selections from the backup configuration floppy disk or USB storage device.



Note: Network settings will only be restored to the same HFA II-/i from which they were backed up.

Rebuild Hard Disk Database

A database repair utility; used only in the event of hard disk database problems.

Rebuild Removable Media Database

A database repair utility; used only in the event of USB storage device or floppy disk database problems.

Cleanup Hard Disk Database

Deletes files containing patient data with no associated test data.

Patient Database Protection Procedures

Creating alternate copies of your patient database is important, but can be a lengthy procedure. Therefore, Carl Zeiss Meditec recommends that you choose a schedule that suits your office, preferably one that does not interfere with patient care and testing. Whether you perform 25 visual field tests each week or five, every test worth saving (whether to a USB storage device, hard disk, network file server, or floppy disk) is worthy of being protected by being maintained on alternate storage media. In the event of database failure, alternate copies of your database can be used as a back up measure to minimize or eliminate data loss.

The removable storage media used with the HFA II-/i (USB storage devices and/or floppy disks) are not indestructible. Improper care and handling will affect the contents and render the media unusable. Floppy disks also have a limited shelf life and should not be used indefinitely. It is advisable to rotate between at least two sets of storage media. Information on the proper care and handling of storage media is covered at the end of this section, as well as in [Chapter \(15\), "Care and Cleaning."](#)

Database Protection

Your HFA II-/i comes equipped with five USB ports for connecting USB storage devices. You may have licensed the HFA-NET Pro networking software on your HFA. An optional USB floppy disk drive is also available. These different backup media afford owners several alternative methods for backing up their hard disk data.



Note: An optional USB floppy disk drive should only be used for backwards compatibility. It is highly recommended to use USB storage devices instead of floppy disks. Floppy disks may not be available in the near future.

The recommended database protection procedure for your HFA II-/i involves the following steps:

1. Leave the Save to USB function turned on (the default), and keep a USB storage device inserted into a USB port for automatic saving of all data saved to the hard disk (patient information and tests).
2. On a weekly basis perform either a network or USB storage device backup of the entire database using the BACK UP/RESTORE utility. Rotate between two or more USB storage devices for added protection.
3. Store backup USB storage devices in a safe location away from the HFA II-*i*. It may also be wise to create an extra back up on a USB storage device and store it away from the office or clinic. This extra step can help to prevent critical data loss in the event of a fire, tornado, earthquake, or other major catastrophe.

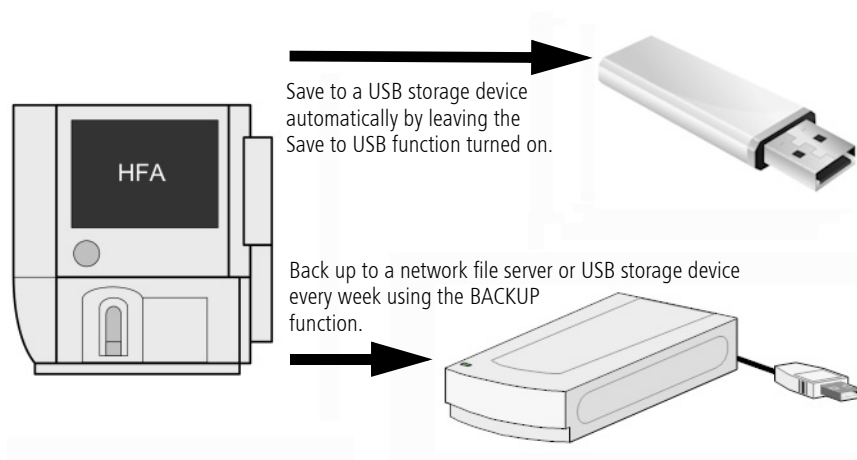


Figure 11.1 Maintaining Backups on Network File Servers or USB Storage Devices

To Back Up Hard Drive Data Onto USB Storage Devices

1. From the File Functions screen, select BACK UP/RESTORE.
2. Choose HARD DRIVE as the Source.
3. Connect the desired USB storage device to a USB port on the HFA.
4. Choose the desired USB storage device as the Destination.
5. Select PROCEED to begin the backup.
6. When the backup has successfully completed, select OK to return to the File Functions menu.
7. Should the HFA II-/require a larger capacity USB storage device, instructions will be indicated on the screen.
8. Disconnect and store the USB storage device in a safe location.

To Back Up Hard Drive Data Onto the Network File Server

This feature is only available if you have licensed HFA-NET Pro on your HFA II-/and have completed the entries on the "Archive and Retrieve" Setup screen. See [Chapter \(14\), "Networking"](#) for more details.

Use the following procedure to back up your HFA II-/.

1. In the Main Menu, select *FILE FUNCTIONS*.
2. In the File Functions menu, select BACK UP/RESTORE.
3. When the Disk Options screen appears, touch the down-arrow to open the SOURCE drop-down box. Select HARD DRIVE.
4. Touch the down-arrow of the Destination drop-down box. Select FILE SERVER. Press PROCEED.
5. An alert will appear while data is being backed up to the server.
6. When the backup is completed, select OK to return to the File Functions menu.



Note: Subsequent backups replace the current backup.



Note: Should the database need to be restored, see ["Restoring the Hard Disk Database,"](#) on page 11-20 or ["Restoring Data from the Server,"](#) on page 14-16.

Configuration Back Up and Restore

Custom test patterns, Main Menu button definitions, network settings, software licensing, and System Setup choices can be backed up on a USB storage device. This backup includes all changes made via the Alter Main Menu feature. It also includes settings in the System Setup and Additional Setup screens, including Personalized ID, printer choice, etc. Backup copies of your configuration ensure that your settings will be preserved for the future. This may be important if you wish to restore settings that you have deleted, or if an unexpected data loss occurs. Bear in mind that a restoration cannot occur unless a backup has been performed first.

The System Setup and Additional Setup changes that are saved are not instrument specific. This means that you can update additional HFA's with the same setup information. This is an advantage if you wish for all of your available HFA's to have the same altered Main Menu screen, for example. You can restore the configuration backup from a selected HFA to each of several other HFA's to update their configurations.



Note: You may not back up or restore an individual Custom test pattern. All Custom test patterns must be backed up and restored as a group.



Note: The network settings and software licensing that you back up only can be restored to the HFA from which they originated. Therefore, if you apply a configuration backup from one HFA to several others, the network settings and software licensing settings will not restore to the other locations.



Note: Configuration Backup is a separate function from the Patient Database Backup.



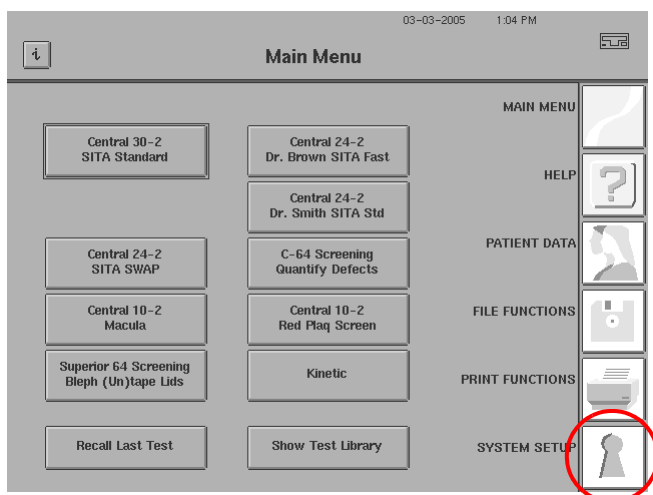
Note: Any time you change configuration settings, you should back up all your settings to a USB storage device. That way, should you ever need to restore your configuration settings, you will be able to restore them to their most recent selections.

Backing Up Configurations to a USB Storage Device

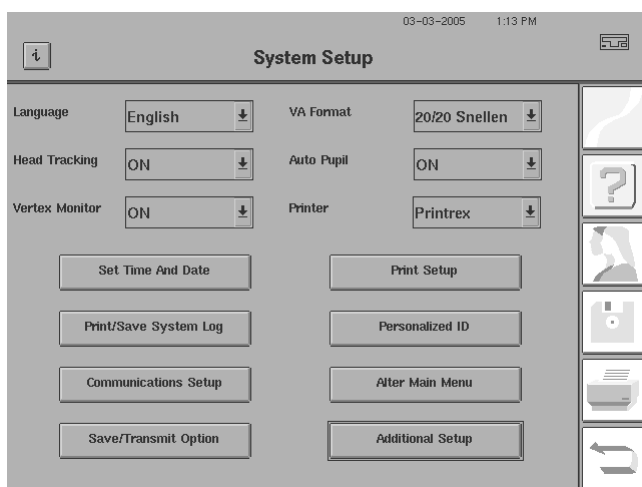
1 From the Main Menu screen, press the *SYSTEM SETUP* icon.

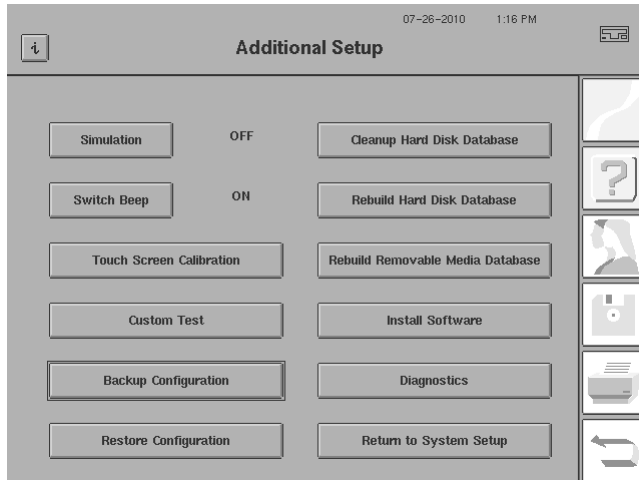


Note: This example shows numerous test buttons on the Main Menu altered by the user. Refer to [“Altering the Main Menu Screen,” on page 2-26](#) for the details. Your unique Main Menu configuration will be saved with this procedure.



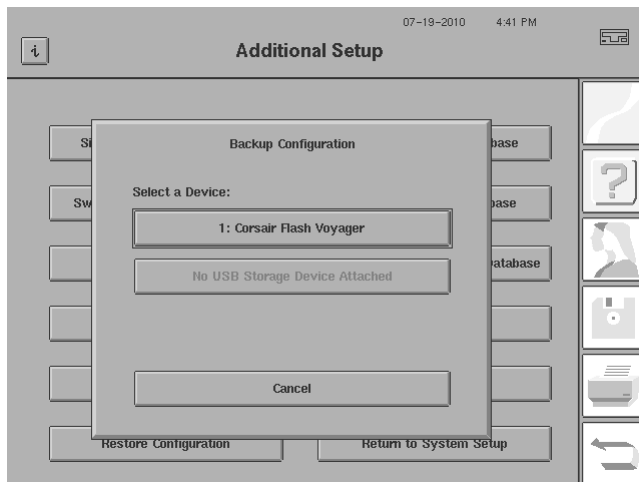
2 Press *ADDITIONAL SETUP*.





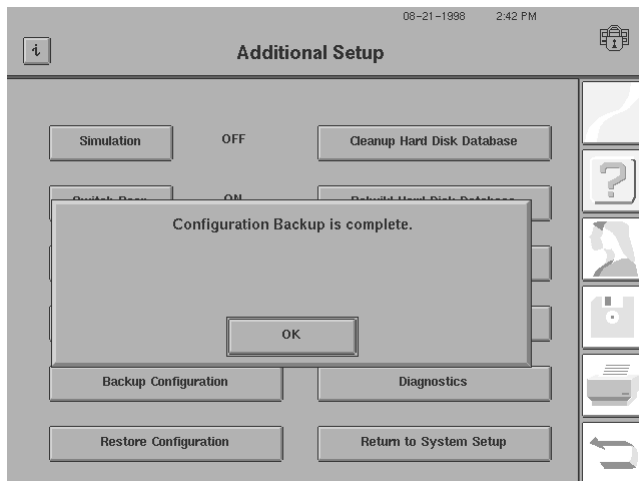
3 Press BACKUP CONFIGURATION.

4 A dialog appears prompting you to select a USB storage device.



5 Insert a USB storage device into a USB port on the HFA II-*i*.

6 Select the desired USB storage device by pressing the button with its device name.



7 When the "Configuration Backup is complete" message appears, press OK to return to the Additional Setup screen.

8 Remove the USB storage device. Label and date the device. Store the device in a safe place.

To Restore Configurations from a Floppy Disk or USB Storage Device

Restoring configurations will replace your existing configuration with those contained on a Configuration Backup floppy disk or USB storage device. See previous discussion, "[Configuration Back Up and Restore](#)," on page 11-5.

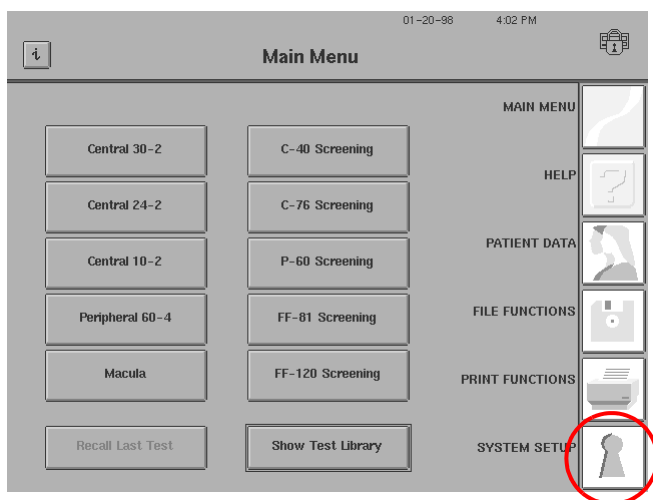


Note: If your office uses more than one HFA II-*i*, and you desire consistent configuration settings among all your instruments, you may use a single configuration backup to restore settings to all the other units. Each instrument must support the same product features.

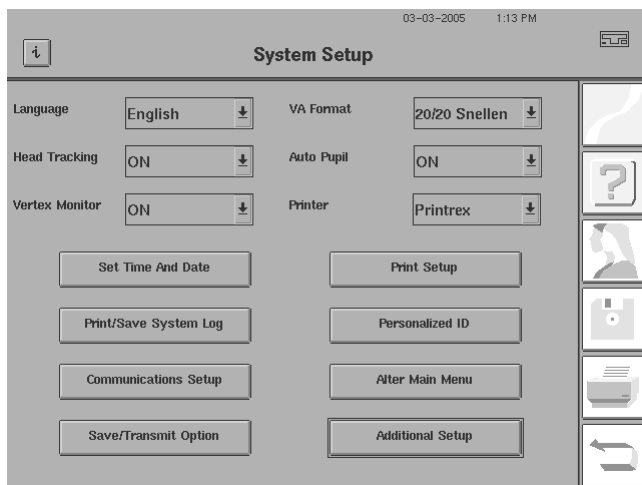


CAUTION: Any new Custom test patterns created, or Main Menu buttons altered, or network settings created since the last configuration backup will be overwritten when you do a restoration. Therefore, to always have the most current configuration available, make a new backup whenever you change the configuration.

1 From the Main Menu screen, press the *SYSTEM SETUP* icon.

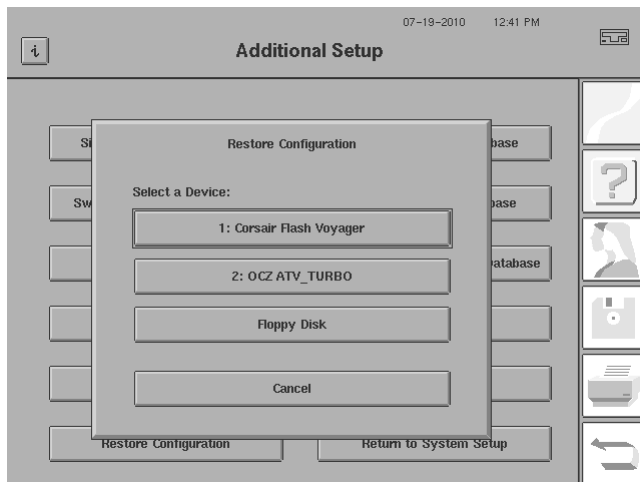


2 Press ADDITIONAL SETUP.



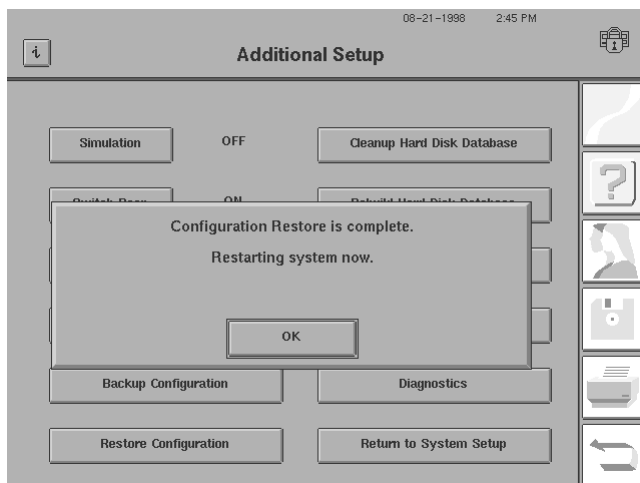


3 Press RESTORE CONFIGURATION.



4 Insert the appropriate Configuration Backup media.

5 Select the appropriate media by pressing the button with its device name.



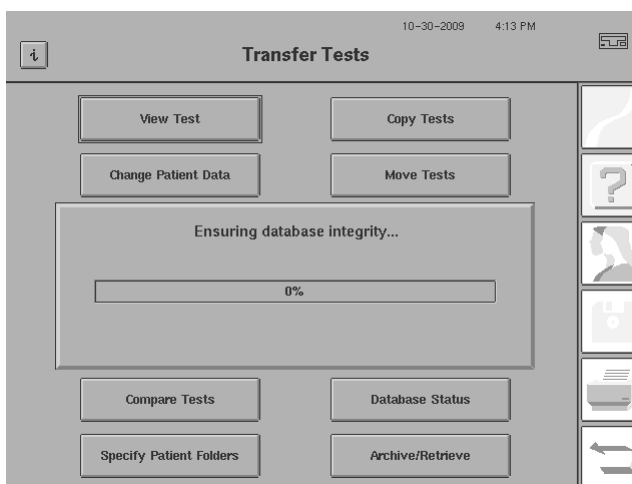
6 When restoration is complete, press OK.

After a 15 second pause, your HFA II-/will restart automatically, using the restored configuration.

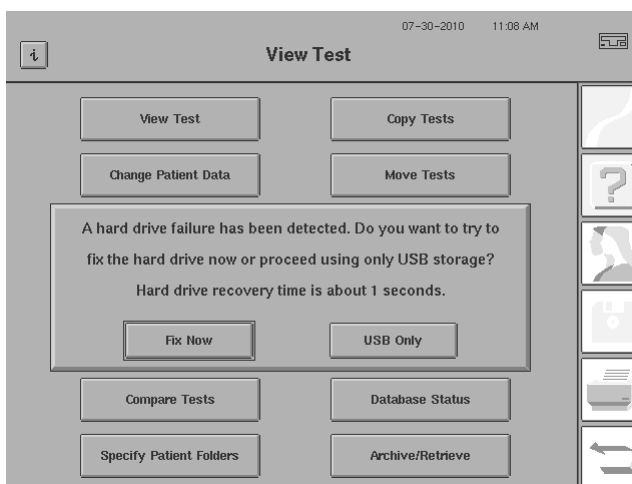
7 Return the Configuration Backup to a safe place.

How to Handle Database Failures

It is important to realize that the HFA II-/ has built-in safeguards against loss or damage of valuable data. You see the evidence of this when, performing certain file functions, you see the following pop-up window.



Database failure may occur while saving test data, saving patient data, or performing file functions. The HFA II-/ is equipped to detect a database failure and attempt to recover any potentially lost information. In the event of failure, a message appears on the screen that includes an approximate “fix” time. You may elect to address the problem immediately or delay the process. You may want to delay the process, if you have patients scheduled for testing. In that case, you may continue testing, though all data will be saved to a USB storage device, provided a USB storage device is attached, until the problem is corrected. The screen below reveals your choices of FIX NOW or USB ONLY.



You will want to address the hard drive problem as soon as your schedule permits. The initial attempt to fix the database problem may not be successful, however. If that is the case, your next option is to use the rebuild utility (REBUILD HARD DRIVE DATABASE) found in System Setup (ADDITIONAL SETUP). If a database rebuild is unsuccessful, as a last resort, you can restore the

patient database from a USB storage device, floppy disks, or from your office network if you have licensed the networking feature of your HFA II-/. [Figure 11.2](#) summarizes the pathway between database failure and problem resolution. The following pages lead you through the necessary steps, for each of the options discussed.

When faced with a hard drive database problem, your options are:

- A. Attempt to fix immediately (FIX NOW).
- B. Delay attempt to fix problem, continue patient testing, and save results to a USB storage device only (USB ONLY).
- C. When time permits, engage the rebuild utility (REBUILD HARD DISK DATABASE).
- D. Restore database from a USB storage device, from your network file server, or backup floppy disks if above options fail (BACK UP/RESTORE).



CAUTION: If a hard drive database failure occurs while attempting to save test results, do not recycle power at this time. This action will cause you to lose the results from the test just completed. Always elect either to fix the problem immediately, or to save results to a USB storage device temporarily until you have time to address the database problem.

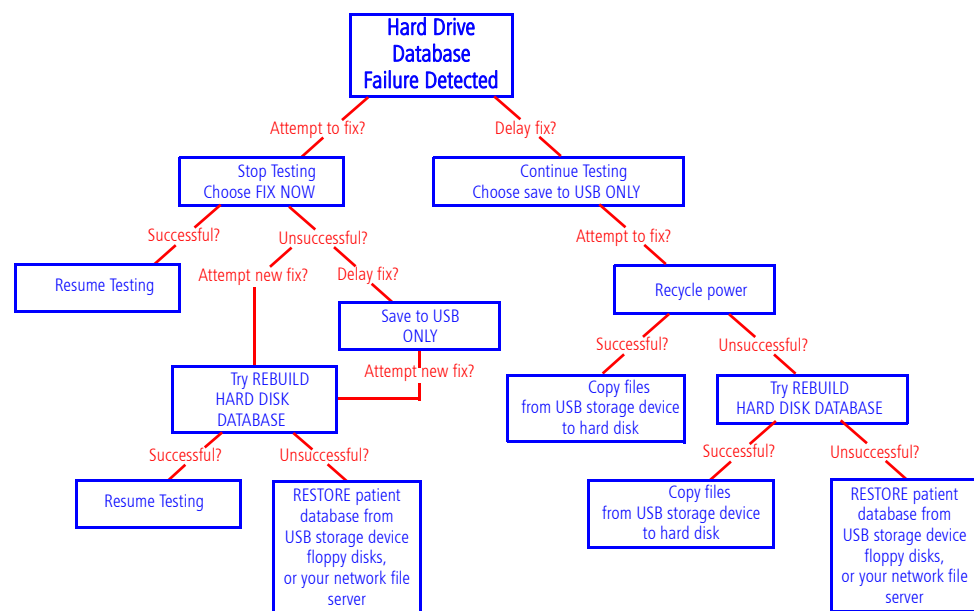


Figure 11.2 Pathways for Resolving a Hard Disk Database Failure – An Overview

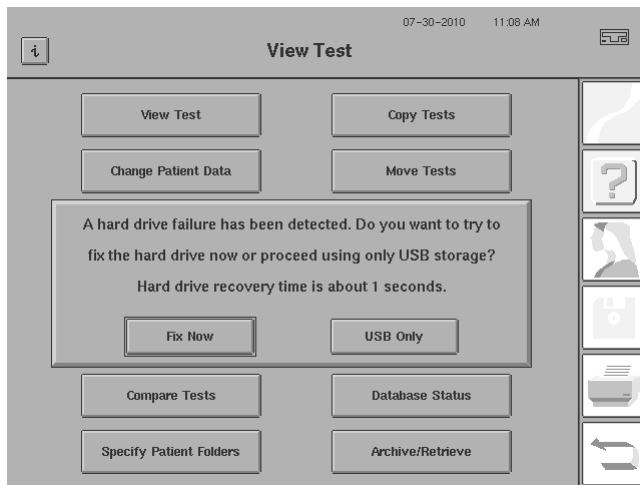
[Figure 11.2](#) provides an overview of different methods for dealing with hard disk database failures. More detailed information, including step-by-step instructions to perform these steps, follows.

Hard Drive Failure: FIX NOW Option

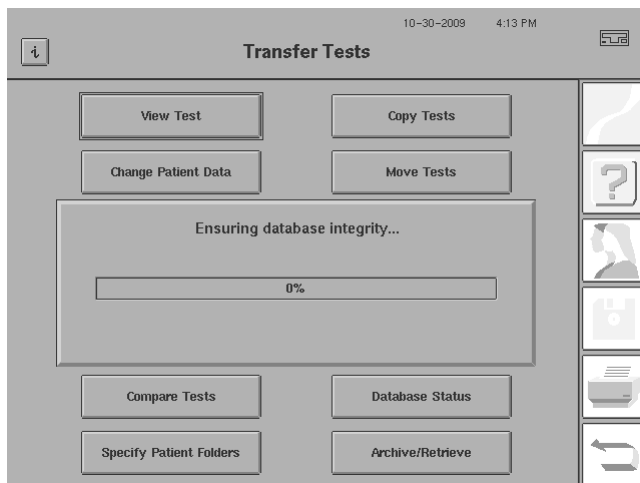
If you are faced with a hard drive failure, and you elect to attempt recovery immediately, choose the FIX NOW option. This option should be initiated only if you have the time, and patients will not be inconvenienced. Otherwise, elect to save tests to USB ONLY, and attempt recovery at a later time (see [“Hard Drive Failure: USB ONLY Option,”](#) on page 11-14). To help you decide, a screen message alerts you to the approximate recovery time.



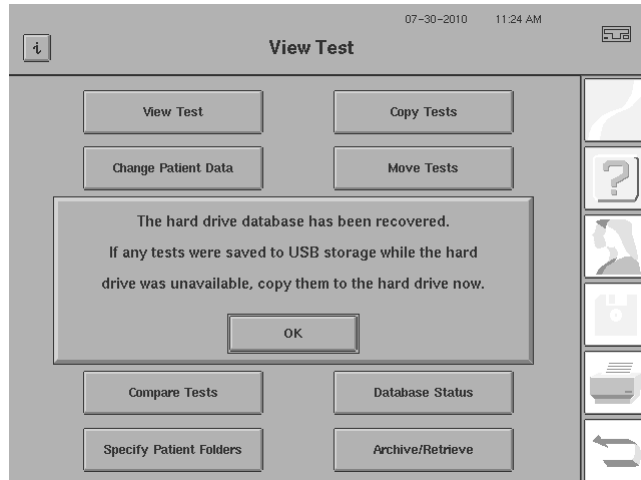
Note: If you were to choose FIX NOW, and the attempt failed, you could always resort to USB ONLY, if patients were scheduled for testing. In that case, once patient testing was completed, you would attempt to rebuild the hard drive database (see [“Hard Drive Failure: REBUILD HARD DISK DATABASE,”](#) on page 11-17).



1 Read the message in the dialog box. Choose FIX NOW.

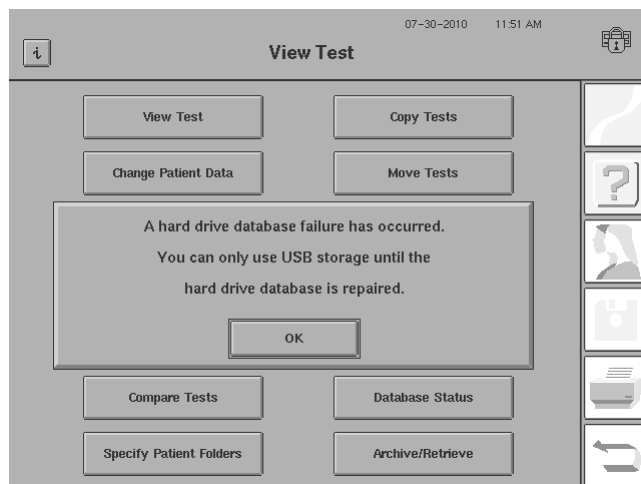


2 While the HFA II-/is attempting to recover the hard disk database, the screen displays a progress bar representing processing time completed.



3 If recovery is successful and the USB ONLY option had never been engaged, the HFA II-*i* automatically completes the original function (before failure). If recovery is successful and the USB ONLY option had been engaged, the HFA II-*i* displays a reminder message. After reading the message, press OK.

Copy to your hard drive any test results stored to the USB storage device since the hard drive failure.

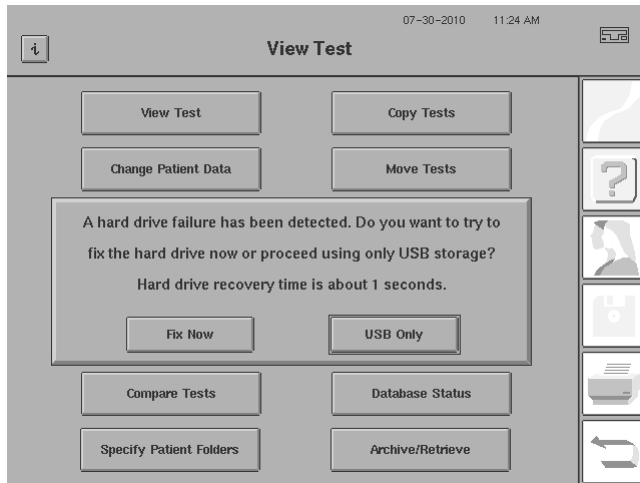


If recovery is unsuccessful, a message appears. Press OK.

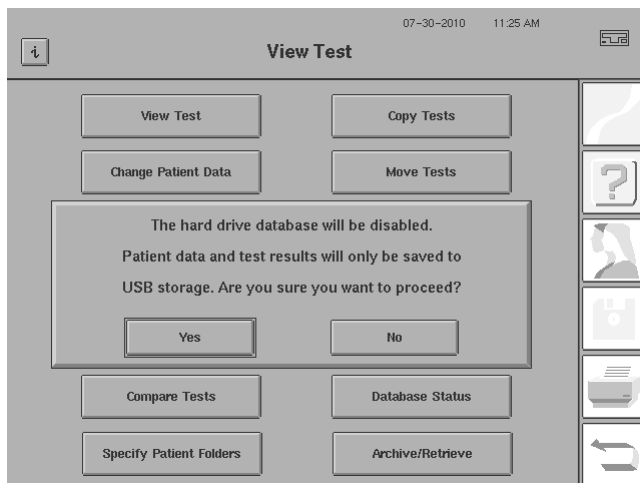
If the failure occurred while saving test results or patient data, the HFA II-*i* will save the data automatically to the USB storage device, provided the USB storage device is attached. If the failure occurred while performing file functions, go to the [“Hard Drive Failure: REBUILD HARD DISK DATABASE,”](#) on page 11-17.

Hard Drive Failure: USB ONLY Option

This option is only an interim measure, to be used in the event of a hard drive failure. It is designed to allow you to continue testing patients, and save patient and test data to a USB storage device until you can attend to the hard drive problem. By choosing this option, the hard drive becomes disabled. When time permits, recycle power to initiate the recovery program (see Step 7 below) or use the REBUILD HARD DISK DATABASE option described later in this section.



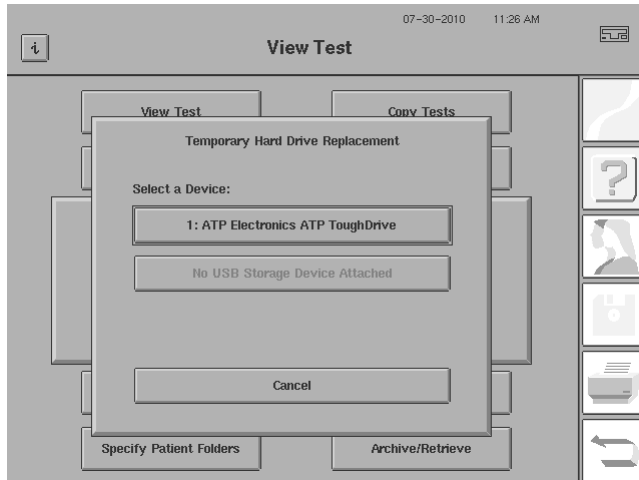
1 Read the message in the dialog box. Choose **USB ONLY**.



2 Read the warning message. Select **YES**. Selecting **NO** returns you to Step 1.

3 A dialog appears prompting you to select a USB storage device.

4 Insert a USB storage device into a USB port on the HFA II-*i*.

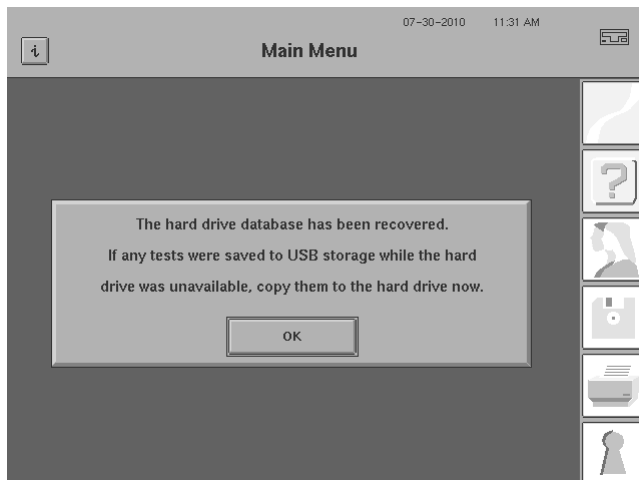


5 Select the desired USB storage device by pressing the button with its device name.

6 Continue saving test results to the USB storage device until you have the time to engage the recovery program.



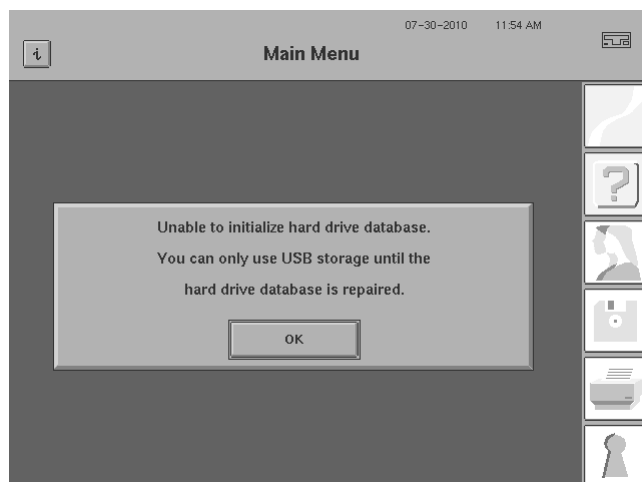
Note: Each time you attempt to save data or try to use a function that involves the hard drive, the previous three screens will display. Continue to choose USB ONLY, YES to save data to the USB storage device, and then select the USB storage device while patients are present.



7 When you have time to address the database problem, and only after all tests have been saved to the USB storage device, recycle power on the HFA II-*i*.

Recycling power will initiate a recovery program. If recovery is successful, a user message appears. Press OK. Wait for the HFA to completely restart.

Copy to your hard drive any test results stored to the USB storage device since the hard disk failure.

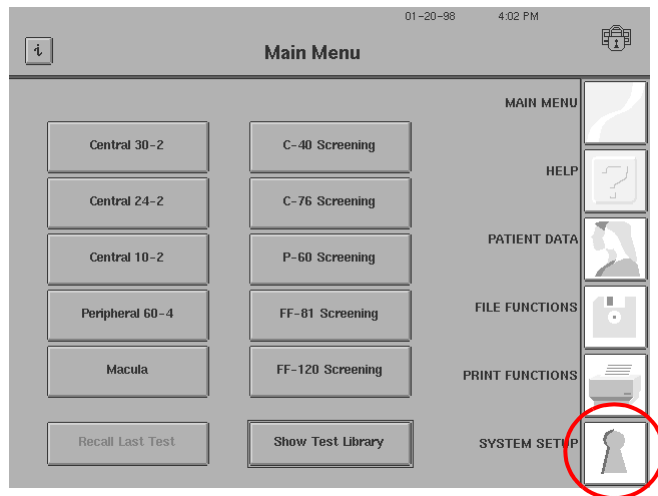


8 If recovery is unsuccessful, a user message appears. Press OK. Go to the next section: ["Hard Drive Failure: REBUILD HARD DISK DATABASE," on page 11-17.](#)

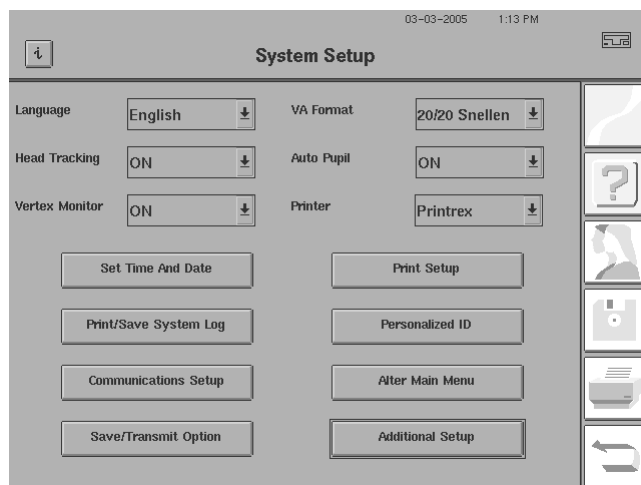
Hard Drive Failure: REBUILD HARD DISK DATABASE

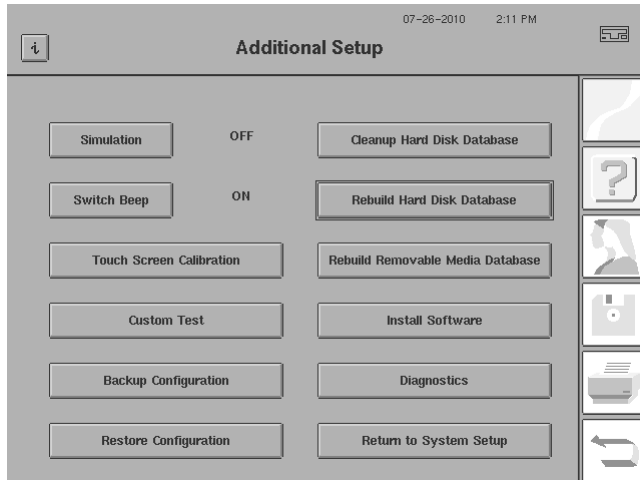
In the event the FIX NOW recovery attempts have failed, use the rebuild utility (REBUILD HARD DISK DATABASE). Typically a lengthy process, rebuilding the database frequently corrects the original database problem and avoids the inconvenience of restoring the database from a USB storage device, backup floppy disks, or the network file server (optional).

1 From the Main Menu, press the *SYSTEM SETUP* icon.

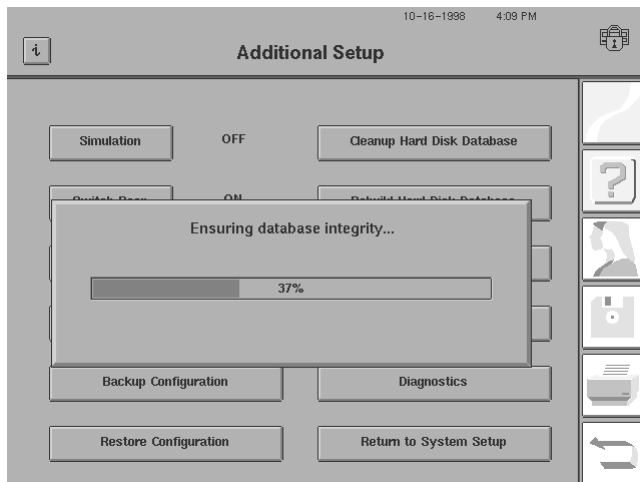


2 Press ADDITIONAL SETUP.

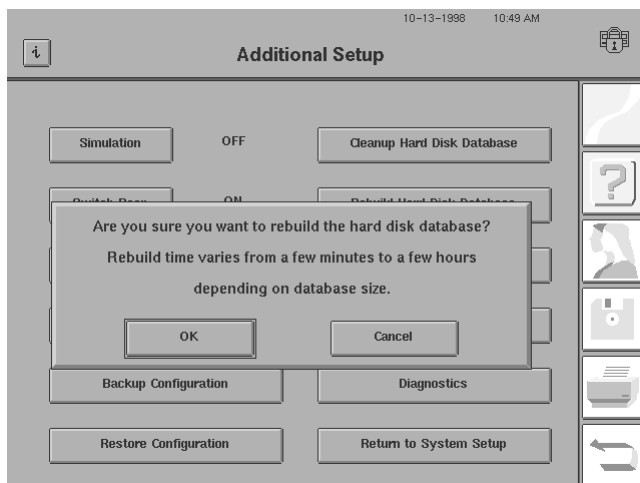




3 Press REBUILD HARD DISK DATABASE.

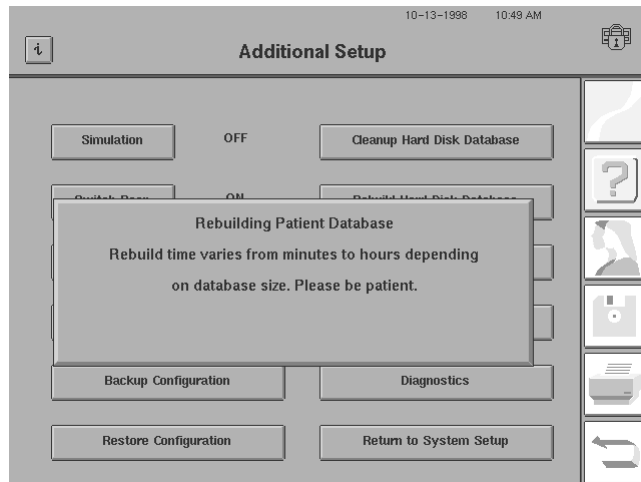


4 The HFA II-/i may attempt a recovery process before launching into the more lengthy rebuild process.

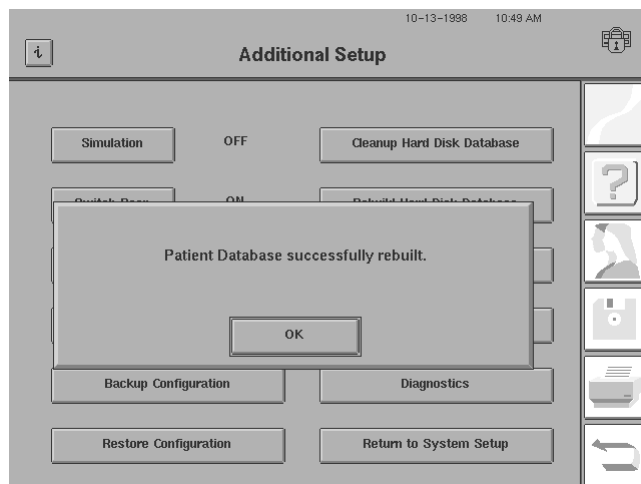


5 Read the warning message. Press OK.

If you press CANCEL, the pop-up window closes and the Additional Setup screen returns.

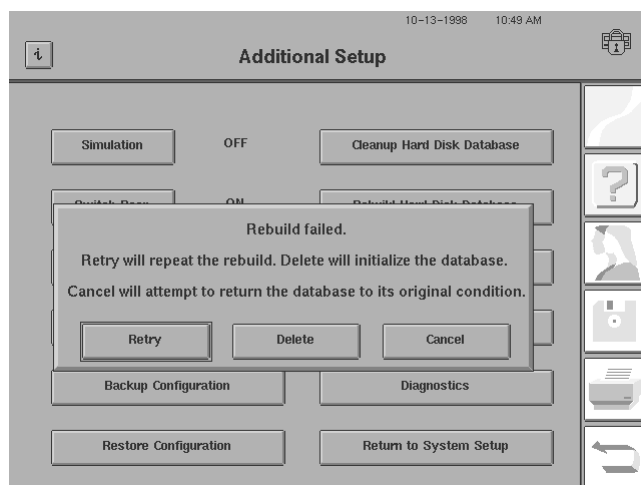


6 While the rebuild utility is running, the screen displays a user message.



7 If the utility successfully rebuilds the database, the screen displays a user message. Press OK.

Copy to your hard drive any test results stored to the USB storage device since the hard disk failure.



8 If the rebuild utility is unsuccessful, the screen displays a user message.

Choose the desired button.

RETRY repeats the rebuild process. Occasionally, a second try is successful.

DELETE initializes the database. **All data on the Hard Disk will be deleted.** You will need to restore the database from a USB storage device, a network file server, or floppy disks as described on the following pages.

CANCEL attempts to return the HFA II-/to its previous condition. Use the "USB Only" method of data storage until you find a more convenient time to deal with the failed database. When time permits, you will need to restore the database from a USB storage device, floppy disks, or the network file server, as is described on the following pages.

Restoring the Hard Disk Database

If all previously cited methods to correct the database problem have failed and you are faced with an unrecoverable database, the only option remaining is to restore the hard disk database from a USB storage device, backup floppy disks, or the network file server (if you have licensed HFA-NET Pro software). Detailed instructions follow. If you need further assistance after attempting this process, call Carl Zeiss Meditec Customer Care at 1-800-341-6968. Outside the U.S., contact your local Carl Zeiss Meditec distributor.



CAUTION: HFA II-*i* series system software 5.x creates a different database structure that is not fully compatible with previous software releases. You can only restore a version 5.x database backup to an HFA II-*i* version 5.x instrument.

To Restore the Hard Disk Database from a USB Storage Device

Information can be restored to the hard disk from a backup created on a USB storage device using the BACK UP/RESTORE feature. To ensure that the information restored to your hard disk is up-to-date, it is important to create backups of your hard disk frequently.

1. Start at the File Functions screen, select BACK UP/RESTORE.
2. Connect the USB storage device that contains the backup to a USB port on the HFA.
3. Choose the USB storage device that contains the backup as the Source.
4. Select PROCEED.
5. You are given the option of replacing the database or merging the database. Choose REPLACE.
6. A screen will appear showing the progress of the restoration. When completed, be sure to return the USB storage device to a safe place.
7. Copy to your hard disk any tests stored only to the USB storage device since your last backup.



Note: The option referred to in Step 5 will not be available if the hard disk database has been disabled following a database failure. The hard disk is disabled as a result of choosing USB ONLY.

To Restore the Hard Disk Database from Backup Floppy Disks

If you have backed up your entire database onto a series of backup floppy disks, perform the following steps to restore your database:

1. Start at the File Functions screen. Select BACKUP/RESTORE.
2. Choose FLOPPY as the Source. Press PROCEED.
3. You are given the option of replacing the database or merging the database. Press REPLACE.
4. Insert the first backup floppy disk. Press OK.
5. Insert the remaining disks, as requested.
6. When complete, return the backup floppy disks to a safe place.
7. Copy to your hard drive all tests stored to the chronological floppy disk since your last backup.



Note: The option referred to in Step 3 above will not be available if the hard disk database has been disabled following a database failure. The hard disk is disabled as a result of choosing USB ONLY.



CAUTION: Carl Zeiss Meditec does NOT recommend that your only method of data protection is backing up the entire database to a single USB storage device. It is safest to have several sets of backups stored on different USB storage devices and to rotate them on a regular basis. It also is wise to store one set of backup information at an off-site location, in the event of a major disaster such as a fire, flooding, earthquake, etc. You also can license the HFA-NET Pro software and use routine backups of data to the network file server as means of adding data security.

To Restore the Hard Disk Database from the Network File Server

This data restoration option only is available if you have licensed the networking software on your HFA II-*i*. Please refer to [“Restoring Data from the Server,”](#) on page 14-16.

Removable Media Failure: Using the Rebuild Removable Media Database Button

A USB storage device or floppy disk can have problems similar to a hard disk when it comes to database retrieval. Occasionally, data cannot be accessed from a USB storage device or floppy disk. Rebuilding the database on the removable media may fix the problem.

1. From the Additional Setup screen, press REBUILD REMOVABLE MEDIA DATABASE.
2. A dialog appears prompting you to select a device ([Figure 11.3](#)).

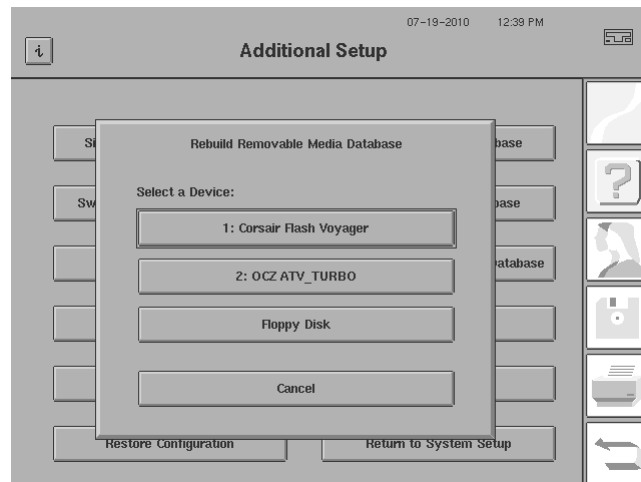


Figure 11.3 Select Removable Media Device

3. Insert a USB storage device into a USB port on the HFA II-*i*, or a floppy disk in a connected USB floppy disk drive.
4. Select the desired device by pressing the button with its device name.
5. A message will appear asking if you are sure you want to rebuild the database. Press OK to start the rebuild process or CANCEL to return to the Additional Setup screen.

Merging Databases

The Merge Database function is designed to add tests from a backup source to the tests on the hard disk database (the destination). One disadvantage of the Restore Database function is that it erases all the patient tests on the hard disk and replaces them with the patient tests from the backup source. If some tests found on the hard drive are not on the USB storage device, backup floppy disks, or network file server, these test results will be lost.

The merge database feature has the added advantage of helping prevent the loss of patient data by the inadvertent use of an outdated or improperly labeled backup set. No tests are deleted from the hard drive.

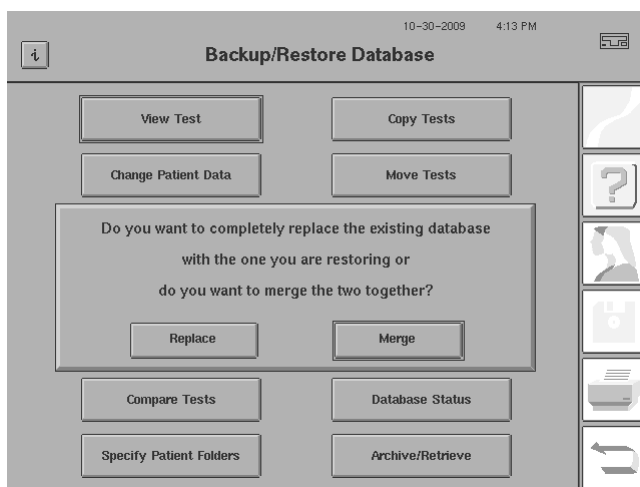
Merging two databases can be a lengthy process. If your backup source contains 10,000 patient tests, it may take up to 75 minutes to merge the backup database with the current hard drive database.



Note: If your HFA II-/ suffered a hard disk failure that could not be repaired by the previously described methods, you will not be given the opportunity to use the Merge option. You will need to use the Replace procedure.

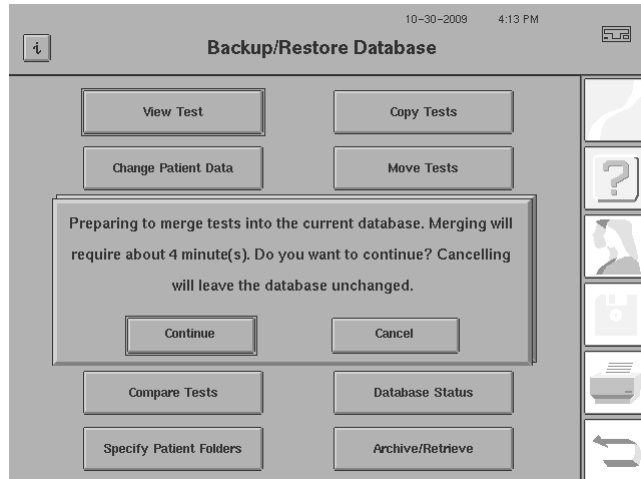
To merge a backup database with the current hard disk database:

- 1 From the File Functions screen, select BACK UP/RESTORE.
- 2 Choose the Source of the backup database (USB storage device, file server, or floppy), and the Destination (Hard Drive). Select PROCEED.



- 3 A pop-up window will appear giving you the option to replace the current hard drive database with a backup database, or merge the two databases. Choose MERGE.

- 4 Insert the backup USB storage device or first backup floppy disk, and select OK. A popup window with the phrase "Restoring from USB storage device/floppy/File Server" and a progress indicator will appear. The HFA II-/is analyzing the disk to determine how long it will take to merge the two databases.



5 When the analysis is complete, a screen will appear indicating the time it will take to merge the two databases. Press CONTINUE to complete the merge procedure or press CANCEL to stop it.

When the merge is complete, and the database integrity is ensured, you will be returned to the File Functions screen.

Cleanup Hard Disk Database

Cleanup Hard Disk Database

This feature deletes patient records with no associated test data. This can occur when patient data is entered, but the test is not saved. This can also happen when patient data is entered early in the day for convenience, but the patient does not take the visual field test. Pressing the CLEANUP HARD DISK DATABASE button will remove all the “unassociated” data from the database.

In addition to removing extra patient data, this feature also acts as a hard disk utility by reorganizing internal files and storage, thereby freeing up hard disk space. Some rearrangement of the data structure will take place which can improve database access.



Note: Depending on the size of your HFA database, the database cleanup operation can be time consuming. For offices or clinics that have many thousands of patients and tests stored in their databases, we recommend that you start this operation after normal office hours and allow it to run overnight.



CAUTION: Some offices enter patient data (and trial lens information) but do not save all test results. The next time the patient is tested, the patient data is still available via the RECALL PATIENT DATA feature. Using the CLEANUP HARD DISK DATABASE feature will remove this type of patient data information (not linked to actual test results).

Practices with Multiple Field Analyzers

Some offices have more than one HFA II-/i to serve their patients. Some practices have more than one office. It often is convenient to keep the same patient test data on every instrument. This process is called data synchronization. By using data synchronization, returning patients may be tested on any of the practice's HFA II-/s and each instrument will have a complete record of previous tests. This is especially important when you desire an Overview or Guided Progression Analysis printout which displays multiple visual field results. Having all patient data on all instruments also ensures that test results are safeguarded against accidental erasure or database problems with a different instrument.

Carl Zeiss Meditec recommends two methods to maintain identical patient databases on multiple HFA II-/s. The first method synchronizes your HFA II-*i* with other components of an office HFA network. The second method allows you to synchronize your HFA's manually.

Synchronizing Networked Office HFA's

You can use this process if your HFA is networked. For complete details, refer to ["Synchronizing Databases on Two or More HFA II-i Perimeters,"](#) on page 14-18.



CAUTION: HFA II-*i* series system software 5.x creates a different database structure that is not fully compatible with previous software releases. You can only synchronize an HFA II-*i* version 5.x instrument with other HFA II-*i* version 5.x instruments.

Synchronizing Multiple Office HFA's Manually

You can use the following manual process, if your office HFA's are not networked.

1. Every week, copy the week's tests from each instrument onto a USB storage device.
2. Copy all the tests on this USB storage device onto the hard drive of each of the other instruments.
 - A. From the File Functions screen, choose COPY TESTS.
 - B. Set the Source to the USB storage device and the Destination to HARD DRIVE.
 - C. Select PROCEED.
 - D. Press SELECT ALL.
 - E. Choose PROCEED.



Note: If there are tests on the USB storage device that previously have been copied to the hard disk, these tests will be recopied to the hard drive without creating any duplicate tests.

If all of the HFA II-/s are kept current, the weekly USB storage device backup will only need to be performed on one of the HFA II-/s. Backing up another HFA II-*i*, however, provides additional security by creating a second copy to store off site.



CAUTION: HFA II-*i* series system software 5.x creates a different database structure that is not fully compatible with previous software releases. You can only synchronize an HFA II-*i* version 5.x instrument with other HFA II-*i* version 5.x instruments.

Care and Handling of Removable Storage Media

Information stored on both USB storage devices and floppy disks can easily be corrupted or erased. When handling or storing removable media, follow the warnings below:

- Do not expose removable media to a magnetic field. Keep all magnets at least five feet away.
- Do not expose removable media to temperatures above 120° F (50° C) or below 50° F (10° C).
- Never tamper with the inside components of a floppy disk.
- Never get removable media wet.
- Always write-protect floppy disks before performing restorations from them.
- Use only high quality 1.44 MB "Double-Sided, High-Density" floppy diskettes.

(12) Custom Testing

Creating Custom Tests	12-1
Deleting Custom Tests	12-13
Performing Custom Tests	12-16
Printout Formats	12-17

The Custom Testing feature (not available on the Model 720) of the Humphrey Field Analyzer II-*i* gives you the flexibility to focus on any aspect of the visual field. By designing either a threshold or screening test pattern, you may create a unique static visual field test to apply to any diagnostic situation.

This chapter discusses how you can create your own Custom tests. Once created, you may save these tests to the hard disk or to a USB storage device. Custom tests can be used as desired, and the results may be printed out and saved. You also can create and store kinetic testing patterns as Custom tests. These Kinetic tests are stored on the Kinetic test menu. Refer to [Chapter \(13\), "Kinetic Testing,"](#) for details.



Note: SITA Standard, SITA Fast, and SITA-SWAP testing strategies are not available for use with Custom tests.

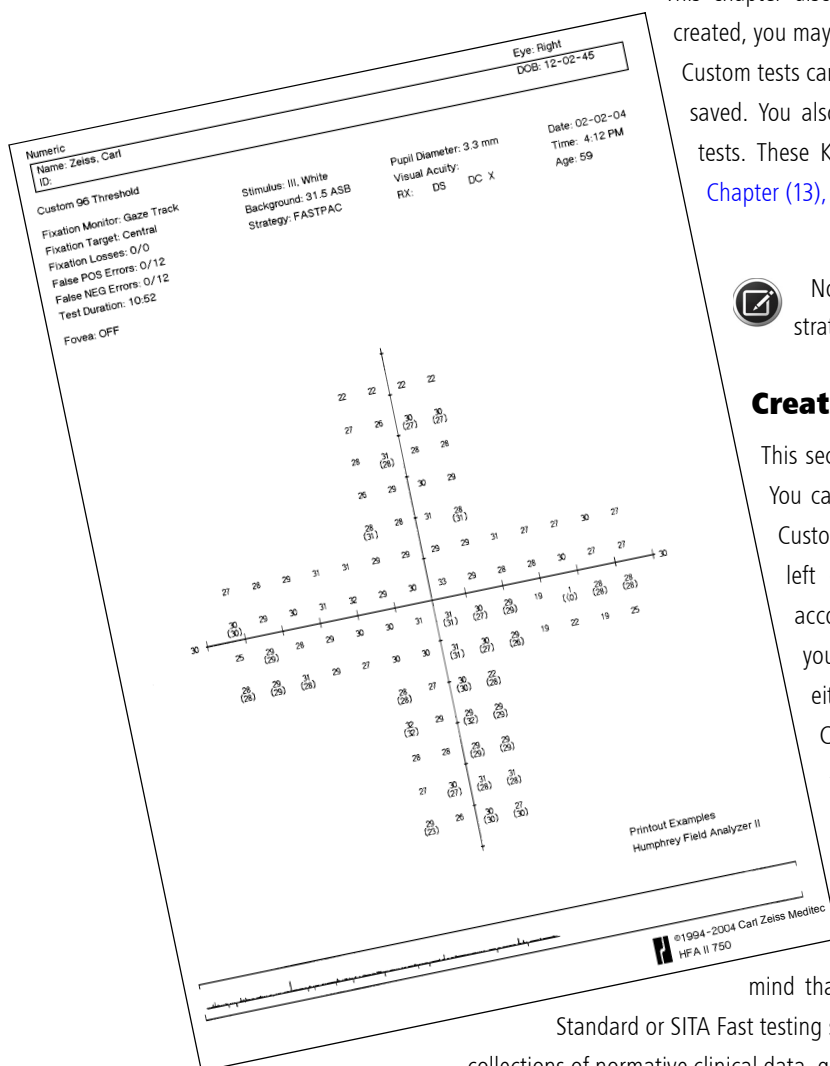
Creating Custom Tests

This section discusses how to create your own Custom static tests. You can create these tests as either Screening or Threshold tests. Custom tests are always created for the right eye only. When the left eye is tested, the HFA II-*i* will flip the test pattern to accommodate for the mirrored physiological differences. Once you have created your custom test, you may begin testing with either the right eye or the left eye. Do not attempt to design a Custom test for the left eye.

You must create your own custom tests. Once created, they may be saved and then accessed for testing by selecting the SHOW TEST LIBRARY button from the Main Menu screen. You can store up to ten (10) Custom tests in the Custom Tests screen at any one time. However, you must bear in

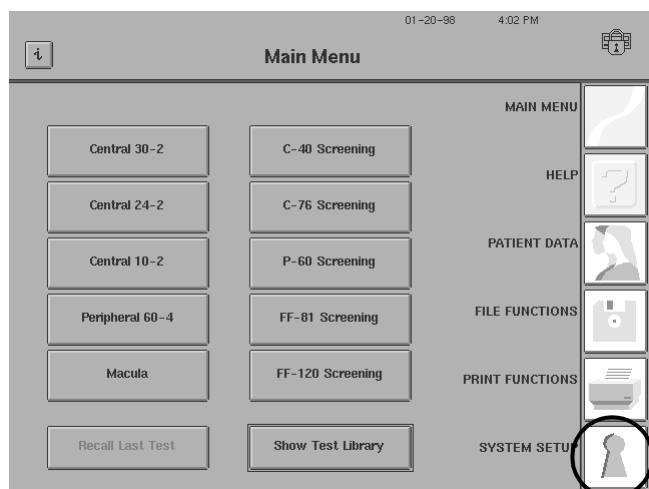
mind that none of these custom tests can employ either the SITA

Standard or SITA Fast testing strategies. The SITA testing strategies are based on extensive collections of normative clinical data, gained only from specific tests that have been conducted with a large number of patients spanning a wide range of ages.



Getting to the Custom Test Screen

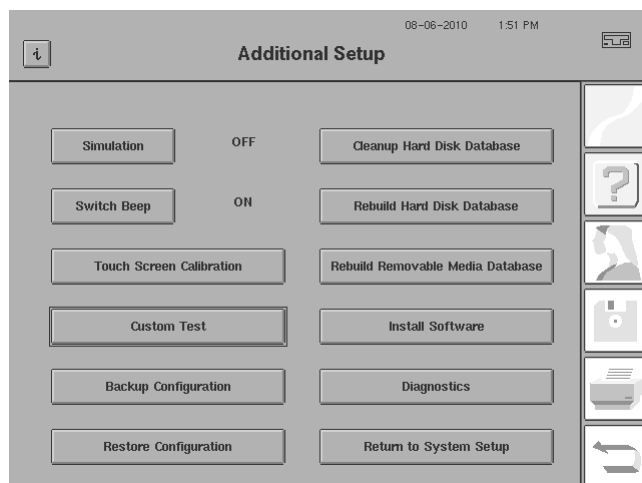
1 Press the *SYSTEM SETUP* icon from the Main Menu screen.



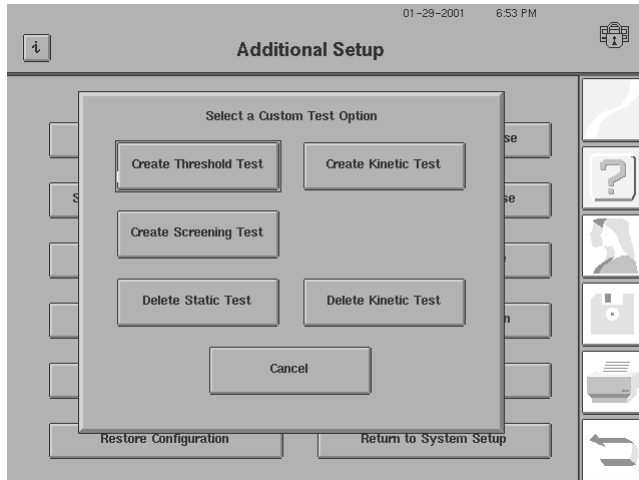
2 Choose ADDITIONAL SETUP.



3 Select CUSTOM TEST.



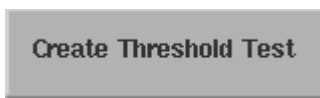
4 Choose one of the Custom Test Options.



The following are the Custom Test Options buttons:

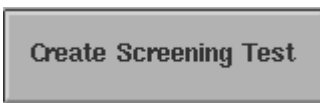
CREATE THRESHOLD TEST

This button allows you to design a Custom Threshold visual field test.



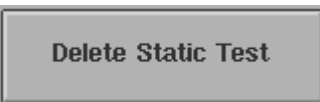
CREATE SCREENING TEST

This button allows you to design a Custom Screening visual field test.



DELETE STATIC TEST

This button allows you to remove a previously created Custom static test pattern from the Custom Tests screen. If chosen, the test pattern is deleted and its button disappears from the Custom Tests screen. If the button had previously been placed on the Main Menu screen via the Alter Main Menu sequence, it also will disappear.



Note: There are two buttons on the Custom Test Options screen which deal with Custom Kinetic tests. These buttons are discussed in [Chapter \(13\), "Kinetic Testing."](#)

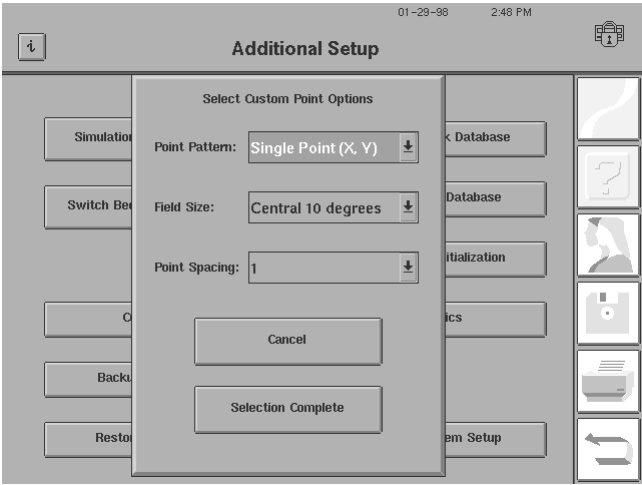
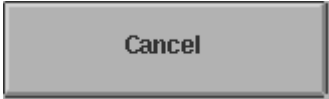
Once deleted, the test pattern cannot be retrieved unless it has been previously copied to a USB storage device. Refer to ["Configuration Back Up and Restore,"](#) on page 11-5, for details. As a safety measure, we suggest that you back up the test patterns before deleting any one of them (should a future need for the test arise).



Note: You may not restore an individual Custom test pattern. You must restore all Custom test patterns as a group. Also, the test patterns created after the last backup will be lost when a backup is restored. Therefore, it is recommended that you create a new configuration backup after each button change.

CANCEL

Choosing CANCEL returns you to the Additional Setup screen, without creating or deleting a Custom test.



5 When you choose CREATE THRESHOLD TEST or CREATE SCREENING TEST, the Custom Point Options pop-up window appears.

Use the drop-down menus to select the desired POINT PATTERN, FIELD SIZE, and POINT SPACING.

Press SELECTION COMPLETE when done.

Point Pattern



This allows you to decide between a Single Point (X, Y) or a Grid point pattern (X, Y). Single Point (X, Y) is used to create test points one at a time on the test field by entering the “X” and “Y” coordinates for each point. The Grid (X, Y) pattern is used to place an entire square or rectangular grid of points on the field at one time. Each Custom test can contain a maximum of 248 test points.

When entering single points, the “X” coordinate designates the distance in degrees the point will be located to the left or right of the center of the test field. For example, an entry of “15” will place the point 15 degrees to the right of the center, while an entry of “-10” will place the point 10 degrees to the left of the center.

The “Y” coordinate designates the distance in degrees the point will be located above or below the center of the test field. For example, an entry of “6” will place the point 6 degrees above the center, while “-12” will place the point 12 degrees below the center. The combination of “X” and “Y” coordinates locates the point in the test pattern.

Figure 12.1 is a graph to help explain (X, Y) coordinate systems. For the point shown, $X = 5$ and $Y = -3$. (X, Y) is (5, -3).

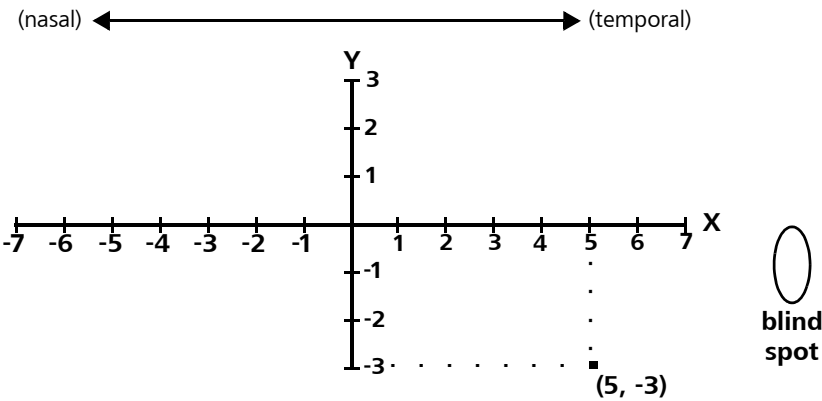


Figure 12.1 An Example of the X, Y Coordinate System for the Right Eye

Remember, the Custom test pattern you are designing must be created for the right eye. Therefore, temporal points will be plotted to the right (positive “X” values) and nasal test points will be to the left (negative “X” values).

Field Size

Central 10 degrees

⌵

This lets you choose one of three field sizes for testing: Central 10 degrees, Central 30 degrees, or Full 90 degrees. Each field size is independent of the other two. They may not be combined. The field size may not be changed once set.

Point Spacing

1

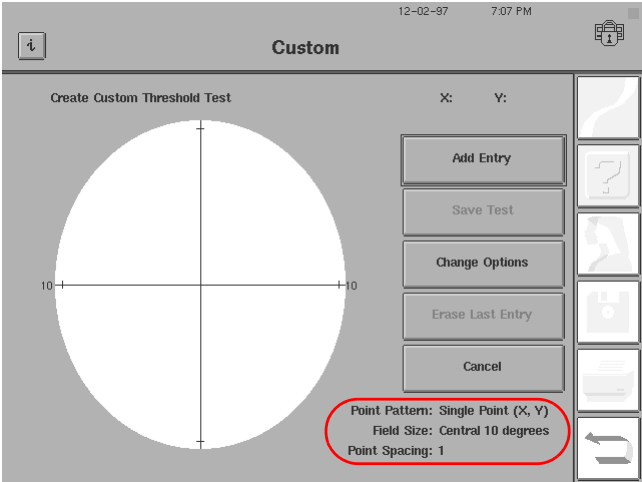
⌵

This option allows you to determine the spacing in degrees between points on the test field. This point spacing applies to the separation between each point in a Grid as well as the separation of a Single Point from another Single Point (or Grid point). The point spacing options for each Field Size are indicated below:

Central 10	Central 30	Full 90
1° *	2° *	6° *
2°	4°	8°
4°	6°	10°
6°	8°	12°



Note: The default point spacings are marked with asterisks (*).



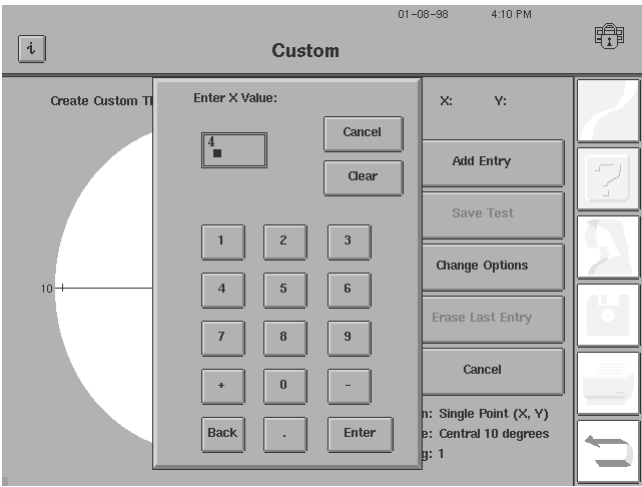
6 The Custom screen will appear.

Your chosen Point Pattern, Field Size, and Point Spacing are indicated in the lower, right-hand corner of the screen.

 Note: Custom tests are automatically generated for the right eye only. When the left eye is tested, the HFA II-/i will flip the test pattern to accommodate for the mirrored physiological differences. Do not attempt to design a left eye Custom test.

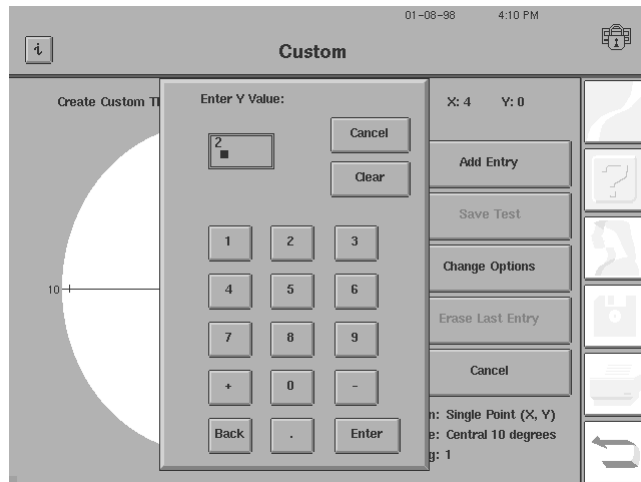
Adding Single Points

1 If you chose the Single Point (X, Y) option, you may now input the individual points to be tested. Press the ADD ENTRY button.

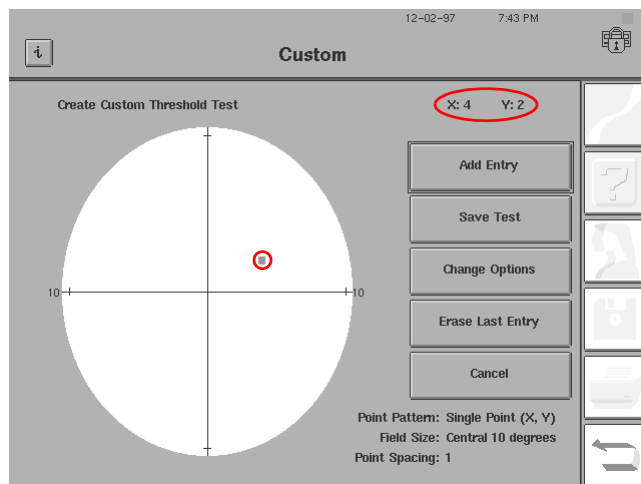


2 For a Single Point entry, you must enter the (X, Y) coordinate values (as whole numbers) of each point you wish to test.

Input the "X" value of the point. Press ENTER.

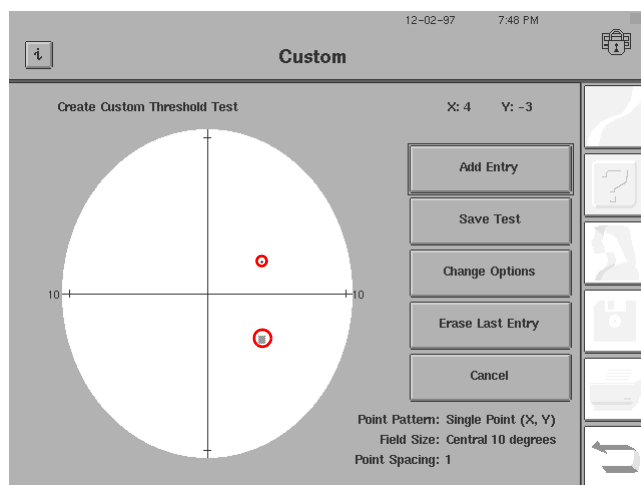


3 Input the "Y" value of the same point. Press ENTER.



4 The Custom screen now displays this point.

The entered point's (X, Y) coordinate value is displayed in the upper, right-hand portion of the screen. Note that the circle and the oval that are shown in the illustration are there to help you locate the areas we are referring to. The circle and oval will not appear on the screen of your HFA II-*i*.



5 To add an additional point, repeat steps 1 through 4. Your next point will also appear on the screen, once you enter the values.

When you have completed the entry of Custom points, you need to save the pattern for future testing. Please review ["Saving Custom Tests,"](#) on page 12-11 for additional information.



Note: The last point you enter will appear as a small square, not a point. The previously entered point will turn from a square into a point. This is only to make the most recent entry more noticeable on the Custom screen. This will not affect the size of the point projected during the test.

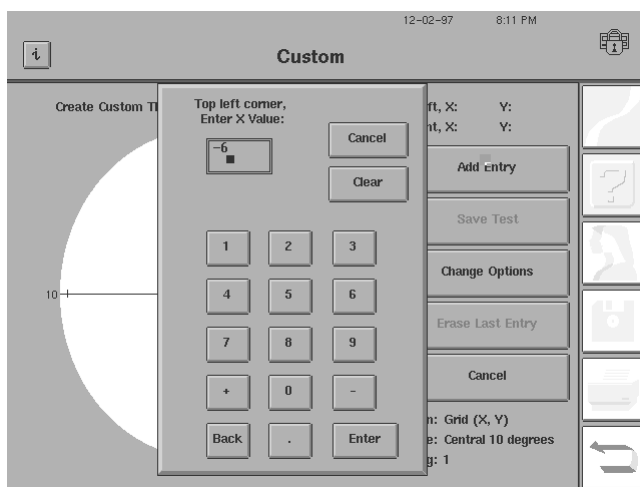


Note: If you add a point that is either too close to a previously entered point or completely outside of the selected field size, the HFA II-*i* will reject your selection. Change the point spacing either by

pressing CHANGE OPTIONS and selecting a different spacing option, or by placing the point in a different location.

Adding Grid Points

For a Grid points entry, you must input two sets of (X, Y) coordinate values (as whole numbers) to define each grid of points you wish to test. These two points will define the diagonally opposing corners of a rectangular grid. Each point within this grid will be tested. The number of points in a grid is determined by the grid size and the point spacing.



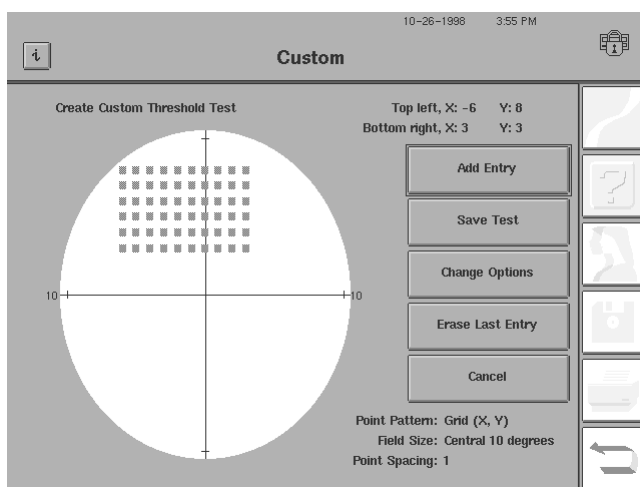
1 Enter the "X" value of the point in a corner of the grid. Press ENTER.

2 Enter the "Y" value of the same point. Press ENTER.

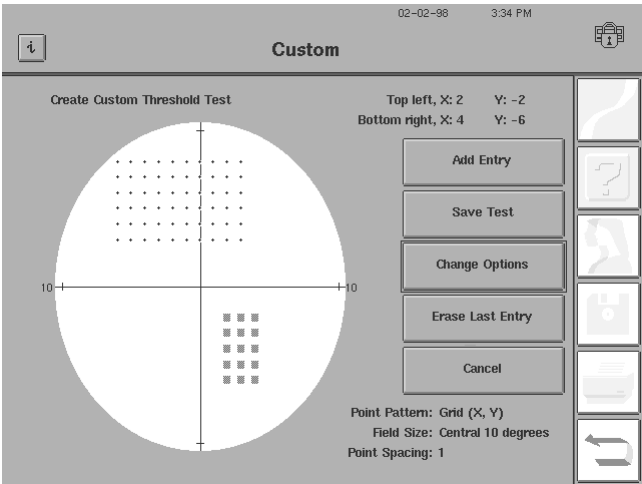
3 Repeat steps 1 and 2 for the diagonally opposing corner of the grid.

4 The Custom screen now displays each point in the grid.

5 To input an additional set of Grid points for the same test, repeat steps 1 through 4. There can be a maximum of 248 points in a test.



When you have completed the entry of Custom points, you need to save the pattern for future testing. Review ["Saving Custom Tests,"](#) on [page 12-11](#), for a description of this process.



Note: Each point in the last grid you enter will appear as a small square, not a point. The previously entered Grid will turn from squares to points. This is to make the most recently programmed points more noticeable on the Custom screen. This will not affect the size of the points projected during the test.

Note: If you add a grid that is either too close to a previously entered point or completely outside of the selected field size, the instrument will reject your selection. You must change the point spacing, either by pressing CHANGE OPTIONS and selecting a different spacing option, or by placing the grid in a different location.

Note: If you create a Grid where some points fall outside the selected field size, only the points within the field will be stored.

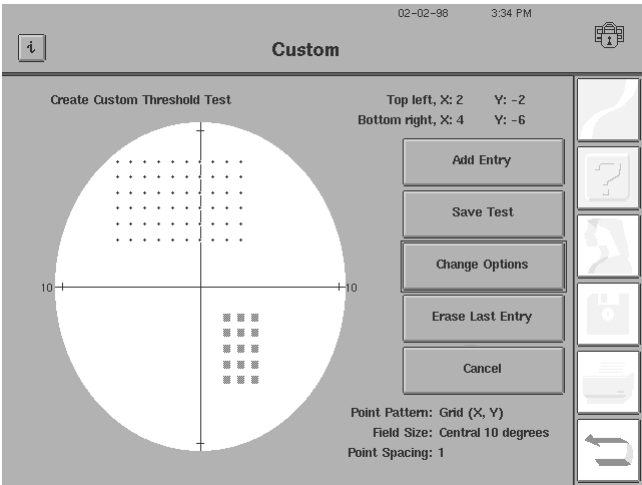
Combining Grids and Single Points

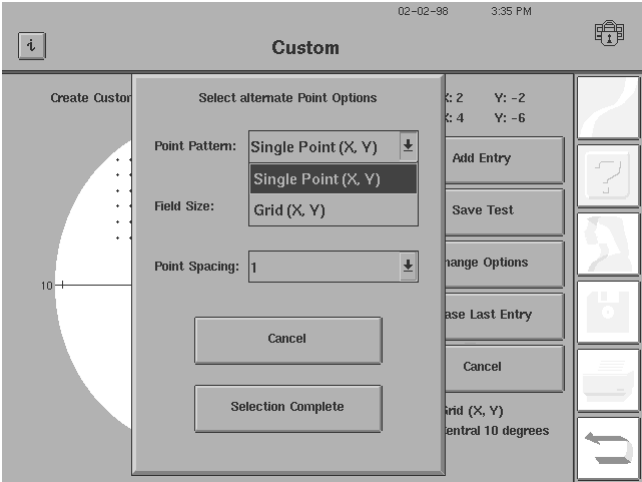
You can easily combine Grids and Single Points within the same Custom test. The following description explains how to add Single Points to a test with Grid points. Please bear in mind that you can add Grid points to a test with Single Points just as easily.

Note: If Grids or Single Points overlap (have the same X, Y coordinates), the overlapping points will be tested only once.

1 Input Grid points as described in ["Adding Grid Points," on page 12-8.](#)

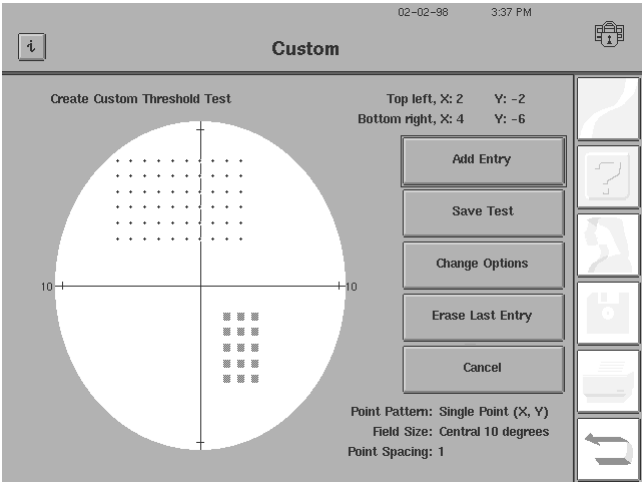
2 From the Custom screen, select CHANGE OPTIONS.





3 Change the Point Pattern. Change the Point Spacing, if desired.

Press SELECTION COMPLETE.



4 Press ADD ENTRY.

5 Input Single Points as previously described in [“Adding Single Points,”](#) on page 12-6.

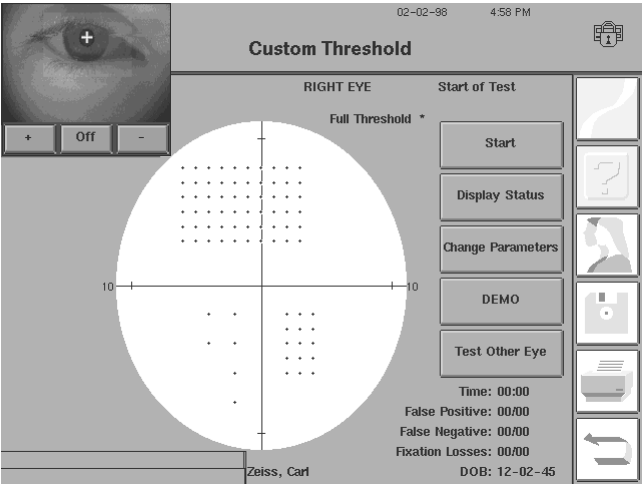
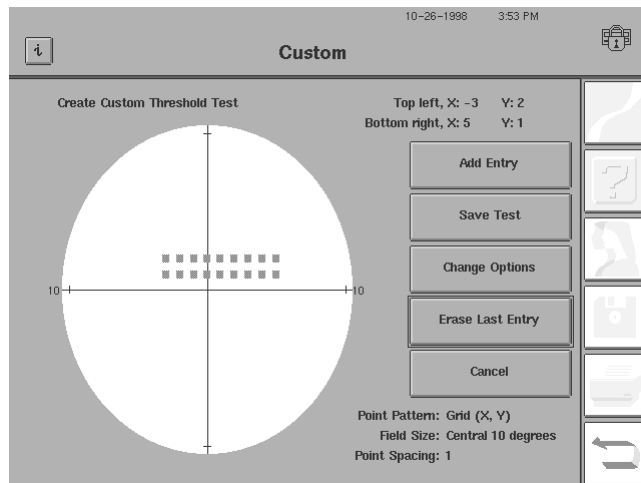


Figure 12.2 An Example of a Point and Grid Combination

Erasing Grids or Single Points

Please read this entire section before removing any points. You can remove unwanted Grids or Single Points from a Custom test that you are creating. However, you can remove only the last entry. If you input a Single Point or Grid that you are unsure of, it is best to erase it and input it again later. The ERASE LAST ENTRY button is disabled if there are no points created already.



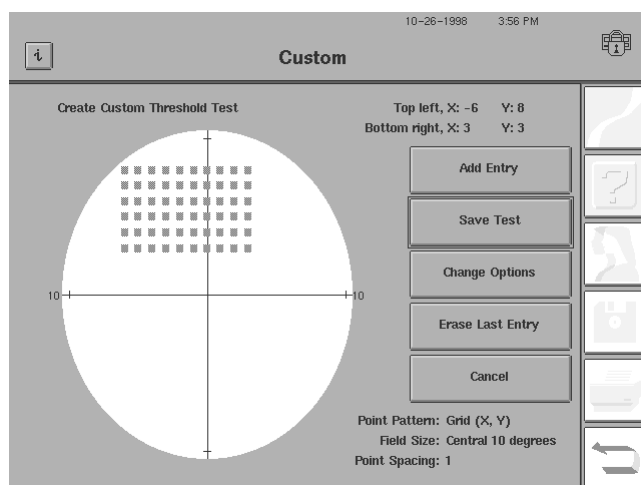
1 From the Custom screen, press ERASE LAST ENTRY.

The last Single Point or Grid you have entered will automatically be removed from the test field. No warning will be issued before deleting the last entry.

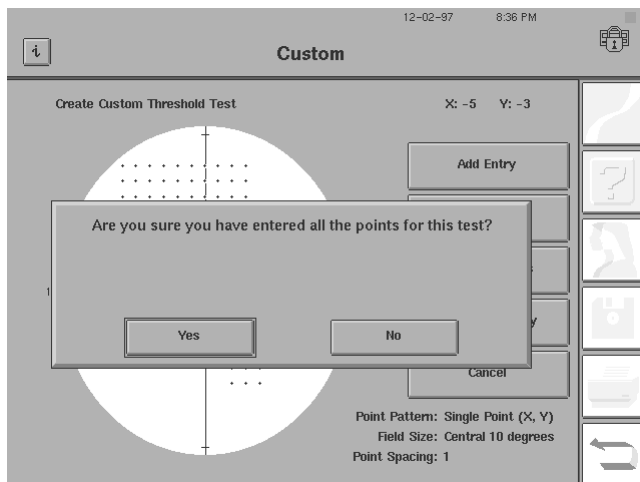
2 Subsequent selections of the ERASE LAST ENTRY button will delete the next previous entry. By repeating this process, you can remove Grids or Single Points in the reverse order from which they were created.

Saving Custom Tests

When you have entered all desired test points, you must save the test. Saving the Custom test pattern you programmed creates a test button on the Custom Test screen which is specific to that test. This button is used to recall the test pattern for future use. **Be sure to save your Custom test pattern, using the method that follows.**

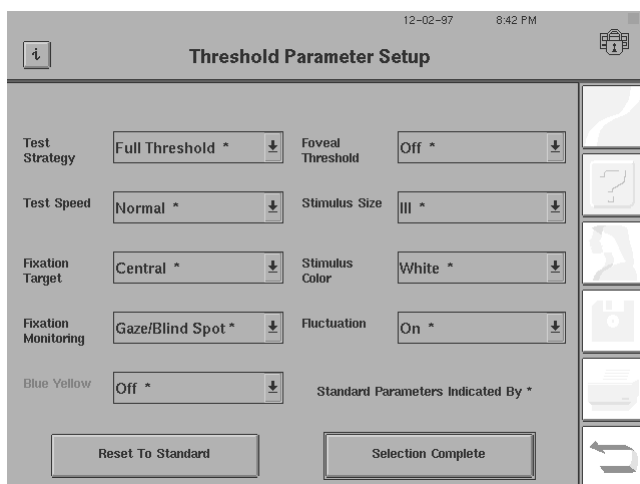


1 From the Custom screen, select SAVE TEST.



2 A message will appear in the pop-up window, "Are you sure you have entered all the points for this test?"

Press NO if you need to add more points. Press YES if you have entered all test points and now are ready to advance to the Parameter Setup screen.



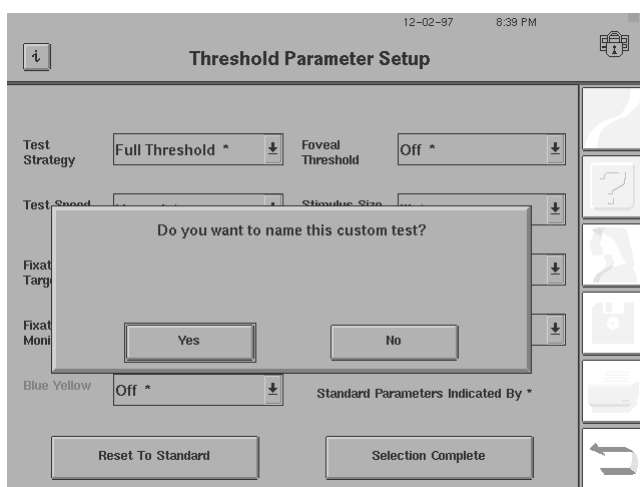
3 Make any desired changes to the default parameters.

Press SELECTION COMPLETE.

If you are creating a Custom Screening test, the Screening Parameter Setup screen will appear.



Note: SITA Standard and SITA Fast are not available for use with Custom tests.

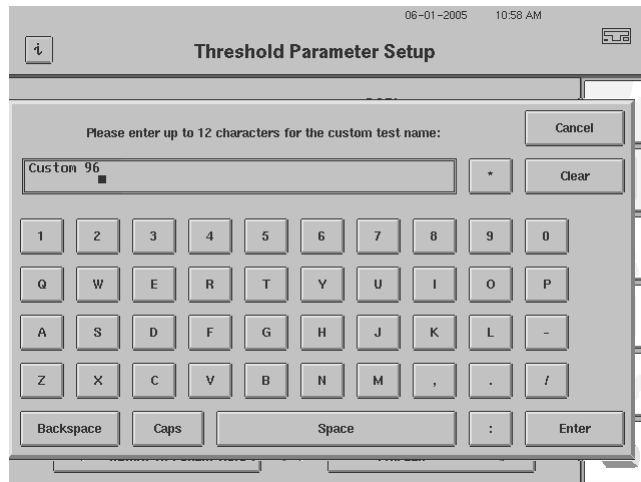


4 Name the completed Custom test.

Press YES if you wish to personalize the Custom Test. Press NO if you wish to use the default name: "Custom Threshold" (or "Custom Screening").



Note: If you choose not to use unique names to identify your Custom test patterns, then more than one Custom test can end up with the same name: "Custom Threshold" (or "Custom Screening"). We recommend that you add information as described in the following step, so that your Custom test is uniquely identified.

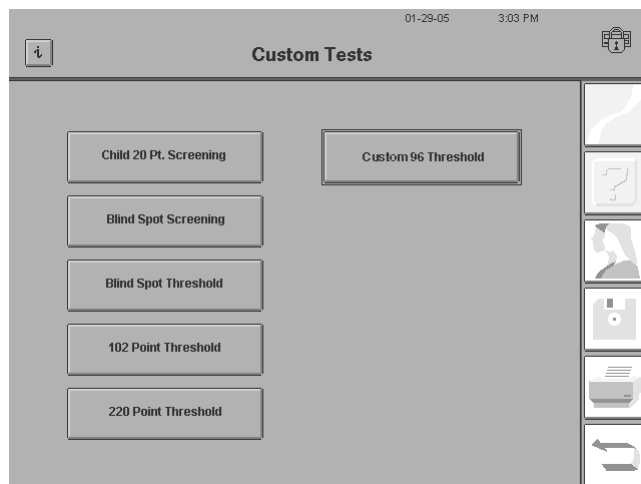


5 If YES, input up to 12 characters for the test name. The word “Threshold” or “Screening” will appear after the test name on the button.

You will not be able to change the name of the test after the ENTER button is pressed. Therefore, be sure to check the name.

Press ENTER.

 Note: The name of the Custom test button will also be printed as part of the title on the printouts for your Custom test.

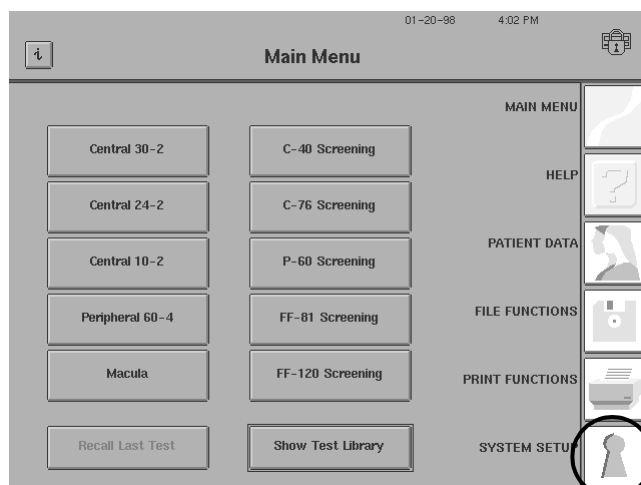


6 Custom test buttons are added automatically down the first column of the Custom Tests screen. When five tests have been added, the next test buttons will be added to the right-hand column. Screening tests will always appear before threshold tests.

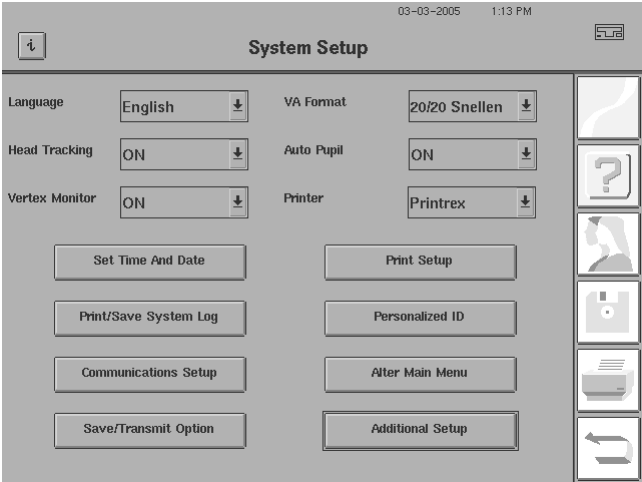
 Note: Your Custom test buttons may be added to the Main Menu screen. See [“Altering the Main Menu Screen,” on page 2-26](#), for details.

At this point, we highly recommend that you perform a Configuration Backup to back up your Custom test patterns to a USB storage device. See [“Configuration Back Up and Restore,” on page 11-5](#), for instructions.

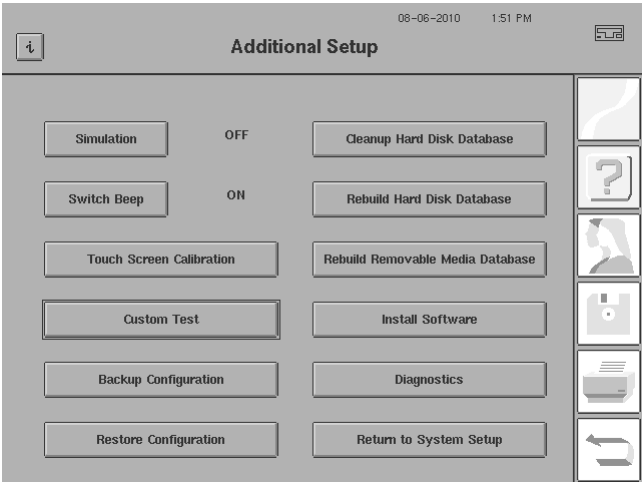
Deleting Custom Tests



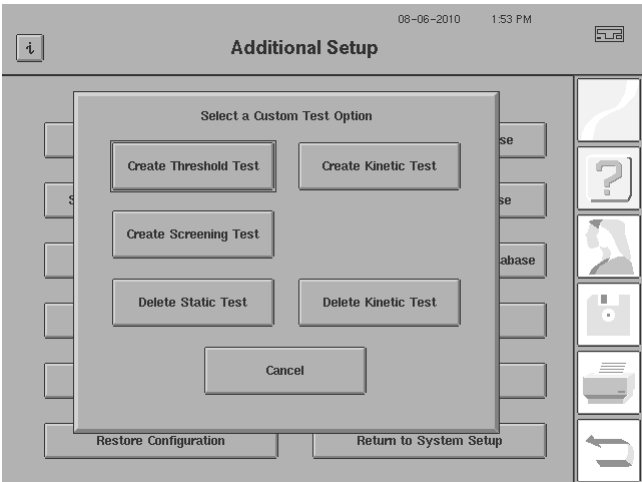
1 Press the *SYSTEM SETUP* icon from the Main Menu screen.



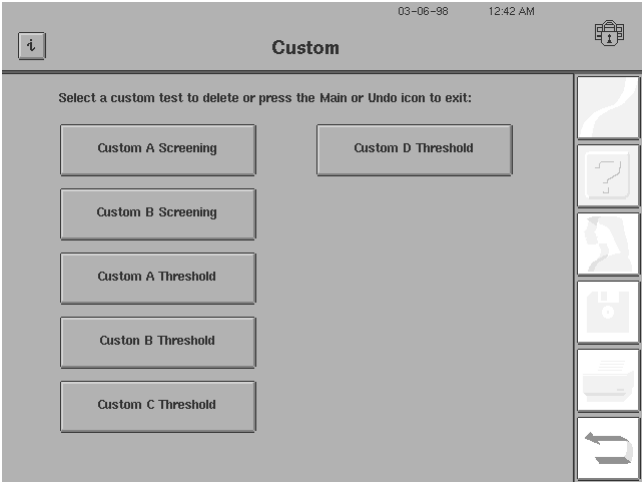
2 Choose ADDITIONAL SETUP.



