



Humphrey Visual Field Analyzers

Innovation and connectivity



We make it visible.



// PERIMETRY
MADE BY ZEISS

Humphrey Visual Field Analyzers

Offering the industry's broadest selection of perimetry products, ZEISS continues to set the gold standard for quality, precision and innovation worldwide.

Humphrey Field Analyzer: HFA II-*i* Series The gold standard with comprehensive connectivity options

Validated by more than 30 years of research, design and clinical experience, the Humphrey® Field Analyzer (HFA™) is the accepted standard of care to aid in glaucoma diagnosis and management. With over 65,000 installed units worldwide, the HFA is the premier automated visual field analyzer.

Advanced diagnostics and analyses

- **Guided Progression Analysis™ (GPA™):** The perimetry progression analysis software identifies statistically significant change automatically.
- **Visual Field Index™ (VFI™):** A simple and intuitive global index to determine percentage of field loss on every visual field.^{1,2}
- **STATPAC™:** The language of perimetry compares results to age-normative and glaucoma databases.
- **SITA™:** A patented acquisition algorithm for fast and accurate visual field threshold measurements; the most commonly used test strategy, incorporates patient responses in real time.
- **Data management connectivity:** Patient reports and other data can be electronically transferred to ZEISS FORUM® Eye Care Data Management, EMRs and other data management solutions.
- **Gaze tracking:** Uniquely tracks patient's fixation angle and prints the gaze error to help the doctor judge test quality.

FORUM Glaucoma Workplace Integrated glaucoma management

- Enables analysis of HFA data within the FORUM Viewer
- Combines structure and function information from the CIRRUS™ HD-OCT and HFA in one report with FORUM
- Automatically generates reports (e.g. SFA, Overview, GPA, visual field reports)
- Enables interactive adjustment of GPA parameters (e.g. change baseline)
- Shows evolution of the GPA triangle plots animated over time ("cine-mode")
- Improves patient flow and education

Humphrey Matrix Proven early visual field loss detection, now with connectivity

The Humphrey Matrix® is the ideal solution for busy practices for case detection and fast threshold testing. In addition to simplifying visual field testing, numerous studies show that frequency doubling perimetry can detect visual field loss missed by other methods.³⁻⁶

Humphrey FDT Clinically validated for efficient visual field loss detection

Multiple studies⁷⁻²¹ have shown that the Humphrey FDT® detects visual field loss due to a variety of ocular diseases, including glaucoma.

FORUM Glaucoma Workplace

Structure and function analysis at your fingertips

Doctors want the ability to analyze HFA data in their office. Now, with the FORUM® Glaucoma Workplace from ZEISS, they have it. The FORUM Glaucoma Workplace uses the same STATPAC engine as the HFA. Guided Progression Analysis™ (GPA™) analyses are automatically performed and instantly available once three or more exams have been stored. For the first time, you can change the baselines for GPA analyses and generate HFA reports from a Mac or PC right in your practice.

Doctors also want greater integration of HFA and CIRRUS™ HD-OCT analysis data in a single report. Here, too, FORUM delivers.



Review relevant HFA and CIRRUS data in one combined report

Streamline your workflow

HFA analyses in the lane

The ZEISS FORUM Glaucoma Workplace easily allows you to review and generate HFA reports directly in the FORUM Viewer. For follow-up visits, a GPA summary can be automatically produced following 3 or more exams. And, with just a single click of the mouse, baseline exams can be changed and outliers removed. Additional to the GPA screen, an overview of visual field exams is available.

Review and analysis at your fingertips

FORUM gives you on-demand access to visual field data, OCT scan data, and structure and function results wherever you are, whenever you want – including your office, at a workstation, or in the examination lanes.

Better patient flow throughout the office

The FORUM Glaucoma Workplace streamlines your assessments for more efficient patient flow with no compromise to the quality of care. Now, instead of searching through stacks of paper reports, you can fully focus on the patient examination.

Simplified patient education during the consultation

GPA and Combined Reports from FORUM save you time and simplify patient consultations, enhancing the patient education experience and potentially improving compliance.



