TympStar Pro 1.2:

Implementing New Features for Efficient Testing

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- Part of a team of 3 three audiologists
- Doctorate of Audiology from AT Still University.
- 15 years experience include providing manufacturing support as well as managing educational audiology training for an international audiologic equipment company.
- Clinician in both ENT offices and a retail hearing center conducting audiologic evaluations and hearing aid fittings on all patient populations including infants, adults, geriatric, and special needs patients.
- Time at GSI focused on training and education. In addition to webinars and phone training, and speaks at audiology congresses and conferences around the world.

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Course Outcomes

- After this course, the participant will be able to navigate the configuration application to customize settings in the TympStar Pro and implement new features into testing routine.
- After this course, the participant will be able to perform the Multi Hz test using the TympStar Pro.
- After this course, the participant will be able to perform the Patluous ET test using the TympStar Pro.

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Agenda

- Overview
- Review Updates
  - *New* Multi-Hz
  - *New* Patulous ET
  - *New* Seek Below Start
  - *New* Baseline Configuration Options
- Config App Updates
- Summary

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TympStar Pro™ – Overview

- Precise, Reliable, Efficient
- Large Color Touch Screen Display
- Ultra-light Probe
- Pre-Programmed Testing Protocols
- Multi-Frequency, Multi-Component Tympanometry
- Integrated Special Tests
  - Multi Hz
  - ARLT
  - Patulous ET

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Front Panel

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Touch Screen Display

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Probe or Shoulder Box

- Change ear-side
- Launch test

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Most Frequently Asked Questions

- Why is there a screening option on a clinical middle ear analyzer?
  - Fast method to evaluate middle ear status
  - Determine if more testing is appropriate
  - Infants, children and difficult to test patients
- What's the difference between screening an diagnostic?
  - Screening: As fast as possible (600/200 daPa per second), auto start, and recording will stop after a peak is detected and the tracing returns to baseline
  - Diagnostic: Full control of parameters such as pump speed, baseline, probe tone, start pressure, sweep direction, and admittance.

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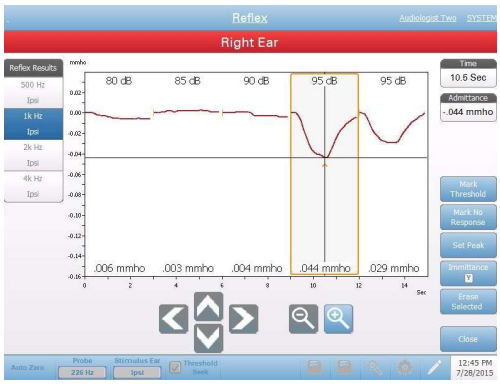
Most Frequently Asked Questions

- What is the fastest way to do reflex thresholds?
  - Fully Automatic: Auto Sequence
  - Semi-Automatic: Threshold Seek ON
  - Manual: Threshold Seek OFF



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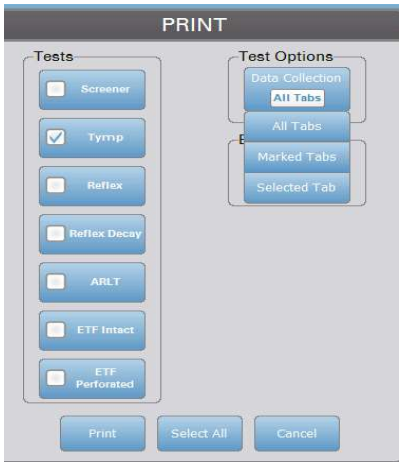
Most Frequently Asked Questions

- **How Do I Manage Direct Printing:**
  - **Screen Print** – prints the data displayed on the screen
  - **Summary Print** – prints the marked data to a one page report that includes Tymps and Reflex/Reflex Decay test results in tabular format (no graphs)
  - **Session Print** – prints all of the marked data from all test tabs and includes reflex and reflex decay graphs.
  - **Dialog Print** – displays the print dialog where you may choose what to print. "Ask me what to do"



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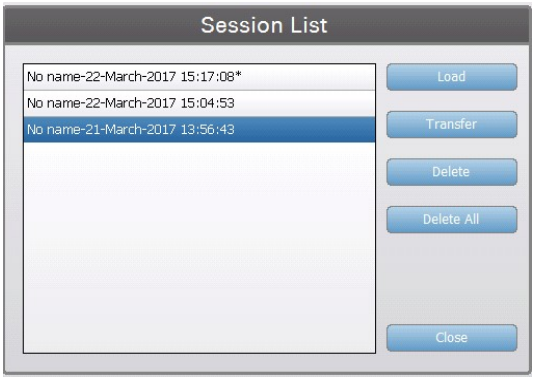
Most Frequently Asked Questions

- Can I View Stored Sessions
  - Patient Screen→Session List
  - Load any previously saved test session
  - Current test session is labeled with an "*"

NOTE: data is active/not locked so it may be altered by the user.