3 Select CUSTOM TEST.

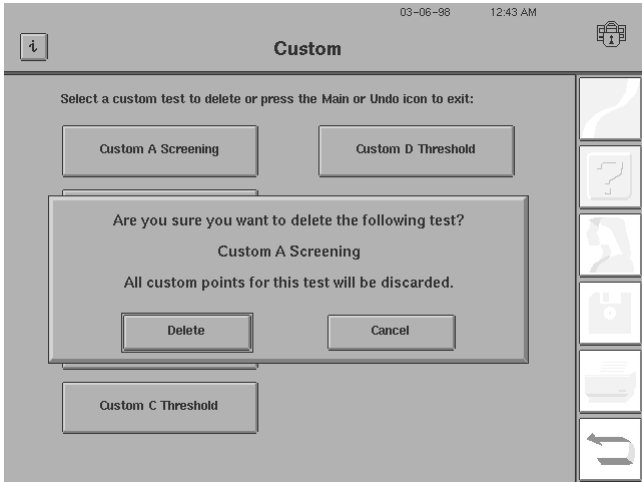


4 Choose DELETE STATIC TEST.



5 The Custom screen will appear.

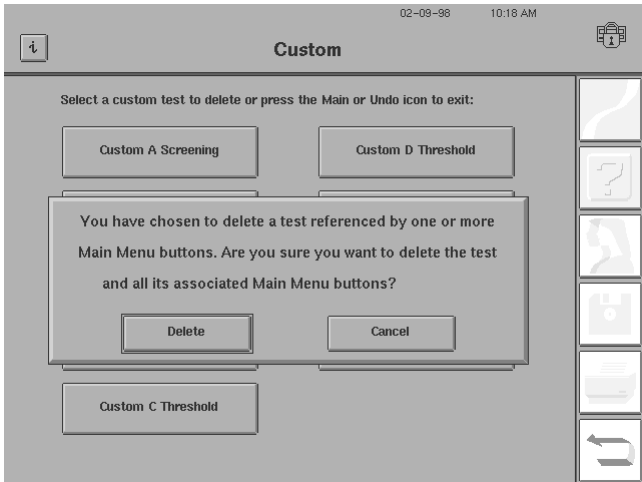
Select the button that represents the test you want to remove.



6 A pop-up window will verify that you wish to delete this test.

Press DELETE if this is the test you intend to delete.

Press CANCEL if this is not the test you wish to delete. Your Custom Tests screen will stay unchanged.



 Note: If you have placed a button on the Main Menu screen for the Custom test you are deleting, this screen appears instead of the one shown in Step 6. This screen advises you that the corresponding button on the Main Menu screen also will be deleted.

7 To leave the Custom Test library, you must select either the *MAIN MENU* icon to exit to the Main Menu screen, or the *UNDO* icon to exit to the Additional Setup screen.

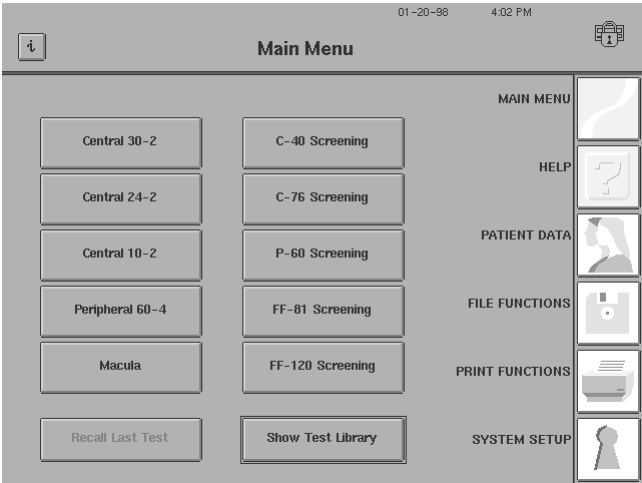
Performing Custom Tests

A Custom test is performed just like any other threshold or screening test. The only exception is that Custom tests cannot be used with the SITA Standard or SITA Fast testing algorithms.

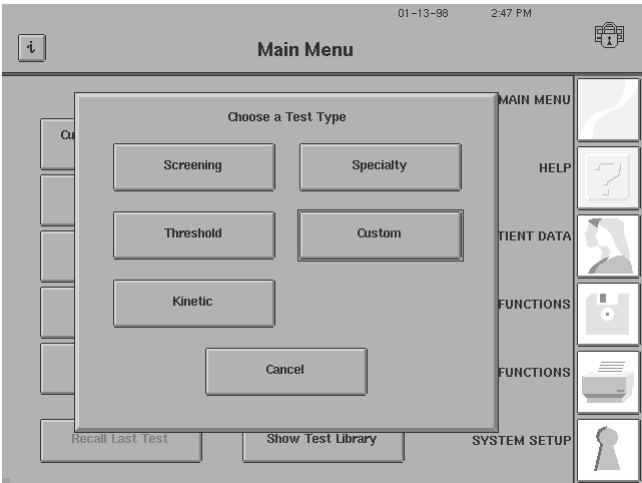
When you create Custom test patterns, they are stored for future use on the Custom Tests screen. You may store up to ten (10) Custom test patterns (threshold and/or screening tests) in the library. You may also place buttons for these tests on the Main Menu screen, using the procedure that is described in [“Altering the Main Menu Screen,” on page 2-26.](#)

As we mentioned earlier, Custom tests are automatically generated for the right eye only. When you test the left eye, the HFA II- will flip the test pattern to accommodate for the mirrored physiological differences. You may begin your testing with either the right or left eye.

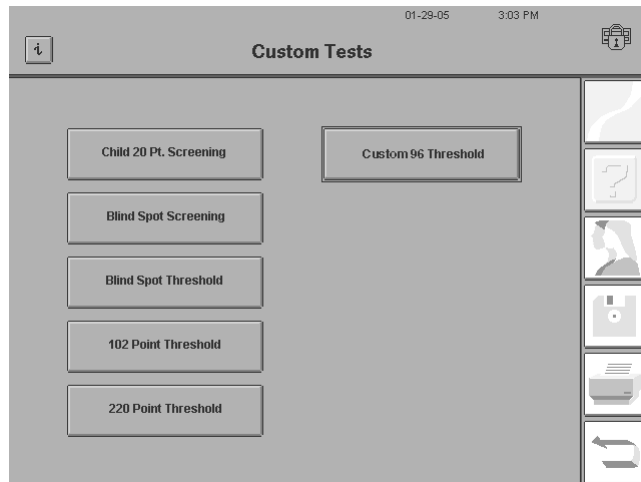
1 To access the Custom Tests screen, select SHOW TEST LIBRARY from the Main Menu screen.



2 Select CUSTOM.



Note: The CUSTOM button will be ghosted if you have not created any Custom tests. Go to the section entitled, [“Creating Custom Tests,” on page 12-1,](#) for further details.



3 The Custom Tests screen will appear.

Select the desired Custom test. Proceed with testing as usual.

Printout Formats

There are two printout formats: one for Screening tests and one for Threshold tests. The format is determined by the testing strategy you have used, and it cannot be changed.

Screening

Printouts for Custom Screening tests will look similar to the existing Screening printouts. A single printout style will be available for each Custom Screening test, except when points exist in both the central and peripheral visual field. When a Custom visual field is larger than 30 degrees and you are using the "Quantified Defects" strategy, an additional Central 30 degree field will be printed if a point has been quantified within the central 30 degrees. In all other situations, only one printout occurs.

Threshold

As is shown in [Figure 12.3](#), Custom Threshold printouts contain only the numeric dB values for each point. The visual field takes up the majority of the page. There will be no gray scale, defect depth, or STATPAC analysis on these printouts.

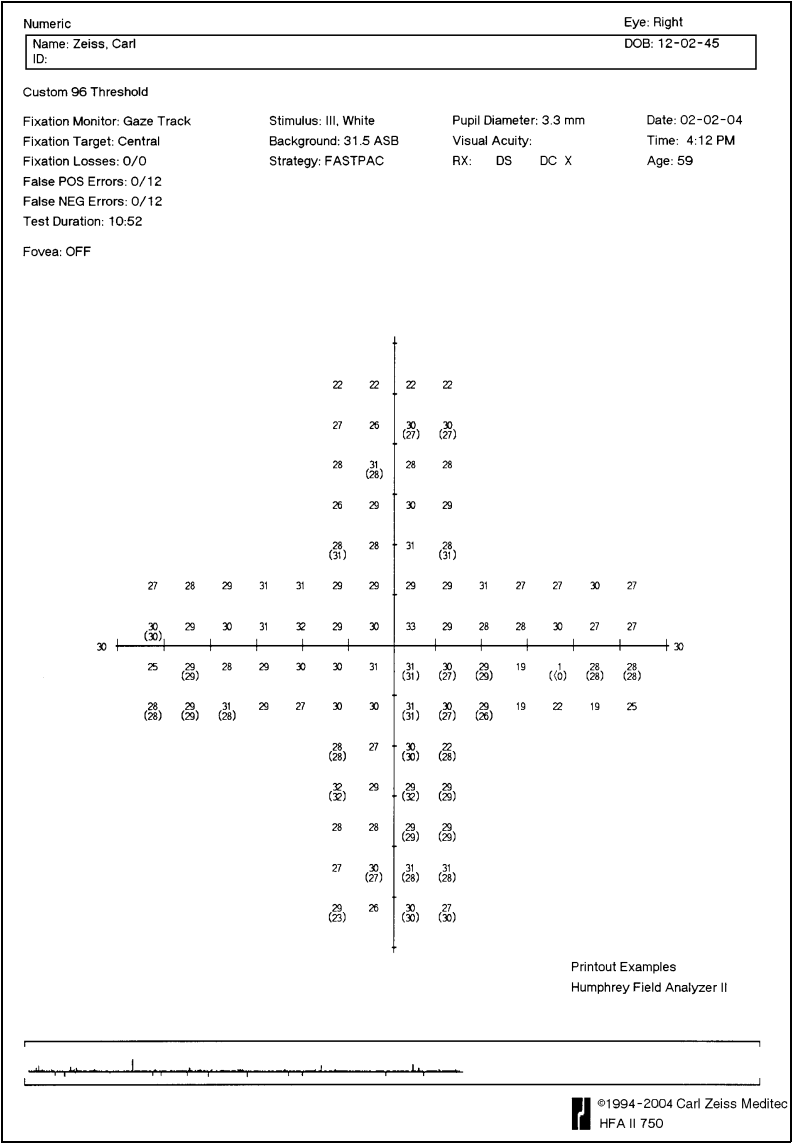


Figure 12.3 An Example of a Custom Threshold Printout

(13) Kinetic Testing

Introduction to Kinetic Testing	13-2
Performing Kinetic Perimetry Manually	13-3
Pre-Defined Kinetic Test Patterns	13-13
Running Automated Kinetic Tests	13-14
Social Security Administration Kinetic Disability Test	13-24
Special Mapping	13-27
Viewing Kinetic Tests	13-39
Printing Kinetic Tests	13-43
Designing a Custom Kinetic Test Pattern	13-48
Creating the Aphakic SSA Disability Test	13-56

In addition to static perimetry, the Humphrey Field Analyzer II Model 750/ (and optional on Model 740/ and 745/) allows you to perform kinetic perimetry. The HFA II-/s Kinetic feature emulates manual standard Goldmann perimetry. You specify the stimulus size, intensity, speed, and color for

plotting kinetic isopters. You can present stimuli starting from 80 degrees (peripherally), 30 degrees (centrally), or anywhere you choose (with Custom Scan). Pre-set testing sequences are available for automatic or step by step procedures. Scotoma mapping, blind spot mapping and static point display are available for investigation of small areas of the visual field. You can choose the location of the starting points with a glidepad or even by touching the display screen. You also can create Custom Kinetic test patterns to satisfy specific needs.

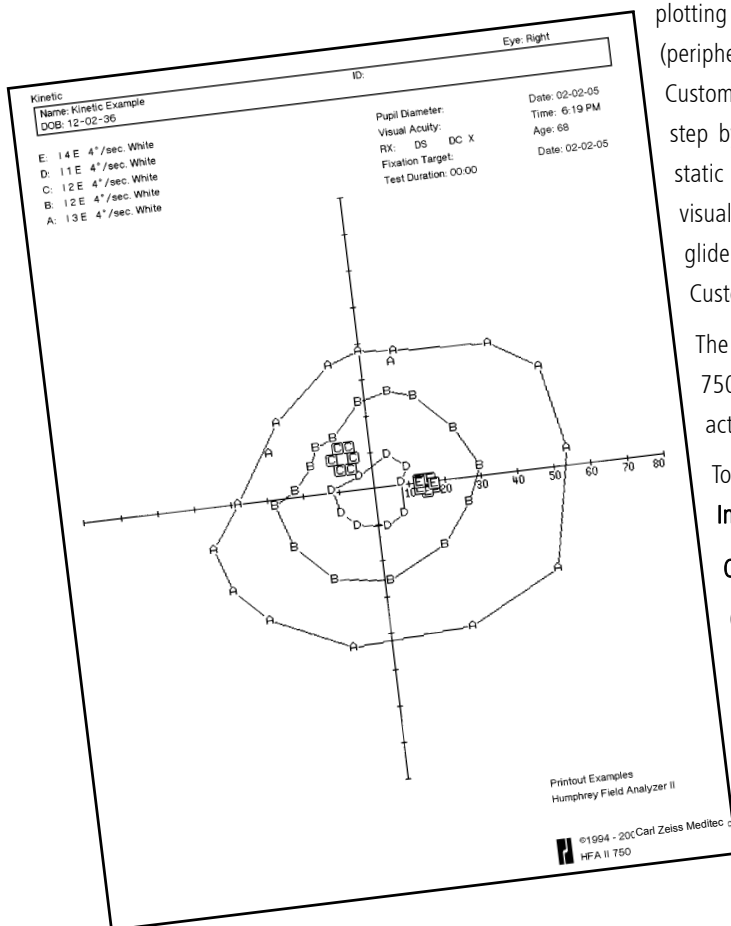
The Kinetic software comes factory-installed on all new HFA II Model 750/ instruments. For Model 740/ and 745/ instruments, you must activate the Kinetic software for it to function on your HFA II-/.

To obtain a Kinetic license, you must contact Carl Zeiss Meditec:

In the U.S.: Call Carl Zeiss Meditec at 1-800-341-6968.

Outside the U.S.: Contact your local Carl Zeiss Meditec distributor.

Once you have obtained your license, you can activate it using the procedure that is provided in [Appendix \(J\)](#) beginning with "Installing Additional Software," on page J-3.



The HFA II-/s Kinetic feature is designed for those experienced in standard Goldmann perimetry. Thus, the instructions and illustrations in this user's manual act as a guide to performing kinetic perimetry. This chapter is not intended to serve as a textbook for teaching an inexperienced technician the principles and strategies of kinetic visual field examination. There are textbooks and continuing education programs available for that purpose.

By the end of this section you will be familiar with:

- how to run a Kinetic test in either the Manual, Step by Step, or Automatic mode
- how to print and save Kinetic test results
- how to use the Special Mapping options
- how to create a Custom Kinetic test

Introduction to Kinetic Testing

There are a number of ways that you can perform Kinetic testing on your Humphrey Field Analyzer. You can:

- Choose the test points manually.
- Choose the starting location by moving a cursor to the point, or by entering coordinates from the keypad.
- Move the cursor by using almost any standard external entry device. This can be a glidepad, trackball or a mouse.
- Use your finger, while pressing the touch screen, to move the cursor to the desired location.
- Present the stimulus using the external keyboard, an external entry device, or the touch screen.
- Display test points automatically by using pre-programmed testing sequences. There are a number of these tests available, each with a different amount of separation between the points. Both the vertical and horizontal midlines are tested in each pattern. These tests can be "fully" automatic or can be used to select the next test point, yet still allow you to activate the stimulus (Step by Step mode). Currently these pre-programmed test sequences are limited to one isopter (III 4E).
- Create Custom Kinetic patterns and store them for repeated use. You can run these custom tests in Manual, Automatic or Step by Step mode. You can use multiple isopters (up to 10) with these Custom Kinetic patterns.
- Test isolated areas using the Special Mapping features. For example, you can map the blind spot, scotomas, and single static points using special features that are available in this kinetic package. Testing of isopters away from the point of fixation is available using the Custom Scan option.

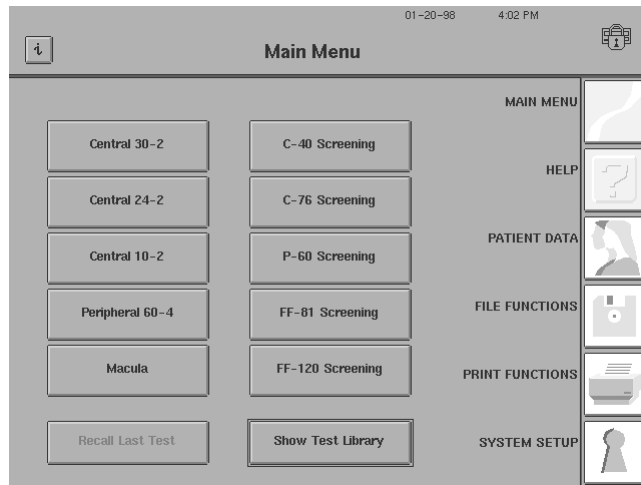
One example of a programmed test available for Kinetic testing is the **Social Security Administration's "Kinetic Disability Test."** This Kinetic test can help you to qualify patients with visual deficits for benefits as determined by the Social Security Administration. This single isopter test includes eight meridians and calculates an Efficiency Score which is indicated on the printout at the end of the test. Carl Zeiss Meditec is grateful to the Social Security Administration for making this test available on the Humphrey Field Analyzer for your use.

Performing Kinetic Perimetry Manually

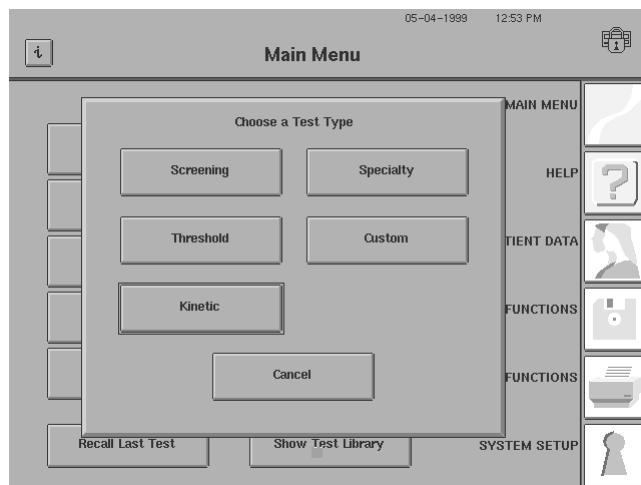
We have formatted this section to highlight critical steps in performing manual kinetic perimetry. You can either refer to each step as needed, or read the following pages as a tutorial.

1 From the Main Menu screen, select SHOW TEST LIBRARY.

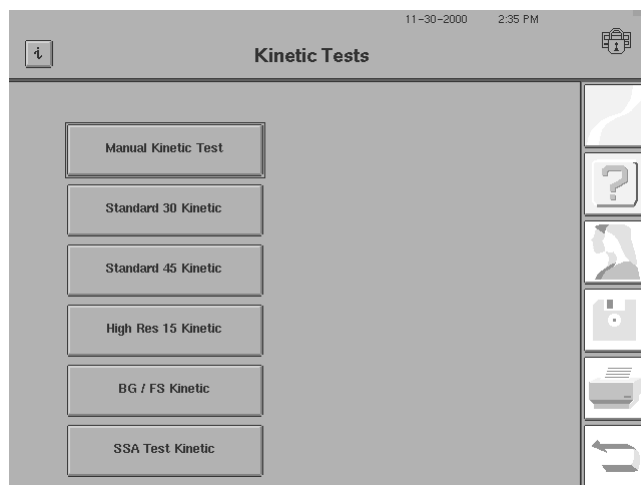
 Note: You can place any KINETIC button on the Main Menu screen. To do so, use the sequence that is described in [“Altering the Main Menu Screen,”](#) on page 2-26.

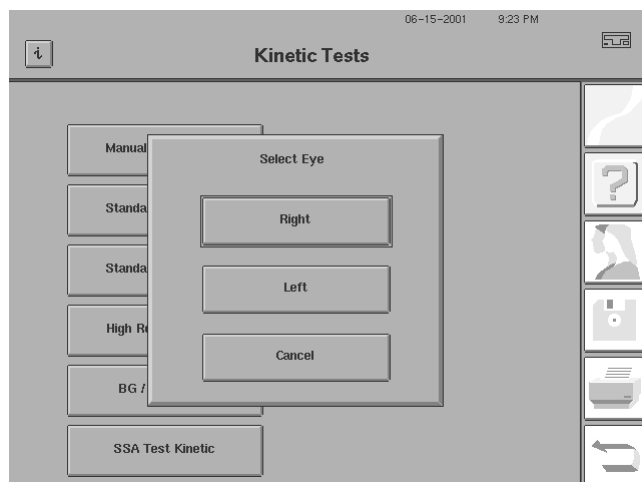


2 Select KINETIC.

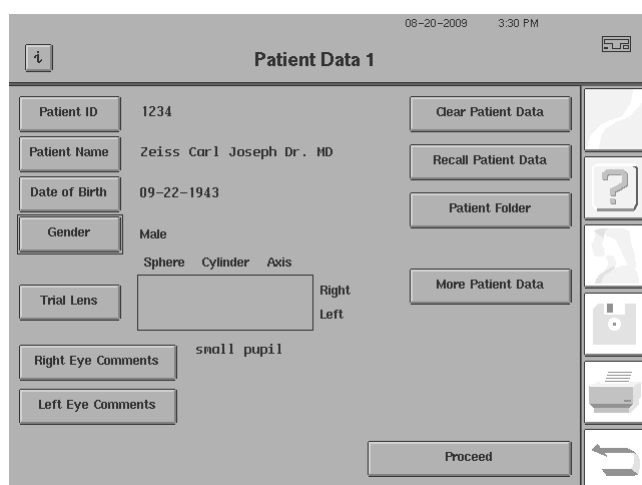


3 Press the MANUAL KINETIC TEST button on the Kinetic Tests menu.



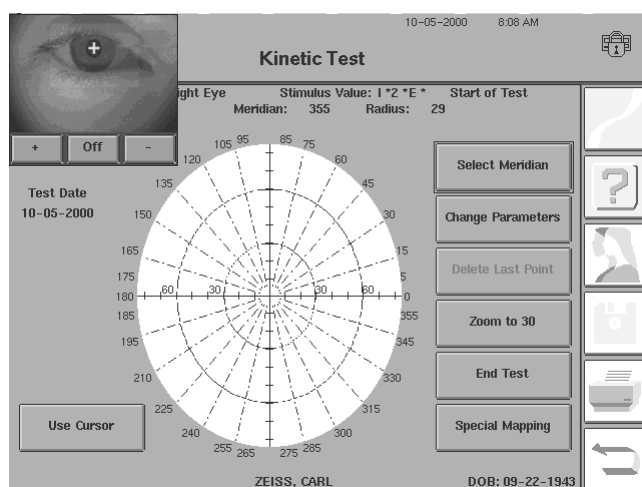


4 Select the test eye. Choose either RIGHT or LEFT.



5 Enter the appropriate patient data. You must enter the patient name and date of birth before saving at the end of the test.

You can also use the RECALL PATIENT DATA button, if the patient information previously has been stored on your HFA II-*i*.



6 Press PROCEED. The Kinetic Test screen will appear.

Setting Parameters

Kinetic testing always uses the central fixation target. Gaze Tracking and Blind Spot Monitoring are not available. The current stimulus value setting will display in standard Goldmann notation (see [Appendix \(E\), "Goldmann Conversion Tables,"](#) for stimulus conversion values) in the upper, middle portion of the Kinetic Test screen.

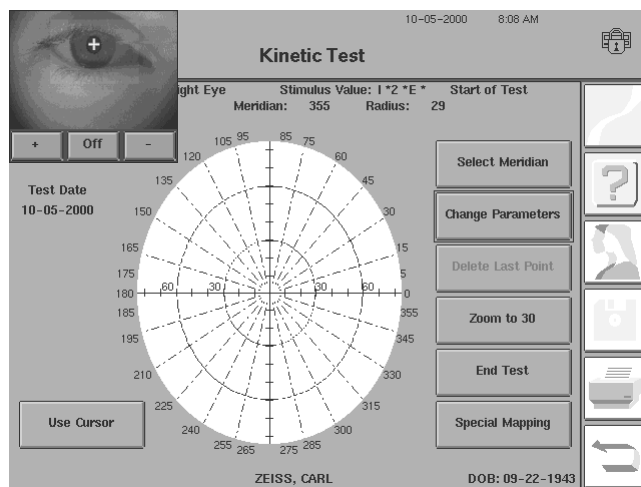
The default settings for the kinetic stimulus are:

- Stimulus Color: White
- Stimulus Value: I 2 E (20 dB)
- Stimulus Speed: 4 degrees per second

Unless the default settings are changed, Kinetic testing will begin in the peripheral field at approximately 75° nasally and temporally, or 55° in the superior and inferior fields.

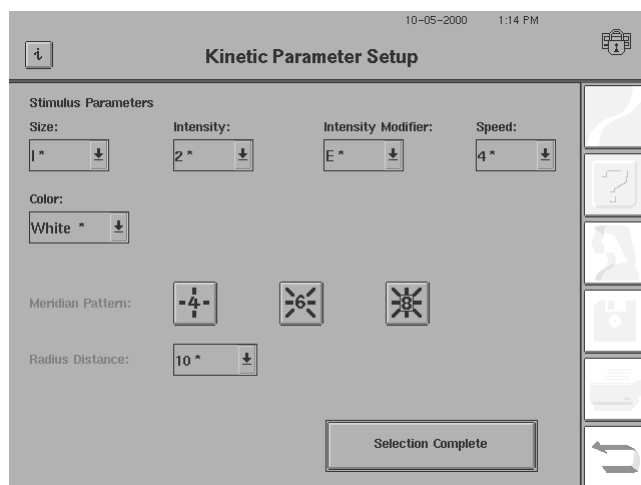
Each Kinetic test can have up to ten (10) sets of parameters that define different isopters or static point stimuli. The results of the first isopter are marked on the Kinetic test field with the uppercase letter "A". The second isopter is indicated by a "B" on the display. Each subsequent new set of parameters is then marked sequentially by the next letter of the alphabet.

1 From the Kinetic Test screen, press CHANGE PARAMETERS.



2 Use the drop-down menus to make any needed changes. See the following pages for explanations.

Press SELECTION COMPLETE when done. You will return to the Kinetic Test screen.





Note: Asterisks (*) in the text that follows denote the default setting for each parameter.

I *

↓

Stimulus Size

This drop-down box allows you to set the size of the test stimulus. You can select any one of the five standard Goldmann test stimulus sizes. They are designated by Roman numerals I* through V.

2 *

↓

Stimulus Intensity

This drop-down box lists numbers corresponding to the first (“coarse”) Goldmann intensity filter, which helps to determine the intensity of the stimulus. The values corresponding to the various standard Goldmann filters are:

<u>Goldmann Filter Number</u>	<u>Humphrey Intensity</u>
1	25 dB
2*	20 dB
3	15 dB
4	10 dB

E *

↓

Stimulus Intensity Modifier

This drop-down box lists the letters corresponding to the second (“fine”) Goldmann intensity filter, which also helps to determine the intensity of the stimulus. The values corresponding to these filters are:

<u>Goldmann Filter Letter</u>	<u>Humphrey Intensity</u>		<u>Goldmann Filter Letter</u>	<u>Humphrey Intensity</u>
A	+4 dB		A'	+24 dB
B	+3 dB		B'	+23 dB
C	+2 dB		C'	+22 dB
D	+1 dB		D'	+21 dB
E*	+0 dB		E'	+20 dB

The actual intensity of the test stimulus is equal to the combined values of the Stimulus Intensity and the Stimulus Intensity Modifier. For example, a stimulus with an Intensity of “3” and Intensity Modifier of “C” will have a resultant intensity of 17 dB (15 + 2).

4 *

↓

Stimulus Speed

This drop-down box lets you set the speed, in degrees per second, at which the stimulus moves in the test bowl. You can choose any test speed between 1 and 9 degrees per second.

White *

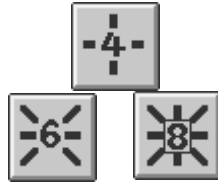
↓

Stimulus Color

This drop-down menu allows you to choose between the following stimulus colors: white*, red, and blue.

Note: You must select SPECIAL MAPPING to use the Meridian Pattern and Radius Distance options below. These two features are used only for Scotoma Mapping and the Blind Spot Map. They are ghosted during standard kinetic testing. Refer to [“Special Mapping,” on page 13-27](#), for details.

Meridian Pattern



This feature lets you select the meridian pattern used to map a patient's blind spot or scotoma. The buttons indicate directions along which each stimulus will move. You can choose from a 4, 6, or 8 meridian pattern. Each meridian of the 4 meridian pattern is separated by 90°, the 6 meridian pattern by 60°, and the 8 meridian pattern by 45°. Each meridian of a chosen pattern will be tested in random order.

The chosen meridian pattern is indicated by the highlighted number in the center of the button. The example in the left-hand margin shows that the 8 meridian pattern is chosen.

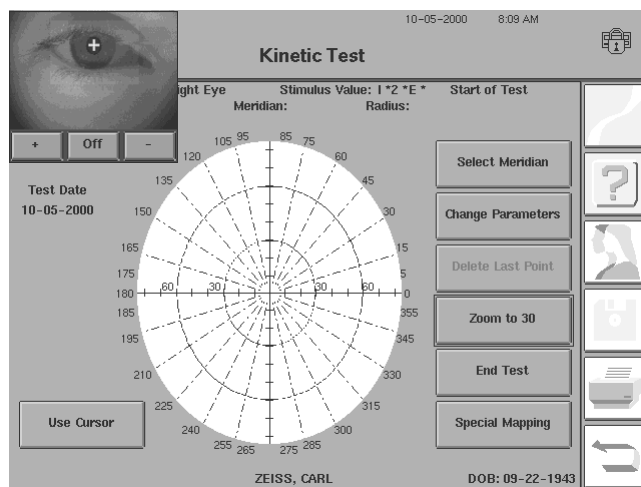


Radius Distance

This drop-down box sets the distance (in degrees) from the starting point to where Scotoma Mapping or Blind Spot Map will end (if the patient does not indicate seeing the stimulus). You can choose from 5, 10*, and 15 degree settings.

Changing the Visual Field Size

Kinetic tests can start either at the edge of an eighty degree (80°) or a thirty degree (30°) field size. The default size is the 80° format. If you want to test only the central visual field, the stimulus can start from a point 30° from fixation. You can use trial lenses only when testing the central visual field.



1 From the Kinetic Test screen, press ZOOM TO 30. The visual field to be tested is now thirty degrees (30°) in size.

The ZOOM TO 30 button will be replaced with the EXPAND TO 80 button. Press this button again, when you wish to return to the original field size.

Peripheral Testing Limits

The projection system has limits on how far out it can project a light stimulus. The following graph shows the projector's limitation when using the 80° field size:

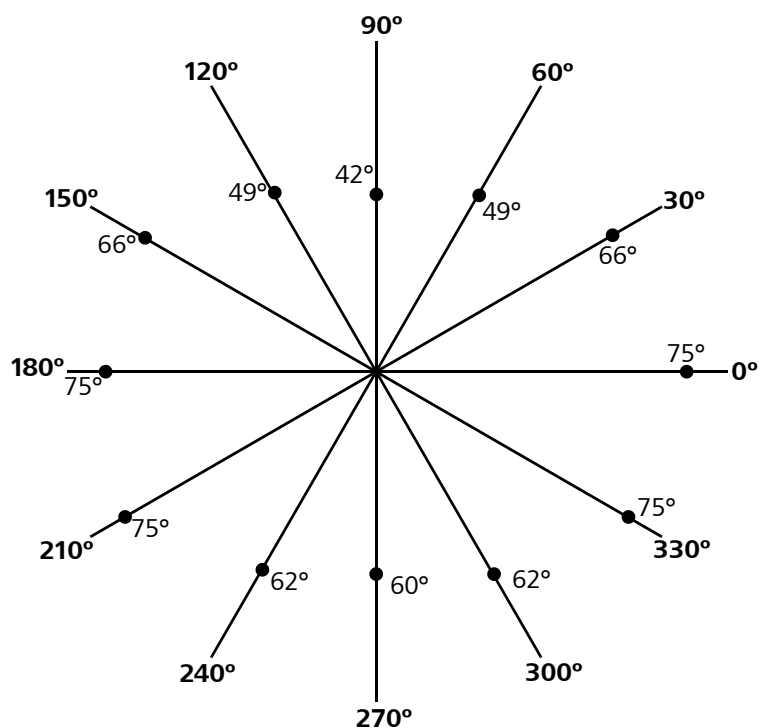


Figure 13.1 Peripheral 80° Testing Limits for Selected Meridians

Presenting a Stimulus Along a Meridian

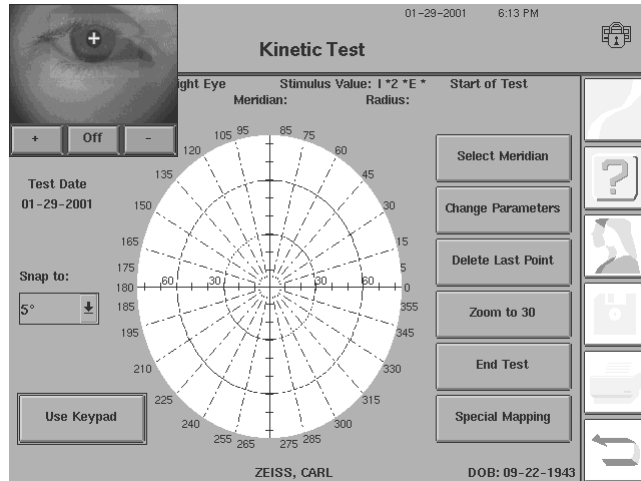
When activated, the HFA II-*i* will display the stimulus inside the bowl for one second at the starting point of the chosen meridian. It then will begin moving the stimulus toward fixation and into the patient's field of vision. If the patient does not respond by the time the stimulus reaches the central fixation point, the light will turn off and the instrument will beep.



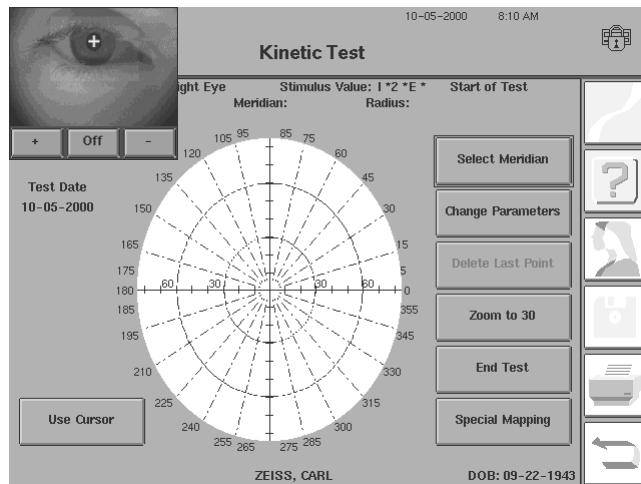
Note: The first stimulus of each isopter will be delayed longer than the one second described above. This is because the HFA II-*i* is verifying the stimulus before beginning the isopter.

Choosing Meridians by Cursor or Keypad

There are two ways to choose the points that define the isopter. One is to use a cursor to point at the meridian to test. The other method involves using the keypad and entering the meridian along which to start the stimulus.



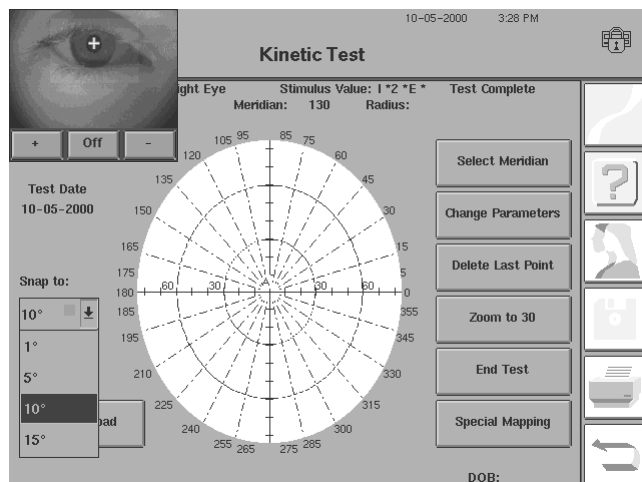
The present screen is in the Cursor mode. To switch to the Keypad, press USE KEYPAD.



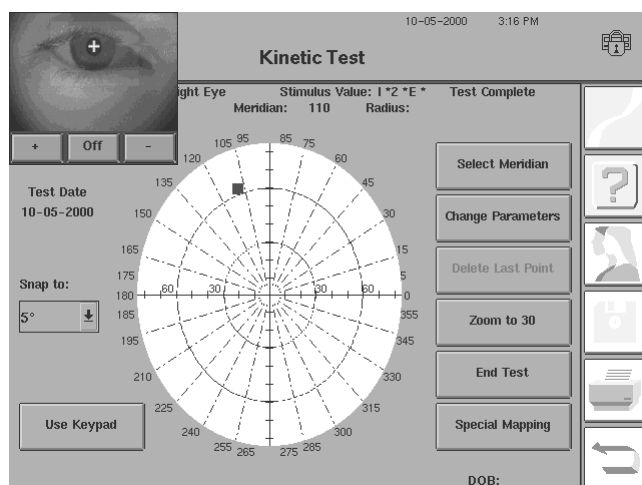
This screen is in the Keypad mode. To switch to the Cursor mode, press USE CURSOR.

Selecting a Meridian with the Cursor

To present a stimulus manually to a patient using the Cursor, follow the steps below:



1 You can adjust the Cursor to various incremental values, for assistance in selecting the desired meridians. Select the sensitivity of the cursor by pressing the SNAP TO pull-down box to choose between 1, 5, 10 or 15 degree increments.



2 Move the Cursor to the desired location. You can move the position of the cursor using the glidepad, a trackball, or a mouse. You also may hold your finger on the touch screen and move the cursor to the desired location by sliding your fingertip. The actual location is noted on the screen in the "Meridian" area above the visual field. In this example, the Cursor is registering its location in 5 degree increments. You do not need to press the glidepad button to locate the starting position. This method only selects the meridian, it does not locate the starting position away from fixation (the radius). The starting position is fixed by whether you choose the Full Field or Central size selection.

3 Prepare the patient for the test. Explain that the light will not be seen for a short time and then it will move into the patient's field of vision. Ask the patient to press the response button as soon as the light is seen. See ["Preparing the Patient," on page 3-24](#), for additional details.

4 Press ENTER on the keyboard, or SELECT MERIDIAN on the screen, to start the stimulus. After a slight pause, the test stimulus will begin to move toward the fixation point in the middle of the bowl.

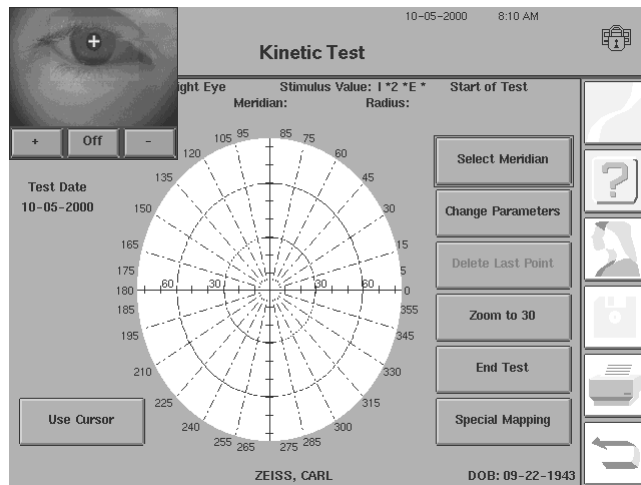


Note: The Humphrey Field Analyzer II-*does not* monitor the patient's fixation automatically during kinetic perimetry. Both Gaze Tracking and Blind Spot Monitoring are turned off. For reliable test results, it is imperative that the operator constantly monitor fixation with the video eye monitor.

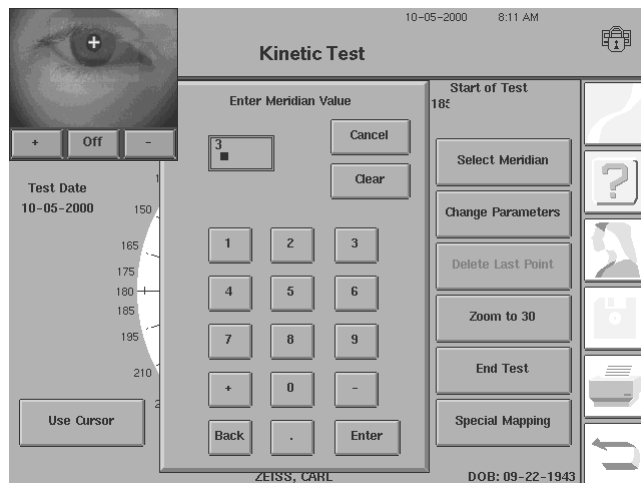
This testing sequence is continued on page 13-12

Selecting the Meridian with the Keypad

To present a stimulus manually to a patient using the Keypad, follow these steps:



1 From the Kinetic Test screen, choose SELECT MERIDIAN. The button in the lower left-hand corner should say "USE CURSOR" for the Keypad to be active. If the button says "USE KEYPAD," press prior to selecting the meridian.



2 A keypad will appear as a pop-up window.

Input the meridian value (in degrees) for the test stimulus.

Using the external keyboard (optional on 720*i*, 740*i*, and 745*i*) may be easier for entering the meridian values. You also can use the RETURN/ENTER key to start the test.



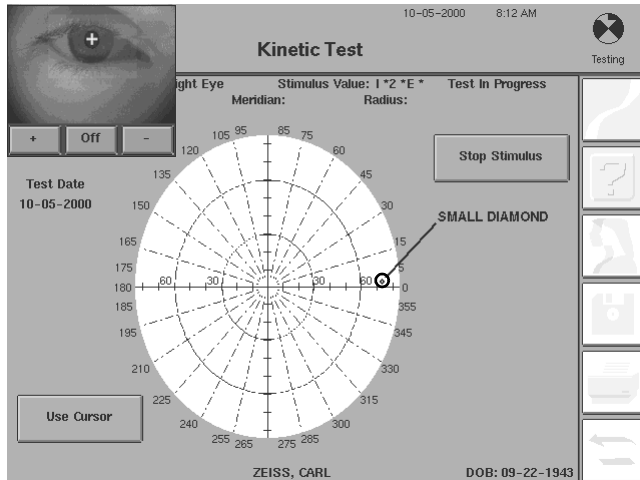
Note: Meridians are positive, whole numbers between 0° and 359°.

3 Prepare the patient for the test. Explain that the light will not be seen for a short time and then it will move into the patient's field of vision. Ask the patient to press the response button when he or she sees the light. See ["Preparing the Patient,"](#) on page 3-24, for additional details.

4 Press ENTER. After a slight pause, the test stimulus will begin to move toward the fixation point in the middle of the bowl.

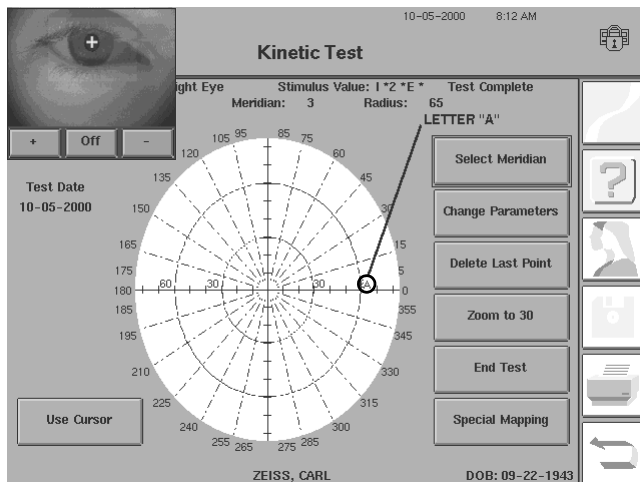


Note: The Humphrey Field Analyzer II-*i* **does not** monitor the patient's fixation automatically during kinetic perimetry. Both Gaze Tracking and Blind Spot Monitoring are turned off. For reliable test results, it is imperative that you constantly monitor fixation with the video eye monitor.



5 During the test a small diamond moves across the video screen to display the progress of the stimulus.

Pressing STOP STIMULUS will end the current stimulus without recording the data.



6 When the patient presses the response button, the test stops.

An uppercase letter marks the location where the patient first pressed the response button.



Note: Each location with the same stimulus intensity will be mapped with the same uppercase letter on the test field. You can map up to ten (10) different isopters.

7 To test another meridian, repeat steps 1 through 6. Continue to repeat the steps until all desired meridians for that particular isopter have been mapped.

8 To create a different isopter, first set the parameters as explained in ["Setting Parameters," on page 13-5](#). Second, repeat Steps 1 through 6. Continue to repeat Steps 1 through 6, until you have mapped all meridians for that particular isopter.



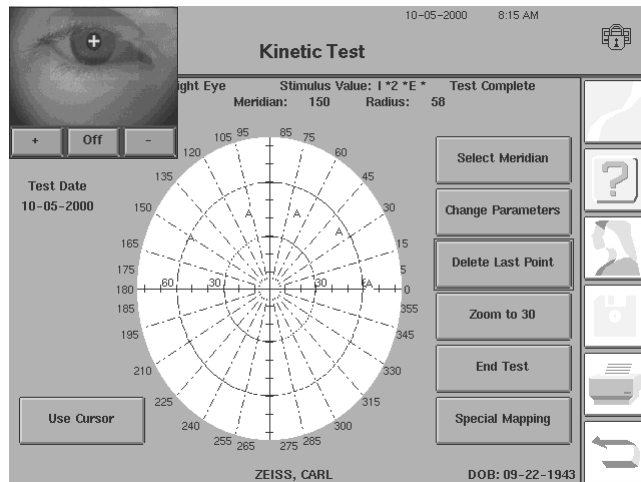
Note: A different uppercase letter will designate the points for each isopter. If an isopter is used a second time later in kinetic testing, a different uppercase letter will be used.



Note: There is no way for the patient to pause the test when performing kinetic perimetry. Holding down the patient response button will be recorded as a response to the stimulus. You must stop the kinetic test manually, to give the patient a break.

Erasing Entries

Unwanted test points can be removed from the Kinetic test you are performing. However, you can remove only the last entry. If you are unsure of a patient response, it is best to erase it and test that meridian again.



1 From the Kinetic Test screen, press DELETE LAST POINT.

The last entry you have made will automatically be removed from the test. **No warning will be issued before deleting the last entry.**

2 Subsequent selections of the DELETE LAST POINT button will erase the immediately preceding entry, in the reverse of the order in which the points were entered.



Note: The DELETE LAST POINT button is disabled if there are no entries.

Repeating Points Along the Meridians

You may wish to retest a previously tested meridian. If you have not deleted the previous response, characters representing both responses will appear on the display and in the kinetic results printout. However, the HFA will use only the point representing the patient's **final** response in forming the isopter.

Pre-Defined Kinetic Test Patterns

Your Humphrey Field Analyzer is programmed with a number of pre-set kinetic test patterns. The following 3 patterns will automatically test the meridians listed below. Only one isopter (III 4 E) is available with these set patterns. Special mapping options are available only when the test is run in the Step by Step mode.

Standard 45 (45 degree steps & 5 degrees on either side of midlines)

Speed: 2 degrees per second

Size: Goldmann III4e

Total Number of Points per Isopter: 12

*Meridians Tested: 5 °, 45 °, 85 °, 95 °, 135 °, 175 °, 185 °,
225 °, 265 °, 275 °, 315 °, 355 °*

Standard 30 (30 degree steps & 5 degrees on either side of midlines)

Speed: 2 degrees per second;

Size: Goldmann III4e

Total Number of Points per Isopter: 15

*Meridians Tested: 5 °, 30 °, 60 °, 85 °, 95 °, 120 °, 150 °, 175 °,
185 °, 210 °, 240 °, 265 °, 275 °, 300 °, 330 °*

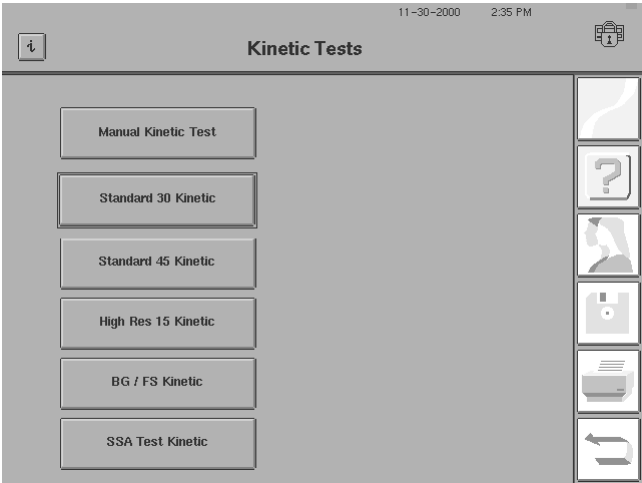
High Res 15 (15 degree steps & 5 degrees on either side of midlines)

Speed: 2 degrees per second;

Size: Goldmann III4e

Total Number of Points per Isopter: 28

*Meridians Tested: 5 °, 15 °, 30 °, 45 °, 60 °, 75 °, 85 °, 95 °, 105 °,
120 °, 135 °, 150 °, 165 °, 175 °, 185 °, 195 °,
210 °, 225 °, 240 °, 255 °, 265 °, 275 °, 285 °,
300 °, 315 °, 330 °, 345 °, 355 °*



In addition to the 3 patterns listed above, there are two other special Kinetic tests available. One is the Social Security Administration Disability Test (SSA Test). The other is a special test used in Germany (BG/FS Test). The BG/FS test is identical to the Standard 30 test listed above.

Press the desired test button found in the Kinetic Tests library.

You will have the option to run the test in either the Automatic or the Step by Step mode as is described in the next section of this chapter.

Running Automated Kinetic Tests

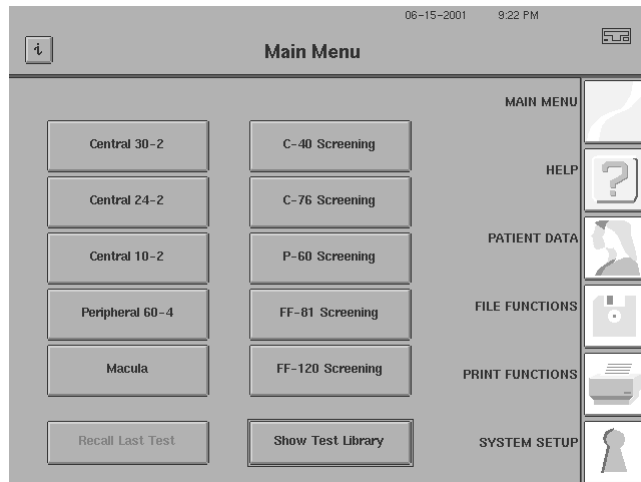
Automatic Mode

The Automatic mode for running a Kinetic test allows you to start the test and have all isopters tested to the completion of the test. The HFA II-/will automatically select the next meridian to test, start the stimulus, and record at which point the patient pressed the response button. It will continue until all programmed isopters and meridians have been tested.

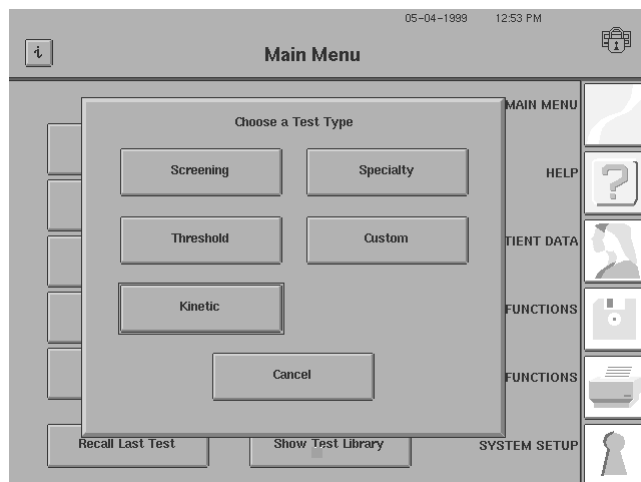


Note: No Special Mapping options are available when performing a test in the Automatic mode.

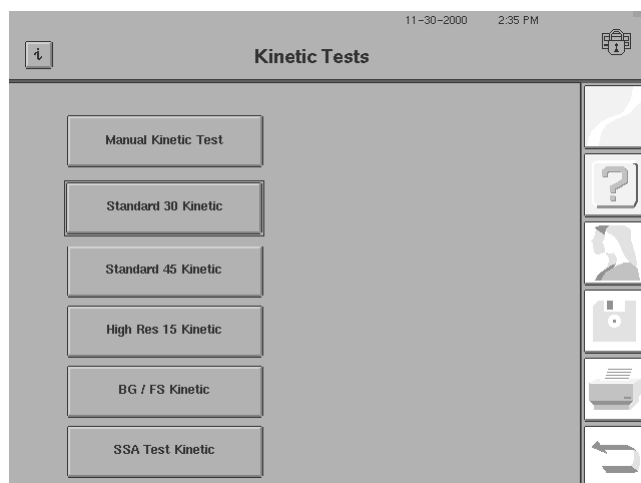
1 Starting at the Main Menu, press SHOW TEST LIBRARY.

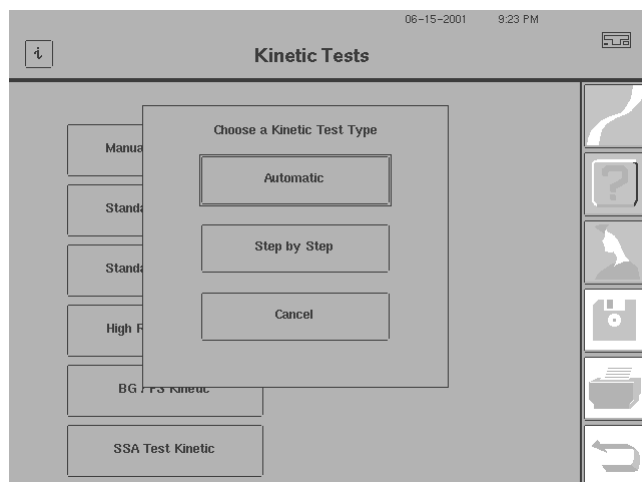


2 Choose KINETIC.



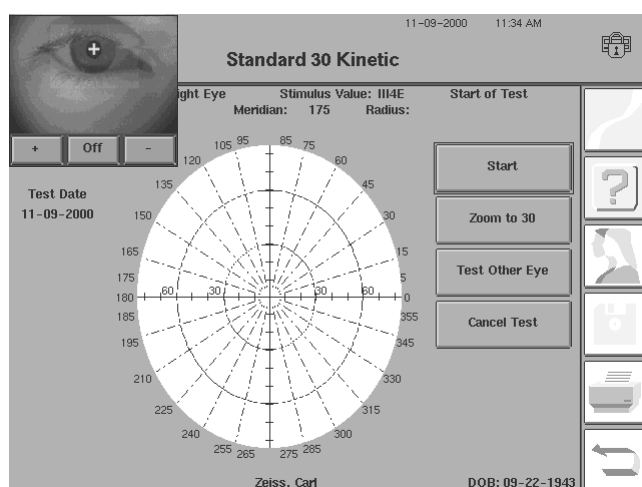
3 Select the Kinetic test to run.



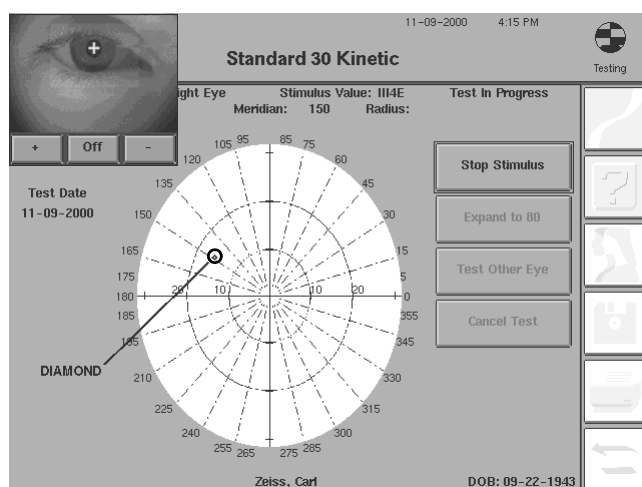


4 Press AUTOMATIC.

You will then need to select the eye to test. The Patient Data screen appears. Press the PROCEED button when all the desired patient data has been entered.

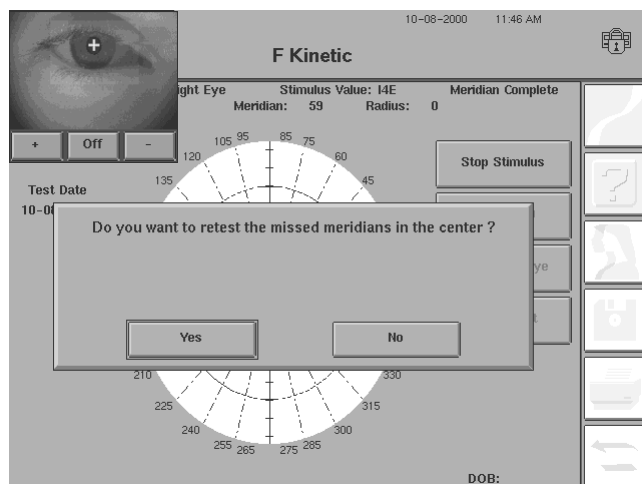


5 Press START to begin the automatic test. The meridian to be tested is indicated on the screen.



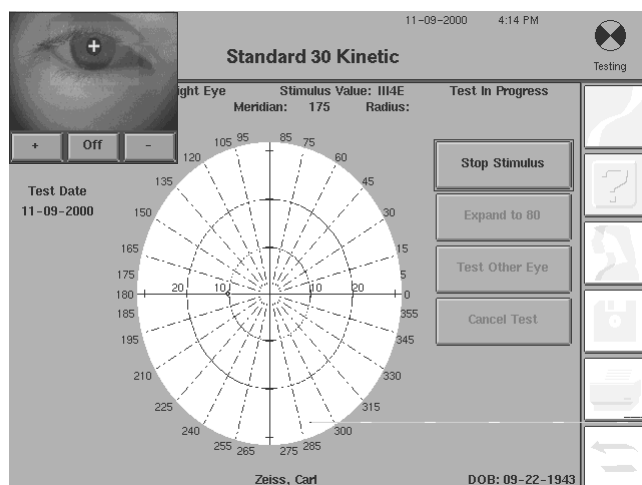
6 The stimulus will light but will not move for a short period of time. You then will see a small diamond begin to move across the screen and the STOP STIMULUS button will become active.

When the patient presses the response button, the isopter letter will appear and the next meridian to be tested will display on the screen. The HFA II-/i will pause briefly, then start to move the stimulus. This is the routine throughout the entire test.

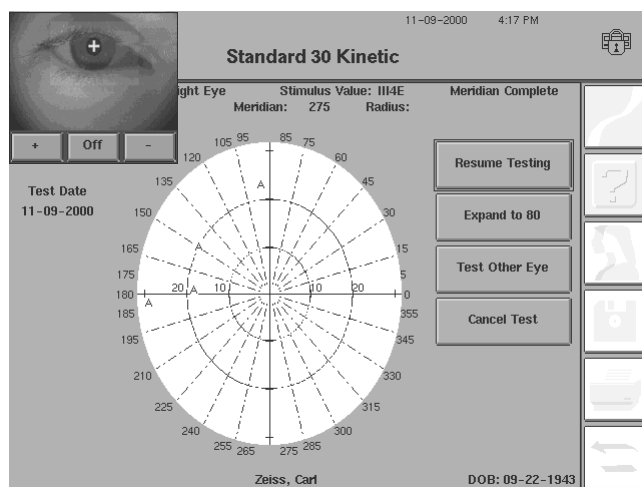


The HFA II-7 also will keep track of stimuli that were not seen. At the end of the isopter, if any stimuli were unseen, this option will be presented. Press YES if you wish to have these points retested. The visual field will be reduced to the Central size to retest the missed point. You will also be given the option of using the trial lens holder at this point. You do not need to use it.

Pausing the Test



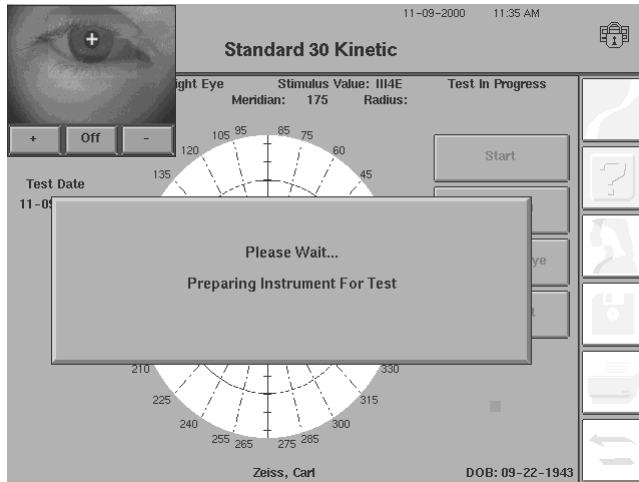
1 You can pause the test at any time by pressing the STOP STIMULUS button.



2 Choose the action you wish to take while the test is paused. The same meridian will be tested to completion when the test is resumed.

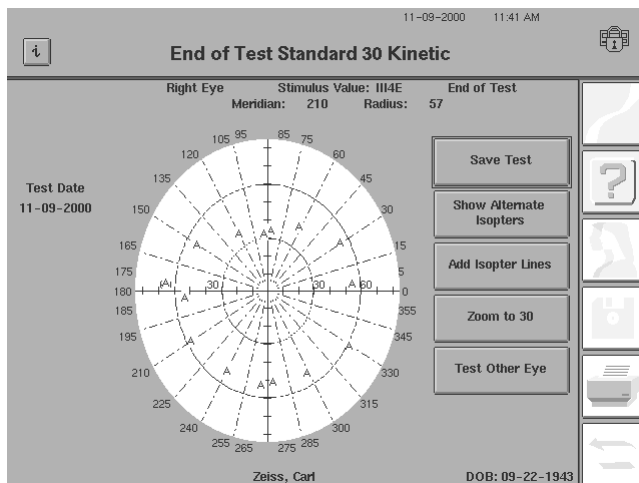


Note: There is no way for the patient to pause the test when performing kinetic perimetry. Holding down the patient response button will be recorded as a response to the stimulus. You must stop the kinetic test manually, if you wish to give the patient a break.

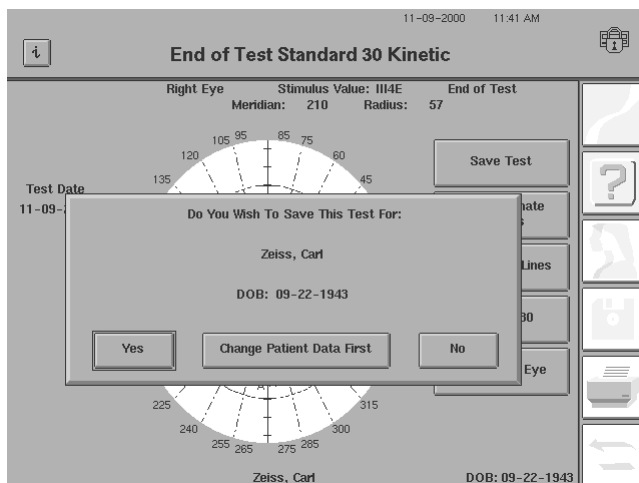


During testing, you may see this announcement appear. This indicates the test has paused while the HFA II-/changes the parameters for the new isopter. The new isopter begins testing when the announcement disappears from the screen.

Saving the Test Results



1 At the completion of the automatic testing sequence, this screen displays. Press SAVE TEST to store the test results.



2 You can save the test results by pressing YES.

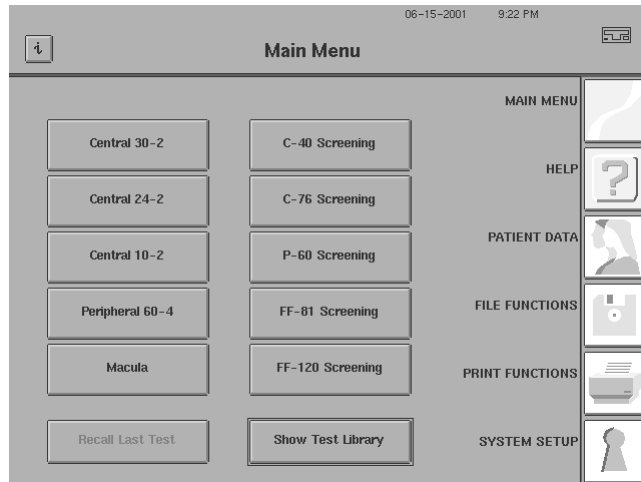
Step by Step Mode

The Step by Step method for running a Kinetic test allows you to start each test point manually. The HFA II-/will automatically select the next meridian to test. This allows you the opportunity to retest a point prior to testing the next meridian, or to advise the patient during the test. You control when each point is to be tested. We recommend starting each stimulus by pressing the Enter key on the external keyboard.

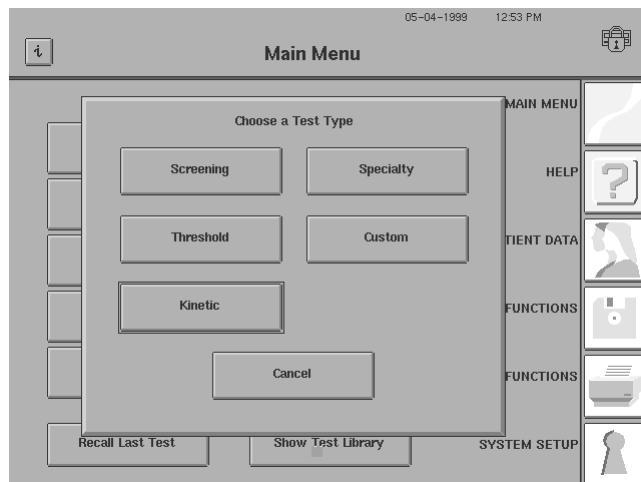


Note: Special Mapping options are available at the end of a test, when running in the Step by Step mode.

1 Starting at the Main Menu, press SHOW TEST LIBRARY.

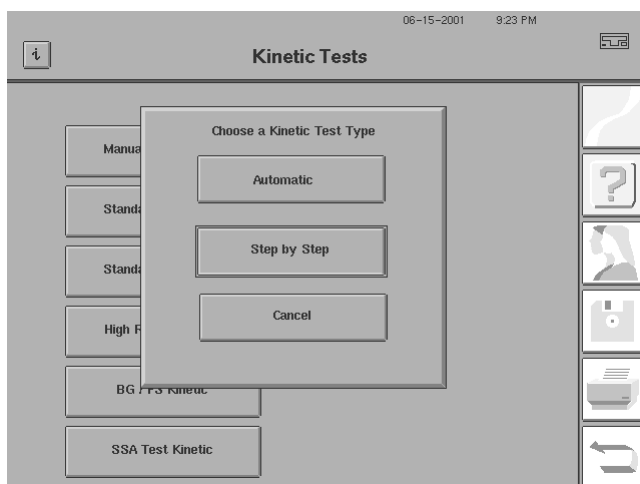


2 Choose KINETIC.



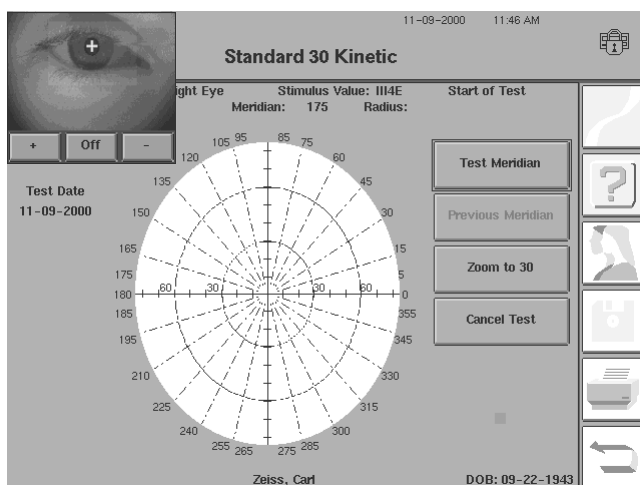


3 Select the Kinetic test to run.



4 Press STEP BY STEP.

Next you will need to select the eye to test. The Patient Data screen appears. Press PROCEED, once you have entered all desired patient data.

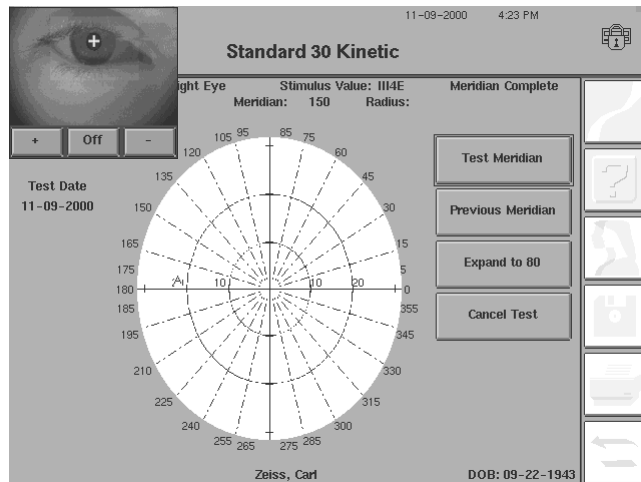


5 Press TEST MERIDIAN to begin the first stimulus. The meridian to be tested is indicated on the screen.

The stimulus will light but not move for a short period of time. You will then see a diamond representing the stimulus begin to move across the screen.



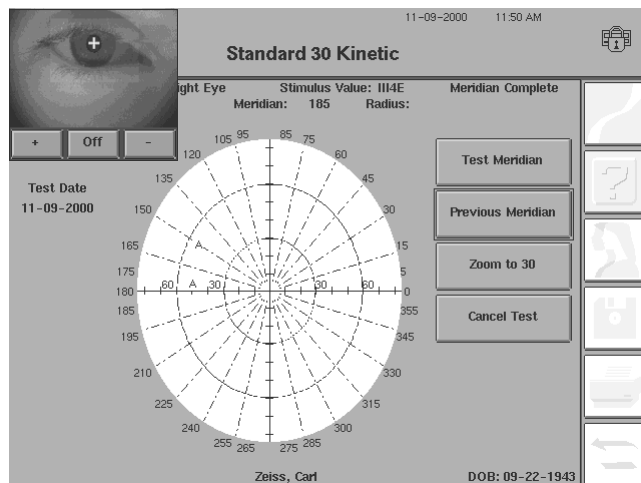
Note: You can use the ZOOM TO 30/EXPAND TO 80 button to change the stimulus starting point prior to starting each stimulus.



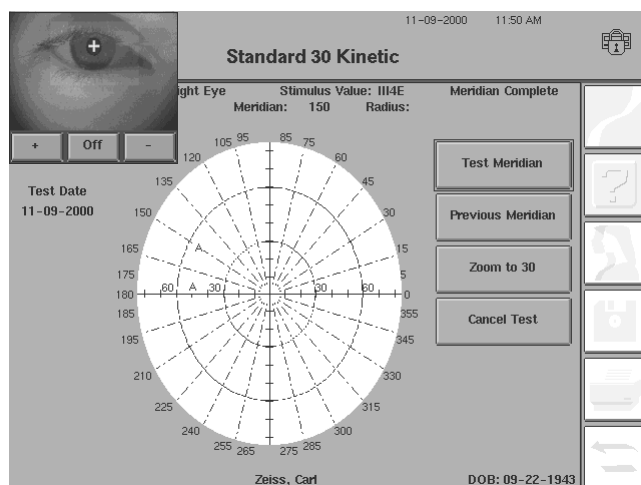
6 When the patient presses the response button, the location of the response will be marked with a capital letter corresponding to the isopter being tested.

The next meridian to be tested then displays on the screen. To start the testing of the next meridian, press TEST MERIDIAN again.

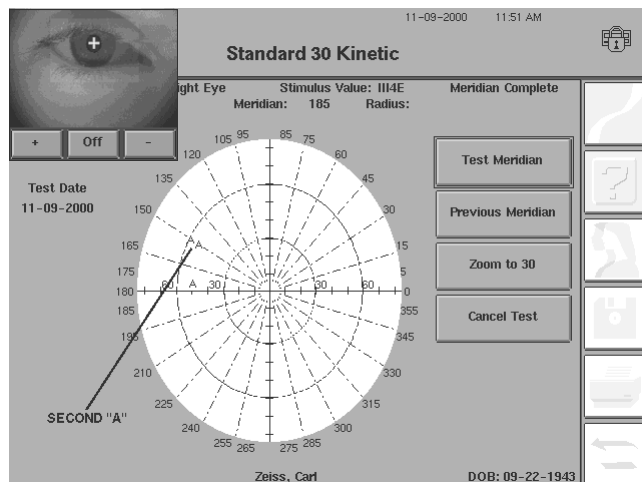
Retesting a Meridian



1 You can retest a meridian when using the Step-by-Step procedure. Press PREVIOUS MERIDIAN.



2 The previous meridian will display at the top of the screen. Press TEST MERIDIAN to start the stimulus.



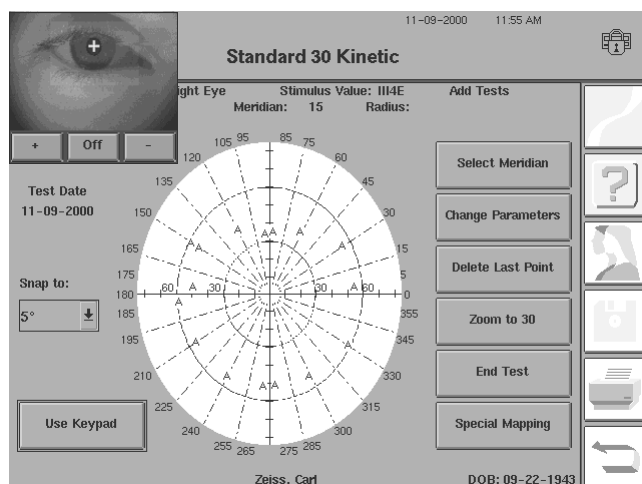
3 A second capital letter will display on the retested meridian.



Note: When isopter lines are drawn, the line will connect to the second stimulus mark.

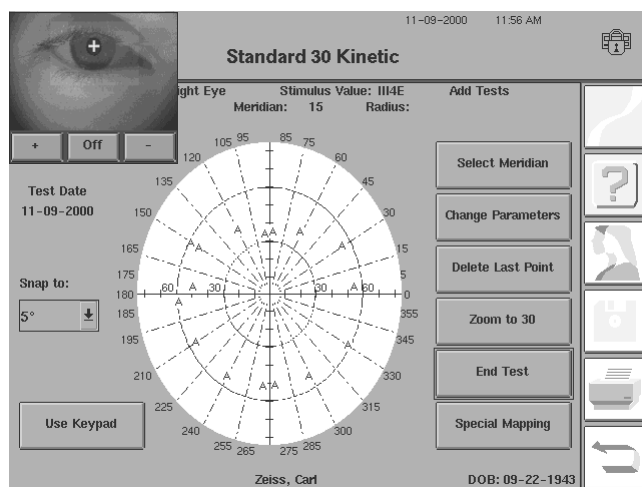
When the last point of an isopter is tested, the change of isopters may be subtle. You can note the change by looking at the Stimulus Value at the top of the screen. You may briefly see the announcement: "Please Wait. Preparing the Instrument For Test" as previously shown in the Automatic-mode description.

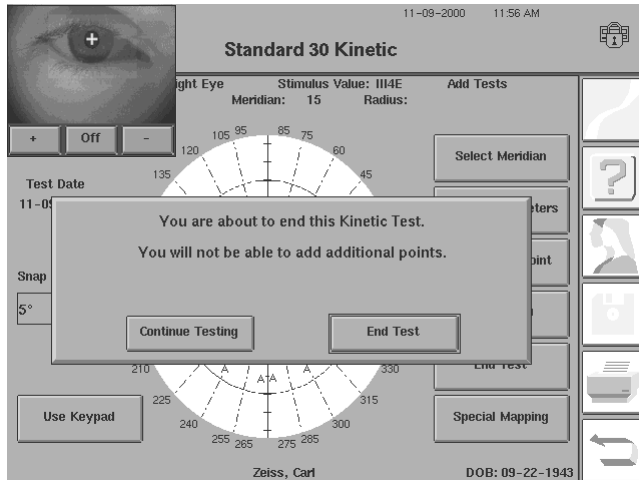
4 At the end of the Step by Step sequence, the manual Kinetic screen configuration displays. This allows you to add an additional isopter or test a selected meridian. It also allows access to the Special Mapping options. Special Mapping will be described later in this section.



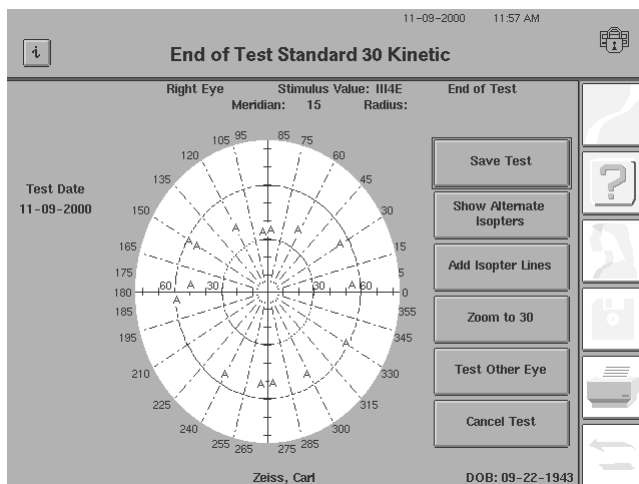
Saving the Test Results

1 Press END TEST.

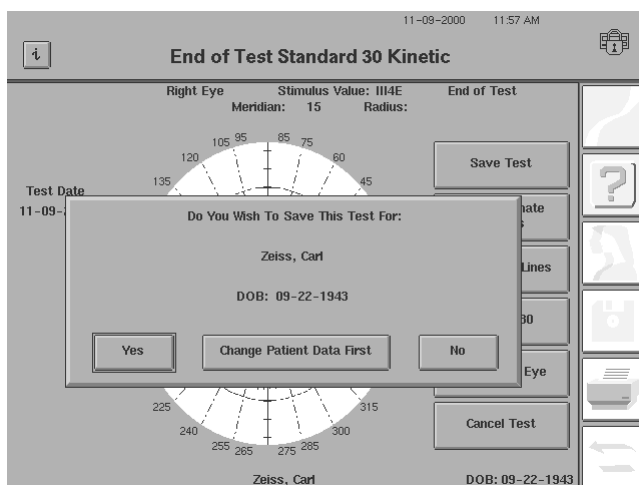




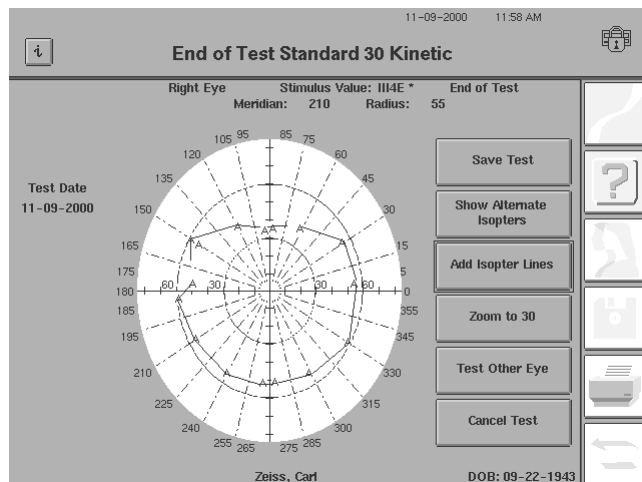
2 Confirm you wish to end the testing by pressing the END TEST button.



3 Press SAVE TEST.



4 Confirm the patient data is correct before pressing the YES button to save the test.



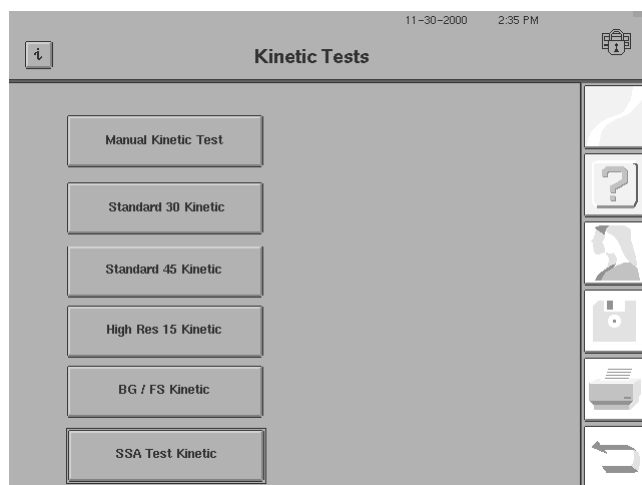
You may add isopter lines to indicate the isopters on the screen.

Social Security Administration Kinetic Disability Test

The HFA II-/ offers a special kinetic test authorized by the Social Security Administration. This test is used to evaluate a patient's visual field and creates a numerical score of the patient's visual disability. Eight (8) meridians are tested with a standardized stimulus (III 4 E). The stimulus moves at a rate of 4 degrees per second. The test uses the full field starting point for the stimulus. Only one isopter is determined. At the end of the test, the Humphrey Field Analyzer will calculate an Efficiency Score and display this value on the printout. The exact values of the 8 points should also be printed for your records and are included in the Numeric Values printout.

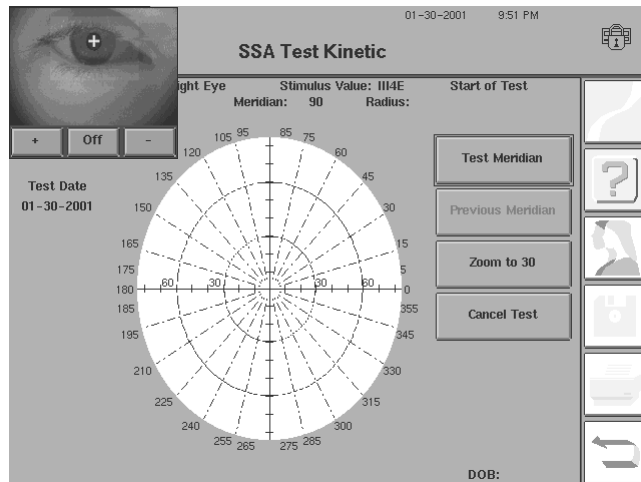
These meridians are randomly tested:

0, 45, 90, 135, 180, 225, 270, 315 degrees

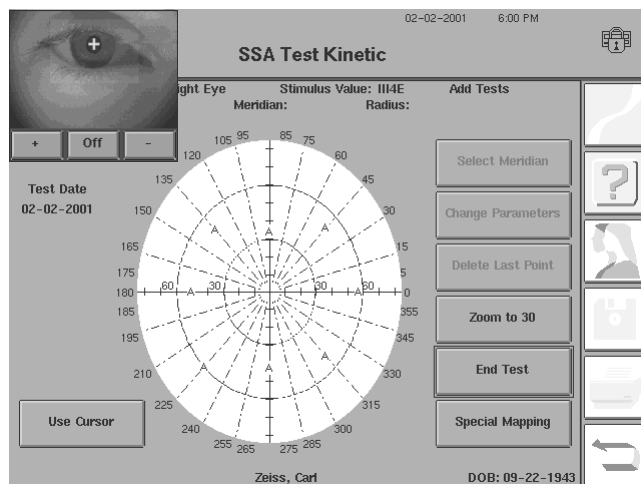


1 Advance to the Kinetic Tests Library by the usual method. Press SSA TEST KINETIC.

You are given the option of Automatic or Step by Step operation. The Automatic mode will run to completion. Step by Step will give you the option to retest a meridian. You can also use the Special Mapping features at the end of the test. Special Mapping features will not change the Efficiency Score. The Special Mapping features are described in ["Special Mapping," on page 13-27.](#)

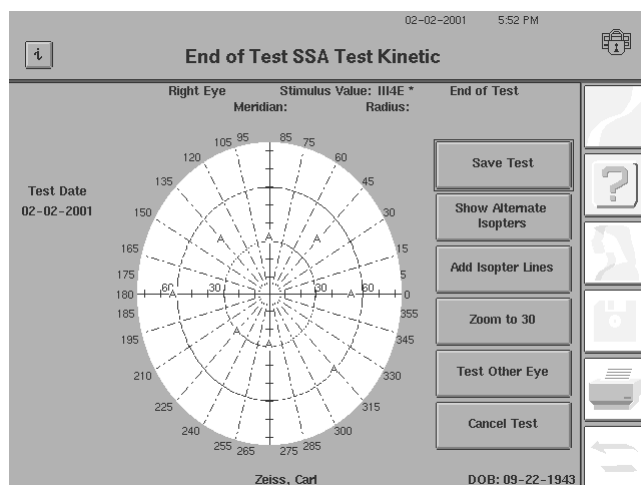


2 Start the test and allow the test to proceed through the 8 preprogrammed meridians.



3 In the Step by Step mode, you will see this screen upon the completion of the 8 meridians. Press END TEST for storing test data.

Prior to ending the test, you can activate SPECIAL MAPPING to allow searching for isolated scotomas. This extra testing will not change the calculated Efficiency Score. The next part of this section goes into greater detail about Special Mapping.



4 This screen will appear after pressing END TEST in the Step by Step mode. This is also the screen that will appear at the end of an Automatic test. All of these options are covered later in this section.

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Kinetic Printout Selection

Choose Printout Styles For:
Zeiss, Carl

RIGHT EYE LEFT EYE

☐ Central

☒ Full Field

☒ Numerical Values

Note: More than one print type may be selected.

Print All Selected Items

5 When the test is complete, save the test results. Press the *PRINT FUNCTIONS* icon to complete the disability test procedure. Choose both the Full Field and the Numerical Values printouts for complete documentation.

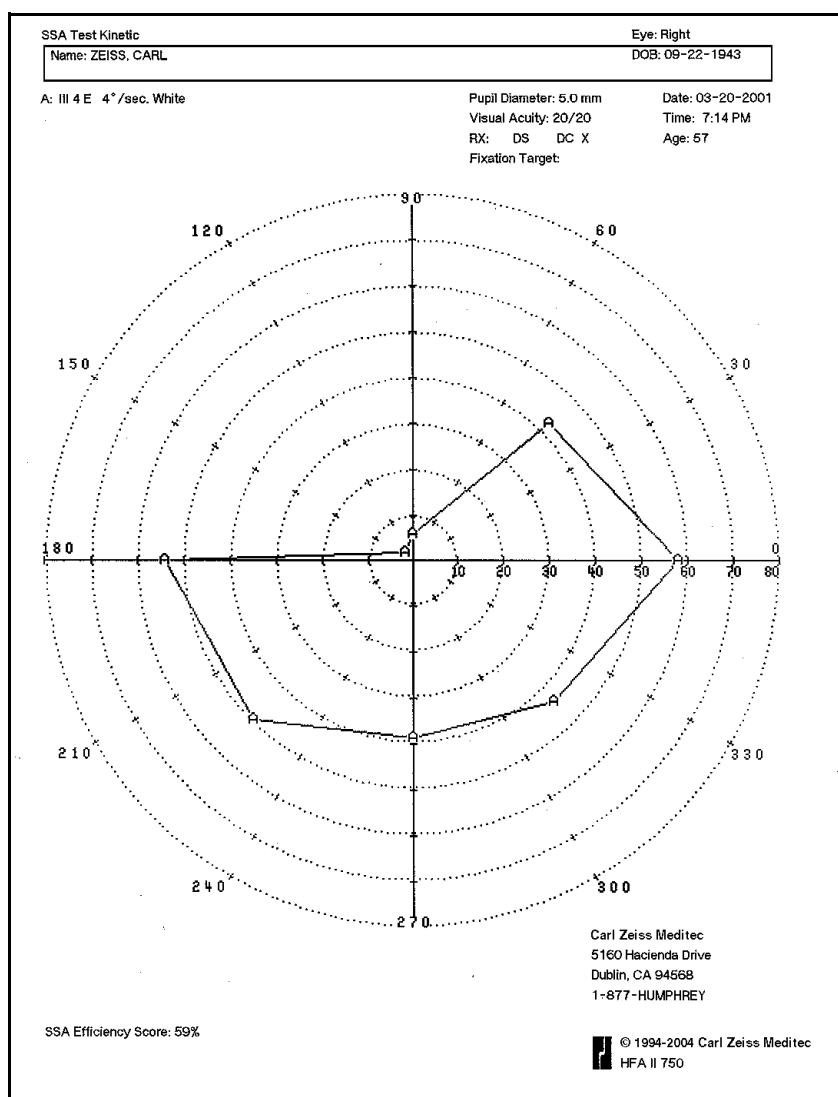
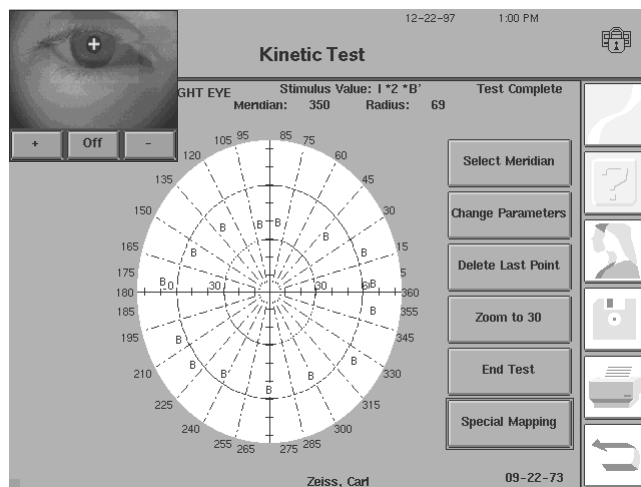


Figure 13.2 The SSA Disability Test Printout

Special Mapping

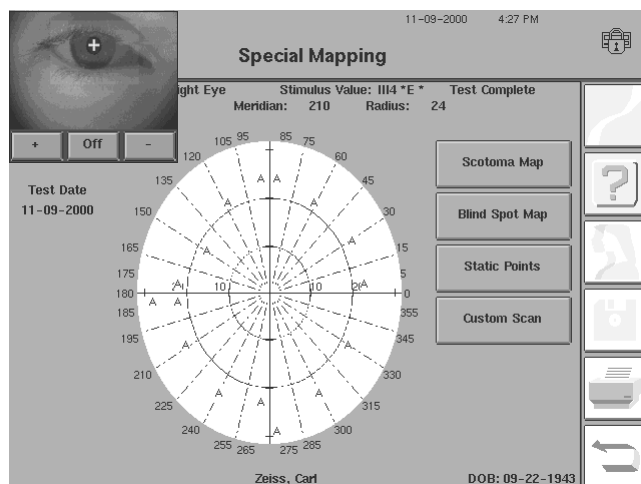
You can perform Special Mapping tests at the completion of either Manual or Step by Step Kinetic testing. Special Mapping is not available for testing done in the Automatic mode. Special Mapping provides you with a number of additional testing options which are described on the following pages:

- Scotoma Mapping
- Blind Spot Map
- Static Points
- Custom Scan



1 From the Kinetic Test screen, check to ensure that the desired field size is displayed. You cannot change the field size from within the Special Mapping screen.

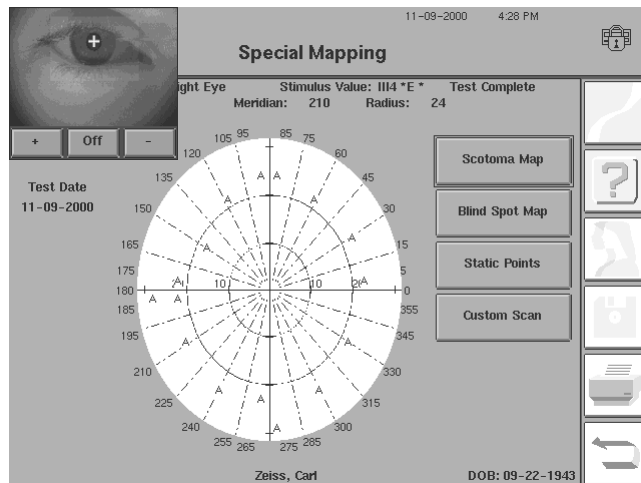
Press SPECIAL MAPPING.



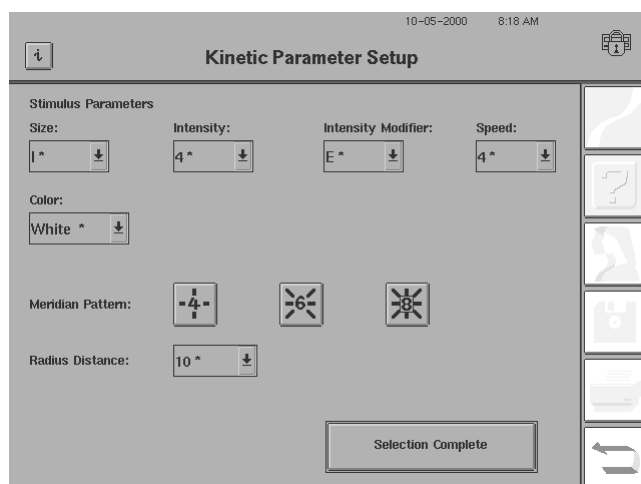
2 The Special Mapping screen will appear.

Scotoma Mapping

The Scotoma Mapping feature allows you to measure the size of a scotoma through the testing of multiple kinetic meridians. A point within the scotoma is located. When activated, the Scotoma Map feature sends the stimulus outward from the central point (a fixed number of times) to outline the boundaries of the scotoma.



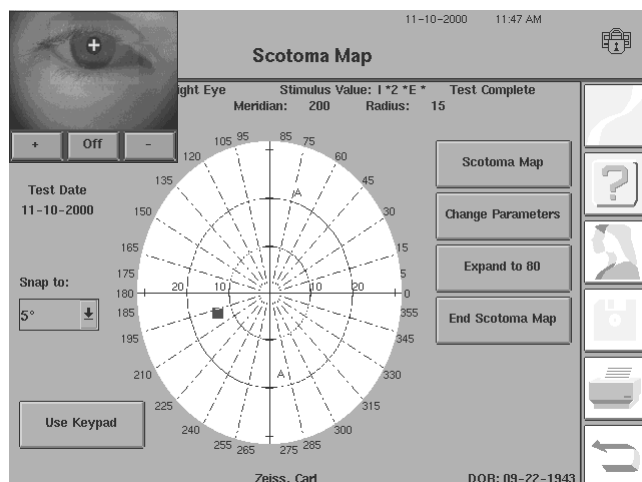
1 From the Special Mapping screen, press SCOTOMA MAP.



2 The Kinetic Parameter Setup screen will display.

Use the drop-down menus to make changes. See [“Setting Parameters,”](#) on page 13-5, for details.

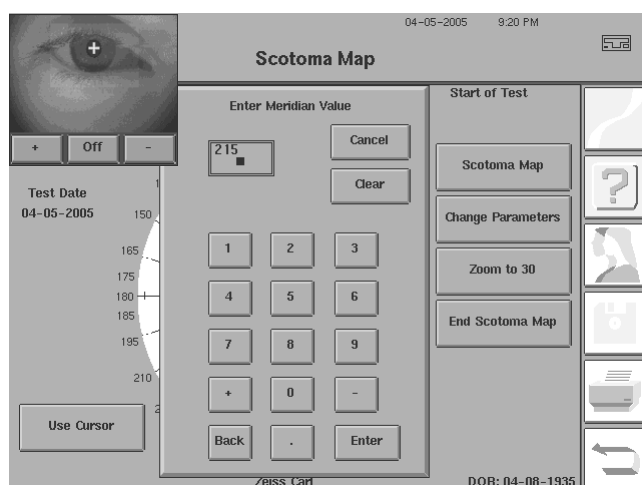
Press SELECTION COMPLETE.



The easiest way to locate the central point is to use the Cursor method. Move the cursor with the glidepad or finger on the touch screen to the desired location. In this example, the cursor is positioned to run the Scotoma Map from a point centered at Meridian: 200 and Radius: 15. Skip to Step 5.

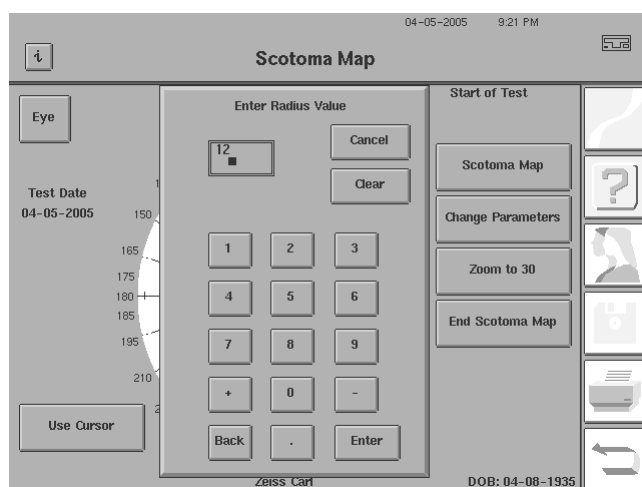
For Keypad Operation

3 Press SCOTOMA MAP. A keypad will appear as a pop-up window.



Enter the meridian value (in degrees) where you wish to place the center of the scotoma map.

Press ENTER.



4 Enter the radius (the distance in degrees from the fixation point) where you wish to place the center of the scotoma map.

5 Prepare the patient for the test. Explain that the light will not be seen for a short time and then it will move into the patient's field of vision. Ask the patient to press the response button as soon as he or she sees the light. See ["Preparing the Patient,"](#) on page 3-24, for further details.

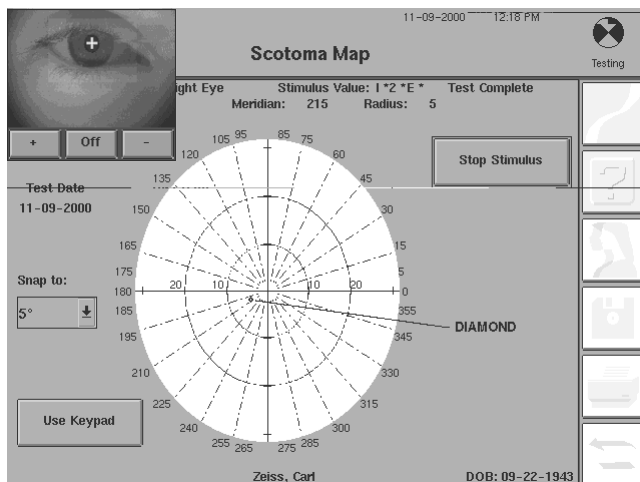
6 Press ENTER/RETURN on your keyboard, or activate the Scotoma Map button on the screen. After a slight pause, the HFA II-/i will automatically map the scotoma according to the meridian pattern that you have chosen.



Note: The Humphrey Field Analyzer II-*i* does not monitor the patient's fixation automatically during kinetic perimetry. For reliable test results, it is imperative that you constantly monitor fixation with the video eye monitor.



