

# MADSEN® Astera<sup>2</sup>



## Full range of tests

- LIRead™
- Pediatrics
- Tinnitus
- TEN Test
- Békésy
- QuickSIN™
- ABLB
- SISI
- Stenger
- Tone Decay
- Multiple Frequency Weber
- Masking level difference (MLD)
- High frequency 20 kHz
- Lüscher/DLI (Difference Limen Intensity)

## Excellence in audiometry

The MADSEN Astera<sup>2</sup> is a state-of-the-art clinical audiometer that enables you to work with precision and flexibility, whether you practice in a major health care facility or a one-person office. It combines the best features of traditional, stand-alone audiometers and newer PC-based systems so you can store, share and report all data in our OTOsuite software universe or integrate directly with NOAH and Electronic Medical Records.

### More intuitive. More possibilities.

The goal for the new MADSEN Astera<sup>2</sup> was to improve the functionality and introduce groundbreaking new assessment tools into daily audiometry. The result is a new and refined clinical audiometer with dedicated test modalities for pediatrics, LIRead™ and tinnitus. In addition to this, new features such as Click'n'Get™ and Score'n'Store™ makes it easy to stay focused on the patient. You have the choice of operating the audiometer either through the intuitive Sunshine™ interface optimised for touch screen, the Audiometer Control Panel or the PC keyboard or mouse depending on your preference.

### Future-proof design

The MADSEN Astera<sup>2</sup> is durable, comfortable and future-proof. Not only will users receive software upgrades for the life of the equipment, the Astera<sup>2</sup> is ready to meet future requirements of EMR (Electronic Medical Records) by incorporating standard data-transfer protocols.

## OTOsuite®

### Easy integration with other processes for seamless workflow

The MADSEN Astera<sup>2</sup> is part of the OTOsuite universe which means the audiometric workflow easily integrates with the immittance and fitting testing processes. This allows you to perform audiometry, fitting, counseling and verification in a seamless workflow. One-click data logging, combined immittance and audiometry reporting contribute to a more efficient testing process and help eliminate paperwork.

## Technical specifications:

### MADSEN Astera<sup>2</sup>

#### Channels

Two separate and identical channels

#### Frequency range

TDH39 earphones:	Standard frequencies: 125 - 12500 Hz
HDA 200 earphones:	Standard frequencies: 125 - 20000 Hz
Otometrics insert earphones:	Standard frequencies: 125 - 8000 Hz
BC:	Standard frequencies: 250 - 8000 Hz
SF:	Standard frequencies: 125 - 20000 Hz
FRESH noise stimulus*:	125 - 20000 Hz
NBN masking:	Available in entire frequency range

\* Range may be limited by choice of transducer

#### Frequency resolution

1/6, 1/12, 1/24 and 1/48 octave as well as 1 Hz (You can store up to 24 points for each audiometry curve)

#### Level range

Maximum output will be limited by the transducer

AC:	-10 to 120 dB HL (500 to 4000 Hz; supra-aural earphone)
BC:	-10 to 80 dB HL (1500 to 3000 Hz; mastoid placement)
SF:	105 dB HL (Note: with external amplifier)

#### Level accuracy

Entire level range (AC):	125 to 5000 Hz: ±3 dB
	5000 to 20000 Hz: ±5 dB
Entire level range (BC):	250 to 5000 Hz: ±4 dB
	5000 to 8000 Hz: ±5 dB

#### Level resolution

1, 2, or 5 dB step resolution over the entire range

#### Stimulus types

Tone
Warble
Pulsed tone
Pulsed warble
FRESH noise (FREquency-Specific Hearing assessment noise)
Pulsed FRESH noise

#### Stimulus presentation

Normal:	The signal is presented when the Stimulate button is pressed
Continuous ON:	The signal is interrupted when the Stimulate button is pressed
Pulse:	The signal is pulsed
Pulse duration:	225 ms on and 225 ms off (default).

