

ReSound LiNX Quattro

World's most advanced
rechargeable solution

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Disclosure

- I have the following financially relevant relationship in the service and/or product communicated, compared, evaluated and/or reviewed in this presentation.
 - *Employee – GN ReSound*
- I have no non-financial relationships to disclose

Learning Objectives

- 1) After this course, participants will be able to identify 3 benefits of ReSound rechargeable hearing technology.
- 2) After this course, participants will be able to identify 2 types of rechargeable hearing aid battery technology.
- 3) After this course, participants will be able to identify 3 ways to check the battery life status of the ReSound LiNX Quattro.



Outline

- Introduction
- Rechargeable hearing aid benefits
- Induction charging benefits
- ReSound LiNX Quattro Rechargeable Hearing Aids
- ReSound LiNX Quattro Hearing Aid Charger
- Use Case: *Recharging on the Go*
- Conclusions & Wrap up
- Questions



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Current Battery Options for Hearing Aids

- Zinc-air



- Silver-zinc rechargeable: ZPower



- Lithium-ion rechargeable



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Zinc-air batteries


- Traditional hearing aid batteries
- Activated by exposure to oxygen
- Factors influencing battery life
 - chip technology
 - amount of amplification
 - use of wireless streaming
 - environment being used
- Are replaceable
- Relatively short battery life
- Considerations
 - Affected by moisture, altitude and temperature
 - Can be difficult to handle
 - Batteries are toxic
 - Can be expensive over lifetime



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Silver-zinc Rechargeable Batteries

- Introduced to hearing aids with ZPower rechargeable cells
- Attachment of ZPower requires a change of the hearing aid battery door
- Recharge via contacts 
- Supports zinc-air batteries if needed
- Considerations:
 - Requires external power source
 - Battery door
 - Charges via physical contact points
 - Battery life

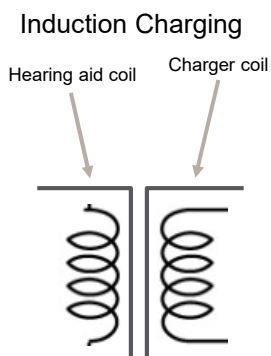


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Lithium-ion Rechargeable Batteries

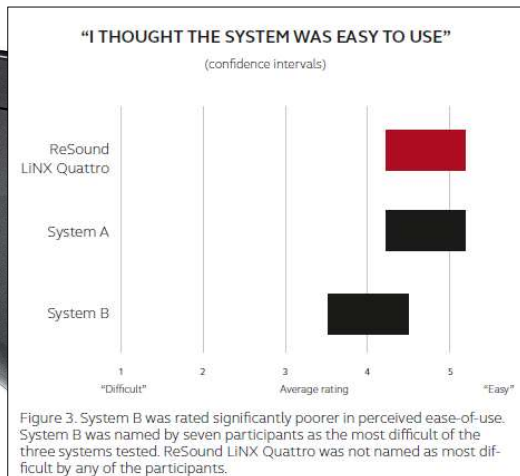
- Recently introduced to hearing aids
- Advantages
 - Lightweight and energy dense
 - Contained batteries
 - Lack of "memory effect"
 - Hold charge
 - Long life
- Induction charging possible
- Considerations
 - Contained batteries
 - Temperature sensitive
 - Regulations for shipping and travel



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High Ease of Use Rating



ReSound LiNX Quattro: Ease of use and reliability were both focal points to the development

