MADSEN Capella

Technical specifications:

DISTORTION PRODUCT OTOACOUSTIC EMISSIONS (DPOAE)

Stimulus	2 sinus stimulus channels
Geometric Center Frequencies	0.5, 0.75, 1.0, 1.5, 2.0, 3.0, 4.0, 6.0, 8.0 kHz
Stimulus Level Range	30-70 dB SPL
Stimulus 3rd order Intermodulation	< -80 dB
Input Sensitivity For Stimulus	≥ 50 dB SPL: 80 to -30 dB SPL < 50 dB SPL: 60 to -50 dB SPL

Frequency Response Accuracy

Microphone:	± 3 dB from 500 to 4000 Hz ± 6 dB from 4000 to 9000 Hz
Sound Level:	711 Coupler Reference (volume compensated) ± 4 dB from 500 to 4000 Hz ± 7 dB from 4000 to 9000 Hz In Situ Sound Level Adjustment ± 4.5 dB from 500 to 4000 Hz

TRANSIENTLY EVOKED OTOACOUSTIC EMISSIONS (TEOAE)

Stimulus Type	
Non-linear & Fast-Screen:	3 clicks of the same polarity and 1 click of opposite polarity, at 3 times the amplitude of the 1st click. Pulse width 40, 80, 120 µsec
Linear:	Unipolar click. Pulse width 40, 80, 120 µsec
Stimulus Level Range	30-80 dB p.e. SPL approx. -30 to 60 dB nHL
Level Accuracy	± 4 dB
Acoustical Bandwidth	500-4000 Hz ± 5 dB @ 1000 Hz

SPONTANEOUS OTOACOUSTIC EMISSIONS (SOAE)

Input Sensitivity	0-70 dB SPL
Frequency Ranges	500-5000, 500-10,000 Hz

ECHO-SCREEN MODE

Stimulus Mode	Non-linear: 3 clicks of the same polarity and 1 click of opposite polarity, at 3 times the amplitude of the 1st click. Pulse width 83 µsec
Stimulus Level Range	70-85 dB SPL automatic volume adapting
Signal Bandwidth	1400-4000 Hz

TYMPANOMETRY MODE

Standards	EN 61027, ANSI S3.39
Probe Tones	226 Hz at 85 dB SPL 1000 Hz at 75 dB SPL
Volume Range	0.1 ml to 8 ml
Air Pressure Range	+200 to -400 daPa
Accuracy	±10% or ±10 daPa
Air Pump Speed	50-400 daPa/sec and as fast as possible (A.F.A.P.)

POWER SUPPLY

AC 50/60 Hz, 100-240 V. Fuses Type 1A T (accessible from outside the cabinet).
Power Consumption: Approx. 55 VA

PATIENT SAFETY

Complies with EN 60601-1, Class I, Type B, IPX0.
Battery version complies with EN 60601-1, Class I, Internal Powered, Type B, IPX0

EMC

EMC Emission and Immunity	Complies with EN 60601-1-2

OPERATING ENVIRONMENT

Temperature	10°-35°C
Relative Humidity	30-90%, non-condensing
Atmospheric Pressure	600-1090 hPa

DIMENSIONS AND WEIGHT

Hardware Platform	305 x 284 x 59 mm, 12" x 11" x 2¼" (W x D x H)
Net Weight	Approx. 1.8 kg, 4 lbs (excl. PC)
Probe Assembly	73 g, 2.6 oz.
Standard Probe	4 g
Echo-Screen Probe	4 g (incl. baby eartip)

HARDWARE REQUIREMENTS

Minimum Pentium III, minimum 128 MB RAM.
VGA Graphics Adapter.
Windows operating system (NT, 98, Me, 2000, XP).
RS232C Serial interface.

ACCESSORIES*

Users' Manual, Quick Guide, Shoulder Harness, Headband, Eartips, Standard Probe, Probe Tips, Echo-Screen Probe, Carrying Case, M.E. Auto. Serial Switch Box.