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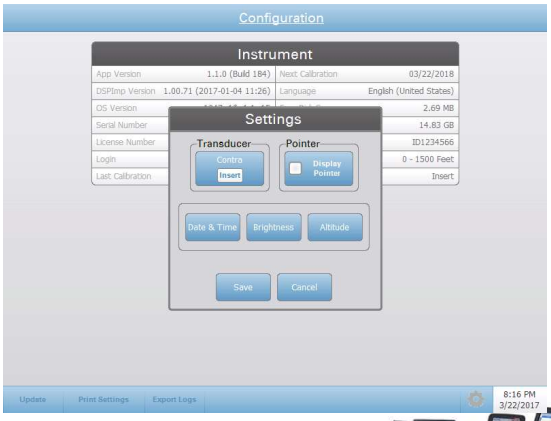
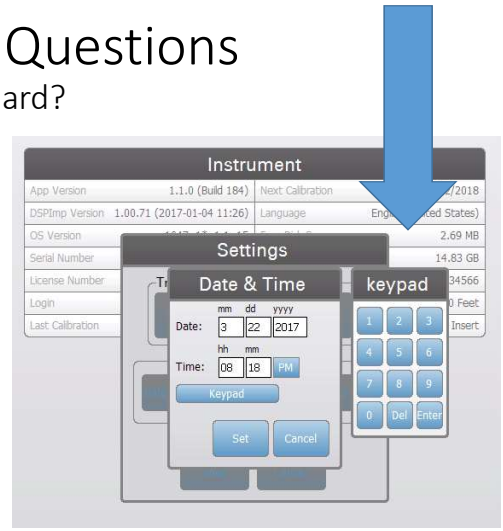
Most Frequently Asked Questions

How do I set the time without a keyboard?





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Most Frequently Asked Questions

Can I load a custom configuration without a computer?

- Now possible to load a custom configuration from a USB

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TympStar Pro v1.2

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What's New with 1.2?

- Multiple Frequency Tympanometry Test (Multi-Hz)
- Patulous Eustachian Tube Test
- Seek Below Start Level-Reflexes
- Normative data range displays for both compensated and uncompensated tymps for 1000 Hz probe tone.
- Set baseline configuration to Auto, Positive Tail, or Negative Tail.

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Multi-Hz Tympanometry

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Multi-Hz Test: Resonant Frequency of the ME

- The frequency at which the middle ear system is the most efficient for energy transfer
- The frequency at which the springy and mass components have equal contribution

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Resonance Frequency

- Colletti (1975) showed that as the probe frequency increased the tympanometric shape changed in a predictable and systematic way
  - Moved from the familiar single peak shape to slightly notched, and ending up a deep V shape at higher frequencies
- The frequency where notching appears indicates the Resonant frequency
- Normal Ranges for Resonance Frequency

  600Hz to 1340 Hz (Colletti 1977)

  800Hz to 1200 Hz (Shanks 1984)

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Resonance Frequency

- Low Frequency Probe Tone (226Hz)
  - Tymp will be Λ
- Mid Frequency Probe Tone (678Hz & 1000Hz)
  - All tymps will have multiple peaks - ΛΛ, **inverted W**
- High Frequency Probe Tone (above resonance frequency)
  - Tymps will continue to evolve to a V shape – opposite of the 226Hz

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Multi Hz Testing – TympStar V2 (Classic)

- First – Probe tone sweep at +200 daPa
- 250Hz to 2000Hz in 50Hz steps
- Then a Y, 226Hz tymp is taken to identify TPP
- A second probe tone sweep is performed at TPP
- Component (Y, B, G) and phase values are calculated for +200 and TPP sweeps and subtracted from each other to obtain the 'Delta B' curve

Test Time: 60-90 seconds plus; multiple button presses

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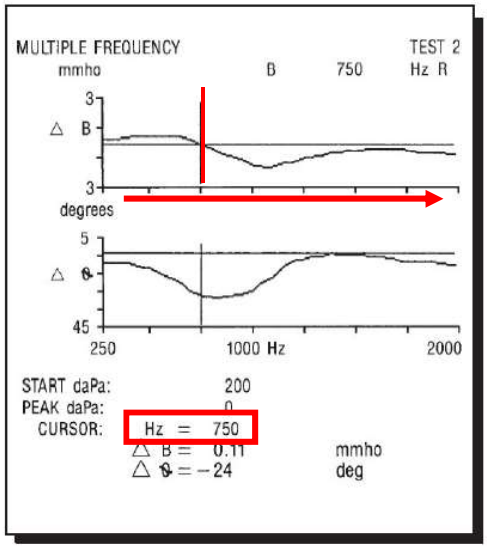
Multi Hz Testing TympStar v2 Classic

Delta B curve (top) displays the total susceptance as it changes With probe tone frequency 250-2000Hz.