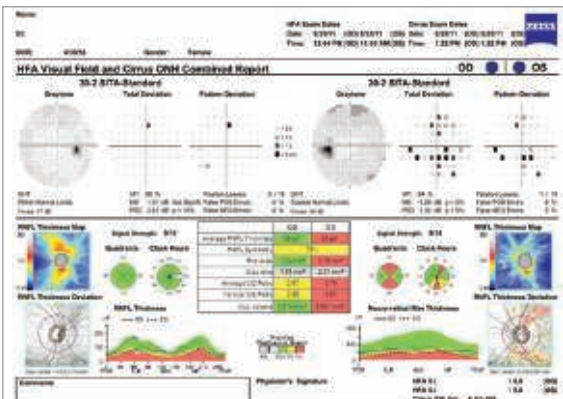
Focus your assessments

Adjust GPA parameters as needed



If necessary, you can adjust GPA parameters by conveniently changing the baseline, resetting the baseline after surgery, or excluding any outliers.

Combined structure and function reports



The HFA-CIRRUS Combined Report from FORUM summarizes patient structure and function analyses in a single display. FORUM delivers this OD-OS integration to your lanes to help you assess patient status at a glance.

Master your data

FORUM Viewer integration

The FORUM Glaucoma Workplace is a clinical application that is directly integrated into the FORUM infrastructure.

Advanced user experience

As an integral part of the modern FORUM platform, the FORUM Glaucoma Workplace lets you take full advantage of the latest FORUM enhancements and features, giving you an advanced user experience across all solutions.

Convenient installation

ZEISS service technicians will assist you with all aspects of the software installation.

Consistent data management

FORUM ensures end-to-end data consistency across the board – between the HFA, CIRRUS, FORUM and the FORUM Glaucoma Workplace.





Humphrey Field Analyzer – HFA II-*i* Series

The gold standard with comprehensive data management integration.

Complete portfolio of HFA II-*i* perimeters

Humphrey Field Analyzer II Model 750*i*

The ultimate for practice efficiency, advanced features and long-term value.

Humphrey Field Analyzer II Model 745*i*

All the features of the Humphrey 740*i* plus SITA-SWAP software for early detection.

Humphrey Field Analyzer II Model 740*i*

The basic model in automated visual field testing for comprehensive care.

Advanced analysis

The HFA is the only perimeter with progression analysis validated in the Early Manifest Glaucoma Trial.²²

- Enhanced Guided Progression Analysis (GPA) software identifies statistically significant progression automatically, and presents “at a glance” visual field progression analysis in a single page report.
- Visual Field Index (VFI) is a simple and intuitive global index to determine percentage of field loss.^{1,2}
- Pattern Deviation Plots identify localized field loss, minimizing ocular media effects such as cataracts.
- STATPAC, the language of perimetry, compares results to proprietary age-normative and glaucoma databases.

Early glaucoma detection

- SITA-SWAP software reduces blue-yellow threshold test time to just 4–6 minutes, providing a clinically practical tool for early detection of glaucoma.^{23,24}

