



Learning Objectives

- After this course learners will be able to describe the product features of LINX².
- After this course learners will be able to describe two benefits of new audiology features.
- After this course learners will be able to describe two benefits of new connectivity features.

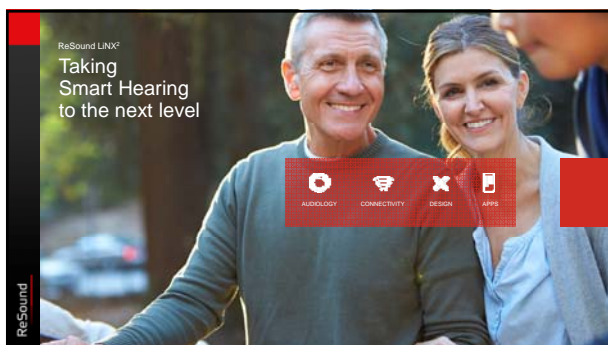
ReSound LiNX - a smash hit

ReSound LINX

Bluetooth

iPhone | iPad

ReSound LiNX™

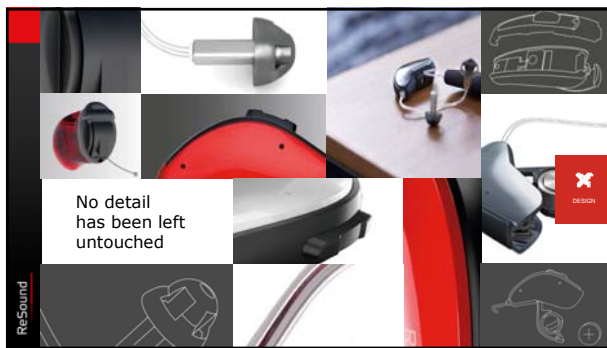


Headlines

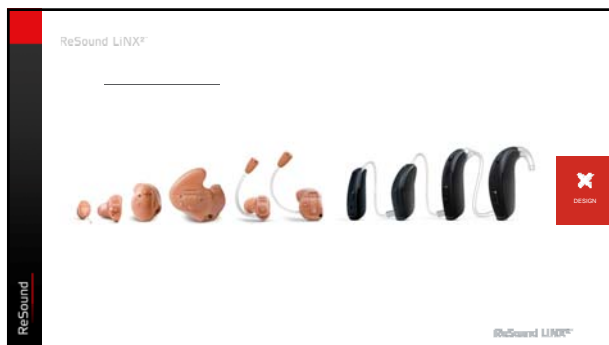
- Full Family of Products
 - Ear-to-Ear in Custom Products
 - Made for iPhone in Custom Products
 - Completely redesigned hardware
 - Size 13 RIE product
 - New receiver and dome system
- New Audiology – Building on Top Sound Quality in Surround Sound by ReSound
 - Spatial Sense
 - Tinnitus Nature Sounds
- Connectivity
 - Compatible with all accessories
- Apps
 - New ReSound Smart App
 - New Features
 - New Android App

