

Innovation,  
Continuity,  
Reliability,

# OAE Test System

by Maico Diagnostics



**MA 25**  
Screening Audiometer



**Pilot**  
Pure Tone Audiometer



**Race Car**  
Audio/Tymp

## MAICO Product Line:

- Screening Audiometers
- Diagnostic Audiometers
- Middle Ear Analyzers
- OAE Test Systems
- PC Compatible Products

This brochure contains only a small segment of the comprehensive product portfolio of MAICO. To find out more about other solutions, please contact us at:

**Telephone: 888-941-4201**

*Introducing*

**The Newest ERO-SCAN**

**ERO-SCAN**<sup>®</sup>  
Screener and Diagnostic **PLUS**



Available in two versions:  
**Screener Plus**  
with 4 frequency  
DPOAE testing Protocols  
**Diagnostic Plus**  
with 4, 6 and 12 frequency  
DPOAE testing protocols



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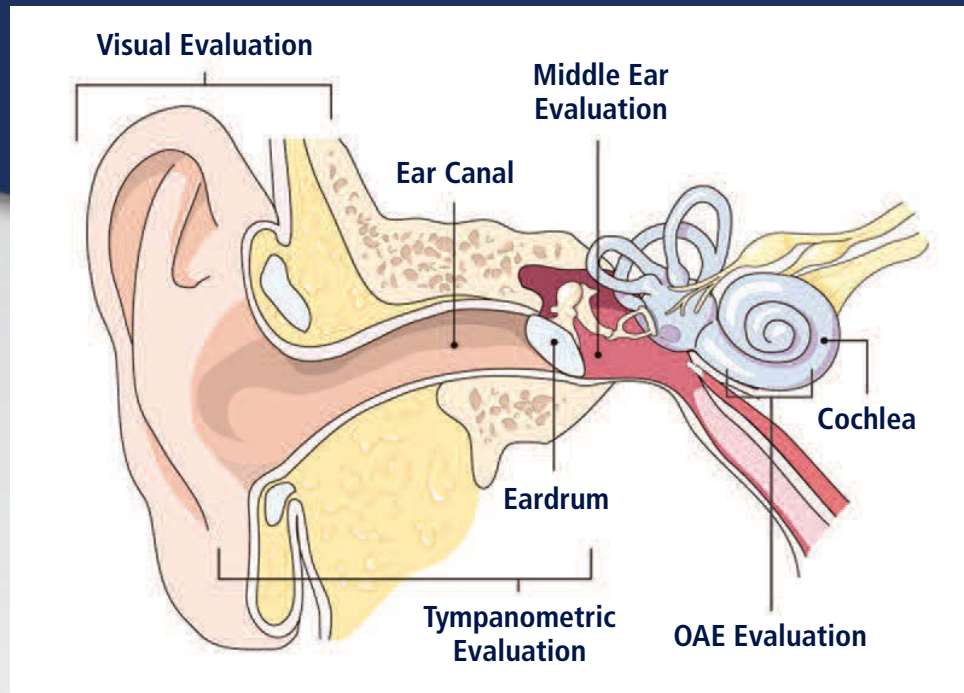


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# Ero•Scan - OAE Test System

## Ideal for...

- Audiologists
- Physicians
- Pediatricians
- Birth-to-3 Programs
- School and Headstart Programs
- Nurseries



## Otoacoustic Emissions (OAEs)

Otoacoustic emissions are sounds that are produced by the cochlea (outer hair cells) and can be measured in the ear canal. When sound passing through the ear canal reaches the cochlea, the vibration stimulates thousands of tiny hair cells. This creates a byproduct that can be detected and measured: otoacoustic emissions.

OAEs only occur in a normal cochlea with normal hearing sensitivity. If there is damage to the outer hair cells, which produces hearing loss, then OAEs will not be present. In general, OAEs will be present if hearing is at 30 dB or better.

PASS test results mean OAEs were detected. If there is damage to the outer hair cells producing a mild hearing loss, OAEs may not be present. The test result is REFER and the patient may be at risk for possible communication difficulties and can benefit from further diagnostic assessment.

This procedure is beneficial in assessing children through a hearing screening program or that cannot be tested by conventional means. For example, pure tone audiometry requires a response from the child which may be an unrealistic expectation and time-consuming.

## Physicians

Otoacoustic emissions testing is an ideal tool for hearing screening because it can quickly identify a possible hearing loss and signal referral for more comprehensive testing.

## Pediatricians

Hearing loss is not always identified by newborn screening. Pediatricians are the first professionals the parents approach with concerns about their child's hearing. Since hospital-based and private practice pediatricians screen infants and young children for hearing loss and middle ear disorders, incorporating OAEs into this routine testing can be greatly beneficial.

