



Audiology Online Course

Wireless Technology: How To Connect FM and Other Accessories Wirelessly To The Ponto Device

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Financial Disclosure

- **Financial:** All presenters are paid employees of Oticon Medical, LLC
- **Non Financial:** Presenters have no non-financial relationships to disclose
- Course content describes Wireless technology and connecting accessories to Oticon Medical Streamer
- This course has been approved for 0.1 CEU's by the following organizations:
 - American Academy of Audiology (AAA)*
 - American Speech, Language, and Hearing Association (ASHA)*

*AAA and ASHA CEU approval does not imply endorsement of course content, specific products, or clinical procedures

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Learner Outcomes

- After this course learners will be able to explain the process of the A/D conversion of the audio signal.
- After this course learners will be able to describe the functionality of the Oticon Medical Streamer and how to connect to the Ponto device.
- After this course learners will be able to explain how easy FM use can be with the Streamer and the Ponto device.



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Continuing Educations Units

- CEU's
 - If you want Oticon Medical to file CEU's on your behalf for AAA and ASHA, you **must** complete all requested information on the sign-in sheet to include:
 - First and last name
 - Membership number(s)
 - Address
 - Email address
 - Complete Course Evaluation form
 - Complete Course Assessment
 - For ASHA CEU's, you **must complete CE Participant Form** and return to an Oticon Medical employee (ASHA only tracks CEU's to members who have paid the additional 25 dollar CEU Registry Fee – this service is included in AAA membership dues)
 - Please write **legibly**
 - If information is not complete, you may not receive CEU credits

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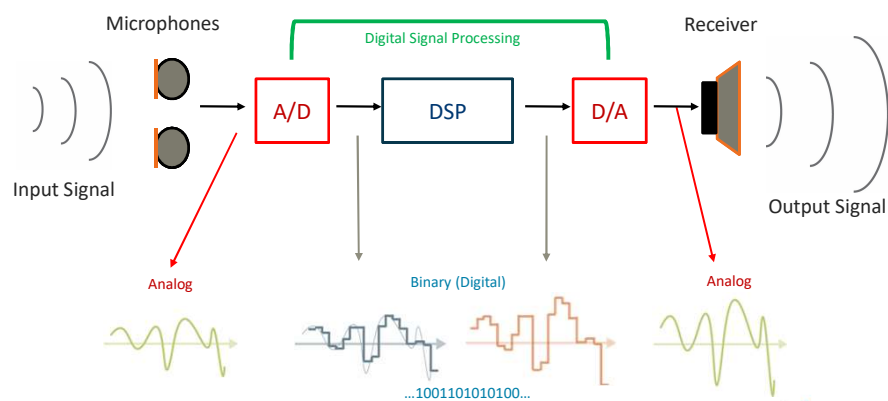
UNDERSTANDING WIRELESS TECHNOLOGY?



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ANALOG TO DIGITAL CONVERTER



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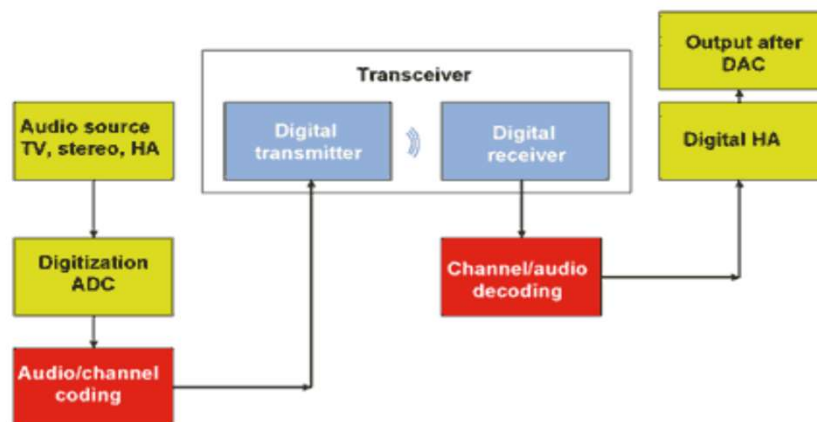
ANALOG TO DIGITAL CONVERTER



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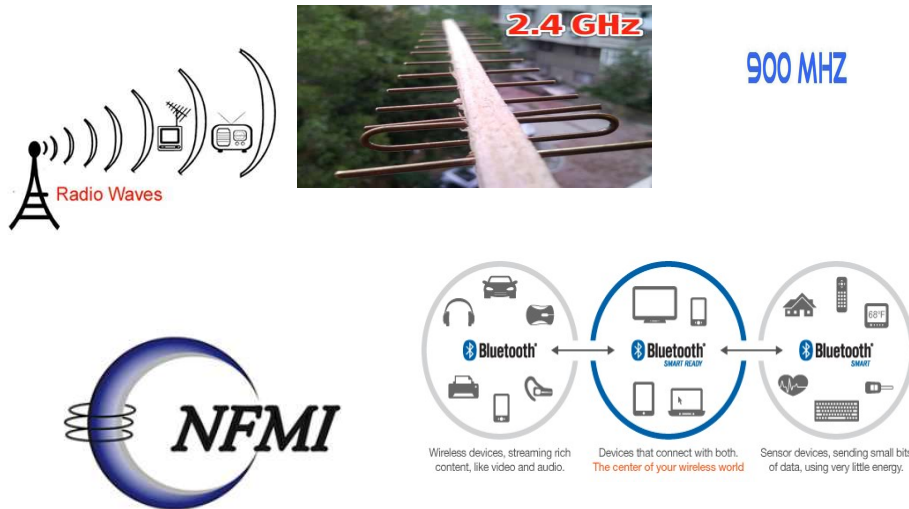
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WHAT IS WIRELESS TECHNOLOGY?