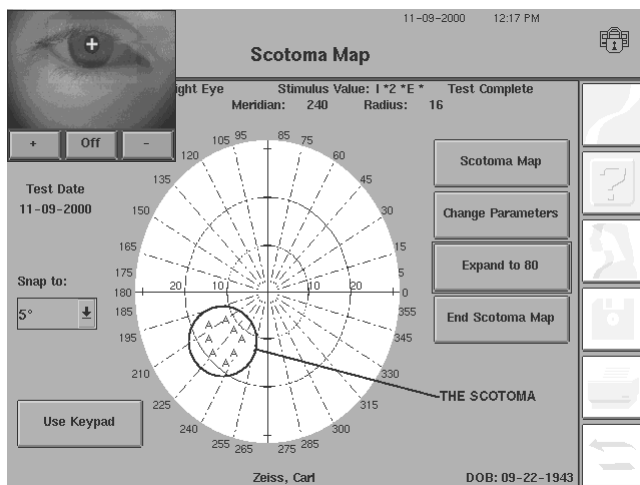
Note: The HFA II-*i* will automatically map the scotoma according to the test parameters that you have chosen. You cannot initiate each test stimulus individually. When the patient presses the response button, the HFA II-*i* will switch to the next meridian and immediately begin testing.



7 During the test, a small diamond moves across the video display. It displays the progress of the stimulus in the test bowl.



Note: The diamond may be difficult to see during Special Mapping operations.



8 When the Scotoma Mapping finishes, the test stops.

An uppercase letter marks each location where the patient pressed the response button.



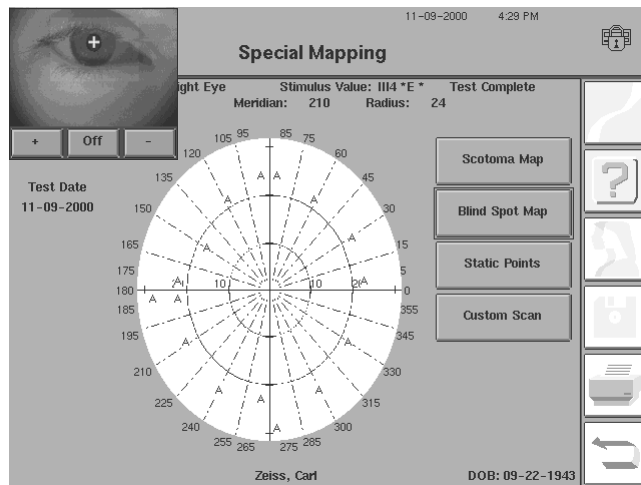
Note: Each time you perform a new isopter or test sequence, a new uppercase letter will display on the test screen. Even if the same stimulus value used for mapping a scotoma was used for a previous isopter, a different letter will appear.

Blind Spot Mapping

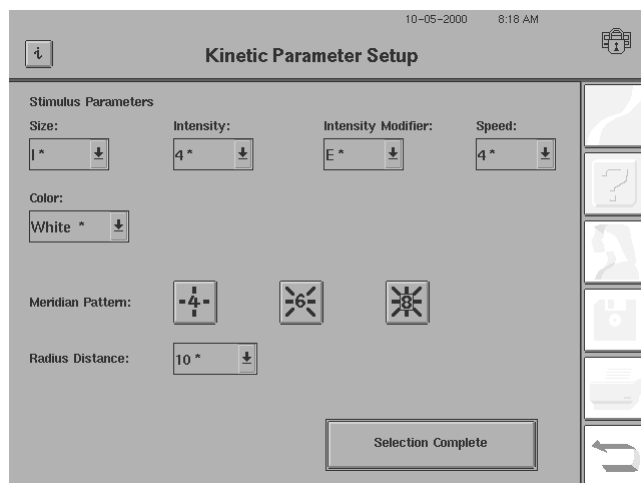
The Special Mapping feature has a built-in program to find and map the blind spot. Most often you can use the I4E stimulus (which is the smallest but most intense Goldmann stimulus) to plot the blind spot. A larger target may be required if the I4E isopter is too small and fails to enclose the blind spot.

The Humphrey Field Analyzer II-*i* will move the stimulus to a point approximately 15° temporal to fixation and just below the horizontal axis for the eye you are testing. Starting at this center point, the stimulus will move out toward the periphery in each of the directions shown on the Meridian

Pattern button. It stops when the patient pushes the response button. In this way, the HFA II-/will map the blind spot borders.



1 From the Special Mapping screen, press BLIND SPOT MAP.



2 The Kinetic Parameters Setup screen will appear.

Use the drop-down menus to make any desired changes. See [“Setting Parameters,” on page 13-5](#) for additional details.

3 Prepare the patient for the test. Explain that the light will not be seen for a short time and then it will move into the patient's field of vision. Ask the patient to press the response button as soon as he or she sees the light. Refer to [“Preparing the Patient,” on page 3-24](#) for more information.

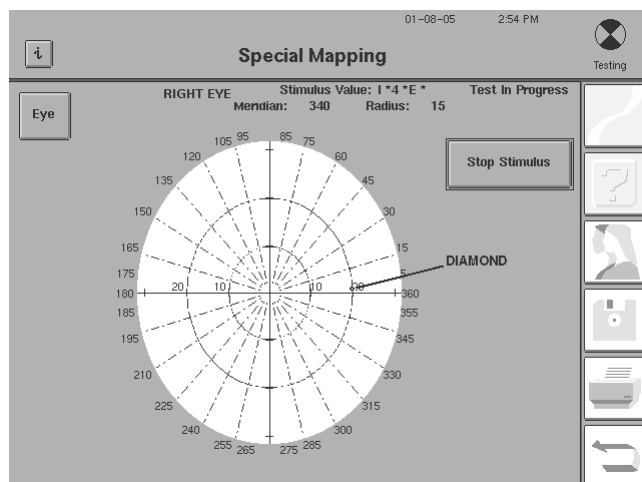
4 Press SELECTION COMPLETE. After a slight pause, the HFA II-/will automatically present each stimulus to the patient for mapping.



Note: The Humphrey Field Analyzer II-/ **does not** monitor the patient's fixation automatically during kinetic perimetry. For reliable test results, it is imperative that the operator constantly monitor fixation with the video eye monitor.

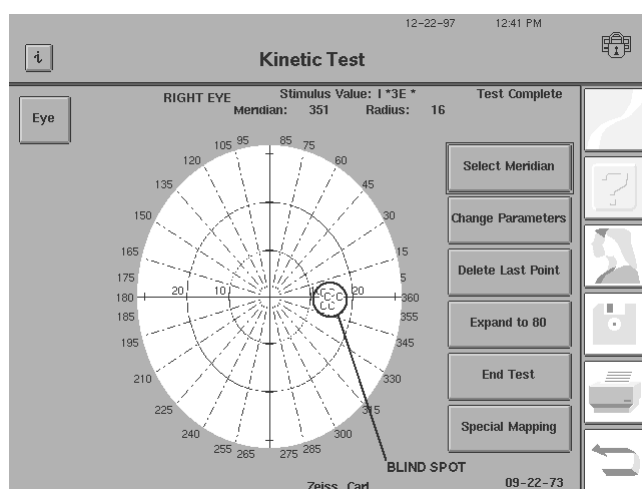


Note: The HFA II-/will automatically map the blind spot according to the test parameters chosen. The user cannot initiate each test stimulus individually. When the patient presses the response button, the HFA II-/will switch to the next meridian and immediately commence testing.



5 During the test, a small diamond moves across the video display. It displays the progress of the stimulus in the test bowl.

If it is necessary to stop in the middle of the blind spot mapping, touch the STOP STIMULUS button.

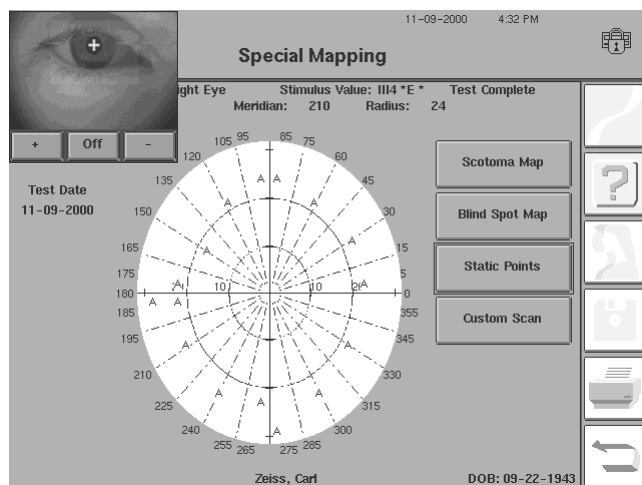


6 When the Blind Spot Map finishes, the test stops. An uppercase letter will mark each location where the patient first pressed the response button.



Note: Each time you perform a new isopter or test sequence, a new uppercase letter will display on the test screen. Even if the same stimulus value used for mapping the blind spot was used for a previous isopter, a different letter will appear.

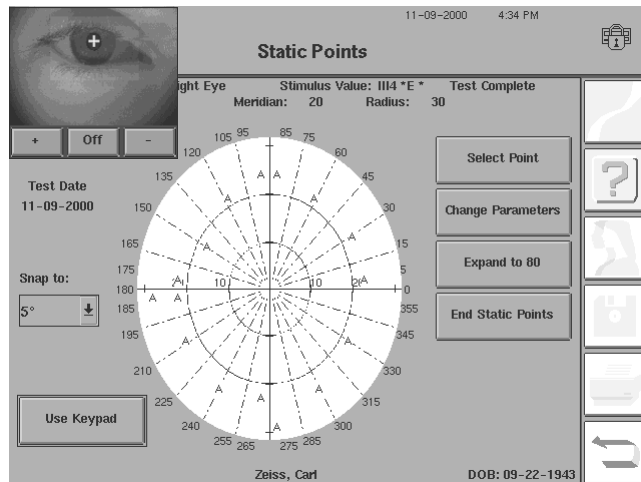
Static Points



Sometimes isolated scotomas exist within previously determined isopters. By using static points, presented like static points in a standard screening test, these small scotomas can often be detected. After discovery, you can map these scotomas with the Scotoma Map option previously described.

1

Select STATIC POINTS from the Special Mapping Screen.



2 For ease of use, set the HFA II-*i* for cursor use. Press USE CURSOR if in keypad mode. Move the cursor to the area at which you wish to test. In this example the point to be tested is located at:

Meridian: 20

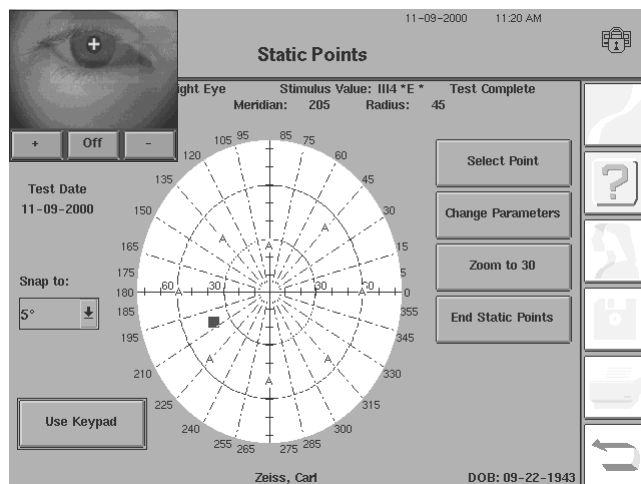
Radius: 30



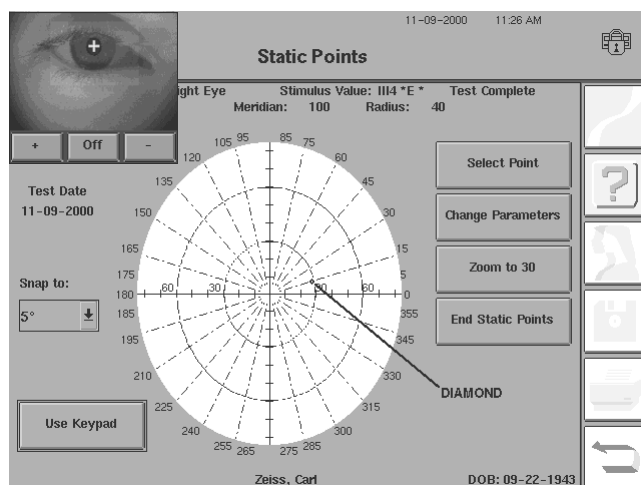
Note: There is no visual cue on the screen as to the location of the static point to be tested.



Note: The point coordinates can also be input using the Keypad option. See previous sections for entering Meridian and Radius values with the keypad.



3 Press SELECT POINT to display the Static point stimulus to the patient.



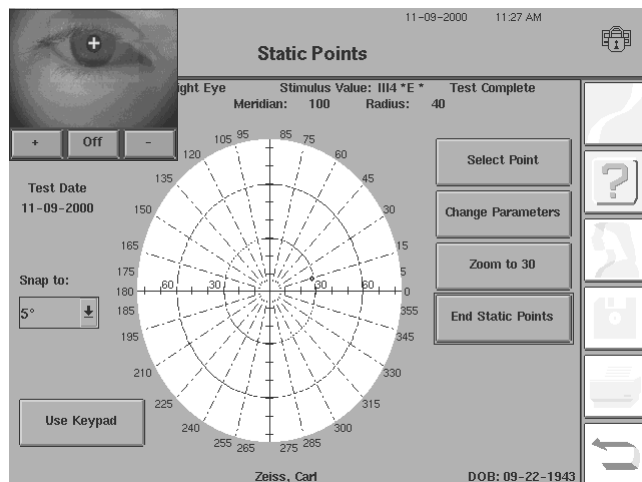
4 If the patient sees the stimulus, a small diamond will display at that point on the screen.

The words "Not Seen" will display briefly if the patient does not see the stimulus.

Additional static points may be checked. Only the most recent point seen will display.



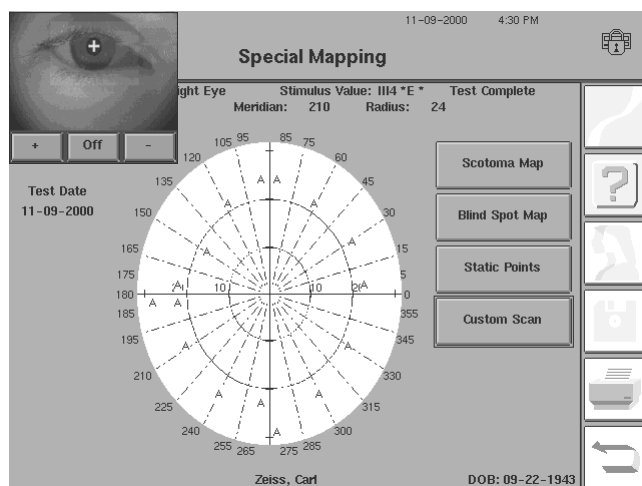
Note: All static points tested, both "Seen" and "Not Seen," are recorded on the Numerical Values printout.



5 When the Static Points procedure is complete, press END STATIC POINTS to return to the Special Mapping screen.

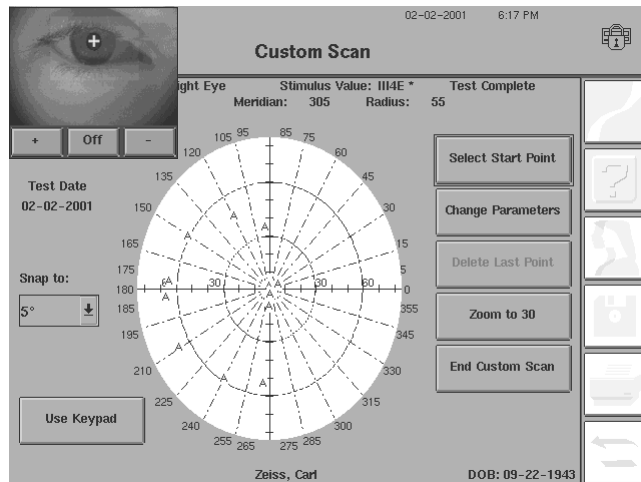
Custom Scan

The Humphrey Field Analyzer II-7 allows you to move stimuli either from peripheral-to-central, from central-to-peripheral, or from point-to-point within the field without going through the fixation point. This feature may be helpful in describing the boundaries of a hemianopsia for example. Using the Cursor method is recommended for selecting the Start and End points of the Custom Scan and the method is described in the following pages. Selecting the Start and End points with the Keypad is available but involves the entering of two coordinates (Meridian and Radius) for each point and, therefore, takes more time.

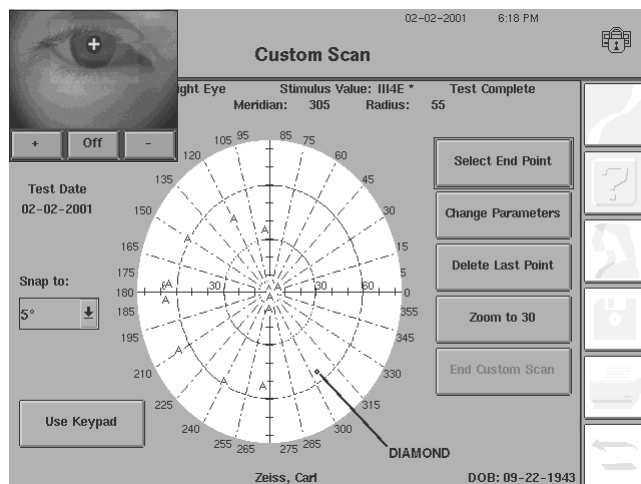


1 From the Special Mapping screen, select CUSTOM SCAN.

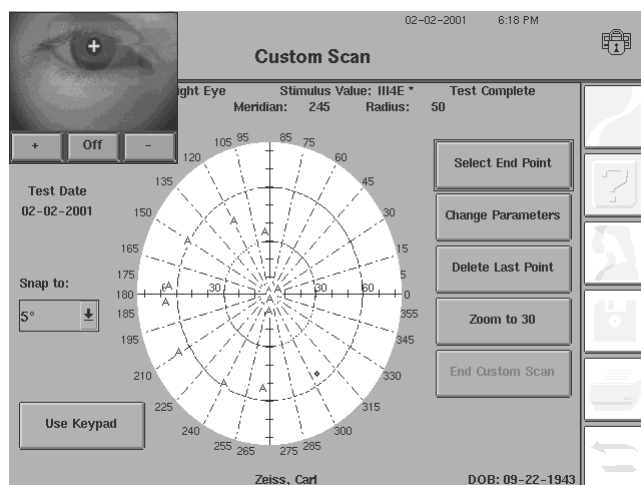
2 You will see the Custom Scan screen. Select CHANGE PARAMETERS if desired. Set the parameters. Review ["Setting Parameters,"](#) on [page 13-5](#) for details. Press SELECTION COMPLETE.



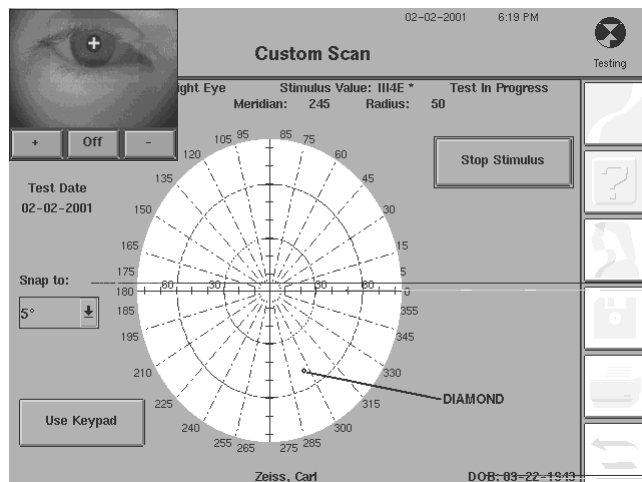
3 First, press the USE CURSOR button if the cursor is not available. Locate the Start point by moving the Cursor by your preferred method (finger on touch screen or with the glidepad) to the point from which you wish to start the Custom Scan. Use the Meridian and Radius locations at the top of the screen for greater accuracy.



4 Press SELECT START POINT. A diamond appears at the position you have chosen.

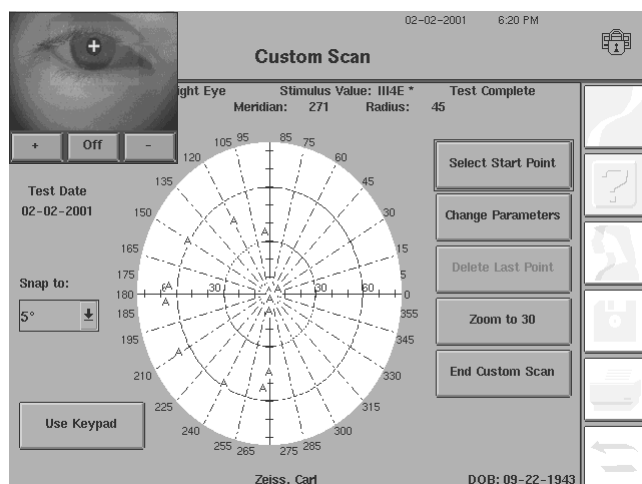


5 Move the cursor to the area where you wish the test point to run towards (the End Point).



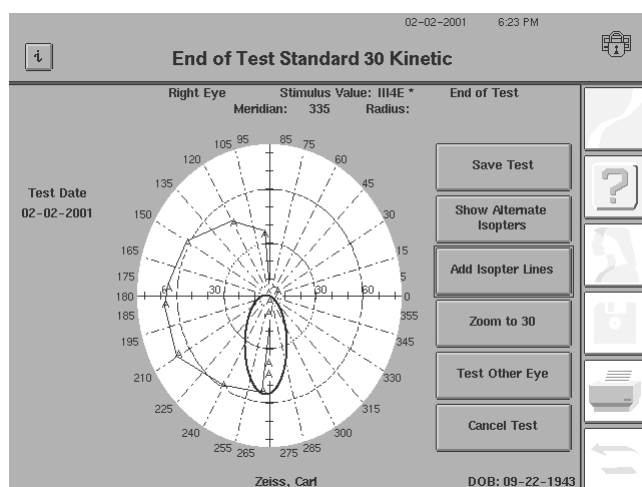
6 When you have located that position, press **SELECT END POINT**. The stimulus will begin moving when you activate **SELECT END POINT**.

During the test a small diamond moves across the video display. It displays the progress of the stimulus in the test bowl.

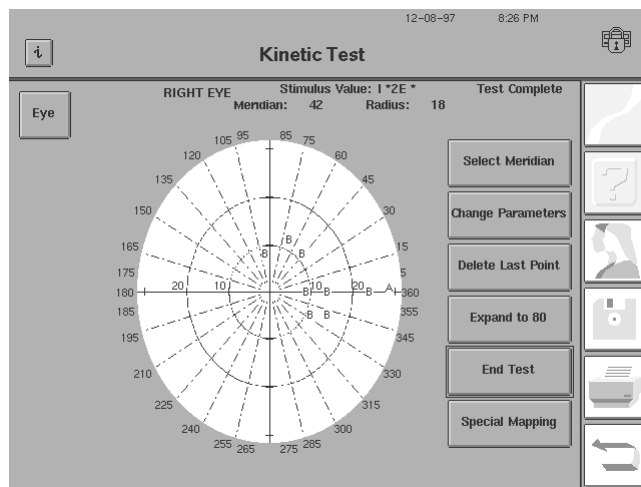


7 To perform another Custom Scan, repeat the previous steps. Continue until you have determined all desired points for each particular isopter.

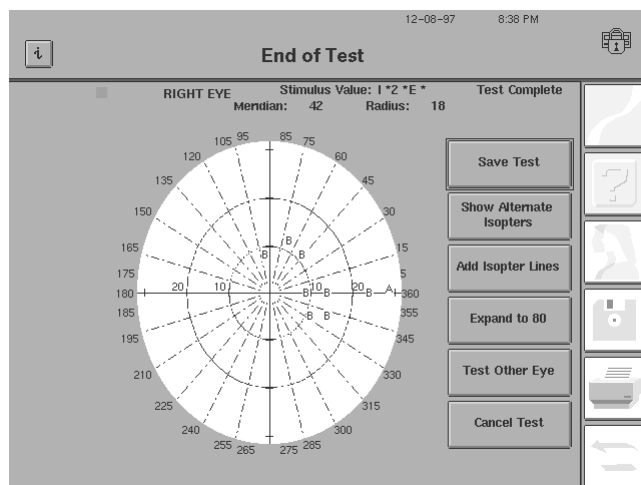
After you have mapped all desired points, press **END CUSTOM SCAN** to return to the Kinetic Test screen.



8 If all of the desired stimuli from the different isopters have been tested, press **END TEST** from the Kinetic Test screen. In the illustration, you can see an example of a Custom Scan that has added definition to the inferior border of a hemianopsia.

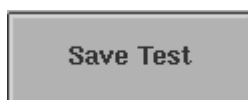
End of Test

1 If you have tested all of the desired stimuli from the different isopters, press END TEST from the Kinetic Test screen.



2 After confirming that no more testing will take place, the End of Test screen will appear.

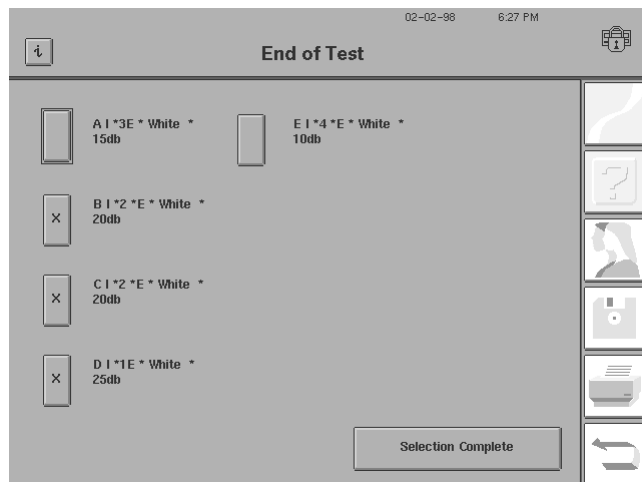
Select from the following options:

**SAVE TEST**

Pressing this button will save the current Kinetic test to the hard disk and a USB external media device (if connected and the Save to USB function is on). You may view or print this information in the future.

**SHOW ALTERNATE ISOPTERS**

When you have plotted more than three (3) isopters, the isopter points may be packed together too closely to show all isopter lines clearly. The SHOW ALTERNATE ISOPTERS feature displays a list of all isopters tested on the patient and allows you to choose which isopters to display on the test screen.



The alphabetic characters for the isopters currently being displayed will each have an "X" in the box adjacent to it. To add or remove the isopters that are displayed, choose the box next to each isopter to select or deselect them. You can display a maximum of three (3) isopters at any one time.

Press SELECTION COMPLETE to view only the chosen isopters.

Add Isopter Lines

ADD ISOPTER LINES

Pressing this button draws lines that connect the test points for each isopter chosen with SHOW ALTERNATE ISOPTERS. The more points the instrument has to work with, the more accurately this function will represent a patient's isopter.



Note: Any locations mapped with Scotoma Mapping, Blind Spot Map, and Custom Scan are not connected with this feature.

Expand to 80

ZOOM TO 30/EXPAND TO 80

This button toggles between the 30° and 80° field formats. This feature especially is useful when you want to see the central 30° of an 80° field in detail. Pressing this button does not eliminate the points outside of the central 30°. These peripheral points may be viewed again by pressing EXPAND TO 80.

Test Other Eye

TEST OTHER EYE

Pressing this button allows you to begin testing on the patient's other eye. Only press this after the first eye has finished being tested.

Cancel Test

CANCEL TEST

This button deletes all data on the current test and takes you back to the Start of Test screen. A dialog box warns you that the test will be canceled. Pressing YES will cancel the test. Pressing NO will return you to the End of Test screen without affecting the test data. Even if a test is deleted using CANCEL TEST, patient data will be unchanged.



Print

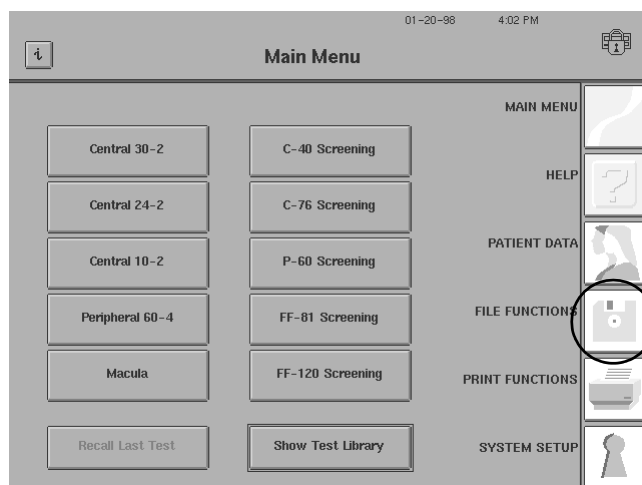
You can print using the *PRINT FUNCTIONS* icon on the right-hand side of the screen. After pressing this icon, the Kinetic Printout Selection screen displays. Refer to step 5 in ["Printing Sequence," on page 13-46](#). Also see ["Printing Kinetic Tests," on page 13-43](#) for further information.

- 3 After all of the adjustments are made and you have saved the data, press the *MAIN MENU* icon to exit Kinetic Testing.

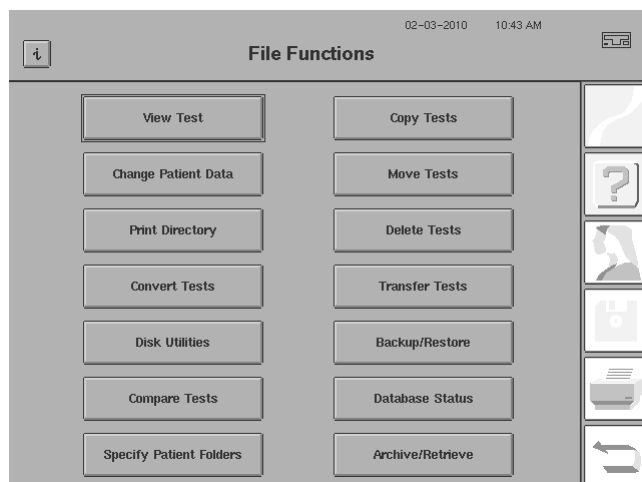
Viewing Kinetic Tests

Just as with static tests, you can view previously saved Kinetic tests by using the VIEW TEST button on the File Functions screen, or from the RECALL LAST TEST button on the Main Menu screen. RECALL LAST TEST will automatically take you to the View Test screen for the Kinetic test (if the Kinetic test was the last test performed on the instrument). To view a Kinetic test other than the last test performed, follow the instructions below:

- 1 From the Main Menu screen, select the *FILE FUNCTIONS* icon.



- 2 Choose VIEW TEST.



04-05-2005 9:13 PM

View Test

Disk Options

Source:
Hard Drive

Directory Order:
Name

Current Range: All Files

Set Current Range

Cancel

Proceed

3 Designate the desired Source and Directory Order.

Select PROCEED.

12-22-97 11:33 AM

View Test

Enter Name To Find

Zeiss

Cancel

Clear

1 2 3 4 5 6 7 8 9 0

Q W E R T Y U I O P

A S D F G H J K L -

Z X C V B N M , . /

Backspace Caps Space : Enter

4 Input the patient name. Press ENTER.

01-29-98 2:29 PM

View Test

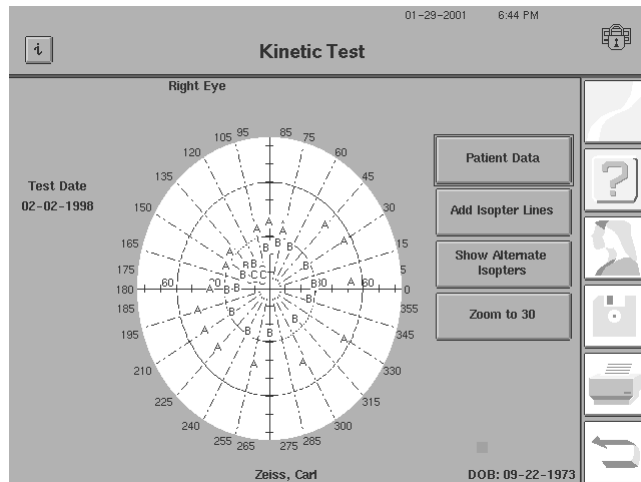
Name	DOB	Eye	Test	Date
Zeiss, Carl	09-22-73	L	Kinetic	12-22-97
Zeiss, Carl	09-22-73	R	Kinetic	12-22-97
Zeiss, Carl	09-22-73	R	Kinetic	12-22-97
Zeiss, Carl	09-22-73	R	Kinetic	12-08-97
Zellerbach, H.	04-06-67	R	Kinetic	01-08-98
Zellerbach, H.	04-06-67	R	Kinetic	01-08-98
Zellman, Jerry	03-12-48	R	SF-24-2	01-08-98

Source: Hard Drive Order: Name Range: All Files

Disk Options Patient Search Select All Proceed

5 Select the Kinetic test you want to view. The selected test will be highlighted. Kinetic tests are designated "Kinetic" in the Directory.

Press PROCEED.



6 The Kinetic Test screen for the selected test will appear.

7 Select from the following options:

Patient Data

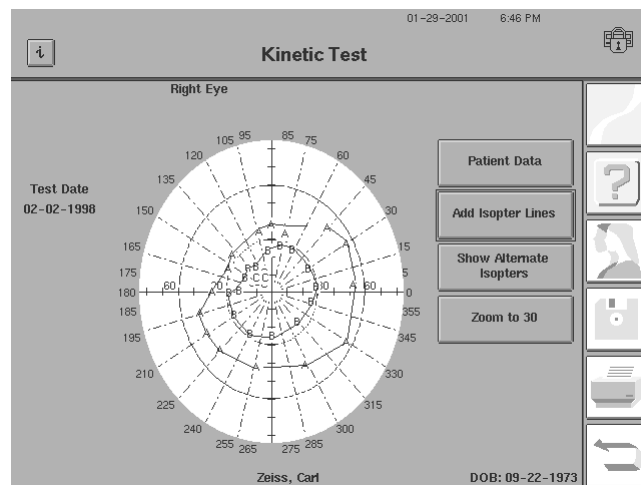
PATIENT DATA

This option allows you to view or change any patient data pertaining to the kinetic visual field. Should the test date be wrong, you also can change it on this screen. The *PATIENT DATA* icon is not functional when using View Test.

Add Isopter Lines

ADD ISOPTER LINES

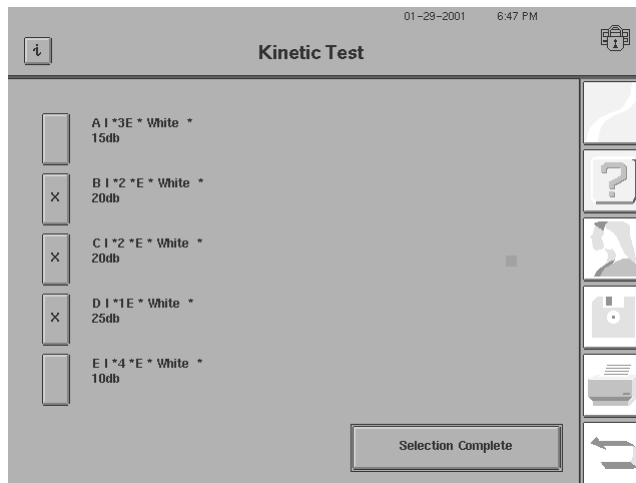
This option allows you to connect the same isopter results (the same uppercase letters) by lines.



Show Alternate Isopters

SHOW ALTERNATE ISOPTERS

This option allows you to choose which isopter(s) to display on the screen.



Note: You can view only three (3) different isopters at one time.

Zoom to 30

ZOOM TO 30 / EXPAND TO 80

This option allows you to zoom in or out of the screen. Zooming in may allow you to see more clearly the uppercase letters that are located close to each other. Zooming out may allow you to see the uppercase letters that are outside of the 30° field.

Printing Kinetic Tests

You can print Kinetic tests in either the Kinetic Central (central 30 degrees) or Kinetic Full Field (full 80 degrees) formats. A Numerical Values format also is available. All isopters are printed.

Full Field Printout

The Kinetic Full Field printout shows all isopters and scotomas mapped out to the peripheral 80 degrees. Some points may be hidden if they are too close together, as is likely in the central 30 degrees of the full field. Printing the 30 degree view will display the hidden points.

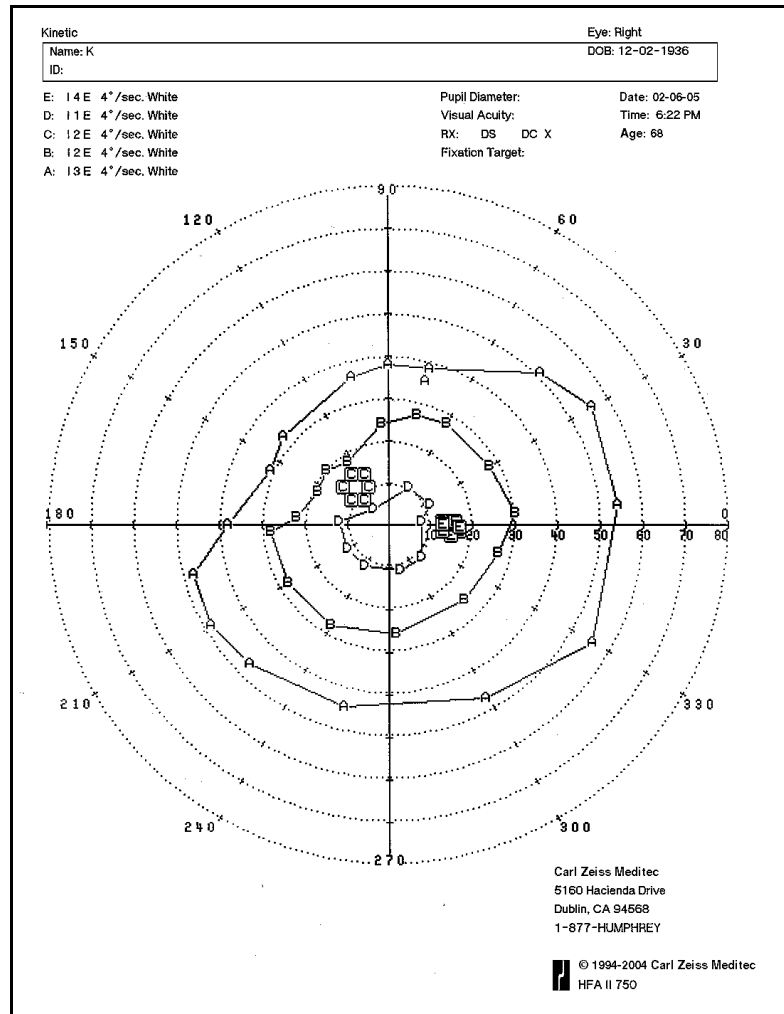


Figure 13.3 A Sample Kinetic Full Field Printout

Central Printout

The Kinetic Central printout documents the central 30 degrees of the visual field. [Figure 13.4](#) shows the central 30 degrees of the Full Field printout that was shown in [Figure 13.3](#).

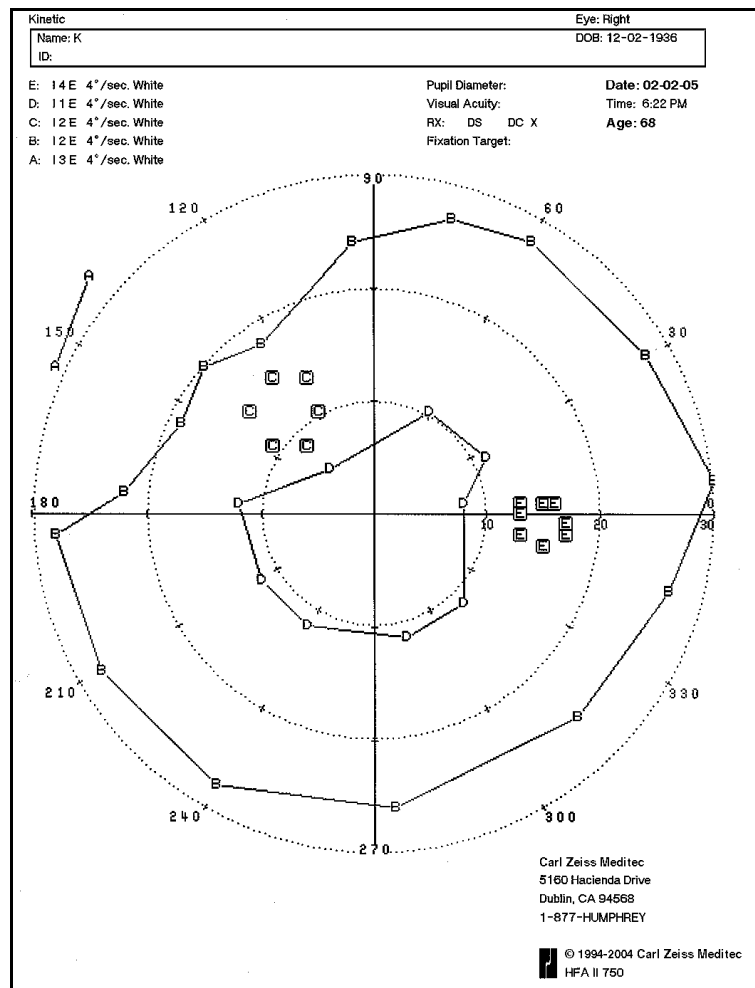


Figure 13.4 Sample Kinetic Central Field Printout

Numerical Values Printout

The Numerical Values printout shows the locations of the starting and ending points of all stimuli presented during the kinetic test. The table also lists all Static Points and whether each point was Seen or Not Seen. Each point is identified by the letter used on the visual field printout as well as the stimulus value.

Kinetic					Eye: Right		
Name: K					DOB: 12-02-1996		
ID:							
E: 14 E 4"/sec. White					Pupil Diameter:		Date: 02-02-2006
D: 11 E 4"/sec. White					Visual Acuity:		Time: 6:22 PM
C: 12 E 4"/sec. White					RX: DS DC X		Age: 68
B: 12 E 4"/sec. White					Fixation Target:		
A: 13 E 4"/sec. White							
ISOPTER IDENT	MERIDIAN START	DEGREES START	MERIDIAN STOP	DEGREES STOP	STIMULUS VALUE	STIMULUS RESPONSE	TEST TYPE
A	180	75	180	38	13 E	SEEN	STANDARD
A	155	70	155	31	13 E	SEEN	RE-TEST
A	140	60	140	33	13 E	SEEN	STANDARD
A	105	43	104	36	13 E	SEEN	STANDARD
A	90	42	90	38	13 E	SEEN	STANDARD
A	75	43	75	35	13 E	SEEN	RE-TEST
A	45	59	45	51	13 E	SEEN	STANDARD
A	30	66	30	56	13 E	SEEN	STANDARD
A	5	75	5	54	13 E	SEEN	STANDARD
A	75	43	75	38	13 E	SEEN	STANDARD
A	330	75	330	56	13 E	SEEN	STANDARD
A	300	62	299	47	13 E	SEEN	STANDARD
A	255	62	256	44	13 E	SEEN	STANDARD
A	225	69	225	47	13 E	SEEN	STANDARD
A	210	75	210	48	13 E	SEEN	STANDARD
A	195	74	195	48	13 E	SEEN	STANDARD
B	154	30	155	19	12 E	SEEN	STANDARD
B	140	30	139	20	12 E	SEEN	STANDARD
B	124	30	124	18	12 E	SEEN	STANDARD
B	96	30	95	24	12 E	SEEN	STANDARD
B	75	30	75	27	12 E	SEEN	STANDARD
B	60	30	60	28	12 E	SEEN	STANDARD
B	30	30	30	28	12 E	SEEN	STANDARD
B	6	30	6	30	12 E	SEEN	STANDARD
B	345	30	345	27	12 E	SEEN	STANDARD
B	315	30	315	25	12 E	SEEN	STANDARD
B	276	30	274	26	12 E	SEEN	STANDARD
B	240	30	240	28	12 E	SEEN	STANDARD
B	210	30	210	28	12 E	SEEN	STANDARD
B	186	30	184	28	12 E	SEEN	STANDARD
B	174	30	175	22	12 E	SEEN	STANDARD
C	132	12	119	10	12 E	SEEN	S-MAP
C	132	12	141	14	12 E	SEEN	S-MAP
C	132	12	117	13	12 E	SEEN	S-MAP

Carl Zeiss Meditec
5160 Hacienda Drive
Dublin, CA 94568
1-877-HUMPHREY

Figure 13.5 A Sample Numerical Values Printout

Printout Legend

Isopter points are shown as uppercase letters. They are connected to form the isopter lines. However, points that define the borders of a scotoma map, a blind spot, or a custom scan, are not connected to each other.



Note: You may wish to connect scotoma map points with colored pencils and shade them. This is often done in manual Goldmann perimetry to facilitate clinical interpretation of test results.

The following is the list of print styles for each type of test point:

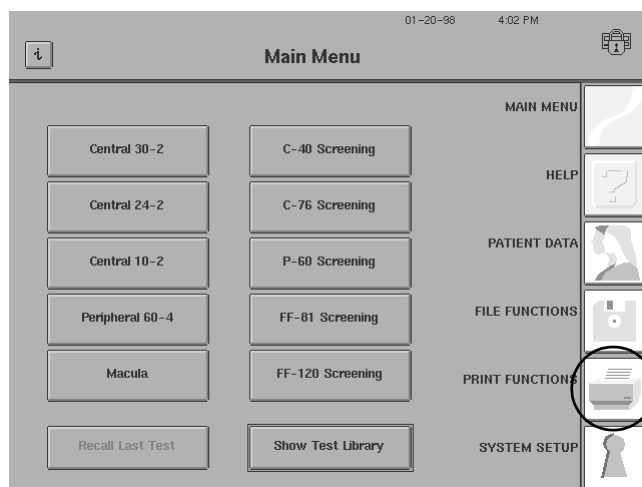
<u>Type</u>	<u>Style</u>	<u>Example</u>
Isopter	Uppercase	A
Scotoma	Outlined	Ⓑ
Blind Spot	Outlined	Ⓒ
Custom Scan	Inverse	Ⓓ

Occasionally an isopter point will appear on the printout but it will not be connected to other isopter points. This situation occurs when you have retested a meridian. Only the most recent point on a meridian will be used for the isopter map.

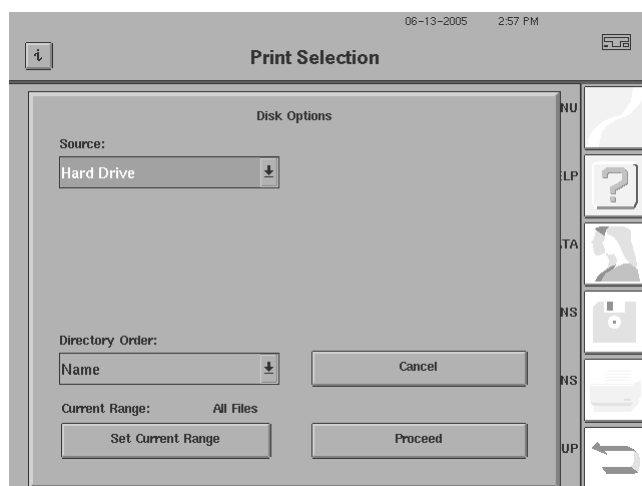
Printing Sequence

To print a Kinetic test, follow the instructions below:

1 Press the *PRINT FUNCTIONS* icon from any screen.



2 Designate the desired Source and Directory Order. Select PROCEED.



View Test

12-22-97 11:33 AM

Enter Name To Find

Zeiss

Cancel

Clear

1 2 3 4 5 6 7 8 9 0

Q W E R T Y U I O P

A S D F G H J K L -

Z X C V B N M , . /

Backspace Caps Space : Enter

3 Type in the patient name. Press ENTER.

Print Selection

12-08-97 9:11 PM

Name	DOB	Eye	Test	Date
√Zeiss, Carl	09-22-73	R	Kinetic	12-08-97

Source: Floppy Order: Name Range: All Files

Disk Options Patient Search Select All Proceed

4 Select the Kinetic test you want to view. Kinetic tests are designated "Kinetic" in the Directory. Press PROCEED.

Kinetic Printout Selection

01-29-2001 6:48 PM

Choose Printout Styles For:
Zeiss, Carl

RIGHT EYE LEFT EYE

☒ Central

☒ Full Field

☐ Numerical Values

Note: More than one print type may be selected.

Print All Selected Items

5 Choose the printout style(s). Press PRINT ALL SELECTED ITEMS. Printing will begin.



Note: When printing at the end of a test, only the current eye that is being tested will be available for printing. In Kinetic mode, both eyes cannot be printed at the end of testing the second eye.

Designing a Custom Kinetic Test Pattern

You also can create and store Custom Kinetic test patterns. This is similar to the custom static Screening and Threshold tests that are described in [Chapter \(12\), "Custom Testing."](#) Custom Kinetic tests always are created for the right eye only. When you test the left eye, the HFA II-*i* will flip the test pattern to accommodate for the mirrored physiological differences.



Note: You may begin testing with either the right or left eye.

You must create Custom Kinetic tests. Once created, you may save them and then access them for future testing. You access them by selecting the SHOW TEST LIBRARY button from the Main Menu screen, then choosing the KINETIC button. There is room for ten (10) Kinetic tests to be stored on the Kinetic Tests menu at any time. Some Kinetic tests may need to be deleted if the menu is full.

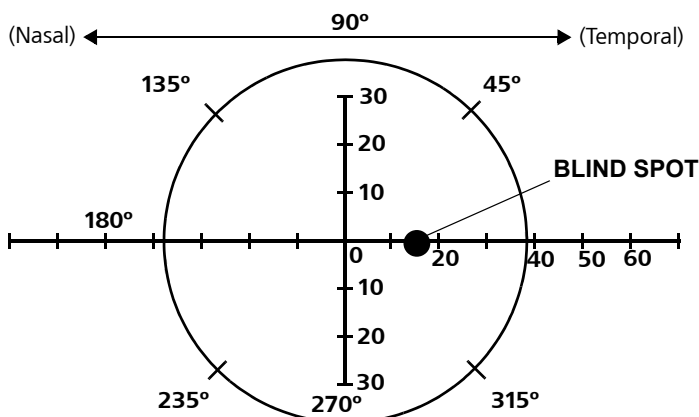


Figure 13.6 The Nasal / Temporal Relationship for the Right Eye

Remember, the Custom test pattern you are designing must be for the right eye. Therefore, temporal points will be plotted to the right (meridians 0 to 89 and 271 to 359) and nasal test points will be to the left (meridians 91 to 269). Testing for the left eye will automatically be reversed.

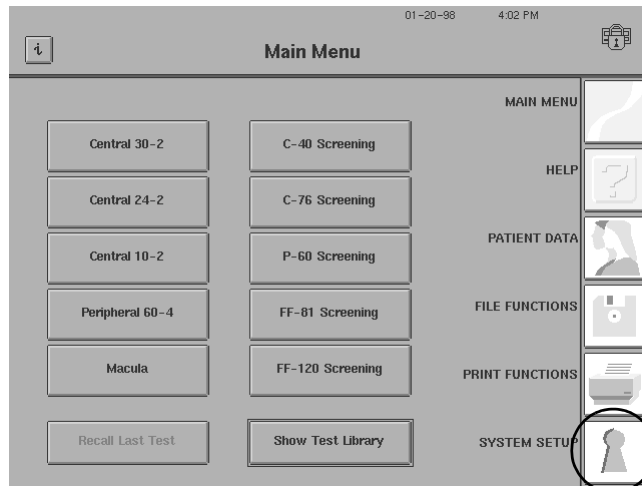
Example: Programming a point to be presented along the 45 degree meridian (in the temporal visual field) for the right eye will be presented along the 135 degree meridian (temporal visual field) for the left eye.

Order of Stimulus Presentation

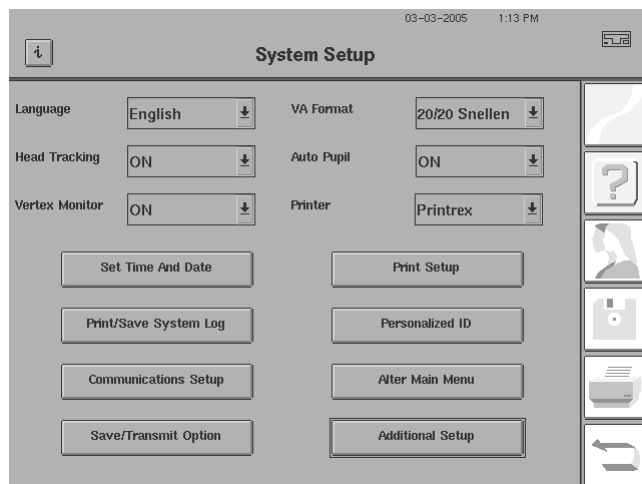
You have two choices for the display of the test points. One way is to have the HFA II-*i* randomize the stimuli for testing. You can enter the points in any order you choose as you create your Custom Kinetic test. You probably will wish to enter the meridians to be tested in a logical sequence (Example: 20 degrees, 40 degrees, 60 degrees...).

The second way is to enter the points in the exact order you wish to have them presented. If you wish to test the superior temporal quadrant first, be sure to select the meridians between 0 degrees and 90 degrees, at the start of your new custom test. If you wish to test at 20 degrees, then at 40 degrees and then at 60 degrees for the right eye (180, 160, 140 degrees for the left eye), make sure you enter the 20, 40 and 60 degree meridians in that order. Remember: the order you list the meridians will be the exact order of presentation every time the test is run.

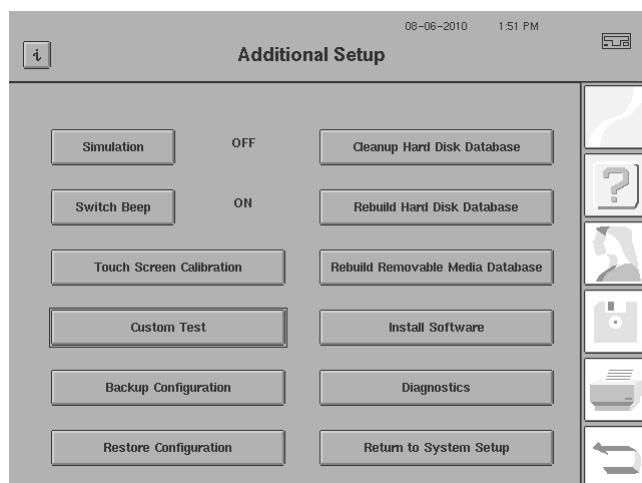
1 Start at the Main Menu. Press the *SYSTEM SETUP* icon.

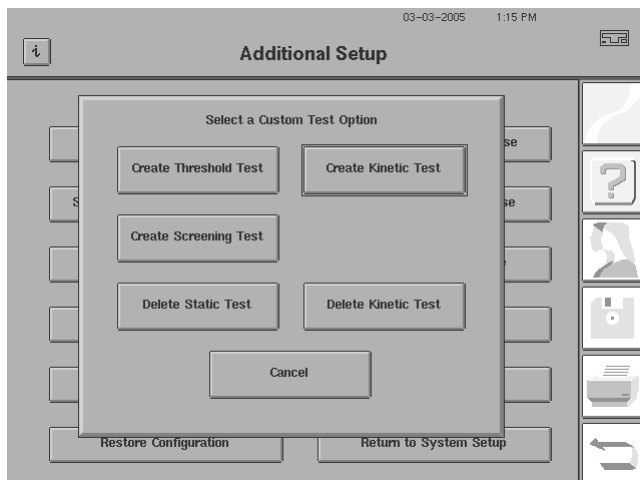


2 Press the ADDITIONAL SETUP button.

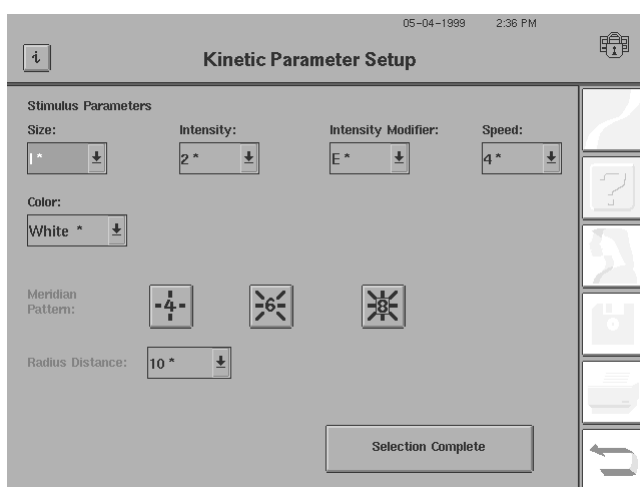


3 Press the CUSTOM TEST button.

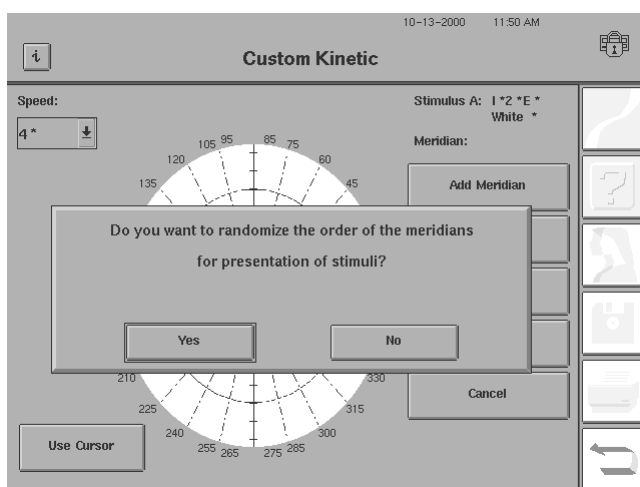




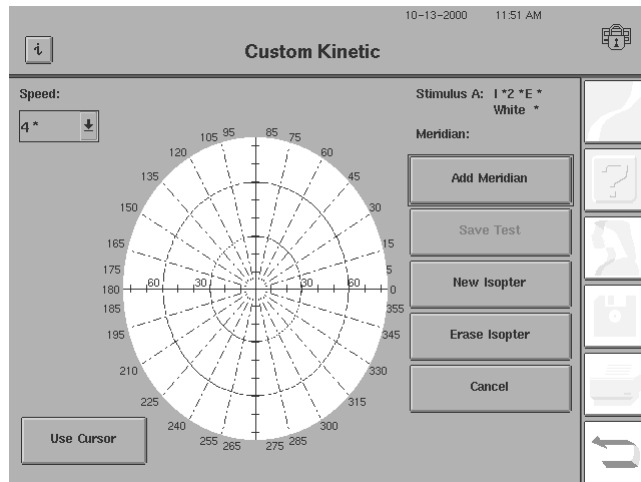
4 When the screen at left appears, press CREATE KINETIC TEST.



5 The KINETIC PARAMETER SETUP screen appears. Choose the stimulus parameters for the first isopter to be tested. Press SELECTION COMPLETE.

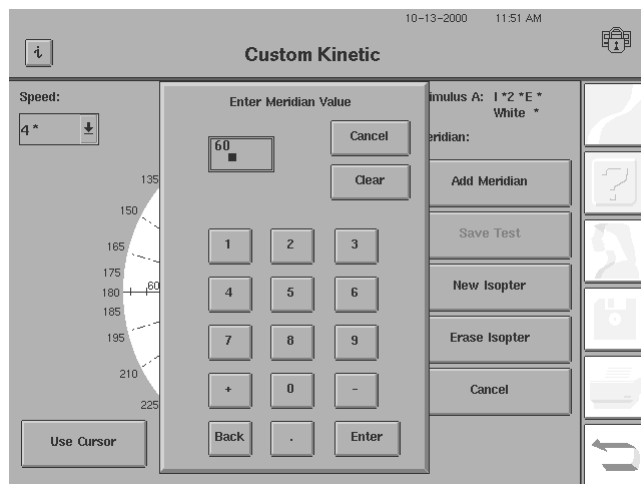


6 You have the option of entering each test point in the order you wish to test the points, or to have the HFA II-/randomize the point presentation for each isopter. Choose YES if you wish to have the points randomized.



7 To enter the first meridian, press ADD MERIDIAN.

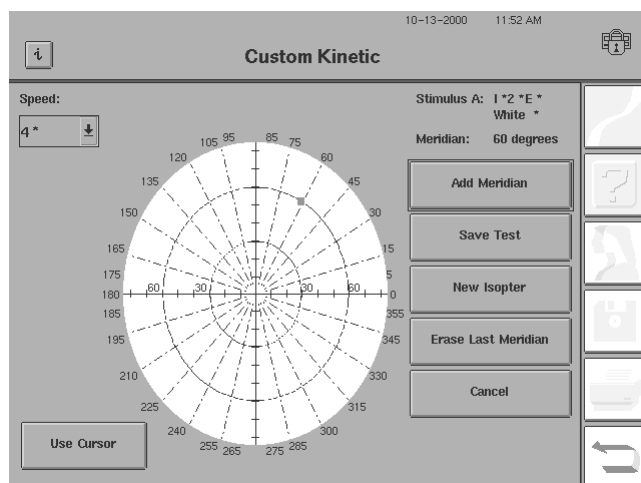
This is the initial screen for creating the Custom Kinetic test. The stimulus information is displayed in the upper right-hand corner. If desired, you can alter the stimulus speed for each meridian to be tested by using the Speed pull-down menu located in the upper-left corner.



8 The Keypad will appear on the screen. Enter the meridian desired (eligible range is 0 - 359 degrees).

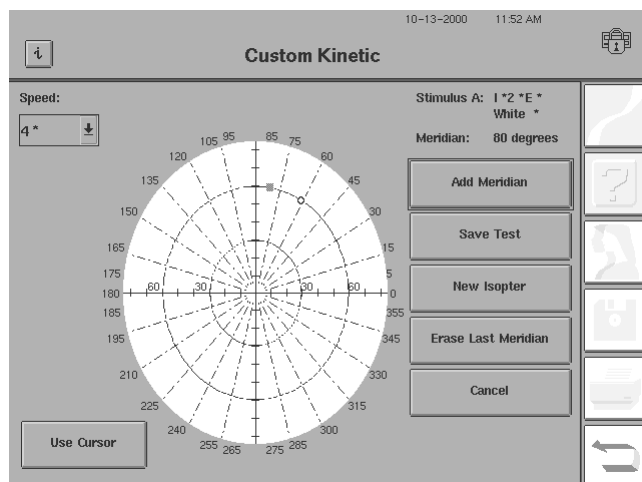


Note: You may find it more convenient to use the Cursor method (as described earlier in this chapter) when choosing the points.

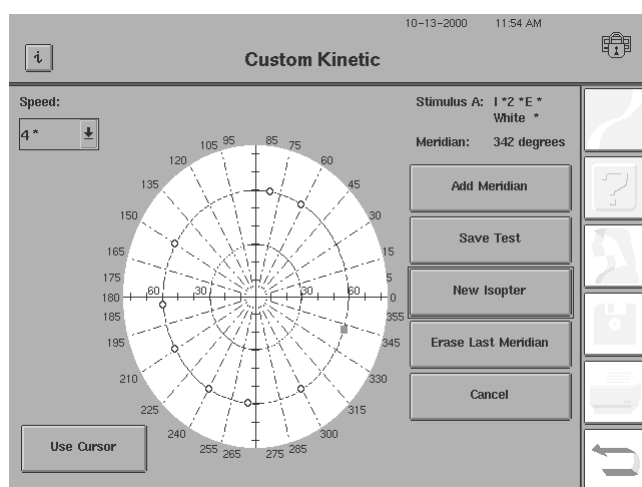


9 A small gray square will be placed on the meridian entered. In this example, the square can be seen on the 60 degree meridian. The meridian is displayed at the right.

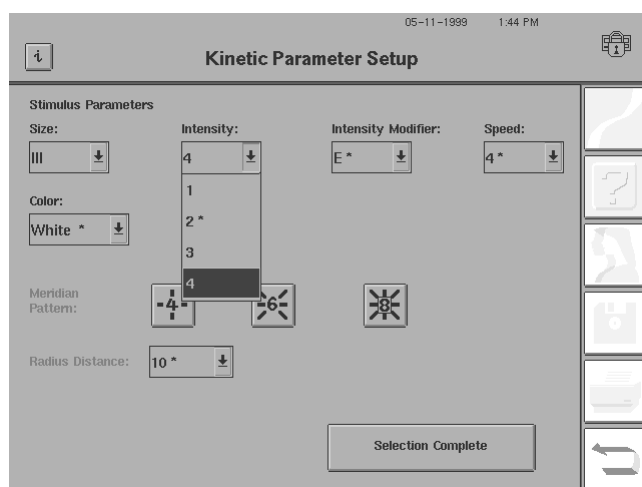
Continue to add the meridians to be tested by repeating the preceding steps.



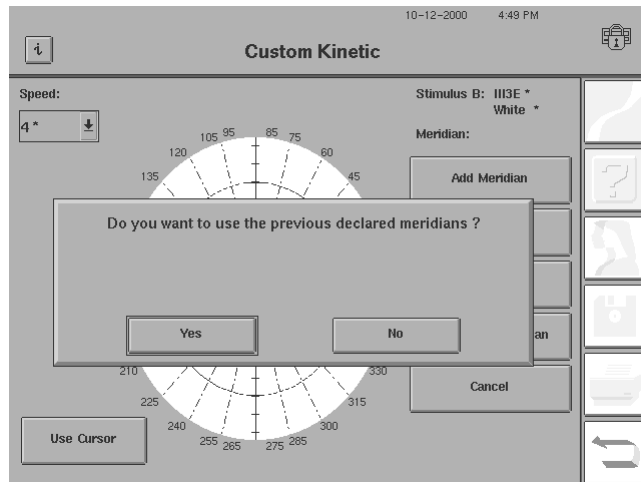
10 Here is an example of the second meridian added to the program. The 80 degree meridian shows a gray box on the field. The previous meridian (at 60 degrees) has changed to a circle. This is to make it easier to identify the most recent meridian that you have programmed.



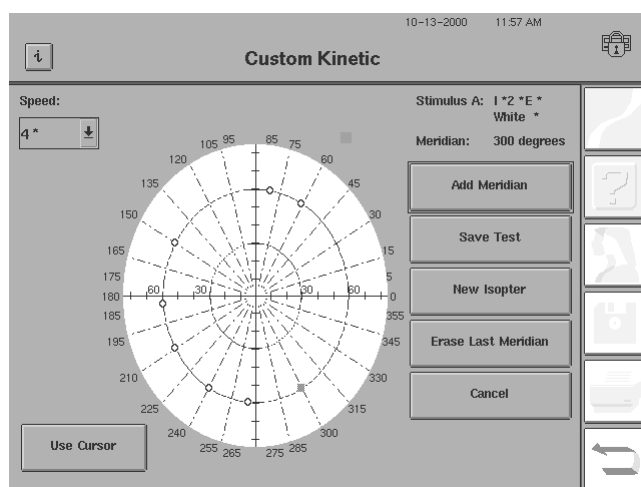
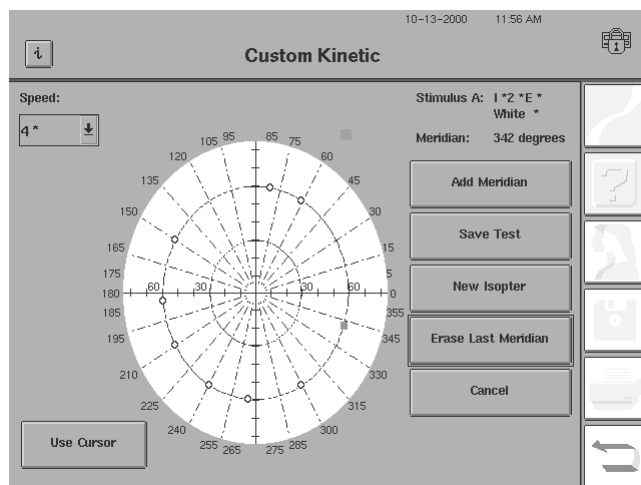
11 When you have added all the meridians for the first isopter, press the NEW ISOPTER button.



12 The Kinetic Parameter Setup screen will appear. Change the stimulus parameters and the test speed to the desired settings for the second isopter to be tested. Press SELECTION COMPLETE.



Erasing a Meridian



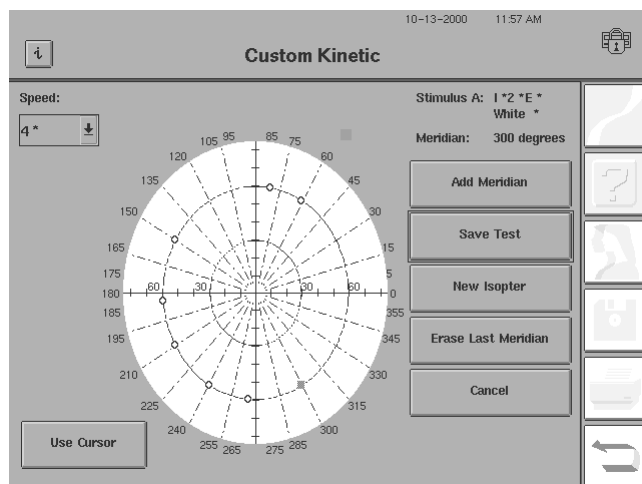
13 You will be given the option to use the same points you chose for the first isopter to be applied to this second isopter.

Add the meridians to be tested, as previously described for the second isopter. Repeat the sequence for as many isopters (up to 10) as desired.

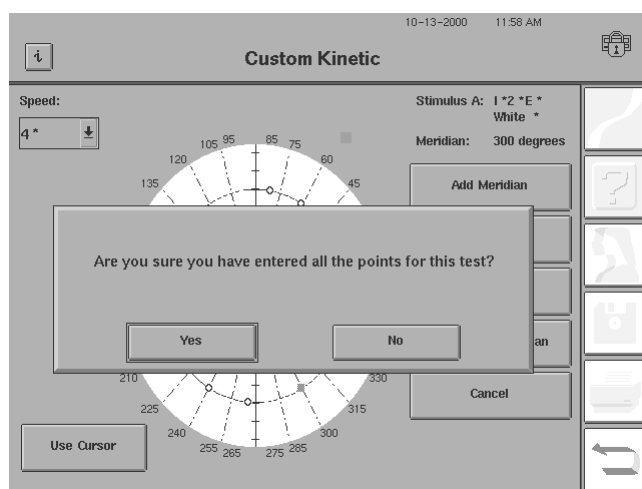
1 You can remove a meridian by pressing the ERASE LAST MERIDIAN button.

2 The gray box moves back one meridian and the indicator at the top changes to the previous meridian. You can press the ERASE LAST MERIDIAN button repeatedly to erase previously programmed meridians. It will change to ERASE ISOPTER when all meridians have been deleted from the current isopter.

Saving the Custom Test

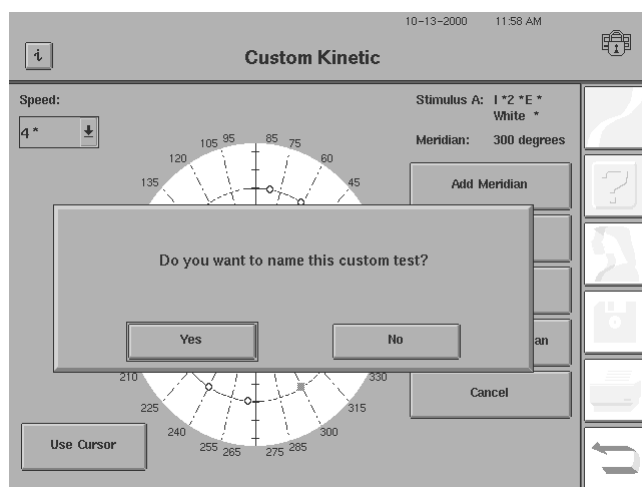


1 When you have created all of your desired isopters, you must save the Custom Kinetic test. Press the SAVE TEST button.



2 You will see this pop-up window verifying that you have entered all the isopters and points for this Custom Kinetic test. If you desire to add more isopters or meridians to be tested, press NO. If you are ready to save your Custom Kinetic test, press YES.

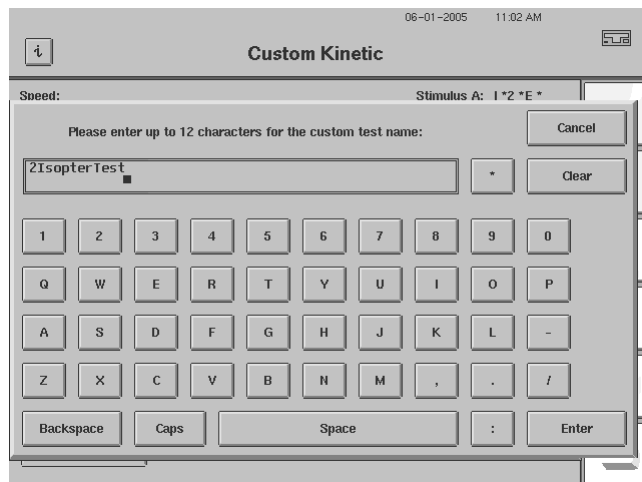
Naming the Test Button



1 You will have the opportunity to name the Custom Test you just created. Press YES.



Note: If you press NO, the name of your test will automatically be entered as "Custom Kinetic". Should you use the same approach for naming a second Custom Kinetic test, it also will be named "Custom Kinetic." To avoid the confusion that might be caused by two different tests having the same name, we recommend that you give each Custom Kinetic test its own unique name.



2 The Keyboard will appear. You will be able to type up to 12 characters, including spaces, to give a unique name to your Custom Kinetic test. The word "Kinetic" will automatically be added at the end of your text. That way, you do not need to use the word Kinetic as part of your 12 character description.

Press ENTER when the name of your test is complete.

Deleting Existing Kinetic Tests

You may find that you wish to add more Custom Kinetic tests than the Kinetic test menu has room for. Or, you may wish to delete existing tests you do not plan to use. You can delete any of the buttons on the Kinetic Test menu, using the following process:

- 1 From the Main Menu screen, press the *SYSTEM SETUP* icon. Next press *ADDITIONAL SETUP*. Press *CUSTOM TEST*.
- 2 Press *DELETE KINETIC TEST*.
- 3 Choose the test you wish to delete by pressing the appropriate button. Confirm that this is your intention.



Note: The "BG/FS Kinetic" test was created specifically for use in Germany. The test is identical to the "Standard 30" kinetic test. A user in another country may wish to delete this test.

All three of the pre-defined kinetic test patterns are limited to presenting only one isopter. You may wish to create your own Custom kinetic test using the same meridians as any of these tests, with the added flexibility of being able to plot multiple isopters, as desired. You then could delete the original, single-isopter sequence from the menu.

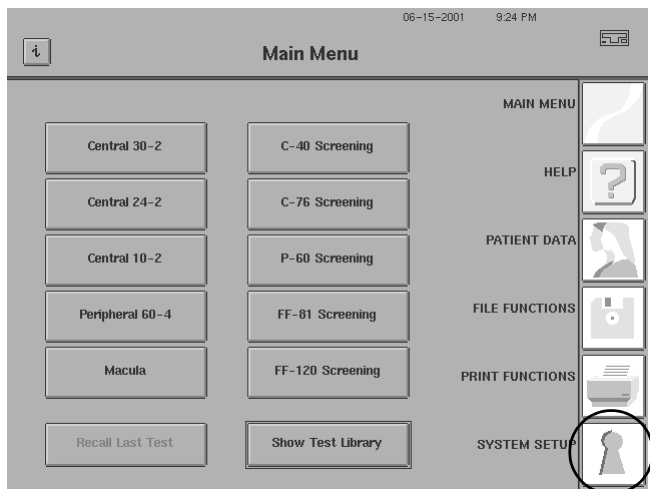
Be careful not to delete the top button on the menu: the *MANUAL KINETIC TEST*. Should you accidentally delete this button, reloading the software will restore the manual kinetic ability to your HFA II-*i*.

Remember, if you plan to use certain tests from the Kinetic menu often, we recommend that you create a new button on the Main Menu. Further explanation is provided in ["Altering the Main Menu Screen,"](#) on page 2-26.

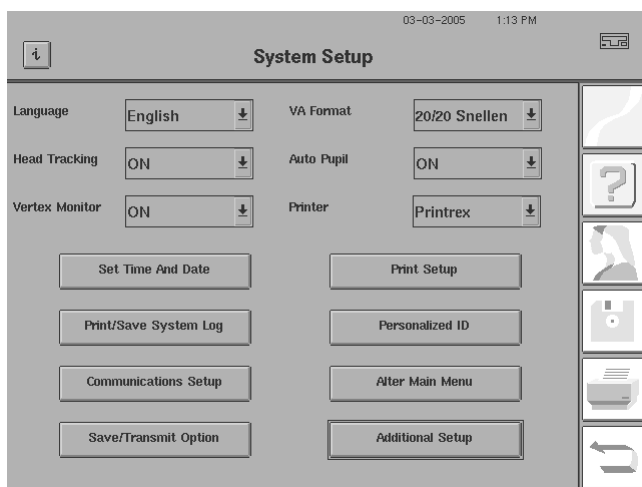
Creating the Aphakic SSA Disability Test

This Social Security Administration disability test variant uses a Size IV stimulus. Use these steps to create the test:

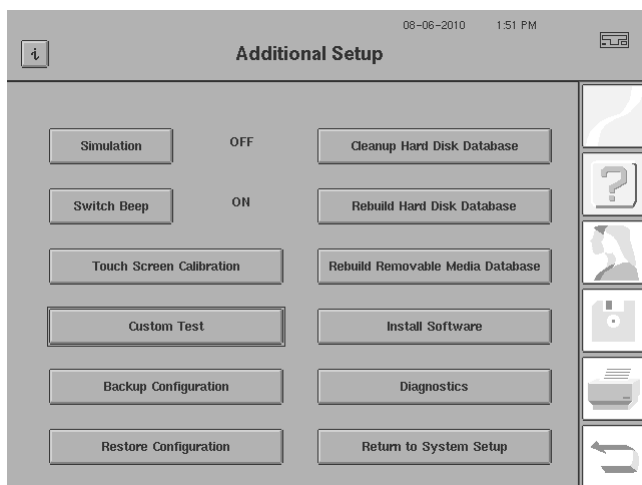
1 Start at the Main Menu. Press the *SYSTEM SETUP* icon.

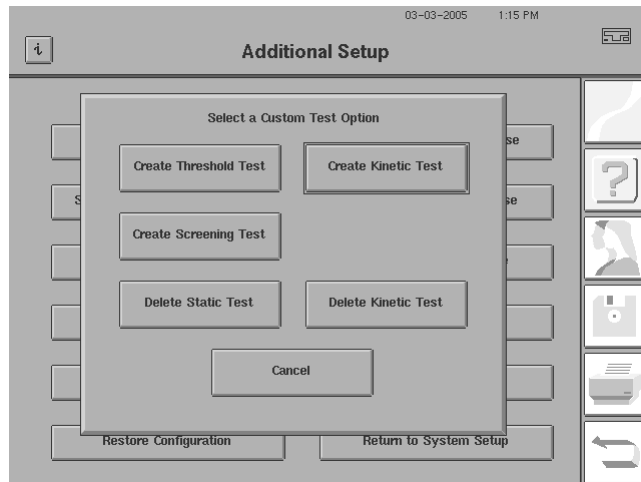


2 Press the ADDITIONAL SETUP button.

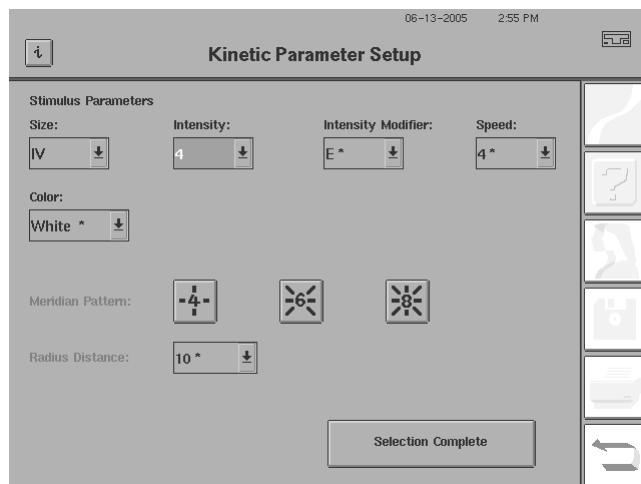


3 Press the CUSTOM TEST button.





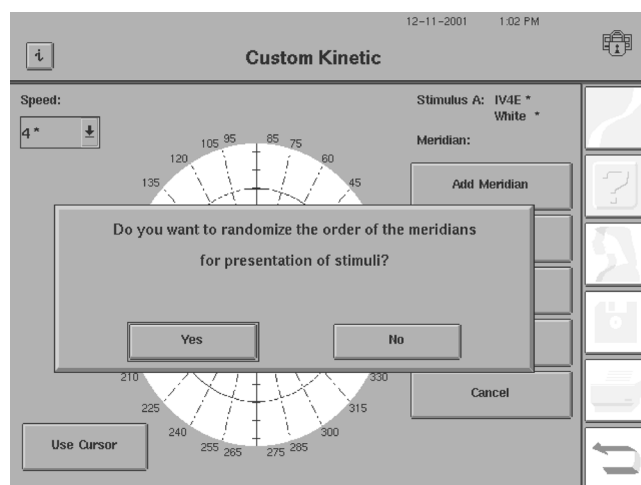
4 When the screen illustrated to the left appears, press **CREATE KINETIC TEST**.



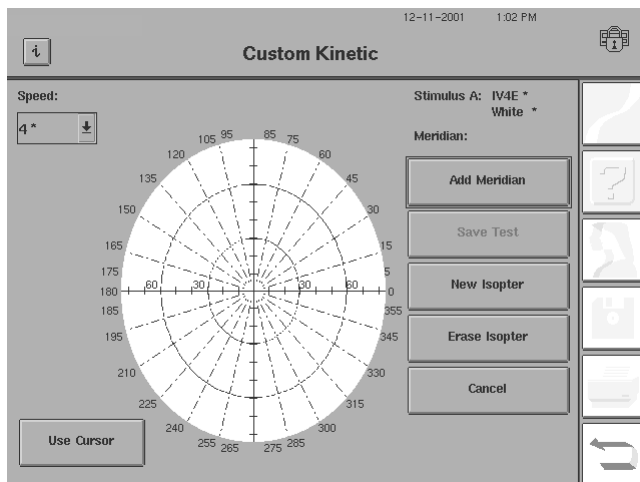
5 The **KINETIC PARAMETER SETUP** screen appears. Set the following stimulus parameters for the isopter to be tested:

Size: IV
Intensity: 4
Intensity Modifier: E
Speed: 4

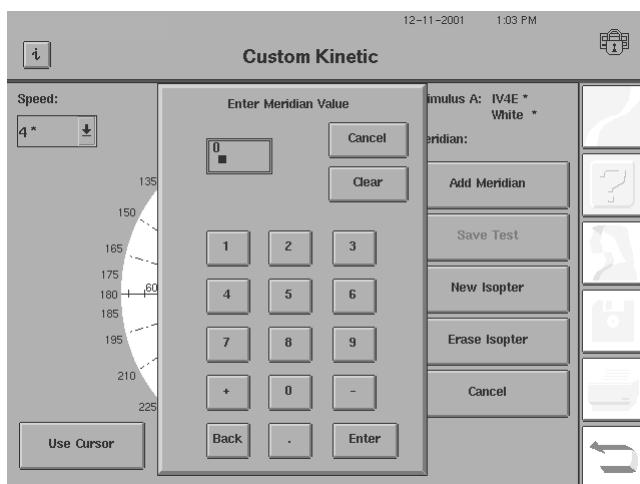
Press **SELECTION COMPLETE**.



6 For the SSA test, the HFA II-/i must randomize the point presentation for the isopter. Choose **YES**.



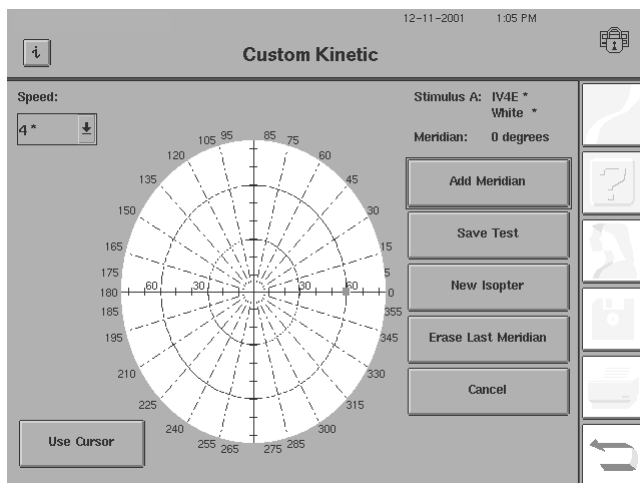
7 To enter the first meridian, press ADD MERIDIAN.



8 The Keypad will appear on the screen. Type the meridian desired. Press ENTER.

The meridians that you must enter are:

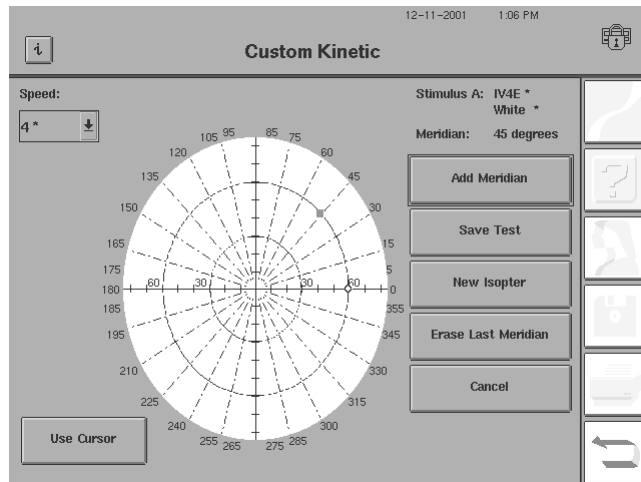
0,
45,
90,
135,
180,
225,
270,
315



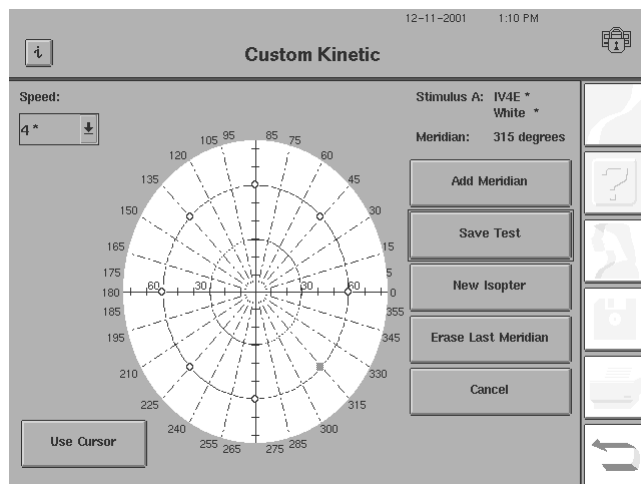
9 A small gray square will be placed on the meridian entered. In this example, the square can be seen on the 0 degree meridian. The meridian is displayed at the right.

Continue to add the meridians to be tested by repeating the previous steps.

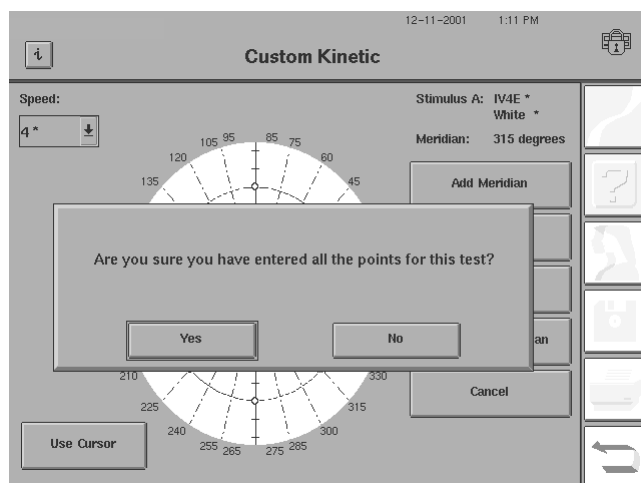
If you make a mistake, please refer to [“Erasing a Meridian,”](#) on page 13-53.



10 Here is an example of the second meridian added to the program. The 45 degree meridian shows a gray box on the field. The previous meridian (at 0 degrees) has changed to a circle. This is to make it easier to identify the most recent meridian programmed.



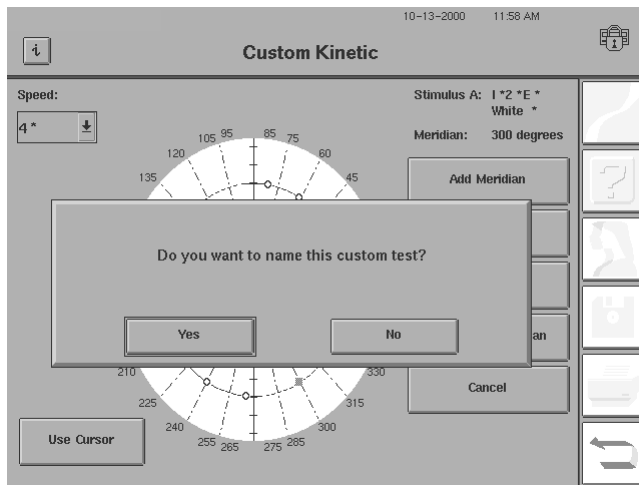
11 When you have added all the meridians for the isopter, press the SAVE TEST button.



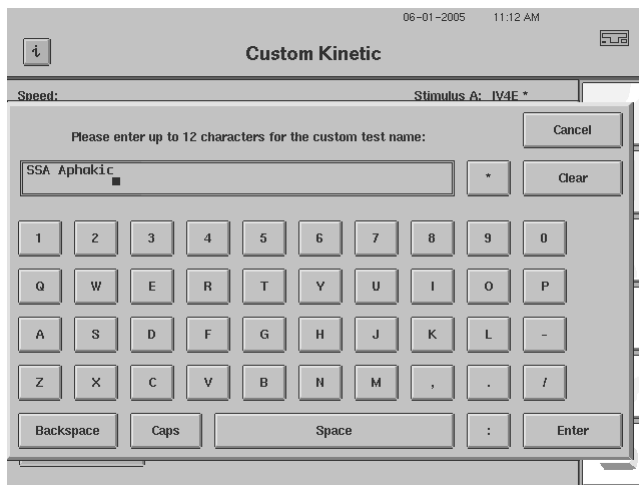
12 You will see this pop-up window verifying that you have entered all the isopters and points for this Custom Kinetic test. If you have entered the 8 meridians correctly, press YES.

Naming the Test Button

1 You will have the opportunity to name the Custom Test you just created. Press YES.

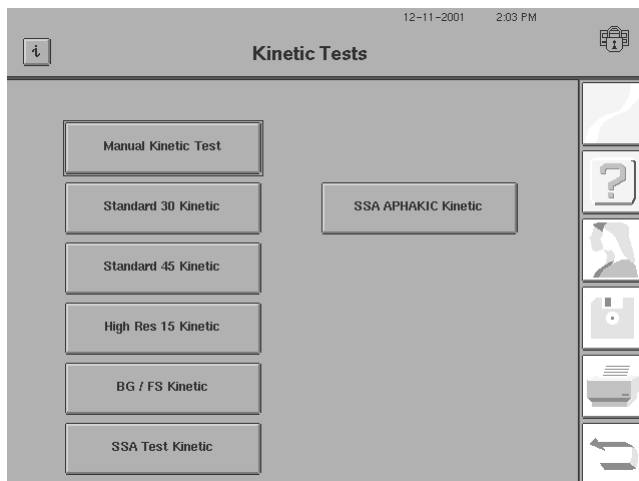


2 The Keyboard will appear. Type "SSA Aphakic." Press ENTER when the name of your test is complete.



The SSA Aphakic Disability Test will be placed on the Kinetic Testing menu. You can access this test by using the traditional method for running a kinetic test. From the Main Menu, press SHOW TEST LIBRARY and then press KINETIC.

Below is an example of the Kinetic Tests screen with the button for the SSA Aphakic Kinetic test.



Final Verification

Run the new SSA Aphakic Kinetic test. Print the Numerical Values printout. Verify the meridians (0, 45, 90, 135, 180, 225, 270, 315), the stimulus (IV4E) and the test speed (4 degrees/sec.) are as shown in this example. The order of the meridians presented is not significant. If the meridians listed in your test are not identical to those specified, you must delete the test and create a new one.

SSA APHAKIC Kinetic					Eye: Right		
Name:				ID:			
DOB:							
A: IV 4 E 4°/sec. White					Pupil Diameter:		Date: 01-08-2005
					Visual Acuity:		Time: 12:35 PM
					RX: DS DC X		Age:
					Fixation Target:		

ISOPTER IDENT	MERIDIAN START	DEGREES START	MERIDIAN STOP	DEGREES STOP	STIMULUS VALUE	STIMULUS RESPONSE	TEST TYPE
A	135	59	135	49	IV 4 E	SEEN	STANDARD
A	0	75	0	53	IV 4 E	SEEN	STANDARD
A	270	60	270	45	IV 4 E	SEEN	STANDARD
A	45	59	45	48	IV 4 E	SEEN	STANDARD
A	225	70	225	53	IV 4 E	SEEN	STANDARD
A	315	70	315	59	IV 4 E	SEEN	STANDARD
A	90	42	90	33	IV 4 E	SEEN	STANDARD
A	180	75	180	66	IV 4 E	SEEN	STANDARD

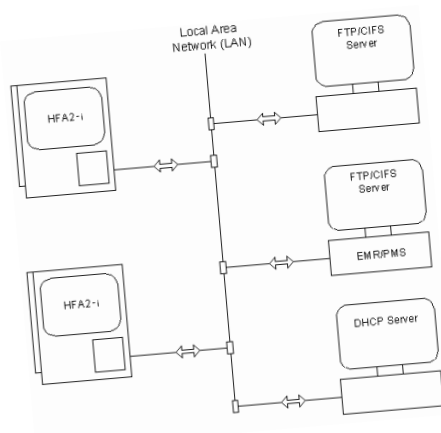
Deleting the Test

If the SSA Aphakic Test is determined to be incorrect, you must delete it. Follow these steps:

- 1 From the Main Menu screen, press the *SYSTEM SETUP* icon.
- 2 Next press *ADDITIONAL SETUP>CUSTOM TEST>DELETE KINETIC TEST*.
- 3 Choose the SSA Aphakic test as the test that you wish to delete, by pressing the appropriate button. Confirm that this is your intention.

(14) Networking

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HFA II-*i* series perimeters offer many useful networking capabilities for patient data, test data, and image files. It is very important that only an Information Technology (IT) professional or Network Administrator sets up your HFA with an office network. Establishing a network can be a complex and costly task, if not undertaken by a professional. For the balance of this chapter, the term “Network Administrator” can refer to either an IT professional, a Network Administrator, or a System Administrator.

Your office network must meet certain minimum requirements in order to support HFA-NET Pro or DICOM Gateway. Your Network Administrator must ensure that your network system meets these requirements. Details on [Licensing HFA-NET Pro and DICOM Gateway 2.0](#) can be found on page 14-3. Review this chapter with your Network Administrator so that your user preferences can be programmed into the network settings. Once your network is set up, these networking capabilities allow an HFA II-*i* perimeter to:

- import work lists from non-DICOM and DICOM EMR/PMS systems
- import patient information and exam data from a DICOM system (DICOM Gateway 2.0 only)
- export patient data, image files, and test results to non-DICOM and DICOM EMR/PMS systems
- export raw exam data and reports to a DICOM system (DICOM Gateway 2.0 only)
- export patient data, test results, and image files (PDF and TIFF format) to a file server

- synchronize databases on two or more HFA II-/perimeters via archiving and retrieval
- back up patient data and test results to a file server for safe external storage
- restore patient data and test results from a network file server to an HFA II-/

Chapter Organization

This chapter on networking contains a brief overview of the capabilities available with DICOM Gateway and HFA-NET Pro software. Following the overviews, each networking feature is described to allow you to use the feature and to make changes to the feature, if possible. However, in order to use these features or make changes, the network must be set up first. This chapter is written primarily for the user and not the Network Administrator. For instructions on setting up your HFA network, have your Network Administrator refer to [Appendix \(I\)](#) of this manual.

DICOM Gateway Features

DICOM Gateway is a purchased and licensed software program that allows you to connect one or more HFA II-/series instruments to a qualified DICOM compatible EMR/PMS system, or DICOM archive, such as Carl Zeiss Meditec's FORUM™ or VISUPAC™ software, or the United States Veterans Administration's (VA) VistA™ system.

DICOM Gateway software includes DICOM work lists, which enables easy scheduling of patient exams on the HFA. Work list scheduling eliminates manual lookup of patient records on the instrument, or entering of patient data which can lead to duplication of patient records.

DICOM Gateway 2.0 has the additional feature of saving and retrieving the complete patient record (which includes patient demographics and exam data) to and from a DICOM archive. HFA reports can also be sent to the EMR/PMS/DICOM system. If you have multiple HFAs, the DICOM archive functions as a central repository of images and patient data, where you can view exam reports which are organized with the patient data, and provides a means of database backup. Routine IT backup procedures at the DICOM server ensures patient data will never be lost in case of instrument failure. Automatic or manual archiving and synchronization of patient records is not needed as there is only one database (the DICOM archive) that all HFAs save to and retrieve from (i.e., patient A's exam taken on HFA A can be accessed by HFA B). In addition to work list functionality, unscheduled query and retrieval of patient information can be performed. Also retrieval of prior exams from a central storage location frees up usage of HFAs by running GPA on any GPA licensed HFA; you don't have to run GPA on the same HFA where you acquired the last exam.

HFA-NET Pro Features

HFA-NET Pro is a software package that runs on your HFA II-*i* series instrument to allow you to connect your HFA II-*i* to an external computer using a high speed Ethernet connection. Once your HFA II-*i* is networked, you will be able to synchronize data between two or more HFA II-*i* units, archive and retrieve data, back up data for safe external storage, and save and transmit image files.

In addition, HFA-NET Pro also allows you to use any non-DICOM EMR/PMS software package that is certified for use with the HFA II-*i*. This allows you to import work lists or export patient data, test results, and image files to the EMR/PMS software.

Licensing HFA-NET Pro and DICOM Gateway 2.0

You must activate the HFA-NET Pro or DICOM Gateway 2.0 software for it to function on your HFA II-*i*. Version 4.2 or later includes a license for HFA-NET Pro.

Please contact Carl Zeiss Meditec for minimum network requirements prior to having your software licensed for HFA-NET Pro or DICOM Gateway 2.0. To activate your license, you must contact Carl Zeiss Meditec: In the U.S.: Call Carl Zeiss Meditec at 1-800-341-6968, or by email at z.customersupport@meditec.zeiss.com. Outside the U.S.: Contact your local Carl Zeiss Meditec distributor.

Once you have obtained your license, you can activate it using the procedure that is provided in [Appendix \(J\)](#) beginning with “Licensing GPA, SITA-SWAP, HFA-NET Pro, or DICOM Gateway 2.0,” on page J-5.

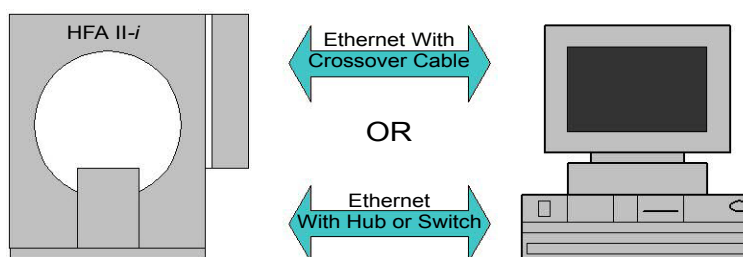
Network Configurations

There are two different configurations for networking your HFA II-*i*:

1. **A single HFA II-*i* connected to a stand-alone PC.**

With the aid of your office Network Administrator, you can connect your HFA II-*i* to an external computer ([Figure 14.1](#)) that is running Microsoft Windows®. The Windows operating systems supported as of the date of this manual include:

- Windows 2000 (with Service Pack 4 installed)
- Windows NT 4.0 (with Service Pack 6a installed)
- Windows XP Pro (with Service Pack 2 installed)



*Figure 14.1 One HFA II-*i* Networked to a Single Windows-based PC*

2. **One or more HFA II-*i* perimeters connected to an office network (LAN) via a file server.**

Many practices already have their office PCs networked (local area network, or LAN). Now your HFA II-*i* can be connected to this network. Your HFA II-*i* instrument(s) can be connected to the file server of this existing network (and via the LAN to EMRs and network printers) as is shown in Figure 14.2. In addition, an HFA II (or HFA I) may also be a part of the network, if connected via a serial cable to an HFA II-*i*. The test data must first be transferred from the HFA I or HFA II to an HFA II-*i*. The HFA I or II cannot connect directly to the network and cannot receive data from the network. Synchronization via the network cannot be accomplished with an HFA I or an HFA II.