* *Which accessories are standard and which are optional depends on which application modules are purchased. Please contact your local GN Otometrics distributor.*

Distributor:

Hearing Assessment | Fitting Systems | Ba ance Assessment

GN Otometrics, Europe. +45 72 111 555. info@gnotometrics.dk
GN Otometrics, North America. 1-800-289-2150. sales@gnotometrics.com
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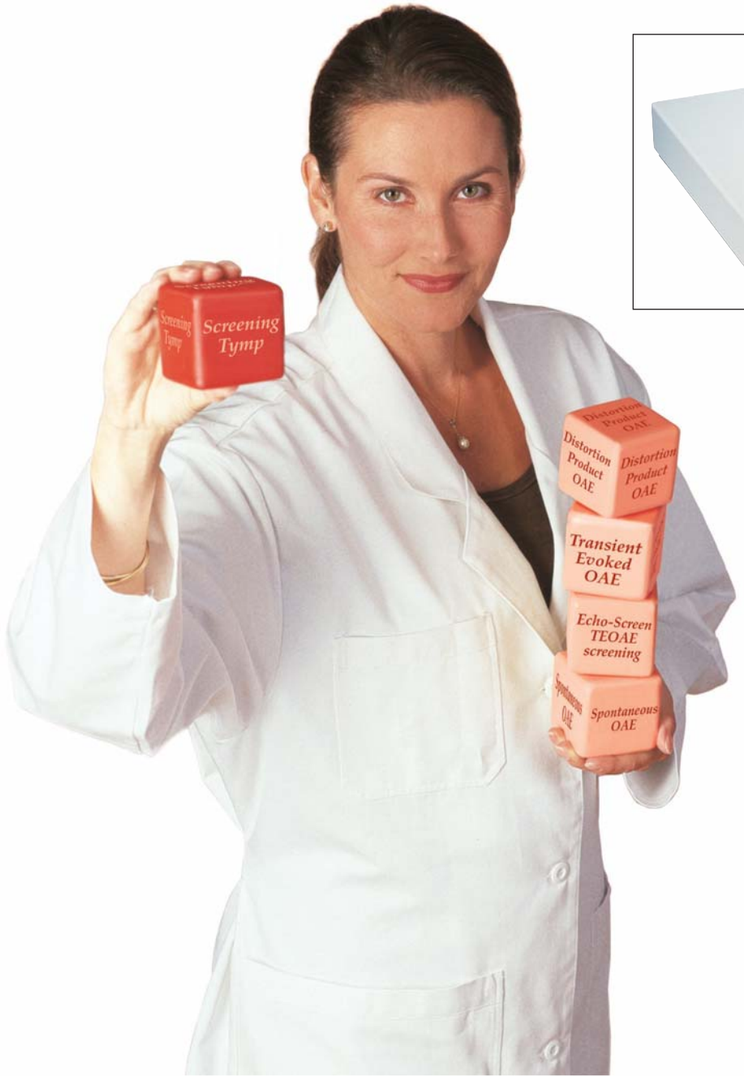
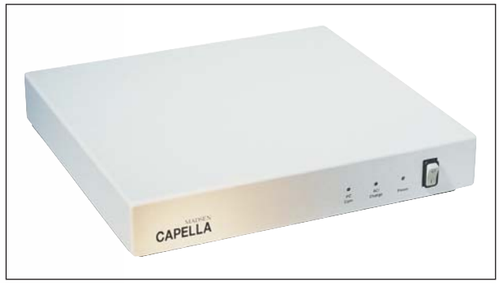
Build your own Windows-based system for objective diagnostics





MADSEN Capella

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The modular MADSEN Capella holds the building blocks which take OAE into the future

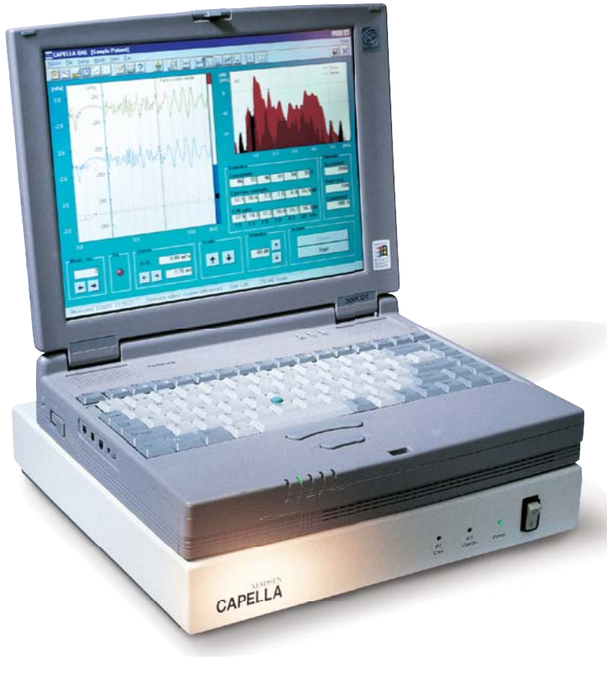
All in one – or modular
With GN Otometrics' Capella, you can combine otoacoustic emissions (OAE) testing, screening tympanometry and infant hearing screening in the same Windows™-based system. In fact, Capella is the only system to offer both OAE and middle-ear diagnostics.