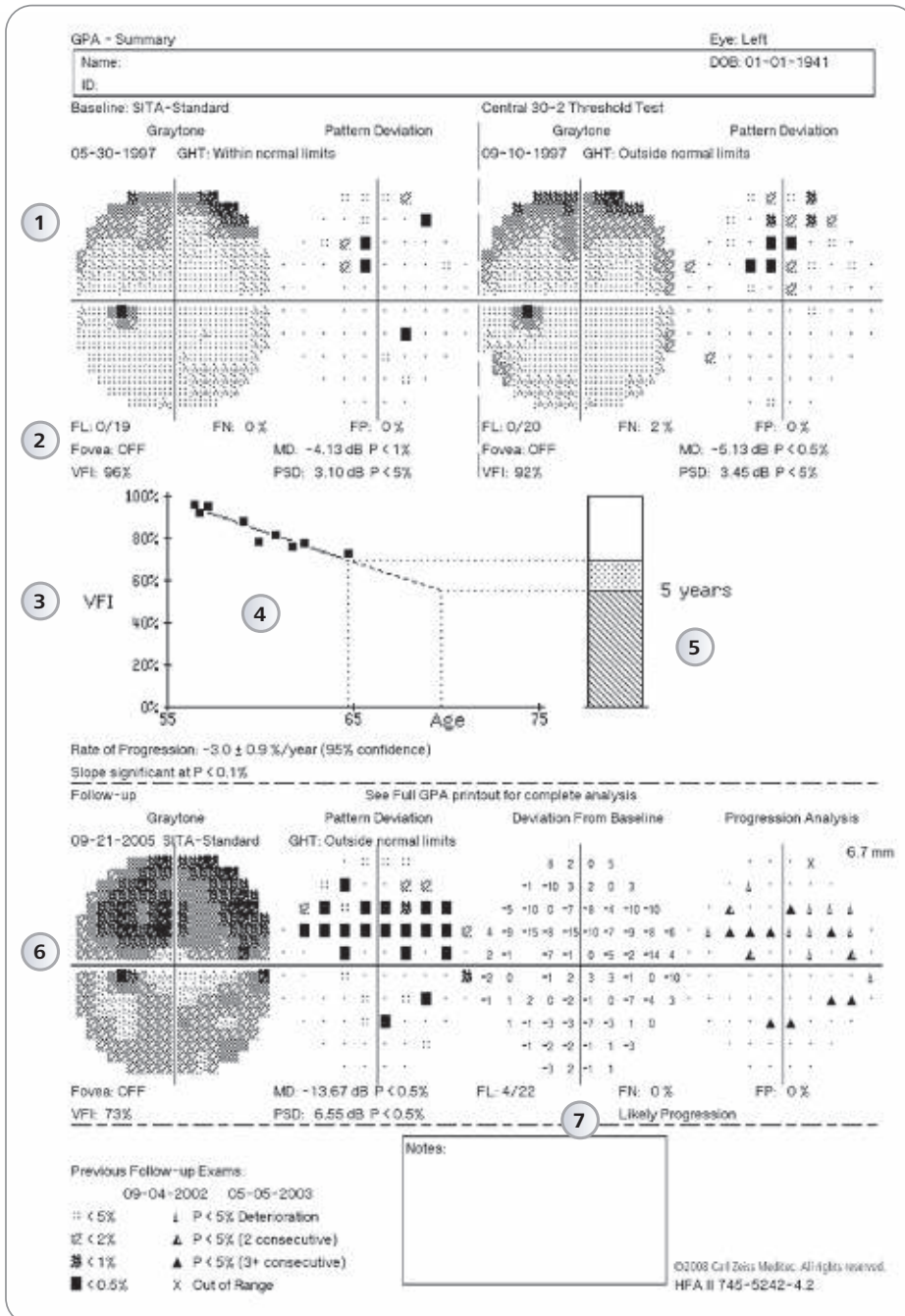
Enhanced exam reliability

- Patented system automatically tracks and aligns head and eye position.
- Kinetic, Custom and Social Security Disability testing provide a wide range of special purpose testing protocols.
- Connectivity to office networks, EMRs and FORUM® Eye Care Data Management System.

GPA – Advancing the science of progression analysis

The **HFA Guided Progression Analysis (GPA)** software accurately differentiates statistically significant progression of visual field loss from random variability. The analysis is based upon detailed empirical knowledge of the variability found at various stages of glaucomatous visual field loss through information acquired in extensive multi-center clinical trials worldwide.

GPA Summary Report



1 Baseline Exams
 Establish initial visual field status.

2 VFI Value
 A summary measurement of the patient's visual field status, expressed as a percent of a normal age-adjusted visual field.

3 VFI Rate of Progression Analysis
 Trend analysis of the patient's overall visual field history.²⁵

4 VFI Plot
 Regression analysis of VFI values and 3 to 5 year projection.

5 VFI Bar
 A graphical depiction of the patient's remaining useful vision at the current VFI value along with a 3 to 5 year projection of the VFI regression line if the current trend continues.

6 Current Visual Field Summary
 Complete report of current visual field including VFI, MD, PSD, the Progression Analysis Plot and the GPA alert.

7 GPA Alert
 A message that indicates whether statistically significant deterioration was noted in consecutive tests.

// **CONFIDENCE**
MADE BY ZEISS

Humphrey Matrix 800

With Frequency Doubling Technology.

Proven to find early visual field loss. Quickly. Easily.