Internal Usability Study Results

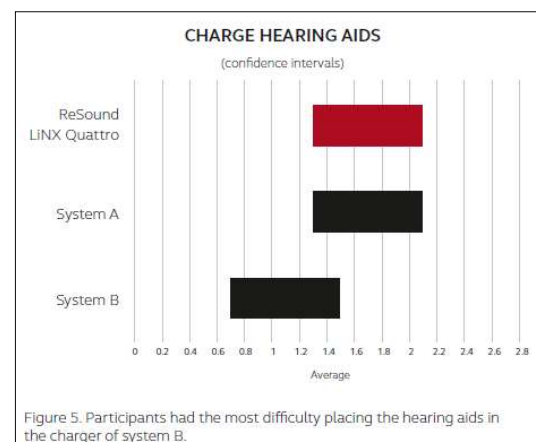
- 3 Rechargeable Hearing Aid systems
- 10 participants: Adult hearing aid users
 - none owned rechargeable hearing aids
- Rated from 1 (Difficult) to 5 (Easy)
- ReSound LiNX Quattro was perceived as easy to use
 - No participants named Quattro as most difficult system



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Ease of Charging Devices

- **Ease of charging the devices was measured on a 0-2 point scale**
 - 2: No difficulty: task completed within 30 seconds
 - 1: With Difficulty: task completed in 30-120 seconds
 - 0: Fail: task not completed or completed in more than 120 seconds
- **ReSound LiNX Quattro & System A were equally easy for patients to set to charging**
 - System B was also induction charging
 - **Design of the charger, not just charging type, can have an impact on ease of use**



Benefits of ReSound rechargeable solution

Easier use for patients with poor dexterity

Easier use for patients with visual difficulties

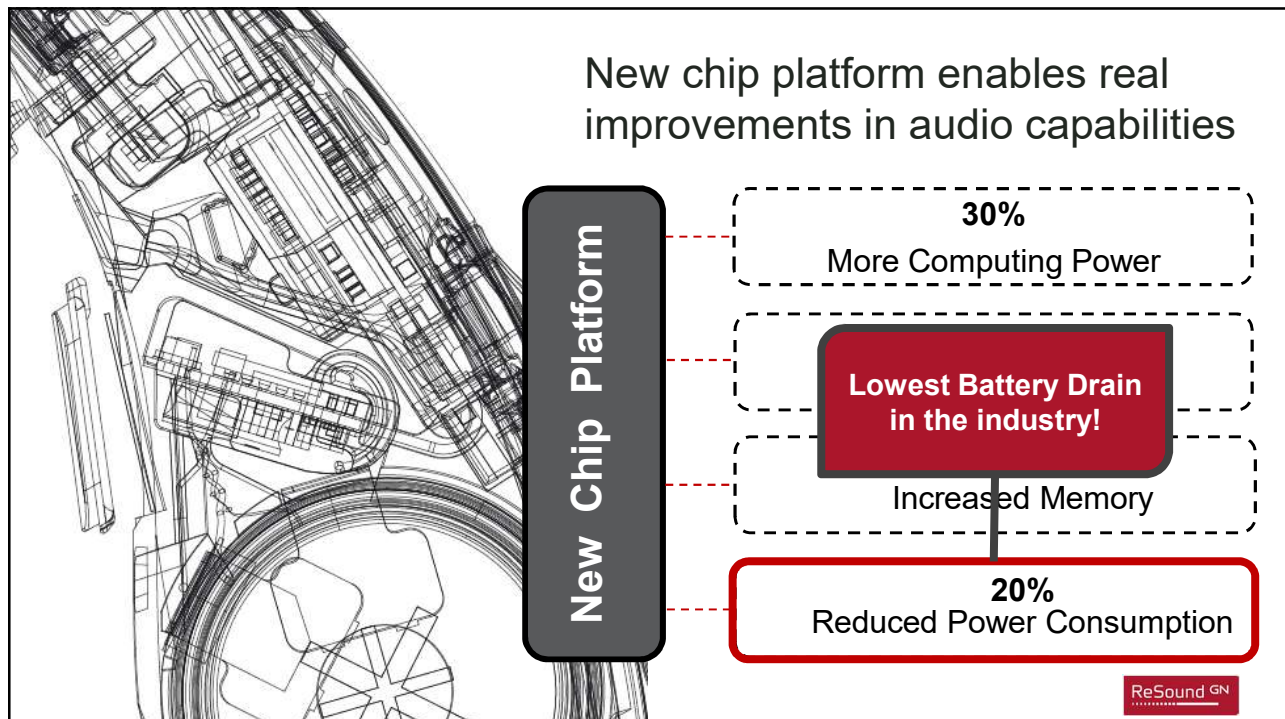
Reduces the environmental footprint

Providing Convenience, Portability and Freedom to Charge Anywhere!