Resonance occurs when curve crosses 0 mmhos.

As frequency increases, the total susceptance progresses from positive values (stiffness controlled) toward zero (resonance) to negative value (mass controlled).



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Multi-Hz Testing TympStar Pro

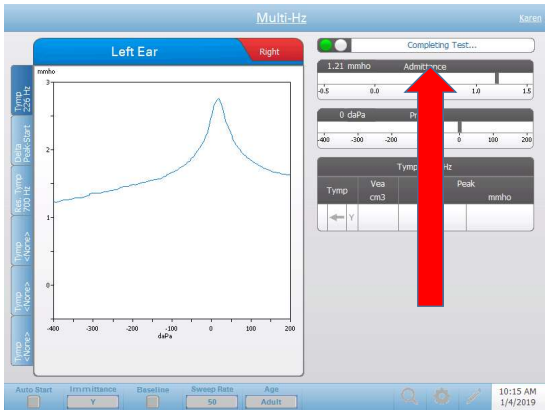
- Measurements and calculations are exactly the same as the Classic.
- A single sweep using a wideband 'probe tone' for the pressure range selected—default +200 to -400 daPa
- All calculations are performed from the single sweep results
- Automatically displays 226 Hz Y tymp, Delta B graphs, resonant frequency tymp.
- Can store only 1 Multi-Hz test per ear

Multi Hz TympStar Pro

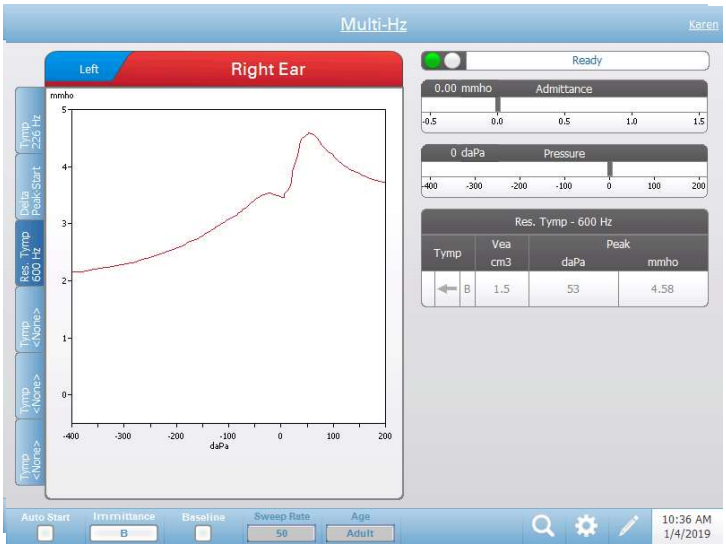
Press start

1. Will run a tympanogram with the wideband stimulus
2. Will analyze data
   - Test in Progress
   - Processing Data at Pressure
   - Processing Frequency
   - Completing Test

