

Phonak Pediatrics

A Close look at Remote Mic technology



A Sonova brand



Disclosure in accordance with ASHA CEU Requirements

- I have a financial relationship to disclose:
 - Employee of Phonak who receives a salary
- I have no nonfinancial relationship to disclose



Lisa Dyre, AuD
Phonak Pediatrics
NM TX OK LA MO AR



Agenda



1. Remote Mic technology benefits
2. Remote Mic technology differences
3. Roger evidence-based Remote Mic solutions
4. Summary and questions

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Remote Mic Technology

Remote Mic technology definition

- The microphone and receiver technology are separate units
 - Remote microphone implies:
 - The microphone picking up the signal of interest is NOT only on the hearing instrument itself
- Paired together, the microphone and receiver create a system used to increase SNR
 - Voice proximity to the remote mic
 - Special processing characteristics



Additional Terms:

- Assistive Listening Devices
- Hearing Assistance Technology – HAT
- FM mic
- *DM Mic*
- External mic

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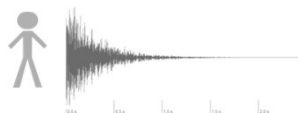
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Remote Mic technology

Facilitate the best communication possible in poor acoustic environments

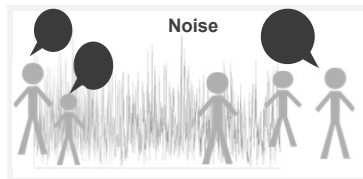
Reverberation



Distance



Noise



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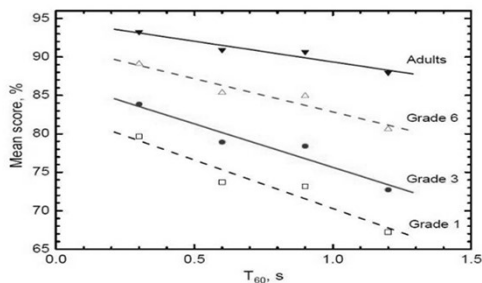
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Remote Mic technology

Facilitate the best communication possible in poor acoustic environments

Reverberation



Reverberation time (RT60) ranged from 0.2 sec to 1.27 sec (Knecht et al., 2002)

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Remote Mic technology

Facilitate the best communication possible in poor acoustic environments

Distance



Blah

70 dBSpl
at 1 foot

64 dBSpl
at 2 feet

58 dBSpl
at 4 feet

For every doubling of the distance from the sound source, SPL decreases 6dB

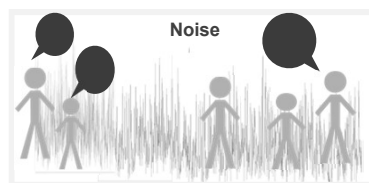
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Remote Mic technology

Facilitate the best communication possible in poor acoustic environments



"...the children seem unable to estimate the impact of the noise on their own performance..."

"This finding clearly indicates that teachers and researchers cannot rely on the children's judgments when assessing the acoustic quality of classrooms."

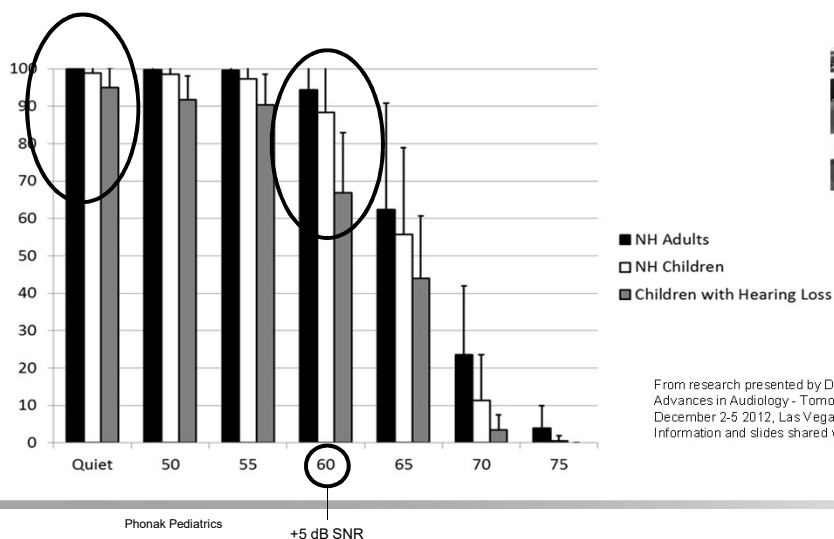
Klatte M, Lachmann T, Meis M. Effects of noise and reverberation on speech perception and listening comprehension of children and adults in a classroom-like setting. Noise Health [serial online] 2010 [cited 2017 May 14];12:270-82. Available from: <http://www.noiseandhealth.org/text.asp?2010/12/49/270/70506>