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ReSound LiNX Quattro



RE62
Standard RIE



RE61
Rechargeable RIE



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LiNX Quattro RE 61: Rechargeable Hearing Aids


Rechargeable model = RIE 61

- Uses lithium-ion batteries
 - Fully encased RIE body
 - Long battery life
- Induction charging
 - No metal contacts
 - Muted while charging – activate automatically
- LED status Indicators
- Charger with built-in battery
 - Power on the go



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LiNX Quattro 61: Battery life

- Long-lasting built in Lithium-Ion battery
- Quick charging at the onset
- 3 hours to full charge

CHARGING TIME	BATTERY LIFE
3 hours =	30 hours 24 hours <small>With 50% of streaming time</small>
1 hour =	16 hours
30 minutes =	8 hours
1 minute =	16 minutes





Rechargeable 61 – Push button and LED

Push button functions

- Change program/Volume Control
- Streaming (initiate & cycle)
- Turn on/off (Press & Hold for 5 seconds)
 - LED blinks when turned OFF
 - LED solid when turned ON
- Enter flight mode

LED indicators

- Turn on/off
- Enter flight mode
- Put into charger
- Identify hearing aid in fitting software

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LiNX Quattro RE61 Design Benefits

Built-in Battery: Hearing aid body completely sealed for protection

- **Ingress protection rating = IP58**
- This protection increases durability and the overall lifetime of a hearing aid
- No metal contacts reduces possibility for corrosion, reduces need for cleaning or debris issues



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Confidence in the System: LiNX Quattro Charger

Charging on-the-go!

- Simple and easy to use charger
 - Ease of Use
 - Visual Feedback
- Charger doubles as carrying case
 - Integrated rechargeable battery
 - 3 full wireless charges
- Charges by induction, no contacts!



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LiNX Quattro Charger: Ease of Use

- Ease of use critical for rechargeable device successful use

Charger Usability Test Results

- Same methods as charging hearing aid usability testing
- ReSound LiNX Quattro and System B were completed at nearly identical rates
 - System A took more time on average
- Less variability in results for charger set up than in setting hearing aids to charge

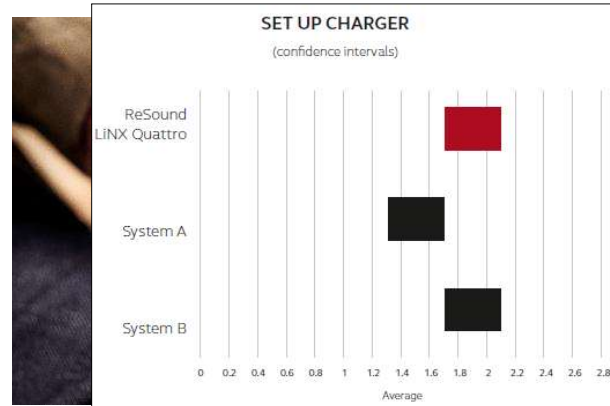


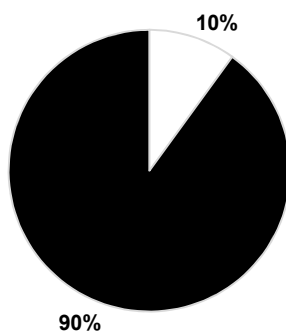
Figure 4. ReSound LiNX Quattro and system B were the easiest for participants to set up for use.

LiNX Quattro: best performer in each measure!