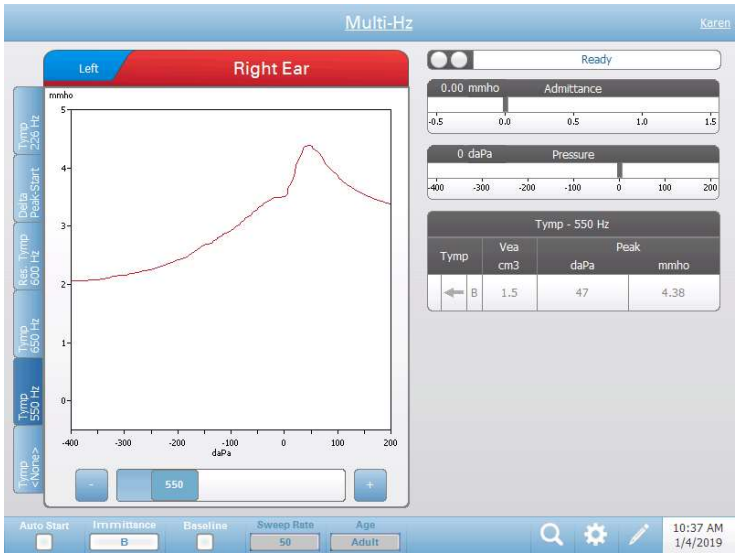
Total time: ~25 seconds

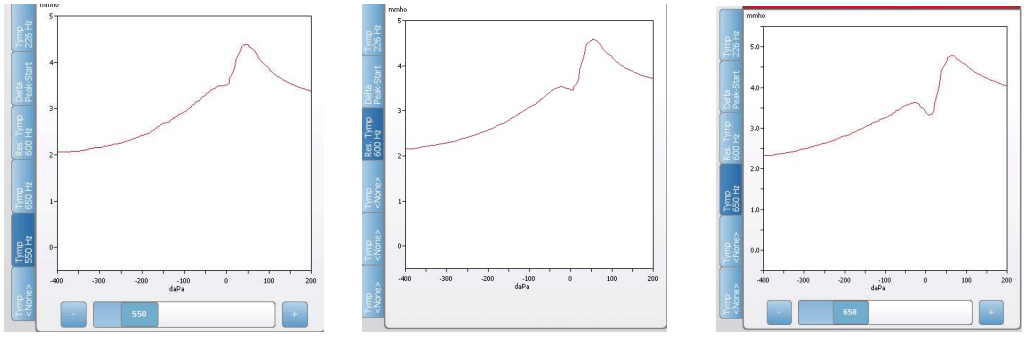


Multi-Hz Results



Other Tabs





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Multi Hz with TympStar Pro

- 5x faster – complete test in 13 seconds.
- Automatically displays 226 Hz tymp, Delta B, tymp at resonance frequency
- Allows you to scroll through the tymps from 250 Hz to 2000 Hz to verify resonance frequency.

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Diagnostic Use of MultiHz

- Normal resonance frequency range: 800 to 1200 Hz
  - Resonance is point where starting admittance value equals the “tymp peak” admittance value
- Disarticulation: decreases resonance Hz below 600 Hz
- Otosclerosis: increases the resonance Hz above 1300 Hz
- Documentation pre- and post- surgery—resonant freq should decrease post-stapedectomy
- Confirm success of surgery for physician and patient

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Multi-Hz

- Multi Hz test type will be included with all TympStar Pros

- Upgrades Require:

  Firmware Update

  Probe Calibration

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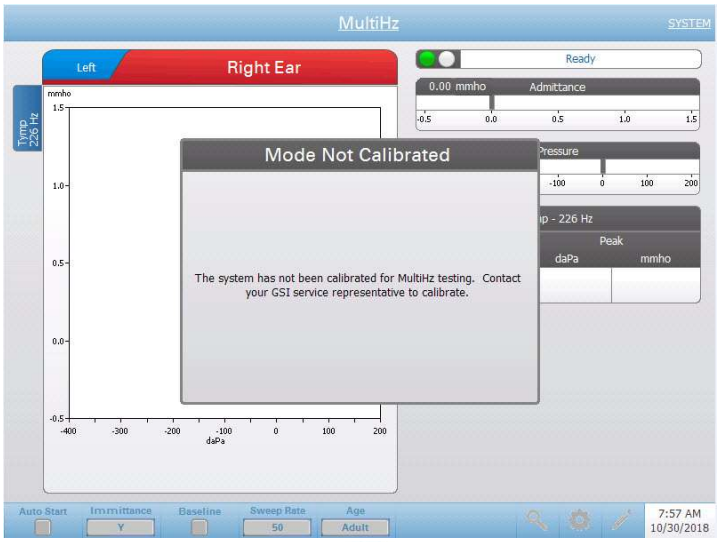

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Test Results

- Print to PDF
- Print to MPT III thermal printer
- Print to LPQ80 printer
- Print to any compatible HP printer

NOTE: this test will be compatible with GSI Suite in the next release

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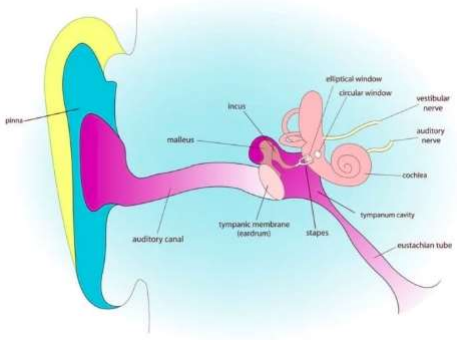
Patulous ETF Test

What is a Patulous ET?

- Persistently open Eustachian Tube
- Symptoms
  - Aural fullness or plugged up feeling
  - Own voice is loud
  - Crackling sound when chewing
  - Loud breathing
  - Tinnitus
  - Hyperacusis



What causes a Patulous ET?