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Speech recognition without FM



From research presented by Dr. Jace Wolfe:
Advances in Audiology - Tomorrow's Solutions for Today's Challenges
December 2-5 2012, Las Vegas, USA
Information and slides shared with permission

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Who benefits from Remote Mic technology?

Everyone!

- Even those with normal hearing – can benefit from Remote Mic technology
- School Children:
 - Use Soundfield amplification to overcome negative effects of distance and noise.
 - Use Listening devices on Museum Tours
- Those with hearing and listening issues not only benefit from Remote Mic technology **but often need it** to perform and function auditorally in today's complex listening environments.

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Advanced hearing aid technology

Advanced Hearing aid technology has been a wonderful solution for people with hearing loss to live life to their fullest in many unique situations.

Autosense OS

Designed for an adult's acoustic environment

- Moderate loud noise
- Reverberation
- Wind
- Phone
- Car




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Advanced hearing aid technology

Autosense Sky OS

Designed for a child's acoustic environment

With AutoSense Sky OS, children have

- 30% more precise Speech in Noise classification
- 39% more precise Comfort in Noise classification

This can account for up to
2/3 of a child's school day!



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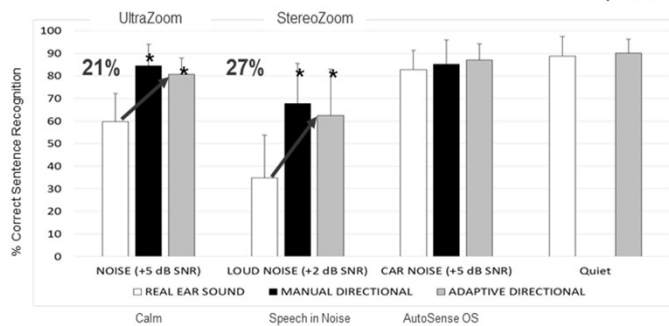
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Automatic Noise Management Technology for Children

Wolfe et al. in press, JAAA

* $p < .001$



Directional microphones
provide significant improvements
over real ear sound.

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Children live in a noisy world

Poor SNRs in children's everyday environment

- Car seat (70 mph) -10 dB SNR
- Bus -10 dB SNR
- Stroller -8 dB SNR
- Shopping cart -6 dB SNR
- Car seat (30 mph) -5 dB SNR
- Wind Noise -3 to -10 dB SNR



Conservative Take:

Use in situations in which the child has no chance to hear without Remote Mic use.

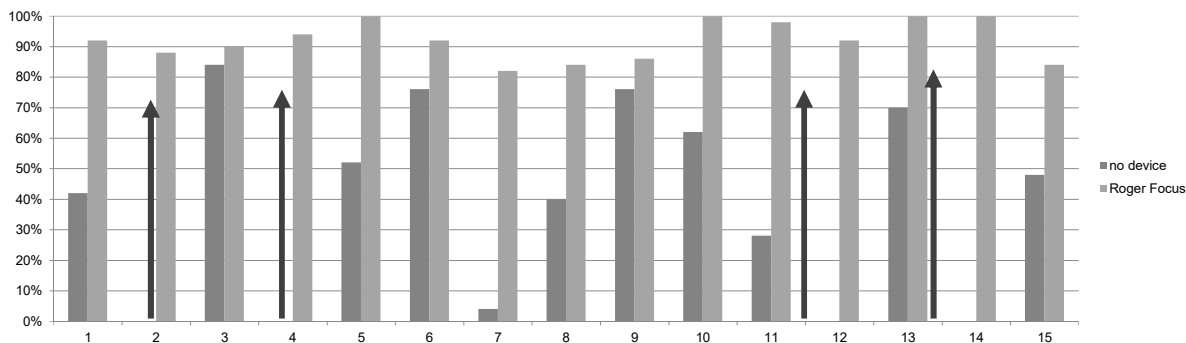
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Imran Mulla, 2013

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Maximum performance: Roger Focus evidence

Speech-in-noise testing revealed an average improvement of 53% with Roger Focus compared to no device



N=15 BKB-SIN, -5dB SNR noise at 65dB SPL

Note: with the exception of subjects 3 and 9 all individual scores showed significant improvement
Subjects 2, 4, 12, and 14 scored 0% without any device and almost 100% with Roger Focus

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Jones, et al. Phonak FSN June 2014

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Remote Mic Technology

Even with sophisticated processing in personal amplification, Remote Mic technology can be quite beneficial in today's complex acoustic environments.