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LiNX Quattro: Easy and intuitive hearing aid charger



(Groth, 2018)

90%
of users can set up and
use the rechargeable
system without
instructions

"Can go two days on one charge and charger can go eight days without being plugged in"

"Charger is an excellent travel case for the aids"

"Love the charging unit"



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Practical Know-How

Getting the best
out of the ReSound
LiNX Quattro
Rechargeable device



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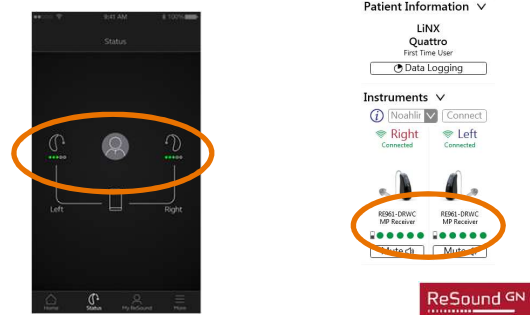
LiNX Quattro LEDs: Never caught without charge!

Ways a patient can check battery level:

- Status lights on the charging case
- Devices show charging/charged status in charger
- ReSound Smart 3D app display

For the Hearing Care Professional:

- view battery status in Smart Fit sidebar



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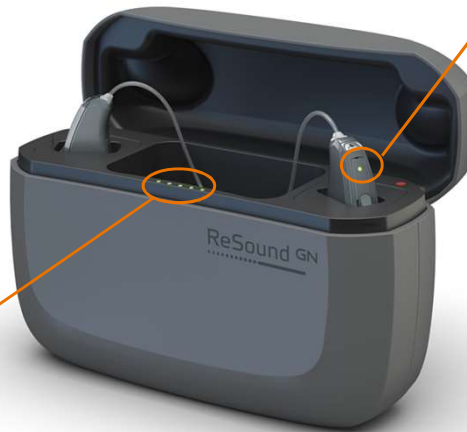
ReSound LiNX Quattro: Inside charger LEDs

Upon **insertion** or **removal** of hearing aids current battery status is indicated for about 10 seconds

- ● ● ● ● 0 – 20% charged
- ● ● ● ● 20 – 40% charged
- ● ● ● ● 40 – 60% charged
- ● ● ● ● 60 – 80% charged
- ● ● ● ● 80 – 100% charged

Note: Only for ReSound LiNX Quattro RIE 61 rechargeable model

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Hearing aid LED "pulse" when charging

Hearing aid LED is green when charged

- Hearing aids **MUTED** while in the charger
- Automatically turn **ON** when removed from the charger
- Indicator LEDs on charger will show charge for lowest charged device of pair (if different)



ReSound LiNX Quattro: RE61 Battery level in the App

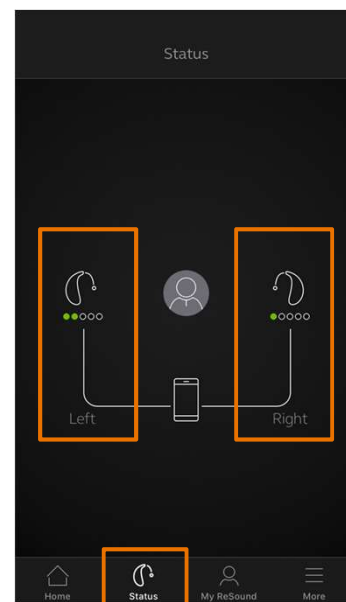
Battery level display is in **Status** screen

5 circle indicators consistent across ReSound charger, ReSound Smart 3D app & ReSound Smart Fit

- Battery level display is up to 5 green dots with each dot an increment of 20% charge
- One red dot indicates less than 10% charge remaining

See this example:

- the left device has 20 – 40% charge
- the right device has 10 – 20% charge



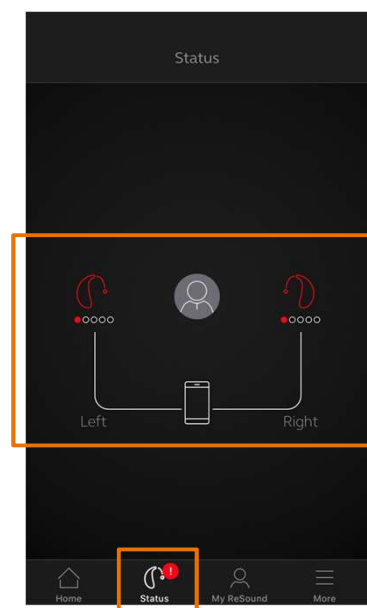
Only for rechargeable devices (RE61)



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ReSound LiNX Quattro RE61 – Low battery

- One red dot will display on status screen when the hearing aid battery is less than 10% charge
- A red dot with an exclamation mark appears on the status bar icon
 - **Charging is recommended!**
 - less than 3 hours of charge remains (without streaming)

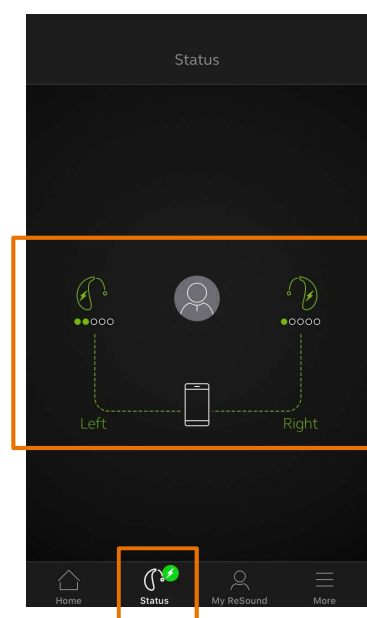


Only for rechargeable devices (RE61)



ReSound LiNX Quattro RE61 – Charging

- ReSound LiNX Quattro RE61 hearing aids communicate with the ReSound Smart 3D app while charging
- ReSound Smart 3D app shows a green hearing aid with charging symbol on Status screen
- A green dot with charging symbol appears on the status bar icon
- When hearing aids are removed from the charger, a boot sequence occurs and the app returns to normal non-charging display



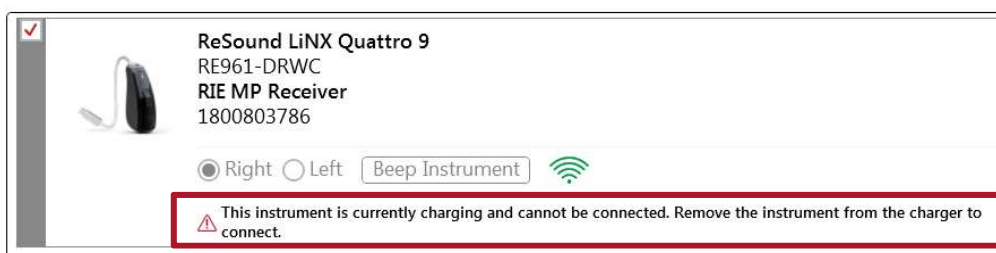
Only for rechargeable devices (RE61)



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LiNX Quattro: Connecting to the Fitting Software

- Same discovery procedure
- CANNOT connect with devices are in the charger!
 - 1 minute of charge = 16 minutes of use
 - 30 minutes of charge = 8 hours of use
- Hearing care provider will see a specific charging warning in the fitting software
- Wireless only connection (NOAHLINK Wireless)