- Significant weight loss
- Hormonal changes--pregnancy
- Medications
- Scarring after surgery (adenoidectomy)
- Radiation
- Neurologic disorders causing muscle atrophy
- Stress

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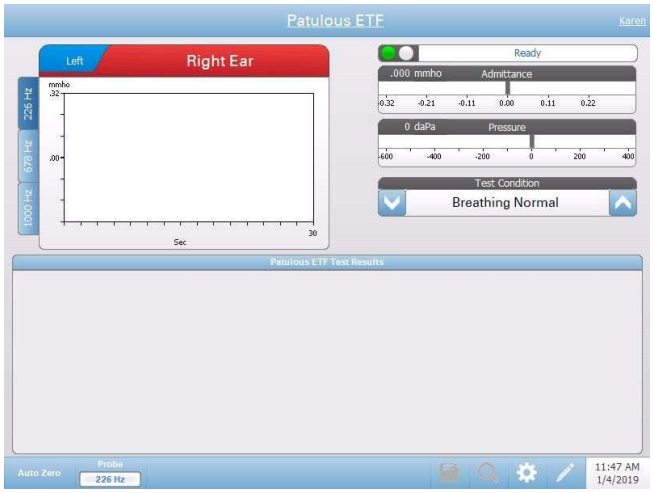
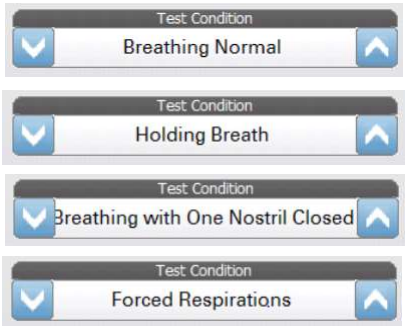
Patulous ETF on the TympStar Pro

- Measure admittance at peak pressure over time
- No stimulus
- Observe tracing for rhythmic movement
- Press Start to pressurize the ear
- Press Present to start the recording



Patulous ETF on the TympStar Pro

- Adjustable time base
- Customize labels for test conditions using Config App



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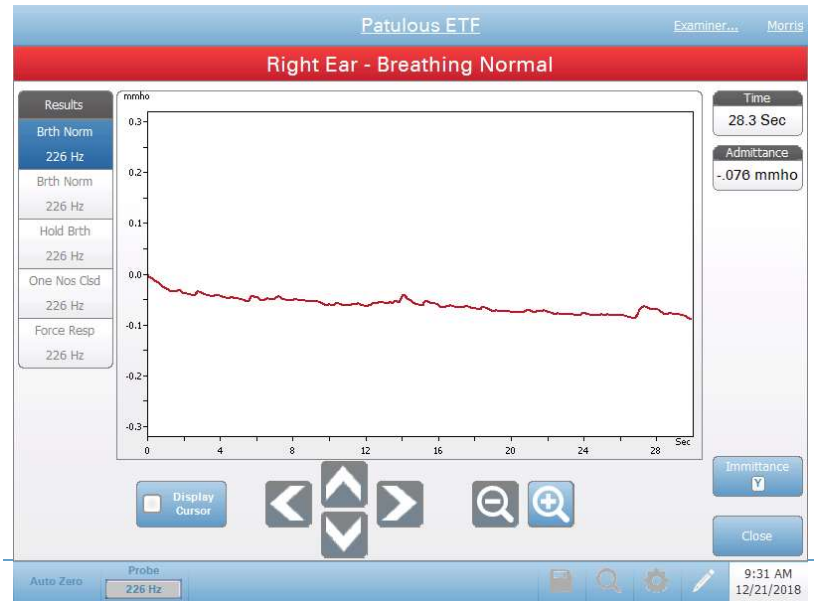
Test Results-Normal

- Can save multiple tracings for the same test condition.
- Can save up to 8 tracings.

Zoom



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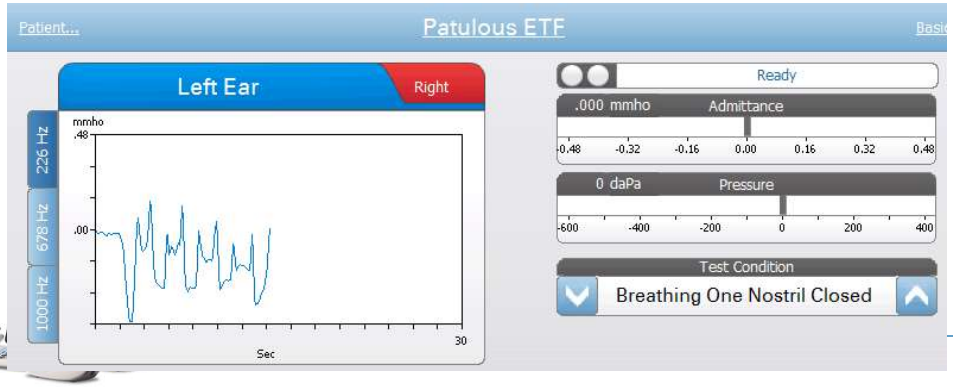
Test Results Abnormal