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Remote Mic technology differences

Remote mic options available in today's market

1 SIMPLE Inexpensive 1:1 pairing



- » "Near Area Network"
- » Simple mic – omni, directional, adaptive directional
- » Gateway device to hearing aids
- » Usually one to one person
- » Usually short distances

2 SIMPLE Moderate cost Group situation



- » FM, or similar
- » Simple mic – omni, directional, positional adaptive directional
- » Attaches directly to hearing aid or with Gateway device
- » One mic to one or multiple people
- » Short or long distances (up to ~100 feet)

3 ADVANCED Moderate cost Group situation



- » Roger, DM, FM or similar
- » Sophisticated mic – acoustically and positionally adaptive with various options omni to highly directional
- » Attaches directly to hearing aid or with Gateway device
- » One to many mics to one or multiple people
- » Multi Talker
- » Short or long distances (up to ~100 feet)

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Remote mic options available in today's market, *cont.*

1 SIMPLE Inexpensive 1:1 pairing

Single conversation in moderate noise or over distance

- Proprietary to Hearing Device Manufacturer
- Inexpensive and easy to use
- Gateway device may or may not have other options
- Usually 1:1 person
- Usually short distances

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Remote mic options available in today's market, *cont.*

1

Phonak Example:

Phonak Compilot II with Remote Mic II
Phonak Compilot Air II with Remote Mic II



Conversation

TV and music

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Remote mic options available in today's market, *cont.*

2

SIMPLE

Moderate cost
Group situation

Single conversation partner (with multiple listeners) over distance and in moderate noise

- Compatible with multiple amplification technologies and hearing aid brands.
- Moderately expensive and more complicated to use
- FM receiver connects to personal device by DAI/adaptor, dedicated FM receiver to DAI port, gateway device, induction loop

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Remote mic options available in today's market, *cont.*

2 Phonak Example:

Phonak Classic FM*
Phonak Dynamic FM*



* Phonak has discontinued classic and dynamic FM due to technological advancements in remote mic technology

Conversation

Computer,
TV or other
audio
devices

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Remote mic options available in today's market, *cont.*

3

ADVANCED

Moderate cost
Group situation

Multiple or single
conversation partner with
one or multiple listeners
over distance and in
moderate to loud noise

- Compatible with multiple amplification technologies and hearing aid brands.
- Moderately expensive and easy to use
- Roger receiver connects to personal device by DAI/adaptor, dedicated Roger receiver to DAI port, gateway device, induction loop
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Remote mic options available in today's market, *cont.*