Operating a visual field instrument doesn't get much easier than a Humphrey Matrix. It provides the ideal solution for busy practices for case detection and fast threshold testing. In addition to simplifying visual field testing, numerous studies show that frequency doubling perimetry can detect visual field loss missed by other methods.³⁻⁶

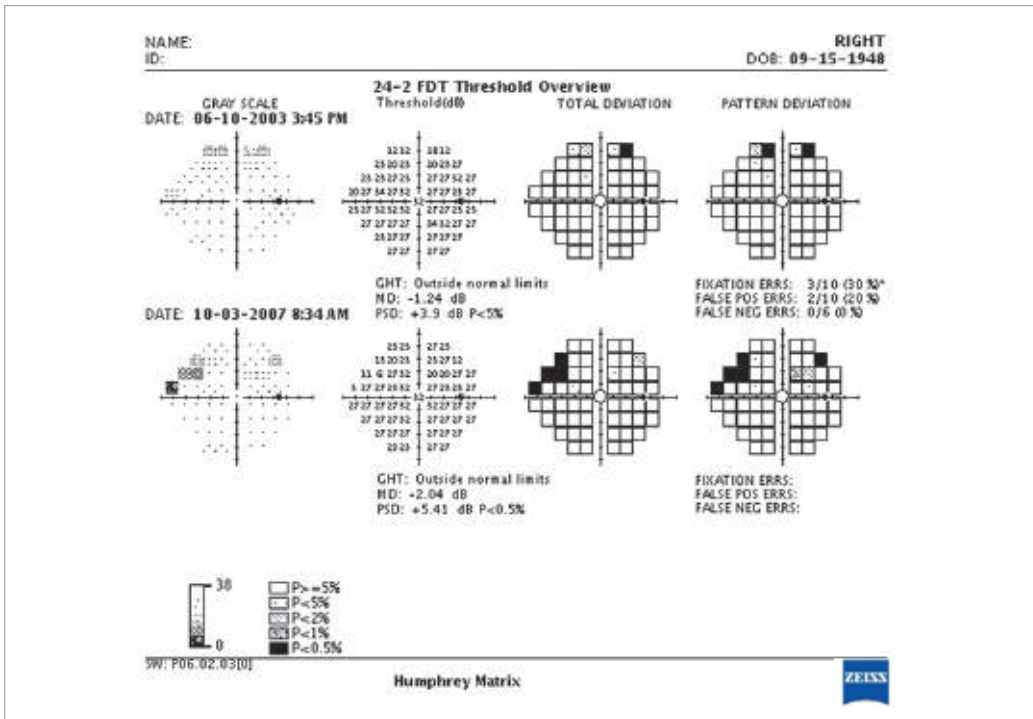


Validated clinical performance

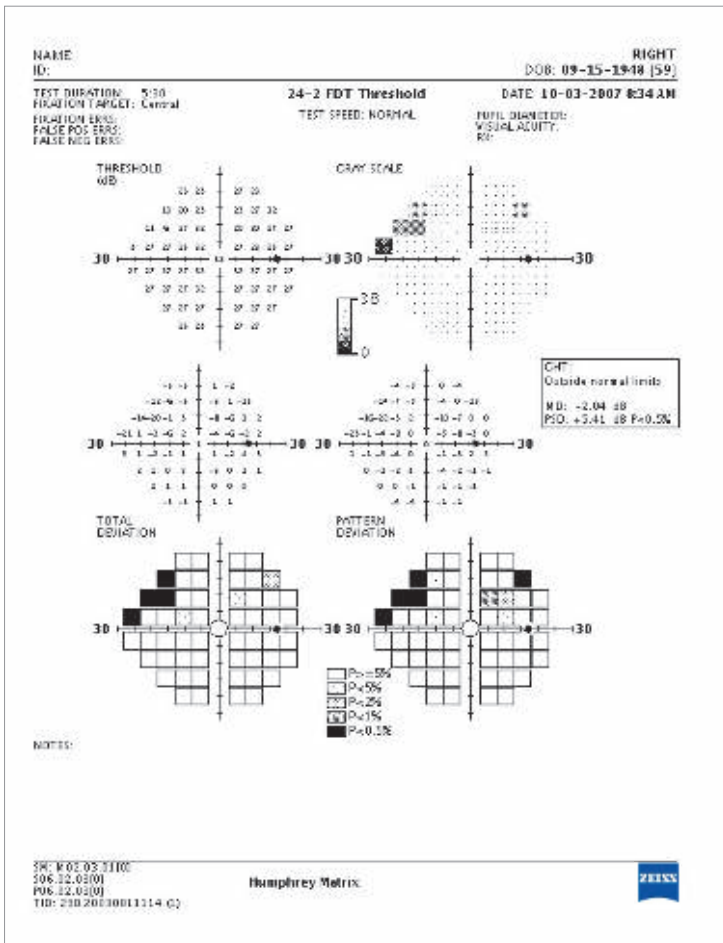
- Proven diagnostic performance in detecting early visual field loss.^{27,28}
- 15% faster threshold testing on average and up to 70% faster for more advanced cases.²⁹
- Video eye monitoring and comfortable chin rest simplify patient alignment and fixation monitoring.
- Patient-friendly stimulus eliminates the need for trial lens correction in most patients.²⁶