- Rhythmic fluctuation of compliance (mmho)
- Fluctuation of greater than .07 mmho in any test condition is considered abnormal



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References

J Am Acad Audiol 22:201–207 (2011)

Use of Middle Ear Immittance Testing in the Evaluation of Patulous Eustachian Tube

DOI: 10.3766/jaaa.22.4.2

Andrew P. McGrath*†
Elias M. Michaelides‡

J Am Acad Audiol 4: 53–57 (1993)

Patulous Eustachian Tube Identification Using Tympanometry

David F. Henry*
Joseph R. DiBartolomeo†

Test Results

- Print to PDF
- Print to MPT III thermal printer
- Print to LPQ80 printer
- Print to any compatible HP printer

NOTE: this test will be compatible with GSI Suite in the next release

Seek Below Start Level

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Reflex Threshold Setting

- Applies when using Threshold Seek for reflexes.
- Seek Below Start level = On:
  - If a reflex is detected at the initial Start Level of Threshold Seek, the intensity level will decrease until no reflex is detected and then increase to find threshold.

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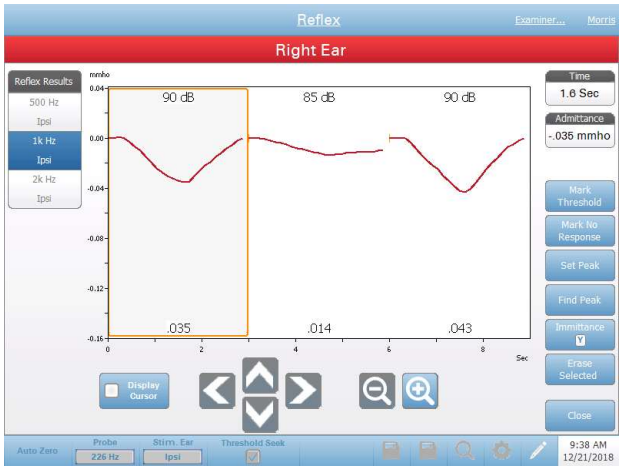
Examples

Start Level: 100
Threshold level: .02
Verification: Repeat

Examples

Start Level: 90
Threshold level: .02
Verification: Repeat



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Examples

Start Level: 85
Threshold level: .02
Verification: Repeat

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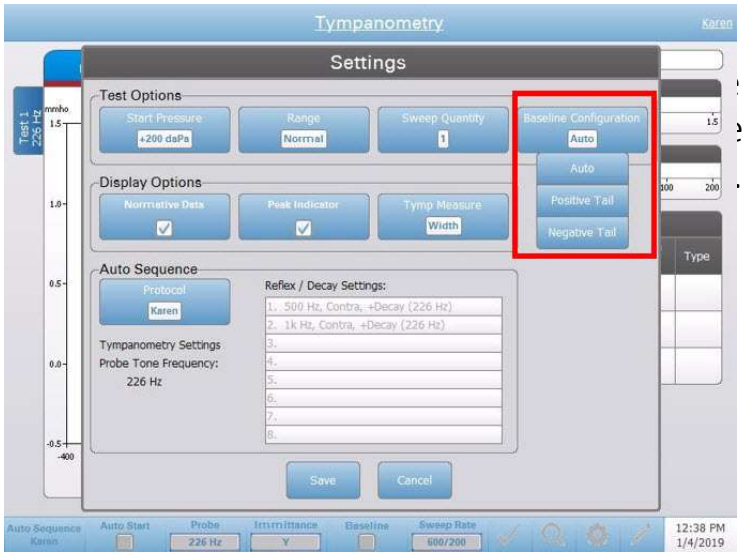
Baseline Configuration Options

What is it?



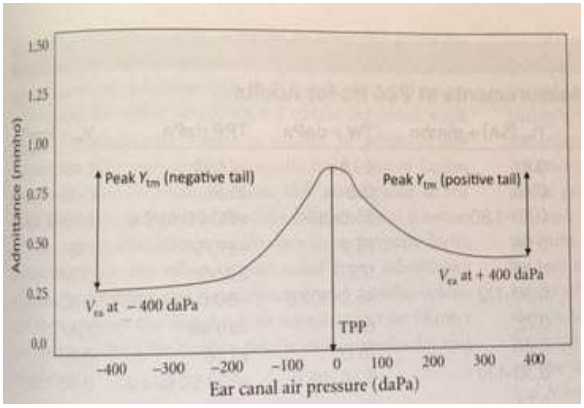
Course presented in partnership with

3 Options

1. **Positive Tail (+200):** Vea/Admittance for all probe tones is calculated at the positive tail.
2. **Negative Tail (-400):** Vea/Admittance for all probe tones is calculated at the negative tail.
3. **Auto** (default setting/**recommended**): Vea/Admittance for a 226Hz probe tone tympanogram is calculated at the positive tail and for a 1000Hz probe tone tympanogram is calculated from the negative tail.