## Head Start and School Screening

The MAICO ERO•SCAN is an effective tool for Head Start and school programs as a means to document hearing testing as well as screen large numbers of children very quickly. Since there is no need for a behavioral response from the patient, it is easy to test ESL and special needs children.



## Accessories:

- Standard:**
- Hand-held unit
  - Probe
  - Carrying Case
  - Micro USB charging cable
  - Database software
  - Micro USB connector
  - Disposable ear tip kit and tubes
  - User Manual
  - Quick Guide
  - Calibration Certificate
- Optional:**
- Thermal dot matrix printer
  - Replacement ear tips
  - Replacement probe tubes
  - Replacement cables
  - Replacement probe

Product Feature	EroScan Screener	EroScan Diagnostic	TE (Upgrade)
DPOAE	Y	Y	Y
Diagnostic (CPT)	92558	92558, 92587 and 92588	See DPOAE
Portable	Y	Y	Y
External Probe	Y	Y	Y
Maximum Number of Test Frequencies or Bands Reported	4 DP	12 DP	6 TE
Frequency Range (kHz)	2-5 DP	1.5-12 DP	Screener: 1.5-4 TE Diagnostic: 7-4 TE
High Frequencies DPs to 12 kHz	N	Y	NA
Default Pass/Refer	Y	Y	Y
Auto Start	Y	Y	Y
Number of Test Protocols	2 DP	5 DP	Screener: 2 TE Diagnostic: 3 TE
Battery Operated (rechargeable)	Y	Y	Y
Number of tests per charge (minimum)	1000	1000	1000
Memory (# tests)/Maximum	250	250	250
Tests All Ages	Y	Y	Y
Tests Patients with PE Tubes	Y	Y	Y
Customizable Parameters:			
• Customizable Test Protocols	N	Y	Screener: N Diagnostic: Y
• Customizable Pass Criteria	N	Y	Screener: N Diagnostic: Y
• Frequency Range	N	Y	Screener: N Diagnostic: Y
• Averaging Time	N	Y	Screener: N Diagnostic: Y
• # Freq. to Pass	N	Y	Y
Database Software Included	Y	Y	Y
• Load pt. names to device	Y	Y	Y
• Print Full Page (Color)	Y	Y	Y
• Field for Interpretation	Y	Y	Y
• OZ Compatible	Y	Y	Y
• HI*TRACK Compatible	Y	Y	Y
Prints Numeric Data	Y	Y	Y
Prints Graphic Data	Y	Y	Y
Date/Time on Print-Out	Y	Y	Y
Carrying Case (Included)	Y	Y	NA
Thermal Printer	Option	Option	NA
All test protocols changes can be made through OAE unit alone (Additional software and computer NOT required to change protocols)	Not Customizable	Y	Screener: N Diagnostic: Y



# Protocols/Specifications

## DPOAE Protocols

	Name	# of Freq.	F2 Freq. [kHz]	L1/L2	Averaging Time	Pass SNR	# Passing Freq. for Test Pass
Screening	DP 4s	4	2, 3, 4, 5	65/55	4 sec	6 dB	3
	DP 2s	4	2, 3, 4, 5	65/55	2 sec	6 dB	3
Diagnostic	DP 2.0-5.0	4	2, 3, 4, 5	65/55**	4 sec**	6 dB**	3**
	DP 1.5-6.0	6	1.5, 2, 3, 4, 5, 6	65/55**	4 sec**	6 dB**	0**
	DP 1.6-8.0	12	1.6, 2, 2.5, 3.2, 3.6, 4, 4.5, 5, 5.6, 6.3, 7.1, 8	65/55**	4 sec**	6 dB**	0**
	DP 1.5-12.0	12	1.5, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12	65/55**	4 sec**	6 dB**	0**

(Diagnostic version also includes DP 4s screening protocol)

## TEOAE Protocols

	Name	# of Freq. Bands	Freq. center bands [kHz]	Averaging Time (max)	Pass SNR	# Passing Freq. for Test Pass
Screening	TE 64s	6	1.5, 2, 2.5, 3, 3.5, 4	64	4 dB	3
	TE 32s	6	1.5, 2, 2.5, 3, 3.5, 4	32	4 dB	3
Diagnostic	TE1.5-4.0	6	1.5, 2, 2.5, 3, 3.5, 4	64 sec**	4 dB**	3**
	TE0.7-4.0	6	0.7, 1, 1.4, 2, 2.8, 4	64 sec**	4 dB**	0**

(Diagnostic version also includes TE64s screening protocol)