3 Phonak Example:

Phonak Roger



Conversation

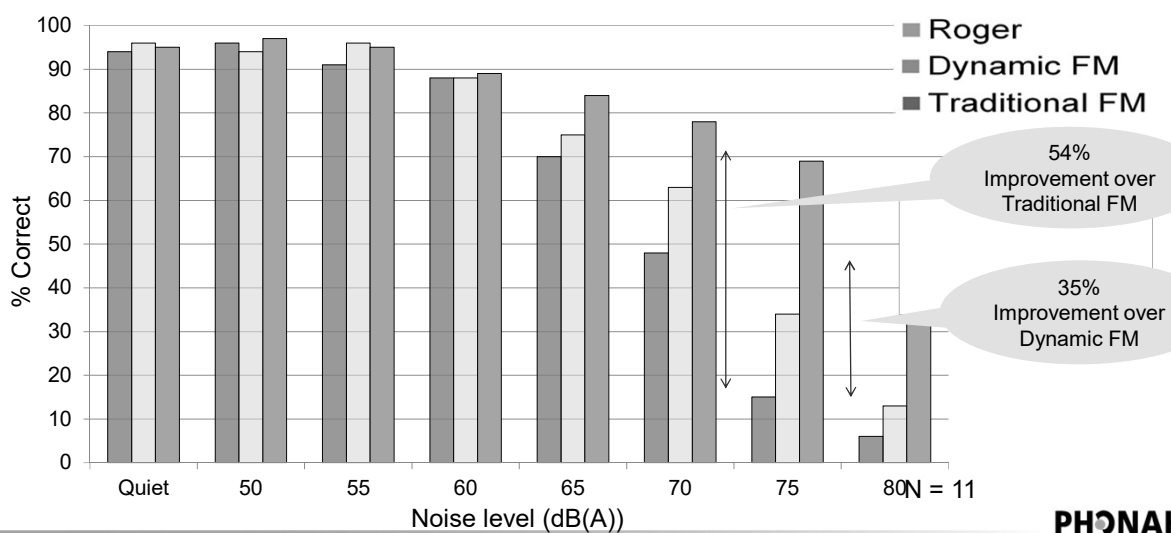
Computer,
TV or other
audio
evices

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Speech understanding at 5.5 m in various noise levels



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Dr. Linda Thibodeau at the University of Texas at Dallas

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“Hear Well or Hearsay?”

Research by Jace Wolfe, Ph. D.

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Study objective

- Evaluate the effect of microphone technology within the remote microphone accessory
- Omni-directional vs. Dual-Mic Directional vs. Dual-Mic Adaptive Gain

Mini Mic



Mini Mic 2+



Roger Touchscreen



Roger Pen



Roger X

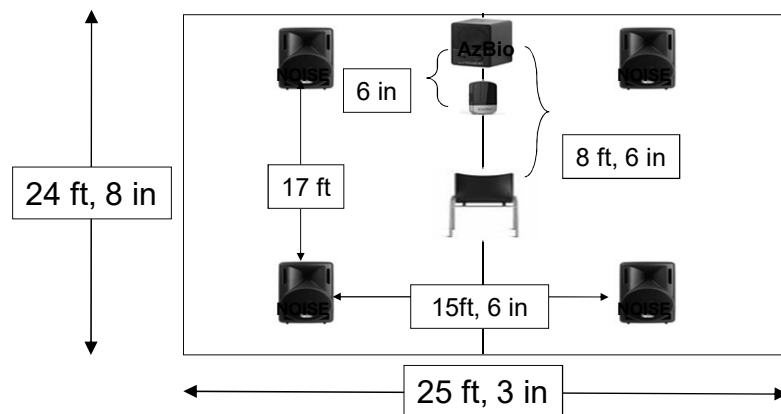


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Wolfe et al, in press, JAAA

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Equipment setup

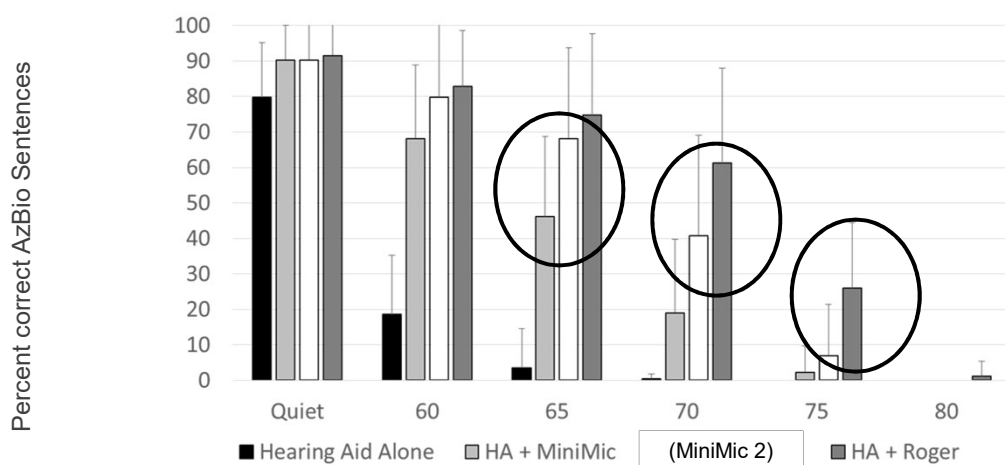


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Wolfe et al, in press, JAAA

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Hearing aid users – Roger provides best access at - SNR