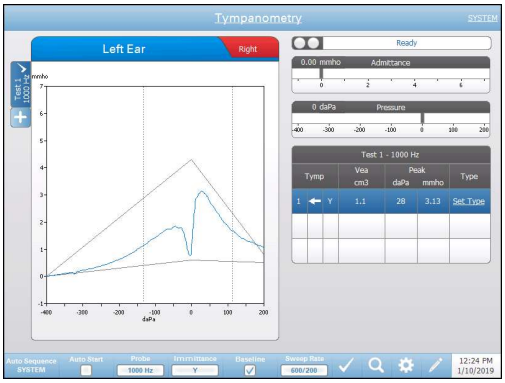
Baseline Configuration

- Negative-tail compensated static admittance was selected because of the larger mean value on the negative tail side.
- The larger value makes it easier to distinguish between a normal tympanogram and one that is flat or nearly flat.



Baseline Configuration

- Negative Tail Calculation for 1000Hz
- Implemented so 1000 Hz norms from Margolis paper display correctly.



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Config App Changes

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Customizing TympStar Pro Configuration Application

- Set preferences
- Define Diagnostic and screening protocols
- Set Auto Sequences

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Custom Protocols

- Adjust defaults
- Create protocols for specific patient populations
- Available for Screener, Diagnostic and Auto Sequence

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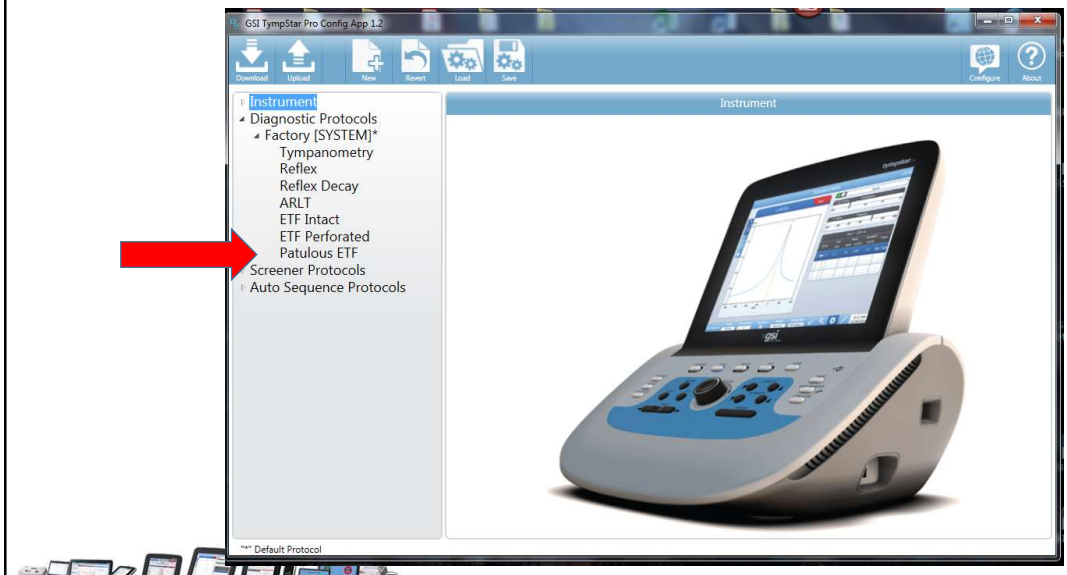

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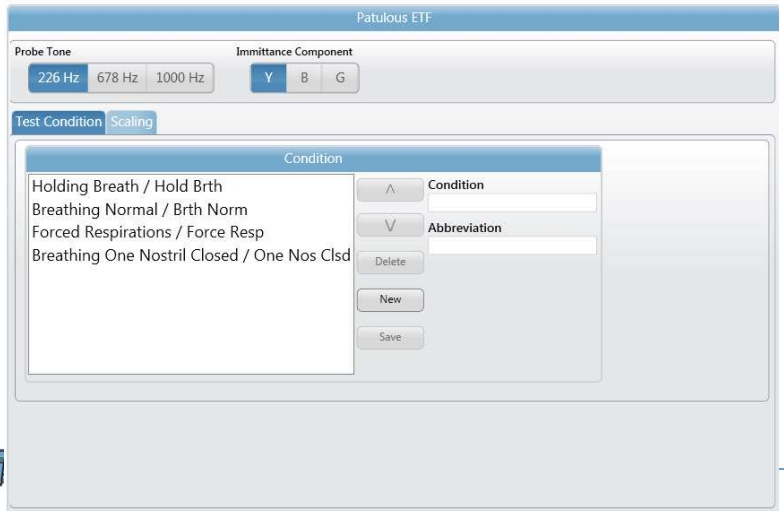
Patulous ET Configuration