Designed for your practice

- HFA-style reports are simple to interpret.
- Light weight, compact and portable.
- Simple operation.
- Ability to test in normal ambient light; no darkened room required.
- Connectivity to office networks, EMRs and FORUM.



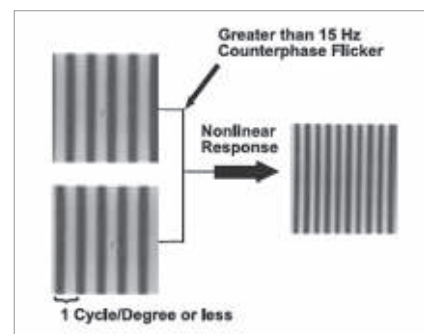
Serial Field Overview



Single Field Analysis

Patented Frequency Doubling Technology

The Humphrey Matrix frequency doubling stimulus can preferentially test for sensitivity loss in the magnocellular pathways of the visual system.³⁰ Alternating black and white bars create a patient-friendly doubling illusion. Studies demonstrate that while all ganglion cell types are affected by glaucoma, and no single test always identifies the functional effects of glaucoma first, the Humphrey Matrix has proven high sensitivity and may find defects earlier in a unique subset of patients.^{31,32}



Frequency Doubling Stimulus



// RELIABILITY
MADE BY ZEISS

Humphrey FDT

Frequency Doubling Technology for efficient visual field loss detection.

Clinically validated

Multiple studies⁷⁻²¹ have shown that the Humphrey FDT detects visual field loss due to a variety of ocular diseases, including glaucoma. The FDT has been clinically validated in more than 170 peer-reviewed publications.



Easy to operate and interpret

The FDT is optimized for use in both ophthalmological and non-ophthalmological settings and may be operated by healthcare workers having little or no specialty training in ophthalmology.

- Patients may be tested using their own glasses, no requirement for trial lenses or eye patches.³³
- Short test: ~ 40 seconds per eye.
- Simplified interpretation of results.

- Large, age-related normative database.
- Compact design that fits anywhere in your practice.
- Easy and intuitive operation for users of any level of experience.
- Dependable performance in ambient light.
- Convenient low-cost, built-in printer.*

*FDT does not include electronic connectivity.

Technical Data

Specifications

Specifications	FDT	Matrix 800	HFA II-i		
			740i	745i	750i
Test specifications					
Maximum temporal range (degrees)	30	30	89	89	89
Stimulus duration	200-400 ms	300 ms	200 ms	200 ms	200 ms
Visual field testing distance	Infinity	Infinity	30 cm	30 cm	30 cm
Background illumination	100 cd/m ²	100 cd/m ²	31.5 ASB	31.5 ASB	31.5 ASB
Threshold test library					
N-30	■	■			
C-20	■				
24-2, 30-2, 10-2, Macula		■	■	■	■
60-4, Nasal step			■	■	■
Threshold test strategies					
MOBS	■	■			
ZEST		■			
SITA Standard, SITA Fast, Full Threshold, FastPac			■	■	■
SITA-SWAP			Option	■	■
Screening test library					
C40, C64, C76, C80, C-Armaly			■	■	■
C-20	■				
N-30	■	■			
24-2		■			
Peripheral test patterns			■	■	■
Screening test modes					
Age corrected	■	■	■	■	■
Threshold related, Single intensity			■	■	■
Specialty test library					
Social Security Disability, monocular, binocular			■	■	■
Superior 36, 64			■	■	■
Kinetic testing			Option	Option	■
Custom testing			■	■	■