\*\* Customizable fields:  
 L1/L2 : DP: 40 to 70 dB SPL  
 Average time: : DP: 0.5, 1.0, 2.0 or 4.0 sec  
 : TE: 4, 8, 16, 32 or 64 sec  
 Pass SNR : DP and TE: 3 dB to 10 dB  
 Passing Freq. for Test Pass : DP and TE: 1 to 12



## Utilizing OAEs

- Follow-up infants from nursery screening and well-baby checks
- Monitor cochlear function in those who are taking medication that is potentially ototoxic
- Identify educationally significant hearing loss
- Detect late-onset hearing loss
- Differentiate possible cochlear versus retrocochlear pathology
- Identify suspected malingering or non-pathological hearing loss
- Identify autoimmune or sudden hearing loss
- Provide objective cochlear screening in both non-cooperative patients and cooperative patients where behavioral testing cannot be performed
- Detect early signs of noise exposure in those who are exposed to high noise levels

## Specifications

<b>Measurement Type:</b>	Distortion Product Otoacoustic Emissions (DPOAE) Transient Evoked Otoacoustic Emissions (TEOAE)	<b>Dimensions and Weight Unit:</b>	Dimensions: W X D X H 2.58 X 1.23 X 5.78 in. Weight: 180 g (6.4oz.)
<b>Frequency Range:</b>	Screening version: DPOAE: 2.0 kHz to 5.0 kHz TEOAE: 1.5 kHz to 4.0 kHz  Diagnostic version: DPOAE: 1.5 kHz to 12.0 kHz TEOAE: 0.7 kHz to 4.0 kHz	<b>Power Supply:</b>	Lithium-Ion rechargeable
<b>Stimulus Intensity Range:</b>	DPOAE: 40 dB SPL to 70 dB SPL TEOAE: 83 dB SPL peak equivalent (±3 dB)	<b>Battery Life:</b>	1000 tests per charge, minimum 20 hours on-time
<b>Microphone System Noise:</b>	-20 dB SPL @ 2 kHz (1 Hz bandwidth) / -13 dB SPL @ 1 kHz (1 Hz bandwidth)	<b>User Interface:</b>	OLED Display to provide user information and progress of measurement 4-button keypad to control instrument functions
<b>Dimensions and Weight Probe:</b>	Length: 1.0 meter (40 in.) Weight: 28 g (1.00 oz.)	<b>Connectors / Communications:</b>	Integrated USB communication capability for battery charging and communication with PC-based database programs or an optional printer HDMI Connector for connection to the Micro-Probe Integrated Bluetooth Class 2 + EDR with SPP Protocol for communication with optional printer

## Ero•Scan Benefits

### Results are displayed as Pass or Refer

No need for interpretation. The equipment is automated and will provide easy to read and easy to interpret results. Training is quick and extremely intuitive!

### Test is completely objective

No response from the patient is necessary. Easily test uncooperative or non-English speaking patients.

### Accurate results

The patented ERO•SCAN noise algorithm allows for reliable testing in up to 70 dB of background noise, which means fewer false refer results.

### Test both ears in less than a minute

Testing takes less than 30 seconds per ear.

### Memory

The ERO•SCAN contains memory to store 250 tests.

### Portability

The ERO•SCAN hand-held unit is rechargeable with a minimum of 1000 tests between charge and allows you to move from room to room. The remote probe makes it easy to maneuver around the head of your patient to attain a tight ear seal.

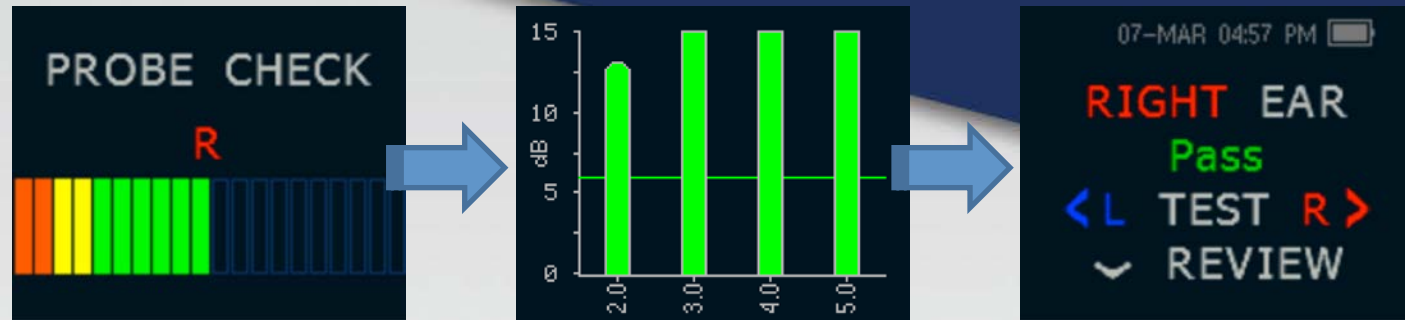
### Managing data

Printing reports and tracking data is easy with the database software.