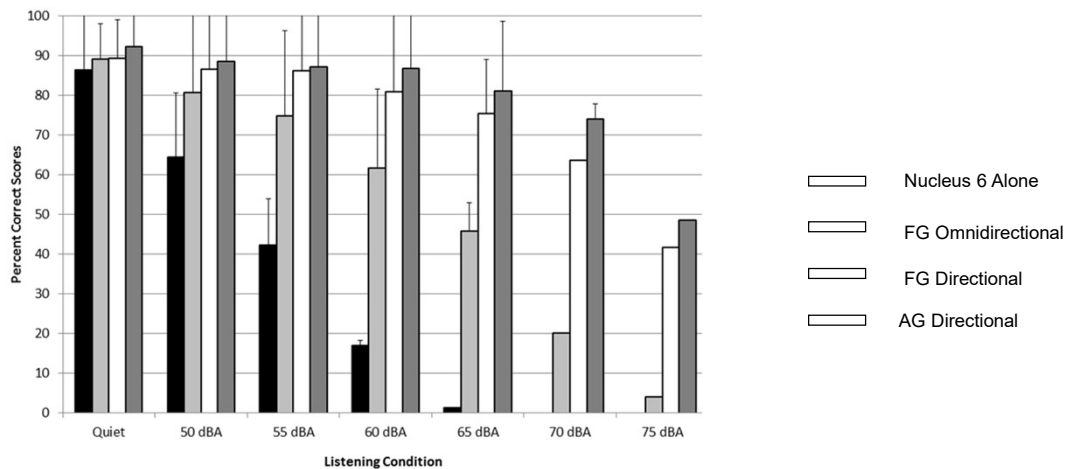
n=14

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Wolfe et al, in press, JAAA

Remote microphone with N6 CI Processor



31 6/27/17 Wolfe et al, in press, JAAA

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Remote Mic Technology

There are definite Remote Mic technology differences available so do your research and know when to recommend which device.



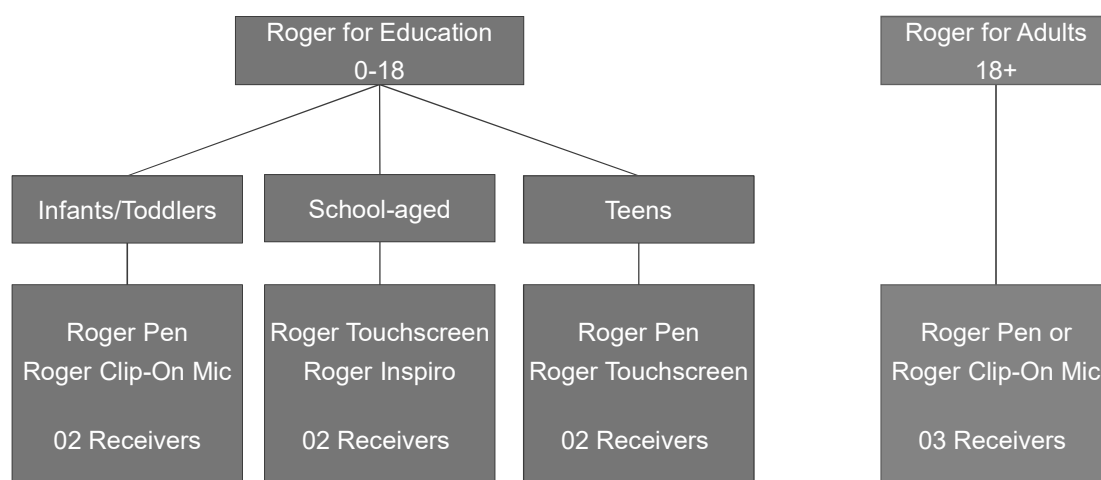
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Roger evidence-based Remote Mic solutions

Roger recommendations



Roger microphone and transmitter choices



Roger Touchscreen Mic



Roger Inspiro Mic



Roger Pen and Roger Easy Pen



Roger Clip-On Mic

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Roger (02) Receivers Design-integrated



Roger 10



Roger 11



Roger 15



Roger 16



Roger 18



Roger 19

Universal



Roger X



Roger MyLink

Design-integrated for cochlear implants



Roger 17
AB Naida CI



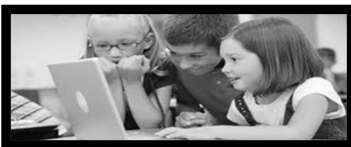
Roger 14
Cochlear Nucleus 5/6



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Modern classrooms
are dynamic

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Classroom Pragmatics



Hearing aids (including Bone-conduction)

Cochlear Implants

Classroom amplification systems

Classroom multimedia
technologies

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Classroom use with different technologies