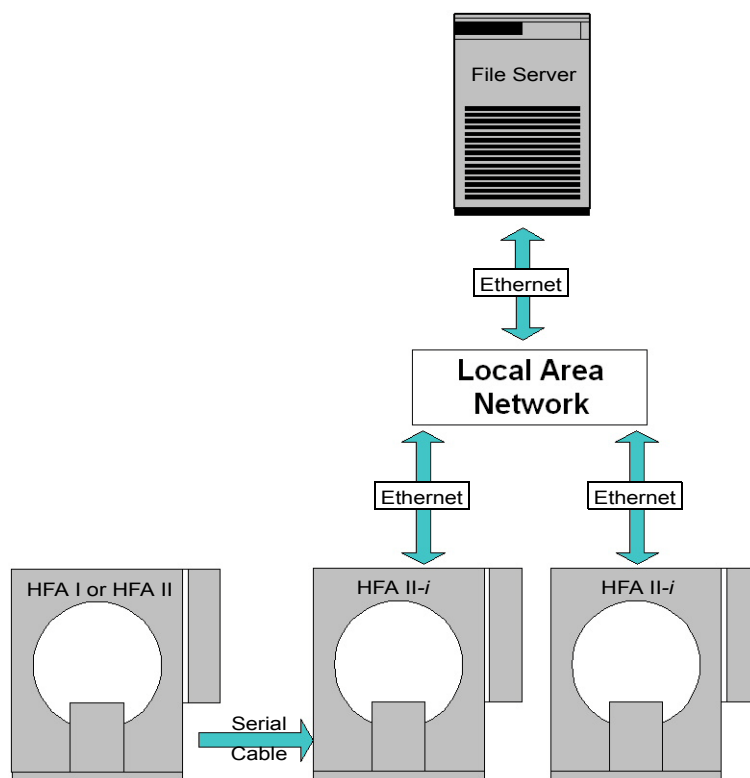


Figure 14.2 One or More HFAs in an Office Network



Note: Please be aware that HFA-NET Pro is limited to the features described in this chapter. Neither package will allow you to conduct analyses on the PC. For example, you can perform a Guided Progression Analysis (GPA) on your HFA II-*i*, and then send the resulting TIFF image or XML file via your network to a PC. You cannot, however, run a separate GPA analysis from your PC with HFA data that you have sent to your PC.

An Overview of HFA-NET Pro

The following sections provide an overview of features available with HFA-NET Pro. Specifically, HFA-NET Pro will allow you to perform the following functions:

- Back up and restore databases
- Synchronize two or more HFA II-*i* units
- Export patient data, test data, and image files to a file server or PC, or a non-DICOM EMR/PMS system
- Import work lists from a non-DICOM EMR/PMS system

The following brief summaries outline each network operation. Step by step instructions are provided later in the chapter.

Backing Up Data to the Server

HFA-NET Pro allows you to back up your patient database to your file server or PC. This is similar to the process described in [Chapter 11](#) using removable media, such as USB storage devices. This gives added protection to your data by having backed up in two different locations. Remember it is always recommended to remove a copy of the database from the location of the HFA in case of some catastrophic event (fire or flood, for instance).

Restoring Data From the Server

Once you have backed up data onto a server or PC, data may be restored to your HFA II-*i* in the event that you lose any data on your HFA II-*i*.



Note: We recommend periodic backup of your file server to maintain multiple copies of the database.

Backing Up and Restoring Your HFA Network Configuration

The network settings for the HFA II-*i* are stored on the hard disk. Using the Configuration Backup capability of your HFA II-*i*, you can back up those network settings to a USB storage device for safety in the event of hard disk problems. You should use this Configuration Backup process every time that you make changes to your settings. This process is the same one that is used for backing up custom tests, changed button text, custom Main Menu configurations, and so forth. For a detailed Configuration Backup procedure, refer to [“Configuration Back Up and Restore,” on page 11-5](#).



Note: You cannot store the configuration backup information for a given HFA II-*i* on the file server, only on a USB storage device.



Note: Unlike many other HFA II-*i* configuration settings, backed up network settings are unique to the HFA II-*i* from which they originated. Therefore, they can be restored only to the HFA II-*i* from which they were backed up. They cannot be restored to a different HFA II-*i*. For that reason, it is critical that you record on the backup USB storage device the serial number of the HFA II-*i* from which the configuration information has been backed up.

Synchronizing Databases

HFA-NET Pro allows you to synchronize multiple HFA II-*i* units. Synchronization is the process of ensuring that all compatible perimeters in the office contain the same database.



CAUTION: HFA II-*i* series system software 5.x creates a different database structure that is not fully compatible with previous software releases. You can only synchronize an HFA II-*i* version 5.x instrument with other HFA II-*i* version 5.x instruments.

Synchronization consists of moving data from two or more HFA II-*i* perimeters into a centralized archive on the network server. Then, once all the data is gathered in one location, it can be retrieved back to any or all of the HFA II-*i* perimeters from which the data originated. This synchronization may be done automatically at a set time, or manually, as desired.

As an example, an office with 3 HFA II-*i* instruments has visual tests done on all three HFA II-*i* instruments in one day—10 patients on HFA #1, 12 patients on HFA #2, and 8 patients on HFA #3. If the 3 HFA II-*i* instruments are synchronized on a daily basis, all 3 instruments will have all the new test data from all 30 patients in each HFA database the next day. This allows you to run a GPA from any GPA licensed HFA in the office, for instance.

Exporting Data from the HFA II-*i*

With HFA-NET Pro, your HFA II-*i*/perimeter is capable of exporting patient data, test data, and image files (exam reports) to a file server or PC. These files can be organized into folders, viewed on the PC as a TIFF or PDF file, or sent to a printer that is connected to the PC.

To better organize your database, you may place any of this information into *Patient Folders*. Patient Folders are directories that contain all exams for a given patient.

The data can be transferred from your HFA II-*i* to a file server or PC either manually or automatically, at a frequency that you determine. The “default-style printouts” referred to in the following sections are the printouts that would normally be generated at the end of an exam: a Single Field Analysis (or SFA GPA) for Threshold or a Screening printout. Kinetic and Custom test printouts are also included when defining default-style printouts. These are traditionally printouts of a single visual field test. An exception is the Both Eyes Screening printout (the O. U. printout) that captures the results of both eyes on one page. “Multi-test printouts” are printouts that analyze more than one test. This would include Overview, GPA and Change Analysis.

There are three methods that you can use to export data and they each have a specific purpose:

- The Transfer Tests function copies all selected exams (default-style printout) from your HFA II-*i* hard drive to your network. This is done from the Transfer Tests screen.
- The Save/Transmit Option continually keeps your newly completed exams (default-style printout) exported to your network after saving to the hard drive and USB storage device on the HFA II-*i*.
- The Print to a File option allows you to export all types of printouts (both default-style and multi-test printouts) to your network. This is done from the Printout Selection screen.

Transferring Tests

The Transfer Tests function (MAIN MENU>*FILE FUNCTIONS*>TRANSFER TESTS>SELECT EXAMS>PROCEED) allows you to transfer exams as a TIFF image or PDF file of the default-style printouts and is most useful when exporting numerous tests at once. For example, when you initially set up your network, you may wish to “Transfer” all exams stored on your HFA hard drive to your network. It allows you to export default-style printouts, patient and examination data as a computer file. Images are converted to TIFF or PDF files. The text-based data is exported as an XML (Extensible Markup Language) file to allow it to be read across a broad range of different servers and operating systems.



Note: The GPA Single Field Analysis printout is available only if you licensed GPA on your HFA II-*i*.

Save & Transmit

The Save/Transmit Option function (MAIN MENU>*SYSTEM SETUP*>SAVE/TRANSMIT OPTION) allows you to save the results of newly completed tests to the hard drive of your HFA II-*i*, as well as to automatically transmit them to the network file server, an EMR/PMS system, or DICOM Archive. Only the TIFF or PDF image of the default-style printout and the XML file will transmit to the network file server.

Once you have set the “Save & Transmit” option, you may not need to use the Transfer Tests function again.



Note: Tests can also transfer via a serial connection from an HFA II (or HFA I) to the HFA II-*i*. This option allows you to transmit data first from an HFA II (or HFA I) to the HFA II-*i*. This data is then treated like any other data on the HFA II-*i* and can be transferred to a folder on your network file server or PC. The HFA I or HFA II instruments cannot be connected directly to the network. See [“Serial Transfer of Tests Between HFA I, HFA II or HFA II-i Instruments,” on page 10-19](#) for details.

Printing To a File

The Print To a File feature allows you several options, including the option to export any type of printout. This is the only method to export multi-test printouts (i.e., to export a Full GPA or Overview). The Print To a File feature (MAIN MENU>*SYSTEM SETUP*>PRINT SETUP) must be set up before you will be able to export Multi-test printouts. Thereafter, whenever the Print Selection screen is available, by pressing the PRINT ALL SELECTED ITEMS button, the resulting action will depend upon which option you selected in the Print Setup screen. For example, if you selected the option of “Export Image File and Print”, the printout image (TIFF or PDF image) and XML file will be exported to your file server, and the printer will also print a hard copy printout of the style you selected. You may select any default-style (SFA, for example) or multi-test printout (GPA, for example) or any combination of printouts available on the list.

Exporting Examples

Here is an example of how to utilize the exporting data functions of HFA-NET Pro. After setting up your network, your Network Administrator should transfer the data from the HFA II-*i* to the PC (MAIN MENU>FILE FUNCTIONS>TRANSFER TESTS). The examples are taken from a PC running Windows XP. The screens on your PC may vary. The examples show PDF files, but TIFF image files are the same. In [Figure 14.3](#) we see exams from “Zeiss, Eric” listed in the Transfer Tests function.



Figure 14.3 Exams Shown on Transfer Tests Function

When all exams are transferred for “Zeiss, Eric” and “Enable Patient Folders” was selected on the Data Export Setup screen, a patient folder is automatically created on the PC that include the patient's name and date of birth (year, month, day) as shown in [Figure 14.4](#) below.

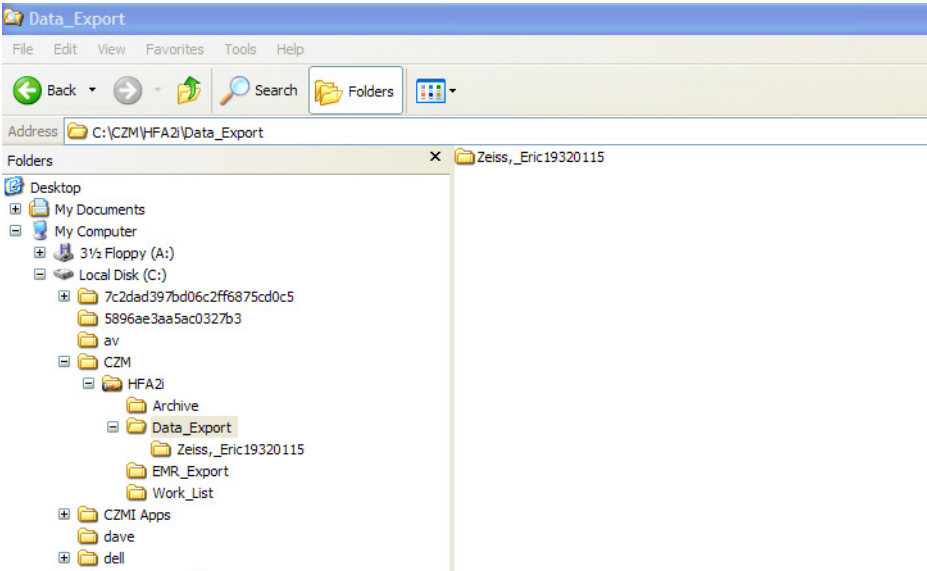


Figure 14.4 Patient Folder on the PC of Patient Displayed in Figure 14.3

You may designate your own names for these Patient Folders, but it must be done on the HFA II-*i* (see “Using Patient Folders,” on page 14-25).

When the patient folder for patient “Zeiss, Eric” is opened on the PC (Figure 14.5) we can see 30 files in the folder, two per each test. The files shown selected are the PDF image of a SFA printout and the XML text file of that test.

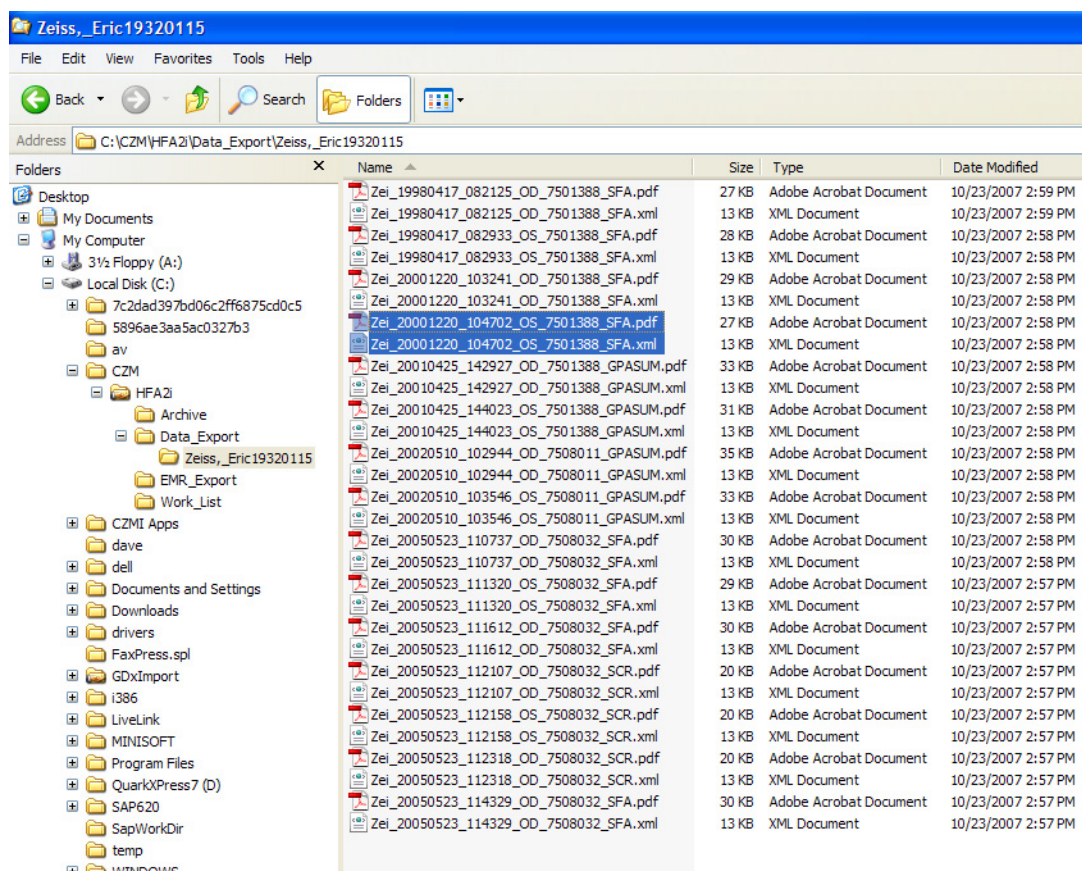


Figure 14.5 Patient Folder on the PC Showing SFA Files Selected

These files can be attached to e-mail, opened in an image viewer, or imported into other applications. For example, you might insert a graphic file (the TIFF or PDF image of the printout) into a Microsoft Word document or Powerpoint presentation. The individual file name is a combination of information as shown in Table 14.1 below.

Table 14.1 Exported File Name information for Patient “Zeiss, Eric”

File Name	Ze_20001220_104702_OS_7501388_SFA
Ze	first 3 letters of the patient's last name
20001220	Test Date - 2000 - 12 (December) - 20
104702	Test time - 10:47:02 - the test was taken at 10:47 AM (24- hour test time is used to make file names unique)
OS	Eye - Left
7501388	HFA Serial number test was taken on
SFA	Type of test printout



Note: The date and time in the file names of the image (PDF or TIFF) and XML files on the PC is the actual test date and time. This may be different than their file modification date and time displayed on the PC.

Figure 14.6 shows what the highlighted PDF file of the SFA printout from Figure 14.5 would look like on the PC with Adobe Reader. You may view the report on the screen or print to your office printer from the PC.

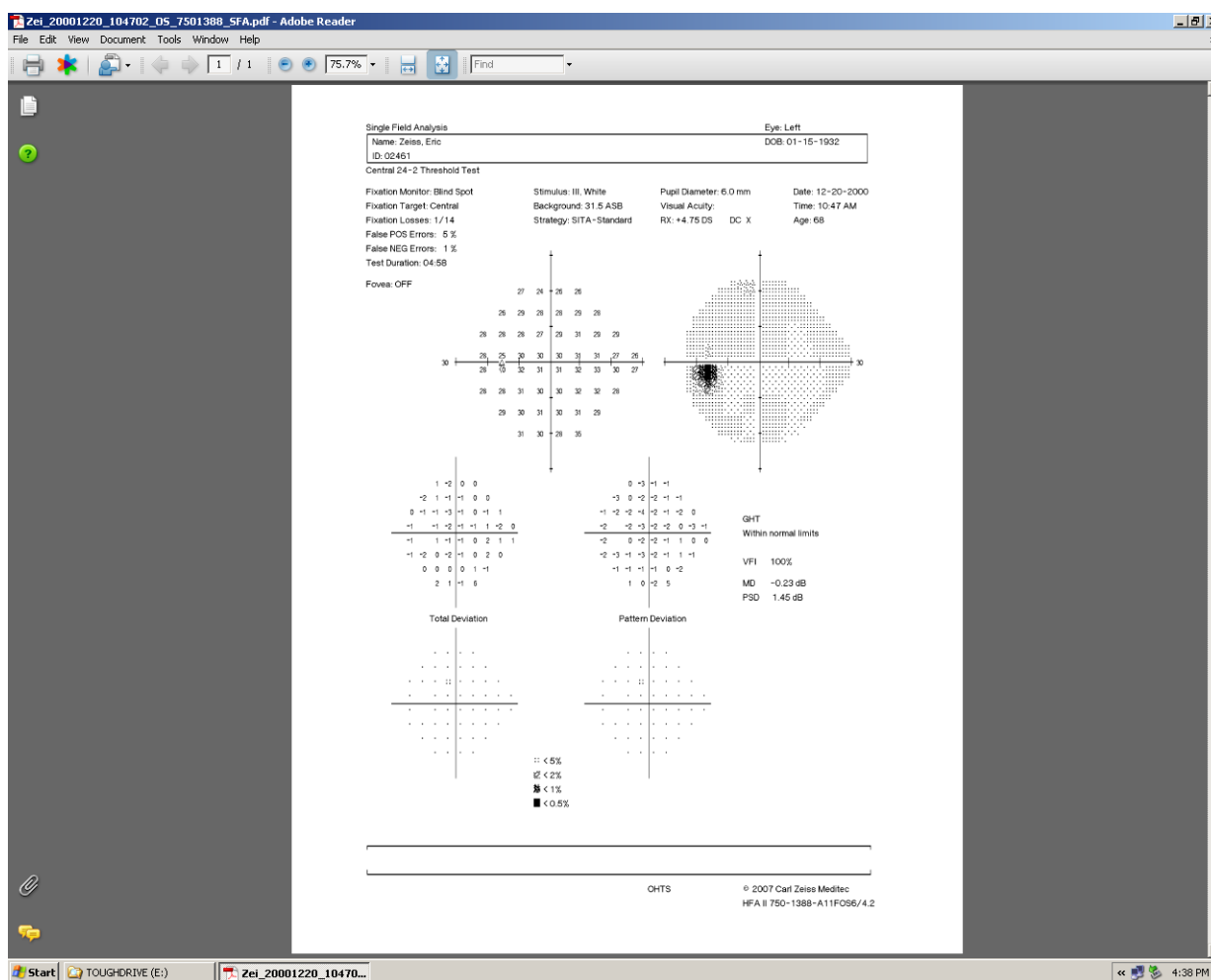


Figure 14.6 PDF Image of SFA File Displayed on the PC



Note: PDF images open in Adobe Reader. The program on your PC used to view the TIFF image would vary depending on the program used to display them.

Multiple printout formats such as the Overview, GPA or Change Analysis may be exported as TIFF or PDF images by using the Print To a File feature. Default-style printouts may also be printed this way from the Printout Selection screen and can be selected at the same time.



Note: HFA-NET Pro will not allow you to conduct offline analyses with the HFA data by using the PC. For example, by using the Print to a File feature you may export a series of GPA printouts, but you are not able to alter the tests selected for Baseline or Follow-up on the PC. The GPA file you open on the PC looks identical to the GPA printout and cannot be altered. If the GPA is changed later on the HFA II-*i*, the new GPA file will need to be exported to the PC to create a new GPA file.

In Figure 14.7, GPA Summary files (PDF and XML text file) have been selected.

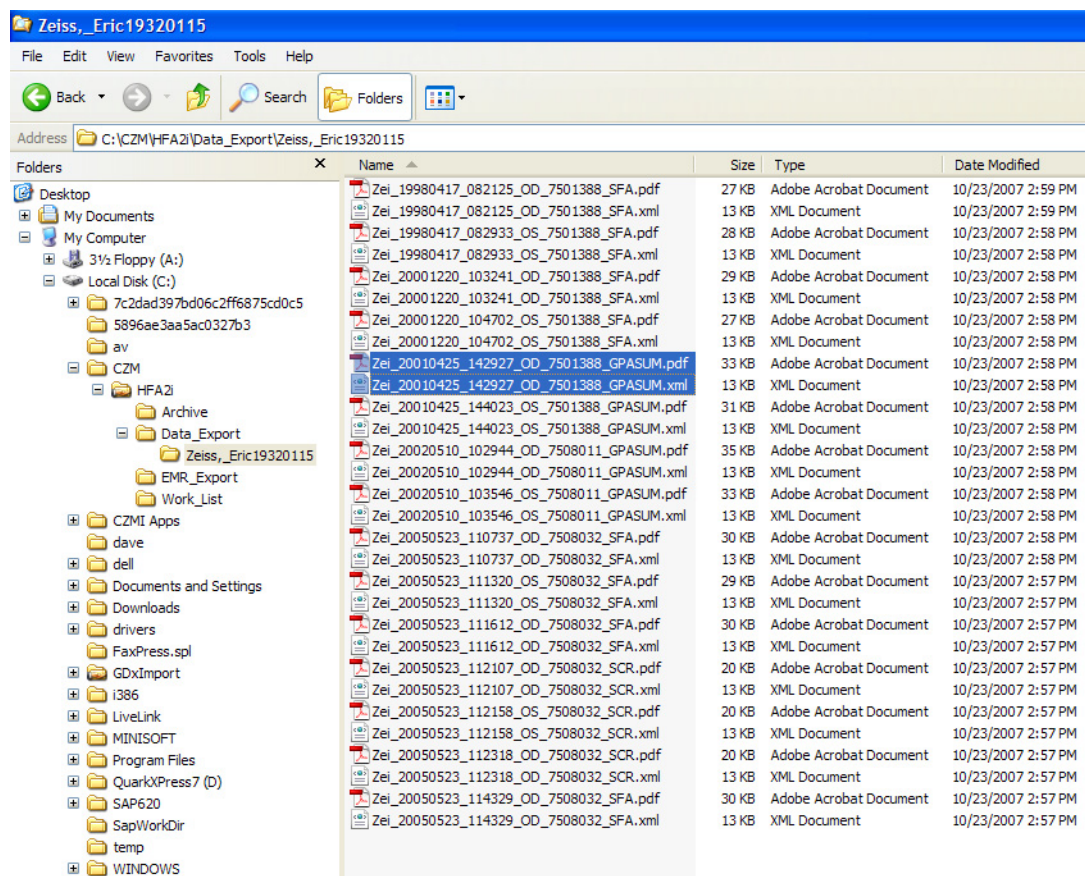


Figure 14.7 Patient Folder on the PC showing GPA Summary Files Selected

In Figure 14.8, the PDF image of the GPA Summary file is displayed on the PC.

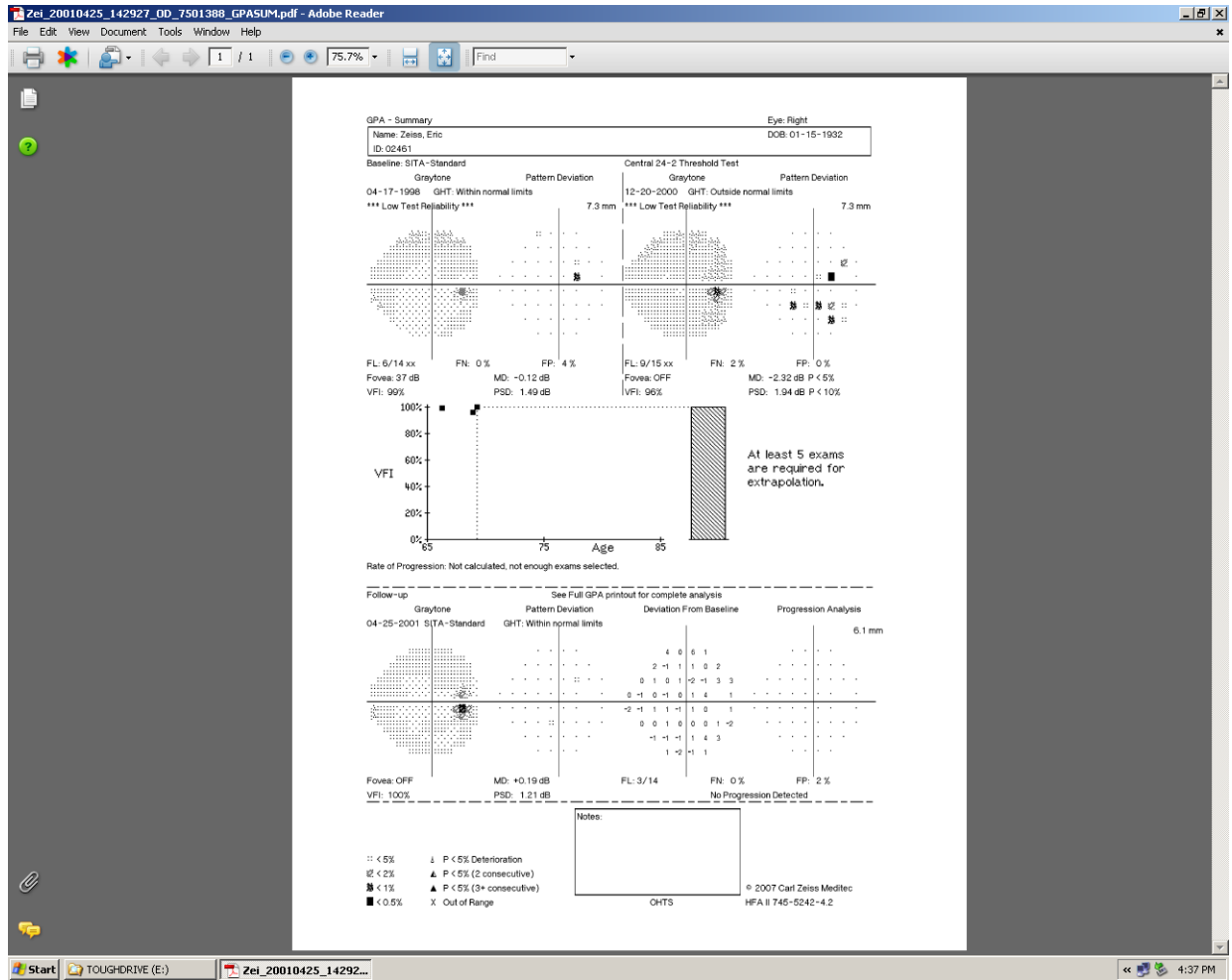


Figure 14.8 PDF Image of the GPA Summary File Displayed on the PC

How to Use the HFA's Networking Features

The sections that follow provide specific instructions for how to perform a variety of networking tasks, once your HFA-NET Pro or DICOM Gateway software has been licensed and your Network Administrator has set up your network including the applicable Communication Setup screens on your HFA II-*i*:

- Archive/Retrieve Setup
- Data Export Setup
- Save/Transmit Option Setup
- EMR/PMS Export Setup
- Work List Setup
- DICOM Gateway Setup

The networking functions that are described are:

- Backing up HFA II-*i* data to a network file server.
- Restoring backed up HFA II-*i* data from a network file server.
- Synchronizing data on two or more HFA II-*i* instruments.
- Archiving data to the file server and retrieving archived data from the file server.
- Exporting patient data, test data, and TIFF or PDF image files from the HFA II-*i*.
- Exporting patient data, test data, and TIFF or PDF image files to EMR/PMS/DICOM software.
- Importing work lists from EMR/PMS/DICOM software systems.
- Export raw exam data and reports to a DICOM archive.
- Recalling patients, viewing, or printing tests from a DICOM archive.

Backing Up Data to the Server

The HFA II-*i* perimeter allows you to back up your patient database to safeguard the data. You can use USB storage devices or a network file server (see [Chapter \(11\), "Database Management"](#)).



Note: You should have a removable storage device available for your network file server to keep the backed up data on the server safe from loss. Should something happen to the server, (a computer hard drive failure, fire or theft for example), the backed up data from the HFA II-*i* would be lost. Just like the recommendation for using USB storage devices, we recommend you remove the network file server backup files from the premises and store in a safe place.



Note: Subsequent backups replace the current backup.

Once you have backed up data to the server, you can restore it onto your HFA II-*i*, by following the steps described in ["Restoring Data from the Server,"](#) on page 14-16.



Note: The shared folder or FTP folder that is used for backing up and restoring data is the same one that is used for archiving and retrieving data.

The number of minutes that are required to perform a backup will depend on the amount of data that is stored on the hard drive of your HFA II-*i*. Use the following procedure to back up your HFA II-*i* to your network.

- 1 From the Main Menu, select *FILE FUNCTIONS*.
- 2 From the File Functions menu, select BACKUP/RESTORE.

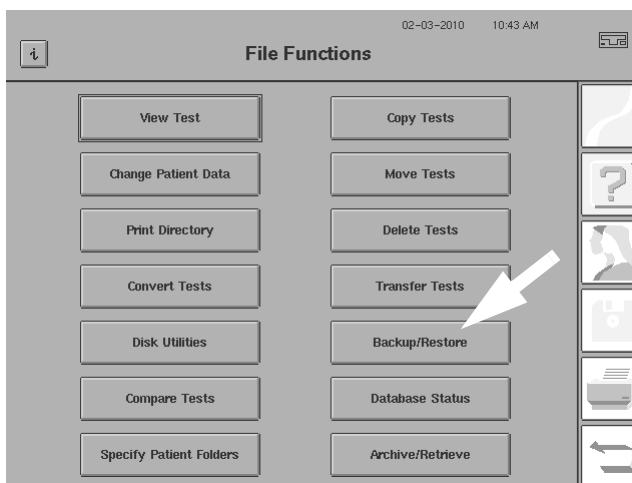


Figure 14.9 File Functions Menu

- 3 When the disk options screen appears, select the down-arrow to open the SOURCE drop-down box. Select HARD DRIVE ([Figure 14.10](#)).

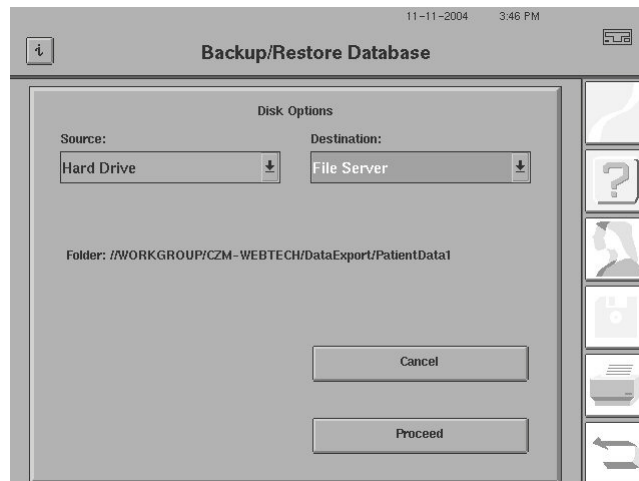


Figure 14.10 Disk Options Screen – Backing Up a Database

- 4 Select the down-arrow of the Destination drop-down box. Select FILE SERVER.
- 5 Select PROCEED.
- 6 The message shown in [Figure 14.11](#) will appear while data is being backed up to the server.

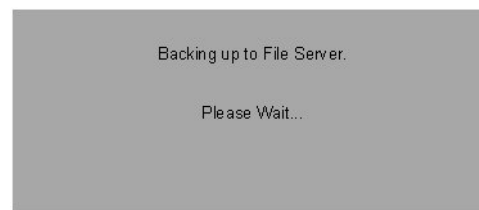


Figure 14.11 Hard Drive Backing Up to the File Server Message

- 7 When the backup has completed, the message shown in [Figure 14.12](#) will appear. Select OK to return to the File Functions menu.

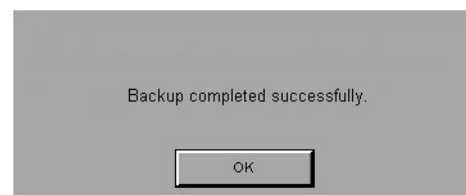


Figure 14.12 Backup Completed Message



Note: If a problem occurs during this procedure, refer to [Appendix \(I\) "Network Troubleshooting Error Messages,"](#) on page I-31 for assistance.

Restoring Data from the Server

Once you have backed up data to the server, you can restore that data from the server in the unlikely event that your HFA II-*i* database must be replaced. This procedure is similar to the one used with USB storage devices, as described in ["How to Handle Database Failures" on page 11-10](#).

- 1 Select *FILE FUNCTIONS*>*BACKUP/RESTORE* to open the Disk Options screen ([Figure 14.13](#)).

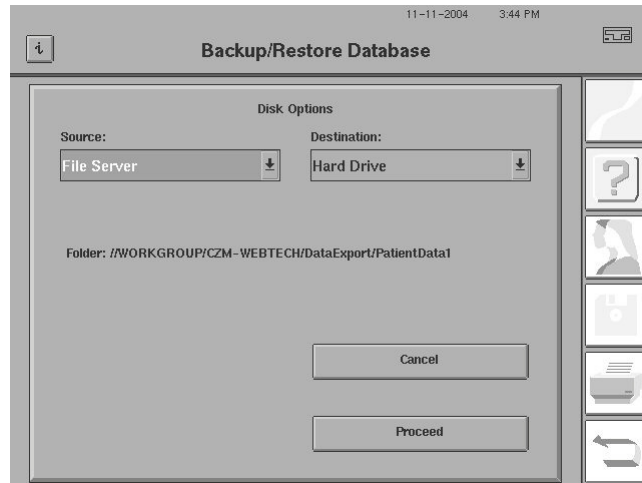


Figure 14.13 Disk Options Screen – Restoring a Database

- 2 Select FILE SERVER in the Source drop-down box.
- 3 Select HARD DRIVE in the Destination drop-down box.
- 4 Select PROCEED to begin the data restore. A message will appear as is shown in [Figure 14.14](#). Select REPLACE if you wish for the existing data on your hard disk to be overwritten. All data on the hard drive will be erased. Select MERGE if you wish data from the server to be added to the data already on the hard disk of the HFA II-*i*.



Note: You would normally use Replace to restore a backup. Merge is infrequently used in cases where you would want to bring in a local backup database from your archives, or from other clinics or off-site instruments.

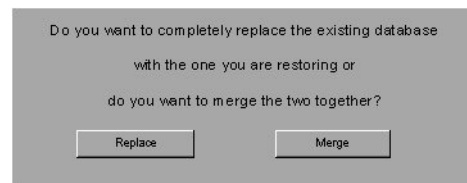


Figure 14.14 Database Replace/Merge Dialog Box

If you select REPLACE, you will see the window shown in [Figure 14.15](#). Press CANCEL to return to the File Functions menu. Press PROCEED to continue with the process of overwriting existing data on your hard drive. If you select PROCEED, a message will appear toward the end of the restore process, telling you that the HFA is verifying the integrity of the database. The HFA will then restore the database from the file server to the hard drive.

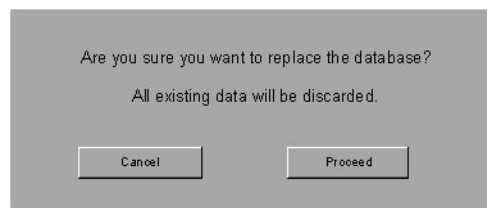


Figure 14.15 Database Replacement Confirmation

5 When the data has been restored successfully, you will be notified by a message.



Note: If a problem occurs during this procedure, refer to [“Network Troubleshooting Error Messages,”](#) on page I-31 for assistance.



WARNING: Every patient has an identifier that consists of Name, Date of Birth, Patient ID, and Issuer of ID. To avoid unintentional automatic merging of patient records, VERIFY a unique combination of Name, Date of Birth, Patient ID, and Issuer of ID exists when patients are copied, transferred, retrieved from an archive, or restored from a backup. There is no way to separate the combined records of erroneously merged patients. Automatic merging of patient records occurs when a patient exists in the local database with the EXACT SAME Name, Date of Birth, Patient ID, and Issuer of ID as a patient that is copied, transferred, retrieved from an archive, or restored from a backup.

For example, consider the following scenario:

Patient A: This patient is currently on the local HFA database and was automatically assigned a unique Patient ID by the instrument because it was a blank field prior to a software upgrade to V5.x software or during an import to the HFA through a copy, transfer, retrieval from archive, or a restore from backup.

Patient B: This patient is about to be transferred to the local HFA database and has the same Name and Date of Birth as Patient A, but does not have a Patient ID (i.e. field is blank). When Patient B is copied, transferred, retrieved from an archive, or restored from a backup to the local HFA database, Patient B will automatically be assigned the same Patient ID and Issuer of ID as Patient A, and Patient B will be merged with Patient A.

Synchronizing Databases on Two or More HFA II-/Perimeters

It is possible to synchronize multiple HFA II-/instruments with each other using your HFA-NET Pro software. Synchronization is the process of ensuring that each HFA II-/in the office has the same database after synchronization.



Note: DICOM Gateway 2.0 allows saving and retrieving raw exam data to and from a DICOM archive which acts like a “central database”. Using DICOM Gateway 2.0, automatic or manual archiving and synchronization of patient records is not needed as there is only one database (the DICOM archive) that all HFAs save to and retrieve from. See [Appendix \(H\)](#) for more information.



CAUTION: HFA II-i series system software 5.x creates a different database structure that is not fully compatible with previous software releases. You can only synchronize an HFA II-i version 5.x instrument with other HFA II-i version 5.x instruments.



WARNING: Every patient has an identifier that consists of Name, Date of Birth, Patient ID, and Issuer of ID. To avoid unintentional automatic merging of patient records, **VERIFY** a unique combination of Name, Date of Birth, Patient ID, and Issuer of ID exists when patients are copied, transferred, retrieved from an archive, or restored from a backup. There is no way to separate the combined records of erroneously merged patients. Automatic merging of patient records occurs when a patient exists in the local database with the **EXACT SAME** Name, Date of Birth, Patient ID, and Issuer of ID as a patient that is copied, transferred, retrieved from an archive, or restored from a backup.

For example, consider the following scenario:

Patient A: This patient is currently on the local HFA database and was automatically assigned a unique Patient ID by the instrument because it was a blank field prior to a software upgrade to V5.x software or during an import to the HFA through a copy, transfer, retrieval from archive, or a restore from backup.

Patient B: This patient is about to be transferred to the local HFA database and has the same Name and Date of Birth as Patient A, but does not have a Patient ID (i.e. field is blank). When Patient B is copied, transferred, retrieved from an archive, or restored from a backup to the local HFA database, Patient B will automatically be assigned the same Patient ID and Issuer of ID as Patient A, and Patient B will be merged with Patient A.

Synchronization consists of moving data from two or more perimeters into a centralized archive on the network server. This function is known as “archiving.” Once all the data is gathered on the file server, it can be retrieved back to any or all of the perimeters from which various portions of the overall data originated. This function is known as “retrieving.” In this way, the data sources are synchronized, so that each perimeter contains the same data as all the other perimeters.

The first archiving that is performed will archive the entire database from the HFA II-/hard disk to the server. This should be done for each HFA II-/in the network. Subsequent archiving operations will archive only new data that has been collected since the last archiving was completed.

Once your Network Administrator has set up your Archive/Retrieve options, archiving can occur automatically, when you power up your HFA II-*i*. How often automatic archiving occurs will depend on whether your Network Administrator set the archiving to occur daily, weekly, or monthly. You can also perform an archive manually (see [“Manually Archiving Data,”](#) on page 14-21).

You will know that automatic archiving is occurring when the following message displays on your HFA II-*i* during instrument start up.



Figure 14.16 Automatic Archiving in Process Message



Note: Automatic archiving may not fully retrieve all patient data if another HFA has not completed its archiving by the start of automatic retrieval. If this happens, the next automatic retrieval will retrieve the previously unretrieved data. If you want to ensure that all HFAs have the same patient data at any one time, perform a manual archive of all instruments, and then after all instruments have completed their archiving (and not before), perform a manual retrieval on all instruments.

For information on how to change the automatic synchronization schedule (if the HFA II-*i* has been set up to synchronize automatically by your Network Administrator), see below. You may also wish to review the section entitled [“Manually Archiving Data,”](#) on page 14-21.

Making Changes to Automatic Synchronization

The following process will allow you to change automatic archiving and retrieval on your HFA II-*i*.

- 1** Select MAIN MENU>SYSTEM SETUP>COMMUNICATIONS SETUP>ARCHIVE/RETRIEVE SETUP to open the Archive/Retrieve Setup screen.
- 2** Open the Archive drop-down box to select DAILY, WEEKLY, or MONTHLY automatic archiving.

If you select DAILY automatic archiving, your HFA II-*i* will archive data automatically, each day when you power up the instrument.

- 3 If you select WEEKLY automatic archiving, a Day of the Week drop-down box appears below the Archive drop-down box (Figure 14.17). Select a day from MONDAY to SUNDAY. The HFA II-*i* will archive patient data automatically at instrument startup on the selected day, or on the first day that you power up the HFA II-*i* after that day of the week.

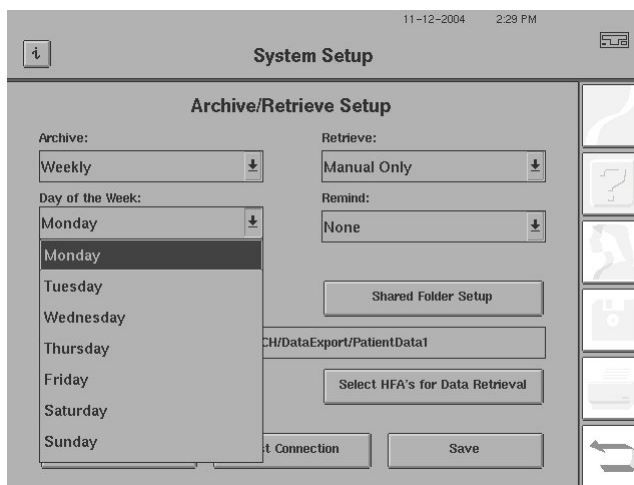


Figure 14.17 Setting Up Weekly Automatic Archiving

- 4 If you select MONTHLY automatic archiving, a Day of the Month drop-down box appears below the Archive drop-down box. Use the numeric keypad to enter a date from 1 through 31. On your selected date, the HFA II-*i* will archive patient data to the server automatically at instrument startup on the selected day, or on the first day after that date when you power up the HFA II-*i*. The archiving process is rapid, depending on how often archiving is performed, allowing you to use the HFA II-*i* for patient testing after a brief pause—it only takes a couple of minutes to perform the archive operation.

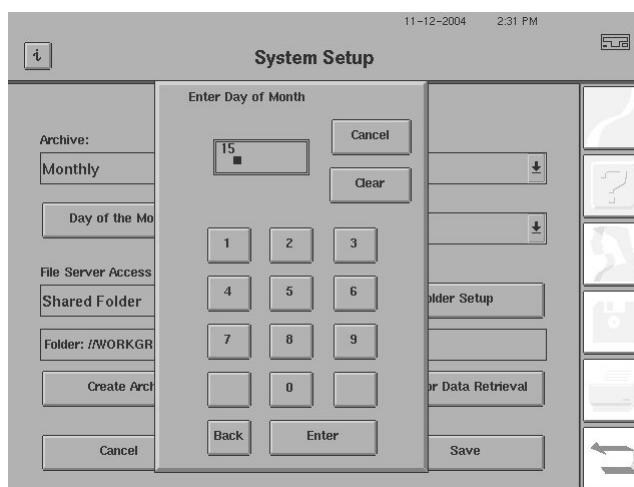


Figure 14.18 Setting Up Monthly Automatic Archiving

- 5 For changing the Retrieval settings for synchronization, follow steps 2, 3, and 4 above to change the Retrieval-side of the drop-down boxes to the appropriate schedule.



Note: Carl Zeiss Meditec does not recommend archiving as infrequently as once a month. More frequent archiving will provide greater safety for important data.

Manually Archiving Data

If you wish to perform a manual archiving:

- 1 Select *FILE FUNCTIONS*>ARCHIVE/RETRIEVE.
- 2 Select ARCHIVE. The archive operation will begin and run for a couple of minutes, until the archive operation is completed.

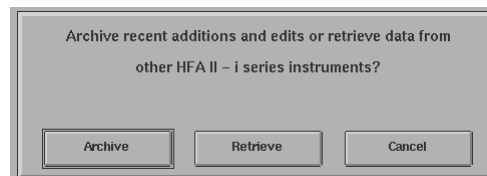


Figure 14.19 Archive/Retrieve Selection Dialog

Archive Reminders

If your Remind setting for archive (see ["Setting Up Manual Archiving,"](#) on page I-15) is set to Weekly or Monthly, the first time you are reminded to perform a database archive you will receive a reminder message similar to that shown in [Figure 14.20](#) upon starting up the HFA II-*i*.



Figure 14.20 Initial Reminder to Archive the Database Manually

After the first time you archive manually, you will receive a reminder like that shown in [Figure 14.21](#) upon starting up the HFA II-*i*; if your archive Remind setting is active. If you select WEEKLY as the archive reminder frequency, upon starting up the HFA II-*i*, you will be reminded to archive your data manually 7 days after your last archive, and you will continue to be reminded every day thereafter until you do an archive. If you select MONTHLY as the archive reminder frequency, upon starting up the HFA II-*i*, you will be reminded to archive your data manually 30 days after your last archive, and you will continue to be reminded every day thereafter until you do an archive.

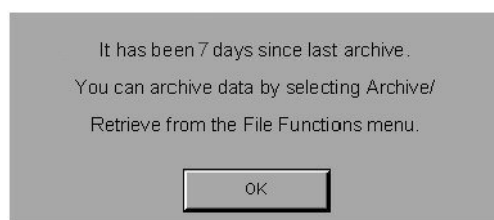


Figure 14.21 Reminder to Archive Data Manually

Manually Retrieving Archived Data

You can perform the archive retrievals manually by using the procedures that follow, even if your Network Administrator has set up automatic archive retrieval.



Note: The retrieve process will not work until you have first archived data to the server. If you have several HFA II-*i* perimeters in your network, each one must have been archived previously, before you can retrieve data from all of them.

Performing an Archive Retrieval Manually

- 1 Select *FILE FUNCTIONS*>ARCHIVE/RETRIEVE.
- 2 You will see a dialog like that shown in [Figure 14.22](#). Select RETRIEVE.

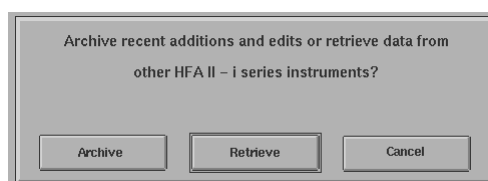


Figure 14.22 Archive/Retrieve Selection Dialog

- 3 A browser window ([Figure 14.23](#)) will open to allow you to select the HFAs you wish to retrieve data from. The archives are named with the model number and serial number of the HFA II-*i* from which the data was archived (*e.g.*, 750i-123456). Select the individual HFA II-*i* archives by pressing each entry to add a check mark to the left of it. If you make a selection error, press the entry a second time to de-select it.

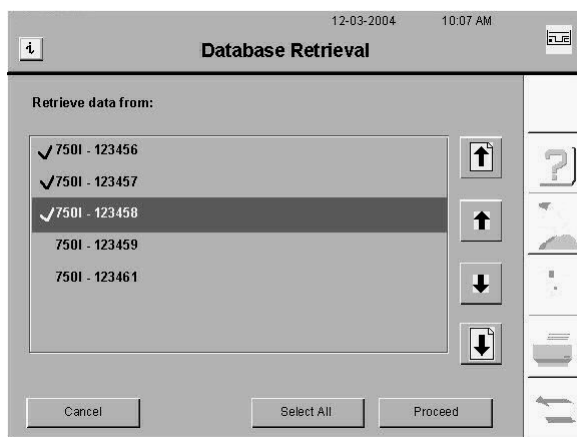


Figure 14.23 Database Retrieval Screen



Note: You can select as many HFA II-*i* instruments as you wish, by selecting their individual serial numbers to place a check mark to the left of each serial number entry.

- 4 Ensure that you have checkmarked each HFA II-*i* for which you wish to retrieve previously archived data. You can only manually synchronize the complete series of HFA II-*i* perimeters if you have selected all of them in the browser screen.

- 5 Press PROCEED. The dialog shown in [Figure 14.24](#) will appear to let you know how the retrieval is progressing.

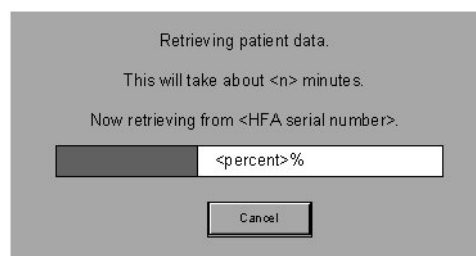


Figure 14.24 Data Retrieval Progress Indicator

If you select the CANCEL button during the data retrieval process, the retrieval process will stop. A dialog will appear that allows you to either CANCEL the operation, CONTINUE the operation, or UNDO the operation.



Note: The automatic screen saver may blank out the HFA II-*i* screen display during the retrieval process. Be sure that if you touch the screen to reactivate the display, you only touch the screen at the very top. Otherwise, you take the risk of inadvertently pressing the CANCEL button that is on the progress indicator dialog that is positioned near mid-screen. Should you accidentally press that button, you would have to start the retrieval process over again from the beginning.

- 6 Once you have completed manually retrieving the pool of archived data to this individual HFA II-*i*, you will need to repeat this retrieval process for each of the other HFA II-*i* perimeters that you may have in your office network.

Hint: If you wish to synchronize multiple HFA II-*i* perimeters in your office or clinic routinely, it is far easier and faster to have your Network Administrator set up automatic synchronization (archiving/retrieval) than to do it manually.

Retrieve Reminders

If your Remind setting for retrieval (see [“Setting Up Manual Archive Retrieval,”](#) on page I-17) is set to Weekly or Monthly, the first time you are reminded to perform a database retrieval you will receive a reminder message similar to that shown in [Figure 14.25](#) upon starting up the HFA II-*i*.



Figure 14.25 Initial Reminder to Retrieve the Database Manually

After the first time you retrieve manually, you will receive a reminder like that shown in [Figure 14.26](#) upon starting up the HFA II-*i*, if your Remind setting is active. If you select WEEKLY as the retrieval reminder frequency, upon starting up the HFA II-*i*, you will be reminded to retrieve your data manually 7 days after your last retrieval, and you will continue to be reminded every day thereafter.

until you do a retrieval. If you select MONTHLY as the retrieval reminder frequency, upon starting up the HFA II-*i*, you will be reminded to retrieve your data manually 30 days after your last retrieval, and you will continue to be reminded every day thereafter until you do a retrieval.

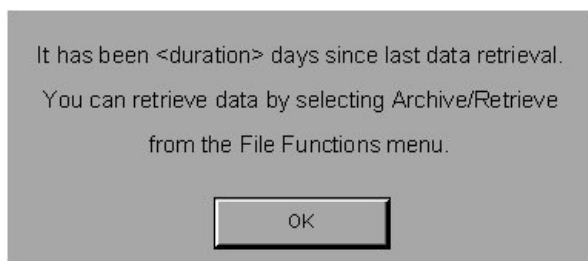


Figure 14.26 Reminder to Retrieve Data Manually

Using Patient Folders

Patient Folders allow you to store exported exam results using a separate folder on the file server for each patient. This is like having a separate manila file folder for each patient in an office file cabinet, except there are files stored on the file server rather than thousands of sheets of paper in a cabinet. The Patient Folders are created in the shared folder that your Network Administrator has established on your file server. They cannot be created on a DICOM Archive when using DICOM Gateway 2.0.



Note: Patient Folders are only available if you have licensed the HFA-NET Pro networking software on your HFA II-*i*. Also, you or your Network Administrator must have activated “Enable Patient Folders” in the Data Export Setup screen (MAIN MENU>SYSTEM SETUP>COMMUNICATIONS SETUP>DATA EXPORT SETUP) in order to be able to use Patient Folders. See [“Setting Up Patient Folders,” on page I-13](#) for more information.

There are four different ways to specify a Patient Folder name:

Automatically:

- Allow the HFA II-*i* to create the Patient Folder name automatically, based on the patient’s name and date of birth (this happens automatically after patient folders are activated). This is the recommended method for the creation of patient folders for most situations. If you need to occasionally change patient folder names, use one of the following methods (of which the first method is recommended).

Manually:

- Use the Patient Folder button on the Patient Data 1 screen (see [“Manually Creating a Patient Folder with the Patient Folder Button,” on page 14-26](#)).
- Specify a Patient Folder from the File Functions menu (see [“Manually Creating Patient Folders with the Specify Patient Folders Function,” on page 14-27](#)). Use this if you want to create patient folders for a group of selected patients at one time, rather than the somewhat tedious method of recalling each patient to use the Patient Folder button.
- Enter a Patient Folder name, when prompted to do so, upon completion of a visual field examination, or during any data transfer to the Data Export Host (see [“Using the Prompt for Patient Folder Setting,” on page 14-29](#) for more information on using this feature).



Note: By default, an automatically created patient folder name will consist of the patient’s last name, first name, and date of birth. For example, if the patient’s name is Bob Williams (entered as Williams, Bob) and his date of birth is August 16, 1946, the default folder name will be Williams,_Bob19460816 (refer to [“Exporting Examples,” on page 14-8](#)). If you do not wish to use the default patient folder name, you may still press the Patient Folder button on the Patient Data 1 screen (see [“Manually Creating a Patient Folder with the Patient Folder Button,” on page 14-26](#)) and use the pop-up keyboard to manually enter a new folder name of your preference.



Note: Be careful to type the name of an existing folder exactly the same each time if wishing to store multiple tests in the same folder. The difference of typing an extra space, for example, will create a separate folder. Spaces appear as underscore lines on the PC, and commas appear as commas. This is different than the way the HFA II-*i* handles names (see [“Entering Patient ID, Patient Name, Date of Birth, Gender, & Comments,” on page 3-8](#)).

Manually Creating a Patient Folder with the Patient Folder Button

- 1 From the Patient Data 1 screen of a selected patient, select PATIENT FOLDER (Figure 14.27).

The screenshot shows the 'Patient Data 1' screen with the following fields and buttons:

- Patient ID:** 1234
- Patient Name:** Zeiss Carl Joseph D. MD
- Date of Birth:** 09-22-1943
- Gender:** Male
- Trial Lens:** +5.00 (Right), +6.00 (Left)
- Right Eye Comments:** small pupil
- Left Eye Comments:**
- Buttons:** Clear Patient Data, Recall Patient Data, Patient Folder (highlighted with a white arrow), More Patient Data, Proceed.

Figure 14.27 Patient Data 1 Screen

- 2 A pop-up keyboard will appear to allow you to enter the name for that patient's folder (Figure 14.28). All future tests for this patient will be stored to this folder. Press ENTER to complete your entry. You will be returned to the Patient Data 1 screen.

The screenshot shows a pop-up keyboard interface with the following elements:

- Title:** Enter the patient folder name for Zeiss, Carl
- Text Field:** Zeiss, Carl_Glaucoma
- Buttons:** Cancel, Clear, * (asterisk).
- Keyboard Layout:** A standard QWERTY keyboard with letters, numbers, and symbols.
- Bottom Row:** Backspace, Caps, Space, :, Enter.

Figure 14.28 Entering the Name of a Patient Folder



Note: Patient folders created from the Patient Data 1 screen override automatic folder creation and remain the specified folder for the patient unless changed later in the Patient Data 1 screen or via the Specify Patient Folders function. Furthermore, if patient folders are created in the Patient Data 1 screen or with the Specify Patient Folders function, you will *not* be prompted for a patient folder when the Prompt for Patient Folder setting is enabled (see "Using the Prompt for Patient Folder Setting," on page 14-29).

Manually Creating Patient Folders with the Specify Patient Folders Function

- 1 Select *FILE FUNCTIONS*. Then, select *SPECIFY PATIENT FOLDERS* (Figure 14.29) to open the screen that is shown in Figure 14.30.



Figure 14.29 The Specify Patient Folders Button

- 2 Touch the drop-down arrow next to the Source drop-down box. Select your source of patient data as either *HARD DRIVE* (Figure 14.30), *FLOPPY*, or a *USB storage device*.

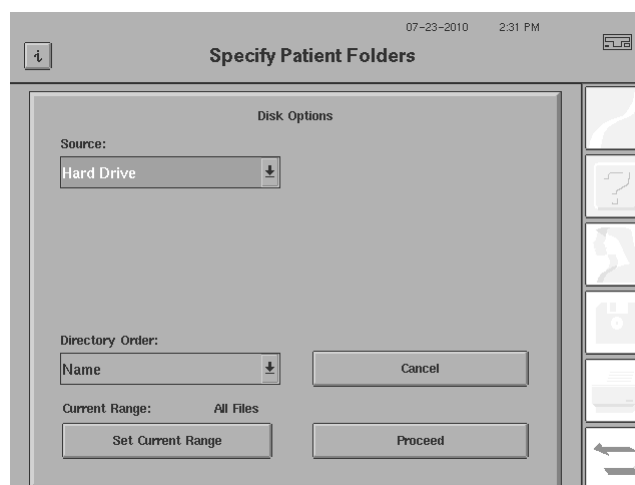


Figure 14.30 Specify Patient Folder - Disk Options Screen

- 3 If you desire to limit the range of files, select *SET CURRENT RANGE*. Specify any limitations that you wish to place on your search of all available files. You can limit the selection by Patient Name or test dates. These limitations will determine which patients will be available for you to include in the patient folders that you are creating. *PROCEED* returns you to Disk Options.
- 4 Select *PROCEED*. A pop-up keyboard will be displayed to allow you to enter a name to find. If you limited your search in Step 3, you can leave the keyboard entry line blank.

- 5 Press ENTER on the keyboard. A Patient Selection screen (Figure 14.31) will open to allow you to see the complete list of files that satisfied your search criteria. If you limited the search by name, the list will be in ascending alphabetical order. If you limited the search by Date of Birth, the list will be in ascending numerical order.

Select the patients from the list whom you wish to place in a patient folder. Touching an entry on the Patient Selection screen selects it. Touching an entry a second time de-selects it. During the selection process, you can use the up/down one line and up/down one screen buttons to move through your file listing more rapidly, if your listing is two or more screens in length.

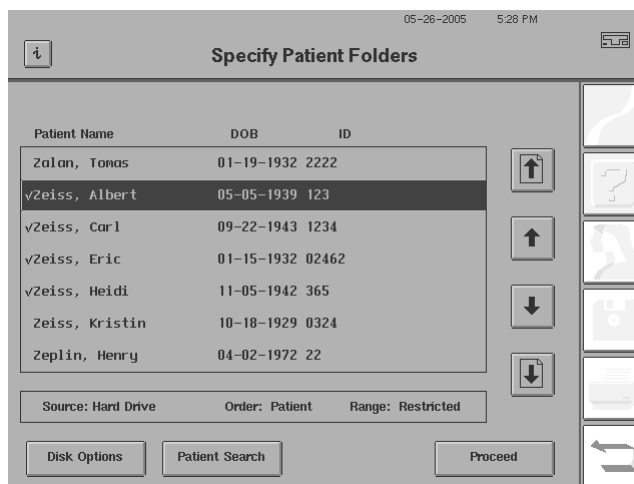


Figure 14.31 Selecting a Patient

- 6 Select PROCEED. The Patient Folder Edit screen will appear, as is shown in Figure 14.32.

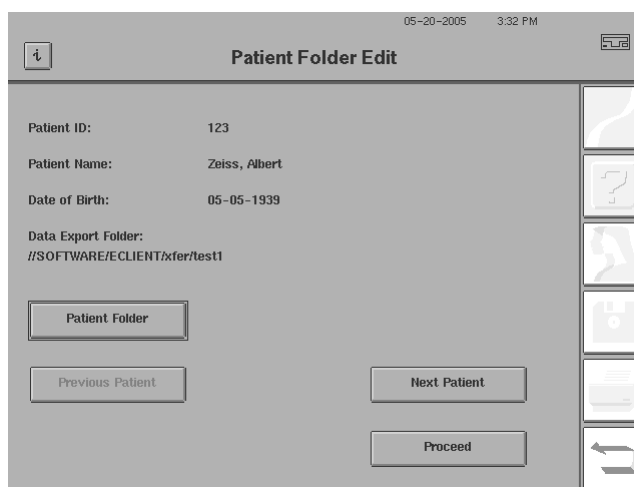


Figure 14.32 Patient Folder Edit Screen

- 7 Press the PATIENT FOLDER button. A pop-up keyboard will appear to allow you to enter the name for that patient's folder.

- 8 After you press ENTER on the keyboard, your manually entered name for the patient folder will appear to the right of the Patient Folder button, as is shown in [Figure 14.33](#).

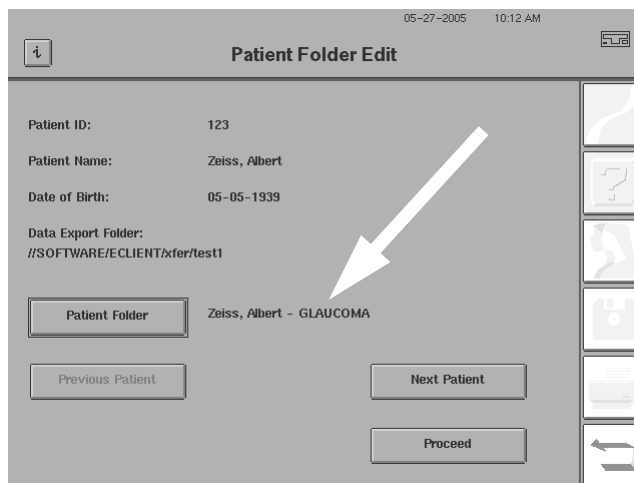


Figure 14.33 Patient Folder Edit Screen with Manually Entered Patient Folder

- 9 Use the PREVIOUS PATIENT and NEXT PATIENT button to move forward and backward, one patient at a time, through the patient list that was selected. For each additional patient, enter a patient folder name as described in Step 7 and Step 8 above.

- 10 Press PROCEED to complete the operation. You will be returned to the File Functions menu.



Note: Any previously exported tests (before a new custom patient folder is created) will remain in the old default patient folder—only exams that are transferred after a custom patient folder is created will be exported to the new custom patient folder.



Note: Patient folders created from the Specify Patient Folders function override automatic folder creation and remain the specified folder for the patient unless changed later via the Specify Patient Folders function or in the Patient Data 1 screen. Furthermore, if patient folders are created with the Specify Patient Folders function or in the Patient Data 1 screen, you will *not* be prompted for a patient folder when the Prompt for Patient Folder setting is enabled (See [“Using the Prompt for Patient Folder Setting”](#) below).

Using the Prompt for Patient Folder Setting

You can be prompted to enter a patient folder name upon completion of a visual field examination, or during any data transfer to the file server (Data Export Host). See [“Setting Up Patient Folders,” on page I-13](#) to enable this option. This option only works to override automatic folder creation—you will *not* be prompted for a patient folder if a patient folder has already been created for the patient on the Patient Data 1 screen or the Specify Patients Folders function. When a patient folder name is entered after a prompt to do so, it remains the patient folder *only* for that current exam or data transfer. Subsequent exams or data transfers will be prompted again. During prompting, if you leave the Patient Folder Name field blank, the automatically created patient folder name will be used for that patient.

Transferring Tests

The Transfer Tests function allows you to export default-style printouts such as the Single Field Analysis, the SFA GPA, or any Screening test along with the accompanying patient and examination data as a computer file. The image is a TIFF or PDF and the data is exported as an XML file.



Note: If you wish to export multi-test types of printout images, such as Overview, Change Analysis, or multi-test GPA, you must use the Print to a File function. For further details, see [“Printing To a File,” on page 14-36](#).



Note: The Transfer Tests function enables you to transfer the entire content of your hard drive in one step. For practices with thousands of files, we recommend that you complete this process in batches (i.e., select all A-L, M-R, and S-Z) so as to reduce the amount of time tied up in transferring files. Use the SET CURRENT RANGE feature as described in Steps 6 and 7 below.



Note: After you have transferred all your exams, you may wish to set up your instrument to automatically save and transmit exams upon completion (see [“Using the Save/Transmit Option,” on page 14-33](#) and [“Setting Up Save/Transmit for EMR/PMS/DICOM Systems,” on page 14-41](#)).



WARNING: Every patient has an identifier that consists of Name, Date of Birth, Patient ID, and Issuer of ID. To avoid unintentional automatic merging of patient records, VERIFY a unique combination of Name, Date of Birth, Patient ID, and Issuer of ID exists when patients are copied, transferred, retrieved from an archive, or restored from a backup. There is no way to separate the combined records of erroneously merged patients. Automatic merging of patient records occurs when a patient exists in the local database with the EXACT SAME Name, Date of Birth, Patient ID, and Issuer of ID as a patient that is copied, transferred, retrieved from an archive, or restored from a backup.

For example, consider the following scenario:

Patient A: This patient is currently on the local HFA database and was automatically assigned a unique Patient ID by the instrument because it was a blank field prior to a software upgrade to V5.x software or during an import to the HFA through a copy, transfer, retrieval from archive, or a restore from backup.

Patient B: This patient is about to be transferred to the local HFA database and has the same Name and Date of Birth as Patient A, but does not have a Patient ID (i.e. field is blank). When Patient B is copied, transferred, retrieved from an archive, or restored from a backup to the local HFA database, Patient B will automatically be assigned the same Patient ID and Issuer of ID as Patient A, and Patient B will be merged with Patient A.

For manually exporting to a DICOM Archive using Transfer Tests, see [“Manually Exporting to a DICOM Archive using Transfer Tests \(DICOM Gateway 2.0 only\),” on page 14-43](#). Use the following steps to export default-style printouts and test results to a network file server:

1

From the Main Menu, select the *FILE FUNCTIONS* icon.

2

Select TRANSFER TESTS to open the Transfer Tests setup screen.

- 3 Select your source of test data from the Source drop-down box (Figure 14.34) as HARD DRIVE or FLOPPY.

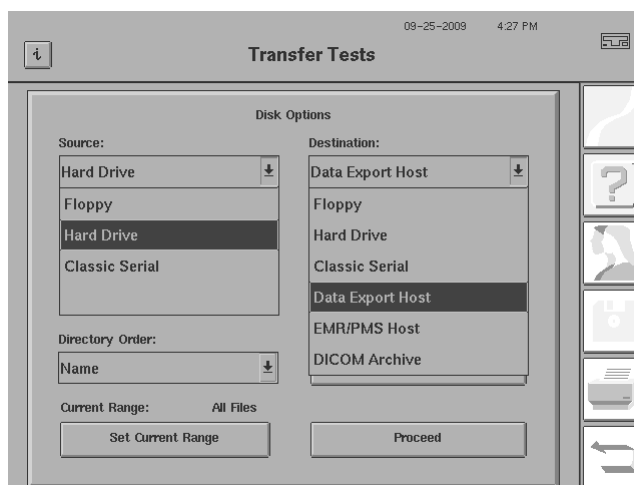


Figure 14.34 Transfer Tests Screen (with drop-down boxes open)

- 4 From the Destination drop-down box (Figure 14.34) select DATA EXPORT HOST.



Note: You can think of Data Export Host as the name or destination of your network file server.



Note: If "Enable Patient Folders" was *not* selected on the Data Export screen, all files will be placed into one common file folder. If it *was* selected, each file will be transferred into a specifically named file folder for each unique patient (i.e., all files for Williams, Bob will go into his own folder).



Note: The DATA EXPORT HOST or EMR/PMS HOST options in the Destination drop-down box are only available in the listing if you have licensed the HFA-NET Pro networking software on your HFA II-*i*. The DICOM ARCHIVE option in the Destination drop-down box is only available in the listing if you have licensed the DICOM Gateway 2.0 software on your HFA II-*i*. Otherwise, these options will not appear in the Destination drop-down box.

- 5 From the Export Format drop-down box select XML AND IMAGE FILES (Figure 14.35).

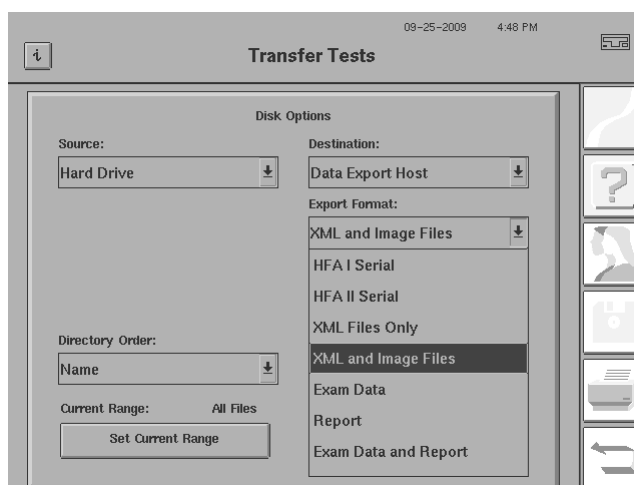


Figure 14.35 Transfer Tests Screen (with Export Format: drop-down box open)



Note: The EXAM DATA, REPORT, and EXAM DATA AND REPORT options in the Export Format drop-down box are only available in the listing if you have licensed the DICOM Gateway 2.0 software on your HFA II-*i*. Otherwise, these options will not appear in the Export Format drop-down box.

- 6 Verify the Directory Order and choose either NAME or DATE for the sorting method to be used in the directory that lists file names. By default the system will be set up to display all available patient files. This is indicated by the statement "All Files" that appears to the right of the text "Current Range." If you wish to choose from a reduced number of patient files (rather than "All Files") select SET CURRENT RANGE. If not, press PROCEED and go to Step 9.
- 7 The Transfer Tests Set Current Range window opens. You can select a portion of all available tests by restricting the listing with a specified range of patient names or test dates. See ["Selecting Tests from the File Directory," on page 10-9](#) for more information.
- 8 Once you have entered the various range settings that you wish to use, select PROCEED to return to the Transfer Tests screen with your limitations applied. Press PROCEED again to continue or select CANCEL to return to the Transfer Tests screen with no limitations applied to the file listing.
- 9 The keyboard is displayed so you can enter a specific patient name, if desired. Either leave the keyboard entry line blank or enter a name (or the first few characters of a name) and press ENTER to proceed. If you press CANCEL on this keyboard, you will exit the Transfer Tests function.
- 10 A Transfer Tests selection screen will open to allow you to see the complete list of tests that satisfied your search criteria. If you limited the search by name, the list will be in ascending alphabetical order.

Select the tests you want to transfer from the list. Touching an entry on the screen selects it. Touching an entry a second time de-selects it. During the selection process, you can use the up/down one line and up/down one screen buttons to move through your file listing more rapidly, if your listing is two or more screens in length. If you wish to transfer all exams available on the list, press the SELECT ALL button.



Note: If you have limited which files to display, it now will say "Restricted" to the right of the Current Range text entry, rather than "All Files."

11

Select PROCEED and follow the on-screen instructions to transfer the tests that you have selected.



Note: If you have elected to use "Save & Transmit" (see ["Using the Save/Transmit Option,"](#) on page 14-33), newly completed exams will be exported as XML and image (TIFF or PDF format) files automatically. As a result, you may not need to use the Transfer Tests function again.



Note: If your network server connection is lost or gives an error, your exams will not be transferred to your network file server or EMR/PMS/DICOM system. You can choose to defer the transfer, and when the network file server is back up, press TRANSFER DEFERRED TESTS on the Save/Transmit Option screen to transfer them to your file server or EMR/PMS/DICOM system (See ["Transfer Deferred Tests,"](#) on page 14-34 for more information).

Using the Save/Transmit Option

The Save/Transmit Option function allows you to save the results of newly completed tests to the hard drive of your HFA II-*i*, as well as to automatically transmit patient data, test data, and exam printout images to your network file server or to an EMR/PMS/DICOM system. Therefore, you may not need to use the Transfer Tests function again. Please note that it will only transmit a TIFF or PDF image and XML file of the default-style printouts. It will not transmit any multi-test type of printout (i.e., to export a Full GPA or Overview).

1

From the Main Menu, select *SYSTEM SETUP*>*SAVE/TRANSMIT OPTION* to display the screen that is shown in [Figure 14.36](#).

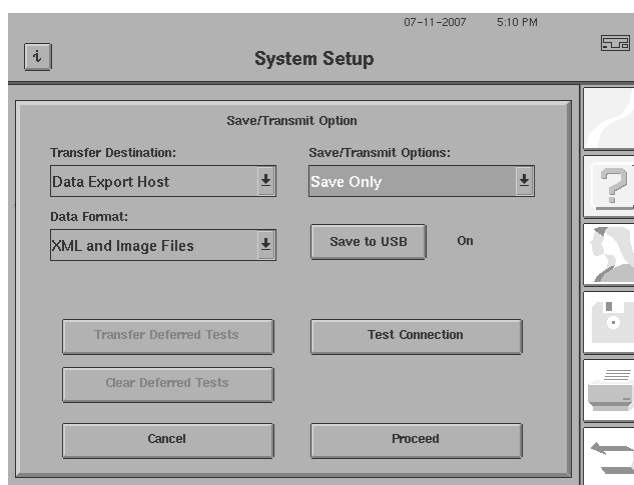


Figure 14.36 Save/Transmit Option Screen

- 2 Open the Transfer Destination drop-down box and select DATA EXPORT HOST. This selects your PC to receive the data and act as the file server. For EMR/PMS/DICOM systems, see [“Exporting to EMR/PMS/DICOM Systems,” on page 14-41.](#)
- 3 Open the Save/Transmit Option drop-down box and select SAVE AND TRANSMIT.
- 4 Open the Data Format drop-down box and select XML FILES or XML AND IMAGE FILES.

Use **XML Files** to transfer only textual information (patient data and test results) to the network file server. You will not get a printout image with this setting. Use **XML and Image Files** to transfer both graphics (a TIFF or PDF image file of the test printout) and textual information to the network file server (see [“Printing To a File,” on page 14-7.](#))



Note: If your network server connection is lost or gives an error at the end of your exams, and your “Save/Transmit Option” is set to “Save and Transmit”, your completed exams will still be saved to your hard disk but not transferred to your network file server. You can choose to defer the transfer and continue to take exams, and when the network is back up, use “Transfer Deferred Tests” to transfer them to your file server (See [“Transfer Deferred Tests,” on page 14-34.](#))

- 5 Press PROCEED. Now when tests are saved the data will be transmitted to your file server (Data Export Host) after the HFA II-/saves your completed exam to the hard drive and optionally to a USB storage device.

Transfer Deferred Tests

If the Transfer Deferred Tests and Clear Deferred Tests buttons are active and not greyed out ([Figure 14.37](#)), you have completed exams that have been saved to your hard drive, but have not yet been transferred to your network file server or EMR/PMS/DICOM system.

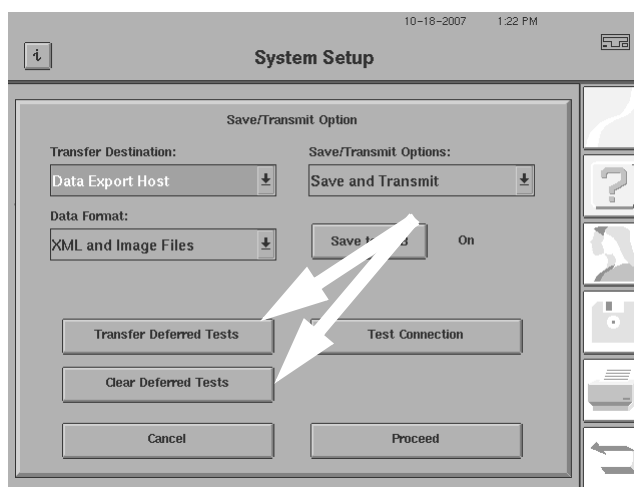


Figure 14.37 Save/Transmit Option screen with Active Transfer Deferred Tests button

This happens when a transfer failed due to a network error and your “Save/Transmit Option” drop-down box is set to “Save and Transmit” in the Save/Transmit Option function. When a transfer fails, a dialog box will be displayed to allow you to defer the transmission of the exam as shown in [Figure 14.38](#). This dialog box will only be displayed for the first failed exam transfer of the session

(instrument startup). You can continue to take exams, and although you will not see this dialog box, additional exam transfers will be deferred if the network is still down during the session.

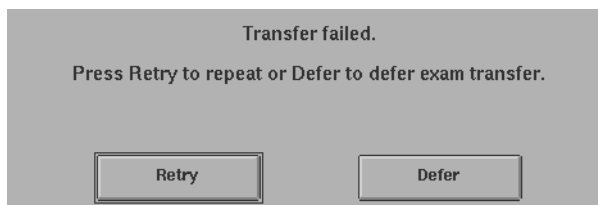


Figure 14.38 Transfer Failed Dialog Box

By pressing the DEFER button, the exam can be transferred later (when the network is re-initialized) by pressing the Transfer Deferred Tests button on the Save/Transmit Options screen. At instrument startup, a message will be displayed if you have any deferred exams to be transferred (Figure 14.39).

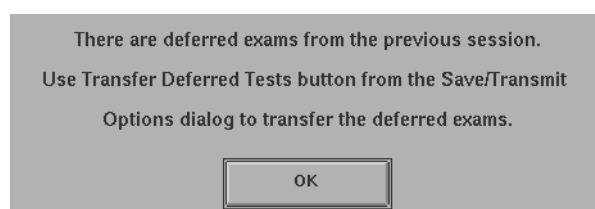


Figure 14.39 Startup Deferred Exams Message

Pressing the Transfer Deferred Tests button displays a dialog box like the one in Figure 14.40. Select YES to transfer the deferred test(s).

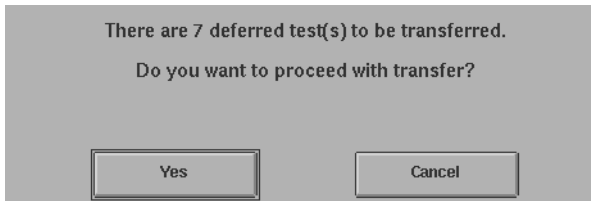


Figure 14.40 Proceed with Transfer Dialog Box

If you do not want these tests to be transferred, press the Clear Deferred Tests button. A dialog will be displayed like that in Figure 14.41. Select YES to clear the deferred tests list.

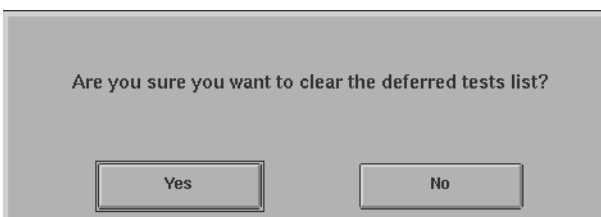


Figure 14.41 Proceed with Clearing Deferred Tests List Dialog Box

Printing To a File

The Print to a File utility is offered via the PRINT-TO-FILE SETUP button on the Print Setup screen. This allows you to export both default-style and multi-test printouts along with their accompanying patient and examination data as a computer file. Images are converted to TIFF or PDF files and the data is exported as an XML file. This is the only way in which the multi-test printouts, such as GPA or Overview, can be exported to the file server. If you have licensed and registered the DICOM Gateway 2.0 software, you can export an Encapsulated PDF to the DICOM Archive.



Note: With the “Save & Transmit” option set, when you save an exam, you will also transmit *only* the default-style printout—not a full GPA or Overview multi-test printout for example (the GPA Single Field Analysis print style is only available if you have the GPA software licensed on your HFA II-).

Changing the Print-To-Files Options

Use the following process to change the Print Destination from the initial set up, if necessary.

- 1 From the Main Menu, select *SYSTEM SETUP*>PRINT SETUP, to open the Print Setup screen.
- 2 From the Print Setup screen, select the PRINT-TO-FILE SETUP button to display the Print-To-File Setup screen (Figure 14.42).

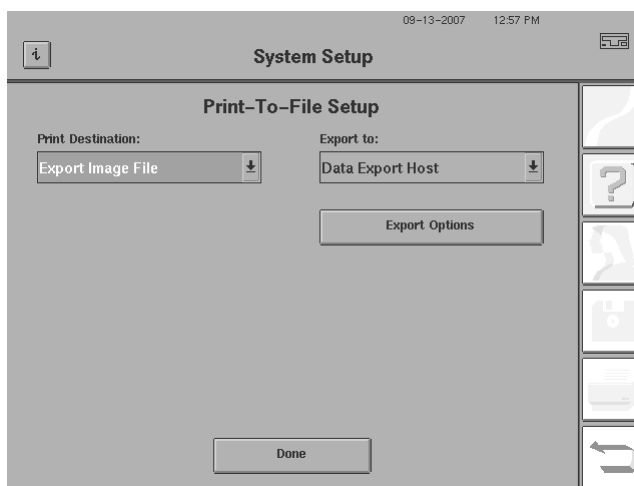


Figure 14.42 Print-To-File Setup Screen

- 3 Select the PRINT DESTINATION: drop-down box (see Figure 14.43). Your available selections in this drop-down box are:
 - PRINT TO PRINTER
Choose this selection if you wish only to print to paper.
 - ASK BEFORE PRINT
Choose this selection if you wish to be asked for the print destination each time you enter a print command.
 - EXPORT IMAGE FILE
Choose this selection if you wish to transmit a TIFF or PDF image file of selected printouts to the file server, or an EMR/PMS/DICOM system.

- EXPORT IMAGE FILE AND PRINT

Choose this selection if you wish to export a TIFF or PDF image file, as well as to print out a paper copy.

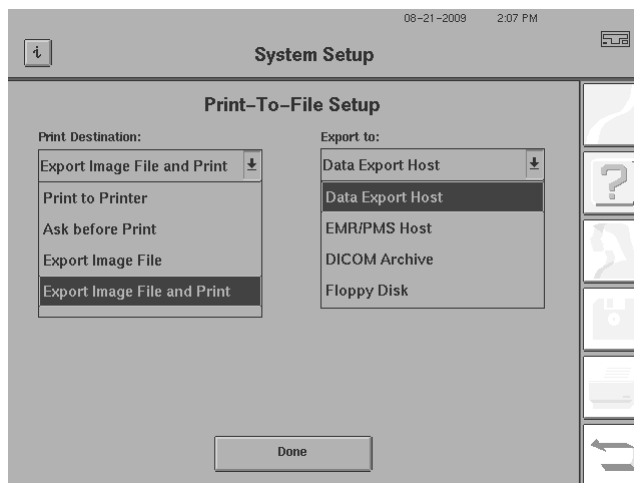


Figure 14.43 Print Destination: and Export to: Drop-Down Buttons

- 4 If you selected "Ask before Print", "Export Image File" or "Export Image File and Print", select the EXPORT TO: drop-down button and select your desired destination as either DATA EXPORT HOST, EMR/PMS HOST, DICOM ARCHIVE, or FLOPPY DISK.



Note: The Data Export Host or EMR/PMS Host options will only appear on the list if you have registered the HFA-NET Pro software on your HFA II-*i*. The DICOM Archive option is only available if you have licensed and registered the DICOM Gateway 2.0 software on your HFA II-*i*.

5

If you selected an image file destination in the previous step, select the EXPORT OPTIONS button to display the Export Options screen (Figure 14.44).



Note: The Export Options button will not be displayed if you selected DICOM Archive from the EXPORT TO: drop-down list. The image format for the DICOM Archive is always set to Encapsulated PDF—a DICOM formatted PDF file transmitted via DICOM protocols.

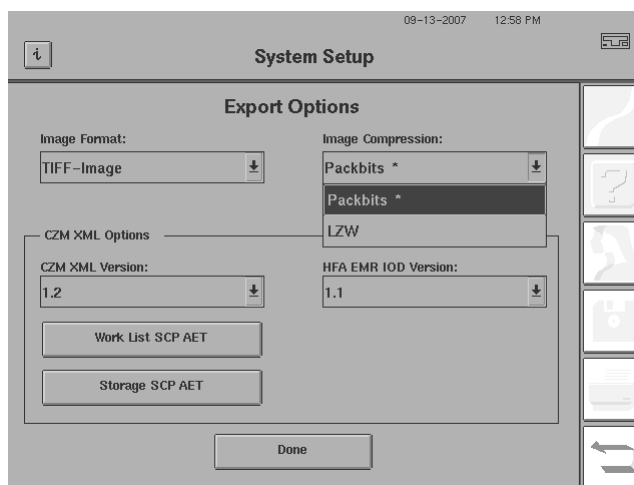


Figure 14.44 Export Options Screen

- 6 Select an image format in the IMAGE FORMAT: drop down box. You can select TIFF-IMAGE (Tagged Image File Format, TIFF version 6.0) or PDF-DOCUMENT (Portable Document Format, PDF 1.2/Acrobat 3.x).
- 7 If you selected TIFF-IMAGE, you can specify the compression used for the image. Select an image compression in the IMAGE COMPRESSION: drop down box. You can select PACKBITS or LZW. If you selected PDF-DOCUMENT, the only compression available is ZIP.
- 8 If you are using an EMR/PMS/DICOM System with you HFA II-*i*, consult your documentation for required settings to enter into the CZM XML Options fields.
- 9 Select DONE to save your Export Options and return to the Print-To-File Setup screen.

If you have set up the Print-To-Files Options to “Ask Before Print,” a dialog box will appear ([Figure 14.45](#)), each time you have selected an exam for printing. Use it to select your printout destination.

- Select PRINTER to generate a hard copy paper printout.
- Select IMAGE FILE to save an image file to floppy disk or to export it via the network.
- Select PRINTER AND FILE to print both a hard copy paper printout and export an image file via the network.

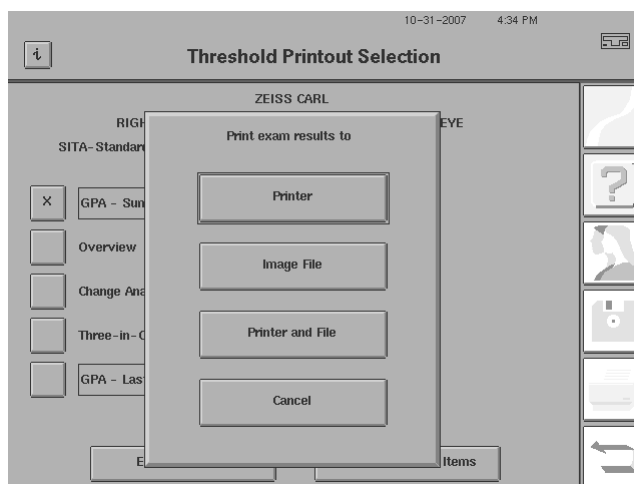


Figure 14.45 Ask Before Print Dialog Box

Using an EMR/PMS/DICOM System

HFA-NET Pro is a licensed software utility that allows you to connect your HFA II-*i* to either a non-DICOM HFA II-*i* compliant Electronic Medical Records (EMR) system or a non-DICOM HFA II-*i* compliant Patient Management System (PMS). The DICOM Gateway (1.0 or 2.0) is a purchased and licensed software program that allows you to connect one or more HFA II-*i* series instruments to a qualified DICOM system, such as Carl Zeiss Meditec’s FORUM or VISUPAC software or the United States Veterans Administration’s (VA) Vista system. To use HFA-NET Pro or the DICOM Gateway, it is necessary for you to have licensed these features of your HFA II-*i* with Carl Zeiss Meditec and to have an operational EMR/PMS/DICOM system that is compatible with the HFA II-*i*.

Once you have purchased and licensed the DICOM Gateway (1.0 or 2.0), and purchased and installed a DICOM system, see the *HFA II-i DICOM Gateway 1.0 User Manual* or *DICOM Gateway 2.0 User Manual* for detailed procedures to install and configure your DICOM Gateway software. See [Appendix \(H\), "DICOM Gateway 2.0 \(Optional\)"](#) for setting up your HFA to use the DICOM Gateway 2.0.



Note: You should check with the DICOM Conformance Statement and/or your EMR/PMS/DICOM vendor to determine the compatibility of their system with your HFA II-i; before purchasing a DICOM Gateway software license from Carl Zeiss Meditec.



Note: Make sure that the EMR/PMS/DICOM system is accessible. Your system must be connected to the network for network import/export processes.

Patient Uniqueness—Patient ID and Issuer of ID

The HFA II-i 5.x database is different from previous software versions in what determines patient uniqueness. To be compatible with EMR/PMS/DICOM systems, a Patient ID is now required. In the Patient ID-centric 5.x database, a patient is determined to be unique by only two fields—Patient ID and Issuer of ID. A Patient ID is required, but the Issuer of ID is optional. Issuer of ID (Issuer of Patient ID) is a DICOM data field to specify the assigning authority of the Patient ID. The Issuer of ID may be automatically created on the HFA or EMR/PMS/DICOM system, or specified manually in the HFA. If specified manually, the Issuer of ID should be a practice-wide identifier which is the same for all instruments. To specify the Issuer of ID, see ["Specifying Your Practice's Issuer of ID," on page 14-40](#). When the Issuer of ID is manually specified, it is used whenever a Patient ID is entered for a patient on your HFA. If you do not enter a Patient ID, an Issuer of ID and Patient ID is automatically created and entered for the patient. If you do not specify an Issuer of ID, when you enter a Patient ID for a patient, the Issuer of ID will be blank. See [Table 14.2](#) below.

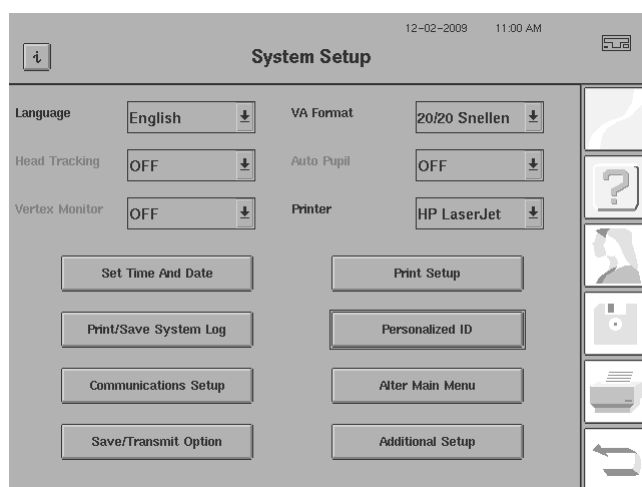
Table 14.2 Patient ID and Issuer of ID Fields

Issuer of ID Field	Patient ID Field	Issuer of ID Used
Issuer of ID manually specified.	Patient ID entered.	Manually specified Issuer of ID is used.
Issuer of ID manually specified.	Patient ID not entered.	Patient ID is created and HFA specific Issuer of ID is used. ^a
issuer of ID blank.	Patient ID entered.	Issuer of ID remains blank.
Issuer of ID blank.	Patient ID not entered.	Patient ID is created and HFA specific Issuer of ID is used. ^a

a. A unique 29-character Patient ID such as "1966.1207.786F.C555.B6B9.473F" will be automatically created for the patient from the patient's name and date of birth. An HFA specific Issuer of ID will be entered for the patient (1.2.276.0.75.2.2.30.2).

See ["Imported Patient Rules and Conflicts," on page 14-59](#) for information on imported Patient ID and Issuer of ID rules and conflicts.

Specifying Your Practice's Issuer of ID

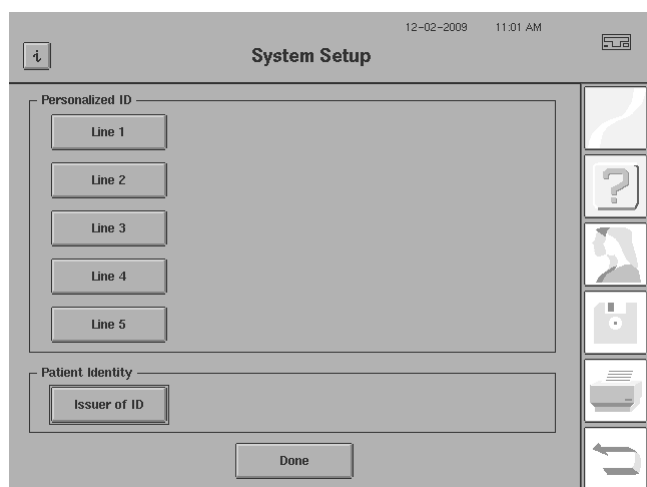


1 From the Main Menu screen, select the *SYSTEM SETUP* icon.

2 Press PERSONALIZED ID.

3 Press ISSUER OF ID.

4 Input up to a total of 64 Issuer of ID characters and spaces from the pop-up keyboard. You can use any character found on your keyboard. Pressing the CAPS key will allow you to switch between upper and lower case letters. Press ENTER, and then DONE. You will automatically be returned to the System Setup screen.



Exporting

HFA-NET Pro or the DICOM Gateway software allows export of exam data from the HFA II-*i* to an EMR/PMS/DICOM system. Once you have licensed HFA-NET Pro, and purchased and installed an EMR system or a PMS, see ["Setting Up Exporting to Non-DICOM EMR/PMS Systems and DICOM Systems using DICOM Gateway 1.0," on page I-22](#) to set up the EMR/PMS Export feature. DICOM Gateway 2.0 exports exam data and/or a report (a DICOM formatted Encapsulated PDF) to a DICOM archive, such as FORUM.



Note: Exporting exams to a DICOM Archive can only be done from the hard drive. If you want to export exams contained on a floppy disk or USB storage device to a DICOM Archive, use Copy Tests to copy them to the hard drive first.

Importing Work Lists

With HFA-NET Pro, your HFA II-*i* allows retrieval of patient demographic information from a work list generated by a non-DICOM EMR/PMS system. The DICOM Gateway (1.0 or 2.0) allows retrieval of patient demographic information from a work list generated by a DICOM system. Electronic medical

records and patient management systems use work lists to group patient data needed for particular tasks, like exam scheduling. A work list is a list of patients specifying what services are required, or have been provided, for them. This allows all patient data and scheduling information to be entered in the EMR/PMS/DICOM system and then later imported into your HFA II-*i*. Work list information might include patient names, exam types, exam dates and times. Additional data elements in the patient database include patient last name, patient given name, patient gender, requesting physician name, and accession number. See your EMR/PMS/DICOM documentation for more information on using work lists.

When patient information is recalled from a work list, a new patient record is created in your HFA II-*i* database if the corresponding patient record does not exist. If the patient record exists in your HFA II-*i*, the patient record will be updated with information from the work list. See [“Imported Patient Rules and Conflicts,”](#) on page 14-59.

Exporting to EMR/PMS/DICOM Systems

To export exam data and reports to EMR/PMS/DICOM systems, use the same export functions (Transfer Tests, Save & Transmit, and Print To a File) as you would exporting to a computer file, except select the Transfer Destination to EMR/PMS Host for EMR/PMS systems and DICOM systems using DICOM Gateway 1.0, or DICOM Archive for DICOM systems using DICOM Gateway 2.0.



Note: DICOM Gateway 2.0 can be set to automatically export raw exam data at the end of an exam by enabling the END OF TEST EXAM DATA EXPORT option on the DICOM Gateway Services screen (see [“Enable/Disable DICOM Gateway Services,”](#) on page H-4).

Setting Up Save/Transmit for EMR/PMS/DICOM Systems

The following is a procedure to set up Save & Transmit for EMR/PMS/DICOM systems.

- 1 From the Main Menu, select *SYSTEM SETUP>SAVE/TRANSMIT OPTION* to display the screen that is shown in [Figure 14.46](#).
- 2 Open the Transfer Destination drop-down box and select EMR/PMS HOST for EMR/PMS systems and DICOM systems using DICOM Gateway 1.0 ([Figure 14.46](#)), or DICOM ARCHIVE for DICOM systems using DICOM Gateway 2.0 ([Figure 14.47](#)).

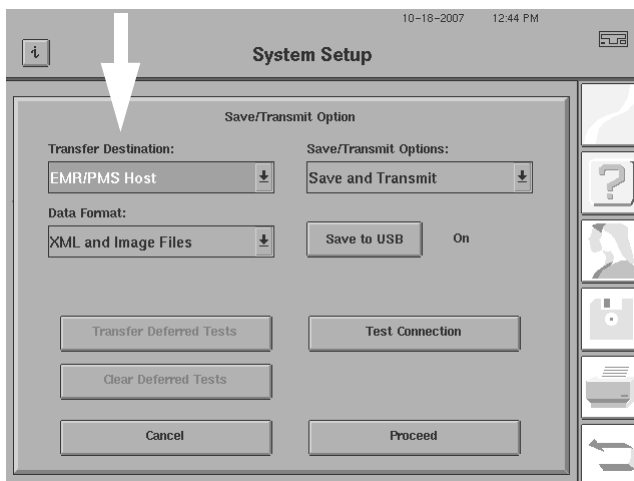


Figure 14.46 Setting Transfer Destination Drop-Down Box to EMR/PMS Host

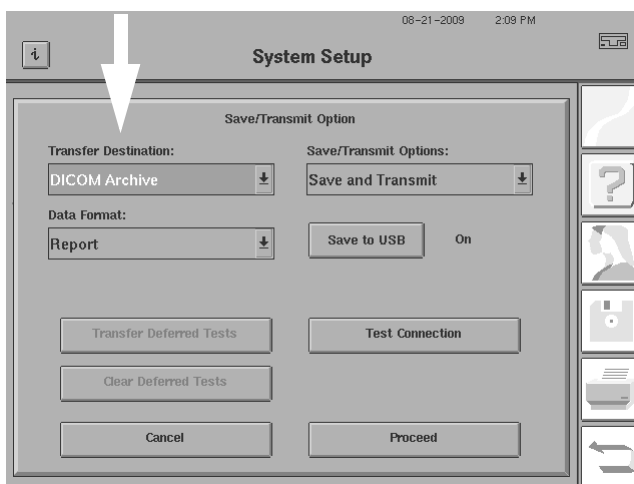


Figure 14.47 Setting Transfer Destination Drop-Down Box to DICOM Archive



Note: The Data Export Host or ERM/PMS Host options in the Transfer Destination drop-down box are only available in the listing if you have licensed the HFA-NET Pro networking software on your HFA II-*i*. The DICOM Archive option in the Transfer Destination drop-down box is only available in the listing if you have licensed the DICOM Gateway 2.0 software on your HFA II-*i*. Otherwise, these options will not appear in the Transfer Destination drop-down box.

3

If you selected the EMR/PMS Host option, open the Data Format drop-down box and select XML AND IMAGE FILES. If you selected the DICOM Archive option, REPORT will be automatically selected. A report is an Encapsulated PDF—a DICOM formatted PDF file transmitted via DICOM protocols. Only DICOM compatible applications can read an Encapsulated PDF file.

4

Open the Save/Transmit Option drop-down box and select SAVE AND TRANSMIT.

5

Press PROCEED.

Manually Exporting to a DICOM Archive using Transfer Tests (DICOM Gateway 2.0 only)

Use the following steps to manually export exam data and reports to a DICOM Archive using the Transfer Tests function:

- 1 From the Main Menu, select the *FILE FUNCTIONS* icon.
- 2 Select TRANSFER TESTS to open the Transfer Tests setup screen.
- 3 Select your source of test data from the Source drop-down box (Figure 14.48) as HARD DRIVE.