Features	FDT	Matrix 800	HFA II-i		
			740i	745i	750i
Fixation control					
Heijl Krakau blind spot monitor	■	■	■	■	■
Video eye monitor		■	■	■	■
Gaze tracking			■	■	■
Head tracking					■
Vertex monitoring					■
Remote video eye monitor capability			■	■	■
Operator interface					
Display	LCD	LCD	Touch-screen LCD		
Keyboard		■	■	■	■
Stimulus					
Frequency doubling	■	■			
White-on-white			■	■	■
Red- or blue-on-white			■	■	■
Blue-on-yellow (SWAP)				■	■
General testing features					
Stimulus sizes	10°	2°, 5°, 10°	Goldmann I-V	Goldmann I-V	Goldmann I-V
Foveal threshold testing			■	■	■
Automatic Pupil measurement					■
Test storage					
User-defined		■	■	■	■
Software features					
STATPAC 2–single field analysis			■	■	■
Glaucoma Hemifield Test (GHT)		■	■	■	■
Visual Field Index (VFI)			■	■	■
Guided Progression Analysis (GPA)			■	■	■
Serial field overview		■	■	■	■
Networking		■	■	■	■
FORUM Connectivity		■	■	■	■
DICOM Connectivity		■	■	■	■
Printer					
	Thermal printer	Native generic PCL 3, PCL 5 and postscript printer support for local, shared and networked printers			
Data storage, retrieval and analysis					
Hard drive		250 GB	160 GB	160 GB	160 GB
USB		■	■	■	■
CD-R/W drive		■			
Dimensions					
Height	17" (43 cm)	17" (43 cm)	23" (58 cm)		
Width	10" (25 cm)	12.2" (31 cm)	23" (58 cm)		
Depth	19" (48 cm)	33.5" (85 cm)	21" (53 cm)		
Weight	19 lbs (8.6 kg)	37.5 lbs (17.4 kg)	88 lbs (40 kg)		
Electrical requirements					
	100-120 V, 50/60 Hz 230 V, 50/60 Hz	100-240 V ~ 50/60 Hz 200 VA max	100-120 V, 50/60 Hz 230 V~, 50/60 Hz, 1.8A		
Standards					
Meets UL, CSA and CE standards	■	■	■	■	■