#### Masking types

Narrow Band Noise	
• AC and BC	Correlated
• SF	Non-correlated <sup>(a)</sup>
Speech Weighted Noise	
• AC and BC	Correlated
• SF	Non-correlated <sup>(a)</sup>
White Noise (Wide band noise)	
• AC and BC	Correlated
• SF	Non-correlated <sup>(a)</sup>

<sup>(a)</sup> A maximum of 3 non-correlated simultaneous masking signals

#### Stimulus modulation

FM (Warble):	Adjustable modulation rate and depth: Modulation rate: 1-20 Hz (default: 5 Hz) Modulation depth: 1-25% of center frequency (default: 5%)
SISI:	5, 2, 1 dB increments

#### Special tests

TEN Test, QuickSIN (optional), SAL Test, MLD, ABLB, SISI, Weber, Rinne, Stenger, Tone Decay, Tinnitus, LiPread™ (CUNY, MLST-C/A) (optional), Pediatric (optional), Békésy, DLF, DLI, HLS, MHA, Multiple Frequency Weber

#### Total harmonic distortion

Air < 2.5 %  
Bone < 5 %

#### Selectable transducers

AC:	TDH39, HDA 200, and Otometrics insert earphones
BC:	B71 (Mastoid / Forehead)
SF:	Passive sound field speaker, using the built-in amplifier in MADSEN Astera <sup>2</sup> , or Sound field speaker with built-in amplifier or external amplifier, with both types using the line output from MADSEN Astera <sup>2</sup>

(Transducer options depend on how MADSEN Astera<sup>2</sup> is ordered and calibrated)

### Outputs

AC:	3 x 2 mono jacks, 1/4 "
BC:	2 x mono jacks, 1/4 "
SF power output:	5 x terminals, 5 x 40 W peak, 8Ω load
SF line output:	3 x min XLR 6 pin (for 5 x balanced line outputs)

### External inputs

CD/Analog line in:	0.2 to 2.0 Vrms, 10 kΩ 2 x RCA phone
Talk Back microphone:	Electret microphone
Input voltage:	0.002 to 0.02 Vrms
Input resistance:	2.21 kΩ. 3.5 mm jack

### USB port connector

Type:	USB device port
Interface:	USB 2.0
Speed:	Full-speed (12 Mb/s)

### Dimensions

Approx. 325 x 255 x 60 mm (12.8 x 10 x 2.4 inches)

### Weight

Approx. 1.3 kg (2.85 lb)

### Power supply

External power supply, type:	
Delta Electronics, Inc.	Output: 24 V, 3.75 A
	Input: 100-240 V, 50-60 Hz

### Standards

Audiometer:	EN60645-1, Type 1, EN60645-2 Type A-E, ANSI S3.6
Patient Safety:	Complies with IEC 60601-1, Class 1, Type B; AAMI ES60601-1; CSA C22.2 NO. 60601-1-08-CAN/CSA
EMC:	IEC 60601-1-2

### Audiometer Control Panel

#### USB port connector

Type:	USB device port
Interface:	USB 2.0
Speed:	Full-speed (12 Mb/s)

#### Dimensions

Approx. 410 x 290 x 36 mm (16.1 x 11.4 x 1.4 inches)

#### Weight

Approx. 2.1 kg (4.6 lb)

#### Power supply

No external power supply. Supplied by the USB (5 V)

(If you are using a USB hub, use a powered USB hub)

### PC System Requirements

- 1.5 GHz processor or higher (2 GHz recommended)
- 1GB RAM (2 GB recommended)
- 2.5 GB free disk space for installation of the OTOSuite software. Additional disk space is needed for installation of prerequisites.
- Windows XP Professional SP3 (X86), Windows 7 Professional (X64), Windows 7 Professional (X86 / 32-bit), Windows 8 Professional (X64)
- USB port for connecting accessories, v.1.1 or higher (v.2.0 or higher for OTOCam 300)
- DVD drive
- 32 bit color display, 1024x768 screen resolution
- 128 MB graphic memory
- Windows-compatible sound card
- If required, NOAH 3.5.2, NOAH 3.5.2 for ENTs, or higher, or NOAH 4 or NOAH 4 for ENTs, for NOAH mode operation.