Figure 14.48 Transfer Tests Screen (with drop-down boxes open)

- 4 From the Destination drop-down box (Figure 14.48) select DICOM ARCHIVE.



Note: The DATA EXPORT HOST or ERM/PMS HOST options in the Destination drop-down box are only available in the listing if you have licensed the HFA-NET Pro networking software on your HFA II-*i*. The DICOM ARCHIVE option in the Destination drop-down box is only available in the listing if you have licensed the DICOM Gateway 2.0 software on your HFA II-*i*. Otherwise, these options will not appear in the Destination drop-down box.

- 5 Select the Export Format drop-down box (Figure 14.49). DICOM Archive available selections in this drop-down box are:

- EXAM DATA
Choose this selection if you wish to export raw IOD exam data.
- REPORT
Choose this selection if you wish export a report—a DICOM formatted PDF file transmitted via DICOM protocols.
- EXAM DATA AND REPORT
Choose this selection if you wish to export both raw exam data and reports.

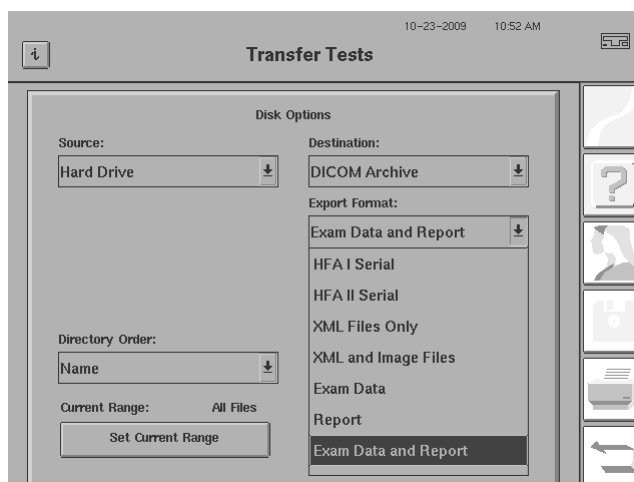


Figure 14.49 Transfer Tests Screen (with Export Format: drop-down box open)



Note: The EXAM DATA, REPORT, and EXAM DATA AND REPORT options in the Export Format drop-down box are only available in the listing if you have licensed the DICOM Gateway 2.0 software on your HFA II-i. Otherwise, these options will not appear in the Export Format drop-down box.

6

After selecting PROCEED and following the on-screen instructions to transfer the tests that you have selected (see [“Transferring Tests,”](#) on page 14-30 for additional information), the exam data and/or reports will be exported to the DICOM Archive. Progress bars appear during transfer: “Transferring Exam Data” or “Transferring Reports”. If you selected EXAM DATA AND REPORT, exam data will be transferred first, followed by reports.



Note: Exam data will not be exported to the DICOM Archive if you have already exported the same exam data, it already exists on the DICOM Archive, or was imported from the DICOM Archive. Reports will always be exported to the DICOM Archive. If you need to re-export exam data to the DICOM Archive, you can use the Reset DICOM Status function (see [“Reset DICOM Status,”](#) on page I-30).



Note: For each GPA report exported, the corresponding GPA Selection information will also be exported to the DICOM Archive. The GPA Selection information is retrieved from the DICOM Archive when a GPA exam selection is required for GPA Printout Selection and the source for Print Selection is DICOM Archive.



Note: Exporting exams to a DICOM Archive can only be done from the hard drive. If you want to export exams contained on a floppy disk or USB storage device to a DICOM Archive, use Copy Tests to copy them to the hard drive first.

Importing Work Lists from Non-DICOM EMR/PMS Systems and DICOM Systems using DICOM Gateway 1.0



Note: If you have licensed DICOM Gateway 2.0, but wish to use HFA-NET Pro (CZM-XML via FEP) or DICOM Gateway 1.0 work lists, WORK LIST must be unchecked in the DICOM Gateway Services screen (see [“Enable/Disable DICOM Gateway Services;”](#) on page H-4).

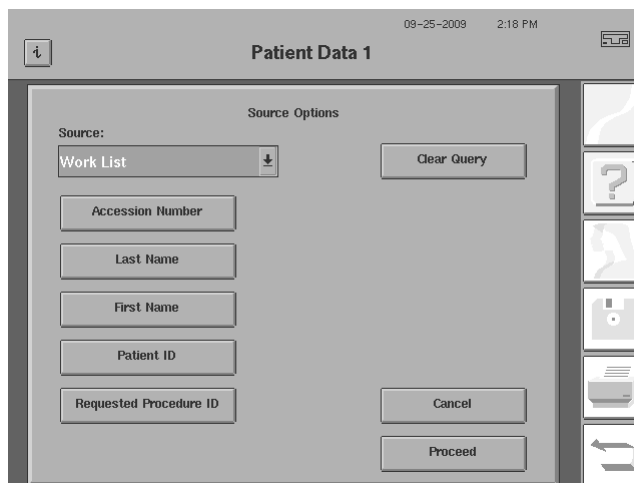
To import patient data using a work list from your non-DICOM EMR/PMS or DICOM system using DICOM Gateway 1.0:

- 1 From the Main Menu, press the *PATIENT DATA* icon to display the Patient Data 1 screen as shown in [Figure 14.50](#).

Figure 14.50 Empty Patient Data Screen

- 2 Press the RECALL PATIENT DATA button to bring up the Source Options screen.

- 3 Touch the drop-down arrow next to the Source drop-down box. Select your source of patient data as WORK LIST as shown in [Figure 14.51](#).



- 4 *Figure 14.51 Select Work List on Source Options Screen (QUERY AND RETRIEVE)*
- If the Work List Mode is QUERY AND RETRIEVE (See ["Setting Up Work Lists for Non-DICOM EMR/PMS Systems and DICOM Systems using DICOM Gateway 1.0,"](#) on page I-23), you can limit the selection by Accession Number, Last Name, First Name, Patient ID, and Requested Procedure ID ([Figure 14.51](#)). These query fields are case independent. Specify any limitations that you wish to place on your search of all available patients from the Work List. These limitations determine which patient(s) are selected. Select the CLEAR QUERY button to clear all these query fields. If the Work List Mode is RETRIEVE ONLY, then these limiting selections will be greyed out ([Figure 14.52](#)) and the complete Work List will be retrieved.



Note: Accession Number and Requested Procedure ID are identifying numbers for exams or procedures. See your EMR/PMS/DICOM documentation for more information.



Note: Your EMR/PMS/DICOM provider will determine which Work List Mode is available for you to use with their system.



Note: In order to be able to see the correct list of patients, you must ensure that the scheduled patient date on the server matches the local system date on the HFA.

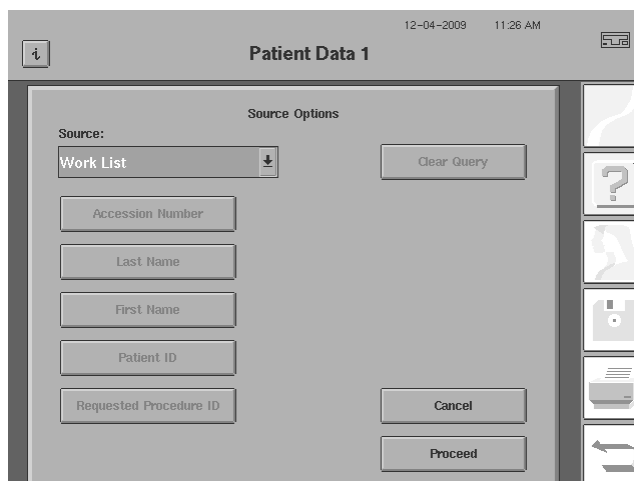


Figure 14.52 Source Options Screen (RETRIEVE ONLY)

- 5 Once you have entered the various limitations that you wish to use, select PROCEED. A message will be displayed indicating "Waiting for response from server..." as the patient list is being retrieved from the external EMR/PMS/DICOM application. A Work List browser screen (Figure 14.53) will then open displaying the complete list of patients that satisfied your search criteria. The list will always be sorted by patient name in ascending alphabetical order.

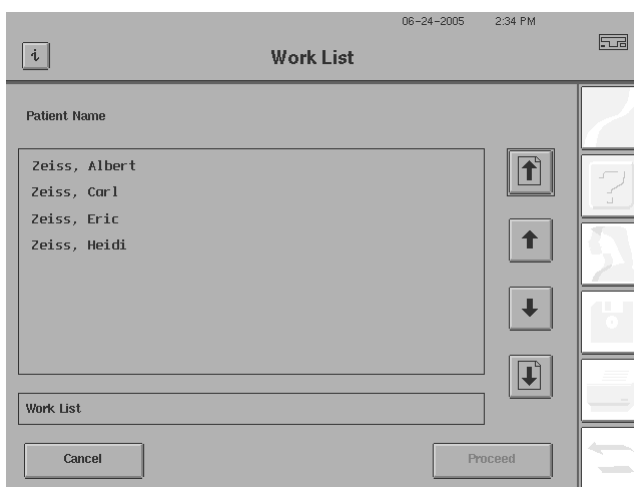


Figure 14.53 Work List Browser Screen

- 6 From the Work List browser, select the patient you want. Touching an entry on the Work List browser screen selects it. Touching an entry a second time de-selects it. During the selection process, you can use the up/down one line and up/down one screen buttons to move through your file listing more rapidly, if your listing is two or more screens in length. Press PROCEED to bring up the Patient Data 1 screen with the selected patient information displayed.



Note: If the selected patient has an Accession Number or Order number from the EMR/PMS/DICOM system, it will appear in the lower left-hand side of the Patient Data 1 screen as shown in Figure 14.54, with either an Accession Number or Order Number label.

The screenshot shows the 'Patient Data 1' screen with the following fields and buttons:

- Patient ID:** 1234
- Patient Name:** Zeiss, Corl
- Date of Birth:** 09-22-1943
- Gender:** Male
- Right Eye Comments:** small pupil
- Left Eye Comments:**
- Accession Number:** A122334455 (indicated by a white arrow)
- Buttons:** Clear Patient Data, Recall Patient Data, Patient Folder, More Patient Data, Proceed
- Visual Aids:** A vertical strip of icons on the right side, including a question mark, a floppy disk, a printer, and a refresh icon.

7 *Figure 14.54 Patient Data Screen with Patient Data and Accession Number*

Select PROCEED to save the patient information and return to the Main Menu (or to a selected test if you entered the Patient Data screen through a selected test).



Note: If a problem occurs during this procedure, refer to [Table I.5, "Work List Networking Error Messages,"](#) on page I-36.



Note: See ["Imported Patient Rules and Conflicts,"](#) on page 14-59 for information on imported Patient ID and Issuer of ID rules and conflicts.

Importing Work Lists from DICOM Systems using DICOM Gateway 2.0



Note: In order to use DICOM Gateway 2.0 work lists, WORK LIST must be selected in the DICOM Gateway Services screen (see ["Enable/Disable DICOM Gateway Services,"](#) on page H-4).

To import patient data using a work list from your DICOM system using DICOM Gateway 2.0:

1

From the Main Menu, press the *PATIENT DATA* icon to display the Patient Data 1 screen as shown in [Figure 14.55](#).

Figure 14.55 Empty Patient Data Screen

- 2 Press the RECALL PATIENT DATA button to bring up the Source Options screen.
- 3 Touch the drop-down arrow next to the Source drop-down box. Select your source of patient data as WORK LIST as shown in Figure 14.56.

Figure 14.56 Select Work List on Source Options Screen

If you have not licensed HFA-NET Pro, and WORK LIST has not been enabled on the DICOM Gateway Services screen, a message is displayed as shown in [Figure 14.57](#). You need to enable WORK LIST to use the DICOM Gateway 2.0 worklist function (see ["Enable/Disable DICOM Gateway Services:"](#) on page H-4).

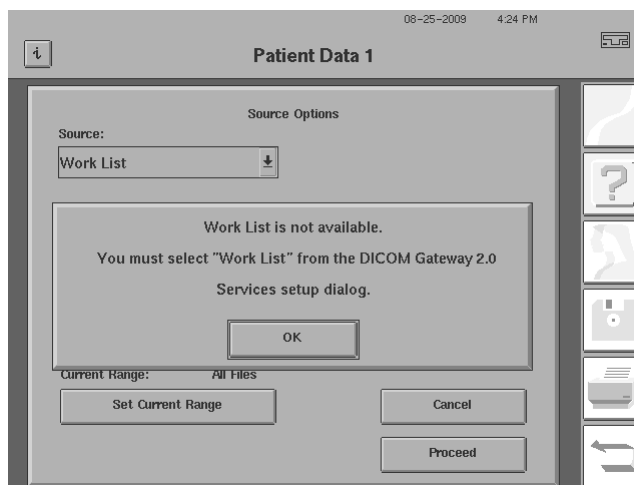


Figure 14.57 Work List is Not Available Message

- 4 You can limit the selection by Accession Number, Last Name, First Name, Patient ID, and Requested Procedure ID ([Figure 14.56](#)). These query fields are case independent. Specify any limitations that you wish to place on your search of all available patients from the Work List. Select the CLEAR QUERY button to clear all these query fields. These limitations along with the entries on the Work List Broad Query Setup screen ([Figure 14.58](#)) determine which patient(s) are selected.



Note: Accession Number and Requested Procedure ID are identifying numbers for exams or procedures. See your EMR/PMS/DICOM documentation for more information.



Note: If your DICOM system supports the wild card character "*", you can enter it to mean any characters in the Last Name and First Name fields. For example, entering "j*" in the First Name field would select all patients with a first name starting with "j". Entering "*" in the Last Name field and leaving the First Name and Patient ID fields blank would select all patients from the DICOM Archive.



Note: In order to be able to see the correct list of patients, you must ensure that the scheduled patient date on the DICOM server matches the local system date on the HFA.

- 5 Select the BROAD QUERY SETUP button to display the Work List Broad Query Setup screen. Initially, all fields are blank and all patients from the Work List will be selected. When the DEFAULT button is selected ([Figure 14.58](#)) the values are set to select patients from the work list for today (HFA system date), to the AE Title entered in the DICOM Gateway Setup screen (see ["DICOM 2.0 Gateway Setup on HFA,"](#) on page H-3), and to the OPV modality type code (Ophthalmic Visual Field). Broad Query is useful to obtain a list of all patients scheduled regardless of instrument, or to see the entire worklist irrespective of the date scheduled.

Select the FROM DATE: and TO DATE: buttons to enter the date range you want to search the work list. Select TODAY to the right of these buttons to always enter today's date—the HFA system date (Today always means the current date). If you leave either date field blank, then no dates will be used in your search.

Select the DEFAULT button to return to the default Broad Query values described above.

Select SAVE to save your entries and return to the Work List Source Options screen. Once set up and saved, you only need to select the BROAD QUERY SETUP button again if you want to change the values on the Work List Broad Query Setup screen.

The screenshot shows the 'Work List Broad Query Setup' window. It has a title bar with 'Patient Data 1' and a timestamp of '09-25-2009 11:10 AM'. The window contains four input fields: 'From Date:', 'To Date:', 'AE Title:', and 'Modality:'. Each field has a 'Today' button to its right. Below these fields are three buttons: 'Default', 'Cancel', and 'Save'. The 'Default' button is highlighted. On the right side of the window, there is a vertical toolbar with several icons, including a question mark, a magnifying glass, a floppy disk, a printer, and a refresh arrow.

Figure 14.58 Work List Broad Query Setup (DEFAULT button pressed)

- 6 Once you have set up and saved Broad Query, and entered the limitations that you wish to use, select PROCEED. A message appears indicating “Waiting for response from server...” as the patient list is being retrieved from the external EMR/PMS/DICOM application. A Work List browser screen (Figure 14.59) will then display the complete list of patients that satisfied your search criteria. The list will always be sorted by patient name in ascending alphabetical order.

The screenshot shows the 'Work List' browser screen. It has a title bar with 'Work List' and a timestamp of '09-25-2009 11:13 AM'. The main area contains a table with three columns: 'Patient Name', 'Patient ID', and 'Accession'. The table lists two patients: 'Forest, Green' with ID '887766' and Accession '27', and 'McBrian, Thomas' with ID 'C2H081222004' and Accession 'C2H090128001'. To the right of the table are four buttons: an up arrow, a down arrow, a magnifying glass, and a refresh arrow. Below the table are three buttons: 'Cancel', 'Detail', and 'Proceed'. At the bottom left, there are labels for 'Requested Procedure ID:', 'Procedure Description:', and 'Procedure Start Date:'. On the right side of the window, there is a vertical toolbar with several icons, including a question mark, a magnifying glass, a floppy disk, a printer, and a refresh arrow.

Figure 14.59 Work List Browser Screen

- 7 From the Work List browser, select the patient you want. Touching an entry on the Work List browser screen selects it (Figure 14.60) and work item information is displayed below the list. Touching an entry a second time de-selects it. During the selection process, you can use the up/down one line and up/down one screen buttons to move through your file listing more rapidly, if your listing is two or more screens in length.

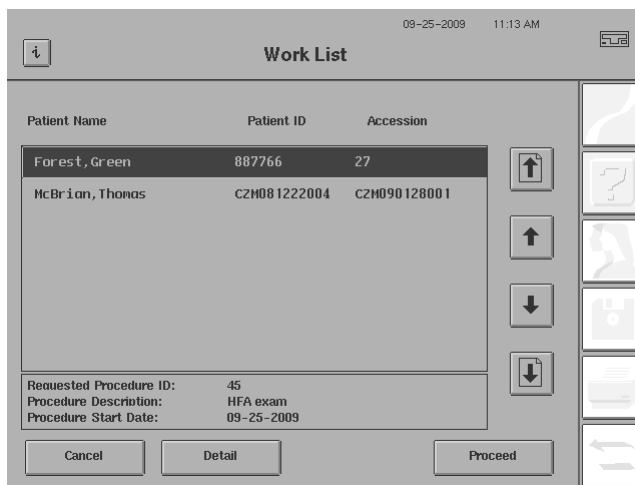


Figure 14.60 Work List Browser Screen – Patient Selected

- 8 Press DETAIL to bring up a Details screen displaying patient and scheduling information. Select OK to return to the Work List browser.

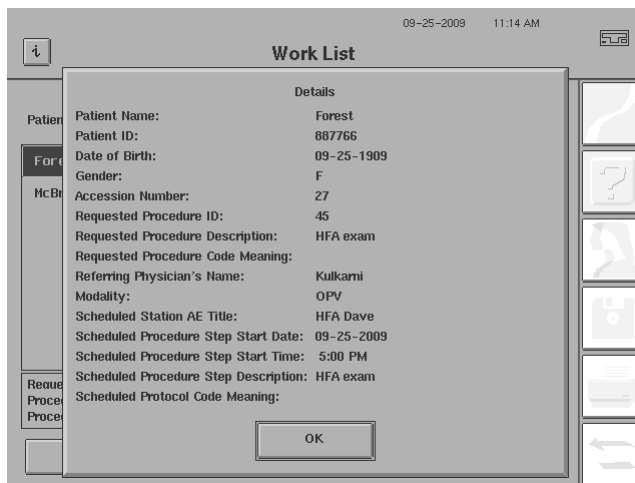


Figure 14.61 Work List Details Screen

- 9 Press PROCEED to bring up the Patient Data 1 screen with the selected patient information displayed. If the selected patient has an Accession Number from the EMR/PMS/DICOM system, it will appear in the lower left-hand side of the Patient Data 1 screen as shown in Figure 14.62, with an Accession Number label.

The screenshot shows a software interface titled "Patient Data 1" with a date and time stamp of "09-25-2009 11:14 AM". The interface contains several input fields and buttons. The patient information entered is: Patient ID: 887766, Patient Name: Forest Green, Date of Birth: 09-25-1909, Gender: Female. There are buttons for "Clear Patient Data", "Recall Patient Data", "Patient Folder", and "More Patient Data". A "Trial Lens" section has a "Right" eye input field. Below this are "Right Eye Comments" and "Left Eye Comments" fields. At the bottom, the "Accession Number" is set to "27", with a white arrow pointing to it. A "Proceed" button is located at the bottom right. A vertical toolbar on the right side contains icons for a question mark, a folder, a floppy disk, a printer, and a refresh/clear icon.

Figure 14.62 Patient Data Screen with Patient Data and Accession Number

10 Select PROCEED to save the patient information and return to the Main Menu (or to a selected test if you entered the Patient Data screen through a selected test).



Note: If a problem occurs during this procedure, refer to [Table I.5, "Work List Networking Error Messages,"](#) on page I-36.



Note: See ["Imported Patient Rules and Conflicts,"](#) on page 14-59 for information on imported Patient ID and Issuer of ID rules and conflicts.

Recall Patients, View, or Print Tests from a DICOM Archive (DICOM Gateway 2.0 only)

If you have purchased and registered DICOM Gateway 2.0, you can transfer patient information and view or print tests from a DICOM Archive.

When patient information is recalled (or tests are retrieved for viewing or printing) from a DICOM Archive, a new patient record is created in your HFA II-/database if the corresponding patient record does not exist. If the patient record exists in your HFA II-*i*, the patient record will be updated with information from the DICOM Archive.



Note: See [“Imported Patient Rules and Conflicts,”](#) on page 14-59 for information on imported Patient ID and Issuer of ID rules and conflicts.



WARNING: Every patient has an identifier that consists of Name, Date of Birth, Patient ID, and Issuer of ID. To avoid unintentional automatic merging of patient records, VERIFY a unique combination of Name, Date of Birth, Patient ID, and Issuer of ID exists when patients are copied, transferred, retrieved from an archive, or restored from a backup. There is no way to separate the combined records of erroneously merged patients. Automatic merging of patient records occurs when a patient exists in the local database with the EXACT SAME Name, Date of Birth, Patient ID, and Issuer of ID as a patient that is copied, transferred, retrieved from an archive, or restored from a backup.

For example, consider the following scenario:

Patient A: This patient is currently on the local HFA database and was automatically assigned a unique Patient ID by the instrument because it was a blank field prior to a software upgrade to V5.x software or during an import to the HFA through a copy, transfer, retrieval from archive, or a restore from backup.

Patient B: This patient is about to be transferred to the local HFA database and has the same Name and Date of Birth as Patient A, but does not have a Patient ID (i.e. field is blank). When Patient B is copied, transferred, retrieved from an archive, or restored from a backup to the local HFA database, Patient B will automatically be assigned the same Patient ID and Issuer of ID as Patient A, and Patient B will be merged with Patient A.



Note: You can only view or print tests from a DICOM Archive if raw exam data exists on the DICOM Archive. If you are only exporting reports to the DICOM Archive, and not raw exam data, the patient can be selected, but no tests will be available to view or print.

To recall patient data from a DICOM Archive:

1

From the Main Menu, press the *PATIENT DATA* icon to display the Patient Data 1 screen as shown in [Figure 14.63](#), and press the RECALL PATIENT DATA button.

Figure 14.63 Empty Patient Data Screen

OR to view tests from a DICOM Archive:

- 1 From the Main Menu, press the *FILE FUNCTIONS* icon to display the File Functions menu as shown in Figure 14.64, and press the VIEW TEST button.

Figure 14.64 File Functions Menu

OR to print tests from a DICOM Archive:

- 1 From the Main Menu, press the *PRINT* icon to display the Print Selection screen.

Continue:

- 2 On the Patient Data 1, Print Selection, or View Test screen, touch the drop-down arrow next to the Source drop-down box. Select your source of patient data as DICOM ARCHIVE as shown in Figure 14.65.

Note: When recalling patients, the last source of patient data is remembered by the HFA.

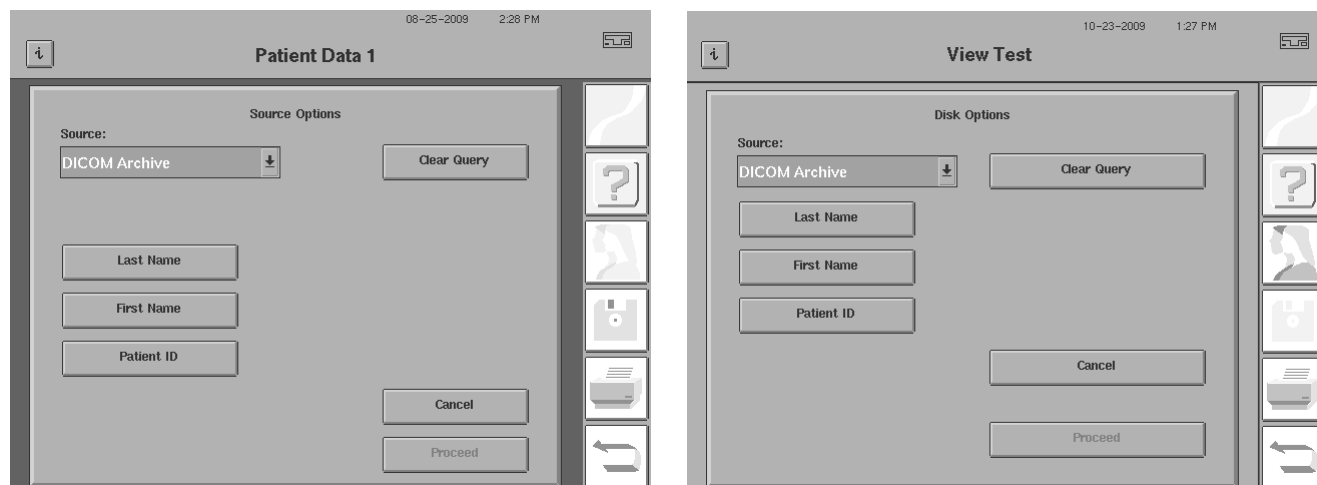


Figure 14.65 Select DICOM Archive from the Patient Data 1 and View Test Screen

- 3 You must limit your patient selection with at least one entry by using the Last Name, First Name, or Patient ID query buttons in order to proceed (Figure 14.66). These query fields are case independent. Specify the limitations that you wish to place on your search of all available patients from the DICOM Archive. These limitations determine which patient(s) are selected. Select the CLEAR QUERY button to clear all these query fields.



Note: A patient cannot be selected if the patient has no exams. When recalling patients, the exams can be from any instrument, not just the HFA. Only HFA exams can be used to view or print tests.



Note: If your DICOM system supports the wild card character "*", you can enter "*" to mean any characters in the Last Name and First Name fields. For example, entering "j*" in the First Name field would select all patients with a first name starting with "j". Entering "*" in the Last Name field and leaving the First Name and Patient ID fields blank selects all patients from the DICOM Archive.

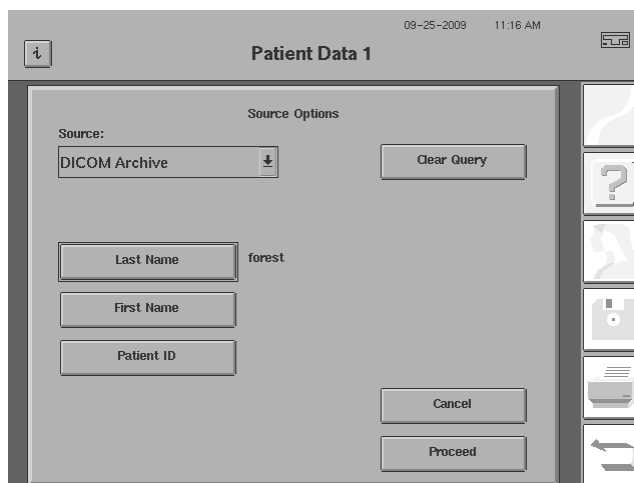


Figure 14.66 Recalling Patient from DICOM Archive

- 4 Once you have entered the various limitations that you wish to use, select PROCEED. A message appears indicating “Waiting for response from server...” as the patient list is being retrieved from the DICOM Archive. A Patient List browser screen (Figure 14.67) will then display the complete list of patients that satisfied your search criteria. The list will always be sorted by patient name in ascending alphabetical order.

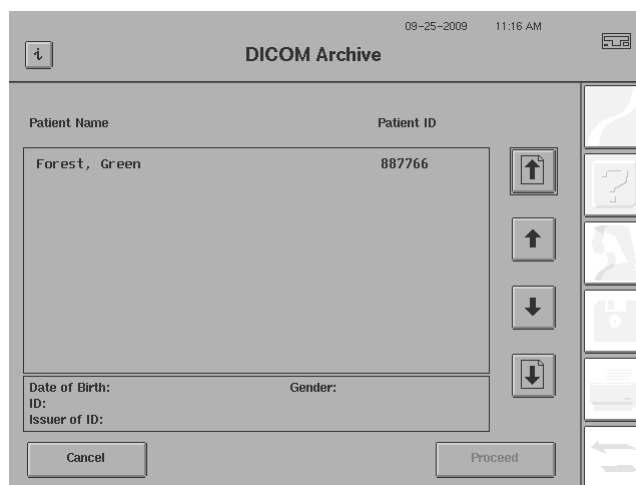


Figure 14.67 Patient List Browser Screen

- 5 From the Patient List browser, select the patient you want. Touching an entry on the Patient List browser screen selects it (Figure 14.68) and displays patient information below the list. Touching an entry a second time de-selects it. During the selection process, you can use the up/down one line and up/down one screen buttons to move through your file listing more rapidly, if your listing is two or more screens in length.

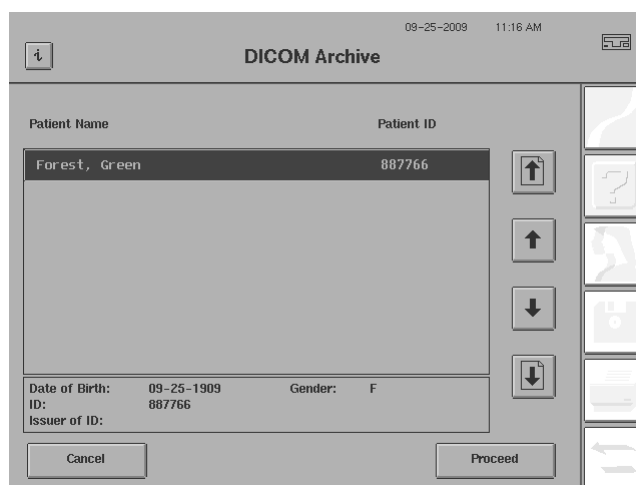
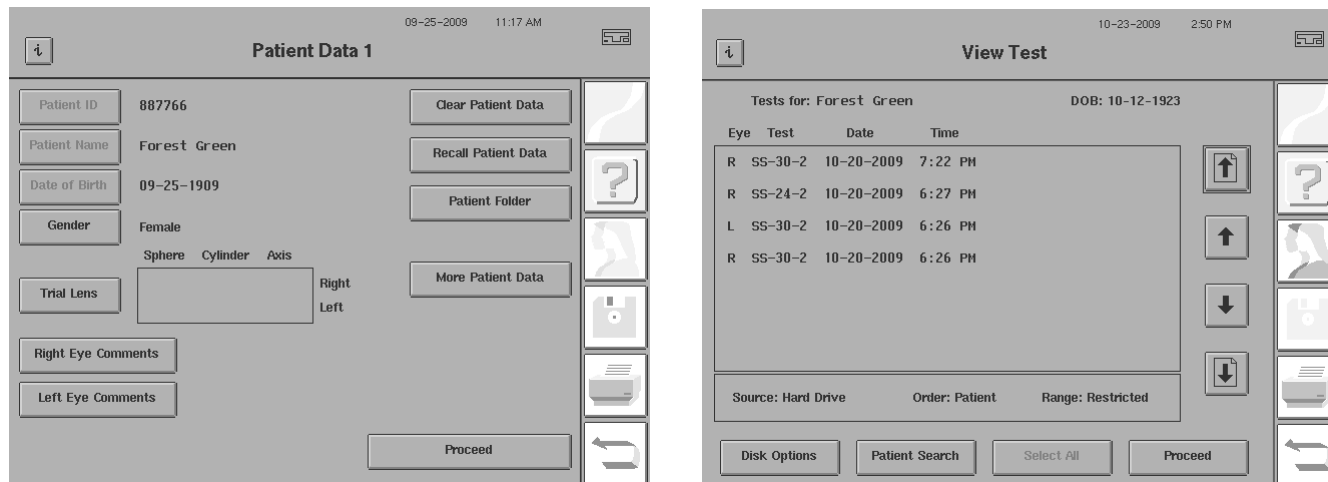


Figure 14.68 Patient List Browser Screen – Patient Selected

- 6 When recalling a patient, press PROCEED to bring up the Patient Data 1 screen with the selected patient information displayed (Figure 14.69).

When viewing tests, press PROCEED to bring up a Test List browser screen with the complete list of tests for the selected patient (Figure 14.69).

When printing tests, press PROCEED to bring up a Test List browser screen with the complete list of tests for the selected patient.



7 *Figure 14.69 Patient Data Screen with Patient Data and Test List Browser Screen*
 On the Patient Data 1 screen, select PROCEED to save the patient information and return to the Main Menu (or to a selected test if you entered the Patient Data screen through a selected test).

On the Test List browser screen, touching a test selects it. Touching the test a second time de-selects it. During the selection process, you can use the up/down one line and up/down one screen buttons to move through your file listing more rapidly, if your listing is two or more screens in length.

When viewing tests, after selecting the test you want, press PROCEED to display the test.

When printing tests, after selecting one or more tests, press PROCEED to print the test(s). The corresponding report(s) (Encapsulated PDF) will also be exported to the DICOM Archive if you have set the Print-To-File function to export images to the DICOM Archive (see ["Printing To a File,"](#) on page 14-36). For each GPA report exported, the corresponding GPA Exam Selection will also be exported to the DICOM Archive (see ["Exam Selection – GPA Screen,"](#) on page 8-32). The GPA Exam Selection is automatically retrieved from the DICOM Archive when a GPA exam selection is required for GPA Printout Selection and the source for Print Selection is DICOM Archive.

Imported Patient Rules and Conflicts

Patients imported into your HFA II-*i* may cause conflicts with your existing HFA II-*i* patient database under certain conditions.

1. If the patient does not have a Patient ID:

A unique 29-character Patient ID such as "1966.1207.786F.C555.B6B9.473F" will be created for the patient from the patient's name and date of birth, and an HFA specific Issuer of ID will be entered for the patient (1.2.276.0.75.2.2.30.2).

2. If the patient has a Patient ID and Issuer of ID (empty or defined):

1. If no other patient exists with this Patient ID and Issuer of ID, the patient will be saved as-is.
2. If a patient exists with the same Patient ID, Issuer of ID, names, and date of birth, then the incoming patient will update the existing patient; the imported patient's exams merges with the existing patient.



WARNING: Every patient has an identifier that consists of Name, Date of Birth, Patient ID, and Issuer of ID. To avoid unintentional automatic merging of patient records, VERIFY a unique combination of Name, Date of Birth, Patient ID, and Issuer of ID exists when patients are copied, transferred, retrieved from an archive, or restored from a backup. There is no way to separate the combined records of erroneously merged patients. Automatic merging of patient records occurs when a patient exists in the local database with the EXACT SAME Name, Date of Birth, Patient ID, and Issuer of ID as a patient that is copied, transferred, retrieved from an archive, or restored from a backup.

For example, consider the following scenario:

Patient A: This patient is currently on the local HFA database and was automatically assigned a unique Patient ID by the instrument because it was a blank field prior to a software upgrade to V5.x software or during an import to the HFA through a copy, transfer, retrieval from archive, or a restore from backup.

Patient B: This patient is about to be transferred to the local HFA database and has the same Name and Date of Birth as Patient A, but does not have a Patient ID (i.e. field is blank). When Patient B is copied, transferred, retrieved from an archive, or restored from a backup to the local HFA database, Patient B will automatically be assigned the same Patient ID and Issuer of ID as Patient A, and Patient B will be merged with Patient A.

3. If a patient exists with the same Patient ID and Issuer of ID, but with a different name and/or date of birth, a new Patient ID is created for the patient in the form "_ID<Old ID><New ID>", where <New ID> is created from the name and date of birth of the incoming patient as described in [1. If the patient does not have a Patient ID:](#) above. An HFA-specific Issuer of ID will be entered for the patient (1.2.276.0.75.2.2.30.2) and:
 - If a patient exists in the database with this new Patient ID/Issuer of ID, the patient will be saved with this new Patient ID/Issuer of ID.

- If a patient does not exist with this new Patient ID/Issuer of ID and the database is not currently being upgraded, a Patient Conflict dialog appears asking if you want to keep both patients or update the existing patient (Figure 14.70). If the operator selects “Keep Both Patients”, then the incoming patient will be saved with the new Patient ID/Issuer of ID. If the operator selects “Update Existing Patient”, then the existing patient will be updated with the incoming patient information—the imported patient’s exams merges with the existing patient, and the name and date of birth of the existing patient will be replaced by the name and date of birth of the imported patient.

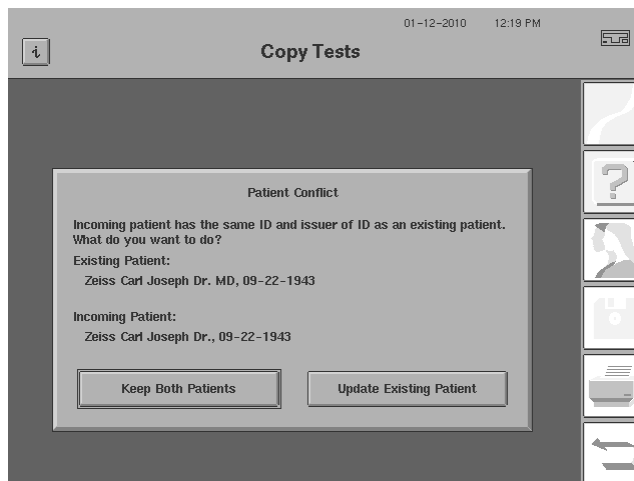


Figure 14.70 Patient Conflict Dialog

The Patient Conflict dialog appears during the following operations:

- Copying exams from a floppy disk or USB storage device to the hard drive
- Restoring a database from a backup in Merge mode
- Retrieving a database from an archive
- Data is retrieved from a DICOM Archive (DICOM Gateway 2.0 only)

The Patient Conflict dialog does not appear during the following operations:

- Restoring an older database from a backup in Replace mode
- Performing a software upgrade to V5.x
- Importing serial data

(15) Care and Cleaning

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The HFA II-*i* is designed to meet the demands of your busy schedule, and because it plays an important part of patient care, you will want to keep it in top working condition.

This section focuses on the proper care of your instrument.



General Use Principles

- The HFA II-*i* is designed for continuous operation. However, it should be turned off when not used for an extended period of time and covered with the dust cover.
- Avoid turning the instrument on and off repeatedly during the day to preserve the life of the bowl lamps.
- The HFA II-*i* should be used in a cool, dry and dust-free setting.
- Do NOT connect or disconnect cables while power is on.
- Do NOT place any container holding liquid near the instrument.
- Do NOT place objects on top of the instrument.
- Carl Zeiss Meditec recommends routine yearly service and maintenance on the HFA II-*i* by a qualified Carl Zeiss Meditec Field Service Engineer.

Cleaning the HFA II-*i*

Your HFA II-*i* should be kept clean and maintained for proper operation. Use the methods and cleaners in [Table 15.1](#) below to clean the indicated surfaces. Clean as often as is necessary.

*Table 15.1 How to Clean the HFA II-*i**

<u>Surface</u>	<u>Cleaner</u>	<u>Method</u>
Exterior Panels	Mild detergent or appliance cleaner or glass cleaner containing no ammonia.	Dampen a soft cloth with cleaner and gently wipe the surfaces. Never spray the cleaner directly on the exterior surfaces.
Bowl (Please review the two cautionary Notes that follow this table)	Dust cloth	Remove accumulated dust from the bowl periodically. Wipe the bowl gently with a clean, dry, soft cotton cloth. Use downward strokes that move the dust toward the front edge of the bottom of the bowl, where there is a small opening around the base of the lens holder.
	Distilled water	If dusting the bowl is inadequate, slightly moisten the cloth with distilled water. Whether using a dry or a dampened cloth, always avoid excessive rubbing in one area, as this can create shiny spots or wear through the specially painted surface of the bowl.
	70% Isopropyl alcohol in H ₂ O (Rubbing alcohol)	For small spots on the bowl surface caused by sneezing or coughing during a test, slightly dampen a cotton-tipped applicator with isopropyl alcohol and gently remove the spot. It is best to wet the spot with the tip of the dampened swab first and let it soak briefly. Then, use the swab very gently to remove the deposit.
Touch Screen	Mild glass cleaner containing no ammonia.	Turn OFF the HFA before cleaning the touch screen. Wipe gently with a moistened cloth. Do not spray cleaner directly on the touch screen.

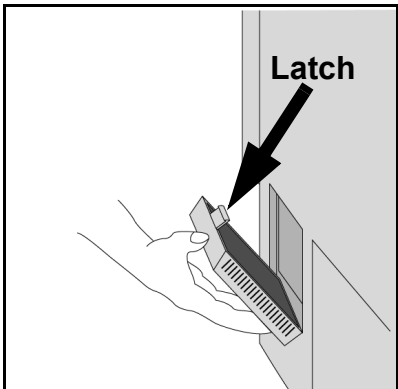
Surface	Cleaner	Method
Forehead & Chin Rests	Mild detergent, alcohol wipes	After each patient, wipe gently using a dampened soft cloth.
Patient Response Button	Mild detergent, alcohol wipes	After each patient, wipe gently using a dampened soft cloth.

-  Note: Always be cautious to avoid scratching, discoloring, or staining the bowl surface. Prior to cleaning the bowl surface, remove all jewelry as it can permanently scratch or damage the painted surface. Be especially careful of long fingernails and fingernail polish contacting the bowl surface, as these can mark or damage the painted surface permanently.
-  Note: During any bowl cleaning process, be cautious to avoid getting either the distilled water or isopropyl alcohol cleaning liquid inside of the fixation target openings or on mirrored surfaces.

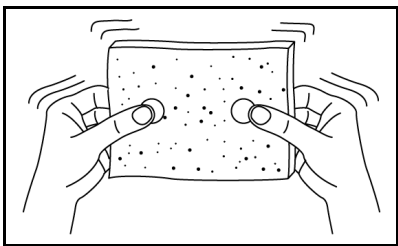
Air Intake Filter

To ensure proper cooling of the instrument, the air filter must be cleaned or replaced every three months (Part Number 2660100029381).

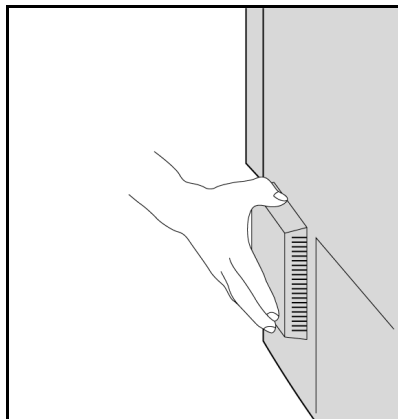
1 Locate the air filter cover underneath the overhang on the back of the instrument. Press firmly with your finger or thumb on the middle of the top surface of the cover, and push down and pull out to unlatch it. Tilt the air filter cover open on its hinges and remove the air filter from its two locating pins.



2 Clean or replace the air filter. For cleaning, you should shake the air filter a few times and flick it with a fingertip to dislodge trapped dust. *The filter may be rinsed with water, but make sure the filter is completely dry before Step 3.* If you wish to replace the air filter, call the Carl Zeiss Meditec Parts Department and order a "Fan Filter" (PN 2660100029381).



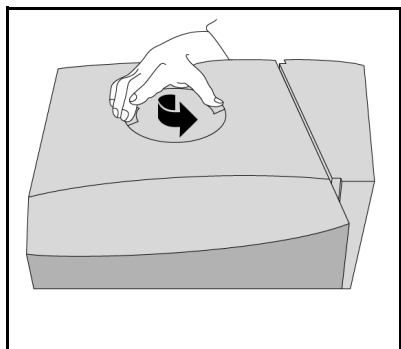
3 Return the clean and dry air filter to the locating pins in the air filter cover. Close and latch the air filter cover.



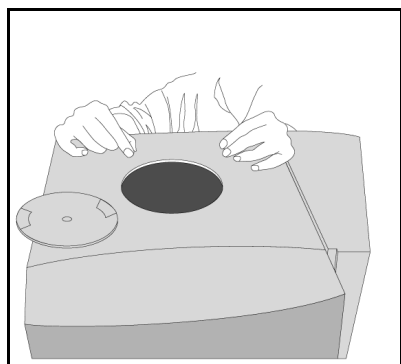
Replacing Parts

Stimulus Projection Lamp

This lamp is responsible for projecting the standard light stimulus. With the aid of color filters, it is also used to create red and blue stimuli for color testing. If needed, you may order a new lamp by calling the Carl Zeiss Meditec Parts Department and asking for PN 2660021106082 (Projection Lamp).



1 Turn off the HFA II-/ and lower the table. To remove the top access panel, rotate it counterclockwise until you align the lamp symbol on the cover with the raised dot that is molded into the top of the case. Standing in front of the bowl opening, you will find that the projection lamp is located inside the open case top, at the 12 o'clock position. Allow the lamp to cool completely (approximately five minutes) before handling it. Do NOT touch the two disk-shaped filters.



2 Remove the connector cable by pulling its connector straight upward. Then use a screwdriver to loosen the screw.

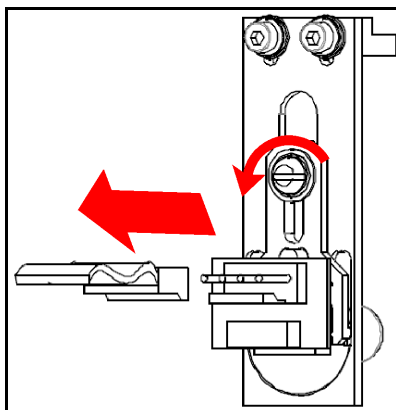
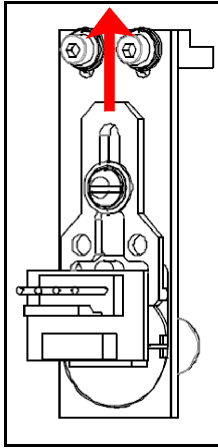
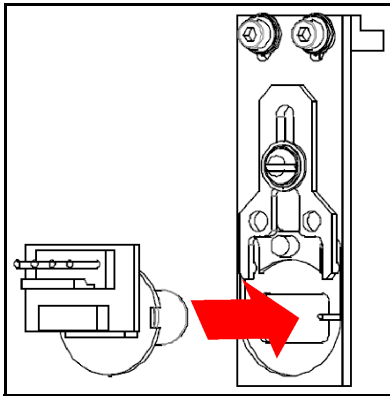


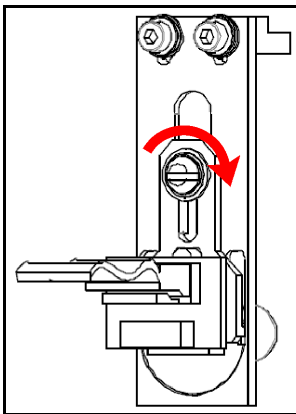
Figure 15.1 Close-up of Lamp Assembly, Indicating Cable Connector Removal



3 Now, slide the wishbone-shaped plate that holds the lamp assembly in place away from you.



4 Remove the old expended lamp assembly. Insert the replacement lamp into the housing. Note the notch in the base of the lamp housing lines up with the pin to the right of the assembly. Do NOT touch the glass part of the lamp with your fingers, as this will shorten the life expectancy of the lamp. If your finger touches the glass portion of the lamp, wipe the lamp clean with a soft cloth.



5 Slide plate back into position, tighten screw and replace connector cable.

6 To replace the top access panel, insert the panel into the opening. As you do so, align the lamp image on the lid with the raised dot on the underlying case. Rotate the panel clockwise until the lamp symbol aligns with the open-circle symbol.

Background Illumination Lamps

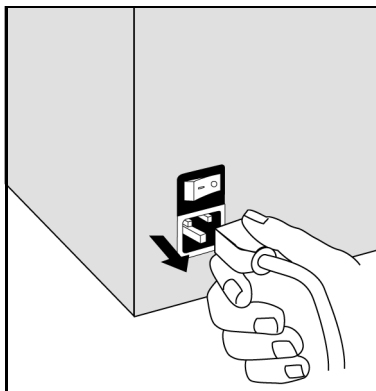
The lamps responsible for illuminating the bowl surface are a fluorescent type (not incandescent) and have a long life expectancy. If you get a bowl illumination error, darken the room and restart the instrument to see if this corrects the problem. If the bowl illumination error continues, do NOT attempt to replace the lamp. These highly specialized lamps are to be replaced only by a Carl Zeiss Meditec Field Service Engineer. Contact Carl Zeiss Meditec Customer Service to arrange for a service call.

Patient Response Button

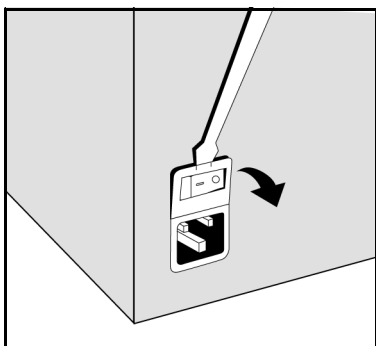
Should the response button malfunction, disconnect it and replace it with a new response button. The Patient Button is PN 2660100029575 and it can be ordered from the Carl Zeiss Meditec Parts Department.

Replacing Instrument Fuses

- 1 Two fuses are located in the rear of the unit. Turn off power. Unplug the power cord.

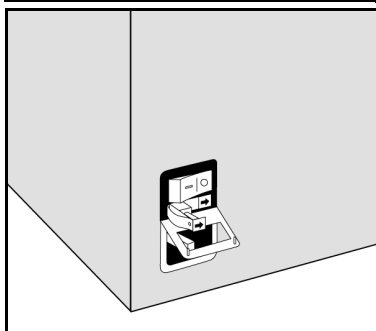


- 2 Using a narrow-bladed screwdriver, gently pry open the cover to expose the fuse holders. Information about the proper replacement fuses is found adjacent to the fuse holder.

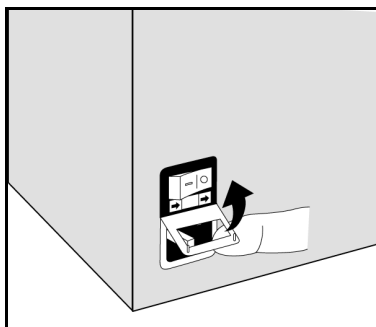


HFA II-/Series
(100-240V~)
Fuse: T4A, 250V

- 3 Slide out each fuse holder (marked with an arrow) and check the filament for breakage. Dispose of any defective fuses.



- 4 Insert the new fuse(s) in the holder. Slide the holder back into the housing with white arrows pointing to the right. Push the cover up and in until it snaps closed. Plug in the power cord.



Note: Actual fuse ratings may vary. Replace fuses with the same rating as the original fuse that was supplied with the HFA II-*i*.

Power Table Fuses

There are fuses on the HFA II-*i* power table located at the base of the lifting column. These fuses control power to the table itself and the instrument (assuming the instrument is plugged into the outlet under the table). Information on the replacement fuses and proper ratings are posted next to the fuse location described below.

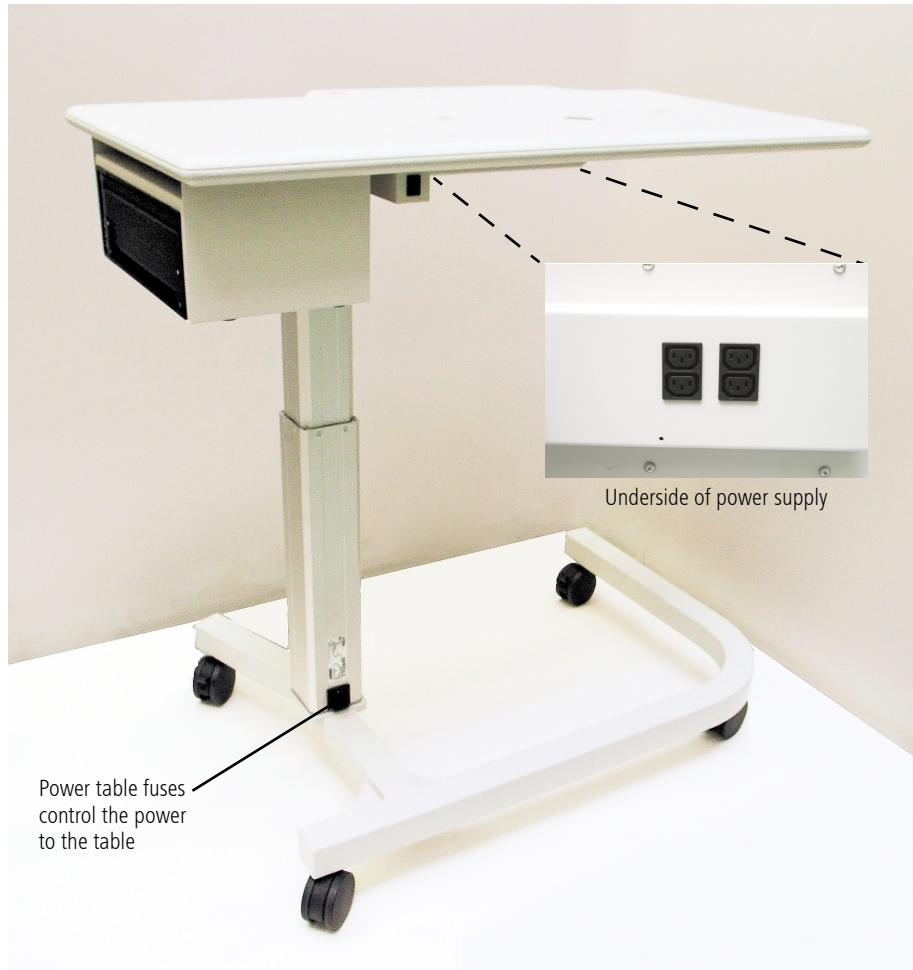


Figure 15.2 HFA II-*i* Power Table With Mounted Printer Showing Location of Fuses

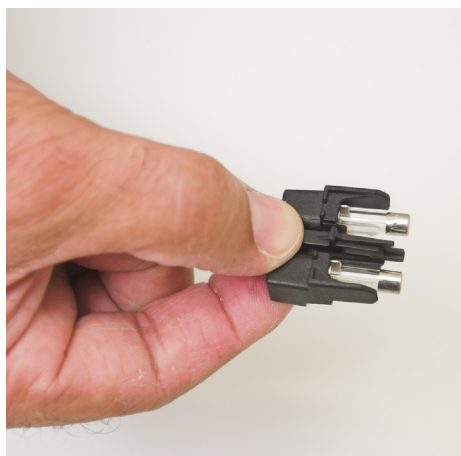
100-120V~ Table	220-240V~ Table
Fuse: T8A, 250V~	Fuse: T6.3A, 250V~

Note: Your actual fuse ratings may vary. Replace fuses with the same rating as the original fuse that was supplied with your table.



WARNING: Do not power the table using extension cords and do not use multiple portable socket outlets.

Replacing Power Table Fuses



- 1 Turn off the power. Unplug the power cord that is attached to the table at the base of the lifting column. Move the table away from the wall to access the back of the table.
- 2 Use needle-nose pliers or fingernails gently to slide the fuse drawer from its housing.
- 3 Remove defective fuses. Insert new fuses in housing.
- 4 Replace the fuse drawer. Plug in the power cord.



Note: For continued protection against fire hazard, replace only with same type and rating of fuse.

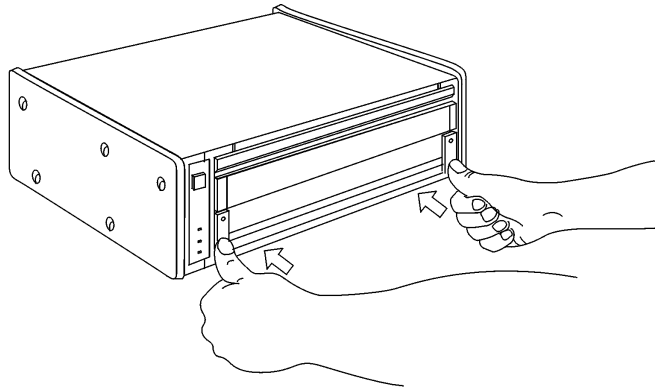
Operating the Printrex Printer

The operating instructions for the Printrex Thermal Line printer are given below. When you see the red stripe appear on the printout, it is time to change the paper roll.

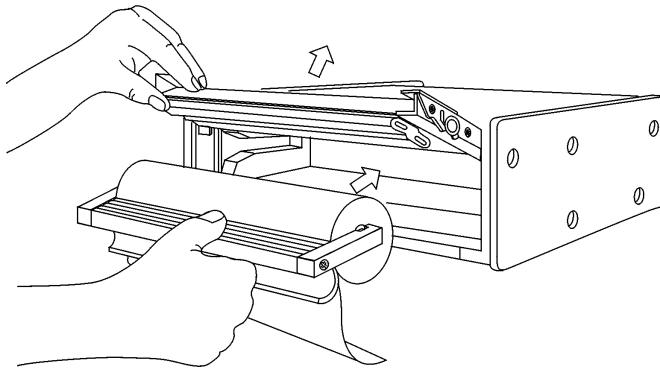
Note: If you are using an optional HP LaserJet or LaserJet-compatible printer, refer to the printer documentation for operating instructions.

Loading Paper

Loading paper is extremely simple because it does not have to be threaded or aligned.



1 Unlock the door of the printer by pressing on the open circles printed on the two latches at the lower corners of the door. Pull up on the latches to open the door.

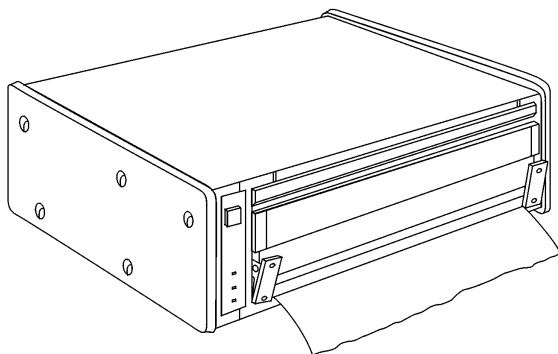


2 Remove the paper roll holder from the printer and remove the paper roll bar from the holder. Slip the empty core off the bar.

3 Slip the paper roll bar through the core of the new paper roll and install the paper roll on the holder so the paper feeds from the top of the roll toward the front of the holder. Feed a few inches of paper from the roll so it will extend over the platen after insertion.

4 Insert the paper roll in the printer and close the door with the latches unlocked. Press on the solid circles printed on the door latches to lock them. The Paper Empty and Error lights should go out when the door is latched.

5 Tear off the extra paper. For best results, hold the paper up at a 45 degree angle and tear from the right or left.



Controls and Indicators

Figure 15.3 shows the Printrex printer control panel. It contains a push button switch (Paper Advance) and three indicators (Paper Empty, Error and Power).

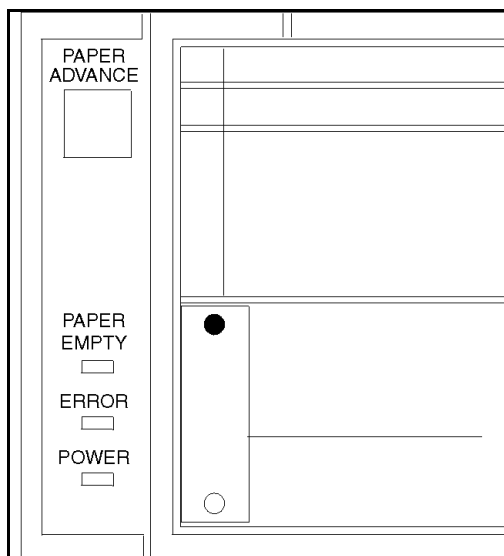


Figure 15.3 The Printrex Printer Control Panel

To advance the paper, press the Paper Advance button. The button will have no effect if the printer is printing.

Whenever power is applied to the printer, the Power indicator is lit. The Paper Empty indicator will be lit when the printer is out of paper. The Error indicator flashes under certain conditions such as when the door is open or when there is no paper. The printer is ready to print provided the Power indicator is lit and the Error indicator is not flashing.

About Thermal Paper

Storage of thermal paper for the HFA II-/requires special care. Carl Zeiss Meditec recommends that you store your printouts in plain paper folders away from possible contact with water or any of these substances:

- Organic Solvents (including alcohol)
- Cleaning fluids
- Plasticizers such as cellophane tape or PVC film (plastic sleeves)
- Petroleum solvents (gasoline, toluene, or benzene)
- Wet-type diazo copy paper
- Certain types of carbon papers
- Cast coated papers
- Papers containing tributyl phosphate
- Dissimilar thermal systems
- Carbonless paper CB solvents (most)

- Ammonia
- Certain oils
- Water (for prolonged periods of time)
- Sunlight (for prolonged periods of time)

At present, one roll of thermal paper will yield approximately 120 printouts; one box of 6 rolls will yield roughly 720 printouts. Thermal paper may be ordered from Carl Zeiss Meditec Parts Department. The item Part Number for thermal paper is 2660100024433.

Hint: For thermal printouts of exam data that you wish to have a very long shelf life, make and file a photocopy of the printout, shortly after it is thermally printed.

Touch Screen Calibration

Maintaining proper calibration of the touch screen is critical. The touch screen is calibrated properly if the screen recognizes the location where your finger touches the screen and responds appropriately. For example, when accessing the Main Menu, if you select RECALL LAST TEST and the instrument responds as if you selected SHOW TEST LIBRARY, the touch screen is not calibrated correctly.



Note: In addition to the standard calibration method that follows below, there are two additional ways to re-calibrate the touch screen should you have difficulty getting to the TOUCH SCREEN CALIBRATION button on the Additional Setup Screen. These two alternative methods are presented here, following the standard calibration method.

Standard Touch Screen Calibration

The touch screen's response may drift periodically. If errors occur, follow this standard procedure or one of the alternative methods that follow this section:

- 1 Go to the Main Menu and press the *SYSTEM SETUP* icon.
- 2 Press ADDITIONAL SETUP.
- 3 Press TOUCH SCREEN CALIBRATION.
- 4 Verify that you wish to calibrate the touch screen by selecting CONTINUE.
- 5 Follow any screen instructions. Using the eraser end of a pencil, touch the square in the upper left-hand corner of the screen, keeping the alignment of the pencil perpendicular to the screen.
- 6 When prompted, touch the square in the lower right-hand corner, again keeping the pencil perpendicular to the screen.
- 7 You will return to the Additional Setup screen. With your finger, touch the screen in several locations to determine whether it is calibrated properly.
- 8 If the touch screen response still is not accurate, re-calibrate by repeating steps 1 through 7.

Alternative Touch Screen Calibration Method Number One

If you cannot press the *SYSTEM SETUP* icon on the Main Menu and you have an external keyboard attached, use the following steps:

- 1 Press the F6 key.
- 2 Press the external keyboard's Tab key until the ADDITIONAL SETUP button is highlighted.
- 3 Press the Enter/Return key on the external keyboard. Again press the Tab key until TOUCH SCREEN CALIBRATION is highlighted.
- 4 Press the Enter/Return key again. Follow the instructions on the screen to continue the standard calibration method as described starting with Step 5 on page [15-11](#).

Alternative Touch Screen Calibration Method Number Two

The other method for touch screen calibration can be achieved when turning the HFA II-*i* power on.

- 1 If you continuously hold the patient response button down while the HFA II-*i* is powering up, the option to calibrate the touch screen will be displayed. Calibrate the screen in the standard calibration method as described starting with Step 5 on page [15-11](#).



Note: If you accidentally get the touch screen calibration screen while starting up the HFA II-*i*, you can continue the regular start up by cancelling out of the calibration mode. This situation occasionally occurs when the patient response button is pressed down continuously because of the way it was placed in its holder. Always make sure that the response button is not compressed when it is placed in the holder.

Using Removable USB Storage Devices and Floppy Disks

All HFA II-*i* models can use removable USB storage devices and 1.44 MB 3.5" high density floppy disks with an optional USB floppy disk drive. See "[Removable USB Storage Devices and USB Floppy Drives](#)," on page [1-27](#).

To ensure the integrity of the data, learn how to care for and handle these removable media properly. The information on removable media can be destroyed by static electricity and strong electromagnets. Typical sources of magnetic fields include telephones, fluorescent desk lamps, magnetic desk accessories and other electrical appliances.

- Keep your removable media at least 5 feet from these sources of magnetic fields.
- Do NOT touch the recording surface of a floppy disk.
- Remember to label removable media for easy identification. Be careful to not let the label adhere to the sliding cover of a floppy disk.
- Store floppy disks in their protective folders and in the original boxes supplied by the manufacturer or in any filing system designed for the disks.
- Do NOT store floppy disks on top of the HFA II-*i*.



WARNING: Never turn off the HFA II-*i* or remove a USB storage device or USB floppy disk drive while the hard drive or USB device is reading or writing data. Wait for the HFA progress bar to complete and/or the USB device's activity light to cease. This may cause permanent loss of valuable data.

Using the Optional USB Floppy Disk Drive

Insert the USB cable connected to a USB floppy disk drive into any USB port on the HFA II-*i*. To insert a disk in the drive, first take it out of its protective case. Hold the disk so the arrow is aimed at the drive and insert it completely into the drive.

To remove a disk from a USB floppy disk drive, press the ejector button. Never remove the disk:

- When the indicator light is on.
- If the drive is running and the disk is moving.
- If the padlock is visible over the disk drive image in the upper-right corner of the screen (see [Figure 2.1](#)).



Note: Use only 1.44 MB double-sided high density (HD) disks.

How often you need to clean a USB floppy disk drive depends on how frequently you use it. One suggestion is to clean the drive at least once every six months. Head cleaning kits for floppy drives may be purchased from electronic or computer stores.

(A) Product Specifications

HFA II-i Instrument

Stimulus

- Maximum Intensity: 10,000 ASB
- Duration: 200 msec
- Wave Length: Broadband visible light

Visual Field Testing Distance

- 30 cm

Bowl Illumination

- 31.5 ASB

Maximum Temporal Range

- 89 degrees

Dynamic Range

- 50 dB

Computer

- Operating System: VxWorks 6.7
- Intel® Celeron® Processor
- Internal storage: 160 GB (up to 10 million exams)
- 5 USB ports, Type A, USB 2.0 specification
- 1 Ethernet port
- 1 Parallel port
- 1 Serial port
- 1 VGA video port
- 1 Keyboard/Mouse port
- Integrated 12" 256 Greyscale CRT display

Physical

- Dimensions: 53 L x 59 W x 59 H (cm)
- Weight: 40 kg (88 lbs.)

Electrical Requirements

Electrical Rating

- 100-120V~, 50/60Hz, 4.0A
- 230V~, 50/60Hz, 1.8A

**Fuse Rating**

- T4A, 250V; (100-240V)



WARNING: Always replace fuses with the same type and rating. Failure to do so may create a risk of fire.

Environmental Conditions**Transport and Storage**

- Temperature: -40 to +70 deg. C
- Relative Humidity: 10% to 100%, including condensation
- Atmospheric Pressure: 500 to 1060 hPa

Operation

- Temperature: +10 to +40 deg. C
- Relative Humidity: 30% to 75%, excluding condensation
- Atmospheric Pressure: 700 to 1060 hPa
- Max. wet bulb: 78°F (26°C)

Power Table (Models HFA 120 and HFA 230 only)**Physical**

- Table Top Dimensions: 53 D x 88 W (cm)
- Table Min / Max Height: 63 Min, 100 Max (cm)
- Table Weight (with Printer): 34 kg (75 lbs.)

Electrical Requirements**Electrical Rating**

- HFA 120: 120 V~, 60 Hz, 8.0 A
- HFA 230: 230 V~, 50 Hz, 6.0 A

Power Outlet Rating

- HFA 120: 120 V~, 5 A Max.
- HFA 230: 230 V~, 3 A Max.

**Fuse Rating**

- T8A, 125V (HFA 120); T6.3A, 250V (HFA 230)

Duty Cycle

- Int. 0.8 min/21 min (FHA 120)
- Short-Time-Op 2 min, int. 1 min 19 min (HFA230)



WARNING: Always replace fuses with the same type and rating. Failure to do so may create a risk of fire.

Load (Lift Mechanism):

- 1000N Push

Protection against ingress of liquid

- IP20 (HFA 120)
- IP30 (HFA 230)

Printer

- Printrex thermal printer, table mounted



WARNING: Do not reconfigure system components on the table, nor add non-system devices or components to the table, nor replace original system components with substitutes not approved by Carl Zeiss Meditec. Such actions could result in failure of the table height adjustment mechanism, instability of the table, tipping and damage to the instrument, and injury to operator and patient.

(B) Product Features**TESTING FEATURES**

Model 720/ Model 740/ Model 745/ Model 750/

Threshold Test Library

Central Field Test Patterns				
10-2, 24-2, 30-2, Macula	X	X	X	X
Peripheral Field Test Patterns				
60-4	X	X	X	X
Nasal Step		X	X	X

Testing Strategies

SITA Standard, SITA Fast	X	X	X	X
SITA-SWAP		Option ^c	X ^b	X ^b
Full Threshold	X	X	X	X
FastPac ^a	X	X	X	X

Screening Test Library

Central Field Test Patterns:				
C-40, C-76, C-80	X	X	X	X
C-64, C-Armaly		X	X	X
Peripheral Field Test Patterns:				
P-60, FF-81, FF-120, FF-135	X	X	X	X
FF-246, FF-Armaly		X	X	X
Nasal Step		X	X	X

Testing Strategies/Modes

Two Zone, Three Zone & Quantify Defects	X	X	X	X
Age Level Referenced & Threshold Related Modes	X	X	X	X
Single Intensity	X	X	X	X

Specialty Test Library

Esterman Monocular	X	X	X	X
Esterman Binocular	X	X	X	X
Superior 36 Screening	X	X	X	X
Superior 64 Screening	X	X	X	X

SWAP (Short-Wavelength Automated Perimetry) Testing

SITA-SWAP		Option ^c	X ^b	X ^b
Full Threshold, FastPac		Option ^c	X	X

Kinetic Testing

Option Option X

Custom Static Testing

X X X

Stimulus Color Filters

White-on-White	X	X	X	X
Red-, Blue-on-White		X	X	X
Blue-on-Yellow (SWAP)		Option ^c	X	X

General Testing Features

Goldmann Stimulus Sizes	III	I-V	I-V	I-V
Foveal Threshold Testing		X	X	X
Automatic Pupil Measurement				X

a. FastPac does not include Glaucoma Hemifield Test (GHT) results and cannot be analyzed with Glaucoma Change Probability (GCP).

b. Requires licensing activation.

c. Available as a field upgrade only; cannot be factory ordered.

DATA ANALYSIS SOFTWARE

	Model 720 <i>i</i>	Model 740 <i>i</i>	Model 745 <i>i</i>	Model 750 <i>i</i>
STATPAC	Limited	X	X	X
STATPAC for SITA	Limited	X	X	X
STATPAC for Blue-Yellow (SWAP) ^a	Limited	X	X	X
Glaucoma Hemifield Test (GHT) ^b	X	X	X	X

PRINTOUT FORMATS**STATPAC Formats (SITA)**

Single Field Analysis (Size III)	X	X	X	X
Overview (Size III)		X	X	X
Change Analysis		X	X	X
Guided Progression Analysis (GPA)		X ^e	X ^e	X ^e

STATPAC Formats (Full Threshold, FastPac)

Single Field Analysis	X	X	X	X
Overview		X	X	X
Change Analysis		X	X	X
Glaucoma Change Probability ^c		X	X	X

STATPAC for SWAP^a

Single Field (Size V)	X	X	X	X
Overview (Size V)		X	X	X

Non-STATPAC Formats

Three-in-One	X	X	X	X
Overview (Sizes I, II, & IV)		X	X	X
Screening O.U. Printout (Both Eyes)	X	X	X	X
Compare	X	X	X	X

DATA STORAGE

Internal Hard Disk Drive	X	X	X	X
5 USB Ports for Removable USB Storage Devices and USB Floppy Drives	X	X	X	X

FILE SORTING

Alphabetical, Chronological, Patient	X	X	X	X
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NETWORKING

	X	X	X	X
--	---	---	---	---

a. All HFA II-*i* models are equipped with STATPAC software for Blue-Yellow analysis. Therefore, HFA Models 720*i* and 740*i* can read and print out Blue-Yellow perimetry results. You cannot perform a Blue-Yellow visual field test with a Model 720*i* or 740*i*, however, the Model 740*i* can be field upgraded to perform Blue-Yellow perimetry.

b. Glaucoma Hemifield Test (GHT) is not available with any FastPac test result (White-on-White or Blue-Yellow).

c. Available only for Full Threshold test results.



Note: SITA-SWAP exams may be viewed and printed only from HFA II-*i* instruments that use the version 4.0 or later system software.

USER FEATURES
Model 720/ Model 740/ Model 745/ Model 750/
Fixation Monitoring

Heijl-Krakau Blindspot	X	X	X	X
Video Eye Monitor	X	X	X	X
Trial Lens Holder	X	X	X	X
Gaze Tracking		X	X	X
Head Tracking				X
Vertex Monitor				X

Operator Interface

Help Menus	X	X	X	X
Touchscreen	X	X	X	X
Keyboard with Glidepad	Option	Option	Option	X
Trackball/Mouse	Option	Option	Option	Option
External VGA Monitor	Option	Option	Option	Option

Patient Data Input

Name, Date of Birth, Patient ID	X	X	X	X
Trial Lens, Visual Acuity	X	X	X	X
Pupil Size	X	X	X	X
IOP, Cup/Disk Ratio		X	X	X
Diagnosis Code, Procedure Code		X	X	X
Comments Window		X	X	X

(C) Legal Notices

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(D) Icon Glossary**Main Menu****Help****Patient Data****File Functions****Print Functions****Undo, Return to Previous Screen****System Setup****Information**

(E) Goldmann Conversion Tables

The decibel notation the Humphrey Field Analyzer II-/uses can be expressed in terms of Goldmann units or apostilbs. The conversion between decibels (dB) and apostilbs (asb) and Goldmann units are listed in Table E.1. For example, a threshold sensitivity of 25 dB using a size III stimulus is equal to a Goldmann III-ie stimulus or 32 asb. A threshold sensitivity of 0 dB using a size III stimulus is equivalent to a Goldmann V 4e stimulus or 10,000 asb. A simplified chart to convert from dB values to Goldmann units is available in Tables E-1 through E-6.

To use the conversion tables, first locate the table which lists the target size you used for the test. For example, you may have completed a central 30-2 threshold test using a size III target and you want to find out what the Goldmann equivalent is for 15 dB. Using Table E-4, find 15 dB. Read the horizontal and vertical columns that intersect at 15 dB. The Goldmann equivalent is either a II 4e, III 3e, IV 2e, or V 1e.

Stimulus Size	Angular Subtense (degrees)	Stimulus Area (30 cm Bowl) (mm ²)
Size I	0.11	1/4
Size II	0.22	1
Size III	0.43	4
Size IV	0.86	16
Size V	1.72	64

Goldmann Conversion Tables

Table E.1 Conversion of Goldmann units to decibels and apostilbs

dB	Intensity	Actual Stimulus Size				
	Asb	I	II	III	IV	V
0	10,000	III 4e	IV 4e	V 4e		
1	7,943	III 4d	IV 4d	V 4d		
2	6,310	III 4c	IV 4c	V 4c		
3	5,012	III 4b	IV 4b	V 4b		
4	3,981	III 4a	IV 4a	V 4a		
5	3,162	II 4e	III 4e	IV 4e	V 4e	
6	2,512	II 4d	III 4d	IV 4d	V 4d	
7	1,995	II 4c	III 4c	IV 4c	V 4c	
8	1,585	II 4b	III 4b	IV 4b	V 4b	
9	1,259	II 4a	III 4a	IV 4a	V 4a	
10	1,000	I 4e	II 4e	III 4e	IV 4e	V 4e
11	794	I 4d	II 4d	III 4d	IV 4d	V 4d
12	631	I 4c	II 4c	III 4c	IV 4c	V 4c
13	501	I 4b	II 4b	III 4b	IV 4b	V 4b
14	398	I 4a	II 4a	III 4a	IV 4a	V 4a
15	316	I 3e	II 3e	III 3e	IV 3e	V 3e
16	251	I 3d	II 3d	III 3d	IV 3d	V 3d
17	200	I 3c	II 3c	III 3c	IV 3c	V 3c
18	159	I 3b	II 3b	III 3b	IV 3b	V 3b
19	126	I 3a	II 3a	III 3a	IV 3a	V 3a
20	100	I 2e	II 2e	III 2e	IV 2e	V 2e
21	79	I 2d	II 2d	III 2d	IV 2d	V 2d
22	63	I 2c	II 2c	III 2c	IV 2c	V 2c
23	50	I 2b	II 2b	III 2b	IV 2b	V 2b
24	40	I 2a	II 2a	III 2a	IV 2a	V 2a
25	32	I 1e	II 1e	III 1e	IV 1e	V 1e
26	25	I 1d	II 1d	III 1d	IV 1d	V 1d
27	20	I 1c	II 1c	III 1c	IV 1c	V 1c
28	16	I 1b	II 1b	III 1b	IV 1b	V 1b
29	13	I <u>1a</u>	II 1a	III 1a	IV 1a	V 1a
30	10	I <u>4e</u>	I 1e	II 1e	III 1e	IV 1e

	Intensity	Actual	Stimulus	Size		
dB	Asb	I	II	III	IV	V
31	8	I 4d	I 1d	II 1d	III 1d	IV 1d
32	6	I 4c	I 1c	II 1c	III 1c	IV 1c
33	5	I 4b	I 1b	II 1b	III 1b	IV 1b
34	4	I 4a	I 1a	II 1a	III 1a	IV 1a
35	3.2	I 3e	I 4e	I 1e	II 1e	III 1e
36	2.5	I 3d	I 4d	I 1d	II 1d	III 1d
37	2.0	I 3c	I 4c	I 1c	II 1c	III 1c
38	1.6	I 3b	I 4b	I 1b	II 1b	III 1b
39	1.3	I 3a	I 4a	I 1a	II 1a	III 1a
40	1.0	I 2e	I 3e	I 4e	I 1e	II 1e
41	0.8	I 2d	I 3d	I 4d	I 1d	II 1d
42	0.6	I 2c	I 3c	II 4c	I 1c	II 1c
43	0.5	I 2b	I 3b	I 4b	I 1b	II 1b
44	0.4	I 2a	I 3a	I 4a	I 1a	II 1a
45	0.32	I 1e	I 2e	I 3e	I 4e	I 1e
46	0.25	I 1d	I 2d	I 3d	I 4d	I 1d
47	0.20	I 1c	I 2c	I 3c	I 4c	I 1c
48	0.16	I 1b	I 2b	I 3b	I 4b	I 1b
49	0.13	I 1a	I 2a	I 3a	I 4a	I 1a
50	0.10		I 1e	I 2e	I 3e	I 4e
51	0.08		I 1d	I 2d	I 3d	I 4d

Table E.2 Using a Size I target

	4					3					2					1				
	e	d	c	b	a	e	d	c	b	a	e	d	c	b	a	e	d	c	b	a
0	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
I	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
II	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
III	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Table E.3 Using a Size II target

	4					3					2					1				
	e	d	c	b	a	e	d	c	b	a	e	d	c	b	a	e	d	c	b	a
0	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
I	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
II	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
III	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
IV	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Table E.4 Using a Size III target

	4					3					2					1				
	e	d	c	b	a	e	d	c	b	a	e	d	c	b	a	e	d	c	b	a
0	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
I	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
II	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
III	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
IV	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
V	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19

Table E.5 Using a Size IV target

	4					3					2					1				
	e	d	c	b	a	e	d	c	b	a	e	d	c	b	a	e	d	c	b	a
0	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
I	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
II	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
III	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
IV	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
V	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Table E.6 Using a size V target

	4					3					2					1				
	e	d	c	b	a	e	d	c	b	a	e	d	c	b	a	e	d	c	b	a
0	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
I	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
II	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44
III	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
IV	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	3	34
V	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29

Conversion Table for Blue-Yellow

Decibels (dB)	Foot Lamberts (Ft.-L)	Apostilbs (asb.)
0	6.0	65
5	1.9	20.6
10	0.6	6.5
15	0.19	2.6
20	0.06	0.65
25	0.019	0.26
30	0.006	0.065
35	0.0019	0.026
40	0.0006	0.0065

Blue-Yellow Specifications

Stimulus Color	440 nm (Blue)
Background Illumination Color	Shott OG-530 Filter (Yellow)
Background Brightness Level	100 cd/m ²
Stimulus Size	Goldmann V
Stimulus Duration	200 msec

(F) Test Patterns

Screening Test Patterns

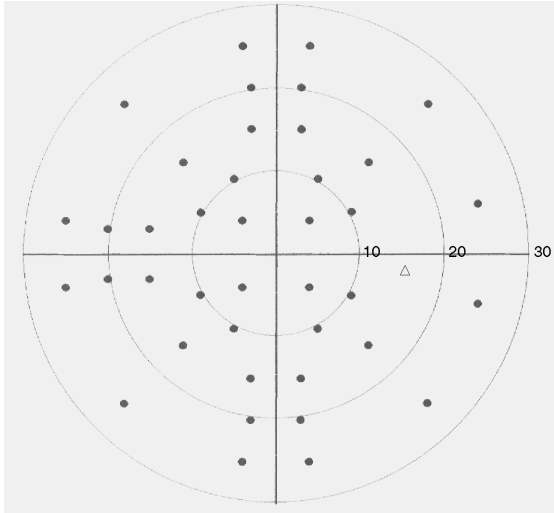


Figure F.1 Central 40-Point Screening Test Pattern, Right Eye

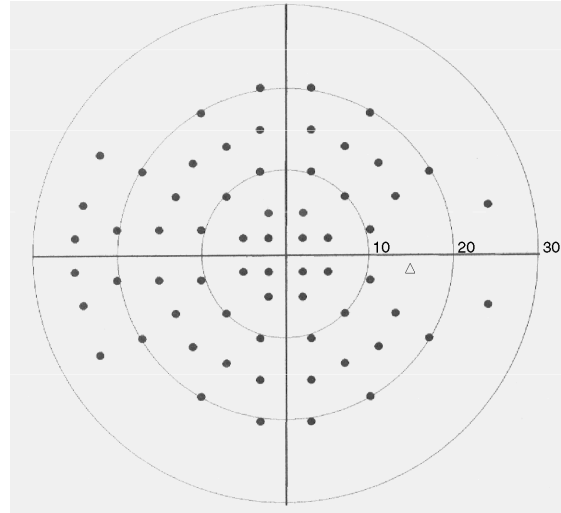


Figure F.2 Central 64-Point Screening Test Pattern, Right Eye

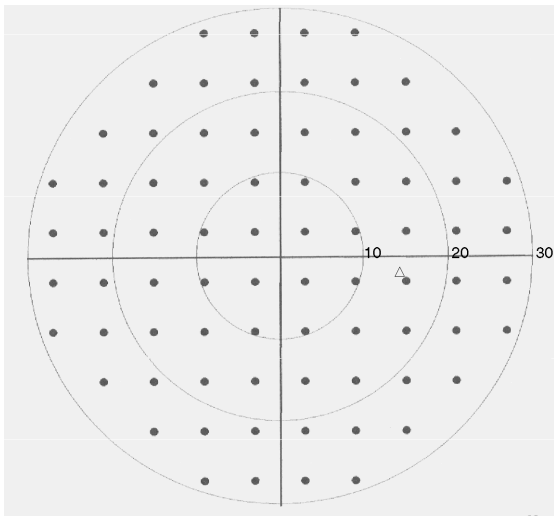


Figure F.3 Central 76-Point Screening Test Pattern, Right Eye
(This is the same pattern as the 30-2 Threshold test)

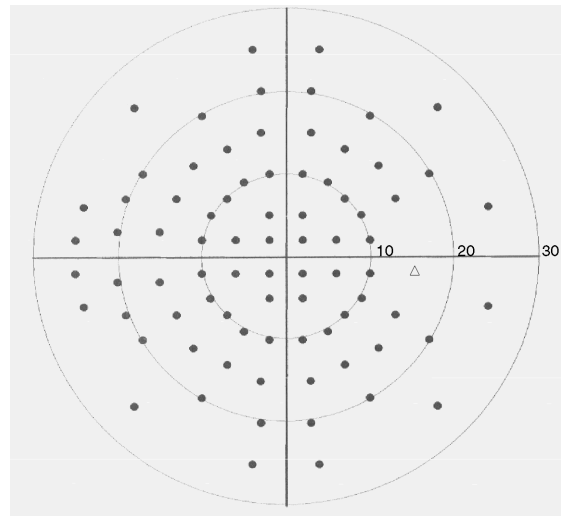


Figure F.4 Central 80-Point Screening Test Pattern, Right Eye

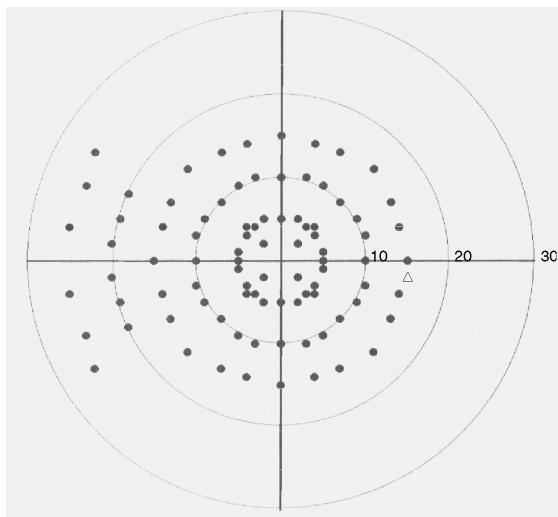


Figure F.5 Central Armaly Screening Test Pattern, Right Eye

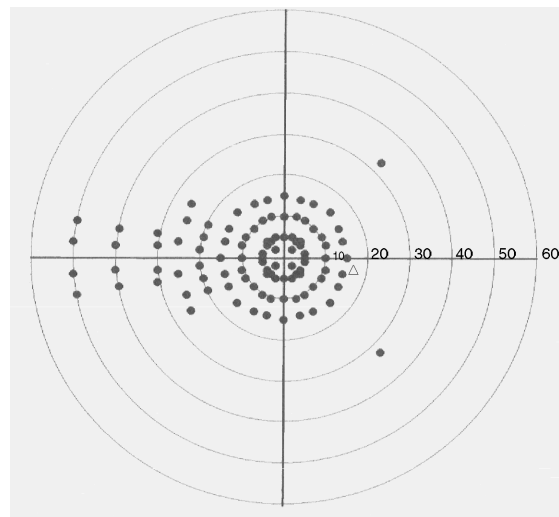


Figure F.6 Full Field Armaly Screening Test Pattern, Right Eye

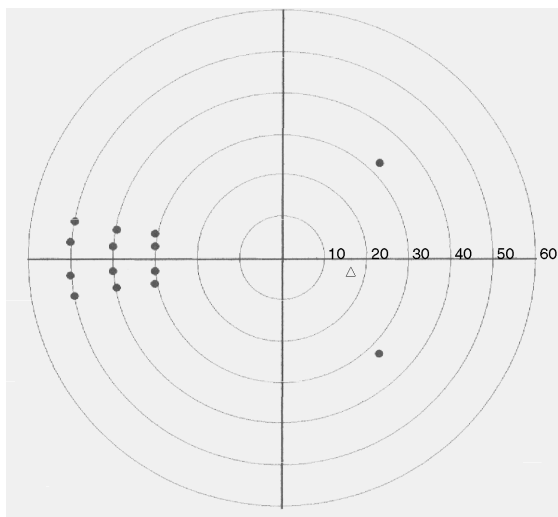


Figure F.7 Nasal Step Screening Test Pattern, Right Eye

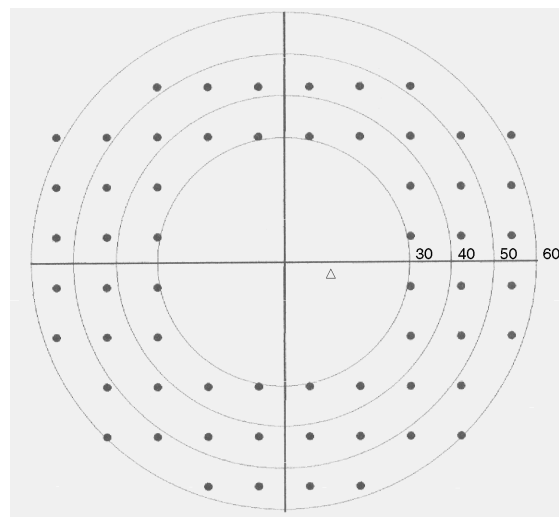


Figure F.8 Peripheral 60 Screening Test Pattern, Right Eye

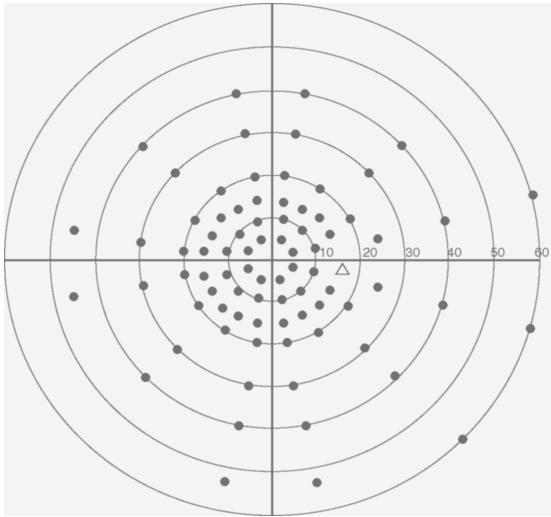


Figure F.9 Full Field 81 Screening Test Pattern, Right Eye

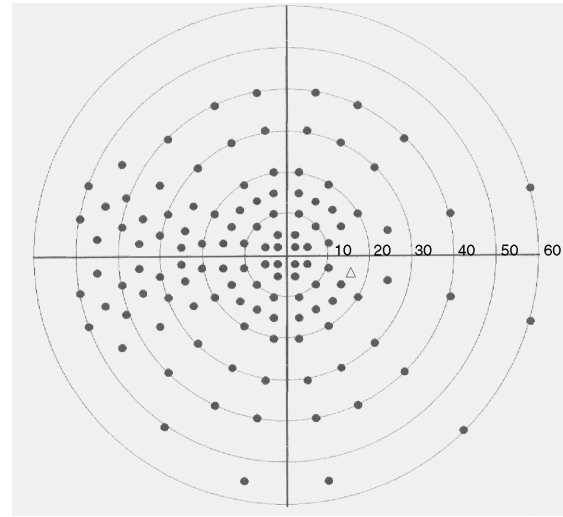


Figure F.10 Full Field 120 Screening Test Pattern, Right Eye

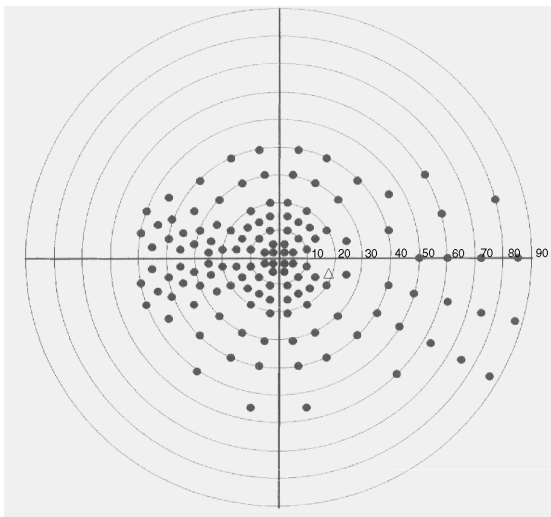


Figure F.11 Full Field 135 Screening Test Pattern, Right Eye

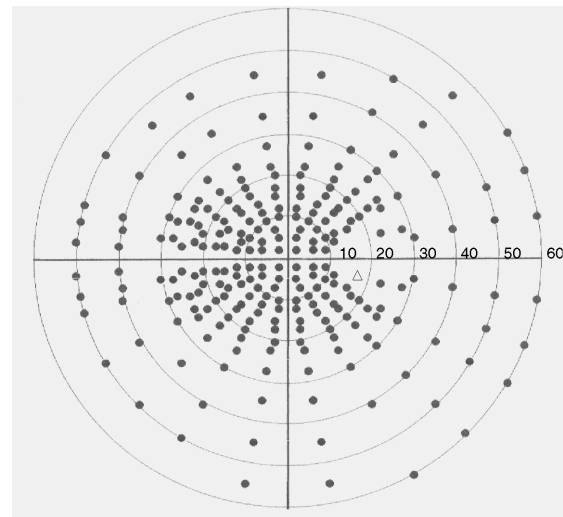
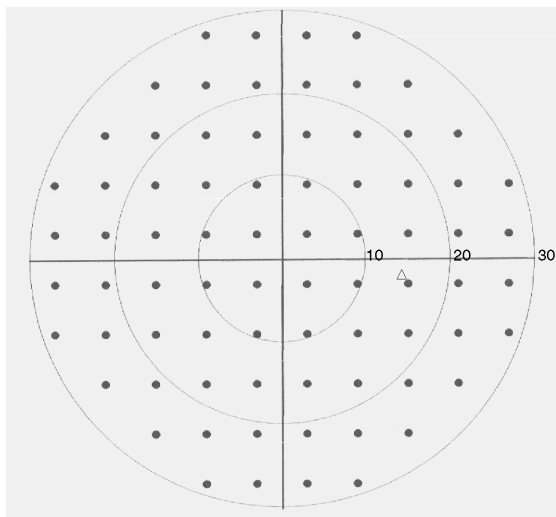
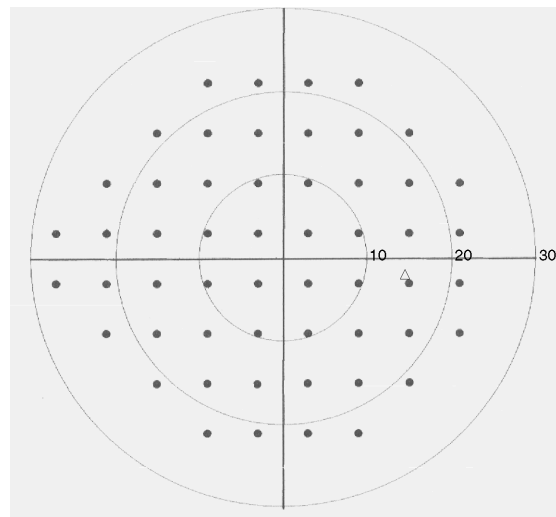
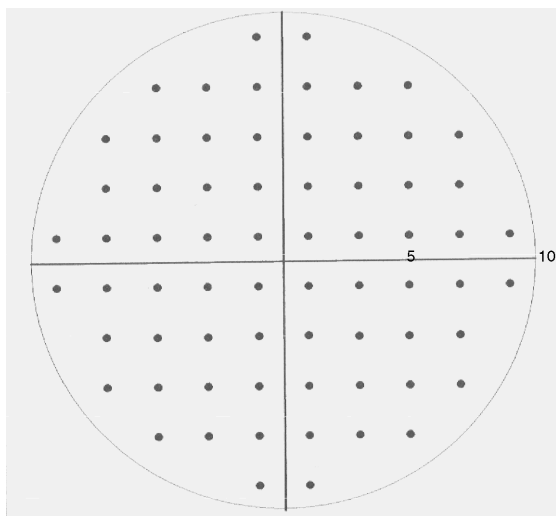
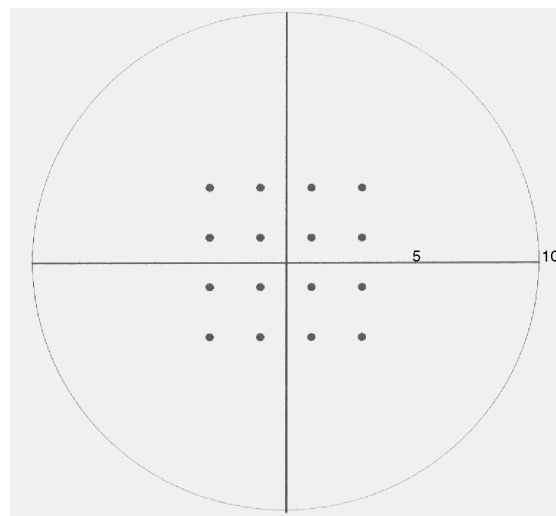


Figure F.12 Full Field 246 Screening Test Pattern, Right Eye

Threshold Test Patterns

*Figure F.13 Central 30-2 Threshold Test Pattern, Right Eye**Figure F.14 Central 24-2 Threshold Test Pattern, Right Eye**Figure F.15 Central 10-2 Threshold Test Pattern**Figure F.16 Macula Threshold Test Pattern*

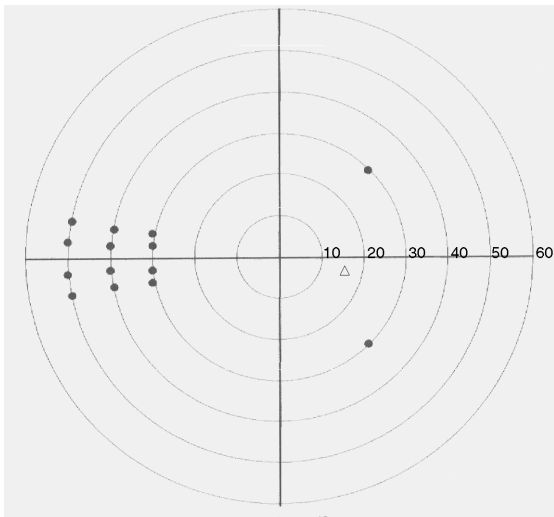


Figure F.17 Nasal Step Threshold Test Pattern, Right Eye

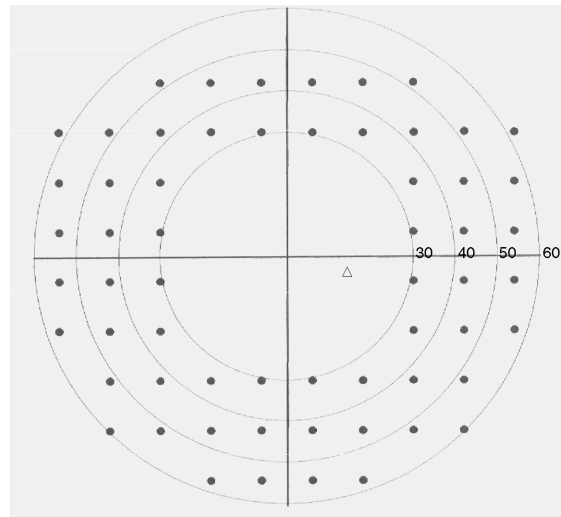


Figure F.18 Peripheral 60-4 Threshold Test Pattern, Right Eye

Specialty Tests Patterns

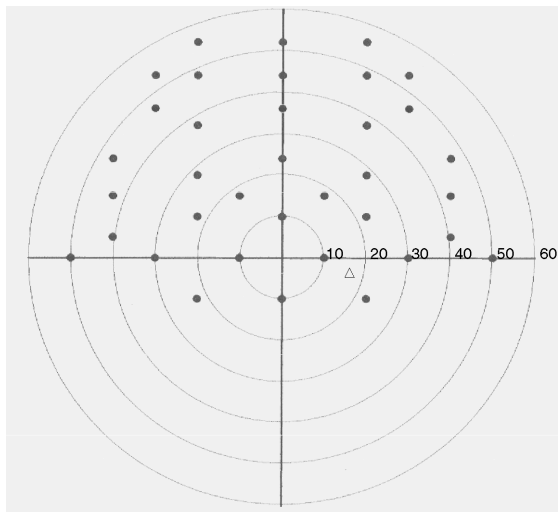


Figure F.19 Superior 36 Screening Test Pattern, Right Eye

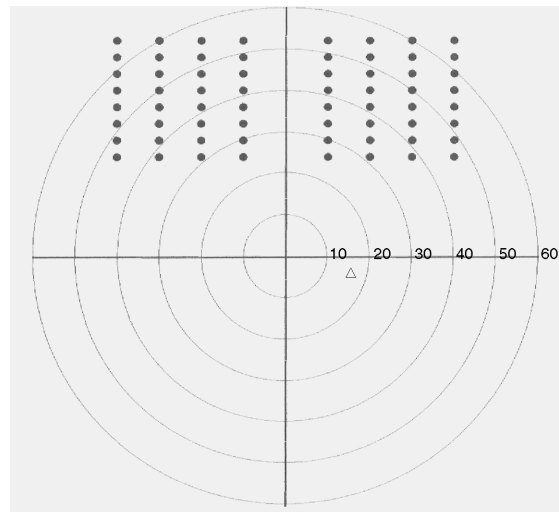


Figure F.20 Superior 64 Screening Test Pattern, Right Eye

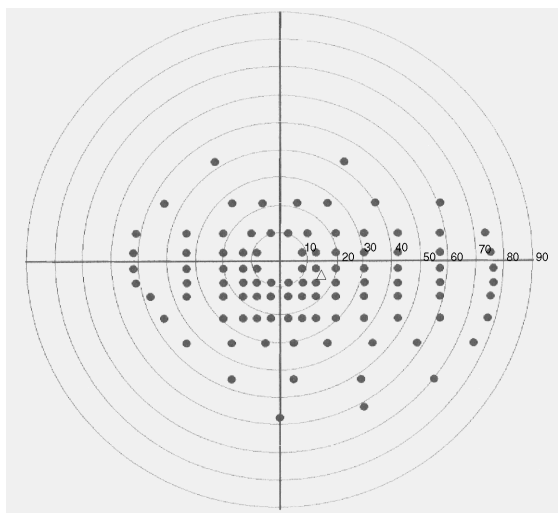


Figure F.21 Esterman Monocular Test Pattern, Right Eye

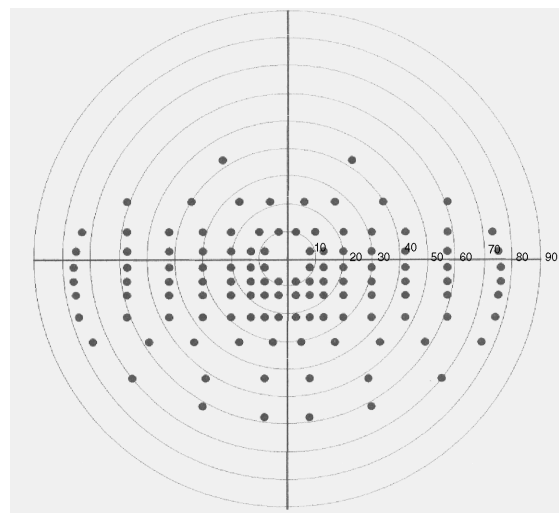


Figure F.22 Esterman Binocular Test Pattern

(G) EasyConnect RCT 1.0

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Note: It is strongly recommended that you use the *EasyConnect* RCT in Easy Mode instead of manually configuring your network settings on your HFA II-*i* instruments.