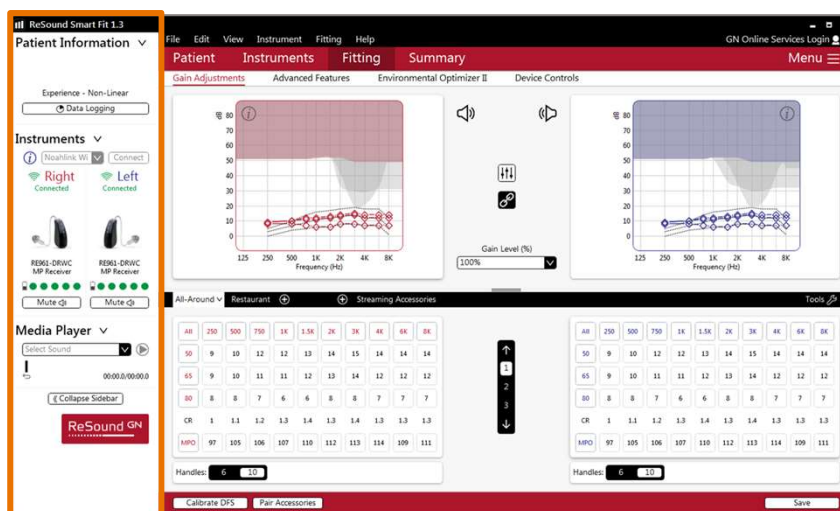


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ReSound LiNX Quattro: RE61 Battery level display

- Battery level display is in Patient Information sidebar
- Only for rechargeable devices (RE61)
- 5 circle indicators are consistent across ReSound charger, ReSound Smart 3D app and ReSound Smart Fit



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ReSound LiNX Quattro: RE61 Battery level display in sidebar

- Battery level display is up to 5 green dots with each dot an increment of 20% charge
- One red dot indicates less than 10% charge remaining



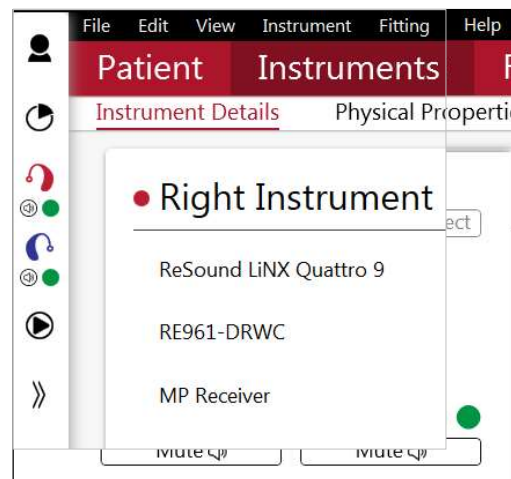
Note: Battery level display only for RE61 rechargeable model

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LiNX Quattro RE61 Battery Level: Collapsed Sidebar

- Collapsed sidebar will only show hearing aid connection status...unless:
- Click/hover over hearing aid icons to show status pop-out window
- This will provide battery charge level & additional hearing aid info



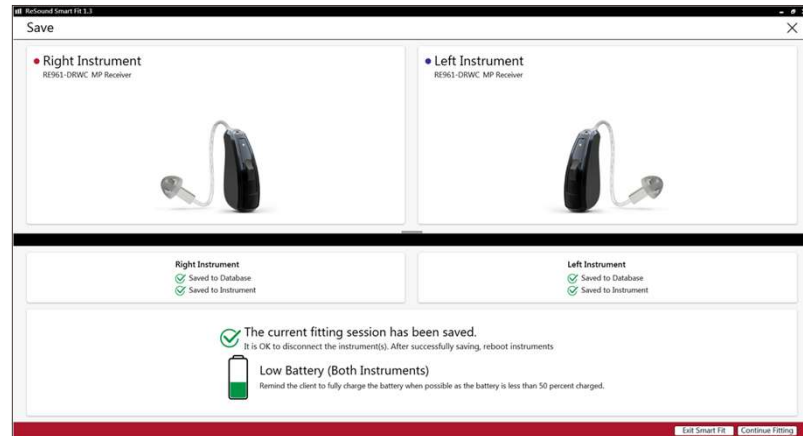
Only for rechargeable RE61 models

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ReSound LiNX Quattro RE61: additional battery status info

- A low battery information appears when saving and batteries are less than 50% charged
- Reminder for the patient to recharge the batteries