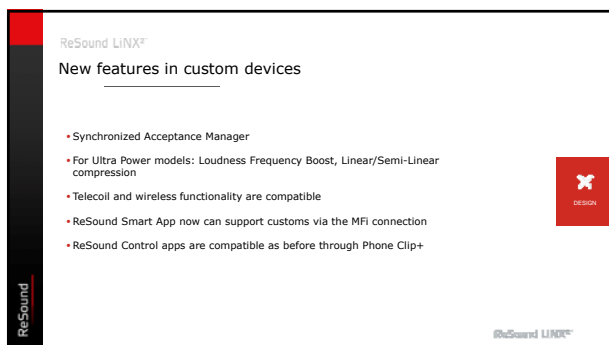
ReSound LiNX

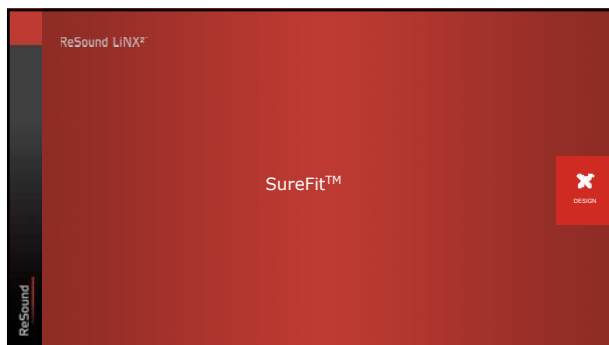













ReSound LINX®
SureFit™ receiver portfolio



ReSound LINX®

DESIGN

ReSound LINX®
4 new receivers



LP Low Power MP Medium Power HP High Power UP Ultra Power

ReSound LINX®

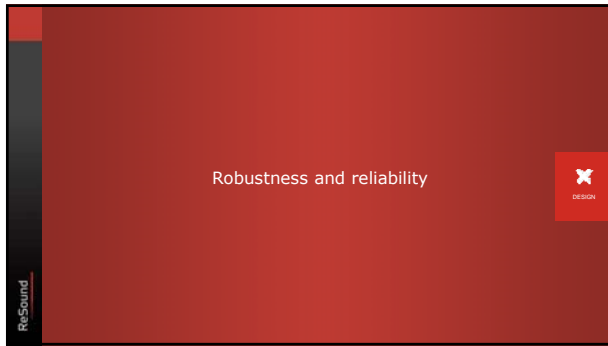
DESIGN

ReSound LINX®
3 new domes

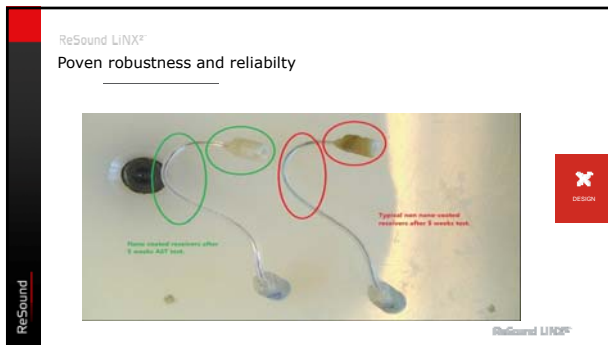


ReSound LINX®

DESIGN







ReSound LINX[®]

Proven robustness and reliability

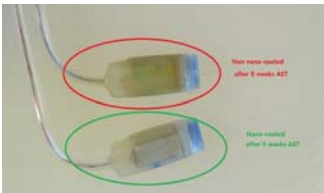


ReSound LINX[®]

DESIGN

ReSound LINX[®]

Proven robustness and reliability



ReSound LINX[®]

DESIGN

Surround Sound by ReSound™

Effortless hearing in top-rated sound quality



SURROUND SOUND by ReSound

RESONANCE



A well rounded hearing instrument



- Warp based wide-dynamic range compression
- Environmental Optimizer™ II
- Sound Shaper™
- DPS Ultra™ with Music Mode
- Timitus noise generator with Nature Sounds™
- Binaural Directionality II with Spatial Sense and other directional options
- Binaural ear-2-ear communication
- NoiseTracker™ noise reduction
- Direct audio and data streaming

ReSound LINDO®

Sound Quality That's Second to None



- Research Site: DELTA SenseLab, an independent research laboratory located in Denmark
- Objective: Evaluation of sound quality preferences
- Products: Premium technology instruments from top six hearing instrument manufacturers
- Subjects: Individuals with mild-to-moderate sloping hearing losses with age ranging from 64-80 years

ReSound LINDO®

Sound Quality That's Second to None

- Listening Situations: Seven Listening Scenarios
 1. Female Speaker
 2. Male Speaker
 3. Speech Babble
 4. Pop Music
 5. Kitchen Work
 6. Moderate Traffic Noise
 7. Small Spring in Forest
- Ratings: Like-Least to Like-Most Scaling for preference ranking on bass, treble, naturalness, reverberation, loudness, dynamics, artifacts/distortion

ReSound LINDO®

**Independent research confirms:
ReSound sound quality is top-rated**

- Evaluation of preferences in sound quality amongst hearing impaired with moderate hearing loss
- Method agreed upon by all leading manufacturers
- Confirming Surround Sound by ReSound™ is delivering best in class sound quality

Attribute	Mean Preference (%)
Speech	~85
Music	~80
TV	~75
Other	~70
ReSound	~95

* Average data from the seven manufacturers tested: Phonak speaker, Voco speaker, Sonus faber, Bose, JBL, Klipsch, Tannoy and Home Cinema.