### State reporting

The database integrates data into HiTRACK or OZ.

# Screening and Diagnostic Testing



## Screening

ERO•SCAN Screener test system provides a rapid measurement and documentation of Distortion Product Otoacoustic Emissions (DPOAEs) or Transient Evoked Otoacoustic Emissions (TEOAEs) at several frequencies. This device is an ideal screening tool for professionals involved in a hearing screening program or needing a quick assessment of the cochlear system due to the "Pass" or "Refer" outcomes provided. This device is used for all age groups but an ideal solution for pre-school and kindergarten children and even newborn infants.

- Qualified protocols built into the device
- 4 DPOAE test frequencies reported
- Integration to state tracking systems, Hi-Track or Oz

## Diagnostic

ERO•SCAN Diagnostic test system is an effective testing tool for otologists, audiologists and otolaryngologists that provides objective information about hearing and middle ear status with only one test. Identify outer hair cell function in the cochlea, assess middle ear function and differentiate between organic and non-organic functional hearing loss. OAEs are also beneficial in assessing patients who cannot be tested by conventional methods.

- 1.5 to 12 kHz Frequency range with up to 12 test frequencies reported
- Customizable test protocols
- TEOAE available as an upgradeable option

## Reimbursement

Otoacoustic emissions are reimbursable using the Current Procedural Terminology (CPT) codes. The most typical CPT code for OAE diagnostic.

### 92558:

Evoked otoacoustic emissions, screening (qualitative measurement of distortion product or transient evoked otoacoustic emissions), automated analysis.

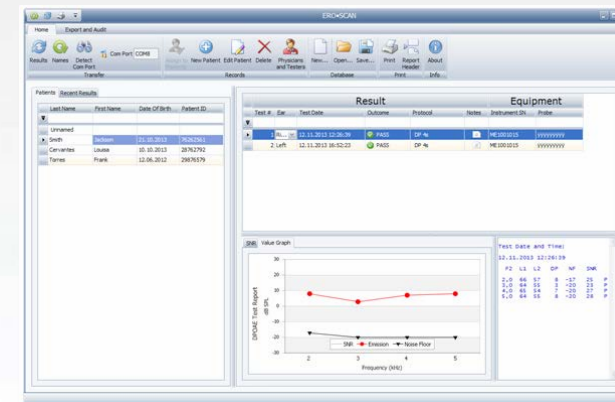
### 92587:

Distortion product evoked otoacoustic emissions; limited evaluation (to confirm the presence of absence of hearing disorder, 3-6 freq.) or transient evoked otoacoustic emissions, with interpretation and report.

### 92588:

Distortion product evoked otoacoustic emissions, comprehensive diagnostic evaluation (quantitative analysis of outer hair cell function by cochlear mapping, minimum of 12 freq.), with interpretation and report.

The ERO•SCAN Database Software is a data management tool that compliments the MAICO ERO•SCAN. It provides the ability to transfer patient OAE test data from the device to a PC for the purposes of viewing, archiving, managing and printing OAE reports. Using the database also gives you the means to create letter sized, detailed reports that can be easily filed or faxed. You can also create a "paperless" office by saving the test results as a PDF for electronic filing or email.



# Database Software

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7625 Golden Triangle Drive  
Eden Prairie, MN 55344  
888.941.4201

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**Patient Name:** Smith  
John

**Patient ID:** 578264  
**Date of Birth:** 1/1/2014  
**Sex:** Male

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**DPOAE Test Report**  
Right Ear: PASS

Test Date: 2/26/2014 1:50:24 PM Protocol: DP 4s Avg Time: 4  
Instrument: V100.05 ME0000115 MEdemo34 Frequencies: 4, minimum for a pass: 3

F2	L1	L2	DP	NF	SNR
2.0	65	55	-11	-17	6
3.0	65	57	-2	20	18 P
4.0	67	56	4	-20	24 P
5.0	66	55	7	-20	27 P

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**DPOAE Test Report**  
Left Ear: PASS

Test Date: 2/26/2014 1:50:24 PM Protocol: DP 4s Avg Time: 4  
Instrument: V100.05 ME0000115 MEdemo34 Frequencies: 4, minimum for a pass: 3

F2	L1	L2	DP	NF	SNR
2.0	65	52	-14	-17	3
3.0	62	53	-2	-20	18 P
4.0	63	53	-1	-20	19 P
5.0	63	53	3	-20	23 P

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