Overview

EasyConnect RCT 1.0 (RCT) is a remote configuration program that configures network settings for HFA-NET Pro on Humphrey HFA II-*i* instruments running system software version 4.2 or later. The RCT uses a multi-page wizard to guide the operator step-by-step through the HFA-NET Pro configuration process. It provides a simple mode of operation that will make most of the decisions, selecting default values for configuration data.

The RCT runs from a *computer* connected to an *existing network*—not from an HFA II-*i* instrument. The RCT runs on NT 5.x based Windows systems:

- Windows 2000
- Windows Server® 2003
- Windows XP

Configurable features are HFA-NET Pro Windows file sharing Shared folder and Shared Printer setups. FTP (File Transfer Protocol) connections must still be configured manually.

Before You Run the RCT

Connect HFA II-/to Your Network

Use an Ethernet cable to connect your HFA II-/ to your existing network (see [“Connecting Your Network Components,”](#) on page I-3).

Firewall Software

Firewall software is designed to limit the transfer of data from one computer to another (e.g., from the HFA to the computer/server), so it will interfere with HFA networking functionality. If you are running firewall software on your system, you will need to change its settings as described below.

Windows XP Firewall: If you are using Windows XP Firewall (the default on most Windows XP systems), then you will need to open Ports 137, 138, 139 and 445 to allow the HFA to transfer files to your computer. The **Open Ports** button on the WELCOME screen opens these ports (see [“Welcome Screen,”](#) on page G-4). When selected, a Question dialog will be displayed. Select **Yes** to continue. No further action on your part will be required. If some or all of the ports are already opened, the **Open Ports** button will keep them opened.

Other Firewall: If you are using any other firewall software, you will still need to open Ports 137, 138, 139 and 445. Please see your firewall documentation for instructions.

For more details, see [“Troubleshooting,”](#) on page G-43.

Windows File Sharing Settings

Some networks require an additional modification to allow file sharing. If the RCT runs successfully, but Test Connection returns “failed”, you may need to modify your Windows File Sharing setting: The **Use simple file sharing (Recommended)** check box in Windows XP must **NOT** be selected. To access this setting, go to *My Computer > Tools > Folder Options...* and select the **View** tab. Scroll to the bottom of the Advanced settings section and ensure that **Use simple file sharing (Recommended)** is **NOT** selected. For more details, see [“Troubleshooting,”](#) on page G-43.

Licensing

The networking features (i.e., HFA-NET Pro) configured by the RCT are only available as licensed software. Make sure you have activated them on your HFA II-/before running the RCT.

Enable the RCT and Name HFA II-/Instruments

Each HFA II-/instrument must have "Allow Remote Configuration" selected to allow the RCT to configure the instrument. This setting is selected by default. In addition, it is strongly recommended to name your HFA II-/instruments for ease in identification when using the RCT. Creating a name for an instrument can also allow you to know the location of the instrument.

To name your HFA II-/instruments and allow them to be configured with the RCT, follow the steps below:

- 1 On the HFA II-/instrument, from the Main Menu, select *SYSTEM SETUP > COMMUNICATIONS SETUP > HFA NETWORK SETUP* to display the HFA NETWORK SETUP SCREEN (Figure G.1).

Figure G.1 HFA Network Setup Screen

- 2 Select ALLOW REMOTE CONFIGURATION so that an **X** is displayed in the button. This allows the RCT to configure the HFA II-/instrument.
- 3 Select HFA NAME to display a pop-up keyboard and enter (or change) the name you want for this HFA II-/instrument. Press ENTER.
- 4 Select SAVE to save your changes.

Launch the RCT



Note: The RCT application does not need to be installed on your computer—it is launched directly from its CD. You must launch the RCT application on the computer that your shared folder and files will reside on. This is your “HFA-NET File Server.”

To launch the RCT application, follow these steps:

- 1 Put the *EasyConnect* RCT 1.0 CD in your computer’s (HFA-NET File Server) optical drive.
- 2 After several seconds, the program should start automatically. If not, click **Start > Run**, type **E:\RCT.exe** (where E is the optical drive), and click **OK**.

Welcome Screen

The RCT opens to the WELCOME screen (Figure G.2) with the English language and Easy mode selected by default. The RCT provides five modes of operation: Easy (default mode), Copy, Custom, Report, and Test. These modes are described in detail in the following sections. The RCT can be run in five languages by selecting the language from the SELECT A LANGUAGE radio buttons. Once selected, the RCT will automatically restart in the selected language.



Note: The user must be logged in as an Administrator of the computer running the RCT to use all modes except Report.

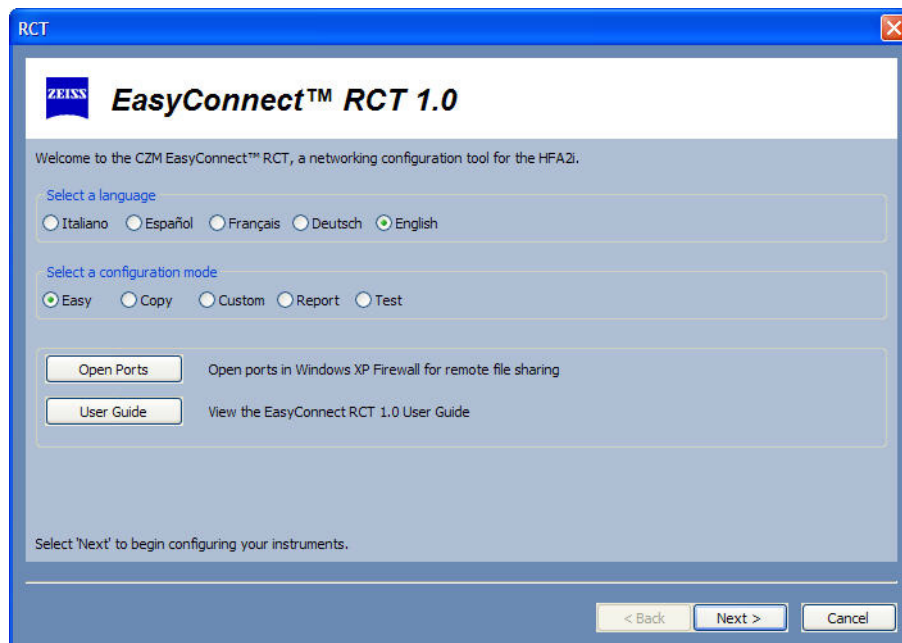


Figure G.2 EasyConnect RCT– Welcome Screen

Select the **Open Ports** button to open all ports in Windows XP firewall required for file sharing. See “Firewall Software,” on page G-2 for more information.

Select the **User Guide** button to view the *EasyConnect* RCT 1.0 User Guide on screen in Adobe Reader. The User Guide can also be opened by right-clicking on any screen in RCT and selecting

User Guide. If you do not have Adobe Reader installed, go to www.adobe.com to download and install the free Adobe Reader.

When the **Next** button is selected for the first time, a LICENSE AGREEMENT window is opened (Figure G.3). Read the license agreement and then select the **Agree** button to continue using the RCT.

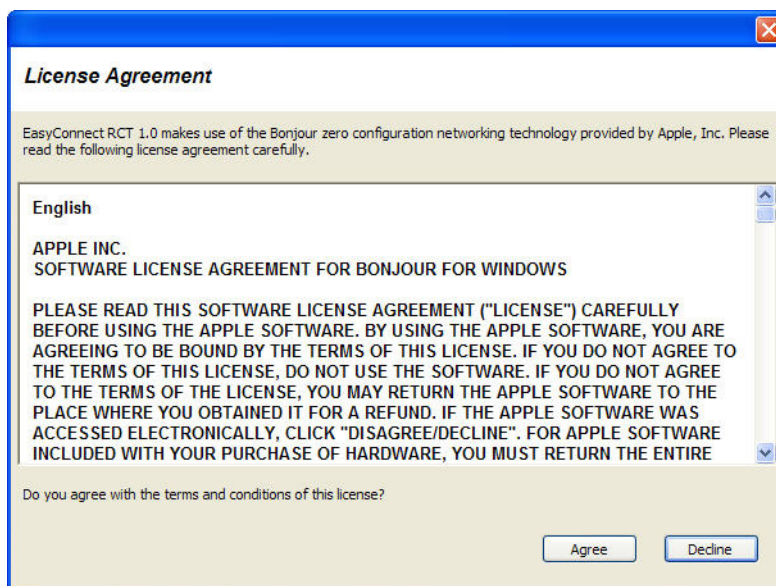


Figure G.3 License Agreement Window

Easy Mode (default)

Easy mode configures a set of instruments by setting up all their shared folders or shared printers in a few steps. Standard defaults are provided for all entered configuration data. The default RCT User Name is "Zeiss" and the default RCT Password is "November171846". All licensed features will be configured.



Note: It is strongly recommended that you use Easy mode to configure your HFA if it is not already using networking features.



Note: If you have a previously created User Account with the User Name "Zeiss" and a password different than the default RCT Password "November171846", you will need to use Custom mode and enter the correct password for the "Zeiss" User Account. If this may be the case, a dialog will be displayed alerting you and allowing you to continue or enter Custom mode.

The following steps describe how to configure your instruments using Easy mode.

1

Select EASY from the SELECT A CONFIGURATION MODE radio buttons (Figure G.4) and then select NEXT to continue.

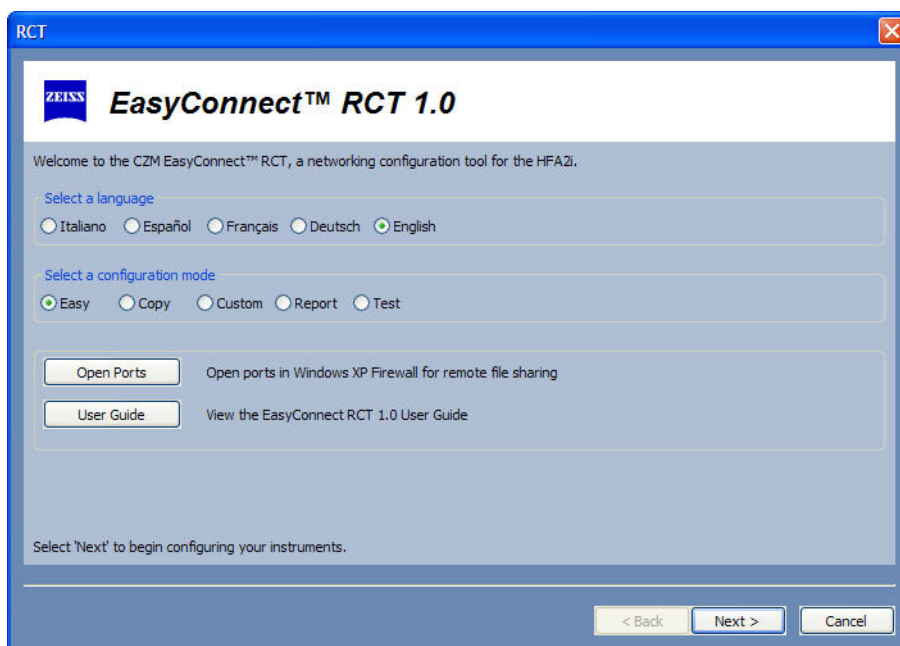


Figure G.4 Select Easy Configuration Mode

The RCT displays a message alerting you there will be a delay before proceeding (Figure G.5).

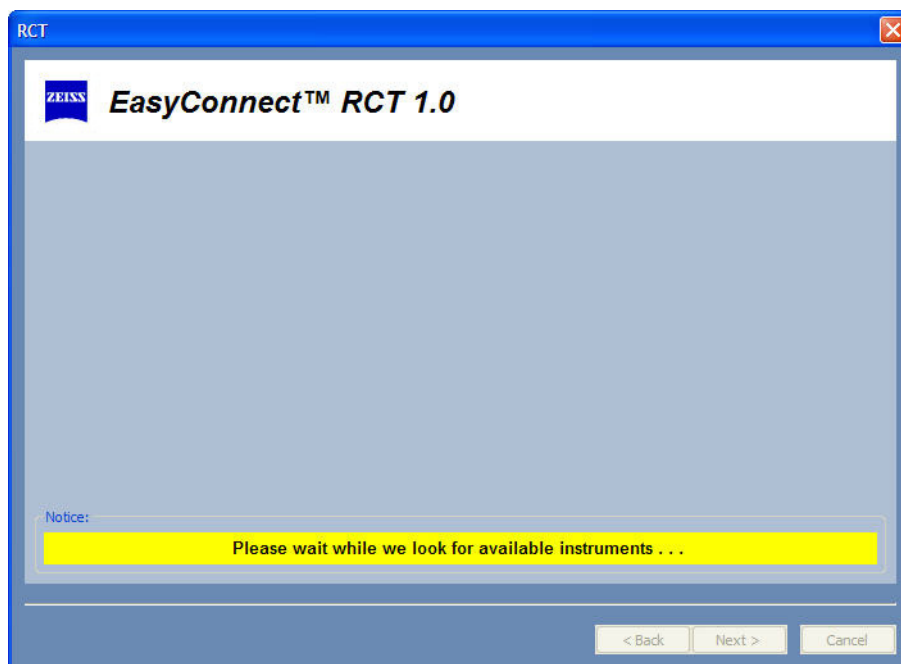


Figure G.5 Please Wait Message



Note: If all your HFA instruments cannot respond fast enough you will receive a message such as *"No instruments are responding. Please try again later"* or *"Could not retrieve instrument configuration data. Please try again later."* If at least one HFA instrument responds, you will not receive a message. If you receive one of these messages, select the Back button until you see the *EasyConnect* RCT Welcome screen, and then run the RCT again.

- 2 Select either the SHARED FOLDER or SHARED PRINTER button (Figure G.6) and then select NEXT to continue. Shared Folder sets up Data Export, EMR/PMS, Archive/Retrieve, and network backup. Shared Printer configures the HFA to use a shared printer connected to the computer.

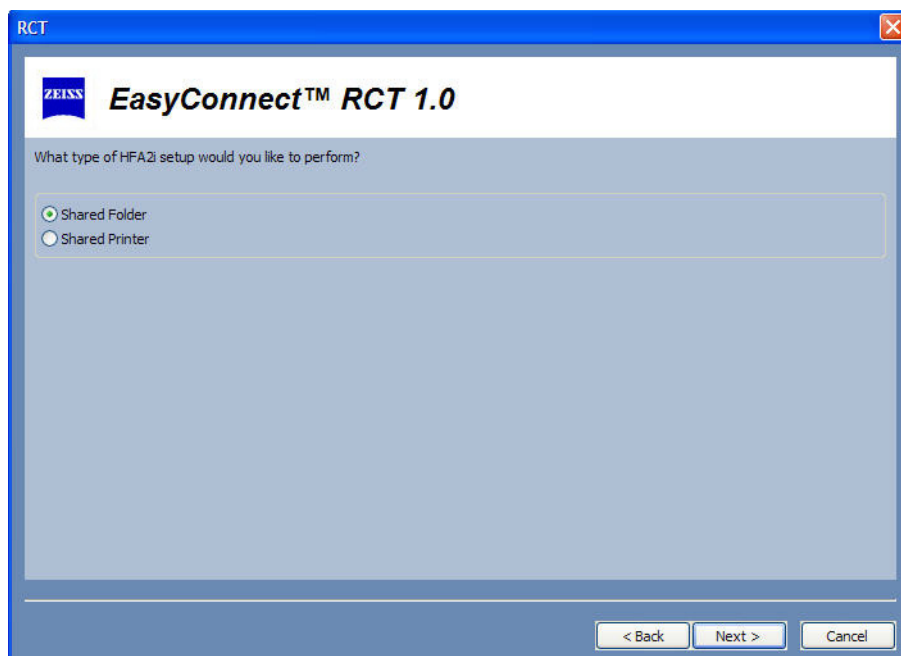


Figure G.6 Select Shared Folder

- 3 A list of all networked HFA II-/i instruments will be displayed (Figure G.7). All instruments are selected by default. Select the instruments you want to configure and then select NEXT to continue. CTRL-CLICK to select or deselect multiple instruments.

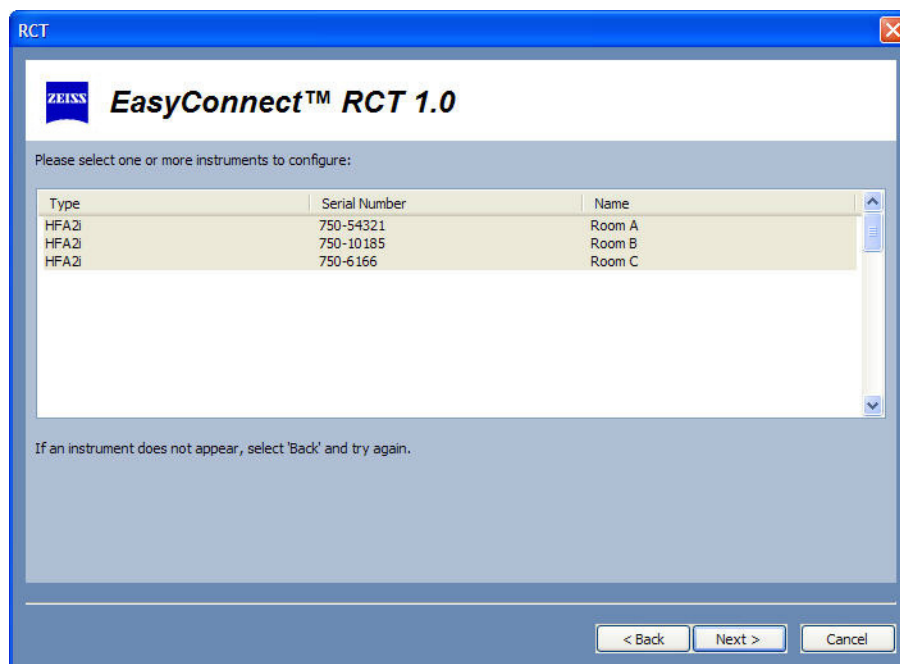


Figure G.7 Select Networked HFA Instruments to Configure

The RCT displays a message alerting you there will be a delay before proceeding (Figure G.8).

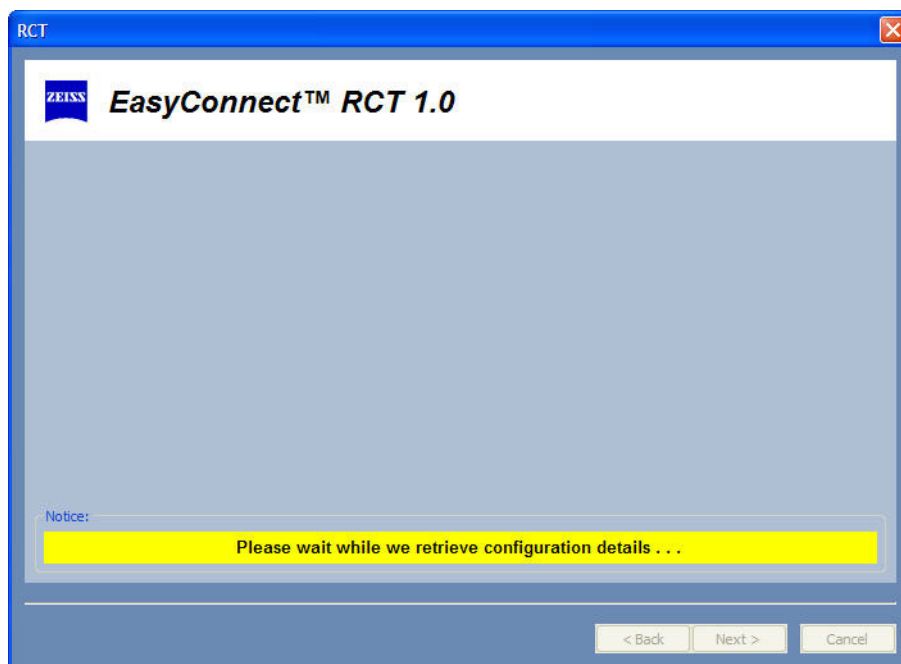


Figure G.8 Please Wait Message



Note: You must select at least one instrument to continue.



Note: The name of the HFA II-/i instrument can be created on the instrument in the HFA Network Setup Screen. Creating a name for an instrument can allow you to know the location of the instrument. If you do not create a name, then the Name field in the instrument list will be empty (see [“Enable the RCT and Name HFA II-i Instruments,”](#) on page G-3).

- 4 If you previously selected a shared folder type of HFA setup, enter the name of the shared folder or select the BROWSE button to locate and specify the shared folder. Select **Create separate subfolders for Work List and EMR/PMS Export** if you want to have separate subfolders inside the shared folder for those features (Figure G.9). This may be required by some EMR products.

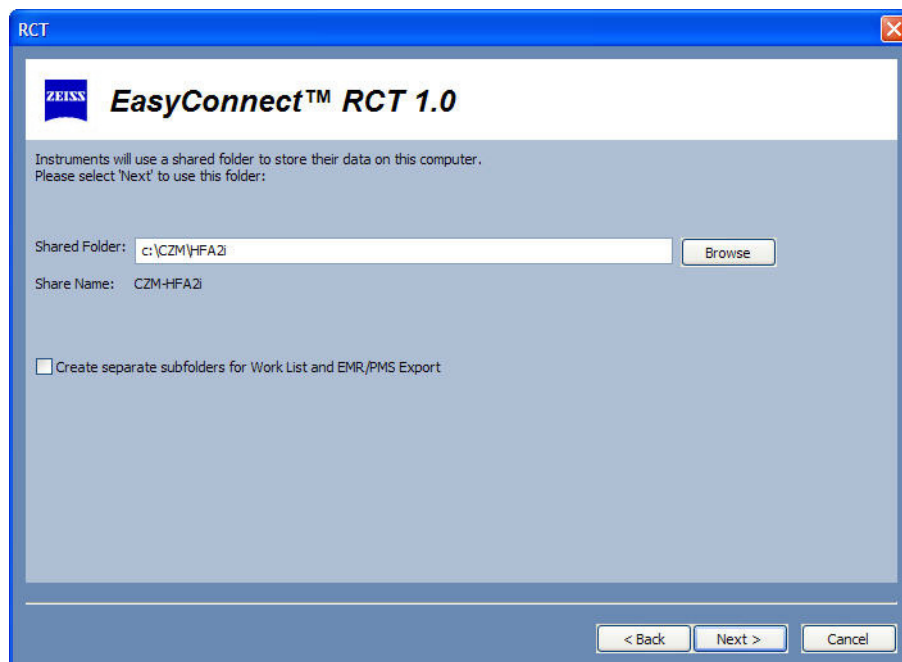


Figure G.9 Enter or Browse for Folder

A default share name for the folder will be created with the name "C:\CZMHFA2i" if that name is not already used. If you enter a folder name that does not currently exist, you will be asked if you want to create it. If you enter or select a folder that is not currently shared, then the RCT will make it sharable.



Note: The RCT only allows you to create a shared folder on a local drive.

The RCT will obtain the computer's name and IP address to set up the selected instruments.

If they do not already exist, the RCT will also create subfolders for each configurable feature (Separate Worklist and EMR/PMS Export subfolders will only be created if you have that option selected). The instruments will be configured to use these subfolders for the corresponding feature setup.

Table G-1 Subfolders for Configured Features

Feature Setup	Subfolder Name
Archive/Retrieve Setup	Archive
Data Export Setup	Data_Export
EMR/PMS Export Setup	EMR_Export (optional)
Worklist Setup	Work_List (optional)

Select NEXT to continue.

- 5 If you previously selected a shared printer type of HFA setup, select a printer you want to share from the list of printers connected to the computer (Figure G.10). The first printer is selected by default.



Note: You must designate the correct printer for the selected printer on the HFA II-*i* to print successfully (*Main Menu > System Setup > Printer > Shared* to select the shared printer). You need to also select the correct printer type as PCL-5, LASERJET COMPATIBLE, or PCL-3, DESKJET COMPATIBLE (*Main Menu > System Setup > Print Setup > Custom Print Setup > Print Type*).

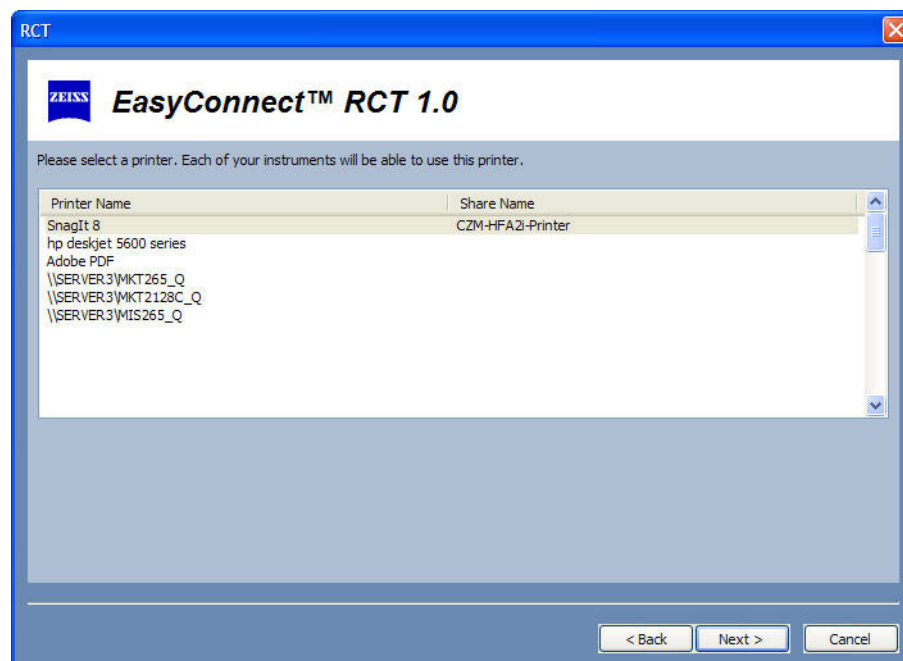


Figure G.10 Select a Printer to Share

If you select a printer that is not currently shared, then the RCT will make it sharable. A default share name for the printer will be created with the name "CZM-HFA2i-Printer" if that name is not already used. The RCT will obtain the computer's name and IP address to set up the selected instruments.

Select NEXT to continue.

- 6 The RCT will display a Commit screen (Figure G.11) before sending configuration messages to any instrument. This screen gives you a last chance to make corrections before committing the specified changes. Select BACK to go back to the previous screen(s) to make any corrections. Selecting CANCEL will exit the RCT without configuring any of the selected instruments.

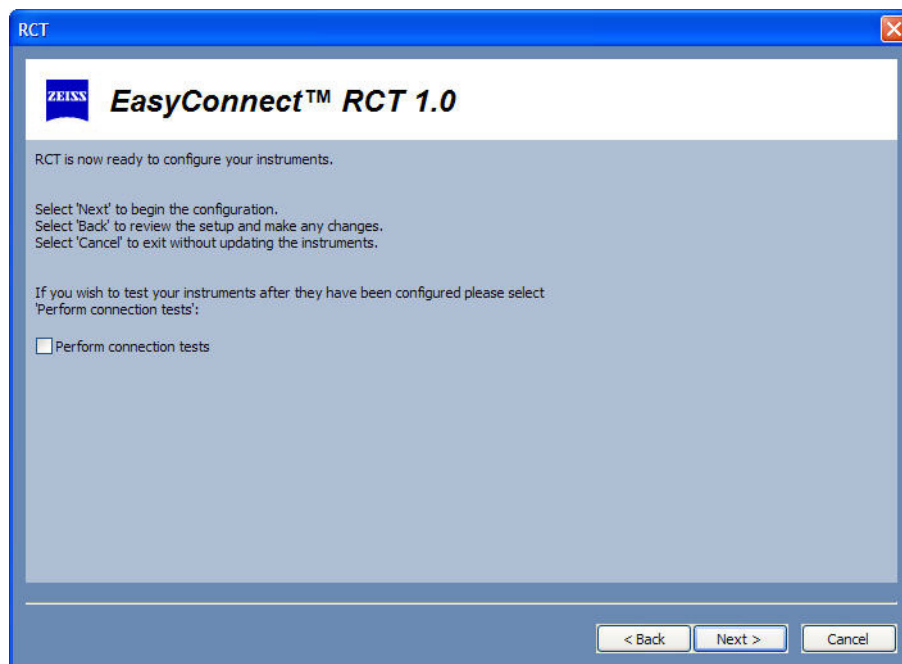


Figure G.11 Commit Screen

Select the PERFORM CONNECTION TESTS checkbox to perform a connection test for each configured setup. Results of these tests will be presented on the Completion screen and a VIEW TEST LOG button will be provided if any instrument failed a connection test.



Note: In some networks, the RCT will run successfully and configure the HFA, but the connection test will still fail, indicating that the HFA cannot currently export files to the shared folder. If a connection test fails, see [“Troubleshooting,”](#) on page G-43 for more information.

When you select NEXT, all selected instruments will be sent the specified configuration.

The RCT displays a message alerting you there will be a delay before proceeding (Figure G.12).

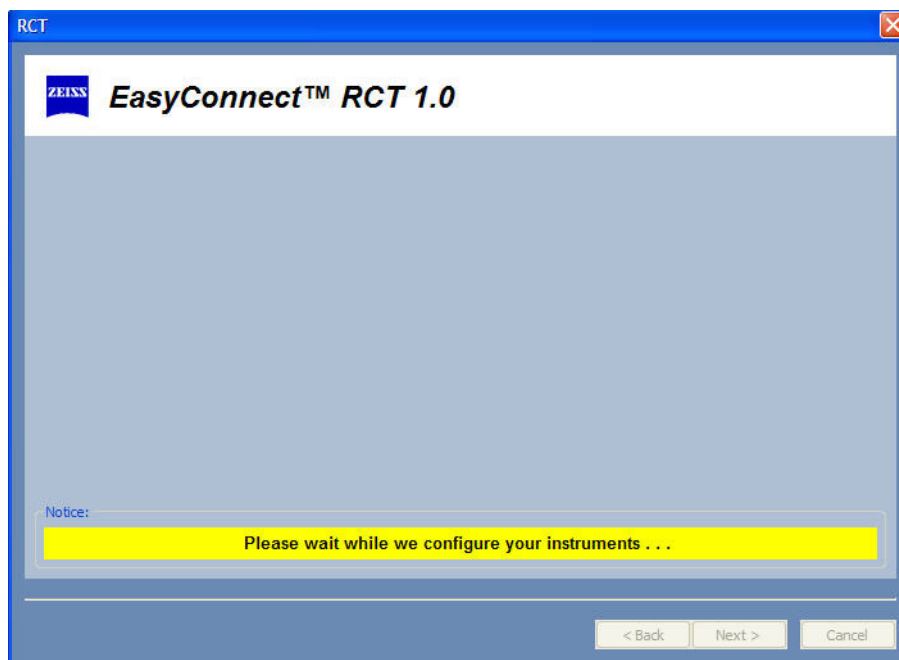


Figure G.12 Please Wait Message

- 7 If the PERFORM CONNECTION TESTS button was *not* selected (default), then after selecting NEXT on the Commit screen, a final Completion screen will be displayed (Figure G.13). If you selected PERFORM CONNECTION TESTS, then each selected instrument will be tested before a final Completion screen will be displayed (See Steps 3–5 in the Test mode section, page 38–42). *Each connection test could take several minutes.* Select FINISH to exit the RCT.

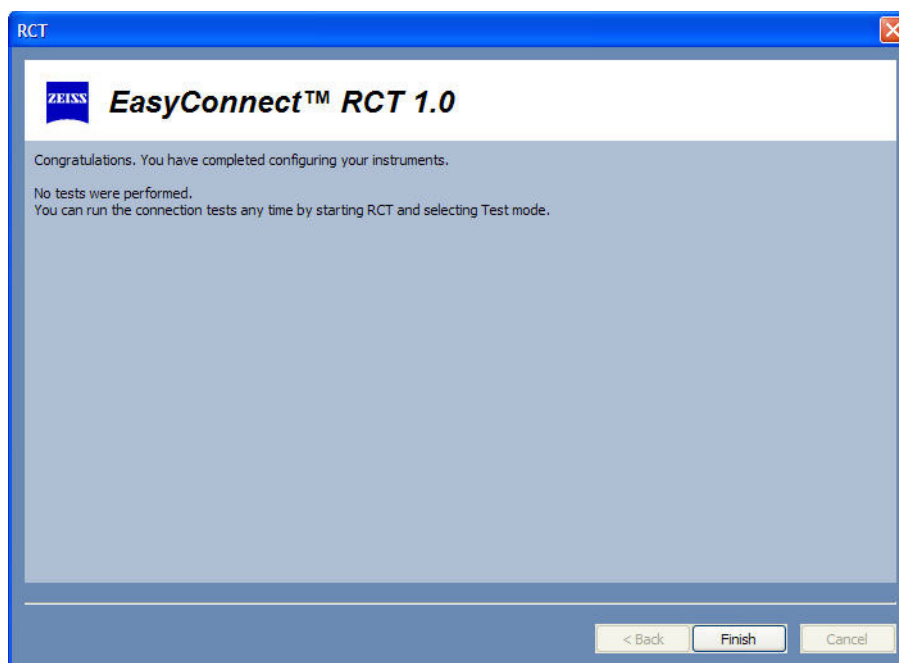


Figure G.13 Completion Screen (No connection tests)

Copy Mode

Copy mode copies the configuration of one instrument to one or more other instruments. Copy mode behaves as if you had used Easy mode and manually entered the configuration of the source instrument, rather than having the configuration automatically created.

The following steps describe how to use Copy mode.

- 1 Select COPY from the SELECT A CONFIGURATION MODE radio buttons (Figure G.14) and then select NEXT to continue.

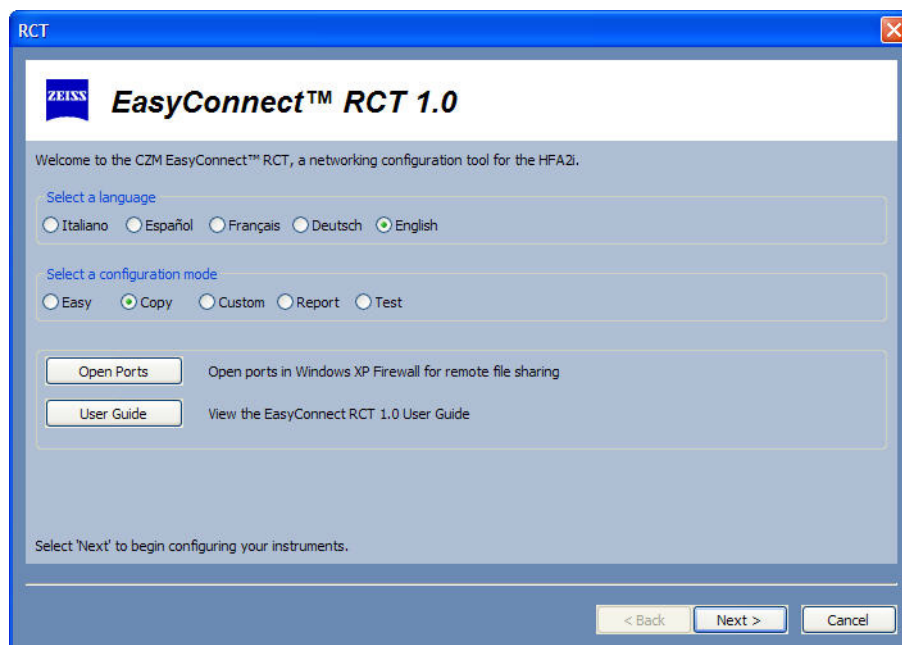


Figure G.14 Select Copy Configuration Mode

The RCT displays a message alerting you there will be a delay before proceeding (Figure G.15).

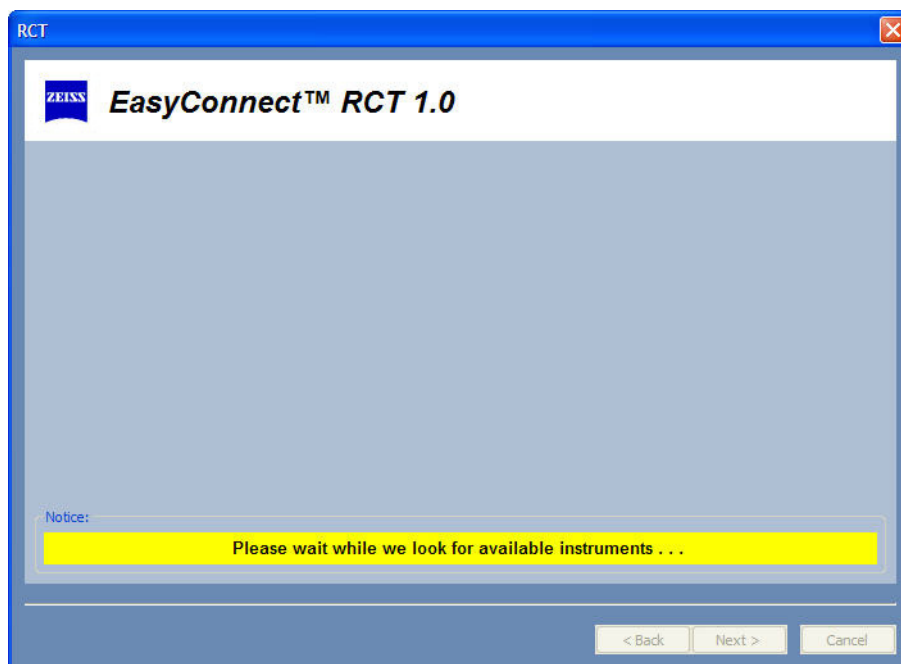


Figure G.15 Please Wait Message



Note: If all your HFA instruments cannot respond fast enough you will receive a message such as *"No instruments are responding. Please try again later"* or *"Could not retrieve instrument configuration data. Please try again later."* If at least one HFA instrument responds, you will not receive a message. If you receive one of these messages, select the Back button until you see the EasyConnect RCT Welcome screen, and then run the RCT again.

- 2 A list of all networked HFA II-/instruments will be displayed (Figure G.16). The first instrument is selected by default. Select the source instrument you want to copy from by clicking on it and then select NEXT to continue.

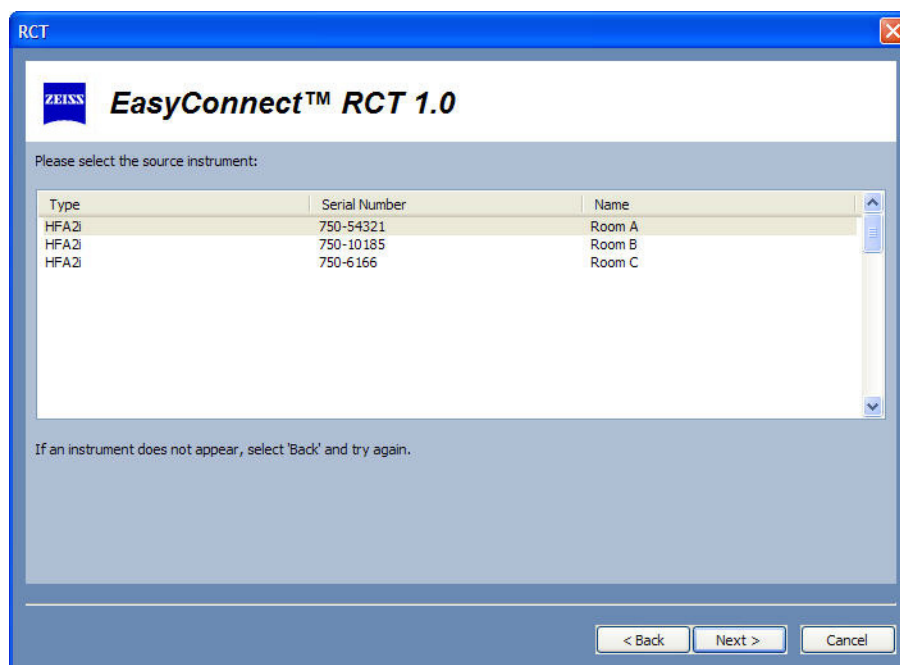


Figure G.16 Select the Source Networked HFA Instrument to Copy



Note: The name of the HFA II-/instrument can be created on the instrument in the HFA Network Setup Screen. Creating a name for an instrument can allow you to know the location of the instrument. If you do not create a name, then the Name field in the instrument list will be empty (see "Enable the RCT and Name HFA II-i Instruments," on page G-3).

The RCT displays a message alerting you there will be a delay before proceeding (Figure G.17).

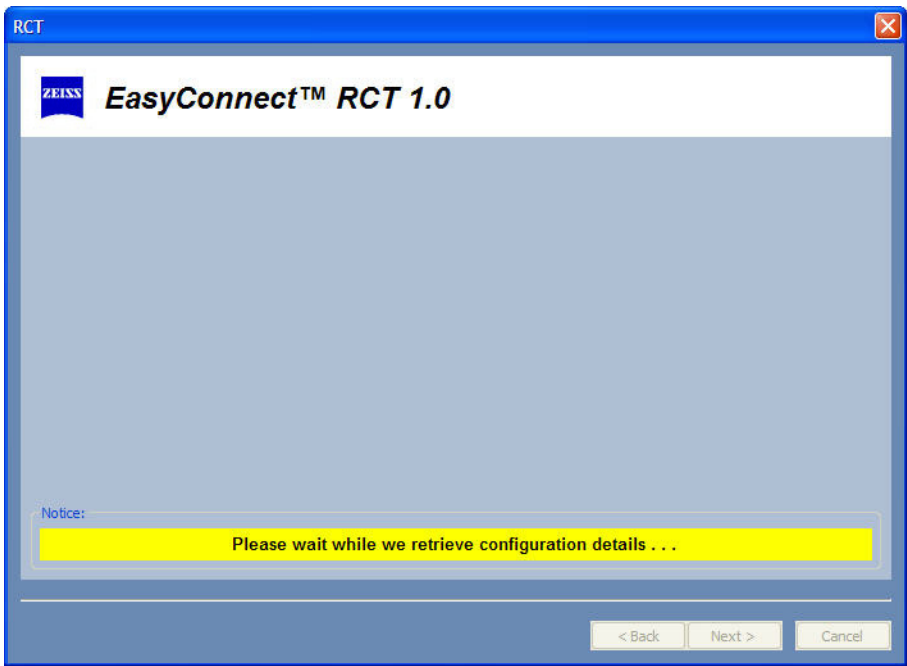


Figure G.17 Please Wait Message

- 3 A list of all other (non-source) networked HFA II-/instruments will be displayed (Figure G.18). All instruments are selected by default. Select one or more destination instruments you want to copy the source configuration to and then select NEXT to continue. CTRL-CLICK to select or deselect multiple instruments.

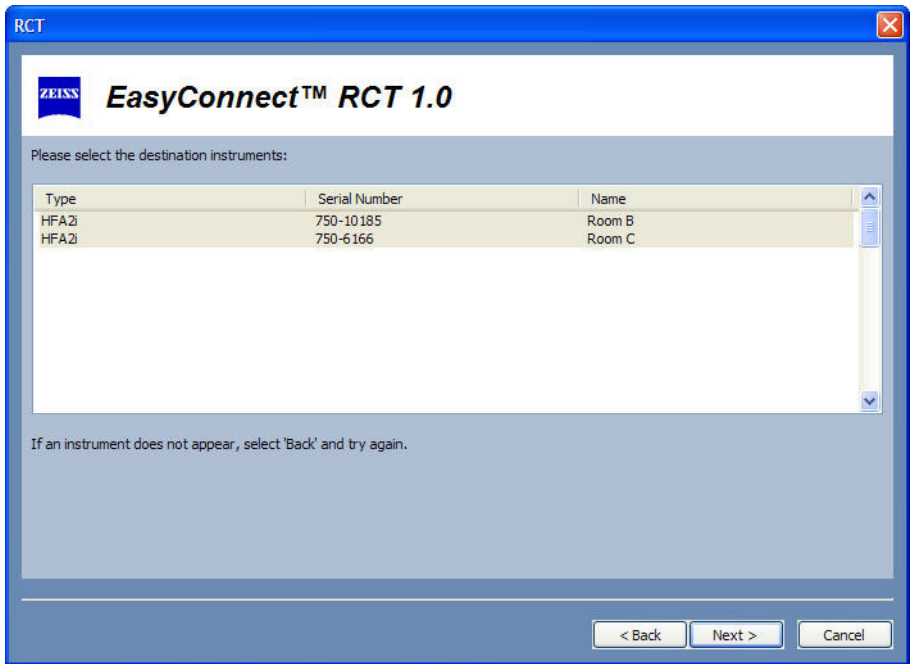


Figure G.18 Select the Destination Networked HFA Instruments

- 4 The RCT will display a Commit screen (Figure G.19) before sending configuration messages to any instrument. This screen gives you a last chance to make corrections before committing the specified changes. Select BACK to go back to the previous screen(s) to make any corrections. Selecting CANCEL will exit the RCT without configuring any of the selected instruments.

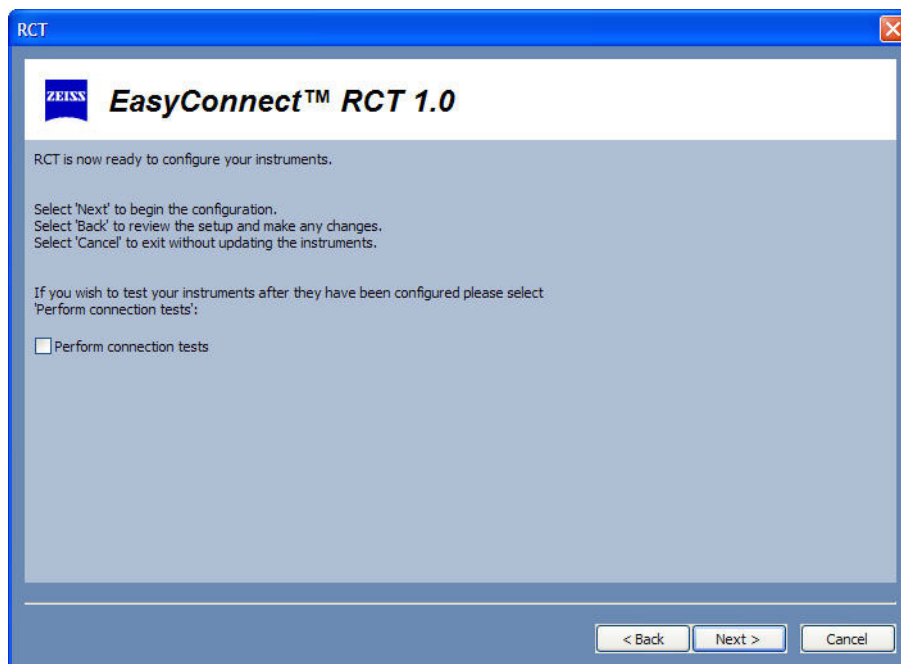


Figure G.19 Commit Screen

Select the PERFORM CONNECTION TESTS checkbox to perform a connection test for each configured setup. Results of these tests will be presented on the Completion screen and a VIEW TEST LOG button will be provided if any instrument failed a connection test.



Note: When Copy Mode is committed only features that are licensed on both the source and destination instrument will be configured.

When you select NEXT, all selected instruments will be sent the specified configuration.

The RCT displays a message alerting you there will be a delay before proceeding (Figure G.20).

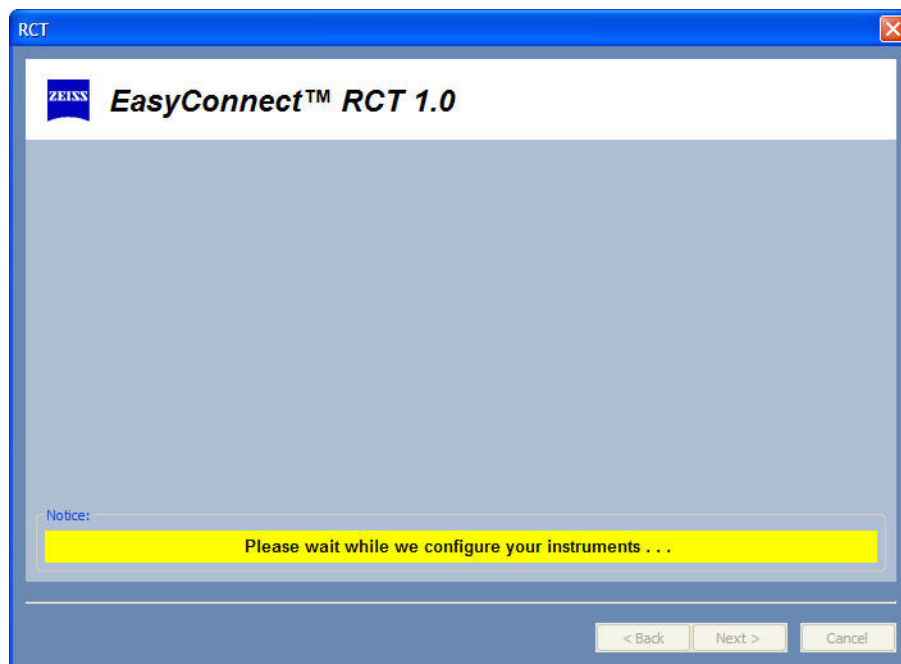


Figure G.20 Please Wait Message

- 5 If the PERFORM CONNECTION TESTS button was *not* selected (default), then after selecting NEXT on the Commit screen, a final Completion screen will be displayed (Figure G.21). If you selected PERFORM CONNECTION TESTS, then each selected instrument will be tested before a final Completion screen will be displayed (see Steps 3–5 in the Test mode section, page G-38–G-42). *Each connection test could take several minutes.* Select FINISH to exit the RCT.

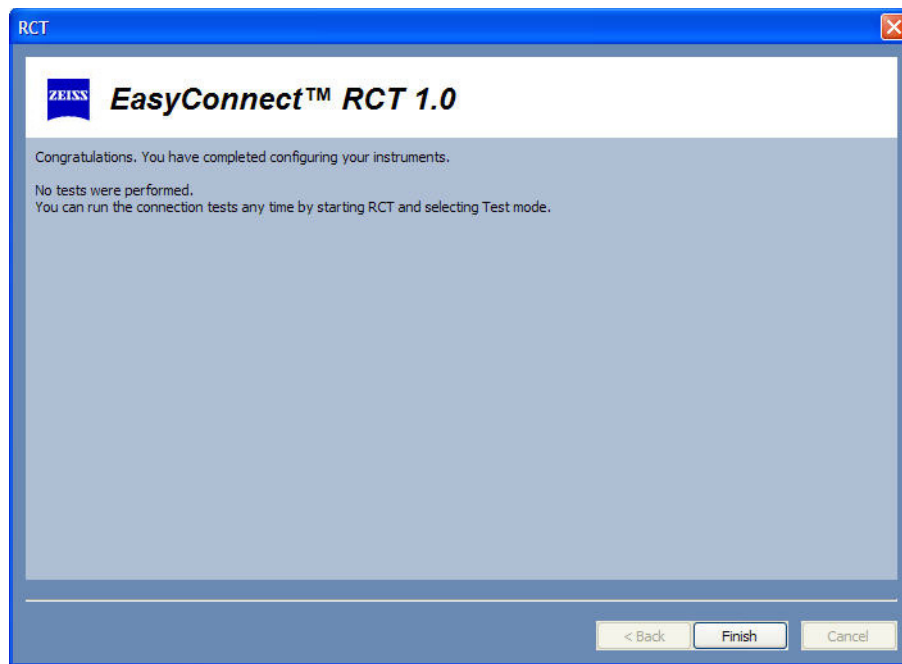


Figure G.21 Completion Screen (No connection tests)

Custom Mode

Custom mode configures one or more instruments by specifying the setup for a specified set of features.



Note: The difference between Easy and Custom modes is that in Custom mode the specified setup will be applied to the *selected* features of the selected instruments, while in Easy mode the setup will be applied to *all* features of the selected instruments.



CAUTION: If you use Custom mode and change the User Name and/or password, you will not be able to use Easy mode. Use Copy mode to copy the Custom mode configuration to other instruments.

The following steps describe how to use Custom mode.

- 1 Select CUSTOM from the SELECT A CONFIGURATION MODE radio buttons (Figure G.22) and then select NEXT to continue.

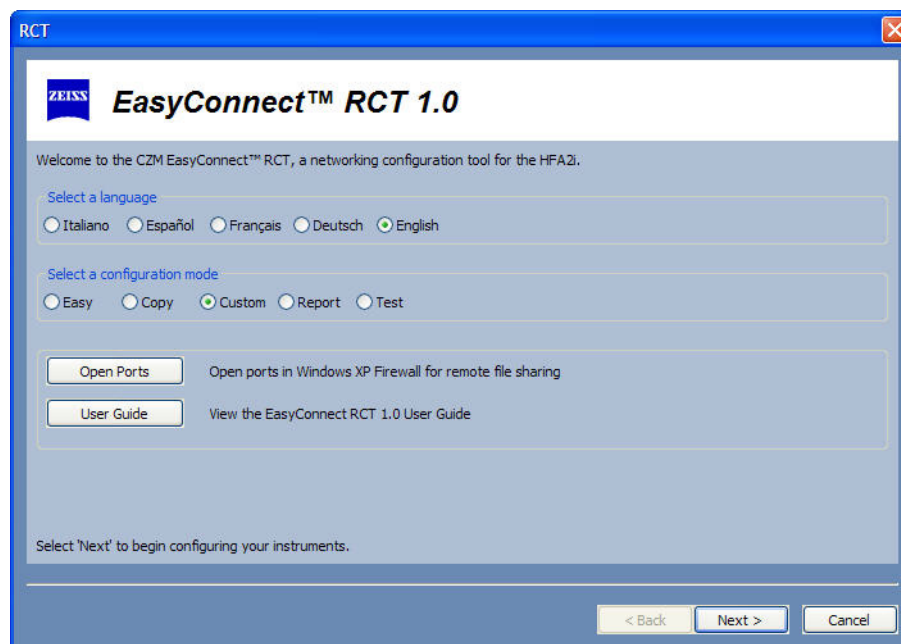


Figure G.22 Select Custom Configuration Mode

The RCT displays a message alerting you there will be a delay before proceeding (Figure G.23).

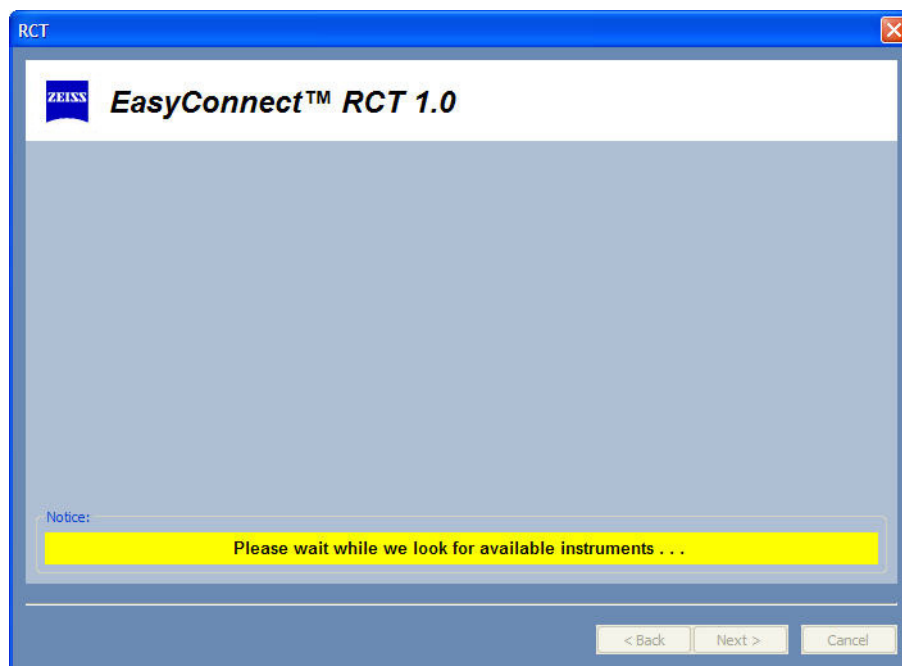


Figure G.23 Please Wait Message



Note: If all your HFA instruments cannot respond fast enough you will receive a message such as *"No instruments are responding. Please try again later"* or *"Could not retrieve instrument configuration data. Please try again later."* If at least one HFA instrument responds, you will not receive a message. If you receive one of these messages, select the Back button until you see the EasyConnect RCT Welcome screen, and then run the RCT again.

- 2 The RCT will prompt for a Custom mode password before beginning the Custom configuration process (Figure G.24). Enter "November171846" for the password and then select NEXT to continue. This login is included to provide a security barrier to the more advanced Custom configuration mode.

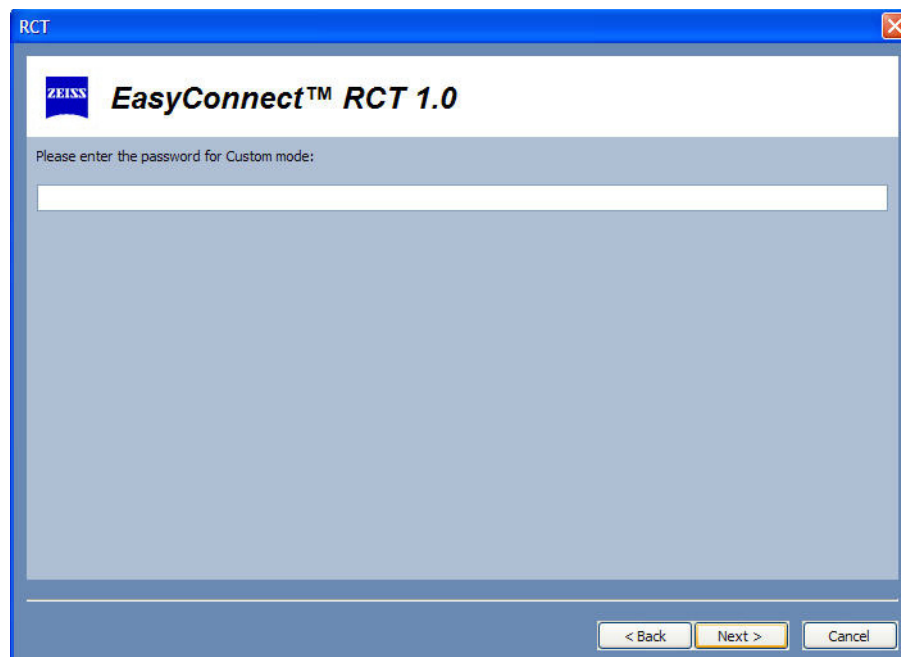


Figure G.24 Enter Custom Mode Password

- 3 Select either the SHARED FOLDER or SHARED PRINTER button (Figure G.25). Select NEXT.

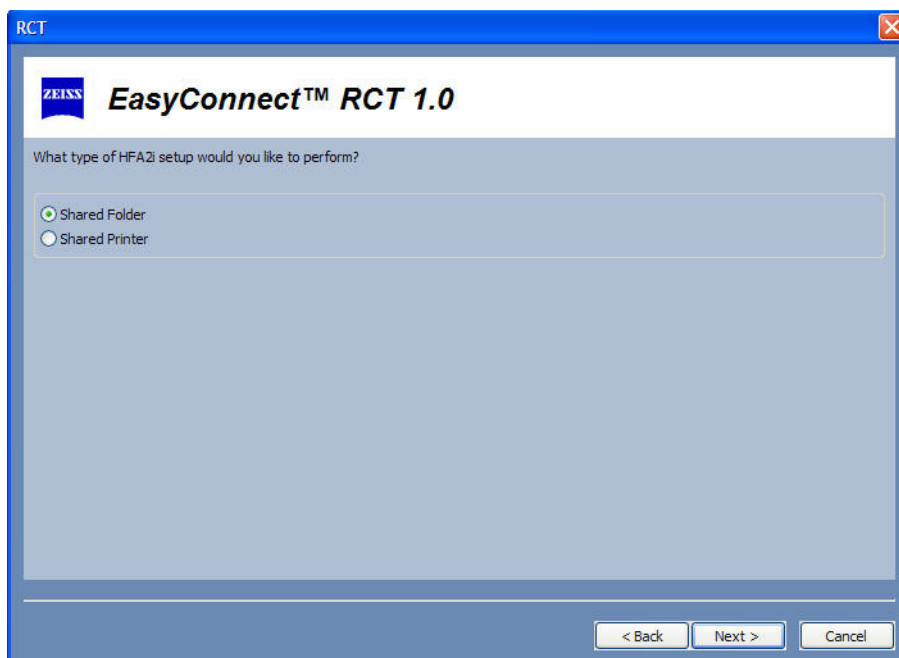


Figure G.25 Select Shared Folder

- 4 A list of all networked HFA II-*i* instruments will be displayed (Figure G.26). All instruments are selected by default. Select the instruments you want to configure and then select NEXT to continue. CTRL-CLICK to select or deselect multiple instruments.

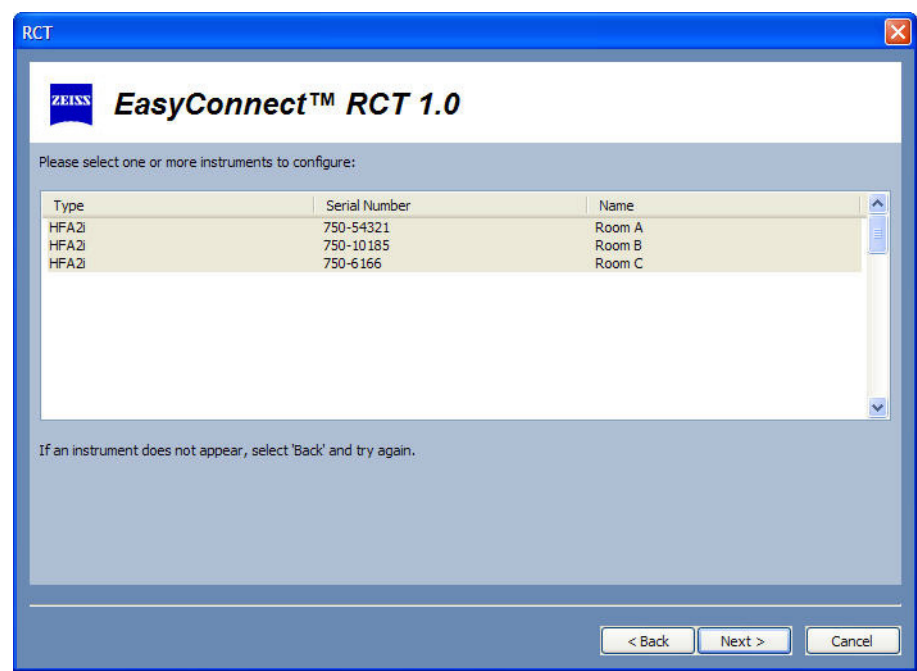


Figure G.26 Select Networked HFA Instruments to Configure



Note: The name of the HFA II-*i* instrument can be created on the instrument in the HFA Network Setup Screen. Creating a name for an instrument can allow you to know the location of the instrument. If you do not create a name, then the Name field in the instrument list will be empty (see “Enable the RCT and Name HFA II-i Instruments,” on page G-3).

The RCT displays a message alerting you there will be a delay before proceeding (Figure G.27).

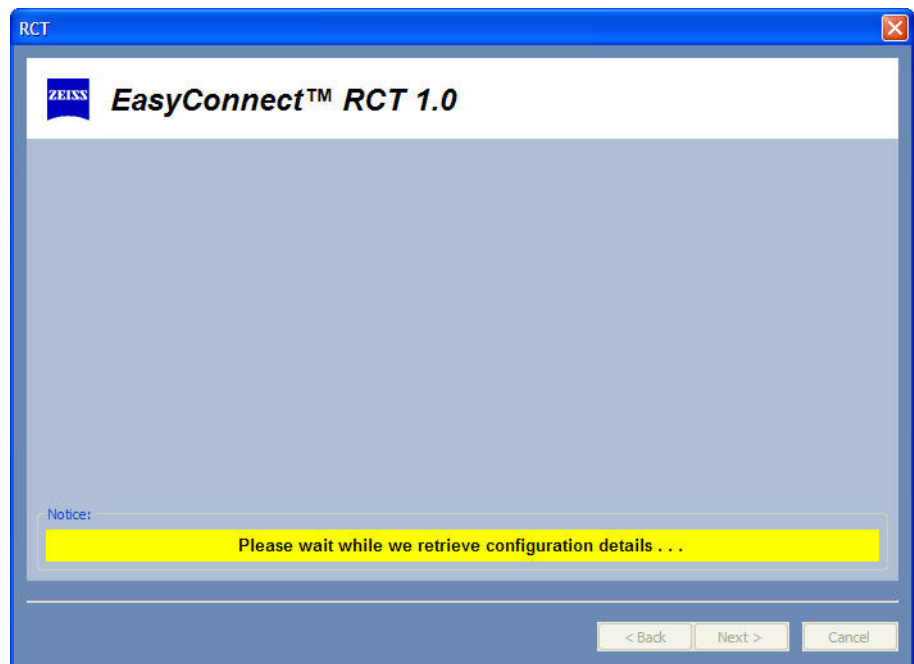


Figure G.27 Please Wait Message

- 5 The RCT will display a list of configurable features for the first selected instrument (Figure G.28 and Figure G.29). This list is restricted to those of the previously selected setup type—shared folder or shared printer.

Currently available shared folder HFA II-/features include:

- Archive/Retrieve Setup – Archiving data to a file server and retrieving archived data from a file server. Synchronizing data on two or more HFA II-/instruments.
- EMR/PMS Export Setup – export information to an Electronic Medical Records (EMR) system or Patient Management System (PMS).
- Data Export Setup – Exporting patient data, PDF and TIFF image files from a HFA II-/i.
- Work List Setup – import work lists from your practice’s EMR/PMS system.

Currently, the only available shared printer HFA II-/feature is Shared Printer Setup.

Network configuration of these features can be set and viewed manually on the COMMUNICATION SETUP Screen of the selected HFA II-/instrument.



Note: Only licensed features will be shown in the list for the selected instrument.

Select one or more features you want to configure and then select NEXT to continue. CTRL-CLICK to select or deselect multiple features.

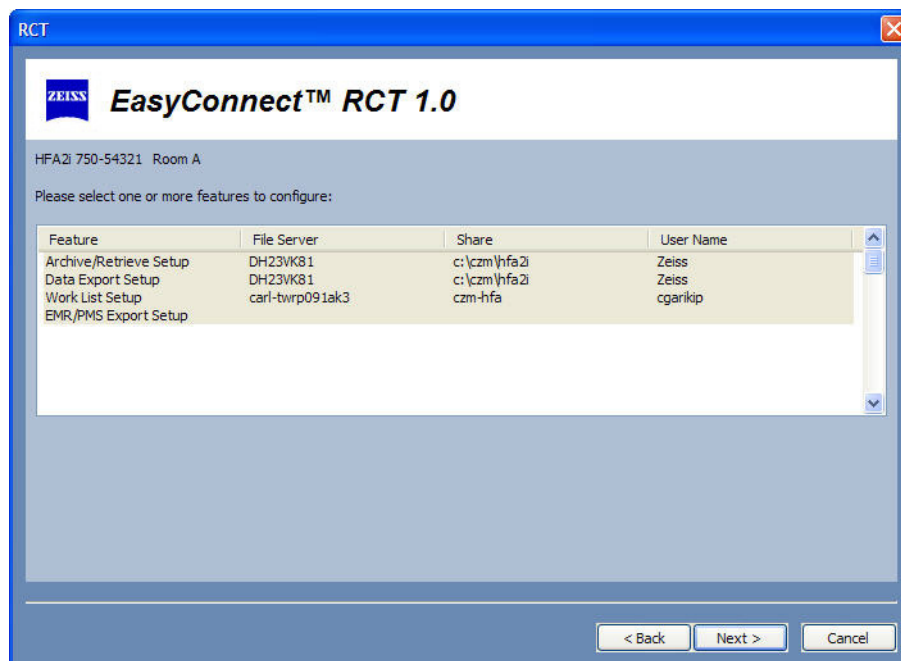


Figure G.28 List of Configurable Features (Shared Folder)

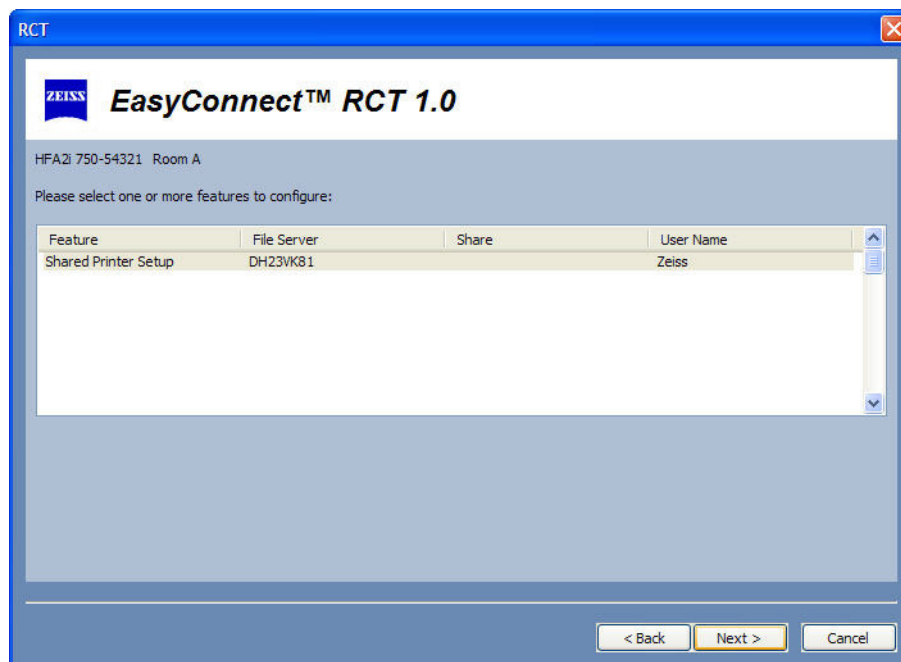


Figure G.29 List of Configurable Features (Shared Printer)

The File Server is the name of the computer. Share is the path of the shared folder or printer, and User Name is the Windows user name.

- 6 If you previously selected a shared folder type of HFA setup, enter the path of the shared folder or select the BROWSE button to locate and specify the shared folder. Select **Create separate subfolders for Work List and EMR/PMS Export** if you want to have separate subfolders inside the shared folder for those features (Figure G.30). This may be required by some EMR products.

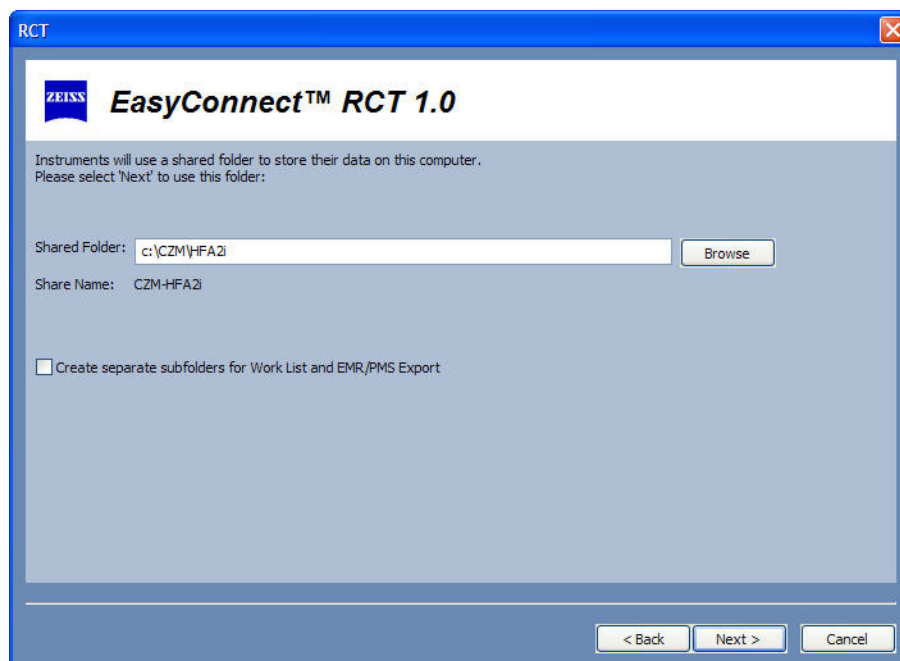


Figure G.30 Enter or Browse for the Folder to Share

A default share name for the folder will be created with the name "C:\CZMHFA2i" if that name is not already used. If you enter a folder that does not currently exist, you will be asked if you want to create it. If you enter or select a folder that is not currently shared, then the RCT will make it sharable.



Note: The RCT only allows you to create a shared folder on a local drive.

The RCT will obtain the computer's name and IP address to set up the selected instruments.

If they do not already exist, the RCT will also create subfolders for each configurable feature (Separate Worklist and EMR/PMS Export subfolders will only be created if you have that option selected). The instruments will be configured to use these subfolders for the corresponding feature setup.

Table G-2 Subfolders for Configured Features

Feature Setup	Subfolder Name
Archive/Retrieve Setup	Archive
Data Export Setup	Data_Export
EMR/PMS Export Setup	EMR_Export (optional)
Worklist Setup	Work_List (optional)

Select NEXT to continue.

- 7 If you previously selected a shared printer type of HFA setup, select a printer you want to share from the list of printers connected to the computer (Figure G.31). The first printer is selected by default.



Note: You must designate the correct printer for the selected printer on the HFA II-*i* to print successfully (*Main Menu > System Setup > Printer > Shared* to select the shared printer). You need to also select the correct printer type as PCL-5, LASERJET COMPATIBLE, or PCL-3, DESKJET COMPATIBLE (*Main Menu > System Setup > Print Setup > Custom Print Setup > Print Type*).

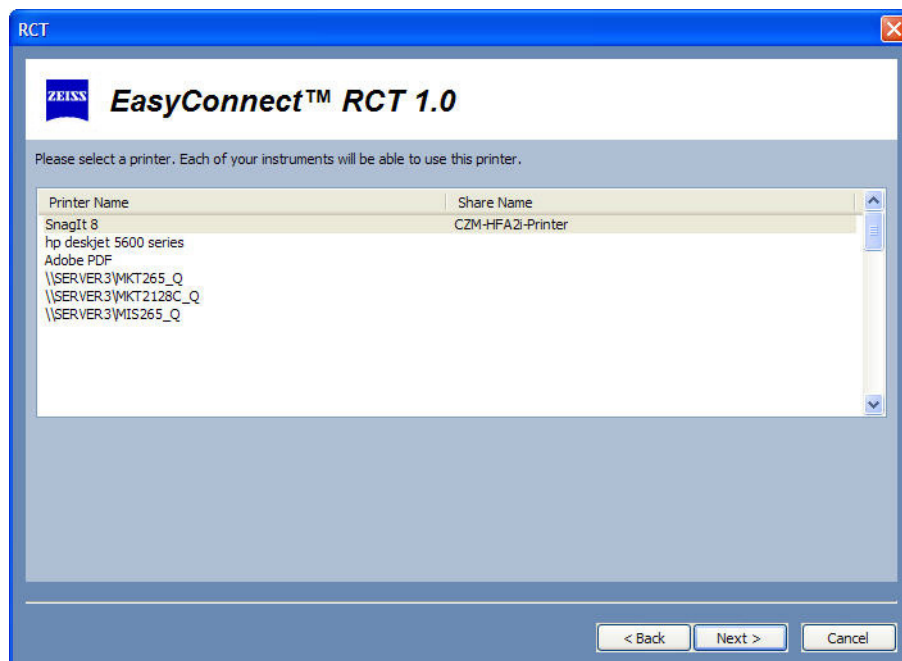


Figure G.31 Select a Printer to Share

If you select a printer that is not currently shared, then the RCT will make it sharable.

A default share name for the printer will be created with the name "CZM-HFA2i-Printer" if that name is not already used. The RCT will obtain the computer's name and IP address to set up the selected instruments.

Select NEXT to continue.

- 8 The RCT will prompt for the User Name and Password of the shared folder (or printer) (Figure G.32). The default RCT User Name is "Zeiss" and the default RCT Password is "November171846." Accept the default or enter another user name and password and then select NEXT to continue.



Note: If you use a User Name in Custom mode from a previously created User Account, and enter a password that is not the same as from the previous account, a dialog will be displayed alerting you and allowing you to continue or change the User Name and/or password.

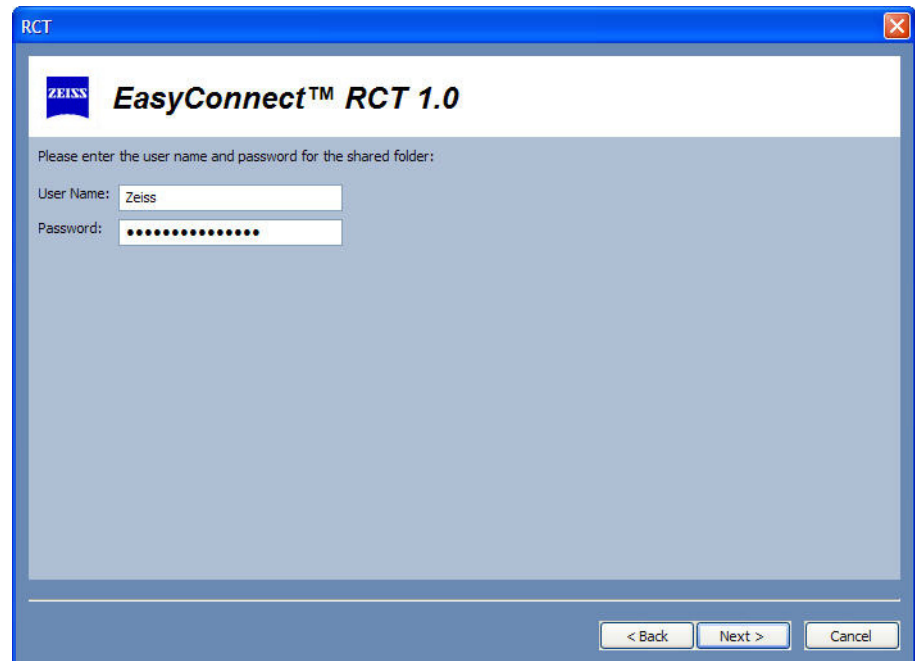


Figure G.32 Enter User Name and Password for the Share

- 9 The RCT will repeat prompting for a selection from each instrument's features until all selected instruments have been configured.

- 10 After all instruments have been configured, the RCT will display a Commit screen (Figure G.33) before sending configuration messages to any instrument. This screen gives you a last chance to make corrections before committing the specified changes. Select BACK to go back to the previous screen(s) to make any corrections. Selecting CANCEL will exit the RCT without configuring any of the selected instruments.

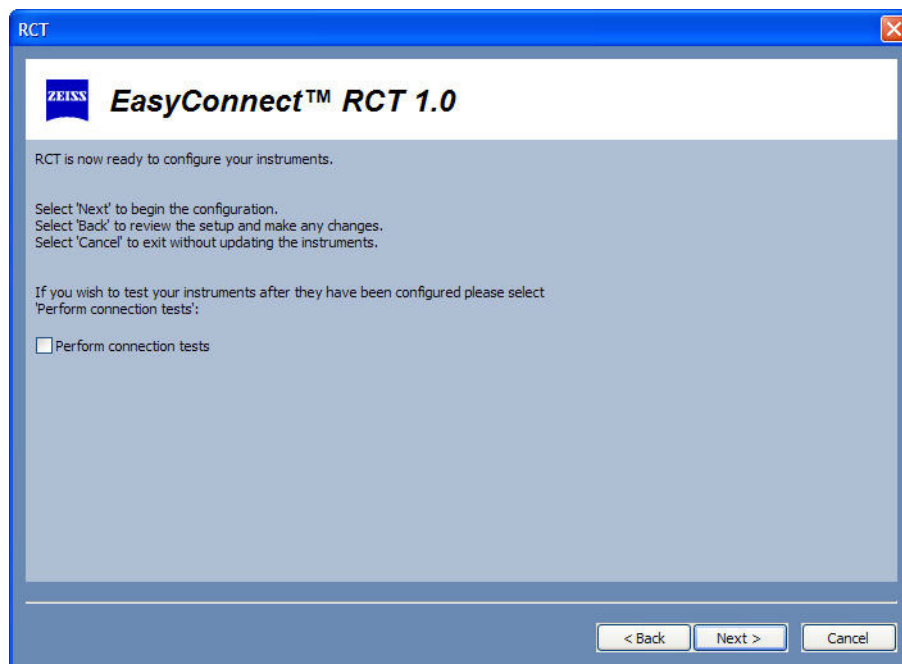


Figure G.33 Commit Screen

Select the PERFORM CONNECTION TESTS checkbox to perform a connection test for each configured setup. Results of these tests will be presented on the Completion screen and a VIEW TEST LOG button will be provided if any instrument failed a connection test.

When you select NEXT, all selected instruments will be sent the specified configuration.

The RCT displays a message alerting you there will be a delay before proceeding (Figure G.34).

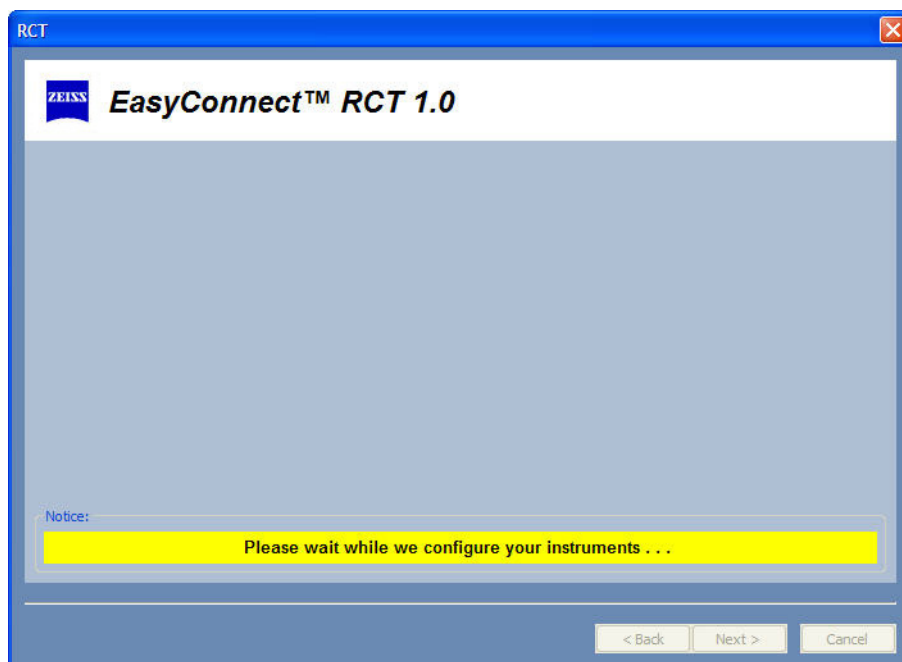


Figure G.34 Please Wait Message

- 11 If the PERFORM CONNECTION TESTS button was *not* selected (default), then after selecting NEXT on the Commit screen, a final Completion screen will be displayed (Figure G.35). If you selected PERFORM CONNECTION TESTS, then each selected instrument will be tested before a final Completion screen will be displayed (See Steps 3–5 in the Test mode section, page G-38–G-42). *Each connection test could take several minutes.* Select FINISH to exit the RCT.

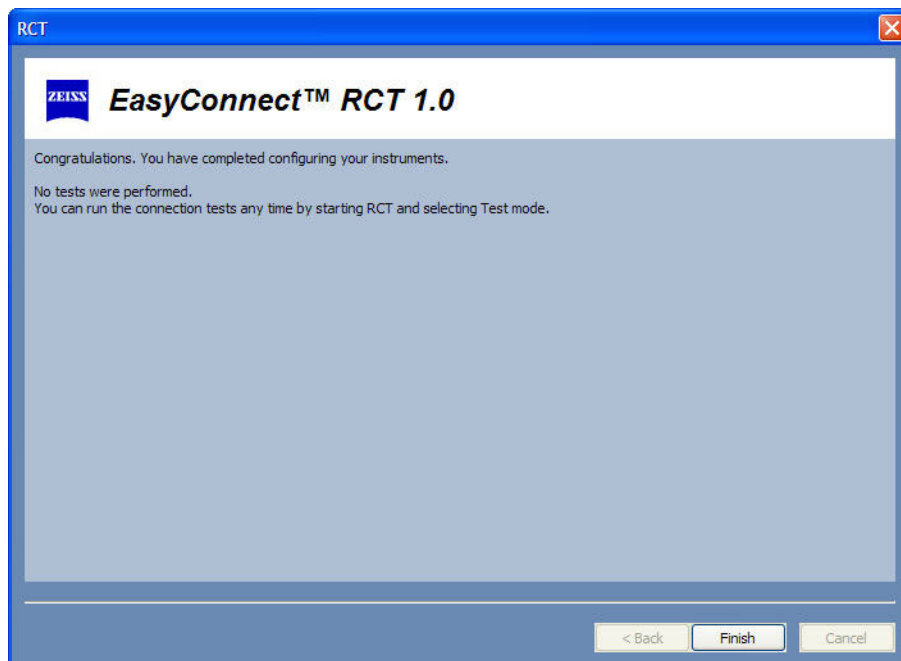


Figure G.35 Completion Screen (No connection tests)

Report Mode

Report mode displays the configuration of a selected set of instruments. Any user can run Report mode—the user does not need to be an Administrator. The following steps describe how to use Report mode.

- 1 Select REPORT from the SELECT A CONFIGURATION MODE radio buttons (Figure G.36) and then select NEXT to continue.

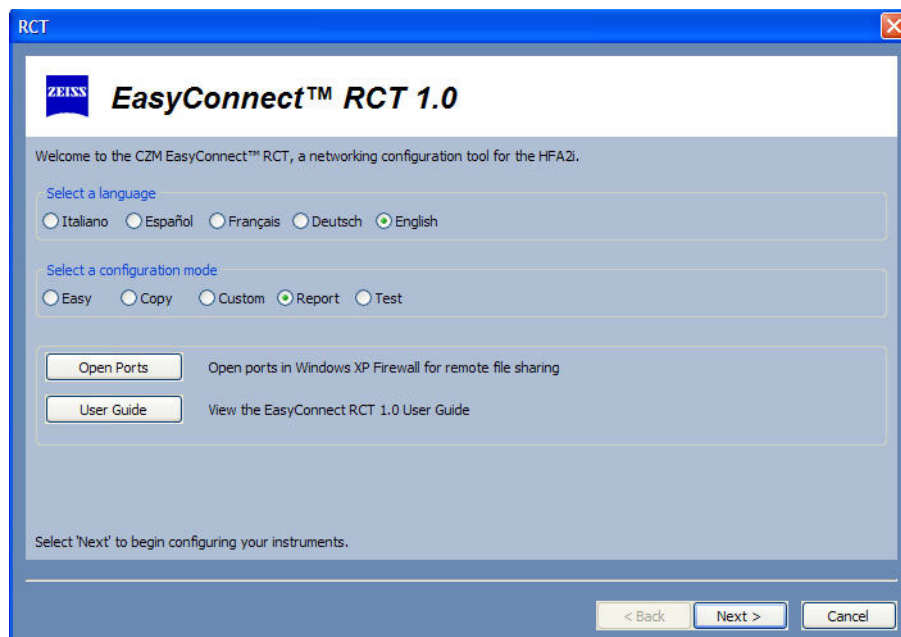


Figure G.36 Select Report Configuration Mode

The RCT displays a message alerting you there will be a delay before proceeding (Figure G.37).

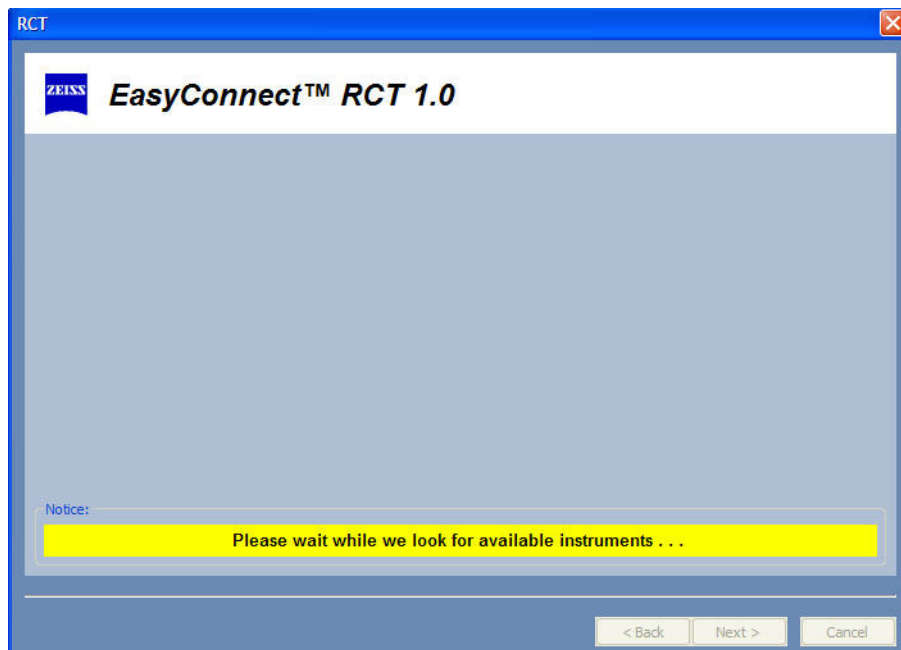


Figure G.37 Please Wait Message



Note: If all your HFA instruments cannot respond fast enough you will receive a message such as “No instruments are responding. Please try again later” or “Could not retrieve instrument configuration data. Please try again later.” If at least one HFA instrument responds, you will not receive a message. If you receive one of these messages, select the Back button until you see the *EasyConnect* RCT Welcome screen, and then run the RCT again.

2

A list of all networked HFA II-/instruments will be displayed (Figure G.38). All instruments are selected by default. Select the instruments you want to display configurations for and then select NEXT to continue. CTRL-CLICK to select or deselect multiple instruments.

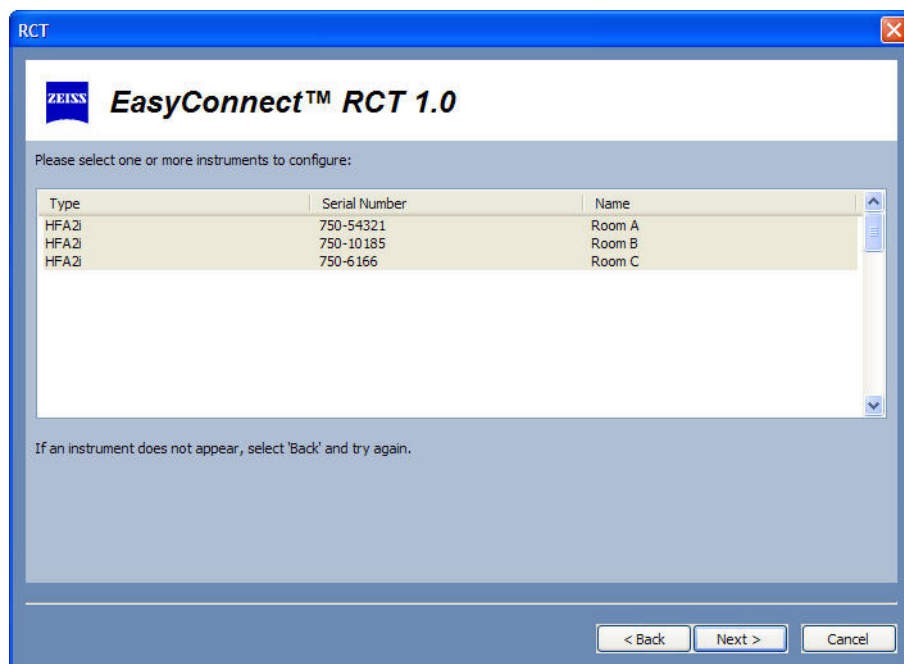


Figure G.38 Select Networked HFA Instruments to Display Configurations



Note: The name of the HFA II-/instrument can be created on the instrument in the HFA Network Setup Screen. Creating a name for an instrument can allow you to know the location of the instrument. If you do not create a name, then the Name field in the instrument list will be empty (see “Enable the RCT and Name HFA II-i Instruments,” on page G-3).

The RCT displays a message alerting you there will be a delay before proceeding (Figure G.39).

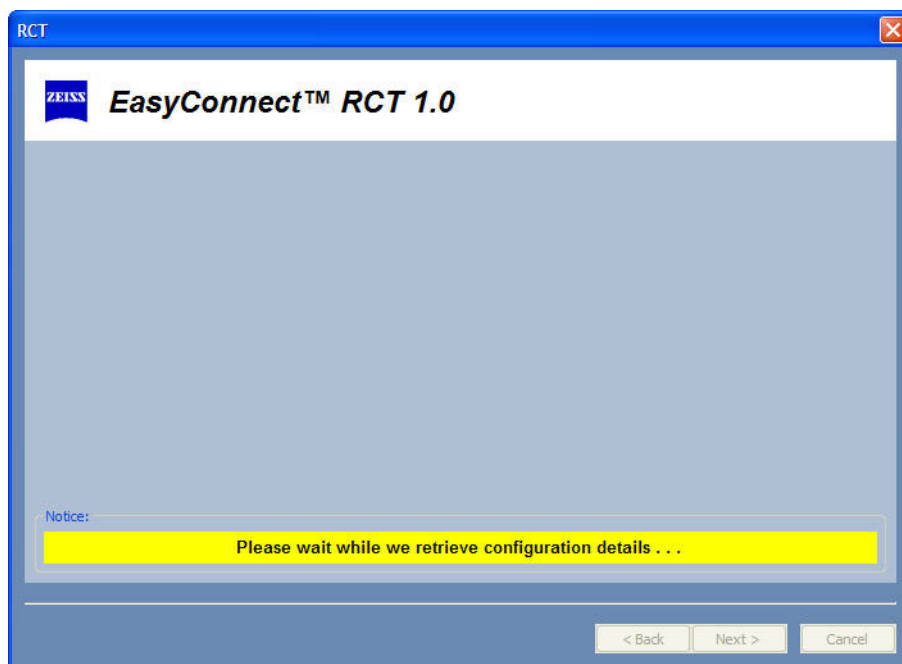


Figure G.39 Please Wait Message

- 3 The RCT will display the network settings for each selected instrument, one instrument at a time (Figure G.40). Select NEXT to continue to the next selected instrument.

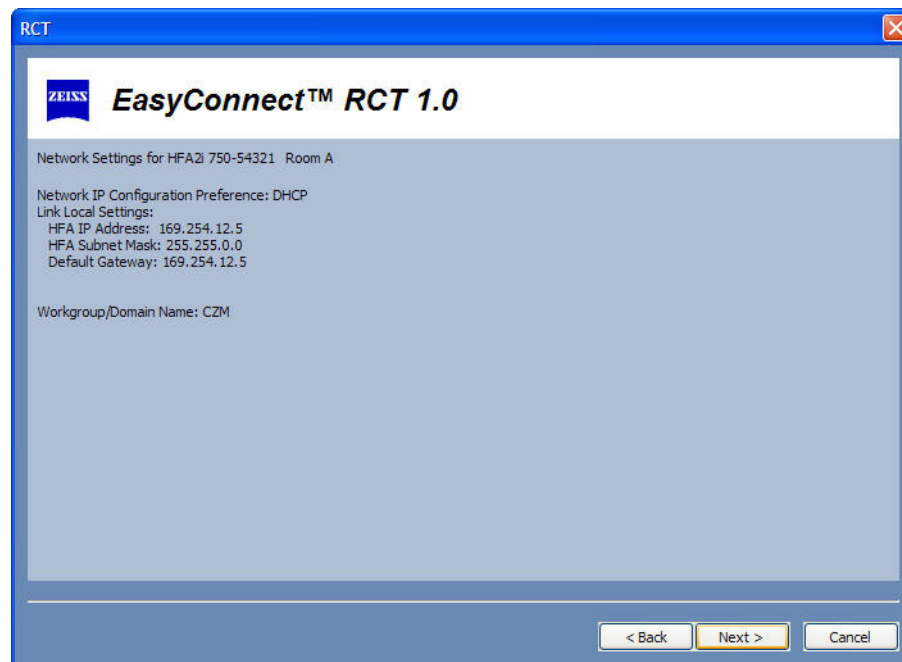


Figure G.40 Network Settings for a Selected Instrument



Note: Automatic Settings will be displayed if network settings were created automatically. Manual Settings will be displayed if the network settings were created manually.

- 4 After displaying network settings for the last selected instrument, the RCT will display the feature configuration details for each selected instrument, one instrument at a time (Figure G.41). Select NEXT to continue to the next selected instrument.

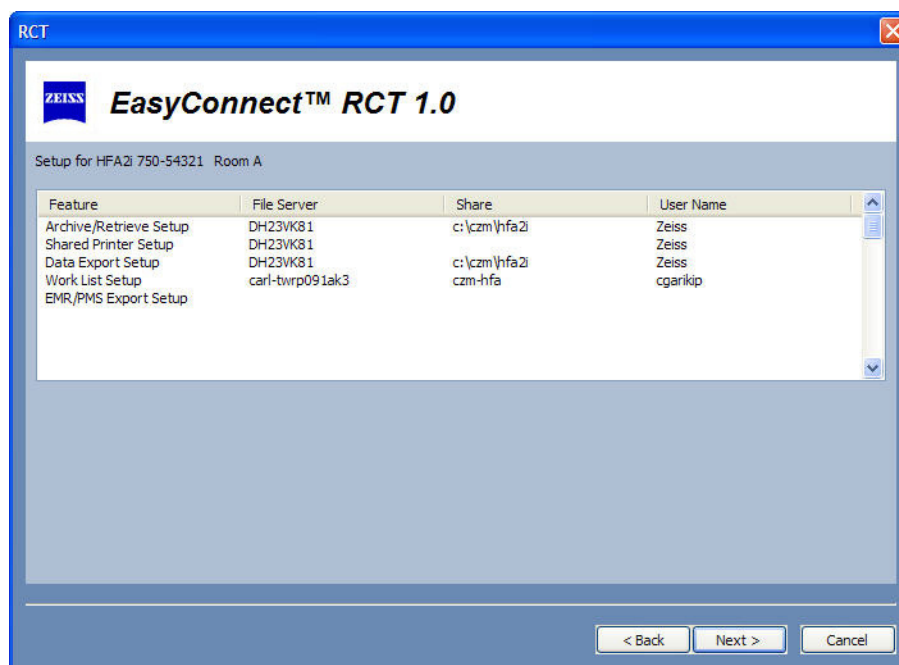


Figure G.41 Feature Configuration Details for a Selected Instrument

- 5 After all instruments have displayed their feature configurations, the RCT will display a Completion screen (Figure G.42). Select FINISH to exit the RCT.