Because Capella is software-based and modular, you can choose only those testing options you require now and add more later. Each testing mode is offered as a separate application module in the form of software and accessories.

The following application modules can be freely combined to suit your individual requirements: Distortion Product OAE, Transient Evoked OAE, Screening Tympanometry, and Echo-Screen™ TEOAE Screening (requires Echo-Screen baby screening probe). Both DPOAE and TEOAE modules include a mode for measurement of Spontaneous OAEs.

Seamless software integration
You can't find a more complete OAE system than Capella. And you can't find another system resembling Capella in a user-friendly NOAH-based platform.

With NOAH, all your OAE measurements can be organized in a professional database, saving you a lot of paperwork and allowing you to more easily manage large numbers of patients. Moreover, your OAE test system can be installed on the same PC or network you use to perform other audiological measurements, like audiometry and real ear measurement, for example. And all your measurements can be saved in the same patient file.



Screening modes for OAE and tympanometry
In addition to its other capabilities, Capella emulates GN Otometrics' Echo-Screen handheld OAE infant hearing screener. This permits you to make a quick screening of cochlear function, follow up with a middle-ear check and, if necessary, move on to a complete OAE analysis. All with one system – in one quick process. And Capella's Screening Tympanometry module offers you the choice of both 226 and 1000 Hz probe tones.

Potential applications for OAE measurements
The non-invasive nature of OAE measurement, as well as its accuracy and objectivity in assessing cochlear function, provide numerous potential clinical applications, ranging from auditory screening to sensorineural diagnosis.

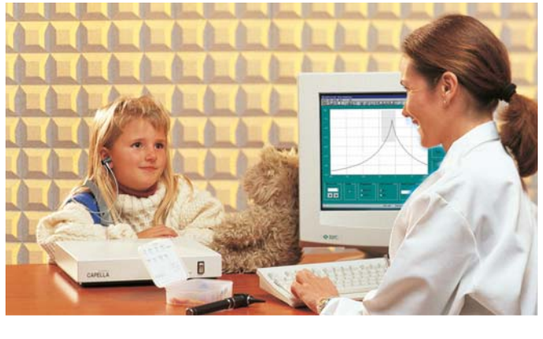
The Echo-Screen module includes an ultra-lightweight probe (4 grams) for screening babies and small children.

HEARING SCREENING
- *Difficult-to-test patients including infants*
- *Industrial (occupational hearing loss)*
- *Schools/Itinerant*

RESEARCH
- *Cochlear function*
- *Outer hair cells (OHCs)*
- *Basilar membrane*
- *Efferent innervation*

CLINICAL EVALUATION
Differential diagnosis (cochlear vs retrocochlear)
Monitoring:
- *Progressive hearing loss*
- *Ototoxicity*
- *Middle-ear surgery*
- *Noise-induced hearing loss*

The Capella hardware platform is compact, and can easily be connected to your PC.



Simple, compact, and easily portable
Capella is more than user-friendly. It's easy to set up. Software is installed directly from NOAH, and you can just plug the Capella hardware platform into your PC via the serial COM port – no additional hardware installation is necessary within the PC.

As with GN Otometrics' other software-based diagnostics equipment, Capella is completely portable. The system consists of a platform about the size of a laptop PC, and a probe assembly. Together with a laptop it weighs less than 5 kg (11 lbs.) and packs in seconds. In fact, it isn't necessary to unpack it at all if you purchase the optional hard-walled carrying case. All you have to do is open the case, take out the probe, power on the hardware and PC, and you're ready to test. And if you opt for the battery version of the hardware, you don't even need an AC power source.

The multi-function OAE and Tymp. probe can be supplemented by the Echo-Screen probe for baby screening (TEOAE only).

The computer people in audiology
GN Otometrics is the world's leading manufacturer of computerized audiologic equipment, both for diagnostics and hearing instrument fittings. Unlike the traditional stand-alone systems, we focus on providing solutions that utilize the power and speed of the PC.

Owners of our PC-based systems can upgrade their products with software rather than having to buy new hardware. Our products integrate with office management networks (we strongly support the NOAH™ standard) and hospital mainframe systems. Even equipment diagnostics and troubleshooting can be handled via modem. All in all, computerized audiologic equipment just makes more sense.

Four separate modules are available for Capella (and SOAE is included as standard).