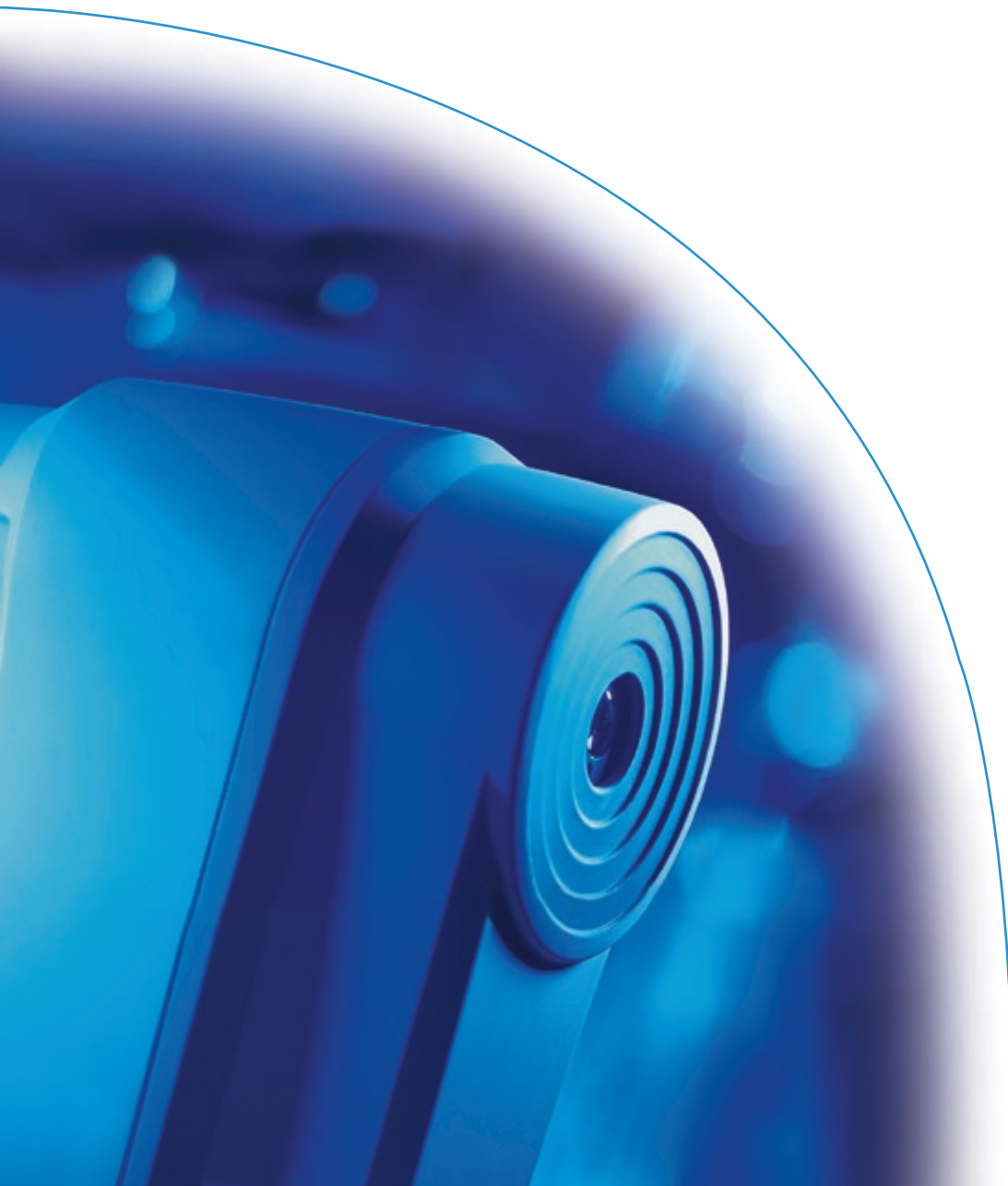


MAXWELL™
OCULAR WAVEFRONT ABERROMETER

**High-Resolution, Multifunctional
Wavefront Aberrometer for the
Comprehensive Eye Examination**





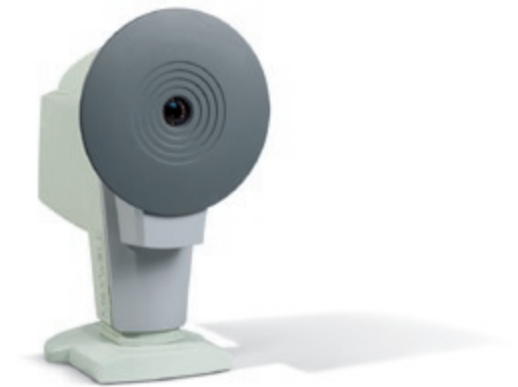
MAXWELL™

OCULAR WAVEFRONT ABERROMETER

The MAXWELL Ocular Wavefront Aberrometer is an innovative diagnostic instrument with a wide range of functions that permit eye care practitioners and researchers to effectively assess all of the wavefront aberrations present in a subject's eye. This remarkable device offers the widest wavefront diagnostic range and functions on more than 99% of subjects. Beyond its superior performance in wavefront analysis, this versatile instrument provides professionals with all the information needed for a complete eye examination. Measurements are displayed in an easy to interpret format, via an intuitive and user-friendly software interface. The MAXWELL offers scientific users a complete collection of physical and optical algorithms and displays that allow them to meet their individual needs by rapidly configuring the way in which data is presented.

Ziemer Group

We develop and produce diagnostic and surgical products for the ophthalmic market that distinguish themselves from established standards in terms of usability, precision, quality, and productivity.



For precision measurements with reproducible pupillary reflex, an optional larger shading disk is available.

Technical Highlights

- Wide wavefront measuring range available (-15 to +20 D sphere; -10 to +10 D cylinder)
- Large area of analysis (7.2 by 7.2 mm)
- High spatial resolution: 1024 sub-pupils (lenslets); corresponding to 230 μm
- Superior precision: repeatability 0.003 D RMS
- Incremental, programmable accommodation target
- Clinically-oriented software interface
- Diopter-based aberration coefficients
- Patient's retinal image display