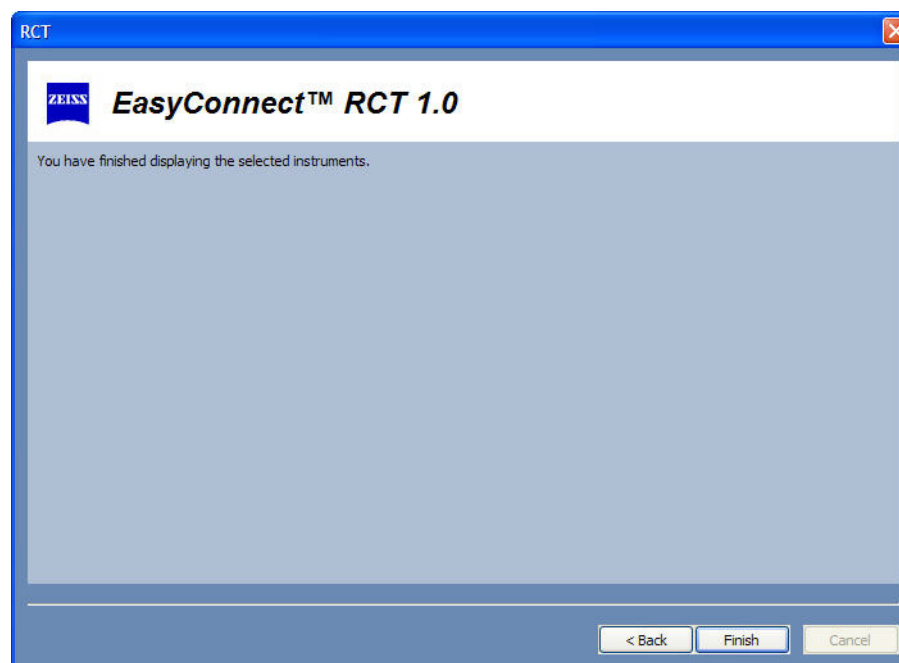


Figure G.42 Completion Screen

Test Mode

Test mode tests the configuration of selected instruments. Any user can run Test mode—the user does not need to be an Administrator.



Note: In some networks, the RCT will run successfully and configure the HFA, but the connection test will still fail, indicating that the HFA cannot currently export files to the shared folder. If a connection test fails, see [“Troubleshooting,” on page G-43](#) for more information.

The following steps describe how to use Test mode.

- 1 Select TEST from the SELECT A CONFIGURATION MODE radio buttons ([Figure G.43](#)) and then select NEXT to continue.

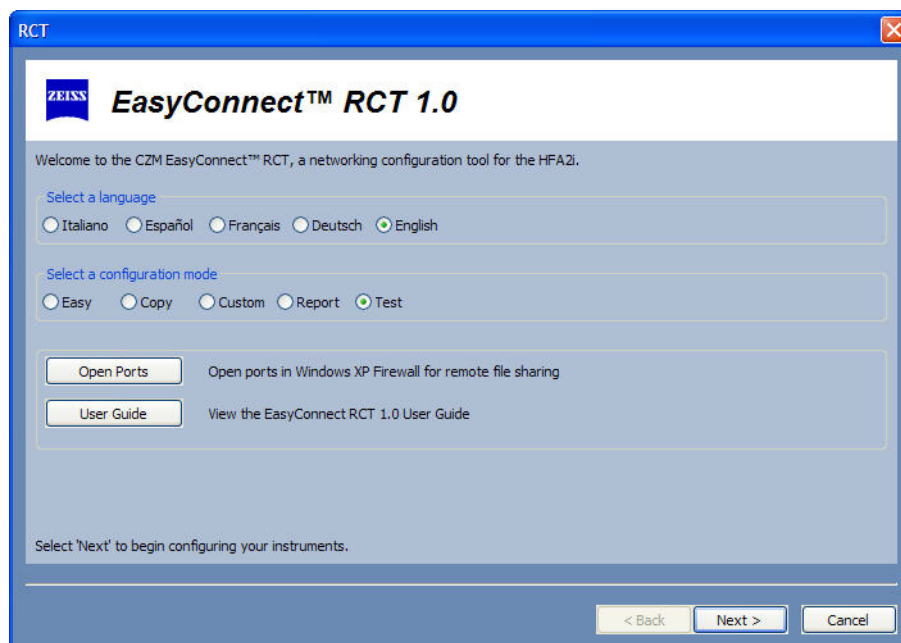


Figure G.43 Select Test Configuration Mode

The RCT displays a message alerting you there will be a delay before proceeding (Figure G.44).

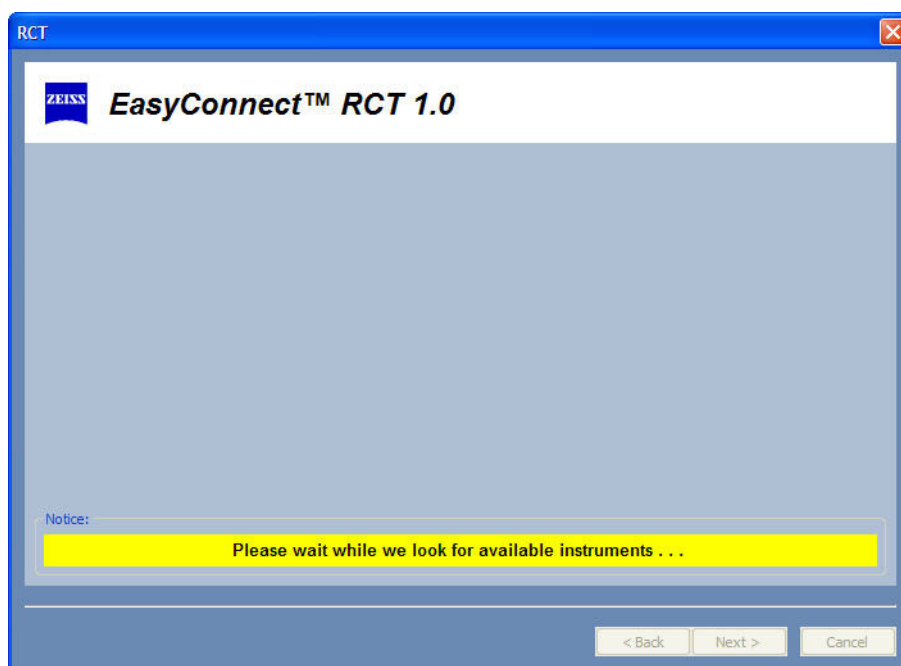


Figure G.44 Please Wait Message



Note: If all your HFA instruments cannot respond fast enough you will receive a message such as *"No instruments are responding. Please try again later"* or *"Could not retrieve instrument configuration data. Please try again later."* If at least one HFA instrument responds, you will not receive a message. If you receive one of these messages, select the Back button until you see the *EasyConnect* RCT Welcome screen, and then run the RCT again.

- 2 A list of all networked HFA II-*i* instruments will be displayed (Figure G.45). All instruments are selected by default. Select the instruments you want to test and then select NEXT to continue. CTRL-CLICK to select or deselect multiple instruments.

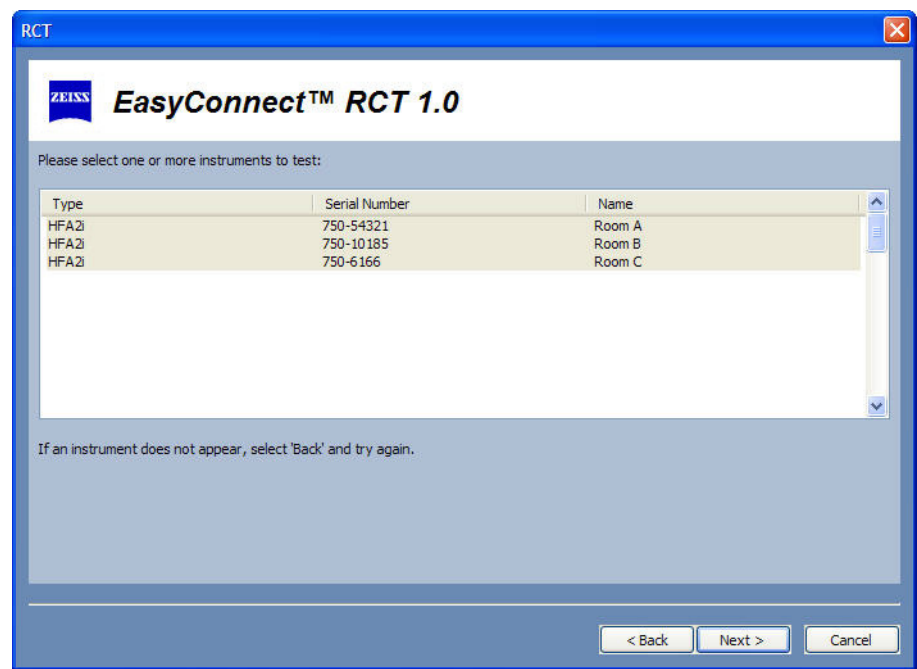


Figure G.45 Select Networked HFA Instruments to Test Configurations



Note: The name of the HFA II-*i* instrument can be created on the instrument in the HFA Network Setup Screen. Creating a name for an instrument can allow you to know the location of the instrument. If you do not create a name, then the Name field in the instrument list will be empty (see "Enable the RCT and Name HFA II-*i* Instruments," on page G-3).

The RCT displays a message alerting you there will be a delay before proceeding (Figure G.46).

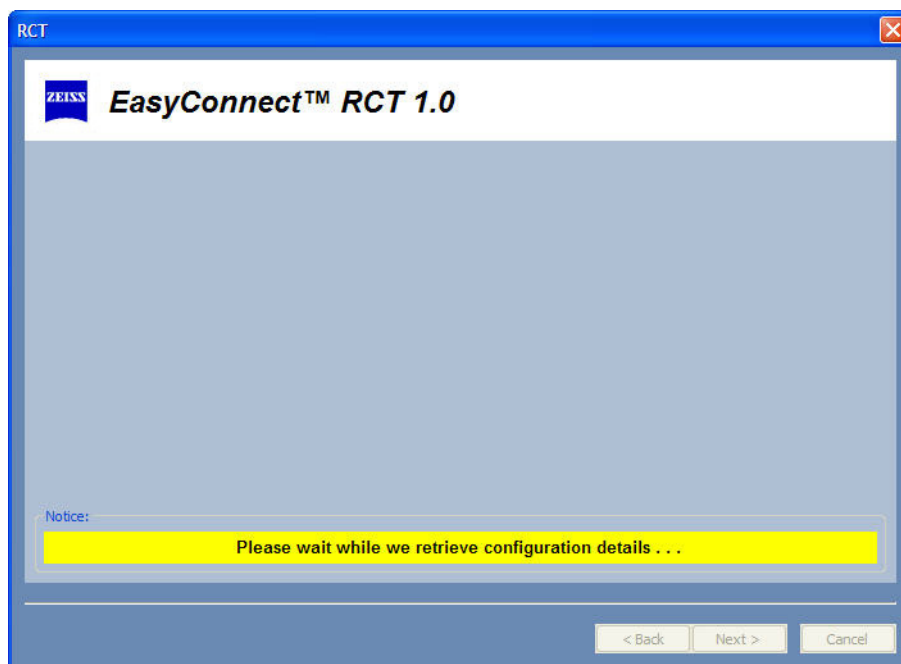


Figure G.46 Please Wait Message

- 3 A Ready to Test screen will be displayed (Figure G.47 and Figure G.48). Select NEXT to begin testing your configured instruments, one at a time. Figure G.49 shows a connection test in progress for the first instrument configured. When an instrument has finished testing, the entry in the Test column changes to either "PASSED" or "FAILED." Keep selecting NEXT until all instruments have completed testing.

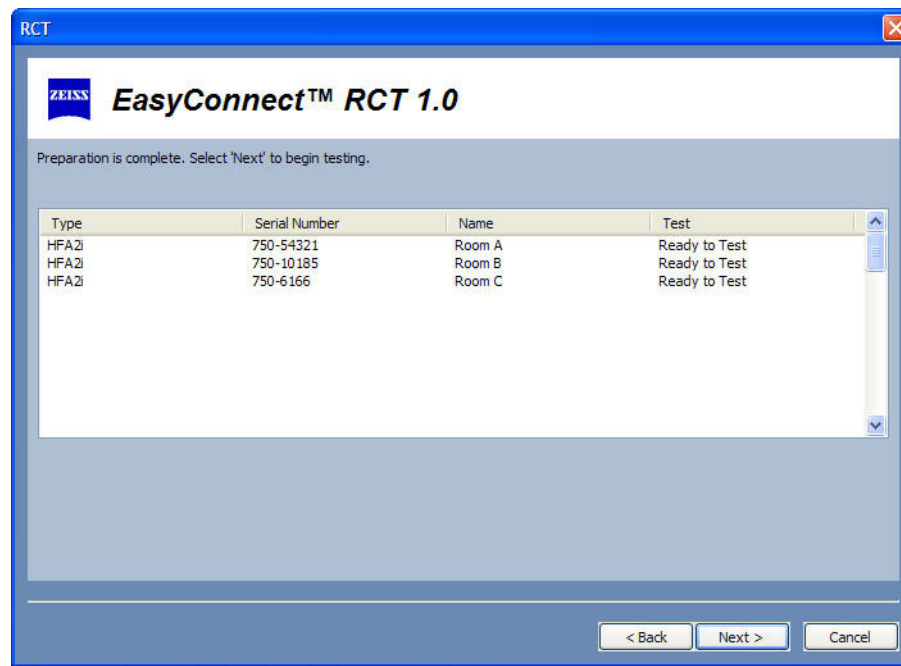


Figure G.47 Configuration Complete in Test Mode – Ready to Test

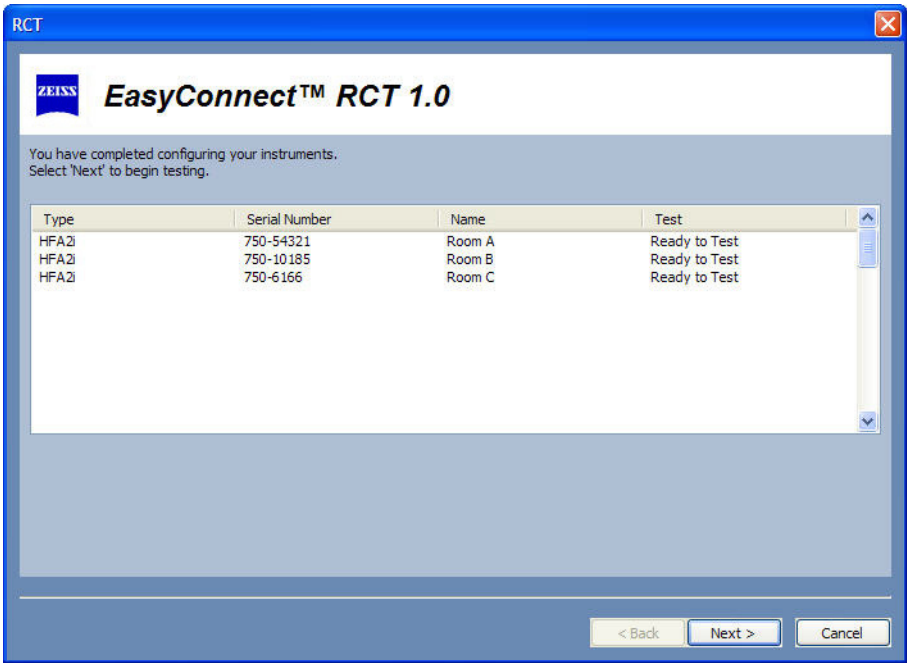


Figure G.48 Configuration Complete in Easy, Copy, or Custom Mode – Ready to Test

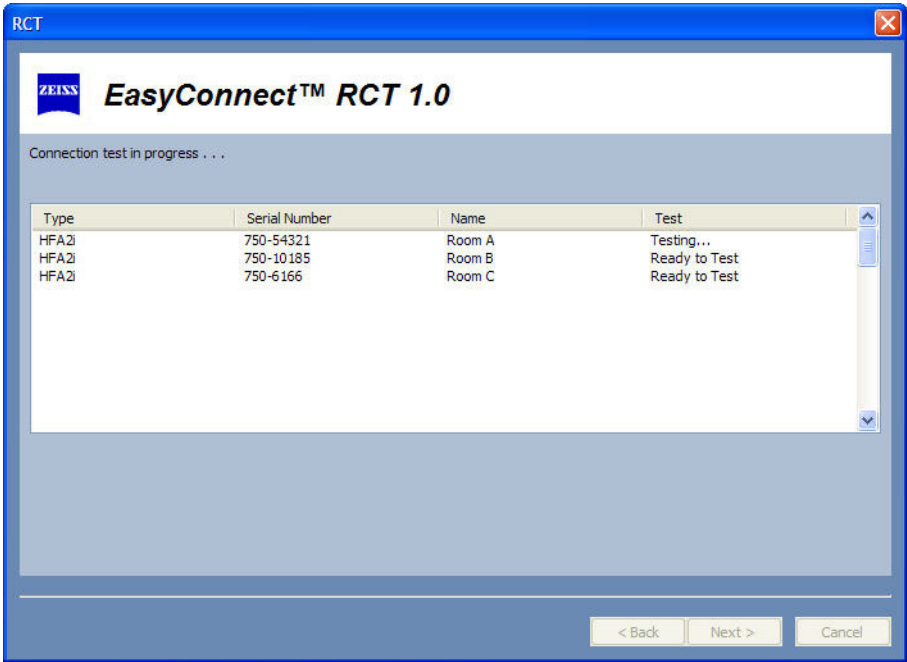


Figure G.49 Connection Test in Progress for First Instrument

- 4 After connection tests have been completed for all configured instruments, select NEXT to continue to a final Completion screen where the results of all tests will be displayed (Figure G.50, Figure G.51, and Figure G.52).

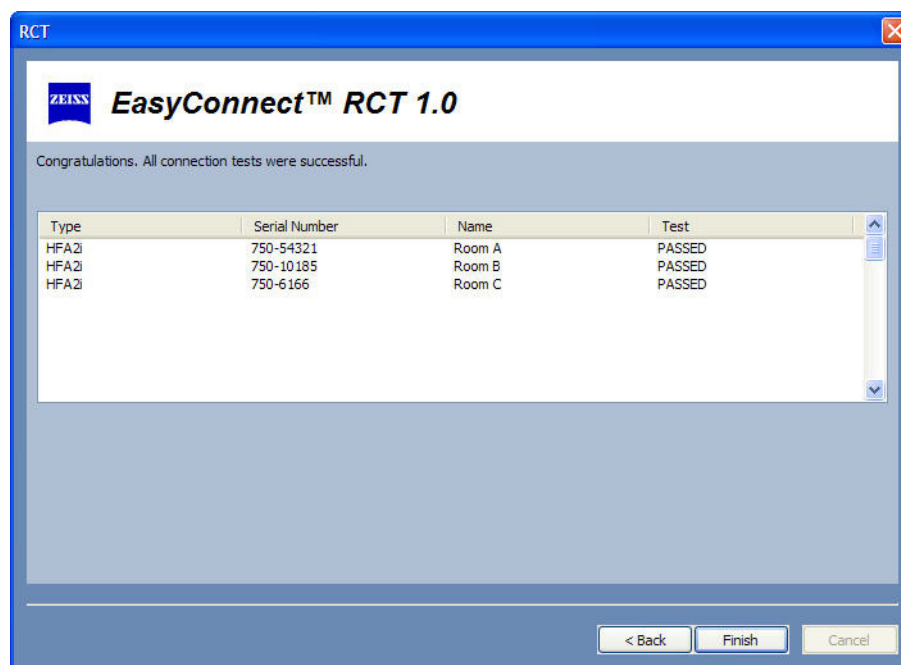


Figure G.50 Completion Screen in Test Mode (Pass)

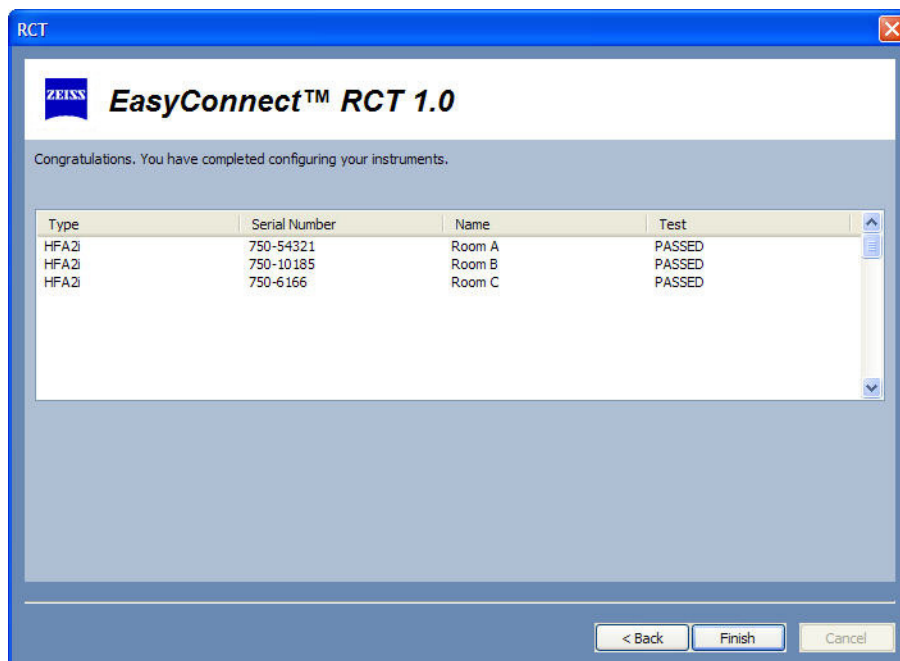


Figure G.51 Completion Screen in Easy, Copy, or Custom Mode (Pass)

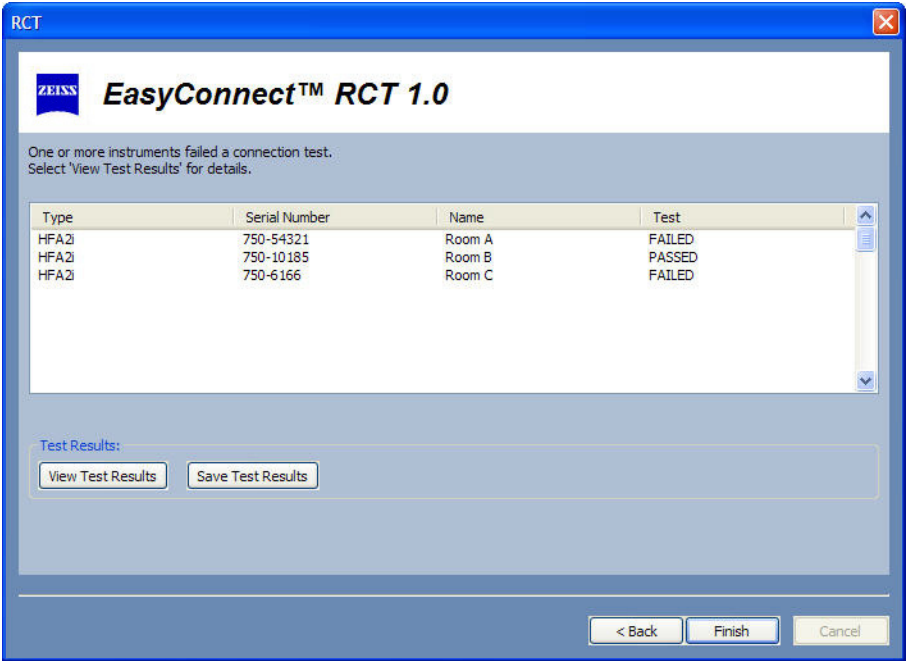


Figure G.52 Completion Screen (Fail)



Note: In some networks, the RCT will run successfully and configure the HFA, but the connection test will still fail, indicating that the HFA cannot currently export files to the shared folder. If a connection test fails, see [“Troubleshooting,”](#) on [page G-43](#) for more information.

- 5 A VIEW TEST RESULTS button will be provided if any instrument failed a connection test. Clicking this button will display a log (Figure G.53) for the first failed instrument showing the same messages that are displayed during an HFA II-/ Test Connection invoked from its Network Diagnostics menu. Clicking OK will display a test log for the next instrument that failed the connection tests, if any. A SAVE TEST RESULTS button will also be provided. Clicking this button will open a dialog where you can save the test results to a text file (Figure G.54). The default file name is "ConnectionTestResults.txt" in the current working directory. This file contains the results for all tested instruments, passed or failed.

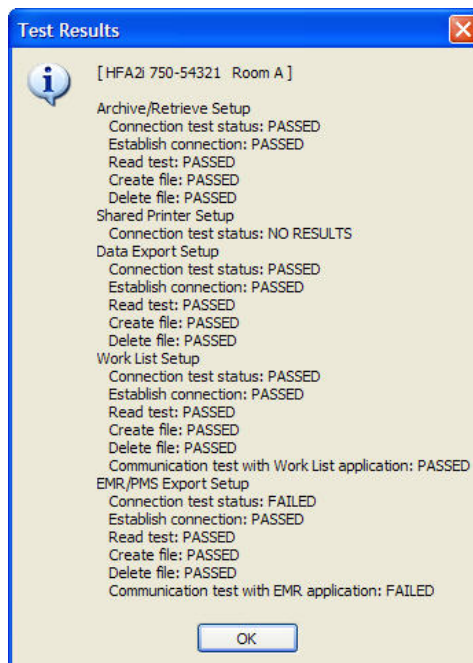


Figure G.53 Test Results

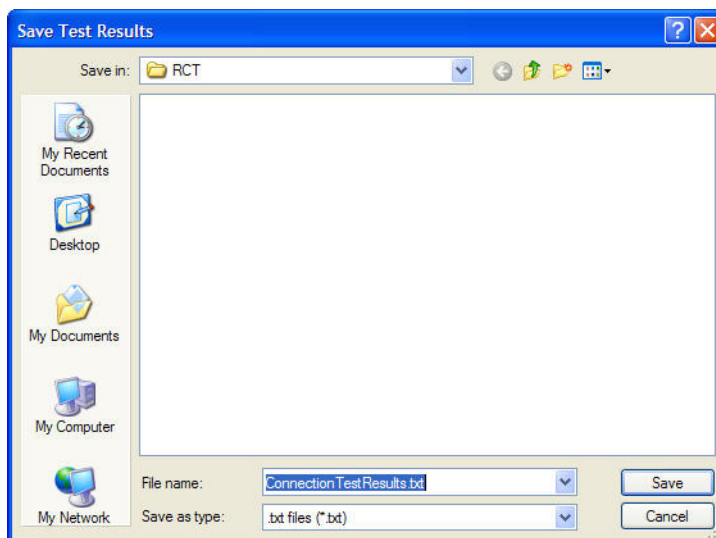


Figure G.54 Save Test Results

- 6 Select FINISH to exit the RCT.

Troubleshooting

Here are some common problems encountered while using the RCT, followed by possible solutions.

Not all HFAs on the local network are visible in the list of configurable instruments

- Select the BACK button and try again. Instruments may be slow to respond or the network may be too busy.
- Ensure that the “Allow Remote Configuration” check box has been selected in your HFA II-/(see [“Enable the RCT and Name HFA II-i Instruments,” on page G-3](#)).
- Check to ensure that HFA is physically connected to the network. Check for loose network cable connections or other sources of network problems.

The RCT was not able to configure the selected HFA

- Network Reliability Problems: This situation may indicate reliability problems with your network. Once an HFA is visible in the RCT selection window, it should be possible to configure it. Check for loose network cable connections or other sources of network problems.

HFA has been transferring exams successfully but subsequently fails

- Run the RCT again to refresh your configuration.

The RCT configured HFA successfully, but Test Connection failed



Note: Some situations (for example, see HFA-NET Pro Enabled below) will cause the Test Connection to return a “failed” message even though the HFA is properly configured and is capable of transferring files to the server. It is often worthwhile to attempt to export an image file from the HFA to determine if the configuration has indeed succeeded before moving on to the additional troubleshooting steps below.

- Windows File Sharing Setting: For the HFA to be able to transfer files to the shared folder, the **Use simple file sharing (Recommended)** check box in Windows XP must **NOT** be selected. To access this setting, go to *My Computer > Tools > Folder Options...* and select the **View** tab.

Scroll to the bottom of the Advanced settings section and ensure that **Use simple file sharing (Recommended)** is **NOT** selected, as shown below (Figure G.55).

Use simple file sharing
(Recommended) is NOT
selected.

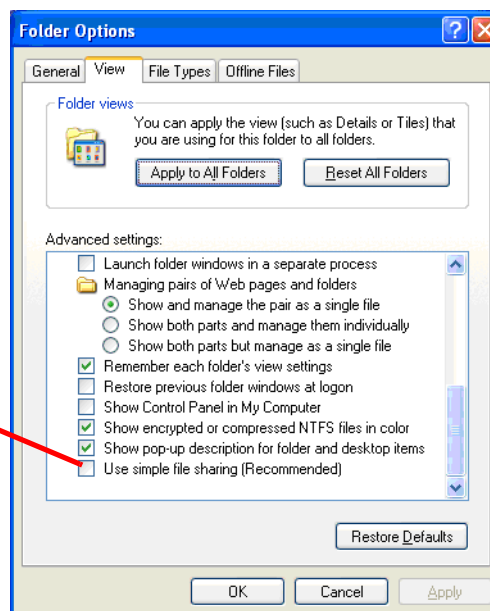


Figure G.55 Folder Options Screen – View Tab

- **Access Through a Router:** If there is a network router between your HFA and the computer you are attempting to connect to, you may not be able to use the RCT to configure your HFA-NET settings.
- **Windows Firewall:** If your file server employs Windows Firewall you should verify that it accepts access on the following NETBIOS ports: 137, 138, and 139; and that it also allows access via port 445 for CIFS over IP. See [“Firewall Software,”](#) on page G-2 for additional information. These exceptions are exposed via the **File and Printer Sharing Service** in the Windows XP Firewall dialog **Exceptions** Tab. If your instrument and server are in different subnets (example: 172. vs 10.), then you will need to change the scope to “Any”.
- **Non-Windows Firewall:** This version was only tested with Windows Firewall. While the exceptions noted above may also work with a non-Windows firewall, you should consult its documentation for information about allowing CIFS access from an IP device.
- **Working with a VPN:** If you are operating with a VPN on the server, you may need to disable its Security Policy. This may not be necessary, so try to operate the RCT first.
- **HFA-NET Pro Enabled:** If you have licensed HFA-NET Pro, but are not currently connected to an Electronic Medical Records (EMR) system, Test Connection will return a “failed” message because it expects a response from your EMR software. If no other failures are present, then HFA networking features should still work.

(H) DICOM Gateway 2.0 (Optional)

Overview	H-1
DICOM Gateway 2.0 Configuration Overview	H-2
HFA II-i Configuration	H-2

Overview

DICOM Gateway 2.0 is an optional purchased software program that allows you to connect one or more Humphrey Field Analyzers (HFA II-/series) to a qualified DICOM compatible Electronic Medical Records (EMR) system, or DICOM archive that supports EPDF, for paperless workflow. When the DICOM Gateway 2.0 is properly installed and configured on a networked PC, an HFA can display a list of patients who are scheduled for visual field exams ("DICOM Modality Worklist"). When a patient is selected from this list, all demographic data (e.g., name, patient ID, birthdate, etc.) is entered automatically into the HFA exam database. Once the visual field exam is performed, any report that would normally be printed can be automatically added to the patient's electronic medical record for easy viewing and analysis. This workflow eliminates the need to manually enter patient demographic information into the HFA and dramatically increases clinic efficiency by eliminating the need to print or scan diagnostic reports.

DICOM Gateway 2.0 allows for saving and retrieving raw exam data and patient information to and from a DICOM archive, such as FORUM. If you have multiple HFAs, the DICOM archive acts like a "central database", and provides a means of database backup. Automatic or manual archiving and synchronization of patient records is not needed as there is only one database (the DICOM archive) that all HFAs save to and retrieve from. In addition to work list functionality, unscheduled query and retrieval of patient information can be performed. Also retrieval of raw patient data frees up usage of HFAs by running GPA on any HFA; you don't have to run GPA on the same GPA licensed HFA where you acquired the last exam.



Note: The DICOM Gateway 2.0 is an optional software program that is separately licensed. You must activate the software for it to function on your HFA II-/i.

To activate, go to www.meditec.zeiss.com/register. You may also contact Carl Zeiss Meditec:

In the U.S.: Call Carl Zeiss Meditec at 1-800-341-6968.

Outside the U.S.: Contact your local Carl Zeiss Meditec distributor.

E-mail: z.customersupport@meditec.zeiss.com.

You can activate a license using the procedure that is provided in [Appendix \(J\)](#) beginning with "Licensing GPA, SITA-SWAP, HFA-NET Pro, or DICOM Gateway 2.0," on page J-5.



Note: You should check the HFA DICOM Conformance Statement and with your vendor to determine the compatibility of their system with the DICOM Gateway 2.0 before purchasing an EMR/PMS/DICOM system. Your EMR/PMS/DICOM system must be DICOM compliant and support EPDF.



Note: Make sure that the EMR/PMS/DICOM system is accessible. Your system must be connected to the network for network import/export processes.

The DICOM Gateway 2.0 is compatible with HFA II-*i* series systems running HFA Software V5.x, with a DICOM Gateway 2.0 networking license activated.

DICOM Gateway 2.0 must be installed on a computer connected to the same network as your HFA. This is your HFA Gateway Computer. The software on this computer acts as an intermediary between your HFAs and your DICOM Storage and Worklist Servers.

The procedures for installing and configuring the DICOM Gateway 2.0 software are described in the *DICOM Gateway 2.0 User Manual*. The procedures for setting up your HFA to use the DICOM Gateway 2.0 are described in this appendix.

To use the DICOM Gateway 2.0, see appropriate sections in this manual:

- [“Printing To a File,” on page 14-36](#)
- [“Using an EMR/PMS/DICOM System,” on page 14-38](#)
- [“Exporting to EMR/PMS/DICOM Systems,” on page 14-41](#)
- [“Importing Work Lists from DICOM Systems using DICOM Gateway 2.0,” on page 14-48](#)
- [“Recall Patients, View, or Print Tests from a DICOM Archive \(DICOM Gateway 2.0 only\),” on page 14-54](#)

DICOM Gateway 2.0 Configuration Overview

The setup process for your complete DICOM Gateway solution includes the following steps that you will need to perform:

1. **DICOM Server Setup:** Set up your DICOM storage server and modality worklist server to recognize the AE Titles of your HFAs that will be connecting through the DICOM Gateway 2.0. This is a potentially complex and time-consuming process whose details depend on your DICOM Storage Provider and which should only be attempted by someone who has expert knowledge of your DICOM Storage Provider system (e.g., an IT or DICOM network administrator).
2. **Install and Configure DICOM Gateway 2.0:** Install and configure the DICOM Gateway 2.0 software to recognize the connected HFAs and to communicate with the designated Storage and Worklist servers. See the *DICOM Gateway 2.0 User Manual*.
3. **Configure HFA:** You will need to manually configure some settings on your HFA to use the DICOM Gateway 2.0. See [“HFA II-i Configuration,” on page H-2](#) for more information.
4. **Use DICOM on your HFA:** Query your worklist server for requested visual field exams, perform these exams and export reports and/or exam data to the DICOM Archive. Recall patients and view or print tests from the DICOM Archive.

HFA II-i Configuration

Configuration Steps and Checklist

1. ☐ Connect the HFA II-*i* to your existing network with an ethernet cable.
2. ☐ Verify you are running system software version 5.x, and a DICOM Gateway 2.0 license is activated on the HFA II-*i* (see [“The Information Button,” on page 2-3](#)).

3. ☐ Configure your HFA to use the DICOM Gateway 2.0, enable services, and perform connection tests to the DICOM servers (see “DICOM 2.0 Gateway Setup on HFA,” on page H-3).
4. ☐ Configure the HFA’s print destination (see “Setting Up Printing To a File,” on page I-25).
5. ☐ Set up your Save and Transmit Options for the DICOM Archive to export a report at the end of an exam (see “Setting Up Save & Transmit for EMR/PMS/DICOM Systems,” on page I-24).

DICOM 2.0 Gateway Setup on HFA

To set up DICOM Gateway 2.0 on the HFA II-/:

DICOM Gateway Setup

- 1 Select **Main Menu > System Setup > Communications Setup > DICOM Gateway Setup** to display the DICOM Gateway Setup screen (Figure H.1).

Figure H.1 DICOM Gateway Setup Screen

Set your local HFA settings:

- 2 Select INSTITUTION NAME.
- 3 Input a total of up to 64 characters and spaces, using the pop-up keyboard. Press ENTER.
- 4 Select STATION NAME.
- 5 Input a total of up to 16 characters and spaces, using the pop-up keyboard. Press ENTER.
- 6 Select AE TITLE.

- 7 Enter a unique AE Title for each HFA instrument. Input a total of up to 16 characters and spaces, using the pop-up keyboard. Press ENTER.

Input your DICOM Gateway settings:

- 8 Select IP ADDRESS.
- 9 Input the IP Address of the HFA Gateway Computer (the computer where you installed the DICOM Gateway 2.0 software), using the pop-up keypad. Press ENTER.
- 10 Select PORT.
- 11 Input the Port Number (the number entered in the Gateway Port of the DICOM Gateway 2.0 software), using the pop-up keypad. Press ENTER.

Enable/Disable DICOM Gateway Services:

- 12 Select SERVICES to display the DICOM Gateway Services screen ([Figure H.2](#)).

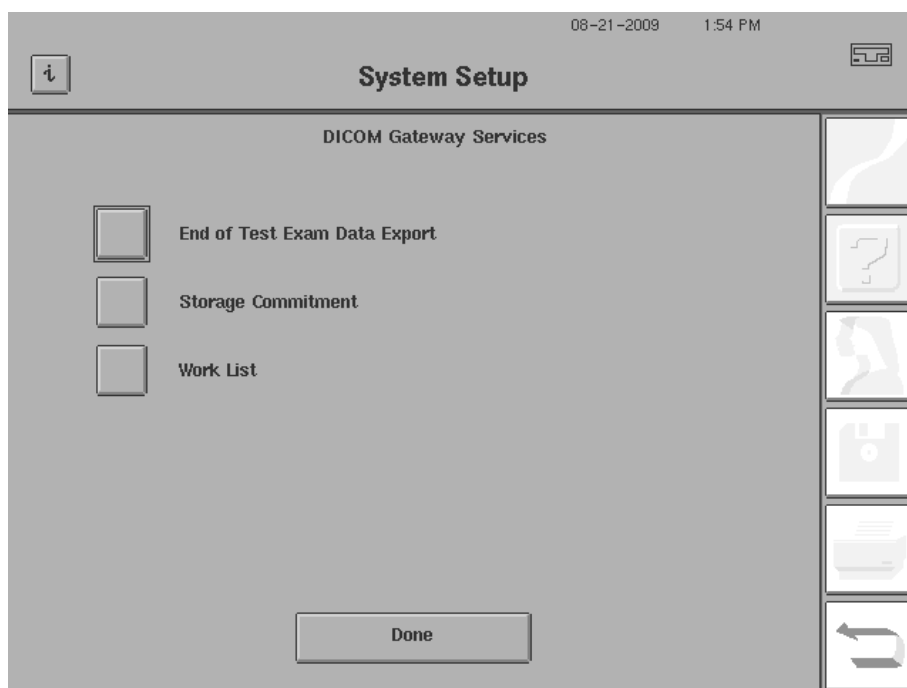


Figure H.2 DICOM Gateway Services Screen

To enable a service, click the button next to service so that an "X" is displayed. Select DONE to return to the DICOM Gateway Setup screen. Your selections will only be saved when you select SAVE on the DICOM Gateway Setup screen.

- **END OF TEST EXAM DATA EXPORT**
Enable this service if you wish to automatically export raw IOD exam data to the DICOM storage provider at the end of an exam (when the exam is saved). Enabling this will also automatically retrieve new raw exam data and GPA Exam Selection from the DICOM Archive for the patient taking the exam.

- **STORAGE COMMITMENT**
Enable this service if you wish to perform a storage commitment request. The DICOM storage commitment service is used to confirm that exam data has been permanently stored by the DICOM Storage Provider.
- **WORK LIST**
Enable this service to use the DICOM Gateway 2.0 work list (see ["Importing Work Lists from DICOM Systems using DICOM Gateway 2.0," on page 14-48](#)). If HFA-NET Pro is activated and this service is disabled, the HFA-NET Pro (CZM-XML via FEP) or DICOM Gateway 1.0 work list will be used (see ["Importing Work Lists from Non-DICOM EMR/PMS Systems and DICOM Systems using DICOM Gateway 1.0," on page 14-45](#)).

Perform Test Connections:

TestConnections

13 Select TEST CONNECTIONS to display the Connection Tests screen ([Figure H.3](#)).

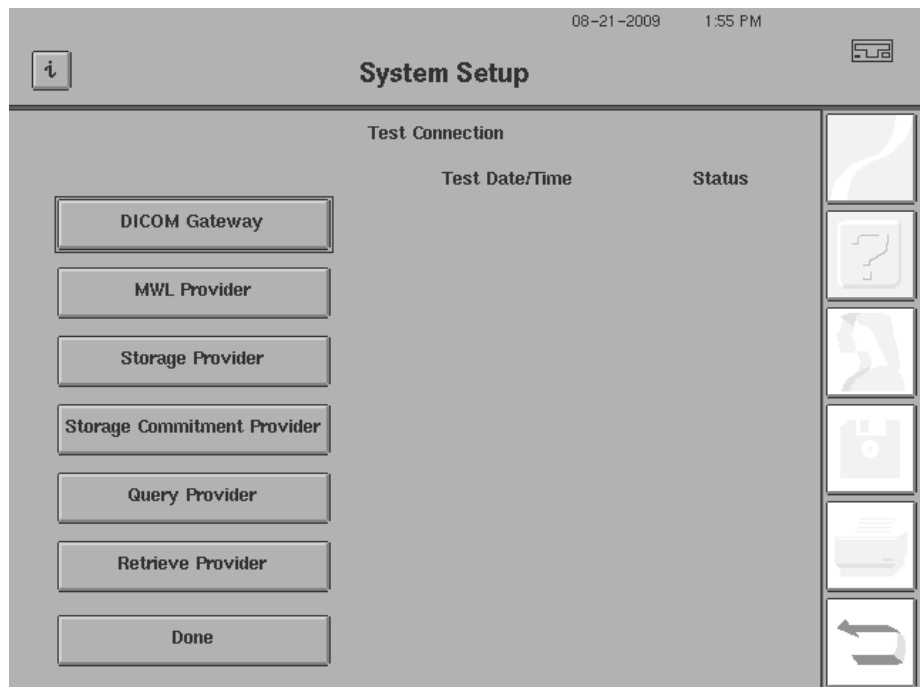
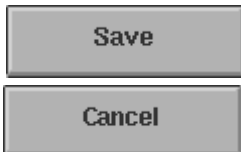


Figure H.3 Connection Tests Screen

The date, time, and status of the last connection test is displayed. To perform a test, click a test button. Select DONE to return to the DICOM Gateway Setup screen.

- **DICOM GATEWAY**
Perform this connection test to the DICOM Gateway computer.
- **MWL PROVIDER**
Perform this connection test to the MWL Provider server set in the DICOM Gateway 2.0 software.
- **STORAGE PROVIDER**
Perform this connection test to the Storage Provider server set in the DICOM Gateway 2.0 software.

- **STORAGE COMMITMENT PROVIDER**
Perform this connection test to the Storage Commitment Provider server set in the DICOM Gateway 2.0 software.
- **QUERY PROVIDER**
Perform this connection test to the Query Provider server set in the DICOM Gateway 2.0 software.
- **RETRIEVE PROVIDER**
Perform this connection test to the Retrieve Provider server set in the DICOM Gateway 2.0 software.

**Save / Cancel DICOM Gateway 2.0 Settings:**

14 Select SAVE to save your DICOM Gateway 2.0 settings. Select CANCEL if you want to cancel your changes and return to the previous settings.

(I) Networking Reference

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Note: It is strongly recommended that you use the *EasyConnect* RCT in Easy Mode instead of manually configuring your network settings on your HFA II-*i* instruments (see "*EasyConnect* RCT 1.0," on page G-1).

Licensing HFA-NET Pro and DICOM Gateway 2.0

The networking features described in this chapter are only available as licensed software. See [Appendix \(J\), "Installing & Licensing HFA II-*i* Software,"](#) for more information.



Note: The networking features discussed operate with the Version 4.0 system software and higher.

How to Use This Chapter

This chapter is here to help the Network or IT Administrator setup your HFA II-*i* in a Peer-to-Peer or Networked environment. The following sections hold all the information you need. By the end of this chapter you will be familiar with:

- how to connect your HFA II-*i* to your office network
- how to configure your HFA II-*i* for networking
- how to organize patient records on the file server using Patient Folders
- how to transfer data to and from an EMR/PMS/DICOM system

If Connecting to a Network or Peer-to-Peer

If you wish to use these types of configurations, refer to the following sections of this chapter:

- ["Connecting Your Network Components," on page I-3](#)
- ["Setting Up Your HFA Network," on page I-4](#)
- ["Archiving Data," on page I-14](#)
- ["Setting Up Printing To a File," on page I-25](#)
- ["Backing Up and Restoring Your HFA Network Configuration," on page I-27](#)

Network Procedure Summary

Note: It is strongly recommended that you use the *EasyConnect* RCT in Easy Mode instead of manually configuring your network settings on your HFA II-*i* instruments (see ["EasyConnect RCT 1.0," on page G-1](#)).

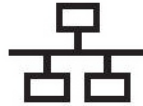
Please contact Carl Zeiss Meditec for minimum network requirements prior to having your software licensed for HFA-NET Pro. In order to be able to network your HFA II-*i*, you will need to have HFA II-*i* system software 4.0 or later in your instruments, and have licensed HFA-NET Pro.

Then you will need to complete the following:

1. Connect an ethernet cable to HFA II-*s* network port.
2. Complete all applicable Communications Setup screens:
 - A. HFA Network (Link-Local, DHCP, or Manual)
 - B. Data Export (FTP or Shared Folder, Patient Folders)
 - C. Archive/Retrieve (to Synchronize Databases and/or Backup to File Server)
3. Set up the instrument to "Save and Transmit" exams.
4. For sites using EMR/PMS/DICOM, complete the additional applicable Communications Setup screens:
 - A. EMR/PMS Export Setup
 - B. Work List Setup
 - C. DICOM Gateway Setup

Connecting Your Network Components

This procedure guides you in interconnecting the HFA II-*i* with your office network.



- 1 Locate the network connector on the connections panel at the rear of the HFA II-*i*. The panel is located under a snap-on cover. See [Figure 1.9, "Rear View of the HFA II-i with Panel Removed," on page 1-30](#). The network connector is located on the panel as is shown in [Figure I.1](#). The connector on the instrument panel is identified with an Ethernet symbol (as shown on the left) on the label that is attached to the adjoining panel.

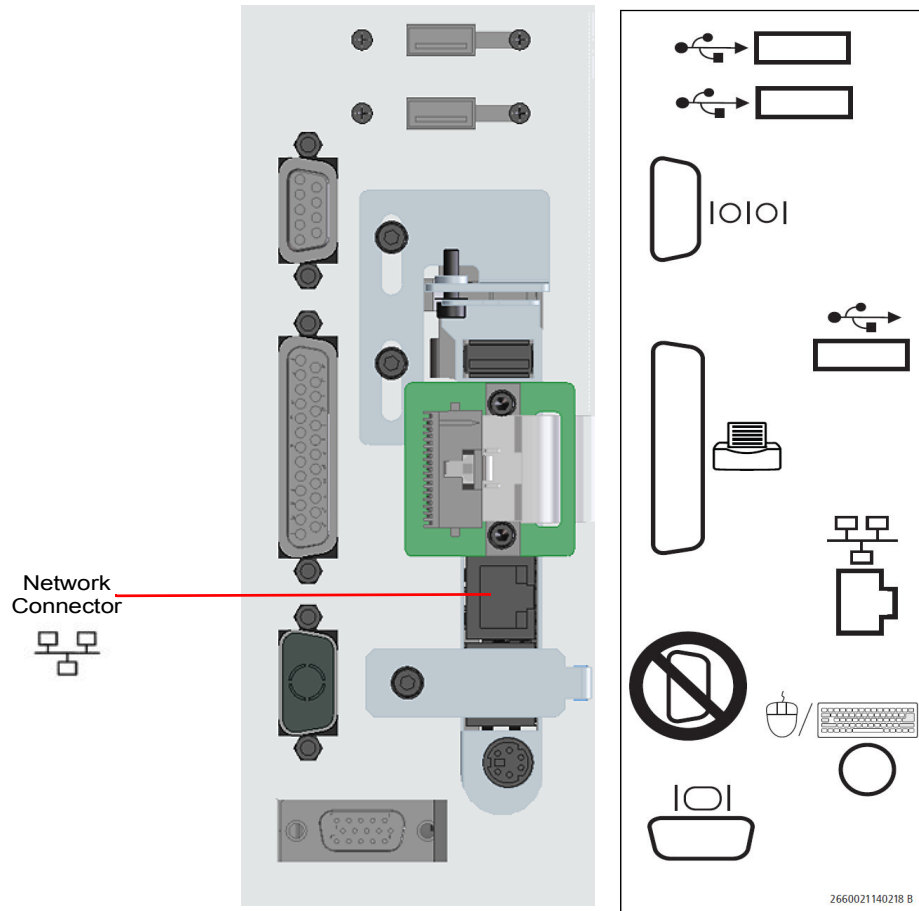


Figure I.1 Location of the Network Connector (Panel and Label)

- 2 Snap one end of the network cable into place in the LAN connector on the HFA back panel. Note that when you need to remove the cable, you will need to depress the locking tab on the side of the connector, to free the connector from the socket.
- 3 Snap the free end of the cable into the network connector of the network router or hub. The Ethernet (LAN) network connector at that location should look exactly like the one on the back panel of the HFA II-*i* perimeter.

Setting Up Your HFA Network



Note: It is strongly recommended that you use the *EasyConnect* RCT in Easy Mode instead of manually configuring your network settings on your HFA II-*i* instruments (see “[EasyConnect RCT 1.0](#),” on page G-1).

You may set up your HFA network to work with Link-Local, DHCP, or STATIC IP.

The following describes the procedures.

- 1 Go to the Main Menu, select *SYSTEM SETUP* ([Figure I.2](#)).

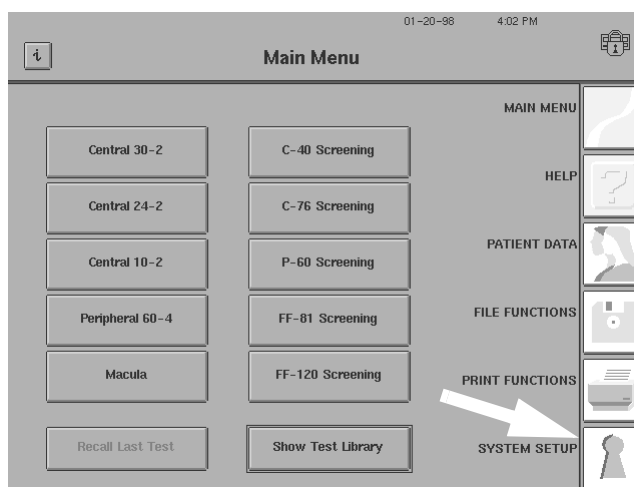


Figure I.2 Main Menu Screen

- 2 On the System Setup screen, select *COMMUNICATIONS SETUP* ([Figure I.3](#)) to open the Communications Setup menu.

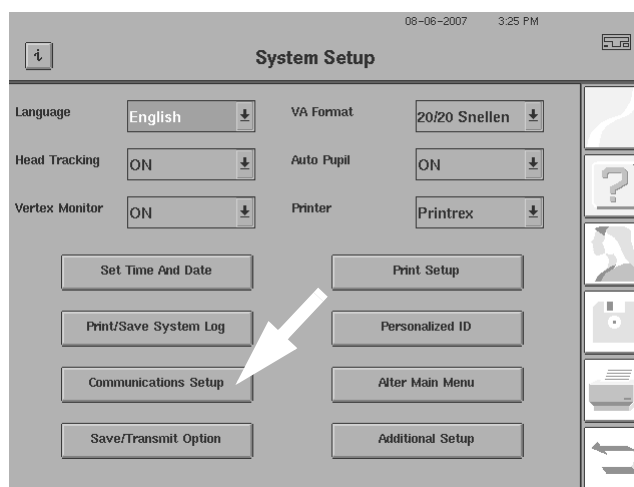


Figure I.3 System Setup Screen

- 3 Select HFA NETWORK SETUP on the Communications Setup menu (Figure I.4).

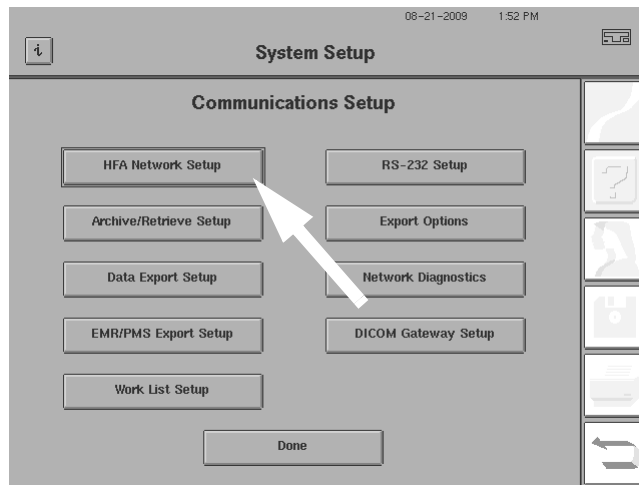


Figure I.4 Communications Setup Screen

HFA Network: Setting Up Link-Local

Link-Local is the default network configuration. Link-Local assigns a unique IP address to the HFA without searching the local network. Link-Local does not require a DHCP server. If you wish to use Link-Local, follow this procedure to set it up.

- 1 From the HFA Network Setup screen, select LINK-LOCAL from the OBTAIN HFA IP CONFIGURATION drop-down box (see Figure I.5).

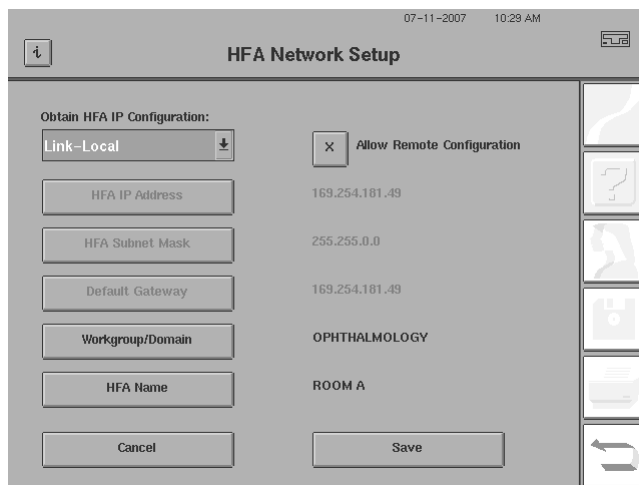


Figure I.5 HFA Network Setup Screen – Link-Local

- 2 The HFA will be assigned an IP address, subnet mask, and default gateway.
- 3 You now need to enter your Workgroup or Domain name. You can do so by pressing the WORKGROUP NAME button. Note: In order to use a Shared Folder, you must enter a Workgroup Name.

- 4 Select OK to accept the name.
- 5 Select ALLOW REMOTE CONFIGURATION so that an **X** is displayed in the button if you want to allow the *EasyConnect* RCT to configure the HFA II-*i* instrument.
- 6 Select HFA NAME to display a pop-up keyboard and enter (or change) the name (up to 24 characters) you want for this HFA II-*i* instrument. Press ENTER.



Note: It is strongly recommended to name your HFA II-*i* instrument for ease in identification when using the *EasyConnect* RCT. Creating a name for an instrument can also allow you to know the location of the instrument.

7

If an error message appears, refer to “[Network Troubleshooting Error Messages](#),” on page I-31 for assistance.



Note: Any time you change any of the IP addresses on this screen, it is necessary to power down the HFA II-*i* and then restart.

HFA Network: Setting Up DHCP

If you wish to use DHCP, follow this procedure to set it up.

1

From the HFA Network Setup screen, select DHCP from the OBTAIN HFA IP CONFIGURATION drop-down box (see [Figure I.5](#)).



Note: Depending on the size and complexity of the network, the search process can take several minutes. Please be patient while allowing the HFA II-*i* to complete its investigation of your network.



Note: The HFA will automatically obtain Link-Local IP configuration if it fails to obtain IP configuration from a DHCP server.



Figure I.6 HFA Network Setup Screen – DHCP

2

Once the HFA gets an IP Address from the DHCP server, the IP address, subnet mask, and default gateway will be displayed.

- 3 You now need to enter your Workgroup or Domain name. You can do so by pressing the WORKGROUP NAME button. Note: In order to use a Shared Folder, you must enter a Workgroup Name.
- 4 Select OK to accept the name.
- 5 Select ALLOW REMOTE CONFIGURATION so that an **X** is displayed in the button if you want to allow the *EasyConnect* RCT to configure the HFA II-*i* instrument.
- 6 Select HFA NAME to display a pop-up keyboard and enter (or change) the name (up to 24 characters) you want for this HFA II-*i* instrument. Press ENTER.



Note: It is strongly recommended to name your HFA II-*i* instrument for ease in identification when using the *EasyConnect* RCT. Creating a name for an instrument can also allow you to know the location of the instrument.

7

If an error message appears, refer to [“Network Troubleshooting Error Messages,”](#) on page I-31 for assistance.



Note: Any time you change any of the IP addresses on this screen, it is necessary to power down the HFA II-*i* and then restart.

HFA Network: Manual Setup (Static IP)

If you wish to a manual network setup (static IP), use the following procedure.

1

From the HFA Network Setup screen, select MANUAL from the OBTAIN HFA IP CONFIGURATION drop-down box (see [Figure I.7](#)).

Figure I.7 HFA Network Setup Screen – Manual

2

Select the HFA IP ADDRESS button and enter the IP address.

3

Select ENTER and the HFA's IP address will appear to the right of the HFA IP ADDRESS button.

- 4 Select the HFA SUBNET MASK.
- 5 Select the DEFAULT GATEWAY Address.
- 6 Select your WORKGROUP NAME (this can also be your Domain name). Note: In order to use a Shared Folder, you must enter a Workgroup Name.
- 7 Select ENTER. Your Workgroup name, if any, will appear to the right of the Workgroup Name button.
- 8 Select ALLOW REMOTE CONFIGURATION so that an **X** is displayed in the button if you want to allow the *EasyConnect* RCT to configure the HFA II-*i* instrument.
- 9 Select HFA NAME to display a pop-up keyboard and enter (or change) the name (up to 24 characters) you want for this HFA II-*i* instrument. Press ENTER.



Note: It is strongly recommended to name your HFA II-*i* instrument for ease in identification when using the *EasyConnect* RCT. Creating a name for an instrument can also allow you to know the location of the instrument.

- 10 Review the numeric and text entries you have just made. Re-enter any entries as necessary. Once they are all correct, select SAVE. Your setup entries will be saved and you will be returned to the Communications Setup screen.



Note: Whenever you change the HFA Network Setup screen entries, you must power down the HFA II-*i* and then restart it. Failure to shut down and restart the HFA II-*i* after a manual change of the IP address will result in a communications failure between the HFA II-*i* and the server.

File Server Access Protocol for FTP or Shared Folder



Note: It is strongly recommended that you use the *EasyConnect* RCT in Easy Mode instead of manually configuring your network settings on your HFA II-*i* instruments (see [“EasyConnect RCT 1.0,” on page G-1](#)).

You will need to set up either an “FTP Folder” or a “Shared Folder” on each of the following Communications Setup screens:

- Archive/Retrieve Setup
- Data Export Setup
- EMR/PMS Export Setup (only for sites using EMR/PMS)
- Work List Setup (only for sites using EMR/PMS)

The information as to how to set up an “FTP Folder” or a “Shared Folder” will remain the same regardless of which setup screen you are in. The procedures on how to complete an “FTP Folder” setup or a “Shared Folder” setup are shown in the following sections.

Setting Up FTP

To be able to export data and image files from the HFA II-*i*, it is necessary to set up Data Export. This section describes setting up to export to FTP.

- 1 Select MAIN MENU>SYSTEM SETUP>COMMUNICATIONS SETUP>DATA EXPORT SETUP (or ARCHIVE/RETRIEVE SETUP, etc.) to reach the screen that is shown in [Figure I.8](#).
- 2 In the File Server Access Protocol drop-down box, select FTP.

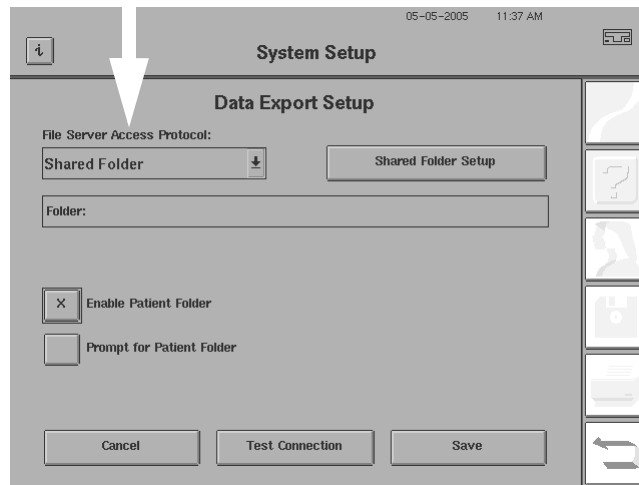


Figure I.8 Data Export Setup Screen

- 3 Select the FTP FOLDER SETUP button ([Figure I.9](#)) to bring up the FTP Folder Setup screen ([Figure I.10](#)).

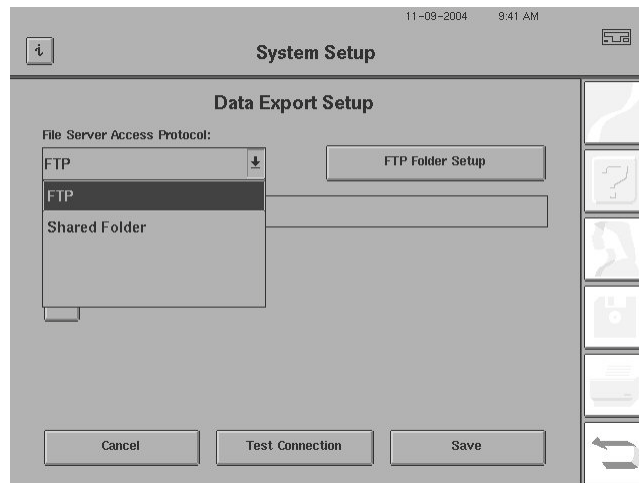


Figure I.9 Location of FTP Folder Setup Button

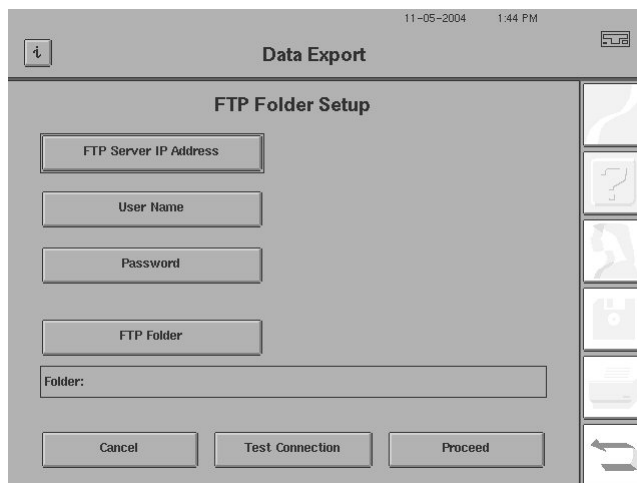


Figure I.10 FTP Folder Setup Screen

- 4 Select FTP SERVER IP ADDRESS. Enter the FTP server IP address.
- 5 Select USER NAME. Enter your user name for the FTP server.
- 6 Select PASSWORD. Enter your password for the FTP server.
- 7 Select FTP FOLDER. Enter the name of the folder on the FTP server where the data will transfer to. This must be either an existing folder on the FTP server or one that your Network Administrator has specifically created for your use. Once the folder is designated, its name and location will appear in the Folder box, immediately below the FTP Folder button.
- 8 Once you have completed all of the entries, the screen will appear as is shown in [Figure I.11](#). Use it to verify the accuracy of the entries that you made.
- 9 Select PROCEED. The instrument will attempt a test connection, using the data you have entered. During this process, an alert will appear that says: "Test Connection in Progress. Please Wait."
- 10 If a problem occurs during this procedure, refer to ["Network Troubleshooting Error Messages,"](#) on page I-31 for assistance.

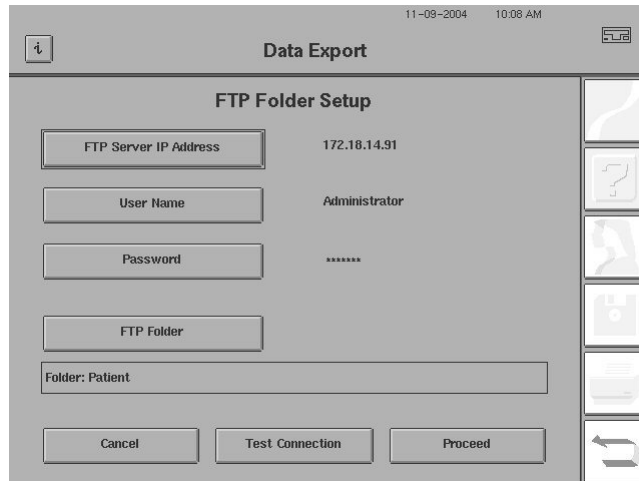


Figure I.11 Completed FTP Folder Setup Screen

Setting Up a Shared Folder

If you selected SHARED FOLDER (Windows Shared Folder) in “Setting Up FTP,” on page I-9, the Shared Folder Setup screen will appear (Figure I.12). This section describes setting up to export a Shared Folder.



Note: In order to use a Shared Folder, you must have entered a Workgroup Name. See “Setting Up Your HFA Network,” on page I-4.

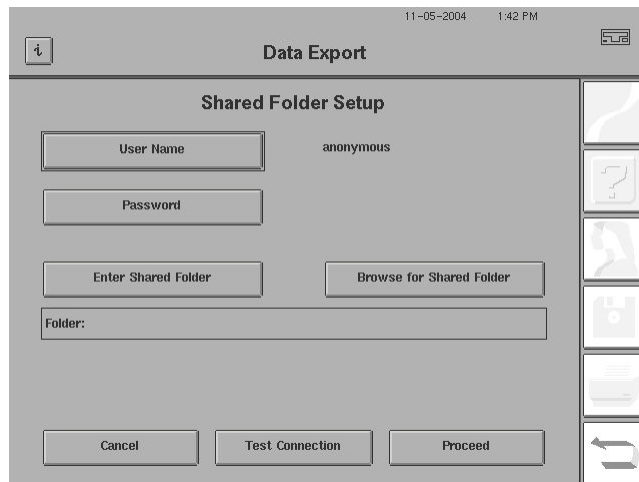


Figure I.12 Shared Folder Setup Screen

- 1 Select MAIN MENU>SYSTEM SETUP>COMMUNICATIONS SETUP>DATA EXPORT SETUP (or ARCHIVE/RETRIEVE SETUP, etc.).
- 2 In the File Server Access Protocol drop-down box, select SHARED FOLDER.
- 3 Select the SHARED FOLDER SETUP button to bring up the Shared Folder Setup screen (Figure I.12)

- 4 Enter the USER NAME for the file server.
- 5 Enter the PASSWORD for the file server.
- 6 Select either ENTER SHARED FOLDER, to enter the folder name and location manually, or BROWSE FOR SHARED FOLDER, to search the directories of the network computer for the shared folder that you wish to use.
 - To Enter a Shared Folder Manually:
 1. When you select ENTER SHARED FOLDER, a pop-up keyboard will appear. Use it to enter the name of the Workgroup/Domain to use. Then, select ENTER.
 2. A second keyboard will open to allow you to specify the Computer to use and to specify the path to the Shared Folder that you wish to use. Key in the needed information and press ENTER.
- 7 When you select the BROWSE FOR SHARED FOLDER button, a "Select Shared Folder" screen will open, listing Windows Workgroups/Domains. Select a Workgroup/Domain (such as PATIENT RECORDS, shown in [Figure I.13](#)). Then, select PROCEED.

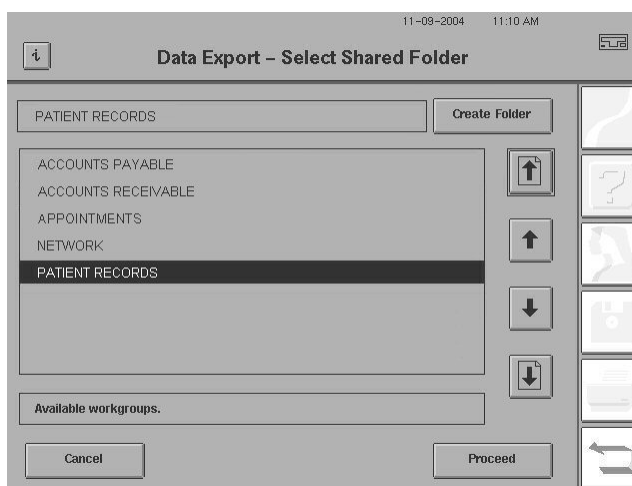


Figure I.13 Shared-folder Browser for Workgroups

- 8 The next browsing screen lists available computers/servers in the selected Workgroup/Domain. Select your desired computer/server and press PROCEED.
- 9 A screen will appear listing the possible Shared Folder selections for the computer you specified in the previous step. You have two options:
 - You can select an existing shared folder.
 - You can select the CREATE FOLDER button toward the upper right-hand corner of the screen (provided the user has permission to create folders on the selected server).
- 10 Once you have selected either an existing shared folder or created a new one, select PROCEED.

- 11** The name and location of the shared folder will appear in the outlined box (Figure I.14), below the Enter Shared Folder button.

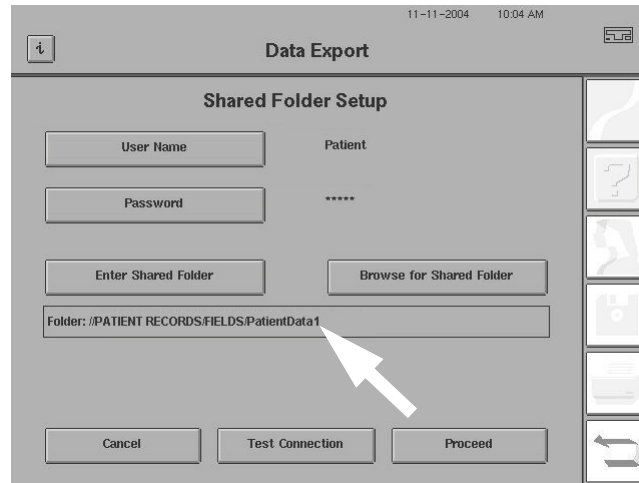


Figure I.14 Completed Entries for Shared Folder Setup

Setting Up Patient Folders

Patient Folders allow you to store exported exam results using a separate file server folder/directory for each patient. This is like having a separate manila file folder for each patient in an office file cabinet, only it is files stored on the file server rather than being thousands of sheets of paper stored in a metal cabinet.

The Patient Folders are created in the Shared Folder that you have established on your file server. You use the Shared Folders when you use the Transfer Tests process, when you use Print to a File, or when you transmit tests to the Data Export Host at the end of an examination.



Note: Patient Folders cannot be created on a DICOM Archive when using DICOM Gateway 2.0.



Note: Patient Folders are only available if you have licensed the HFA-NET Pro networking software on your HFA II-*i*. Also, you must activate "Enable Patient Folders" on the Data Export Setup screen in order to be able to use Patient Folders. By pressing the ENABLE PATIENT FOLDER button on the Data Export Setup screen, you can create folders on the file server manually or automatically to better organize patient data. If you press the Enable Patient Folder button, a second button will appear entitled "Prompt for Patient Folder." If you wish to be able to specify a patient folder upon completion of each visual field examination, select PROMPT FOR PATIENT FOLDER.

- 1** Select MAIN MENU>SYSTEM SETUP>COMMUNICATIONS SETUP>DATA EXPORT SETUP. When the screen shown in Figure I.15 appears, touch the ENABLE PATIENT FOLDER button, to select it. An X will appear in the button once you have selected it. This activates the patient folder capabilities of your HFA II-*i* and to automatically create patient folders.

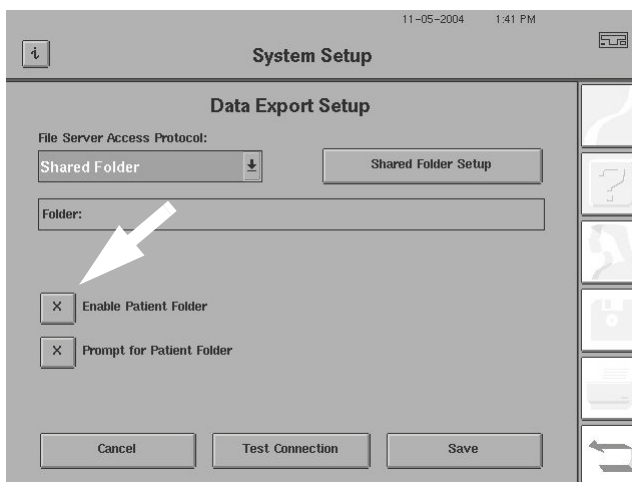


Figure I.15 Data Export Setup Screen

- 2 If you wish for the HFA II-/to prompt you to specify a new folder each time you conduct testing of a patient, select the PROMPT FOR PATIENT FOLDER button (Figure I.15). An X will appear in the button once you have selected it. Once this feature is activated, the HFA II-/will prompt you to enter a folder name upon completion of each visual field examination.
- 3 Click SAVE and it will test the connection to the server and then return you to the Communications Setup screen.

Archiving Data

The system software for the HFA II-/allows patient data and test data to be archived on a remote server, using either FTP or a Shared Folder. You can archive data either manually or automatically.

The first archiving that you perform will archive the entire database on the HFA hard disk to the server. Subsequent archiving operations will archive only new data that has been collected since the last archiving was completed.

When needed, you can retrieve the archived data. The archive retrieval process (manual or automatic) allows you to retrieve patient data that has been archived on the file server from other HFA II-/perimeters.



Note: The retrieve process will not work until you first have archived data to the server. If you have several HFA II-/perimeters in your network, each one must have been archived previously, before you can retrieve from all of them. To perform a manual archive, select MAIN MENU>FILE FUNCTIONS>ARCHIVE/RETRIEVE>ARCHIVE. The archive operation will begin and run for a couple of minutes, until the archive operation is completed.

Setting Up Manual Archiving

Use these steps to set up manual archiving.

- 1 Select MAIN MENU>SYSTEM SETUP>COMMUNICATIONS SETUP>ARCHIVE/RETRIEVE SETUP to open the Archive/Retrieve Setup screen.



Figure I.16 Communications Setup Screen

- 2 Open the Archive drop-down box and select MANUAL ONLY as the archiving frequency.
- 3 A Remind drop-down box will appear below the Archive drop-down box. Either leave the drop-down box setting at NONE, or select WEEKLY (as illustrated below) or MONTHLY archiving reminders.

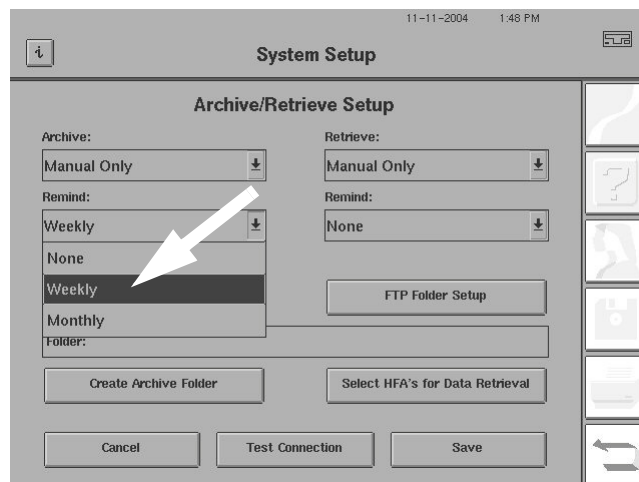


Figure I.17 Selecting Weekly Archiving Reminders

If you select WEEKLY as the archive reminder frequency, upon starting up the HFA II-*i*, you will be reminded to archive your data manually 7 days after your last archive, and you will continue to be reminded every day thereafter until you do an archive. If you select MONTHLY as the

archive reminder frequency, upon starting up the HFA II-*i*, you will be reminded to archive your data manually 30 days after your last archive, and you will continue to be reminded every day thereafter until you do an archive.

- 4 In the File Server Access Protocol drop-down box, select either FTP or Shared Folder. If you selected FTP go to [“Setting Up FTP,” on page I-9](#). If you selected Shared Folder, go to [“Setting Up a Shared Folder,” on page I-11](#).



Note: If you change the File Server Access Protocol setting or change the FTP or Shared Folder, the archive will start over, creating a complete archive of the database.

5

Press the Create Archive Folder button to create an archive folder for this instrument. Alternatively, you can perform a manual archive later which would also create an archive folder. To perform a manual archive, select MAIN MENU>*FILE FUNCTIONS*>ARCHIVE/RETRIEVE>ARCHIVE.



Note: It may take a long time to complete an archive if you already have a large existing patient database on one or more HFA II-*i* instruments. In that case, it is better to use the Create Archive Folder button to create the archive folder. You can then select the HFAs for retrieval without actually doing an archive first.

6

Now that you have set up your archiving, go on to either [“Setting Up Manual Archive Retrieval,” on page I-17](#) or [“Setting Up Automatic Archive Retrieval,” on page I-18](#), to continue with the retrieval part of the setup process.

Setting Up Automatic Archiving

The following process will allow you to set up automatic archiving on your HFA II-*i*.

1

Select MAIN MENU>*SYSTEM SETUP*>COMMUNICATIONS SETUP>ARCHIVE/RETRIEVE SETUP to open the Archive/Retrieve Setup screen.

2

Open the Archive drop-down box to select DAILY, WEEKLY, or MONTHLY automatic archiving.

If you select DAILY automatic archiving, your HFA II-*i* will archive data automatically, each day when you power up the instrument.

If you select WEEKLY automatic archiving, a Day of the Week drop-down box appears below the Archive drop-down box. Select a day from MONDAY to SUNDAY. The HFA II-*i* will archive patient data automatically at instrument startup on the selected day, or on the first day that you power up the HFA II-*i* after that day of the week.

If you select MONTHLY automatic archiving, a Day of the Month drop-down box appears below the Archive drop-down box. Use the numeric keypad to enter a date from 1 through 31. On your selected date, the HFA II-*i* will archive patient data to the server automatically at instrument startup on the selected day, or on the first day after that date that you power up the HFA II-*i*.

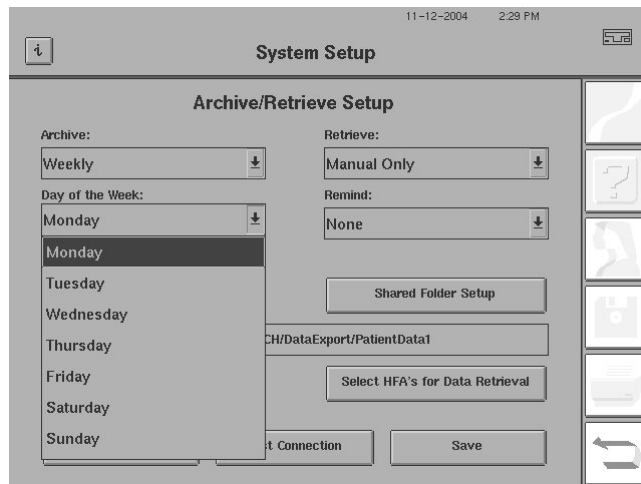


Figure I.18 Setting Up Weekly Automatic Archiving

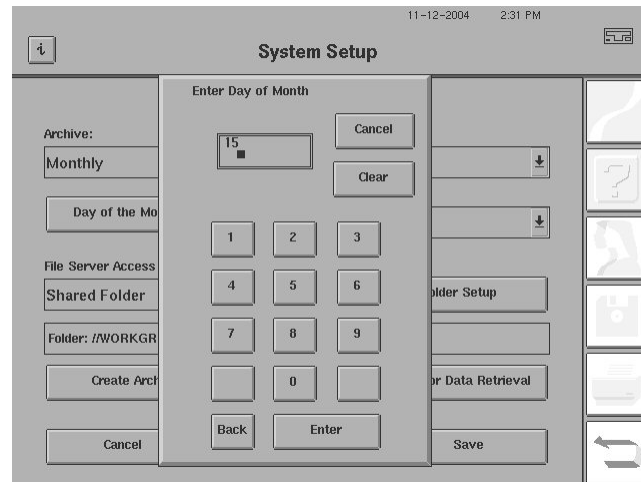


Figure I.19 Setting Up Monthly Automatic Archiving

- 3 Go to Step 4 in Setting Up Manual Archiving to complete the archive setup.

Setting Up Manual Archive Retrieval

Use the following steps to set up manual archive retrieval.

- 1 From the Main Menu, select *SYSTEM SETUP*>*COMMUNICATIONS SETUP*>*ARCHIVE/RETRIEVE SETUP*. Open the *RETRIEVE* drop-down box to select *MANUAL ONLY* as the retrieval frequency.

- 2 A Remind drop-down box will appear below the Retrieve drop-down box. Either leave the drop-down box setting at NONE, or select WEEKLY or MONTHLY (as illustrated in [Figure I.20](#)) retrieval reminders.

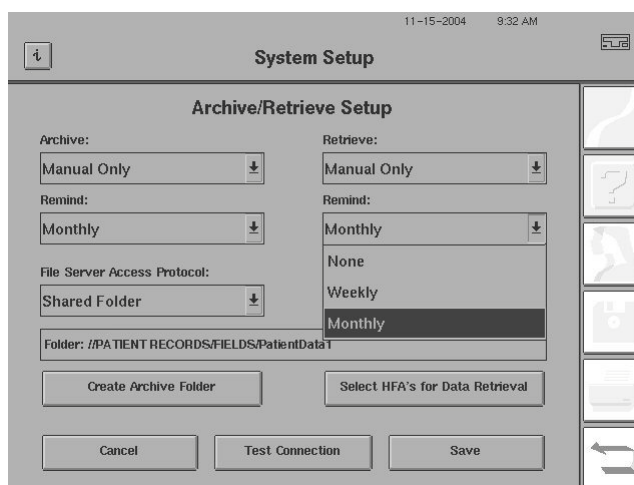


Figure I.20 Selecting the Frequency of Manual Archive Retrieval Reminders

If you select WEEKLY as the retrieval reminder frequency, upon starting up the HFA II-*i*, you will be reminded to retrieve your data manually 7 days after your last retrieval, and you will continue to be reminded every day thereafter until you do a retrieval. If you select MONTHLY as the retrieval reminder frequency, upon starting up the HFA II-*i*, you will be reminded to retrieve your data manually 30 days after your last retrieval, and you will continue to be reminded every day thereafter until you do a retrieval.

- 3 Go to Step 5 in Setting Up Automatic Archive Retrieval to complete the archive setup.

Setting Up Automatic Archive Retrieval

Use these steps to set up automatic archive retrieval.

- 1 Select MAIN MENU>SYSTEM SETUP>COMMUNICATIONS SETUP>ARCHIVE/RETRIEVE SETUP to open the Archive/Retrieve Setup screen.
- 2 Open the Retrieve drop-down box to select WEEKLY or MONTHLY automatic retrieval, as shown in [Figure I.21](#).

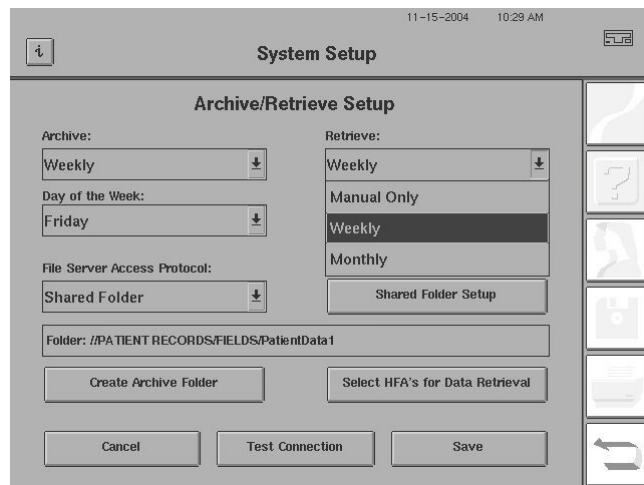


Figure I.21 Selecting Weekly or Monthly Automatic Archive Retrieval

- 3 If you select Weekly automatic retrieval, a Day of the Week drop-down box appears below the Retrieve drop-down box. As is shown in [Figure I.22](#), you can select any day from MONDAY to SUNDAY. On your selected day, the HFA II-*i* will retrieve instrument data from the server automatically. Data retrieval will occur at instrument startup.

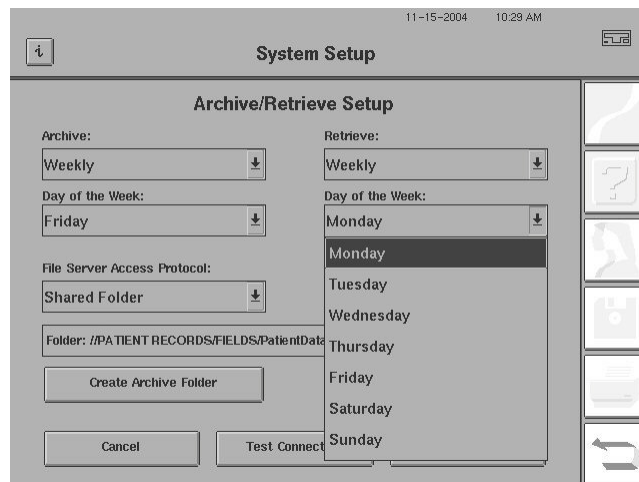


Figure I.22 Selecting a Day of the Week for Automatic Archive Retrieval

- 4 If you select Monthly automatic retrieval, a Day of the Month button appears below the Retrieve drop-down box. Select it and use the numeric keypad that appears to select a date from 1 through 31. Each month on your selected date, the HFA II-*i* will retrieve patient data from the server automatically. Automatic data retrieval always will occur at instrument startup.

- 5 Touch the SELECT HFA'S FOR DATA RETRIEVAL button (Figure I.23).

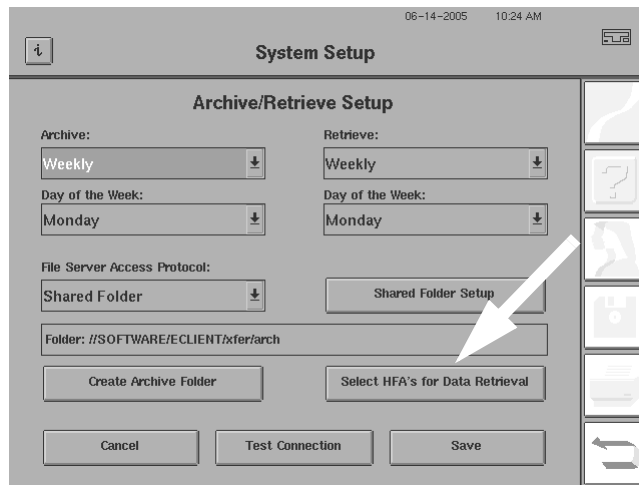


Figure I.23 Archive/Retrieval Screen

- 6 The Database Retrieval screen will appear as is shown in Figure I.24 below.

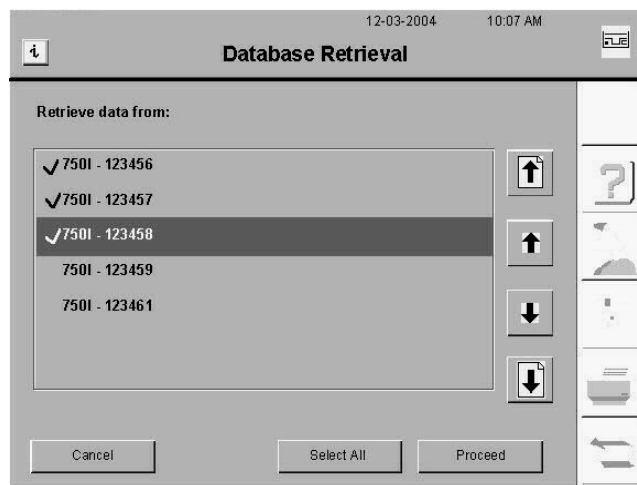


Figure I.24 Database Retrieval Screen

- 7 The archive folders are named with the model number and serial number of the HFA from which they were saved (e.g., 745i-654321). Either press the SELECT ALL button, to choose all listed HFAs in one operation, or select one or more HFA serial numbers from the list manually. HFAs you select will have a check mark displayed to the left of their serial numbers. If you check mark an entry in error, selecting it a second time will remove the check mark. Press PROCEED to complete your selection of HFAs.



Note: The list shown in Figure I.24 shows only the HFAs for which an archive folder has been created with the Create Archive Folder button or during either an automatic or manual archive operation.

- 8 Press the SAVE button to complete the archive/retrieval setup process. If a problem occurs during this procedure, refer to [“Network Troubleshooting Error Messages,”](#) on page I-31 for assistance.

Setting Up Save & Transmit to a Network File Server

- 1 From the Main Menu, select *SYSTEM SETUP>SAVE/TRANSMIT* OPTION to display the screen that is shown in [Figure I.25](#).
- 2 Open the Transfer Destination drop-down box and select Data Export HOST.
- 3 Open the Data Format drop-down box and select XML AND IMAGE FILES.

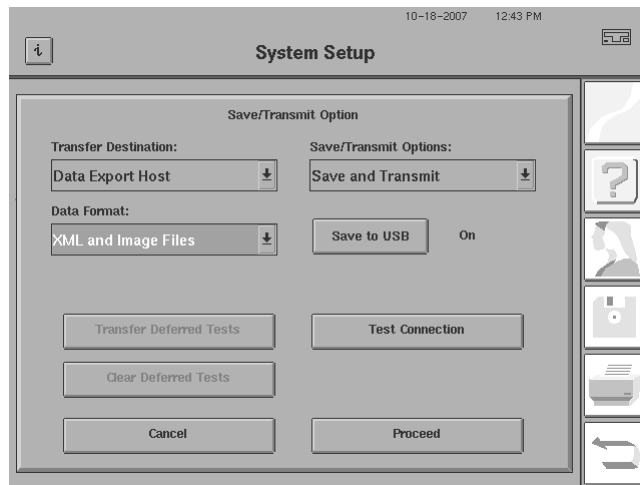


Figure I.25 Setting Up Save & Transmit

- 4 Open the Save/Transmit Option drop-down box and select SAVE AND TRANSMIT.
- 5 Press PROCEED.



Note: The options that are available for selection in the Transfer Destination and Data Format drop-down boxes depend on which software licensing options you have purchased. Further information on these options may be found at the end of this section in [Table I.8](#).

Setting Up Exporting to Non-DICOM EMR/PMS Systems and DICOM Systems using DICOM Gateway 1.0



Note: It is strongly recommended that you use the *EasyConnect* RCT in Easy Mode instead of manually configuring your network settings on your HFA II-*i* instruments (see [“EasyConnect RCT 1.0,” on page G-1](#)).

HFA-NET Pro is a licensed software utility that allows you to export information from your HFA II-*i* to either a non-DICOM Electronic Medical Records (EMR) system or Patient Management System (PMS). To use HFA-NET Pro to export data and image files from the HFA II-*i* to EMR or a PMS, it is necessary for you to have licensed HFA-NET Pro on your HFA II-*i* with Carl Zeiss Meditec and to have an operational EMR/PMS that is compatible with the HFA II-*i*.

Once you have purchased and licensed the DICOM Gateway 1.0, and purchased and installed a DICOM system, see the *HFA II-i DICOM Gateway 1.0 User Manual* for detailed procedures to install and configure your DICOM Gateway 1.0 software.

Once you have licensed HFA-NET Pro and purchased and licensed the DICOM Gateway 1.0, and purchased and installed an EMR system or a PMS, you can use the following steps to set up the EMR/PMS Export feature.

- 1 Select MAIN MENU>SYSTEM SETUP>COMMUNICATIONS SETUP>EMR/PMS EXPORT SETUP to reach the screen that is shown in [Figure I.26](#).



Figure I.26 EMR/PMS Export Setup Screen

- 2 In the File Server Access Protocol drop-down box, select either FTP or Shared Folder. If you selected FTP, go to [“Setting Up FTP,” on page I-9](#). If you selected Shared Folder, go to [“Setting Up a Shared Folder,” on page I-11](#). Upon completion of one of those setup procedures, press SAVE.

Setting Up Work Lists for Non-DICOM EMR/PMS Systems and DICOM Systems using DICOM Gateway 1.0



Note: It is strongly recommended that you use the *EasyConnect* RCT in Easy Mode instead of manually configuring your network settings on your HFA II-*i* instruments (see [“EasyConnect RCT 1.0,” on page G-1](#)).

Work Lists are used to save time and lessen the chance of human error when entering in patient demographic data. Once you have licensed HFA-NET Pro and purchased and licensed the DICOM Gateway 1.0, and purchased and installed an EMR system or a PMS, you can use the following steps to set up work lists.



Note: If you have licensed DICOM Gateway 2.0, but wish to use HFA-NET Pro (CZM-XML via FEP) or DICOM Gateway 1.0 work lists, WORK LIST must be unchecked in the DICOM Gateway Services screen (see [“Enable/Disable DICOM Gateway Services,” on page H-4](#)).

1

From the Main Menu, select *SYSTEM SETUP*>*COMMUNICATIONS SETUP*>*WORK LIST SETUP*. The Work List Setup screen will open.

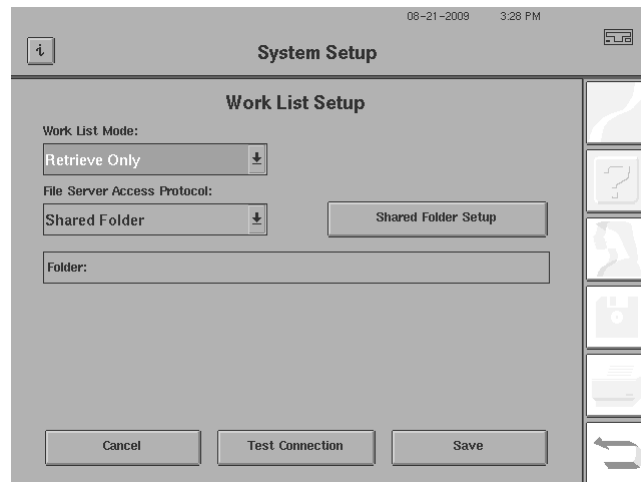


Figure I.27 Setting Up a Work List for EMR/PMS/DICOM Export

2

In the Work List Mode box, you can select one of two options: RETRIEVE ONLY or QUERY AND RETRIEVE.

- Select RETRIEVE ONLY, if you wish to retrieve a work list that you know exists.
- Select QUERY AND RETRIEVE, if you are unsure if a work list exists. If it does exist, it can be retrieved.



Note: Your EMR/PMS/DICOM provider should advise you which of the two preceding options works best with their system.

3

In the File Server Access Protocol drop-down box, select either FTP or Shared Folder. If you selected FTP, go to [“Setting Up FTP,” on page I-9](#). If you selected Shared Folder, go to [“Setting Up a Shared Folder,” on page I-11](#). Upon completion of one of those setup procedures, press SAVE.

Setting Up Save & Transmit for EMR/PMS/DICOM Systems

- 1 On the System Setup screen select SAVE/TRANSMIT OPTION to display the screen that is shown in [Figure I.28](#).
- 2 Open the Transfer Destination drop-down box and select EMR/PMS HOST for EMR/PMS systems and DICOM systems using DICOM Gateway 1.0 ([Figure I.28](#)), or DICOM ARCHIVE for DICOM systems using DICOM Gateway 2.0 ([Figure I.29](#)).

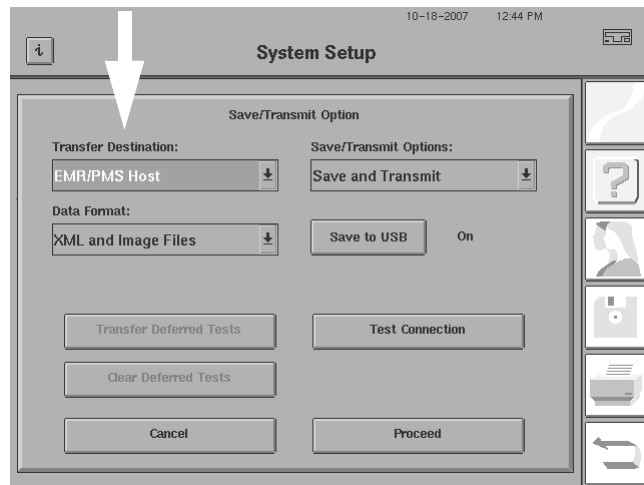


Figure I.28 Setting Transfer Destination Drop-Down Box to EMR/PMS Host

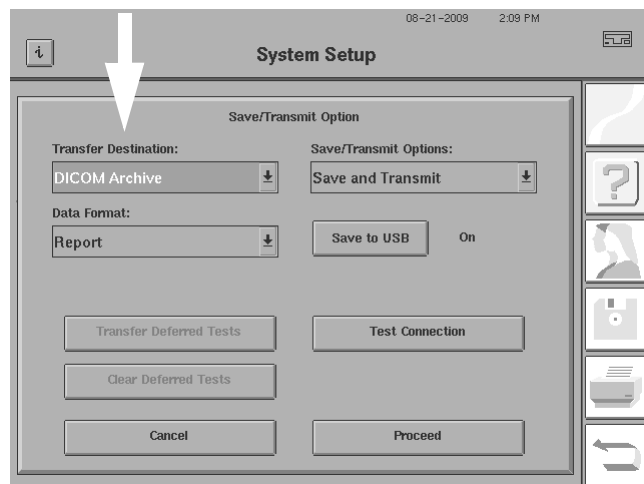


Figure I.29 Setting Transfer Destination Drop-Down Box to DICOM Archive



Note: The EMR/PMS Host option in the Transfer Destination drop-down box is only available in the listing if you have licensed the HFA-NET Pro networking software on your HFA II-*i*. The DICOM Archive option in the Transfer Destination drop-down box is only available in the listing if you have licensed the DICOM Gateway 2.0 software on your HFA II-*i*. Otherwise, these options will not appear in the Transfer Destination drop-down box. Further information on these options may be found at the end of this section in [Table I.8](#).

- 3 If you selected the EMR/PMS Host option, open the Data Format drop-down box and select XML AND IMAGE FILES. If you selected the DICOM Archive option, REPORT will be automatically selected. A report is an Encapsulated PDF—a DICOM formatted PDF file transmitted via DICOM protocols. Only DICOM compatible applications can read an Encapsulated PDF file.
- 4 Open the Save/Transmit Option drop-down box and select SAVE AND TRANSMIT.
- 5 Press PROCEED.

Setting Up Printing To a File

The Printing to a File function allows you to export patient and examination data as a computer file. The text-based data is exported as an XML (Extensible Markup Language) file to allow it to be readable across a broad range of different servers and operating systems. Images are converted to TIFF or PDF files.