ReSound LINGO®

Surround Sound by ReSound

- Inspired by nature, Surround Sound by ReSound is our unique system for processing sound
- Advanced technologies emulate the human ear and take full advantage of the brain's natural ability recognize and localize sounds
- Now with the addition of Binaural Directionality II with Spatial Sense

ReSound LINGO®

**Binaural Directionality II
With Spatial Sense**

ReSound LINGO®



Directional benefit

- Extensive research on directional benefit
- Much is done in controlled laboratory environment
- Spatially separated: Speech from the front and noise from behind
- Directional microphones can provide a large benefit in these controlled situations


ReSound LINX+

How restaurants really are

2012/15 30 ReSound LINX+

Real world listening situations


- Real world listening situations are not controlled environments
- Microphone configuration should provide directional benefit while still hearing all around
- Hearing in a beam provided by two directional microphones is limiting
- A hearing aid cannot determine what a hearing aid user would like to listen to.



ReSound L1000


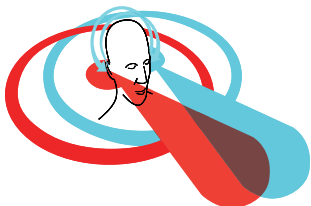
Problems with automatic steering directionality

- Assumption that listener intent can be predicted based on acoustic analysis (acoustics in the environment instead of the listener's interest)
- No regard for what happens when hearing aid user speaks
 - The system will steer forward because this is the loudness modulated signal (speech) in the environment.



ReSound L1000

Binaural Directionality



ReSound L1000

Binaural Directionality: Current and Future

- Binaural Directionality provides improved signal-to-noise ratio (front-to-back) as long as the signal of interest is in front of the listener and the competing signal is to the sides or the back.
- Binaural Directionality provides awareness and audibility to sounds that are not in front of the listener when in an asymmetric directionality mode
- Binaural Directionality II with Spatial Sense will improve sound quality and localization in the omnidirectional listening mode

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Binaural Directionality II with Spatial Sense

Accounts for three hearing-instrument-related issues that can interfere with spatial cues

1. BTE and RIE models have microphones above the pinna and thus removes spectral pinna cues
2. BTE and RIE models have microphone placement that distorts interaural level difference (ILD)
3. Wide dynamic range compression that is independent in right and left devices can distort the interaural level difference (ILD)

Spatial Sense integrates two technologies to preserve acoustic cues for spatial hearing

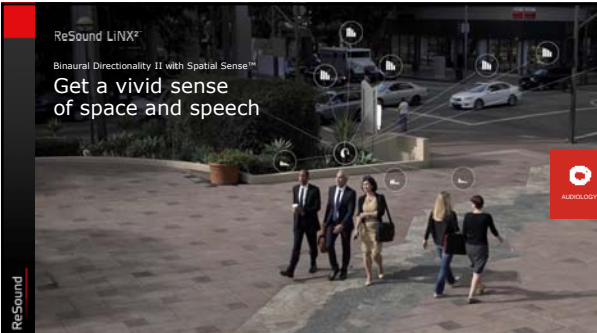
1. Pinna restoration
2. Bilateral compression

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Binaural Directionality II with Spatial Sense™


Get a vivid sense of space and speech



ReSound LINX[®]

Spatial hearing – Why is it important?