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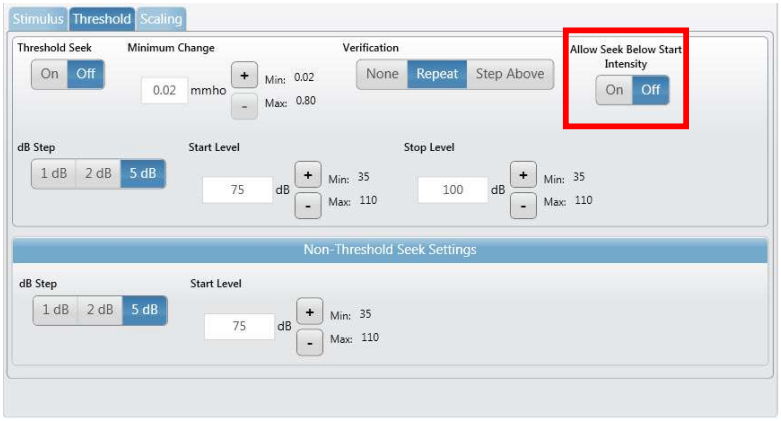
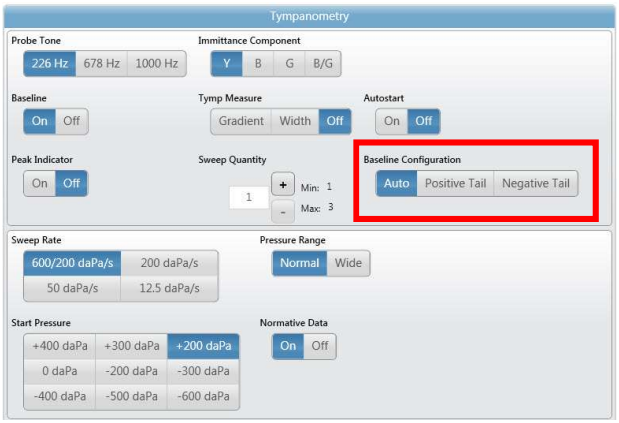
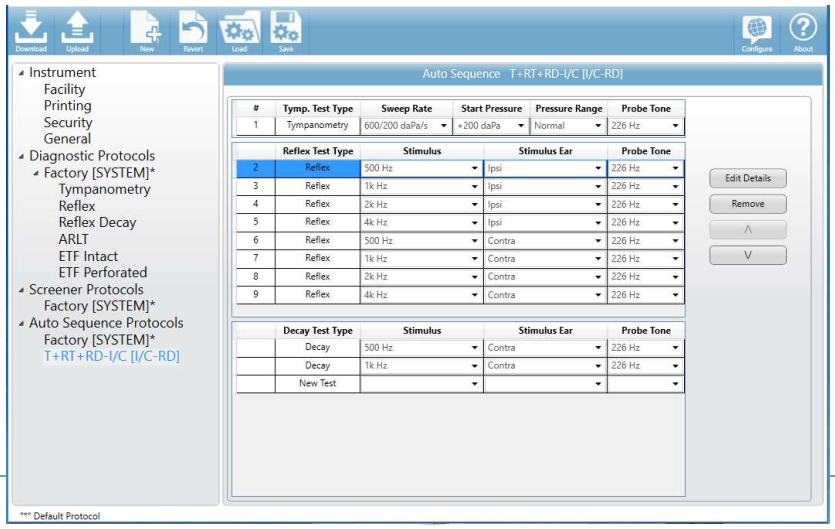
Seek Below Start



Baseline Configuration



Customizing TympStar Pro – Auto Sequence



Summary

- New TympStar Pro firmware v1.2 is released
  - *New* Multi-Hz
  - *New* Patulous ET
  - *New* Seek Below Start
  - *New* Baseline Configuration Options
  - Multi-Hz and Patulous ETF are included with all TSPs
  - Multi-Hz and Patulous ETF not yet implemented in GSI Suite
  - Probe must be calibrated for Multi-Hz
- Config App Updates – must use compatible config app for changes
- Advance Quick Videos

Questions?

Thank You!!!

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