Selected references

- 1 Bengtsson B, Heijl A. A visual field index for calculation of glaucoma rate of progression. *Am J Ophthalmol*. Feb 2008;145(2):343-53.
- 2 Leung CK, Cheung CY, Weinreb RN, et al. Evaluation of retinal nerve fiber layer progression in glaucoma: a study on optical coherence tomography guided progression analysis. *Invest Ophthalmol Vis Sci*. Jan 2010;51(1):217-22. Epub 2009 Aug 13.
- 3 Albanis CV, Quinones RA. Use of Matrix Frequency Doubling Technology (FDT) to Assess Visual Field Status Following Unreliable Standard Automated Perimetry (SAP). *Invest Ophthalmol Vis Sci*. Apr 2008;49:1078.
- 4 Racette L, Medeiros FA, Zangwill LM, et al. Diagnostic accuracy of the Matrix 24-2 and original N-30 frequency doubling technology tests compared with standard automated perimetry. *Invest Ophthalmol Vis Sci*. 2008;49:954-960.
- 5 Sample PA, Medeiros FA, Racette L, et al. Identifying glaucomatous vision loss with visual-function-specific perimetry in the diagnostic innovations in glaucoma study. *Invest Ophthalmol Vis Sci*. 2006;47:3381-3389.
- 6 Sample PA, Bosworth CF, Blumenthal EZ, Girkin C, Weinreb RN. Visual function-specific perimetry for indirect comparison of different ganglion cell populations in glaucoma. *Invest Ophthalmol Vis Sci*. 2000;41:1783-1790.
- 7 Johnson CA, Samuels SJ. Screening for glaucomatous visual field loss with frequency-doubling perimetry. *Invest Ophthalmol Vis Sci*. Feb 1997;38(2):413-425.
- 8 Parikh R, Naik M, Mathai A, et al. Role of frequency doubling technology perimetry in screening of diabetic retinopathy. *Indian J Ophthalmol*. Mar 2006;54(1):17-22.
- 9 Realini T, Lai MQ, Barber L. Impact of diabetes on glaucoma screening using frequency-doubling perimetry. *Ophthalmology*. Nov 2004;111(11):2133-6.
- 10 Thomas D, Thomas R, Muliylil JP, et al. Role of frequency doubling perimetry in detecting neuro-ophthalmic visual field defects. *Am J Ophthalmol*. June 2001;131(6):734-41.
- 11 Wall M, Neahring RK, Woodward KR. Sensitivity and specificity of frequency doubling perimetry in neuro-ophthalmic disorders: a comparison with conventional automated perimetry. *Invest Ophthalmol Vis Sci*. Apr 2002;43(4):1277-83.
- 12 Detry-Morel M, Zeyen T, Kestelyn P, Collignon J, Goethals M. Belgian Glaucoma Society. Screening for glaucoma in a general population with the non-mydiatic fundus camera and the frequency doubling perimeter. *Eur J Ophthalmol*. Sep-Oct 2004;14(5):387-93.
- 13 Quigley HA. Identification of glaucoma-related visual field abnormality with the screening protocol of frequency doubling technology. *Am J Ophthalmol*. June 1998;125(6):819-29.
- 14 Robin TA, Müller A, Rait J, et al. Performance of community-based glaucoma screening using Frequency Doubling Technology and Heidelberg Retinal Tomography. *Ophthalmic Epidemiol*. June 2005;12(3):167-78.
- 15 Iwase A, Tomidokoro A, Araie M, et al. Performance of frequency-doubling technology perimetry in a population-based prevalence survey of glaucoma: the Tajimi study. *Ophthalmology*. Jan 2007;114(1):27-32. Epub 2006 Oct 27.
- 16 Saito M, Yamashiro H, Matsumoto H, Shirato S. [Usefulness of frequency doubling technology as a screening test for glaucoma] [Article in Japanese] *Nippon Ganka Gakkai Zasshi*. Jan 2001;105(1):20-3.
- 17 Kusaba K, Kawanami M, Ban Y. [The usefulness of frequency doubling technology perimetry in glaucoma screening in health-check program]. [Article in Japanese] *Nippon Ganka Gakkai Zasshi*. Sep 2004;108(9):554-9.
- 18 Tatemichi M, Nakano T, Tanaka K, et al. Performance of glaucoma mass screening with only a visual field test using frequency-doubling technology perimetry. *Am J Ophthalmol*. Oct 2002;134(4):529-37. Erratum in: Sep 2003;136(3):592.
- 19 Jonas JB, Xu L, Wang YX, et al. The Beijing Eye Study. *Acta Ophthalmol*. May 2009;87(3):247-61.
- 20 Thomas R, Naveen S, Nirmalan P, Parikh R. Detection of Ocular Disease by a Vision Center Technician & The Role of Frequency Doubling Technology Perimetry in this Setting. *Br J Ophthalmol*. Aug 2009 (18): [Epub ahead of print].
- 21 Wang Y, Xu L, and Jonas JB. Prevalence and causes of visual field loss as determined by frequency doubling perimetry in urban and rural adult Chinese. *Am J Ophthalmol*. Jun 2006;141(6):1078-1086.
- 22 Heijl A, Leske MC, Bengtsson B, Hussein M. Measuring visual field progression in the Early Manifest Glaucoma Trial. *Acta Ophthalmol Scand*. Jun 2003;81(3):286-293.
- 23 Bengtsson B, Heijl A. Normal intersubject threshold variability and normal limits of the SITA SWAP and full threshold SWAP perimetric programs. *Invest Ophthalmol Vis Sci*. Nov 2003;44(11):5029-34.
- 24 Bengtsson B. A new rapid threshold algorithm for short-wavelength automated perimetry. *Invest Ophthalmol Vis Sci*. Mar 2003; 44(3):1388-94.
- 25 Casas-Llera P, Rebolledo G, Muñoz-Negrete FJ, Arnalich-Montiel F, Pérez-López M, Fernández-Buenaga R. Visual field index rate and event-based glaucoma progression analysis: comparison in a glaucoma population. *Br J Ophthalmol*. Dec 2009; 93(12):1576-9. Epub Jun 16 2009.
- 26 Within ± 3 diopters.
- 27 Medeiros FA, Sample PA, Zangwill LM, et al. A Statistical Approach to the Evaluation of Covariate Effects on the Receiver Operating Characteristic Curves of Diagnostic Tests in Glaucoma. *Invest Ophthalmol Vis Sci*. Jun 2006;47:2520-2527.
- 28 Giuffrè I. Frequency Doubling Technology vs Standard Automated Perimetry in Ocular Hypertensive Patients. *Open Ophthalmol J*. Jan 2009;3:6-9.
- 29 Patel A, Wollstein G, Ishikawa H, Schuman J. Comparison of Visual Field Defects Using Matrix Perimetry and Standard Achromatic Perimetry. *Ophthalmology*. Mar 2007;114(3):480-487.
- 30 White AJ, Sun H, Swanson WH, Lee BB. An examination of physiological mechanisms underlying the frequency-doubling illusion. *Invest Ophthalmol Vis Sci*. Nov 2002;43(11):3590-9.
- 31 Sakata LM, DeLeon-Ortega J, Arthur SN, et al. Detecting Visual Function Abnormalities Using the Swedish Interactive Threshold Algorithm and Matrix Perimetry in Eyes with Glaucomatous Appearance of the Optic Disc. *Arch Ophthalmol*. Mar 2007;125:340-345.
- 32 Tafreshi A, Sample P, Liebmann J, et al. Visual Function – Specific Perimetry to Identify Glaucomatous Visual Field Loss Using Three Different Definitions of Visual Field Abnormality. *Invest Ophthalmol Vis Sci*. Mar 2009;50(3), 1234-1240.
- 33 Trial lenses are required beyond ± 3 diopters for the Matrix and beyond ± 7 diopters for the FDT.