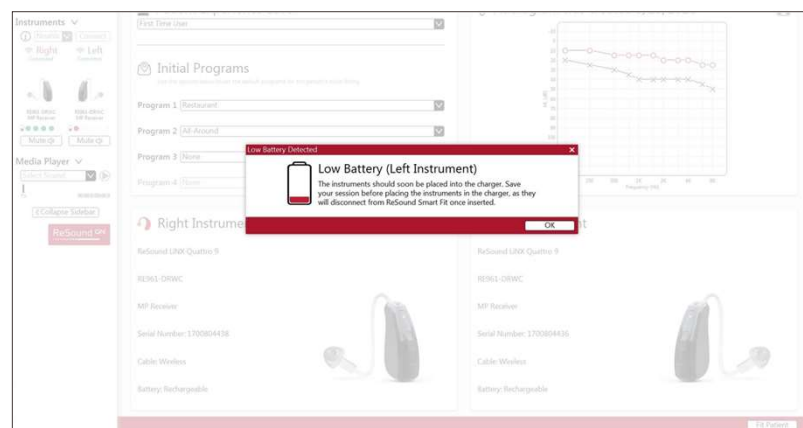
Only for rechargeable RE61 models

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ReSound LiNX Quattro RE61: Low battery warning

- Low battery warning appears as hearing aid gets close to turning off due to low power
- ReSound Smart Fit session should be saved and hearing aid put into charger
- No minimum charge required to program however, sudden turn off when battery depleted



Only for rechargeable RE61 models

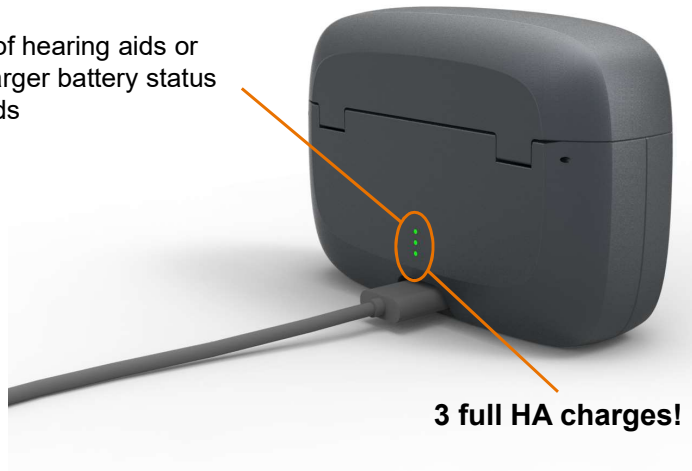
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ReSound LiNX Quattro: Charger integrated rechargeable battery LEDs

Upon insertion or removal of hearing aids or charging cable, current charger battery status is indicated for 5-10 seconds

- 66% - 100% full
- 33% - 66% 2 full
- 10% - 33% full
- <10% left



3 full HA charges!

Note: Only for ReSound LiNX Quattro RIE 61 rechargeable model

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Traveling with lithium-ion batteries

Battery type	Allowed in carry-on baggage?	Allowed in checked baggage?
Zinc-air	YES For personal/professional use	YES In appropriate packaging
Silver-zinc	YES For personal/professional use	YES In appropriate packaging
Lithium ion	YES For personal/professional use	NO

Data shown is from: the Federal Aviation Administration Office of Hazardous Materials Safety August, 2018
<http://www.faa.gov/Go/PackSafe>

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**LiNX Quattro RE61:
Rechargeable Use Case**

Reliability and confidence on the go



ReSound LiNX Quattro: Rechargeable Use Case

Demographic Info:

- Age: 64
- Gender: Male
- Occupation: Consultant
- Travels routinely for work
- Spends a lot of time on his cell phone
- Listens to podcasts regularly



ReSound LiNX Quattro: Rechargeable Use Case



Case Audiological Info:

- Bilateral, sloping mild-to-moderately severe SNHL
- Previous devices: bilateral LiNX² 962 RIE devices
- Enrolled in internal trial
- Fit with LiNX Quattro RE961 for 2 months
- Devices paired to his iPhone for call streaming, audiobooks



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ReSound LiNX Quattro: Rechargeable Use Case



- Datalogged daily use: ~ 13 hours
 - Datalogging showed 16% streaming time
- Reports device batteries never dropped below 3-4 LED indicators per daily use
- Attempted to use devices for as long as possible with charger unplugged from the wall
 - Was able to go 8 days without plugging charger into wall

"I wasn't sold on rechargeable devices, but these won me over!"