- Expandable functionalities with add-on software modules



Advanced Features for Research

- Expert analysis functions: Zernike, MTF, PSF, etc...
- Natural-pupil analysis (no circular truncation of wavefront data)
- User-adjustable wavefront sampling area and scaling of aberration coefficients
- User-controlled fixation distance
- Accommodative response of aberrations of any order
- Data export in tabulated text format

Benefits for the Practitioner

- Complete objective eye exams
- Highest available refractive diagnostic accuracy
- Objective test of visual acuity
- Objective test of contrast sensitivity
- Enhanced prescription range and options
- Applicable to highly aberrated eyes
- May be used with optometric corrections (lenses, etc.) in place
- Integrated monitor facilitates aiming and recording of data
- Easy-to-use
- Intuitive diagnostic information
- Extensive reporting options
- Shorter chair time
- Reduced examination cost



Convenient Graphic User Interface

MAXWELL Software always displays Database Window on left and Analysis Window on right.

Database Window provides easy access to any patient's recorded data.

In the Analysis Window panel, data relating to selected patient are displayed. Tabs on top provide access to measuring procedure, to analysis of refraction and aberration, to accommodation analysis, to keratometry analysis, and to report generation.

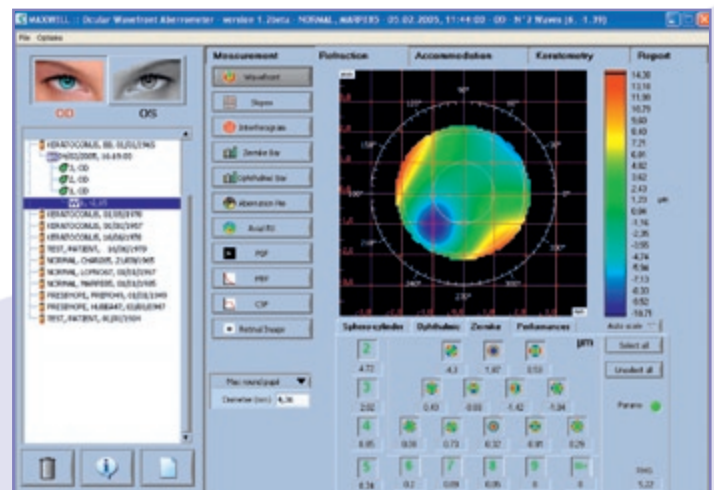


Figure features a Standard Wavefront Error map, in micron units (top), and Zernike coefficients (bottom).

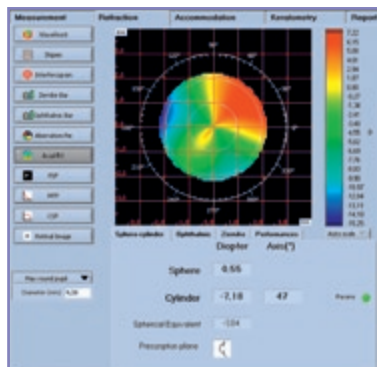
MAXWELL

The Comprehensive Refraction Machine

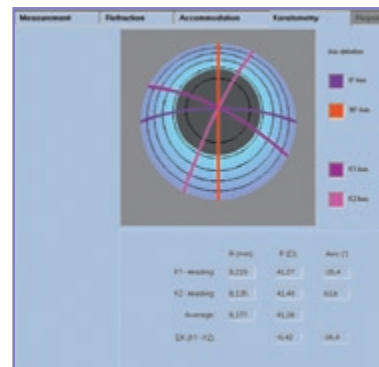
MAXWELL's standard wavefront aberrometer functionalities offer a wide choice of different ways to record aberrometry data, including classic refractometric and keratometric representations as well as multiple advanced wavefront analysis.