You + ZEISS = Evolving Glaucoma Management

“There are multiple challenges for the doctor managing glaucoma: first, is to accurately diagnose and stage glaucoma; and, second, to quickly identify progression in those patients where therapy has been insufficient.”

— Nathan Radcliffe, MD



CIRRUS™ HD-OCT

Brilliant images and applications for greater glaucoma insight



Humphrey® Field Analyzer (HFA™)

The most advanced and accurate picture of glaucoma functional status and progression



CIRRUS™ photo

Get the complete picture with the combined OCT and fundus imaging modalities in one system



Humphrey Matrix® 800

Frequency doubling technology detects early loss



VISUCAM® Digital Fundus Camera

Compact and integrated fundus imaging to visualize and document RNFL and ONH




FORUM®

Comprehensive eye care data management for better workflow efficiency

Humphrey Matrix 800
Humphrey Field Analyzer
Humphrey FDT

FORUM

 **Carl Zeiss Meditec, Inc.**
5160 Hacienda Drive
Dublin, CA 94568
USA
www.meditec.zeiss.com

 **Carl Zeiss Meditec AG**
Goeschwitzer Str. 51-52
07745 Jena
Germany
www.meditec.zeiss.com

PER4622 Rev.B Printed in USA 5M CZ-XX/2014
The contents of the brochure may differ from the current status of approval of the product in your country. Please contact our regional representative for more information. Subject to change in design and scope of delivery and as a result of ongoing technical development. Humphrey, HFA, Matrix, FDT, Guided Progression Analysis, GPA, HFA-NET Pro, STA, STA-SWAP, STATPAC, EasyConnect, Visual Field Index, VFI, Cirrus, GDx and FORUM are either trademarks or registered trademarks of Carl Zeiss Meditec, Inc. in the United States and/or other countries. All other brand references are trademarks or registered trademarks of their respective companies in the United States and/or other countries.
© 2014 by Carl Zeiss Meditec, Inc. All copyrights reserved.