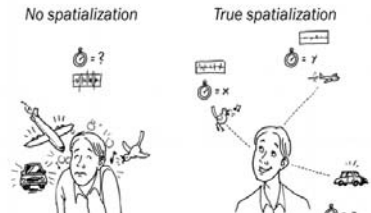
- Allows an auditory image of the environment to be formed
- Spatial hearing also creates a sense of natural sound quality



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Spatial Hearing: Externalization of sounds




No spatialization *True spatialization*




ReSound LINX

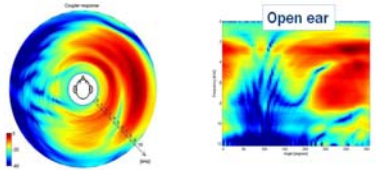
Preserving spectral cues


- BTE and RIE models have microphones placed above the pinnae
- Distortions to the spatial sound image as pinnae spectral cues are reduced compared to open ear
- Need to compensate for the artificial microphone position
- Spatial Sense applies dual microphone processing to mimic an open-ear response




ReSound LINX

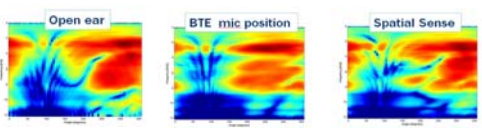
 Spectral characteristics around the head







ReSound L110P

 Spectral characteristics for BTE model






ReSound L110P

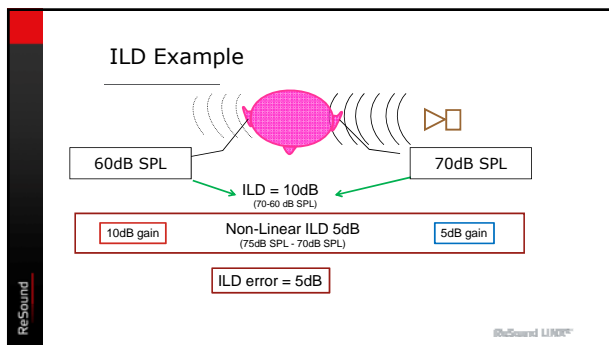
 Localization Ability

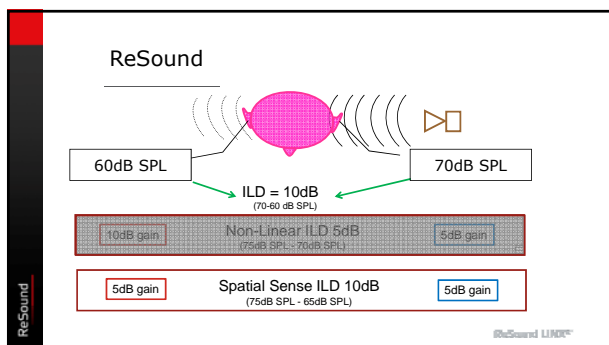
Localization ability is based on two cues

The interaural timing differences (ITD)	The interaural level differences (ILD)
Low-frequency ITD cues are most important for localization in the horizontal plane and are the most robust cues	High-frequency ILD cues are more important for localization in the vertical plane



ReSound L110P

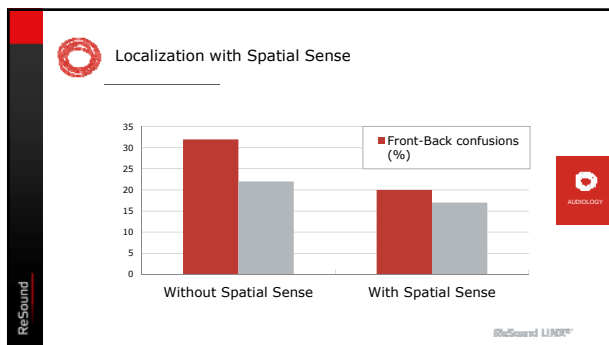




Evidence - Binaural Directionality II with Spatial Sense

ReSound LINGO

ReSound LINGO



Built-in tinnitus features
Break the vicious cycle

ReSound logo on the left. ReSound logo on the right.

Nature Sounds: Water-inspired environments

- Ocean
- Breaking Waves
- Calming Waves
- Beach Surf
- Shoreline
- Water Creek

ReSound logo on the left. ReSound logo and 'ReSound LINC' on the right.