Easy to use
Work consistently

Comfortable

Compatible with different
technologies

Provide maximum increase in
SNR in different educational
acoustic settings

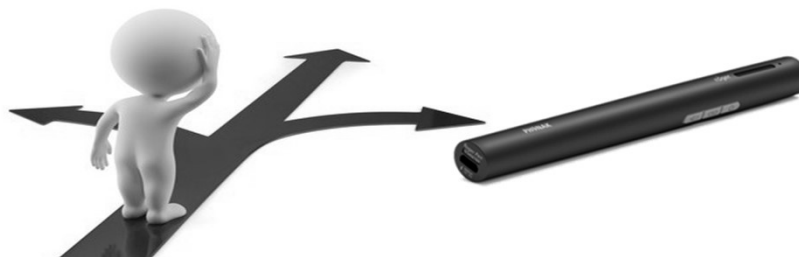
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What transmitter do we choose?

- Roger Touchscreen-1st choice
- Roger inspiro- FM needs
- Roger Pen- Discreet for teens
- Roger Pen cannot connect to Roger for Education



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Roger mics: Accelerometer technology

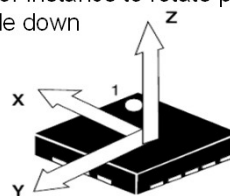


Roger Touchscreen Mic



Roger Pen and Roger Easy Pen

- An accelerometer is a small mechanical and electronic component that measures accelerations in three dimensions (X, Y and Z)
- The accelerometer continuously informs the Roger Pen about its orientation with respect to the direction of gravity
- It also tells the Roger Pen when it is accidentally dropped
- Smartphones use accelerometers for instance to rotate pictures to avoid they are ever displayed upside down



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Roger Pen and Roger Easy Pen



* Roger Pen and Roger Easy Pen are not part of the Roger for Education product line.

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Roger Pen

Built-in
accelerometer

Hands free and headset
Bluetooth protocol for
phone calls



Automatic and
manual microphone
modes

- Lanyard mode
- Conference mode
- Interview mode

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Roger Easy Pen

Built-in
accelerometer

Hands free and
headset Bluetooth
protocol for phone calls



Automatic mode **ONLY**

- Lanyard mode
- Conference mode
- Interview mode

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Roger Pen and Easy Pen – for kids and adults



Interview mode



Conference mode



Lanyard mode



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Listening to television and other audio equipment



- Separate docking station for
 - Roger Pen
- Power supply and charger
- 3.5 mm audio input for audio devices
 - TV
 - Smartphones
 - Game systems

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Roger Touchscreen Mic



* Roger Touchscreen mic is compatible with Phonak's Roger for Education product line.

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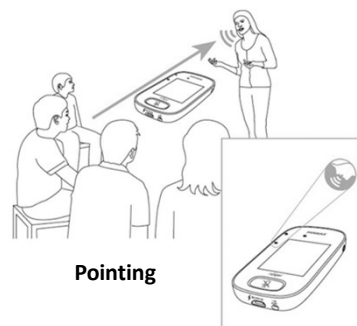
Roger Touchscreen modes



Lanyard



Small Group



Pointing

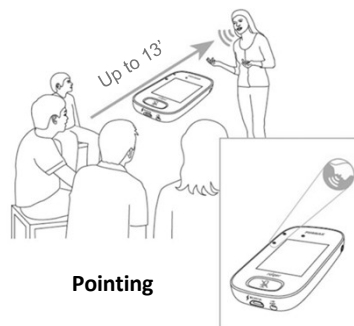
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Pointing mode: especially for teens

- Focus on lecture
- Talk with friends at lunch
- Point toward speaker for morning announcements



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What transmitter do we choose?



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Modern classrooms are dynamic!



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6/27/17

Roger Touchscreen Mic

Roger Touchscreen mic is compatible with Phonak's Roger for Education product line.