Versatile display options

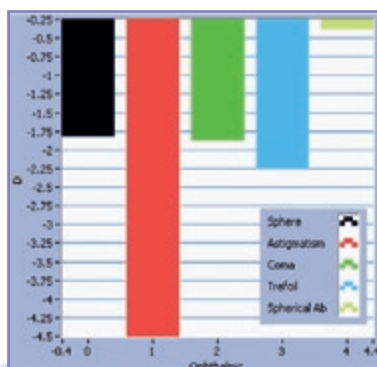
The graphical user interface of the MAXWELL software provides a wide variety of graphical representations, allowing easy interpretation and comparison. Some examples are shown on this page.



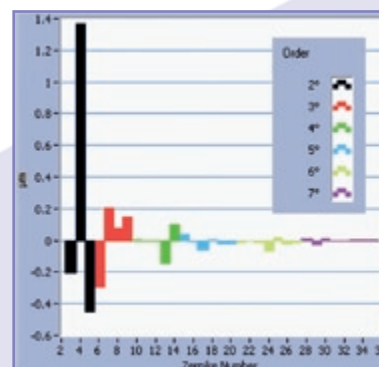
Keratoconus patient, axial refractive error map, in diopter units. The map exhibits the typical diablo shape indicating the presence of a cylinder.



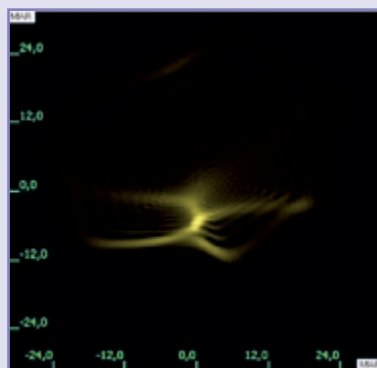
Keratometry report provides values in metric (mm) and keratometric units (diopters), with a visual representation of axis positions.



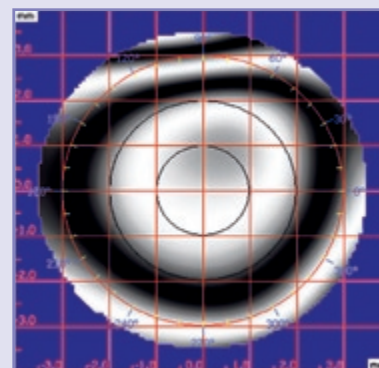
Bar graph shows equivalent defocus coefficients (sphere, cylinder, coma, trefoil, and spherical aberrations) of an eye with keratoconus.



Bar graph shows 2nd through 7th order OSA Zernike coefficients of a normal eye.



Point Spread Function shows how a point light source at infinity would be projected onto the retina of this patient.



Wavefront Interferogram.



Pie diagram of aberration contributions to total wavefront variance.



Simulated view of a letter "E" seen by an aberrated eye. Image computed with patient's measured aberration coefficients.

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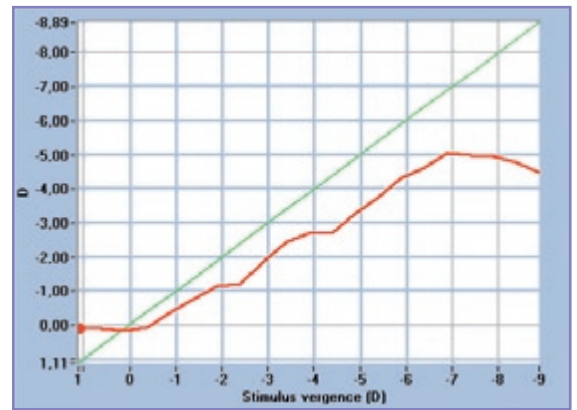
The Presbyopia Machine

One of MAXWELL's unique capabilities is the precise, objective measurement of accommodative response of aberrations of any order. By means of a computer-controlled fixation target, stimulus/response curves as well as defocus/response curves may be recorded.