Setting Up the Print To a File Function

Use the following process to set up Printing to a File:

- 1 From the Main Menu, select *SYSTEM SETUP*>PRINT SETUP, to open the Print Setup screen.
- 2 From the Print Setup screen, select the PRINT-TO-FILE SETUP button to display the Print-To-File Setup screen (Figure I.30).

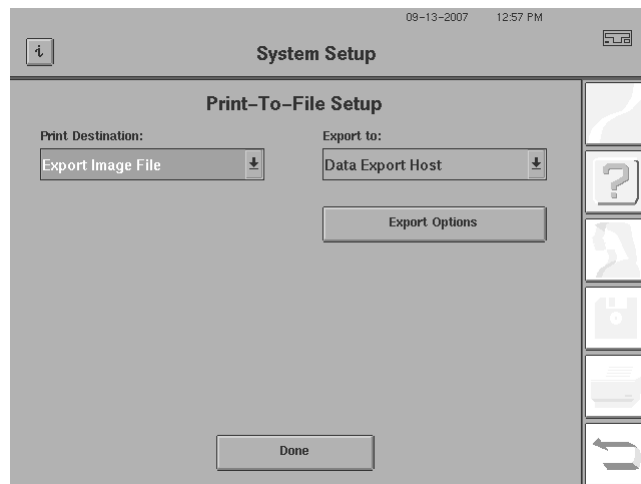


Figure I.30 Print-To-File Setup Screen

- 3 Select the PRINT DESTINATION: drop-down box (see Figure I.31). Your available selections in this drop-down box are:
 - PRINT TO PRINTER
Choose this selection if you wish only to print to paper.

- **ASK BEFORE PRINT**
Choose this selection if you wish to be asked for the print destination each time you enter a print command.
- **EXPORT IMAGE FILE**
Choose this selection if you wish to transmit a TIFF or PDF image file of selected printouts to the file server.
- **EXPORT IMAGE FILE AND PRINT**
Choose this selection if you wish to export a TIFF or PDF image file, as well as to print out a paper copy.

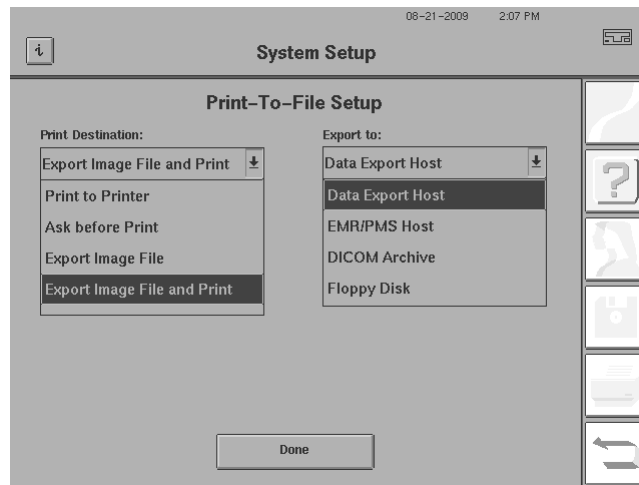


Figure I.31 Print Destination: and Export To: Drop-Down Buttons

- 4 If you selected "Ask before Print", "Export Image File" or "Export Image File and Print", select the EXPORT TO: drop-down button and select your desired destination as either DATA EXPORT HOST, EMR/PMS HOST, DICOM ARCHIVE, or FLOPPY DISK.



Note: The Data Export Host or EMR/PMS Host options will only appear on the list if you have registered the HFA-NET Pro software on your HFA II-*i*. The DICOM Archive option is only available if you have licensed and registered the DICOM Gateway 2.0 software on your HFA II-*i*. Refer to [Chapter \(14\), "Networking,"](#) for further details regarding these network features.

- 5 If you selected an image file destination in the previous step, select the EXPORT OPTIONS button to display the Export Options screen shown below.



Note: The Export Options screen will not be displayed if you selected DICOM Archive from the EXPORT TO: drop-down list. The image format for the DICOM Archive is always set to Encapsulated PDF—a DICOM formatted PDF file transmitted via DICOM protocols.

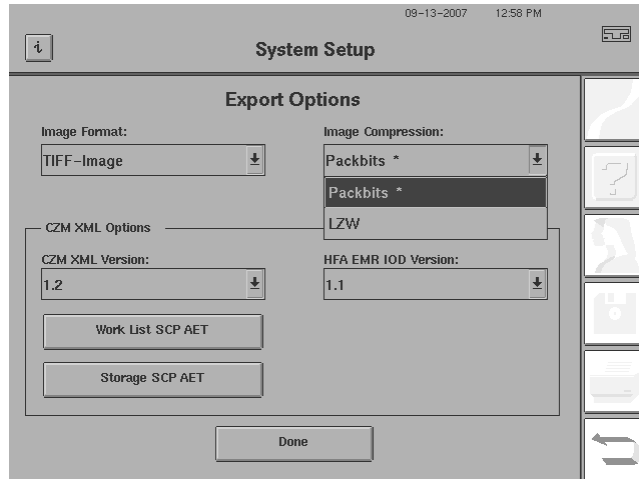


Figure I.32 Export Options Screen

- 6 Select an image format in the IMAGE FORMAT: drop down box. You can select TIFF-IMAGE (Tagged Image File Format, TIFF version 6.0) or PDF-DOCUMENT (Portable Document Format, PDF 1.2/Acrobat 3.x).
- 7 If you selected TIFF-IMAGE, you can specify the compression used for the image. Select an image compression in the IMAGE COMPRESSION: drop down box. You can select PACKBITS or LZW. If you selected PDF-DOCUMENT, the only compression available is ZIP.
- 8 If you are using an EMR/PMS/DICOM System with you HFA II-*i*, consult your documentation for required settings to enter into the CZM XML Options fields.
- 9 Select DONE to save your Export Options and return to the Print-To-File Setup screen.

Backing Up and Restoring Your HFA Network Configuration

The network settings for the HFA II-*i* normally are stored on the hard disk. Using the Configuration Backup capability of your HFA II-*i*, you can back up those network settings to a USB storage device, for safety in the event of hard disk problems. You should use this Configuration Backup process every time that you make changes to your settings. This process is the same one that is used for backing up custom tests, changed button text, custom Main Menu configurations, and so forth.

To backup your network settings to a USB storage device, select MAIN MENU>SYSTEM SETUP>ADDITIONAL SETUP>BACKUP CONFIGURATION. Connect a USB storage device to a USB port on the HFA and select the device. When backup is complete, remove the USB storage device and label the device "Backup Configuration Disk". Also be sure to enter the serial number of the HFA II-*i* and the date on the device. Refer to ["Configuration Back Up and Restore,"](#) on page 11-5 for additional information.



Note: Unlike many other HFA II-*i* configuration settings, backed up network settings are unique to the HFA II-*i* from which they originated. Therefore, they can be restored only to the HFA II-*i* from which they were backed up. They cannot be restored to a different HFA II-*i*.

Network Diagnostics

This section describes the functions available on the Network Diagnostics menu. You can select the Network Diagnostics menu (Figure I.33) from MAIN MENU>SYSTEM SETUP>COMMUNICATIONS SETUP>NETWORK DIAGNOSTICS.

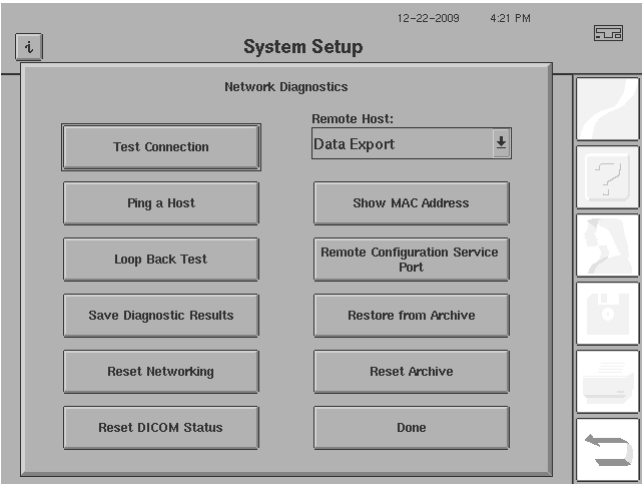


Figure I.33 Network Diagnostics Menu

Remote Host

The Remote Host drop-down box in the Network Diagnostics menu has the options shown in the table below.

Table I.1 Remote Host Drop-down Box Entries Based on Software License Purchased

Software License Option(s) Purchased	Remote Host Drop-down Box Options
None	None
HFA-NET Pro	Archive/Retrieve Host Data Export Host EMR/PMS Host Work List Host
DICOM Gateway 2.0	None

Test Connection

The Test Connection button displays the Test Connection screen and tests the connection with the remote server selected in the Remote Host drop-down box.

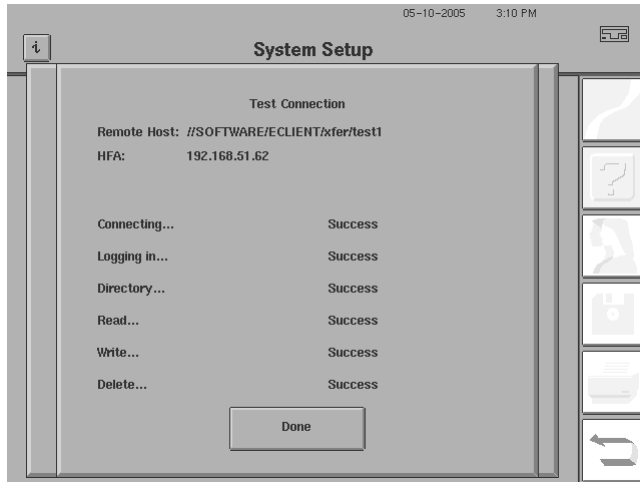


Figure I.34 Test Connection Screen

The remote host name and IP address and the HFA IP address are displayed at the top of the screen. Each test shown is performed with a "Success" or "Failed" message being displayed.

Ping a Host

The Ping to Host button displays a numeric keypad to allow entry of the remote host's IP address. After entry of the IP address, the remote host is pinged and either a "Ping Successful" or "Failed to ping the remote host" message will be displayed.

Loop Back Test

The Loop Back Test button performs an internal loop-back test for the ethernet controller with either a "Loop-back Test Successful" or "Loop-back Test Failed" message being displayed.

Save Diagnostic Results

The Save Diagnostic Results button writes all the test activity performed in this visit to a text file on a floppy disk, Diag_<date><time>.txt, at the date and time the diagnostics are saved.

Reset Networking

The Reset Networking button displays the dialog box shown in [Figure I.36](#).

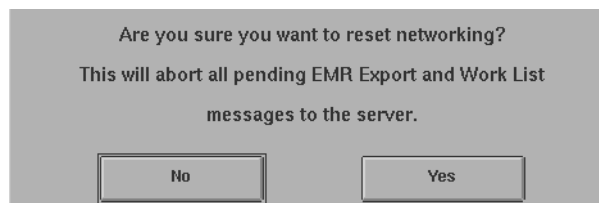


Figure I.35 Reset Archive Dialog Box

Use this function if you can't communicate to the server (i.e., "No response from server" message is displayed) or if a previous import or export did not complete properly. If you select YES, all pending EMR Export and Work List messages to the server will be aborted.

Show MAC Address

The Show MAC Address button displays the MAC address of the HFA network interface.

Remote Configuration Service Port

The Remote Configuration Service Port button displays a numeric keypad to allow entry of the service port number for the *EasyConnect* RCT.

Restore from Archive

The Restore from Archive button displays the dialog box shown in [Figure I.36](#).



Figure I.36 Restore from Archive Dialog Box

If you select YES, a database retrieve from the file server will be performed.

Reset Archive

The Reset Archive button displays the dialog box shown in [Figure I.37](#) below.

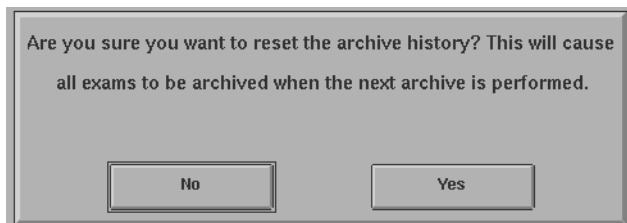


Figure I.37 Reset Archive Dialog Box

If you select YES, all exams are archived the next time an archive is performed.

Reset DICOM Status

The Reset DICOM Status button displays the dialog box shown in [Figure I.38](#) below.

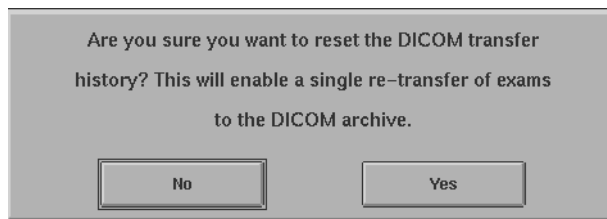


Figure I.38 Reset DICOM Status Dialog Box

If you select YES, the DICOM transfer history will be reset, enabling re-export of exam data to the DICOM Archive. Each exam can then be exported to the DICOM Archive once. This function invokes the Cleanup Hard Disk Database function (see [“Cleanup Hard Disk Database,”](#) on page 11-23).

Network Troubleshooting Error Messages

The tables below contain networking error messages that might display on your HFA II-/. Users in the U.S. who are unable to resolve their problem using this resource should contact Carl Zeiss Meditec Customer Care for assistance, at 1-800-341-6968. Outside the U.S., contact your local Carl Zeiss Meditec distributor.

Specific Networking Error Messages

Several error messages are two-part messages. The first part states what operation was being performed and the second part states what error condition was identified. Examples of conditions and what to do if the condition is encountered are shown in [Table I.2](#) below.

Examples of Operations:

- "Error occurred archiving the database. <Specific condition>"
- "Error occurred creating archive folder. <Specific condition>"
- "Error occurred retrieving data. <Specific condition>"
- "Error occurred retrieving <other-instrument s/n> data. <Specific condition>"
- "Backup to File Server failed. <Specific condition>"
- "Restore from File Server failed. <Specific condition>"

Table I.2 Specific Networking Error Messages

Possible Specific Condition	What to do
"Disk on server is full."	• Free up disk space on server.
"Cannot find server. Check network connection and settings and try again."	• Check network cable. • Check network settings (IP address, subnet mask, Gateway address).
"Cannot login to server. Check user name and password and try again."	• Verify user name and password for specific operation is set correctly.
"Cannot find specified folder. Ensure folder exists on the server and try again."	• Verify the root folder and any required sub-folders are present on the server.
"Cannot write to remote folder. Check permissions on the server and try again."	• Verify that permissions for accessing the appropriate folders on the server are set correct. • Verify that FTP permissions are correct.
"Corrupt file: <file name>." ^a	• Delete the file and replace with a good copy from your system backup.
"Error creating temporary database."	• Unrecoverable write error on hard drive - replace hard drive.
"Error extracting database from <file name>." ^a	• Verify the TAR file on server using WinZip or comparable tool. • Verify Network connection (possible lost data due to faulty connection). • Unrecoverable write error on hard drive - replace hard drive.

Table I.2 Specific Networking Error Messages

Possible Specific Condition	What to do
"Error occurred packaging database." ^b	Unrecoverable write error on hard drive - replace hard drive.
"Error opening <file name>." ^a	The file you are attempting to open appears to be corrupt. If it fails to open a second time, it probably is damaged and unusable.

a. Retrieve and Restore operations only.

b. Archive and Backup operations only.

Unknown Networking Error Messages

In some cases the error message will not specify the possible problem. [Table I.3](#) below provides some guidance for solving these errors.

Table I.3 Unknown Networking Error Messages

If you see	While you are	Check the following
"Error occurred archiving the database. A network error has occurred."	Archiving the database.	- Ensure network cable is connected. - Ensure Archive root folder, instrument folder and instrument's archive folder are present on server (<root>/<instrument>/archive/). - Write permission set correctly on file server.
Empty HFA Selection menu.	Retrieving patient data.	Ensure Archive root folder and instrument folder for other instruments are present on server.
"Error occurred retrieving data. A network error has occurred."	Retrieving patient data.	- Ensure network cable is connected. - Ensure Archive root folder and instrument folder for other instruments are present on server.
"Backup to File Server failed. A network error has occurred."	Backing up patient database.	- Ensure network cable is connected. - Ensure Archive root folder is present on server. - Write permission set correctly on file server.
"Restore from File Server failed. A network error has occurred."	Restoring patient database.	- Ensure network cable is connected. - Ensure Archive root folder, instrument folder and instrument's backup folder are present on server (<root>/<instrument>/backup/).

General Networking Error Messages

[Table I.4](#) below gives some possible solutions to general error messages.

Table I.4 General Networking Error Messages

Error Message	Possible Solution
A hard drive database failure has occurred. The hard drive database must be repaired before backup to file server can be performed.	Refer to "How to Handle Database Failures," on page 11-10.
A hard drive database failure has occurred. The hard drive database must be repaired before restore from file server can be performed.	Refer to "How to Handle Database Failures," on page 11-10.
A hard drive database failure has occurred. The hard drive database must be repaired before archiving can be performed.	Refer to "How to Handle Database Failures," on page 11-10.
A hard drive database failure has occurred. The hard drive database must be repaired before data retrieval can be performed.	Refer to "How to Handle Database Failures," on page 11-10.
A network address must be of the form XXX.XXX.XXX.XXX where XXX is a number between 0 and 255.	Re-enter the IP address in the correct format.
Cannot access the remote host. Check network connection and try again.	- Check all cable connections. - Verify the server is powered up and running. - Verify accuracy of the IP address for your server and re-enter the address, if necessary.
Cannot access the specified folder. Check permissions and try again.	- Verify that the user has access privileges for the specified folder. - Change to a folder for which you have access privileges.
Cannot find server. Check network connection and settings and try again.	- Check all cable connections. - Verify the server is powered up and running. - Verify accuracy of the IP address for your server and re-enter the address, if necessary.
Cannot find specified folder. Ensure folder exists on the server and try again.	- Verify that the specified folder exists on the network server. - Ensure that you have not misspelled the folder name. - Re-enter the folder name or use a different folder.
Cannot login to server. Check user name and password and try again.	- Re-enter your User Name and Password for the server. - If problem persists, verify User Name and Password with the System Administrator.
Cannot write to remote folder. Check permissions on the server and try again.	- Verify that you have write-access to the specified folder. - Get needed write-access privileges from System Administrator.
Could not obtain IP address from the DHCP server.	- Check all cable connections. - Verify the server is powered up and running. - Verify accuracy of the IP address for your server and re-enter the address, if necessary.

Table I.4 General Networking Error Messages

Error Message	Possible Solution
Could not update local TCP/IP settings.	Verify IP Address, Subnet Mask, and Gateway Address (Note: Most likely cause is Gateway Address is not within the Subnet Mask).
Error occurred accessing the remote folder. Press OK to continue. Press Cancel to return to the setup menu.	- Press OK and retry to gain access. Change folders if necessary, or get needed access rights from the System Administrator. - Press CANCEL to return to the previous menu.
Error occurred accessing the remote folder. Press OK to save the settings. Press Cancel to return to the setup menu.	- Press OK to save the settings to the hard drive. - Press CANCEL to end the process and return to the setup menu.
Error occurred while retrieving the work list.	Retry the operation.
Failed to ping the remote host.	Verify that the remote host is powered and active. Then, retry the operation.
Failed to replace database with File Server backup.	- Free up hard drive storage space on the HFA II-<i>i</i>, as necessary. - Retry loading the backup to the hard drive.
Not enough hard disk space to backup to file server. Make more space by deleting old exams.	Free up HFA II-/hard drive storage space, as necessary.
Not enough hard disk space to perform archive. Make more space by deleting old exams.	Free up hard drive storage space on the HFA II-<i>i</i>, as necessary.
Not enough hard disk space to perform data retrieval. Make more space by deleting old exams.	Delete old exams from HFA II-/hard drive and retry retrieving data from the server.
The database backup was empty. A restore was not performed.	You have not performed your first database backup to the server.
The database has not yet been archived. You can archive data by selecting Archive/Retrieve from the File Functions menu.	- You have not performed your first database archiving to the server. - Archive data by selecting ARCHIVE/RETRIEVE from the File Functions menu.
The database is empty. A backup was not created.	There is no data available for backing up on the hard drive of the HFA II-<i>i</i>.
The Internet gateway IP address should be within the specified subnet. Please correct the gateway IP address.	Enter the correct gateway IP address.
Unknown error occurred, archive not completed.	Repeat the process. If it fails on second and subsequent attempts, write down the details of your process and then contact Carl Zeiss Meditec Customer Service.
Unknown error occurred, backup to file server not completed.	Repeat the process. If it fails on second and subsequent attempts, write down the details of your process and then contact Carl Zeiss Meditec Customer Service.

Table I.4 General Networking Error Messages

Error Message	Possible Solution
Unknown error occurred, data retrieval not completed.	• Repeat the process. If it fails on second and subsequent attempts, write down the details of your process and then contact Carl Zeiss Meditec Customer Service.
Unknown error occurred, restore from file server not completed.	• Repeat the process. If it fails on second and subsequent attempts, write down the details of your process and then contact Carl Zeiss Meditec Customer Service.

Work List Networking Error Messages**Error Message Structure:**

"Error occurred while retrieving the work list.

<Specific condition>"

Do you want to Retry?

Table I.5 below lists error messages related to Work Lists and their possible resolution.

Table I.5 Work List Networking Error Messages

If you see	While you are	Check the following
Error occurred while retrieving the work list. Server responded with error: <error description> Do you want to retry?	Retrieving the work list.	- Your work list server returned an error. See if the <error description> points to a possible resolution (For example this may occur if you try to query the work list with Accession number and the work list server does not support querying work list with Accession number). Retry work list retrieval. - Refer to the work list server's manual for a possible resolution of the problem.
Error occurred while retrieving the work list. No items in the work list. Do you want to retry?	Retrieving the work list.	No patients were present in the work list that matched the query. Retry by changing the work list query.
Error occurred while retrieving the work list. Invalid work list. Do you want to retry?	Retrieving the work list.	The work list retrieved contained an invalid message. Retry work list retrieval.
Error occurred while retrieving the work list. Work list not found. Do you want to retry?	Retrieving the work list.	- This error can occur in Retrieve Only mode if the work list server has not yet made the work list. - Make sure the work list server is running and retry.
Error occurred while retrieving the work list. Too many response items. Do you want to retry?	Retrieving the work list.	Work list server returned large number of items in the work list. Narrow your query and retry.
Error occurred while retrieving the work list. A network error occurred. Do you want to retry?	Retrieving the work list.	- Make sure the HFA is connected to the network. - Make sure the Work list server is running. - Retry.

DICOM Networking Error Messages

Table I.6 below lists common error messages related to DICOM connectivity and their possible resolution. These DICOM message codes are generated from the DICOM service provider.

Table I.6 DICOM Networking Error Messages

DICOM Error Message Code	Error Meaning	Check the following
0110	Processing failure. A general failure in processing the operation was encountered.	- Refer to the DICOM system manual for a possible resolution of the problem. - Retry.
0112	No such object instance. One or more of the elements in the Referenced SOP (Service Object Pair) Instance Sequence was not available.	Retry.
0213	Resource limitation. The SCP (Service Class Provider) does not currently have enough resources to store the requested SOP Instance(s).	- The DICOM server hard drive(s) may be full. Add more hard drives or make more space available. - Retry.
0122	Referenced SOP Class not supported. Storage Commitment has been requested for a SOP Instance with a SOP Class that is not supported by the SCP.	Call Customer Service.
0119	Class / Instance conflict. The SOP Class of an element in the Referenced SOP Instance Sequence did not correspond to the SOP class registered for this SOP Instance at the SCP.	Call Customer Service.
0131	Duplicate transaction UID. The Transaction UID of the Storage Commitment Request is already in use.	Retry.

Networking Terminology

Computer networking uses words and phrases with which you may not be familiar. The following glossary is a concise resource for the networking terms that you may encounter in this User Manual.

Table I.7 Glossary of Networking Terms

Term	Definition
Archive	To gather computer data at a central location for storage. Data from multiple sources is added into individual folders on the server; no data is written over. The first archiving operation stores all data from a given HFA II- <i>i</i> . Subsequent archiving operations store only new information that was stored on that HFA II- <i>i</i> , since the last full archiving occurred.
Backing Up	To store the entire HFA II- <i>i</i> database, each time you enter a backup command. The entire database can be backed up to a USB storage device or a network file server.
Bitmap	Computer image composed of columns and rows of dots of varying brightnesses and/or colors.
Category 5	A type of network cabling used for Ethernet.
CIFS	Common Internet File System - A file sharing protocol used by Microsoft Windows.
Components	Network elements such as HFA II- <i>i</i> series instruments, other networkable Carl Zeiss Meditec instruments, computers, etc.
Crossover Cable	A type of Ethernet cable used to connect computing devices together directly where they would normally be connected via a network switch, hub or router, such as directly connecting two personal computers via their network adapters.
DHCP	Dynamic Host Configuration Protocol - A standard used to set up networking communications automatically.
DICOM	Digital Imaging and Communications in Medicine - A communications standard for medical data.
Ethernet	Common networking system built into many new computers.
EMR	Electronic Medical Records - Patient data and test data that is stored electronically.
FTP	File Transfer Protocol - One standardized and reliable method of transferring files across networks and the Internet.
HIS	Hospital Information System - May contain elements of both EMR and PMS.
Hub	Centralized location for network connections.
IOD	Information Object Definition
IP Address	Internet Protocol address. In the format: xxx.xxx.xxx.xxx, where xxx is a number from 0 to 255.
LAN	Local Area Network - Type of network often used in medical offices.

Table I.7 Glossary of Networking Terms

Term	Definition
Link-Local	Link-Local assigns a unique IP address to the HFA without searching the local network. Link-Local does not require a DHCP server.
MAC Address	A MAC (Media Access Control) address is your computer's unique hardware number (128-bit address) associated with a network card or device. On an Ethernet LAN, it's the same as your Ethernet address.
Networking	Term used in this section of the User Manual to represent collectively: data export, database synchronization, and the EMR/PMS/DICOM features provided by the HFA II- <i>i</i> .
PDF	Portable Document Format from Adobe Systems.
PMS	Practice Management System - Integrated system for management of patient and diagnostic data in a practice or clinic.
Protocol	A standardized and commonly agreed upon approach to some form of computer communications.
RCT	<i>EasyConnect</i> Remote Configuration Tool.
Restore	To return backed up data to the HFA II- <i>i</i> . Restored data is either written over existing data or merged with it. All the backed up data for a given HFA II- <i>i</i> is restored in one operation; you cannot selectively restore only a portion of the backed up data.
Retrieve	To return user-selected archive data to the HFA II- <i>i</i> . Data is merged with existing HFA II- <i>i</i> data. Existing HFA II- <i>i</i> data is not overwritten.
Router	Network device that directs data traffic between components.
Shared Folder	A file storage folder that has shared access from other network components. Shared Folders use the CIFS protocol.
Synchronize	Moving data to a centralized location to gather it together. Then, moving it back to various points of the network, so that the same data exists on all of the selected HFA II- <i>i</i> instruments.
TCP/IP	Transmission Control Protocol / Internet Protocol - Communications standard used for networking on the HFA II- <i>i</i> .
TIFF	Tagged Image File Format - Image format used for bit-mapped image files that are exported from an HFA II- <i>i</i> .
UID	Unique Identifier
USB	USB (Universal Serial Bus) is a standard communication specification for peripheral devices.
Work List	A list generated by EMR/PMS/DICOM software, specifying what services are required, or have been provided, for a list of specified patients.
XML	Extensible Markup Language - Programming language that allows exported patient data and test data from an HFA II- <i>i</i> to be readable on a wide range of networked computer operating systems.

Table I.8 Drop-down Box Entries Based on Software License Purchased

Software License Option(s) Purchased	TRANSFER DESTINATION Drop-down Box Options	DATA FORMAT Drop-down Box Options
None	Classic Serial ^a	HFA 1 Serial ^a HFA 2 Serial
HFA-NET Pro	Classic Serial ^a	HFA 1 Serial ^a HFA 2 Serial
	Data Export Host EMR/PMS Host	XML Files Only ^b Image Files Only XML and Image Files
DICOM Gateway 2.0	Classic Serial ^a	HFA 1 Serial ^a HFA 2 Serial
	DICOM Archive	Report
		Exam Data
		Exam Data and Report

a. Classic Serial (HFA I Serial) communication uses the RS-232 protocol to communicate with both HFA I perimeters and HFA II-II-i perimeters.

b. Available only in limited circumstances.

Serial Communications Protocols Used by HFAs

HFA II-/perimeters export data using either Classic Serial or Classic Network communications (see the footnotes for [Table I.8](#) for definitions of these two protocols). The HFA II-/perimeters can also import data using either Classic Serial or Classic Network protocols. The HFA II-/ automatically determines which of the two data categories is being imported and handles it accordingly.



Note: Unlike the newer HFA II-/series instruments, HFA I and HFA II perimeters only export data using Classic Serial communications.

(J) Installing & Licensing HFA II-i Software

Please take a moment to read the following information before attempting to install any new HFA II-i software.

Back Up All Data First

Be sure you have backed up (made copies of) all of your data. You should be careful to ensure that you have copies of all your data backed up on either floppy disks, USB storage devices, or your network file server (if you have licensed HFA-NET Pro software on your HFA II-i) before beginning this procedure. If necessary, refer to [Chapter 11, "Database Management,"](#) for instructions on how to back up your data.

Identify the Current Software

Identify the software your instrument currently is running. Turn on your instrument and allow it to warm up. In the upper, left-hand corner of the Main Menu screen, the software revision will be identified (*e.g.* "Rev. 5.1").

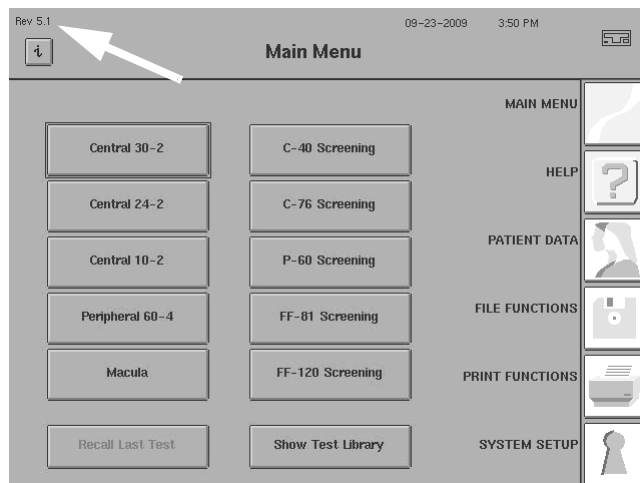


Figure J.1 Location of the Software Revision Number

System Software Installation

HFA II-*i* system software is supplied on a Carl Zeiss Meditec USB flash drive labeled SW. **Ensure that you have backed-up all of your data, or have copies of all of your data.** The total time for software installation is about 5 minutes.

- 1 With the HFA II-*i* turned off, insert the Carl Zeiss Meditec SW USB flash drive into a USB port. Turn on the HFA II-*i*.
- 2 The first screen will display a button labeled INSTALL. Select this button to begin the installation. It will say "Copying files" on the screen.
- 3 At the completion of this portion of the software installation, you will be told to remove the install media and cycle the power off and then back on. Remove the USB flash drive and turn off the HFA II-*i*. Allow approximately 10 seconds to pass before moving on to Step 4.
- 4 There is one more step to installing the software. Turn on the power to the HFA II-*i*. The "Install" screen will be present. Press the button labeled COMPLETE INSTALL to finish the installation process. An "Installation in Progress" window will appear and indicate how the installation is proceeding. You may also hear beeps. At the completion of this phase, the HFA II-*i* screen should read: "Installation Successful. Cycle power to begin using the installed software." At this time, turn off the HFA II-*i*, wait 10 seconds, and restore the power to the HFA II-*i*.

If you have trouble installing your new software

If a system error occurs during any part of the installation process:

- 1 Power down the unit (turn off the HFA).
- 2 Repeat the installation process starting at Step 1.

If you continue to have difficulties, call Carl Zeiss Meditec Customer Care at 1-800-341-6968 to obtain advice or a new Carl Zeiss Meditec SW USB Flash Drive. Outside the U.S., contact your local Carl Zeiss Meditec distributor.

Installing Additional Software

Occasionally, additional software packages become available for the HFA II-/which do not require a full system software upgrade to take place. The following instructions describe the steps to install an optional software feature, such as the Kinetic test feature. **Do not use this method for full system software upgrade installations.**

- 1 From the Main Menu, select the *SYSTEM SETUP* icon. On the System Setup menu, select ADDITIONAL SETUP. Next, select INSTALL SOFTWARE.

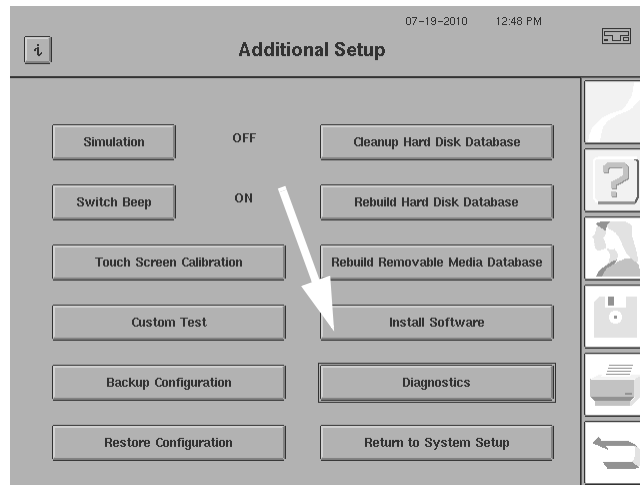


Figure J.2 Additional Setup Screen

- 2 Select INSTALL SOFTWARE FROM USB MEDIA on the Install Software screen. A dialog box will be displayed as shown in [Figure J.3](#). below.

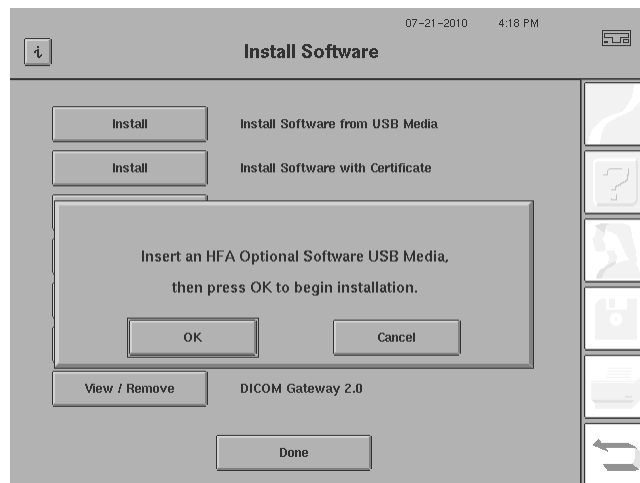


Figure J.3 Beginning an Installation

- 3 Insert the Carl Zeiss Meditec USB flash drive that contains the optional software feature to be installed. Press OK when ready, as indicated on the screen.

Installing & Licensing HFA II-i Software

- 4 A dialog appears prompting you to select a USB storage device (Figure J.4).

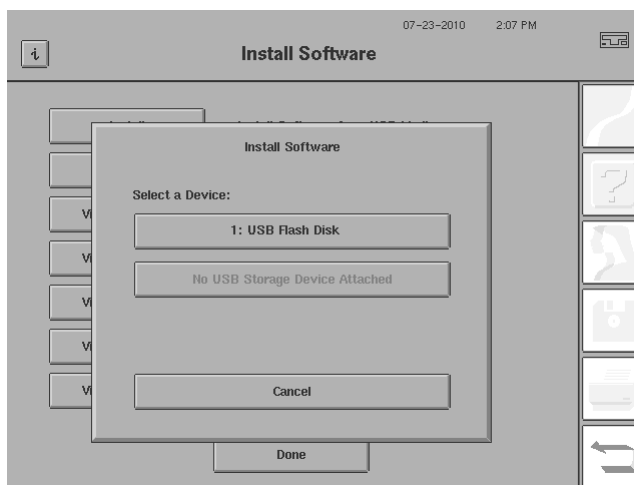


Figure J.4 Select USB Storage Device

- 5 To start the installation select the USB storage device that contains the optional software feature by pressing the button with its device name.
- 6 You will see the screen that is shown in Figure J.5 when you are successful. Select OK to finish the procedure.



Figure J.5 Notice of Successful Software Installation

- 7 Select DONE on the Install Software screen. You do not need to restart the HFA II-i.

Licensing GPA, SITA-SWAP, HFA-NET Pro, or DICOM Gateway 2.0

The procedures that follow will allow you to complete the licensing of the optional GPA, SITA-SWAP, HFA-NET Pro, and DICOM Gateway 2.0 on your HFA II-*i*. Version 5.1 includes a license for HFA-NET Pro. You will need to follow these steps to activate the HFA-NET Pro features.

This is a 3-step process:

- A. Obtain Node ID from the License Registration Screen on the HFA II-*i*
- B. Obtain License Key and Security Code from the Internet
- C. Enter Licensing Information on the HFA II-*i*

Details for each part follow. Each instrument has a unique Node ID, however, the Node ID remains the same regardless of which software option you are trying to license.

A. Obtaining Your HFA II-*i*/Node ID

- 1 From the Main Menu, select *SYSTEM SETUP*>*ADDITIONAL SETUP*>*INSTALL SOFTWARE*.
- 2 Select the **INSTALL** button to the left of **INSTALL SOFTWARE WITH CERTIFICATE** as shown in [Figure J.6](#) below.



Figure J.6 Install Software with Certificate Button on Install Software Screen

- 3 When the License Information screen for your software option opens (Figure J.7), note down on a piece of paper the Node ID information that is provided there. You will need this Node ID to complete the software licensing process on the Carl Zeiss Meditec web site. That process begins with the next step of this procedure.

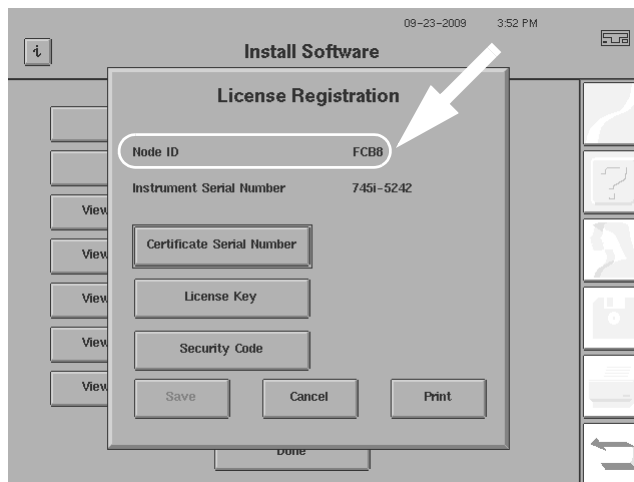


Figure J.7 Obtaining your Node ID on the HFA II-i License Information Screen

B. Obtaining your HFA II-/Software License Key on the Internet

- 1 Go to a computer that is connected to the Internet and launch your Internet browser.



Note: If you have questions regarding software registration, please contact Carl Zeiss Meditec. In the United States please call Carl Zeiss Meditec at 1-800-341-6968 or by email at z.customersupport@meditec.zeiss.com. Outside the United States, please contact your local Carl Zeiss Meditec distributor.

- 2 In the browser's address bar, type in the following URL: <http://www.meditec.zeiss.com/register>. Press ENTER. If your language is other than English, select your language under the "Other Languages:" area of the website.
- 3 If your language is other than English, select your language under the "Other Languages:" area of the website.
- 4 Read the description of what materials are required to license your software. Then, be sure to have on hand the following three items before going on to the next step of this procedure:
 - Node ID
 - Certificate serial number from the certificate provided with your software (including the alphabetic prefix and the intervening dash before the number)
 - HFA II-/ serial number. The model number of your HFA can be found on the License Registration screen (see Figure J.7). It is also imprinted on a label that is affixed to the rear panel of the instrument or may be found by pressing the "i" button in the upper left corner.

After pressing the "i", the screen title would say "HFA II-i Series Configuration" and then your Model and Serial number will be displayed (for example, "Model 750" and "Serial Number 750-1234").

- 5 Go to the bottom of the page, where it says: "When ready use the [form](#) to create your License Key" and click on the word "[form](#)" (See Figure J.8 below).

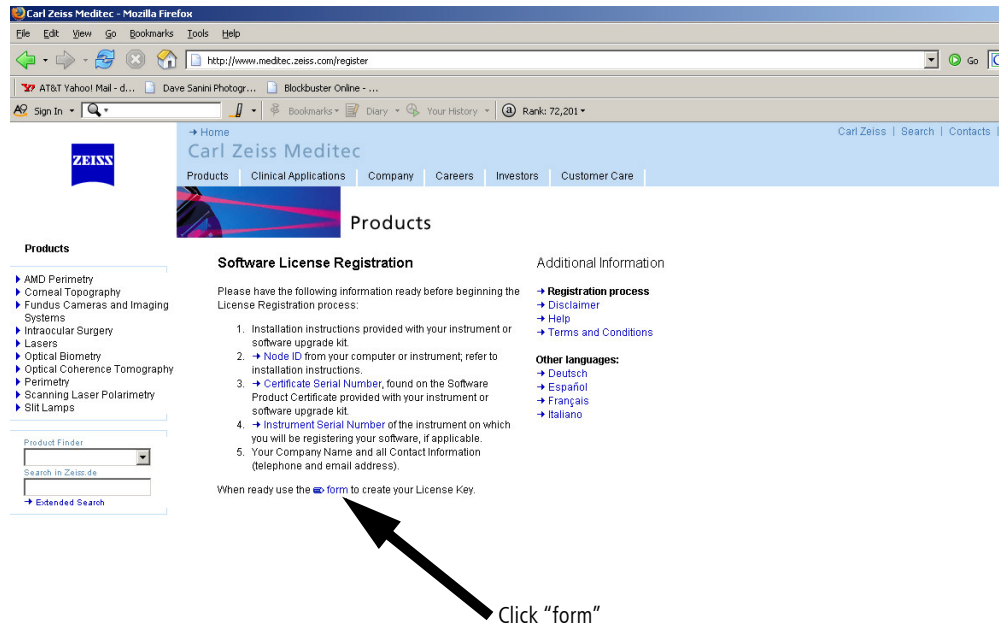


Figure J.8 Carl Zeiss Software License Registration Page on the Internet

- 6 Enter your Certificate Serial Number (including the alphabetic prefix and the intervening dash before the number) and click the Submit button.
- 7 Enter your Instrument Serial Number and click the Submit button.



Note: When you enter your instrument serial number on the web, be sure to include the "i". For example, the number 750-1234 must be entered as 750i-1234. You will not be able to license software with an incorrectly entered serial number.

- 8 Enter your Node ID and personal information and click the Submit button to generate your License Key and Security Code.
- 9 Write down your License Key and Security Code, or print out and save the entire web page for reference. Go on to the next section to begin entering your licensing information on your HFA II-i.

C. Entering Your Licensing Information on the HFA II-i/

- 1 Select CERTIFICATE SERIAL NUMBER from the License Registration Screen (Figure J.7). A pop-up keyboard will appear as is shown in Figure J.9. Use it to type in your certificate serial number (including the alphabetic prefix and the intervening dash before the number) that is printed on your certificate. When your entry is completed, select ENTER.

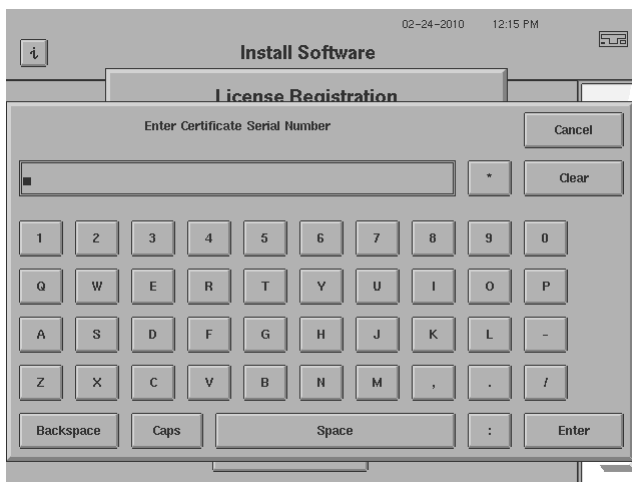


Figure J.9 Pop-up Keyboard for Certificate Serial Number

- 2 When you are returned to the License Registration screen, select LICENSE KEY. A pop-up keypad will open as is shown in Figure J.10. Use it to enter your License Key that you received on the Carl Zeiss Meditec website. Then select ENTER to record the data and return to the License Registration screen.

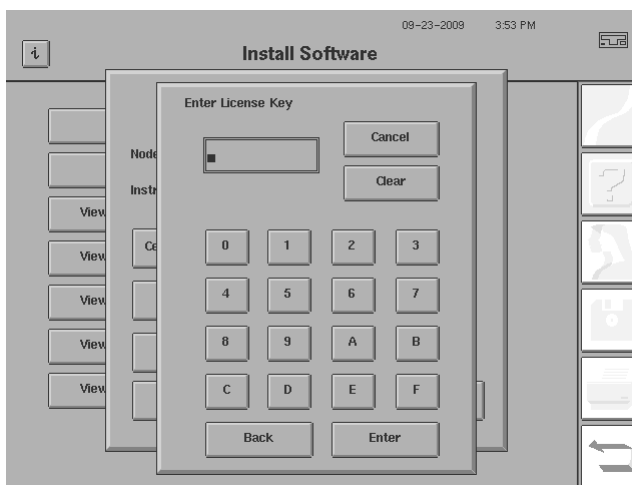


Figure J.10 Pop-up Keypad for License Key

- 3 Select SECURITY CODE. Another pop-up keypad will open to allow you to enter the Security Code that you received on the Carl Zeiss Meditec website. Once you have keyed in the code, select ENTER to record the data and return to the License Registration screen.
- 4 Select PRINT to print out a copy of your licensing settings for future reference, if needed.

- 5 Select SAVE to record all of your settings to the hard drive and to return to the Install Software screen. If you entered the correct license information, a message will be displayed telling you the software installation was successful. Select OK to continue. If you get an invalid value message, verify that you have entered the correct values for your license information and try again.
- 6 To view or remove the software license information, select the VIEW / REMOVE button next to the software you want.



Note: HFA-NET Pro is viewed/removed with the VIEW / REMOVE button next to HFA-NET. XML Data Export is specialized software reserved for research purposes.

A License Registration screen (Figure J.11) is displayed with the license information. Select REMOVE if you wish to remove the license. Select PRINT if you wish to print out the license information. Select CANCEL to return to the Install Software screen.

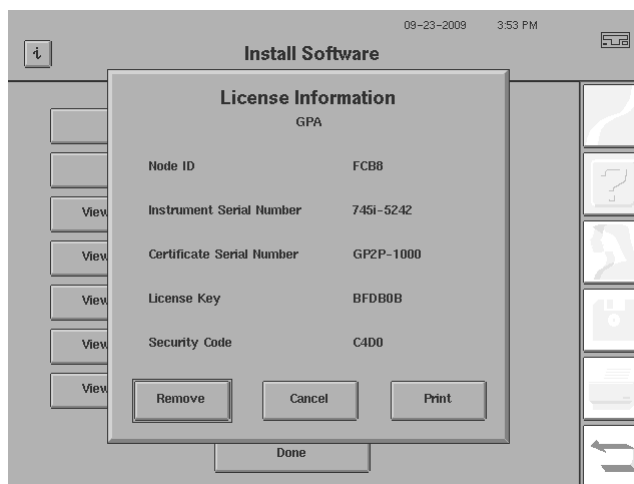


Figure J.11 License Registration Screen After Selecting the View / Remove Button

- 7 Select DONE on the Install Software screen to complete the licensing process, or select the INSTALL button next to INSTALL SOFTWARE WITH CERTIFICATE again for another software that you wish to license, such as SITA-SWAP.
- 8 After selecting DONE, a message will be displayed saying "Please cycle power to restart." Turn off your HFA II-i and wait approximately 10 seconds before turning it on again.

This completes the Licensing process.

(K) SITA Normative and GPA Databases

How SITA Works	K-1
Normative and GPA Database Collection and Demographics	K-3
Acknowledgements	K-8

How SITA Works

To better explain how SITA works, we will use analogies. Think of perimetry testing as taking a patient's case history. Think of SITA as an experienced doctor. Think of previous perimetry strategies as medical students. With these analogies in mind, we will describe how SITA reduces test time in the following four ways:

1. SITA Asks Smart Questions

The importance of asking smart questions is familiar to any experienced doctor. When students take a patient's case history, they often ask questions that are off the mark and do not yield critical information. They sometimes miss clues that the patient is offering— information which could lead directly to the proper diagnosis if pursued. After many years of taking histories, however, experience teaches practitioners precision and economy in framing their questions.

Good perimetry is similar to taking a good history. It is a matter of getting information from the patient in a quick and efficient manner. In perimetry, the most critical factors are the following:

A. Start with stimuli at each point that are already very near the threshold, thus avoiding the long, inefficient process of gradually brightening or dimming the stimulus while searching for the threshold.

B. Make optimal use of the information contained in the patient's responses to those stimuli. This is important both in terms of calculating the threshold at the point being tested, and in terms of determining how bright the initial stimulus should be at the next point to be tested.

SITA considers many factors in determining what stimuli to present at each point during the test. These factors include age, normative data, detailed characteristics of abnormal and normal tests, and patient responses so far in the test. They are combined and weighted into the SITA visual field model, which continually updates calculations of the threshold at each point.

2. SITA Tailors the Testing Pace to the Individual

When taking a history, all doctors know that some patients are quick to respond to questions and others are not. If they rush elderly patients, they will not get much good information. If they go too slowly with young, bright patients they may lose both their interest and their cooperation.

In a threshold test, fewer than half of the stimuli will be seen. Thus, the perimeter must decide how long to wait after stimulus presentation before moving to the next point. The test must allow a reasonable amount of time between presentations, but waiting too long will prolong testing unnecessarily and make the test uninteresting. Thus, it is very important to know how quickly a particular patient reacts to stimuli and to make careful use of that information. If a test proceeds too slowly, the patient may get frustrated and fatigued, and the results may, therefore, be inaccurate.

The original Humphrey Full Threshold testing algorithm measured patient response time and made small adjustments to test pacing. SITA takes this idea much further using patented timing techniques. It is extraordinarily responsive to patient reaction times. One way to think about SITA is that the patient runs the perimeter, rather than the reverse.

3. SITA Knows When to Quit

Student doctors are often given a list of questions to ask while taking histories. At first they will adhere to that list, even when they already have more than enough information to make the proper diagnosis. Later on, they start learning when to stop, and they also develop a sense of when to probe further on issues which the patient did not make clear enough.

SITA does the same thing. SITA knows when enough is enough. The standard Full Threshold algorithm used in the Humphrey Field Analyzer II-/crosses the threshold twice. It quits only after the answer is near what is expected. When the answer is different from the expected value, the measurement is repeated—again crossing the threshold twice.

Using such fixed criteria, sometimes too much information is gathered, and sometimes not enough. SITA computes when to stop testing at each location, based on a patented “information index.” This technique allows the instrument to spend extra time at test locations where SITA is unsure about the result, and to spend less time at locations where the answers are highly consistent.

When the information index reaches a predetermined value, testing at that point is discontinued—the point is then closed. The information index depends not only on patient responses at that location, but also on responses to stimuli presented at other locations nearby. Thus, it is possible that a test point residing in a part of the visual field where all measured thresholds were more or less in agreement might be closed earlier than a test point in a more variable region. This might happen even if the responses at these two test points were otherwise identical.

4. SITA Carefully Recalculates All Threshold Values at the End of Testing

Experienced doctors tend to be very skilled at putting the puzzle together. At the end of the examination, they assess all of the information and make a diagnosis which is consistent with all of the available data. SITA does the same thing, ignoring nothing. At the end of the test it thinks the problem through, completely, one final time.

The original Humphrey algorithm—and other methods in current use—base the calculated threshold on the last apparent crossing of threshold. All answers leading up to that final crossing are ignored, and all answers at adjacent points are ignored as well. Such an approach is highly vulnerable to patient response errors.

SITA looks at the complete pattern of patient responses at each tested point. During the test all responses are considered, not just the last seen value. At the end of the exam, SITA again considers the totality of the responses at each point and recalculates the whole field result to produce a further refinement of its measurements.

Normative and GPA Database Collection and Demographics

Introduction

The Humphrey Field Analyzer contains multiple normative databases that provide data for statistical comparison of how your patient's visual field results compare to an age-matched population. SITA Standard threshold test results are compared to one normative database, SITA Fast results to another. When a patient performs a blue-yellow perimetry test, the SITA Short-Wavelength Automated Perimetry (SWAP) normative database is used for reference. GPA uses two databases. The normative database (either SITA Standard or SITA Fast) appropriate for the particular test is used to generate the VFI value that is used in trend analysis, and a separate database (GPA) of short-term reproducibility data from subjects with glaucoma is used to determine when change exceeds expected test-retest variability. These databases were collected over a significant amount of time and involved hundreds of subjects. The following information discusses the collection of data and the demographics of the subjects qualified for the creation of these databases.

Subjects were recruited and enrolled at each site by the method approved by either an Institutional Review Board (IRB) or an Ethics Committee. Each site bore responsibility for satisfying all local IRB or Ethics Committee requirements, as well as for obtaining informed consent according to local requirements.

SITA and SITA-SWAP Normative Databases

Subjects that were considered normal were recruited for both the SITA and SITA-SWAP normative databases. Furthermore, the SITA normative study collected data that went into the creation of two databases: the SITA Standard and the SITA Fast databases. The same subjects were tested with both the SITA Standard and the SITA Fast threshold algorithms.

SITA Database

The SITA normative database contains normative data for SITA Standard and SITA Fast 30-2, 24-2, and 10-2 threshold visual field test results from healthy subjects ages 17 to 89. Ten centers contributed normative data in this prospective, non-randomized, multi-center study. Enrolled subjects were representative of healthy individuals with no history of eye disease and were carefully screened and evaluated for eligibility (see exclusion criteria). After undergoing a general ophthalmic examination, qualifying and consenting subjects underwent multiple visual field tests over a period of three visits.

Medical and ophthalmic histories were taken prior to qualifying the subjects into the study. Subjects were given a complete ophthalmic examination that included the following tests:

- Distance visual acuity.
- Slit lamp examination of the anterior segment of both eyes.
- Goldmann applanation tonometry.
- Dilated ophthalmoscopic examination, bilaterally.
- Fundus photography that included the macula and the optic nerve of each eye.

SITA-SWAP Database

The SITA-SWAP normative database was collected at a separate time and at different sites than the SITA and GPA databases. Four centers contributed normal data in this prospective, non-randomized, multi-center study. SITA-SWAP 24-2 threshold visual field test results were collected from healthy subjects aged 18 to 80. Enrolled subjects were representative of healthy individuals with no history of eye disease and were carefully screened and evaluated for eligibility (see exclusion criteria below). After undergoing a general ophthalmic examination, qualifying and consenting subjects underwent multiple visual field tests over a period of two visits.

Medical and ophthalmic histories were taken prior to qualifying the subjects into the study. Subjects were given a complete ophthalmic examination that included the tests listed in the SITA collection previously, along with these additional tests:

- Color vision testing.
- LOCS (Lens Opacities Classification System) II grading of crystalline lens through a dilated pupil.

The inclusion and exclusion criteria for the SITA and SITA-SWAP normative database studies were as follows:

Inclusion Criteria

- Males or females over the age of consent in the country in which the testing was done, or had clear parental consent (SITA-SWAP: 18 years of age or older).
- Able and willing to make the required study visits.
- Able and willing to give consent and follow study instructions.

Exclusion Criteria

- History of amblyopia.
- Pressure of more than 22 mm Hg in either eye.
- Corrected visual acuity less than 20/30 in either eye if age 50 or older and less than 20/25 in either eye if under age 50 (For SITA-SWAP: Visual acuity worse than 20/30 in either eye).
- Refractive error in either eye exceeding 5 diopters spherical equivalent or 2.5 diopters cylinder.
- Suspicious or pathologic optic discs.
- Visual field defect or suspicion of a visual field defect in the tested eye that was explained by ocular status or history.
- Previous or current significant eye disease in the tested eye, significant eye trauma or intraocular surgery, or the presence of ocular findings that could affect the visual field.
- Diagnosis in either eye of glaucoma or other disease that might affect the likelihood of normality of the visual field in the tested eye.
- Abnormal pupil, or history of use of pilocarpine or other medication, or history of disease that might have been affecting pupil size or reactivity.
- Any systemic disease, or history of treatment with medications, e.g. plaquenil, any of which may be expected to affect the visual field.
- History of stroke, insulin dependent diabetes, or diabetic retinopathy.
- Inability to undergo the visual field test.

Both eyes were required to have passed the criteria above for the subject to be entered into either study. If one eye qualified and one eye was excluded, the subject and both eyes were excluded.

GPA Database

The GPA database consists of data from subjects that had been previously diagnosed with glaucoma. Results from nine centers were incorporated into the GPA database. Ages ranged from 16 to 89. Each subject was tested four times: once a week over a four-week period. Because the retest period was short, variability was expected to be due to inter-test variation and not progression of the disease.

Inclusion Criteria

- Males or females over the age of consent in the country in which the testing was done, or had clear parental consent.
- Subjects had to be capable of providing informed consent and be willing to make all the necessary study visits (four within one month).
- Visual acuity of 20/30 or better.
- Subjects had to have experience with automated threshold perimetry. Each subject must have been tested on at least two prior occasions on the Humphrey perimeter.
- Pre-test Mean Deviation (MD) must have been better than -20dB.

Subjects needed a clear diagnosis of glaucoma in the institution being used as the study site. It was not necessary that there be established visual field loss. Some eyes were allowed to be enrolled where earlier visual field tests had been normal or questionable, but where optic nerve and other findings clearly indicated that the eye was glaucomatous. In eyes with normal visual fields, it was required that the fellow eye had a diagnosis of glaucoma, with established field loss.

The investigator was allowed to choose which eye of the subject to test. This option was to facilitate obtaining a reasonable number of subjects with various stages of visual field loss.

Exclusion Criteria

- Fewer than 4 completed visits.
- Wrong eye tested or not always the same eye tested.
- MD worse than -20dB.
- Subject unable or unwilling to complete testing.
- Incorrect test pattern or strategy.
- Pronounced trial lens rim defect at one or more visits.
- Visual field loss confirmed to be due to reasons other than glaucoma (e.g. quadrantanopia or clover leaf pattern artifact).

Data Collection

Each database had a different number of visits and tests to complete to qualify subjects into the final study data.

SITA Normative:

One eye was chosen to be the study eye based on the subject's ID number. The sequence of testing was randomized between subjects. A rest period of 15 minutes was required between each test. All visits were completed within 8 weeks. The testing protocol for the SITA normative data collection consisted of:

Visit #1:

- One SITA Standard 30-2 test.
- One SITA Fast 30-2 test.
- One Full Threshold 30-2 test.

Visit #2:

The same three perimetry tests were repeated in the same order, under conditions identical to those of Visit #1.

Visit #3

Two perimetry tests:

- | | |
|--------------------------------|--------------------------------|
| • One half of subjects: | • One half of subjects: |
| • One SITA Standard 10-2 test. | • One SITA Standard 60-4 test. |
| • One SITA Fast 10-2 test. | • One SITA Fast 60-4 test. |



Note: The SITA Standard and SITA Fast 24-2 databases were derived from the data collected with the 30-2 SITA Standard and SITA Fast threshold tests. Also, the 60-4 results were never commercialized as a normative database.

SITA-SWAP:

There were two separate visits scheduled to complete the visual field testing. The first visit consisted of both eyes being tested with the SITA-SWAP 24-2 threshold test. Both eyes were then tested in the same order with the SITA Standard 24-2 threshold test. The pair of SITA-SWAP tests were always run first. The eye tested first was randomized between subjects. Prior to performing each SITA-SWAP test, the subject adapted to the yellow light of the bowl for a minimum of three minutes. There was a minimum rest period of five minutes between all tests. The second visit was identical to the initial visit in order of testing and number of tests.

GPA:

Only one eye was tested. Three visual field tests were performed at each session: one SITA Standard 30-2 test, one SITA Fast 30-2 test and one Full Threshold 30-2 test. A rest period of 15 minutes was required between each test. The test order was the same for each visit and was randomized between subjects.

Database Demographics

The SITA normative databases (SITA Standard and SITA Fast) were developed utilizing 422 subjects (ages 17-89). The mean age of these subjects was 53 years. The gender distribution was 44% male and 56% female. Information on subject ethnicity was not collected as part of this database collection. However, data was collected from centers in Asia, North America and Europe.

The SITA-SWAP normative database was developed utilizing 382 eyes of 194 subjects (ages 18-80). The mean age of these subjects was 45 years. The gender distribution was 48% male and 52% female. Ethnicity information was collected in this study. The ethnicity breakdown of the SITA-SWAP database is as follows: 74% Caucasian, 8% Asian, 7% African-American, 5% Hispanic, 3% Indian and 3% other ethnicities.

The GPA database was developed utilizing 363 subjects (ages 16-89). The mean age of these subjects was 66 years. The gender distribution was 54% male and 46% female. Information on subject

ethnicity was not collected as part of this database collection. However, data was collected from centers in Asia, North America and Europe. For the GPA short-term reproducibility dataset, the age distribution was determined by the prevalence of glaucoma in the test population. Only 30 subjects were younger than 50 years. This may affect the applicability of GPA to younger patients.

Data Analysis

Significance levels were calculated for all three databases. The values for 10%, 5%, 2%, 1% and 0.5% were calculated for the significance levels in the SITA (see [“The Single Field Analysis Printout,” on page 7-4](#)) and SITA-SWAP (see [“Printing Out SITA-SWAP Results,” on page 9-8](#)) normative databases. GPA utilizes the 5% significance limit in its determination of the Progression Analysis Probability Plots (see [“GPA Event Analysis Includes Progression Indicators,” on page 8-4](#)). The normative databases were used to generate age-corrected significance levels for deviation from normal. The GPA database was used to generate significance levels for change that exceeds expected test-retest variability.

Results in patients 80 years of age or older should be interpreted with caution since only eight subjects were included in the SITA normative databases who were 80 years of age or older, and none were included in the SITA-SWAP database. For the SITA normative databases, 56 subjects were included who were between 70 and 79 years of age, and for SITA-SWAP there were 16. The SITA and SITA-SWAP databases do not have subjects with refractive errors outside the -5D to +5D range. Use caution when applying these normative limits to results from subjects with refractive errors outside the -5D to +5D range.

Conclusion

The SITA and SITA-SWAP normative databases were created using data from subjects that were deemed representative of a normal population. The GPA database was created using data from subjects that were deemed representative of a stable glaucoma population. The doctor can compare individual patient measurements to those acquired from these database populations.



Note: Selected references can be found in [“SITA References,” on page 4-10](#), [“GPA References,” on page 8-36](#) and [“SWAP References,” on page 9-15](#).

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- | | |
|---|---|
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(L) Reference to Older Test Strategies

Introduction

The SITA Standard and SITA Fast testing strategies have replaced the Full Threshold and FastPac testing strategies for most threshold testing. In addition, SITA-SWAP is replacing the Full Threshold and FastPac strategies for testing SWAP visual fields due to the much shorter test times available when utilizing SITA-SWAP. These pages add additional details for the Full Threshold and FastPac testing strategies in case you need to use these strategies for any reason. Again, it is recommended you use either SITA Standard or SITA Fast whenever possible.

Variations in Reliability Indices

For Full Threshold and FastPac tests, false positive errors, false negative errors, and fixation losses are all printed as a ratio. The false positive and false negative results will appear as a fraction (*i.e.*, Total number of false positive errors divided by the total number of trials). If false positive or false negative errors equal or exceed 33% of the trials, the characters "XX" will appear both on the screen and on the printout, although test reliability may be compromised at false positive rates that are much lower than 33%.

The visual fields used in developing STATPAC for the Full Threshold and FastPac strategies were those of subjects whose reliability indices were within certain limits. Test results showing fixation loss scores of 20% or more and false positive or false negative errors of 33% or more were excluded as unreliable. The significance limits thus derived were more restrictive than they would have been had unreliable test results not been excluded.

Fluctuation Values (Full Threshold and FastPac Only)

The fluctuation value, also referred to as short-term fluctuation (SF), is an option that you can use with the Full Threshold and FastPac strategies. Fluctuation is not displayed when using either of the SITA strategies. When fluctuation is turned on, the threshold is measured twice at 10 pre-selected points. The HFA II-/then calculates a fluctuation value on the basis of the differences between the first and second measurements at each of the 10 points. This value is an index of how reliable a patient's responses were during the test.

A patient who is very consistent will have a low fluctuation value, while a patient whose responses vary significantly will have a high value. All fluctuation values that lie significantly outside the normal limits will be flagged on the printout with p values, *e.g.* $p < 0.01$.

The fluctuation option will add about 10% to the test time. When test results are analyzed with STATPAC, the fluctuation value is used in the calculation of CPSD, one of the four global indices. If the fluctuation is turned off, the CPSD will not be calculated.

A high fluctuation value may be the first sign of glaucomatous field loss in patients who are otherwise reliable subjects. It is also associated with established field loss in reliable subjects. On the other hand, a high fluctuation value may indicate simply that the patient was inattentive or did not understand the test.

STATPAC Test Parameters

STATPAC will analyze tests that fall within the parameters listed below:

Table L.1 STATPAC Parameters for White-on-White Perimetry

Type of test:	Threshold
Test pattern:	Central 10-2, 24-2, 30-2
Test strategy:	SITA Standard, SITA Fast, Full Threshold ^a , FastPac ^a
Stimulus color:	White
Stimulus size:	Size III
Fixation target:	Any
Foveal threshold:	On or Off
Test speed:	Normal or Slow

a. These strategies are still available on your HFA II-*i*. However, they have been replaced with SITA-based testing in most practices.

STATPAC analysis may be used with all Central 24-2 and 30-2 threshold test results. There are some limitations. For Central 10-2 test results, STATPAC produces a Single Field Analysis or an Overview showing up to sixteen (16) tests results; the Change Analysis and Glaucoma Change Probability Analysis are not available.

The parameters needed for STATPAC analysis of SWAP test results are listed below. Single Field Analysis and Overview printouts are available. The GHT is not available with FastPac tests.

Table L.2 STATPAC Parameters for Blue-Yellow Perimetry

Type of test:	Threshold
Test pattern:	Central 24-2, 30-2
Test strategy:	SITA-SWAP (Central 24-2 pattern only), Full Threshold ^a , FastPac ^a
Stimulus color:	Blue
Stimulus size:	Size V
Fixation target:	Any
Foveal threshold:	On or Off
Fluctuation test:	On or Off (SITA-SWAP tests automatically are set to Off)
Test Speed:	Normal or Slow

a. These strategies are still available on your HFA II-*i*. However, they have been replaced with SITA-based testing in most practices.

Global Indices SF & CPSD

SF stands for Short-term Fluctuation, which the Humphrey Field Analyzer measures during the test. It is an index of the consistency of the patient's responses during the test and is obtained by testing twice at ten (10) pre-selected points. Categories for p values are the same as for MD.

CPSD stands for Corrected Pattern Standard Deviation. It is a measure of how much the total shape of the patient's hill of vision deviates from the shape of the hill of vision normal for the patient's age (PSD), corrected for intra-test variability (SF). The hill of vision may be irregular in shape because of unreliable patient responses, because of actual field losses, or a combination of the two factors. Categories for "p" values are the same as for MD.

In calculating CPSD, STATPAC attempts to remove the effects of patient variability and to present only the irregularity caused by actual field loss. CPSD depends on both PSD and SF and is, therefore, not available unless the fluctuation option remains on during testing. The SITA testing strategies do not calculate SF, therefore only MD and PSD are available when using SITA Standard or SITA Fast.

Change Analysis Printouts Displaying Mixed Test Strategies

When SITA results are mixed with Full Threshold results, FastPac results, or both, no SF or CPSD values will display for the SITA tests.



Note: For the Change Analysis printout, you can mix tests done using the FastPac strategy with those using Full Threshold. Because some of the STATPAC limits are slightly different depending on whether FastPac was used or not, the significance lines for plotting PSD, SF, and CPSD will not be on the printout if you are analyzing a series of FastPac and non-FastPac tests. Significance lines, however, will be displayed for Mean Deviation. When SITA tests are included, the normal box plot is not displayed for comparison (see [Figure L.1](#)).

The Change Analysis program will also perform a regression analysis of mean deviation over time when a series of tests using mixed strategies are used. When strategies are mixed, a minimum of six test results are required for regression analysis; when all tests have used the same test strategy, only five results are required. When tests are mixed with SITA results, or SITA Standard or SITA Fast are mixed with each other, no linear regression will be performed. Mixture of strategies is not recommended, however, as the relationship of results across strategies is complex and difficult to quantify.



Note: The normal box plot and the p values for the global indices are not displayed. In addition, no linear regression information is presented when SITA tests are included.

No Normal Box Plot

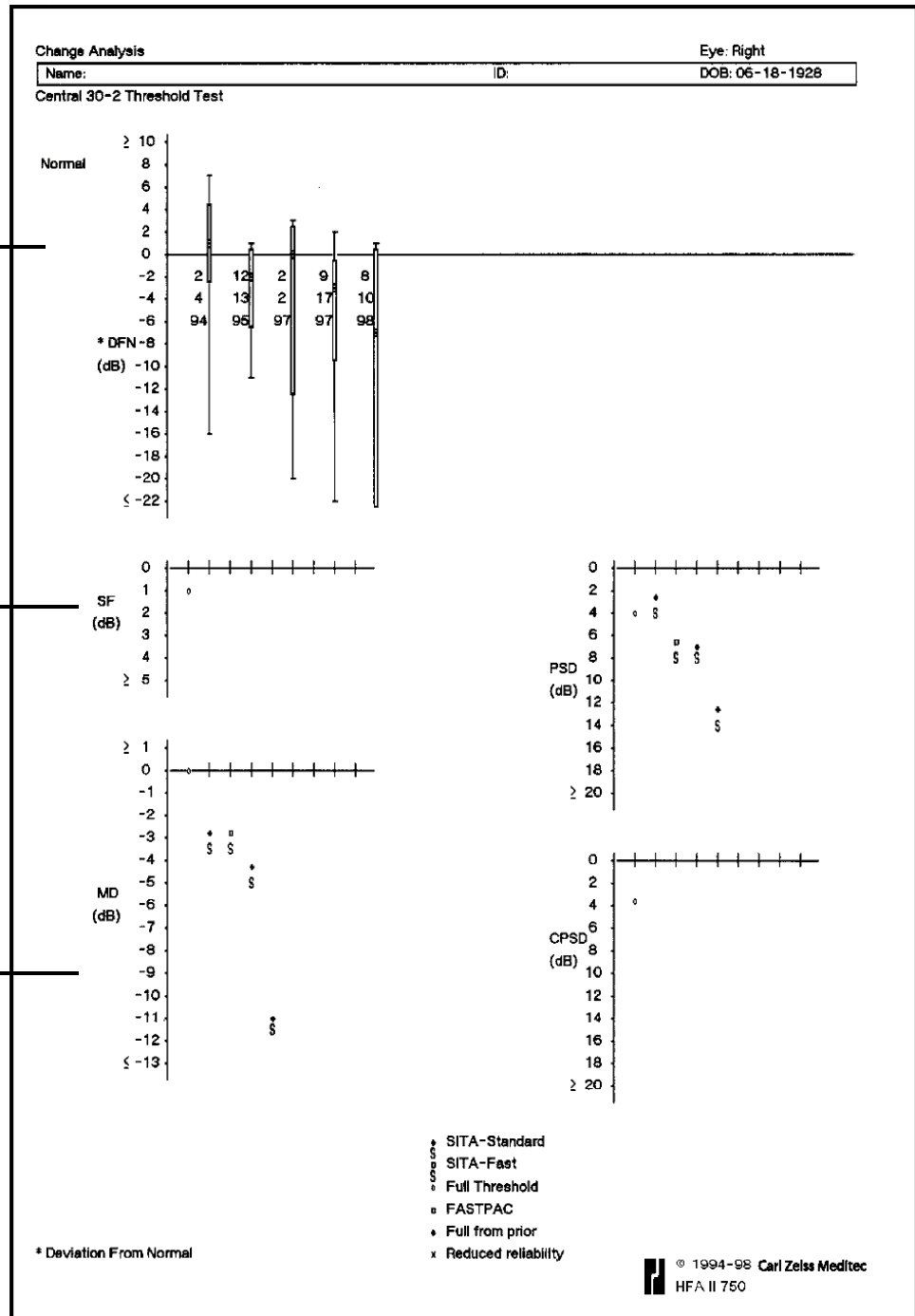
Summary of
Global Indices
(No p Values)

Figure L.1 A Mixed Change Analysis Printout with Sita Tests Included

The Glaucoma Change Probability Analysis Printout

The Glaucoma Change Probability Analysis (GCP) is only available when you use the Full Threshold strategy. This analysis is based on visual field change, using the derived total deviation values. The newer Guided Progression Analysis (GPA) uses pattern deviation values and works with the SITA test strategies. Both the Glaucoma Change Probability Analysis and GPA are designed to facilitate interpretation of Central 30-2 and 24-2 threshold test results for patients with suspect or manifest glaucoma. These two methods of interpretation are intended to allow maximum use of available test results. Both of these analyses are particularly useful for determining change over time. That is to say, they are effective in discriminating random variation from true change. For further discussion of GPA, please refer to [Chapter \(8\), "Guided Progression Analysis \(GPA\)."](#)

The Glaucoma Change Probability Analysis works from Baseline data for the individual patient to create change probability maps and to calculate significance limits for measured changes in mean deviation. Because the global indices (MD, SF, PSD, and CPSD) are not necessarily sensitive to important localized changes, the Glaucoma Change Probability Analysis offers point-by-point significance limits. This allows analysis of smaller areas of the visual field defect and enables early detection of change.

The Glaucoma Change Probability plots identify those locations in the visual field which have changed by more than what would be expected simply due to normal variability. The significance limits for this analysis were obtained by testing a large group of glaucoma patients four times in the course of a month. Normal variability in these patients was found to depend on the depth of the original defect at Baseline, the location in the visual field, and the overall Mean Deviation of the visual field. Points changing from Baseline by more than the empirical significance limits are highlighted with small triangles.

In general, the Glaucoma Change Probability Analysis will use the average of the first two selected tests as a Baseline and all subsequent tests as Follow-up. There are two exceptions:

1. If only two tests are selected, the first will be used as the Baseline and the second as Follow-up.
2. If the mean deviation of the first test falls significantly below the regression line of those of the other tests ($p < 5\%$), and five or more tests are to be analyzed, STATPAC will discard the first test, use the second and third tests to calculate the patient's Baseline, and analyze the subsequent tests as Follow-up tests.



Note: Baseline tests should be representative of the actual Baseline status of the patient. Baselines established from tests in which the patient was obviously inattentive, inexperienced, or too eager to press the response button can lead to false positive or false negative conclusions upon Follow-up. Create a new pair of Baseline tests if significant change has occurred (cataract surgery, for example).

The Glaucoma Change Probability Analysis was designed to allow comparison of a series of Follow-up tests with the Baseline findings in order to detect and confirm changes in the visual field. Prudence requires that changes detected in one Follow-up test be confirmed in at least one additional test before medical therapy is changed significantly or surgery is ordered.

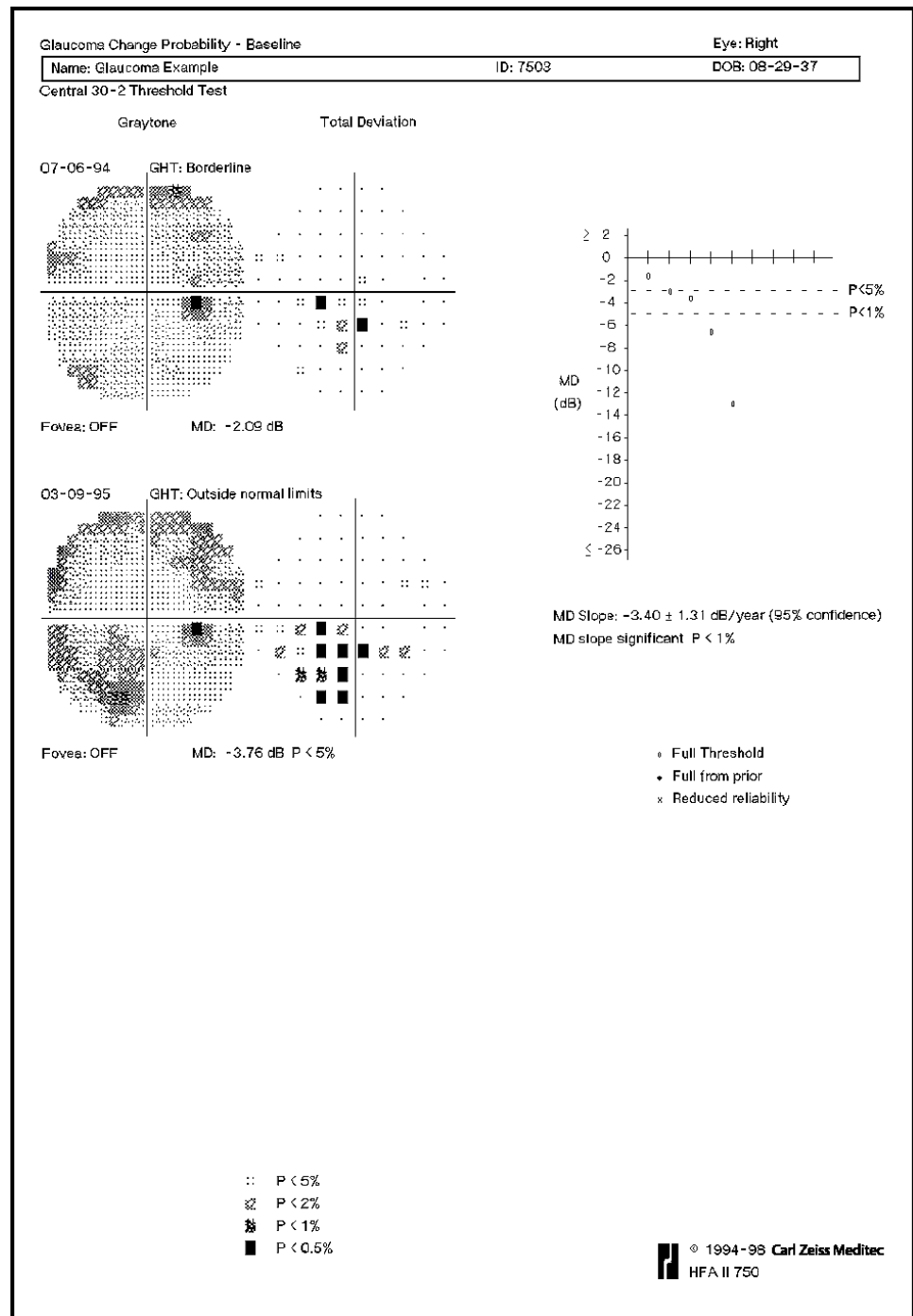


Figure L.2 The Glaucoma Change Probability – Baseline

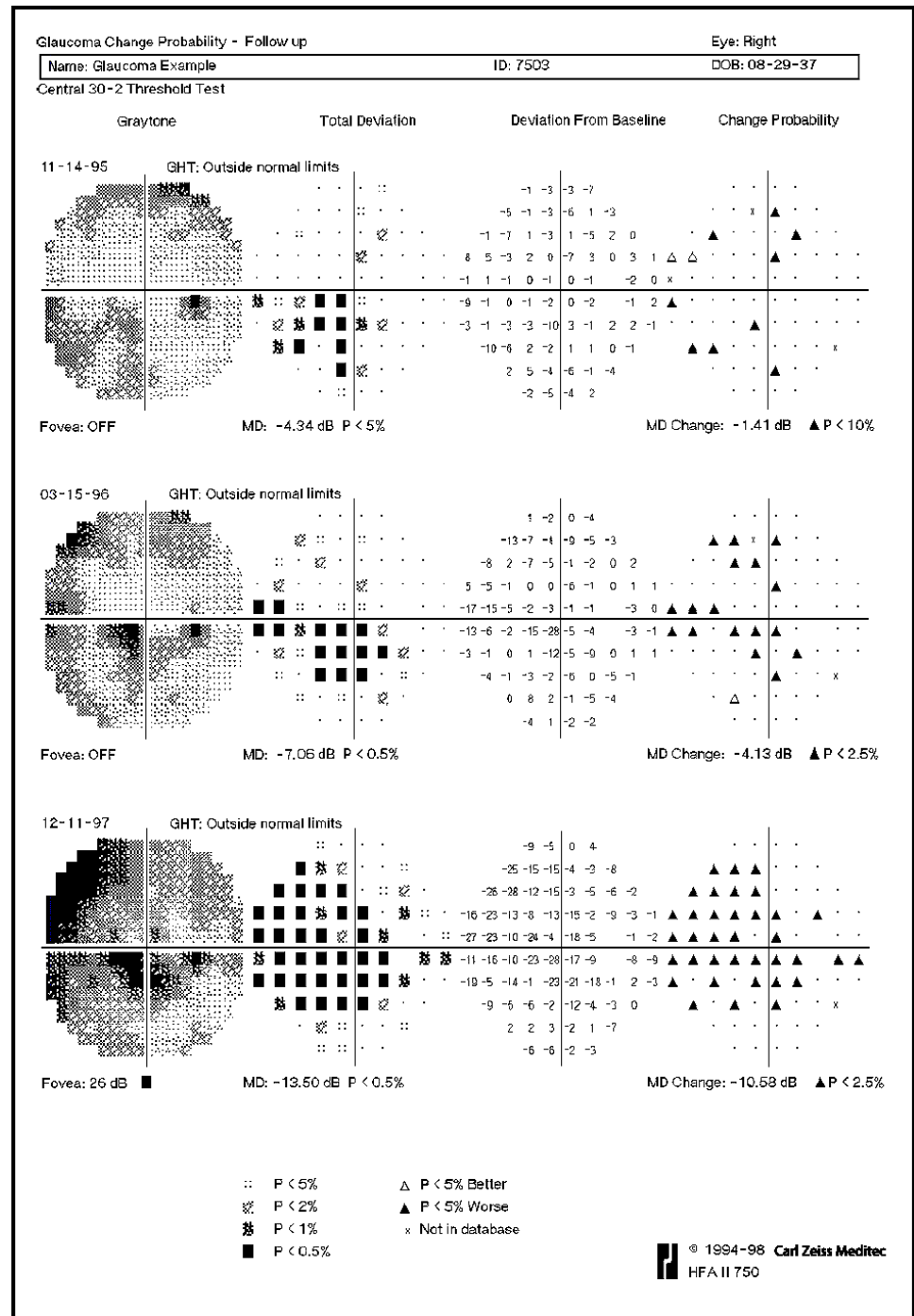


Figure L.3 The Glaucoma Change Probability— Follow Up

The glaucoma change probability printout (Figure L.2 and Figure L.3) includes the patient information that appears on other STATPAC printouts. Two data presentations (graytone and total deviation plot) for the Baseline tests are printed on the upper left section of the printout. A plot of the Mean Deviation (MD) for each test plus the linear regression analysis of mean deviation, which is discussed below, occupy the upper right section of the printout. The first column on the left of the printout contains the graytone presentation of test results. The total deviation plot appears in the

second column. These are the only two data presentations given for the two Baseline tests. Just above them is printed a message indicating whether the results of the glaucoma hemifield test (GHT) were within normal limits, outside normal limits, or borderline. The mean deviation from normal for this test is printed between the graytone and the total deviation plot.

For each of up to fourteen (14) Follow-up tests there are two more test result analyses: the change from Baseline plot (third column), and its associated probability map (fourth column). The change from Baseline plot in the third column subtracts the Baseline average Total Deviation from the Follow-up Total Deviation result and indicates changes at each tested point in dB notation. If, for example, a point is indicated with -6, this means that the tested point was 6 dB lower than the Baseline for the same point. A zero (0) means no change from Baseline. All results use age-corrected values over the Follow-up period.

The Change Probability Map

The change probability map in the fourth column gives the statistical significance of the decibel changes shown in the change from Baseline plot. It compares the changes between the Baseline and Follow-up fields to the inter-test variability typical of stable glaucoma patients and then shows a plot of point locations which have changed significantly. A solid triangle identifies a degree of deterioration found less than 5% of the time at that location in medically stable glaucoma patients, that is, deterioration significant at the 5% level. An open triangle identifies improvement significant at the 5% level. Points not changing by a significant amount are indicated by a single, solid dot.



Note: The open triangle also is used on the Guided Progression Analysis printouts, where it indicates a deteriorating point. Be careful not to confuse these symbols if you use both analysis programs. For further discussion of GPA, please refer to [Chapter \(8\), "Guided Progression Analysis \(GPA\)."](#)

An X signifies that the program was unable to determine whether the encountered change was significant or not. This occurs mainly with deepening field defects which were already quite deep at Baseline. The finite amount of empirical data available to us and the practical limitation of the maximum attainable brightness of the instrument make it difficult to obtain exact significance limits for deterioration in points which are already highly depressed.

The very same reasons, finite amount of data and limits to the maximum brightness, also make it difficult to determine change with certainty in fields where the mean deviation from normal exceeds -15. In addition, variability is extremely large in highly disturbed fields (MD < -15). Since variability increases with increasing MD in this range, STATPAC analysis can only verify stability, not deterioration or improvement. STATPAC printouts carry the message AVERAGE MEAN DEVIATION OF ALL TESTS TOO LOW when the average MD of Baseline and Follow-up tests is lower than -15.

Change in Mean Deviation

STATPAC also evaluates the significance of change in mean deviation over time. The objective is to highlight those clinical cases where the MD changes by more than is typically observed in stable glaucoma patients. The amount of change in decibels is printed under the message MD Change. If the MD change is significant at the 10%, 5%, or 2.5% level, that p value is printed along with a solid triangle to indicate degradation or an open triangle to indicate improvement. If the amount of change is not judged to be significant, the words "Not Significant" follow the decibel value.

Additional Notes on SWAP Perimetry

Although Carl Zeiss Meditec's SWAP testing is available for screening tests in addition to threshold tests, research studies dealing with SWAP have involved threshold testing exclusively. Because screening strategies have been optimized for white testing, you may find an increased number of screening fields to appear abnormal. We suggest that you use SWAP testing only with the threshold testing strategies and to use SITA-SWAP instead of either Full Threshold or FastPac.

Macula Threshold Test

The Macula Threshold Test will test all 16 points twice if the Fluctuation feature is turned ON. If it is turned OFF, the Macula Threshold Test will determine the threshold once. With Fluctuation OFF, the instrument will determine the macular threshold twice, only if there is a discrepancy with expected values. The Fluctuation function may be accessed through the Change Parameters menu screen.

(M) Troubleshooting

The following are a number of situations which may occur when using your HFA II-*i*. More information may also be found on the web site for Carl Zeiss Meditec: www.meditec.zeiss.com/hfa.

Should you still have difficulties after attempting to solve the problem, call Carl Zeiss Meditec Customer Care at 1-800-341-6968. Outside the U.S., contact your local Carl Zeiss Meditec distributor. Have this User Manual available, print a copy of the System Log and know your HFA II-*i* model, serial number and current software revision before calling Customer Service.

To find the Model and Serial Number ([Figure 1.5, "The HFA II-i – Rear View," on page 1-24](#))

- Look on the rear panel of the HFA II-*i* to find the information.
- These numbers may also be found at the top of the System Log or on the Unit Configuration ("i" Information) screen, or on the Information screen.

Record these numbers here for future reference:

Model Number: _____

Serial Number: _____

How to print the System Log

- Start at the Main Menu.
- Press *SYSTEM SETUP* icon.
- Press PRINT/SAVE SYSTEM LOG.
- Press PRINT.

How to print the Unit Configuration information

- Press the "i" button in the upper left-hand corner of most screens.
 - If the eye monitor is visible, press OFF to display "i" button.
- Press PRINT/SAVE.
- Press PRINT.

Troubleshooting Table

Not all potential situations are listed in [Table M.1](#), nor are all of the possible solutions. However, it can be a useful resource for figuring out the cause(s) for many commonly encountered issues.

Table M.1 Troubleshooting Table

Startup Difficulties	
HFA II-/will not turn on	• Check power cord connections to HFA II-/; power table and wall outlet (1-24). • Check power switch on power table (1-31). • Check fuse in HFA II-/ (near power switch) and power table (15-6, 15-7).
HFA II-/turns on but Main Menu screen never appears	• If black screen is present and patient response button drawing is visible, press patient response button to verify error code - write down the error code - then turn HFA II-/off then on again - if this continues, call Customer Service and mention the error code. • If this happens after installation of new software: Turn off HFA II-/; re-install software starting with disk #1 in floppy drive - turn power on to HFA II-/and follow directions. • Check brightness knob on right side of touch screen (1-23). • Check to see if patient response button is being pressed down in holder.
Calibration screen displayed at start-up	• Patient response button stuck in down position (15-11). - follow directions on screen or recycle power - lift patient response button out of holder; replace in proper position.
Touch Screen	
Too dark or too light	• Adjust brightness - knob is to right of touch screen on rear of unit (1-23)
Wrong button activated when pressed	• Make sure finger is perpendicular to the touch screen (2-4) • Try using pencil eraser to make selection • Perform touch screen calibration (15-11)
Slow response or no response	• Touch and remove finger from touch screen in a quicker motion (2-4) (Remember: button activates when finger is released.)
Out of calibration at start up	• Perform touch screen calibration (15-11) • Hold patient response button down at start up to reach touch screen calibration procedure (15-11)
Patient Response Button	
Does not beep when pressed	• Turn Switch Beep on - Additional Setup menu (2-30) • Check patient response button connection to HFA II-/ (1-23) • Verify patient is properly pressing and releasing response button (3-24)

Table M.1 Troubleshooting Table

Video Eye Monitor	
Disappeared	• Press EYE button (5-4) • Eye monitor is only present on some screens (Start of Test, Testing, etc.)
Too dark or too light	• Press "+" to lighten or "-" to darken (5-4)
Time and Date	
Time display on screen is incorrect	• Correct by pressing DATE AND TIME on System Setup screen (2-15)
Date on screen is incorrect	• Change by pressing DATE AND TIME on System Setup screen (2-15)
Test date is incorrect on printout	• Change by pressing CHANGE PATIENT DATA on File Functions screen (5-18, 10-14)
Printer	
Does not print	• No power to printer (no lights visible on front panel) (15-9) - Check to ensure power cord is attached and check power switch (1-31) - Check power to power table (1-31) • No paper in printer (15-9)
No signal from HFA II-/	• Check printer cable connection (1-31). • Check cable is correct and not damaged. • Check to ensure correct printer is selected on System Setup menu (2-22). • Printer buffer full - turn off printer and turn back on. • No printout selected to print (7-16). • Other printers: Consult specific printer manual.
Improper printout	• Random characters or multiple pages printed. - Check that correct printer is selected on System Setup menu (2-22). - Printer needs to be turned off to be reset. • Abnormal value printed - reprint visual field. (printer occasionally prints double characters). • Printrex printout blank - paper may be upside-down.
Printouts fade over time	• Do not store printouts in plastic covers or use adhesive tape on thermal paper (15-10).
Printout Problems	
No Single Field Analysis printout	• Test pattern not eligible for STATPAC analysis (7-2). • One or more test parameters not valid for STATPAC (7-2).
Quad totals not shown	• Available on Three-in-One printout only (7-14).
No SF or CPSD values on threshold printout	• SF and CPSD are not displayed when SITA test strategy is used (4-9, 7-8, L-3). • Fluctuation was turned off for the test (CPSD is not calculated when fluctuation is off) (4-9).
Glaucoma Hemifield Test (GHT) results not displayed	• FastPac test strategy used [GHT not available with FastPac] (7-5) • Test not eligible for STATPAC analysis (7-2).

Table M.1 Troubleshooting Table

Printout does not include all eligible tests for a patient when printing Overview or Guided Progression Analysis (GPA) printout		• Some test parameters not valid for STATPAC (7-2) or GPA. • Patient name or date of birth incorrect on some tests (3-8, 10-14). • Search via recall patient data - fix with Merge Patients feature (3-14, 10-12). • Sixteen (16) test maximum for Overview and GPA printouts (7-8, 8-3).
Blind Spot Monitor		
Cannot change Blind Spot size		• HFA II-<i>i</i> uses same stimulus size for testing and Blind Spot check (4-8).
Cannot locate blind spot		• Realign patient (3-26). • Verify that proper eye is being tested (5-17). • Check to make sure the patient's non-testing eye is occluded (5-17). • Make sure patient is not looking around but fixating on fixation light (5-17). • Select FIXATION button and then press RE-TRY TO FIND BLIND SPOT (5-12).
Blind Spot alarm beep keeps sounding		• Same as "Cannot find blind spot" above. • Blind Spot may be turned off during test by pressing FIXATION (5-11).
Gaze Tracking		
Gaze Tracking will not initialize		• HFA not Model 740<i>i</i>, 745<i>i</i>, or 750<i>i</i>. • High power trial lens being used (5-13). • Droopy eyelid - ask patient to open eye wider during initialization (5-13). • Interfering eyelashes - ask patient to open eye wider during initialization. • Small pupils (5-13). • Excessive eye movement or blinking (5-13). • Excessively large or dilated pupils (5-13). • Dry eyes, cloudy media or dark iris (5-13). • Deep-set eyes (5-13).
Head Tracking		
Head Tracking does not work		• HFA not Model 750<i>i</i>. • Head Tracking not turned on (2-14). • Trial lens holder not in Up position (5-5). • Gaze Tracking was not initialized at the start of the test (5-4).
Head Tracking alarm activates too often		• Patient's chin not moving with the chin rest - re-instruct patient (5-5). • Reset Head Tracking (5-5). • Turn off Head Tracking - press TURN OFF HEAD TRACKING (5-12).

Table M.1 Troubleshooting Table

Vertex Monitoring	
Vertex Monitoring does not work	• HFA not Model 750i. • Vertex Monitoring not turned on (2-15). • Trial lens holder not in Up position (5-6). • Gaze Tracking was not initialized at the start of the test (5-8).
Vertex Monitoring alarm beep goes off too often	• Patient moving away from trial lens - reposition patient (5-6). • Vertex Monitoring needs to be reset - press RE-INITIALIZE VERTEX (5-6). • Turn off Vertex Monitoring - press TURN VERTEX OFF (5-12).
Pupil Size	
Not being automatically displayed on printout or on Patient Data 2 screen	• HFA not Model 750i. • Gaze Tracking was not initialized (5-8). • Auto pupil turned off - turn on at System Setup screen (2-26).
External Keyboard	
Does not work	• May not be compatible with HFA II-<i>i</i> (1-26, 2-6). - try another keyboard. • Plugged in after HFA II-<i>i</i> was powered on (1-31). - plug into HFA II-<i>i</i> before HFA II-<i>i</i> powered on. • Not plugged in properly (1-28, 1-29).
Glidepad, Trackball or Mouse	
Does not work	• May not be compatible with HFA II-<i>i</i> (1-28, 2-7). - try a different trackball/mouse. • Plugged in after HFA II-<i>i</i> was powered on (1-31). - Turn off. Plug into HFA II-<i>i</i> and power on HFA II-<i>i</i>.
Does not connect to HFA II- <i>i</i>	• Needs adapter plug (1-26).
SWAP (Short-Wavelength Automated Perimetry)	
SITA-SWAP not available with Blue-Yellow switched to on	• Wrong test pattern used (9-3). - Choose a 24-2 Threshold test, then turn Blue-Yellow on.
Grayscale looks very dark	• May be "normal" for Blue-Yellow. The eye is less sensitive to the blue stimulus. - Gray scale is the same one used for White-on-White (9-8). - Use Total and Pattern Deviation plots for diagnosis (9-8). • Patient had difficult time recognizing when to respond (9-3). - Re-instruct the patient and repeat the test.

Table M.1 Troubleshooting Table

Blind spot monitor reports many fixation losses		• Size V blind spot check size may be too easy to see at blind spot (9-9). - Consider using Gaze Track only and turn off Blind Spot.
Blue stimulus is on but bowl is not yellow		• Blue stimulus color was chosen instead of Blue-Yellow parameter (4-9). - Blue Yellow parameter set to ON will give yellow bowl and Blue Size V stimulus.
Illumination from yellow lamp at top of bowl annoying to patient		• Blue-Yellow visor not extended during testing procedure (9-5).
Testing Problems		
Test completes immediately after START button is pressed		• SIMULATION set to ON (2-30). - Go to Additional Setup screen, set SIMULATION to OFF. • Instrument motorboard was out of calibration and PROCEED was selected.
Full field test stops before complete		• Trial lens holder in up position for peripheral portion of test. - test peripheral field without a trial lens and put holder down (3-6).
Hard Disk Problems		
Message indicates hard disk failure		• Refer to "How to Handle Hard Disk Failures" for step-by-step instructions (11-10).
Patient names exist in database without test data		• Test results not saved with patient information. - Use CLEANUP HARD DISK DATABASE feature to remove (11-23).
USB Media Problems		
Message indicates "Unrecognized format" error, USB device does not show up on the HFA, or a USB media error is indicated.		• The USB storage device is incorrectly formatted. Format the USB storage device in FAT (FAT16) or FAT32. NTFS or exFAT (FAT64) cannot be used. • The USB device may be incompatible with the HFA.
Floppy Disk Problems		
Floppy disk cannot be used by HFA II-/i		• Disk may not be properly formatted (10-17). - Use INITIALIZE DISK feature (all previous data will be erased). • Disk may be the wrong format (10-17). - Make sure you use only pre-formatted High Density (HD) 1.44 MB floppy disks. - Do not use Super High Density (2.88 MB) disks.
Floppy disk error is indicated		• Disk may be damaged or corrupted (15-12). - Use REBUILD REMOVABLE MEDIA DATABASE feature (11-21).
Data Transfer Problems		
Transfer of files between HFA I, HFA II and HFA II - /series via serial cable does not work		• Check cable attachments (10-19). • RS-232 port settings are incorrect (10-22, 10-23, 10-23, HFA I Manual).
Tests missing after data transfer		• Tests were ineligible to be transferred (10-19).

Table M.1 Troubleshooting Table

Routine Cleaning	
Air Intake Filter	• Clean every 3 months or when dirty (15-3).
Cleaning other components	• See Cleaning the HFA II- <i>i</i> (15-2).

Accessories and Supplies List

Part Number (PN)	Description
2660100024433	Thermal Paper
2660100029623	Chin/Forehead Rest Paper
0000001211666	3-1/2 Diskettes 1.44Mb (Box of 10) Formatted
2660021140162	USB Floppy Disk Drive
2660021140133	PS/2 Splitter Adapter cable for Keyboard/Mouse Port
2660021140637	4GB USB User Backup Flash Drive
2660021106082	Projection Lamp (White)
2660100029954	Halogen Lamp (Yellow)
2660100029381	Air Filter, Rear Fan
2660021102326	Antiseptic Wipes (Box of 200)
0000001142955	Paint - Touch Up
0000001201929	HFA II-/Dust Cover
2660100008025	Eye Patch
2660100029575	Patient Button
0000001212625	Keyboard - Mini with Touch Pad
0000001193140	Printer Cable (Parallel) DB 25 to Centronics (48")
0000001074100	Power Cable - Instrument to Table
2660100022511	100V, 120V Power Cord (Table to Wall) (10')
2660100022581	220V, 230V, 240V Power Cord (Table to Wall)
0000001171872	Serial Cable DB 25 M: DB 9 M (HFA I —> HFA II-/series)
0000001171873	Serial Cable DB 9 M: DB 9 M (HFA II —> HFA II-/series)
0000001241410	Field Analyzer Primer
2660100021453	Fuse for HFA II-/series unit (100-120V): 4 Amp Slo-Blo Metric 250V
0000001211638	Fuse for HPT-120 Power Table (100-120V): T8A, 125V
0000001211851	Fuse for HPT-220 Power Table (220-240V): T6.3A, 250V



Note: Item part numbers and descriptions are subject to change.

To order parts, call Carl Zeiss Meditec Customer Care at 1-800-341-6968. Outside the U.S., contact your local Carl Zeiss Meditec distributor.

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HFA II-/ series User Manual

System Software Version 5.1

Specifications subject to change without notice