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Smart board audio and voice

- Instruction along with movie audio
- No missing important audio content with teacher comments
- Previous generation had primary talker
- Audio signal was lost with teacher comment



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Roger Multimedia Hub benefits

Two indicator
lights

Mixing of audio
and voice
simultaneously



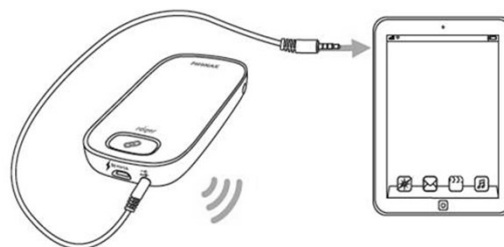
Ideal for
independent
listening activities

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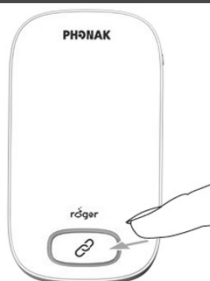
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Multimedia Hub for independent listening

Plug in the audio cable to both the Touchscreen Mic and the audio source for one to one or group listening station



0-10 cm
0-4 inches



Connect directly to an unlimited amount of Roger receiver(s) via the connect button on the Multimedia Hub

Press and hold power and connect for 8 sec to disconnect

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Roger Pass-around benefits

Light-weight and smaller than earlier model

Two indicator lights

Safe and secure table stand



Improved mute functionality

Volume controls and automatic sensitivity

Roll prevention

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Classroom amplification systems – benefits for students



Quicker acquisition of reading, writing and numeracy skills

Easier deciphering of language in early learning years

Expanded seating options for students with attention deficit issues

Better understanding of teacher for non-native speakers

Increased student attention, interaction and participation

Improved sentence recognition ability

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Roger DigiMaster 5000

- Adaptive behavior
- One DigiMaster 5000 per classroom
- Microphones: Roger inspiro or Roger inspiro SoundField
- Options: Roger DynaMic, Roger AudioHub
- For normal-sized classrooms:
100 m² / 1076 ft² and more
- Floor stand or wall mounted
- 12-loudspeaker array
- Audio input

Benefits child with ear level receivers by better signal monitoring.

Shares responsibility of using transmitter with all students.



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Roger Focus

Push button volume control

312 battery
on & off

Ready-to-wear design

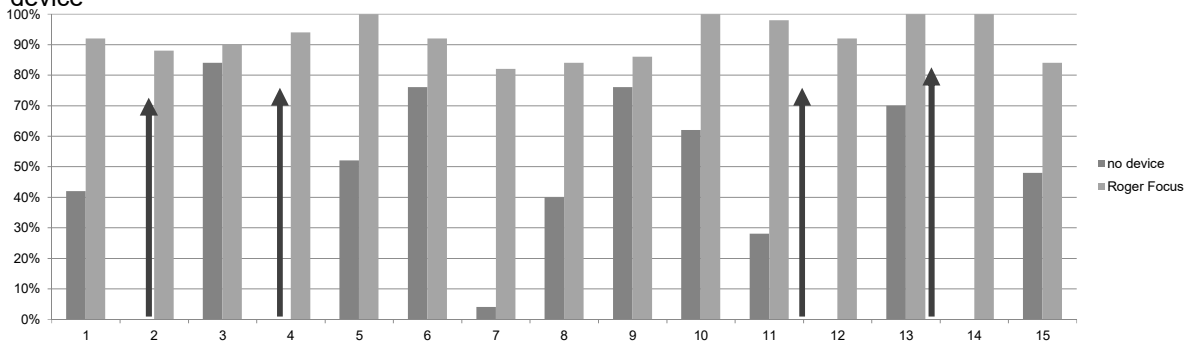
Minimizes distracting background noise for children with normal hearing but attention-related issues.

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Maximum performance: Roger Focus Evidence

Speech-in-noise testing revealed an average improvement of 53% with Roger Focus compared to no device



N=15 BKB-SIN, -5dB SNR noise at 65dB SPL

Note: with the exception of subjects 3 and 9 all individual scores showed significant improvement

Subjects 2, 4, 12, and 14 scored 0% without any device and almost 100% with Roger Focus.

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Jones, et al. Phonak FSN June 2014

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Remote Mic Technology

Phonak Roger Technology is an excellent choice to improve auditory access to desired speakers and multimedia input in today's complex acoustic environments.



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Summary and Questions

Summary

- Even with sophisticated processing in personal amplification, Remote Mic technology can be quite beneficial in today's complex acoustic environments.
- There are definite Remote Mic technology differences available so do your research and know when to recommend which device.
- As a Remote Mic option with advanced mic technology, refined processing algorithms, and multiple solution options, empirical evidence shows that Phonak Roger Technology is an excellent choice to improve auditory access to desired speakers and multimedia input in today's complex acoustic environments.

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Questions?



Thank You

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**Together,
we change lives**