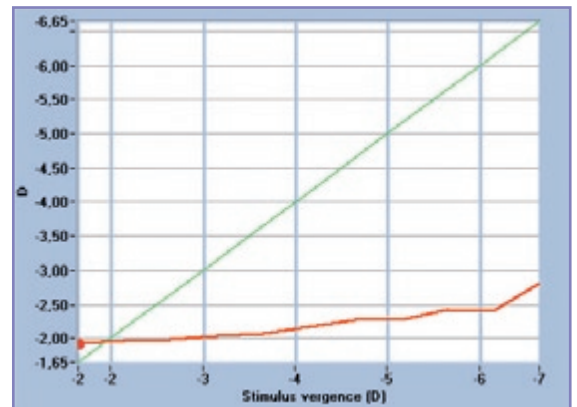
Unlike established subjective accommodation tests, the accommodation measurement technique proprietary to MAXWELL requires no patient feedback, thereby making the assessment truly objective.

By adding a mobile internal fixation target to the aberrometer, the effects of accommodation on the entire optical system at varying focal lengths and states of pupil dilation can be measured. During the examination, the target is repositioned at different intervals by the operator, or automatically under system control, in order to simulate various focal lengths. At each step, a complete wavefront measurement is taken. From these data, accommodation curves are constructed by the software.

MAXWELL provides practitioners with detailed information on their patient's optical system at any viewing distance, including higher-order aberrations up to the 14th order, with comparative information that allows them to choose the appropriate means for correcting the patient's vision.



Accommodation of a young patient was measured by instructing MAXWELL's internal fixation target to approach the patient in 20 steps. Red curve represents patient's accommodative response to the shifting stimulus. Green line represents ideal response. This patient has over 5 D of accommodation.



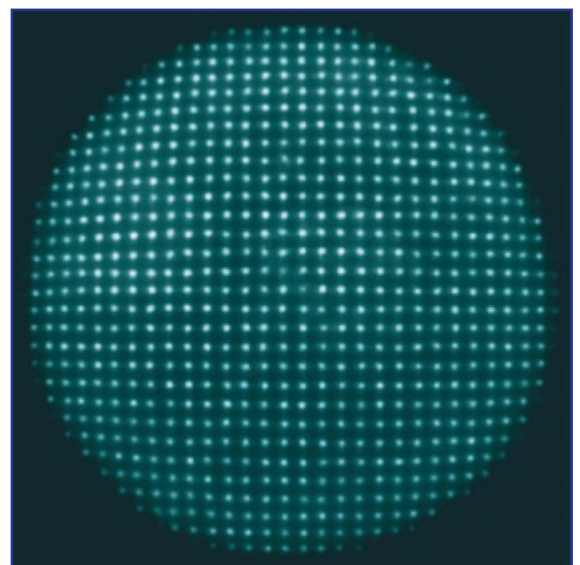
Accommodation graph of an older patient with less than 1 D of accommodation.

MAXWELL

Superior Technology

The technical requirements for a stand-alone machine that allows users to fully exploit the tremendous potential of wavefront aberrometry exceeds by far the capabilities of simple, conventional devices dedicated to a limited, single use (such as devices coupled to excimer lasers for wavefront-guided ablation).

MAXWELL's claim to technological leadership is best demonstrated by the truly astounding precision and definition achieved by the 32 by 32 lenslet matrix that forms the basis of MAXWELL's proprietary wavefront sensor.



Technical Specifications

The MAXWELL Ocular Wavefront Aberrometer is a precision manufactured instrument indicated for use by qualified ophthalmic or optometric professionals.

General Information		
Dimensions:	aberrometer head	42 cm (L) × 18 cm (W) × 42 cm (H)
	complete aberrometer with table	61 cm (L) × 101 cm (W) × 113 cm (H)
Weight:	aberrometer head with base	15 kg (33 lbs)
	complete aberrometer with table	145 kg (320 lbs)
Ambient Operating Temperature		15°C to 35°C (60°F to 95°F)
Input Voltage & Maximum Current		Line Voltage 110-120 VAC, 60 Hz
		Max Current 4 A peak
Laser Classification		Class 1 Laser Device according to EN 60825-1
MDD Classification		Class IIa according 93/42EEC
Aberrometer		
Area of analysis at the eye pupil plane		7.2 mm × 7.2 mm
Number of sub-apertures (lenslets)		32 × 32 = 1024
Spatial resolution at the pupil plane		230 μm
Wavelength		780 nm
Sphere Range, sphere reproducibility		-15 D to +20 D, ± 0.003 D (artificial eye)
Cylinder range, cylinder reproducibility		-10 D to +10 D, ± 0.003 D (artificial eye)
Repeatability (artificial eye w/o sphere & cylinder)		λ/50
Keratometer		
Curvature radius range / reproducibility		5 to 10 mm ± 0.02 mm
Pupillometer		
Pupil diameter range / reproducibility		2 to 10 mm ± 0.02 mm

Caution: Federal (U.S.) law restricts this device to sale by or on the order of a physician.



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Actual product characteristics, specifications, and prices are subject to change. 610.931.002 0702

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