Quick Tips: Some additional information



- If the hearing aids sit in the unplugged charger for more than 24 hours straight, the charger will turn the hearing aids OFF
 - Power-saving measure
 - Hearing aids will need to be manually turned ON with push button
- Hearing aids can charge in either Left or Right position
 - receivers must face inward for charge
- Hearing aid LEDs active ONLY in the charger or when detected in fitting software
- Internal battery has 4 year lifespan
 - After 4 years – battery life/capacity only reduces by ~20% (24 hours on a full charge)

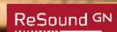
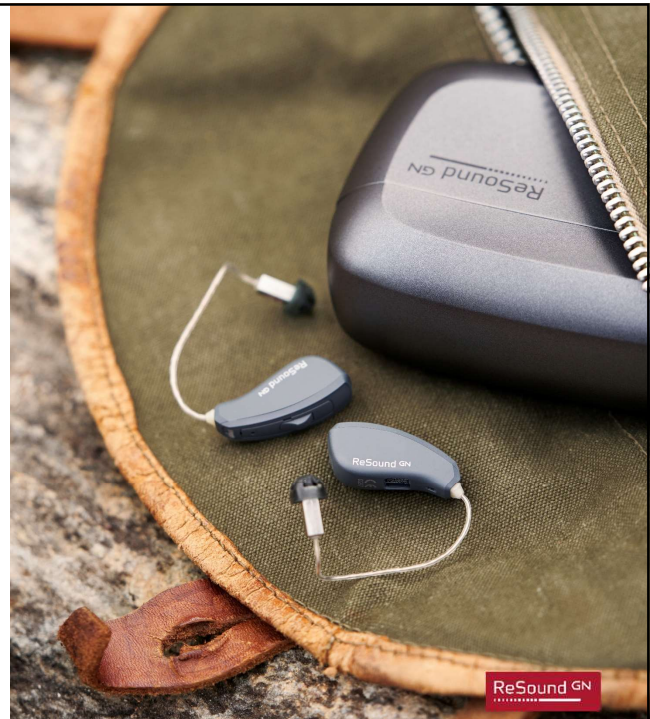


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ReSound LiNX Quattro: RE961 Advantages & Highlights

- Quick charge: 30 minutes charge = 8 hours use
- Long battery life: 30 hours on one full charge
- Hearing instruments completely sealed
 - IP 58 rating
- Portable and aesthetic charger
 - Charger doubles as carrying case
 - Induction charging
- Charger has an integrated rechargeable battery
 - 3 full HA charges
- Reliable battery status LEDs & Indicators
 - LED indicators on hearing aids & charger
 - Hearing aid battery level available in real-time in fitting software, app, and on charger

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Conclusions

- ReSound LiNX Quattro RE961s provide a reliable rechargeable system that is easy to use, reliable, and long-lasting
 - Usability testing found LiNX Quattro to be ease to use for conventional hearing aid users
 - Great for patients with dexterity and/or visual limitations
- LiNX Quattro rechargeable devices that last 30 hours on a full charge
 - Can last 24 hours with 12 hours of streaming
 - Quick charge capabilities: 30 minutes of charge yields 8 hours of device use
 - The LiNX Quattro charger has a built-in battery: 3 full HA charges
- *LiNX Quattro RE961: Provide patient confidence without compromise!*

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Questions ?

Thanks for listening!

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