WHAT DOES IT MEAN???



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WHAT IS WIRELESS TECHNOLOGY?

- “Electronic products and systems that interact by using electromagnetic energy to carry information between these products, enabling communication.”

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WHAT IS WIRELESS TECHNOLOGY?

- Electromagnetic energy involves 2 things with hearing aids:
 1. Signal (acoustic) or information
 2. Means to carry the “information” from one place to another



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WHAT IS WIRELESS TECHNOLOGY?

- Electromagnetic information can be carried via analog or digital technology

1. Analog
 - a) Telecoils
 - b) FM Systems
2. Digital

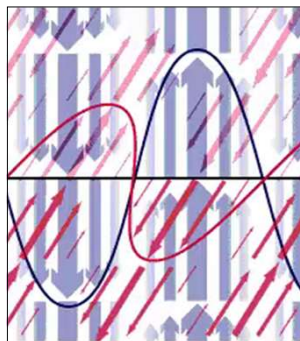


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WIRELESS TECHNOLOGY TODAY

- **EM = Electromagnetic Waves**
- Not audible unless they are converted to a sound wave.
- Easily modified = EM waves are excellent carriers of data.
- EM waves cover a wide range of frequencies - *carrier frequency*

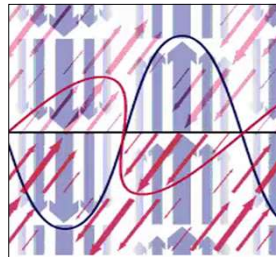


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WIRELESS TECHNOLOGY TODAY

- **Carrier Frequency** depends
 - how much information
 - how much power is available
 - transmission distance
 - how many other devices are using that frequency
 - local laws and regulations
- Higher carrier frequencies = more information
- Lower carrier frequencies = less power for transmission

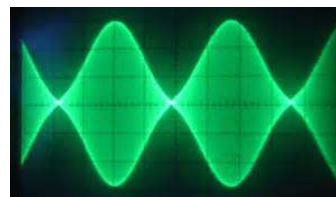


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WIRELESS TECHNOLOGY TODAY

- **RF = Radio Frequency**
- Electromagnetic wave frequencies = 3 kHz to 300 GHz
 - **Carrier Frequencies**
- Use an antenna to generate and transmit
- Designed to radiate into free space = Far-Field
 - Radar / TV Broadcasting / Satellite / Cell-Phone
 - Microwave
 - Infra-Red
 - Bluetooth



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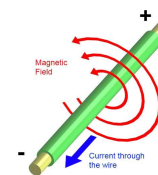
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TRAVELING TRIO



WIRELESS TECHNOLOGY TODAY

- NFMI = Near-Field Magnetic Induction
- Near-Field = Short Range Wireless
- Low Energy Magnetic Field = Low Power
- Fast connection = Instantaneous
- Less Interference; Nulls
- Combined with Bluetooth using an intermediary device



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ADVANTAGES OF NFMI

- Fast connection
 - No delay
- Low battery drain – uses very little power
 - Low current drain on Hearing Aids
- Can transmit through almost anything



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DRAWBACKS OF NFMI

- Short transmission distance
 - 1 meter
- Need a “Gateway device” around the neck when connecting to anything further than 1 meter
- Size
- Sound quality can be affected by the orientation of the gateway device and hearing aid receiver coil
- Magnetic sources may also cause interference
 - Old computer monitors
 - Fluorescent lights



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WIRELESS TECHNOLOGY TODAY

2.4 GHz

RF Carrier Frequency

- 79 channels
- Bluetooth
- Cordless Landline Phones
- Car Alarms
- Microwaves
- Video / Security Systems
- Wireless Data Networks
- Remote Control Cars / Droids



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ADVANTAGES of 2.4 GHz

- Long distance signal transmission
- Does not require "Gateway Device"
- Robust reliable connections
- High transmitted data capacity, bandwidth, stereo, and low distortion
- Low delay from source to listener
- No echo problems and no lip synchronization



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DRAWBACKS OF 2.4 GHz

- High battery consumption
- Can't send information through the skull, need to find a way around it
- Inconsistent connection. Signal can easily drop



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WIRELESS TECHNOLOGY TODAY

- 900 MHz

RF Carrier Frequency

- 4 Channels in US
 - Not Applicable Worldwide
- More Distance
- Lower Power – Energy
- Low Fidelity / Quality
- Video Transmission
- Closed-Circuit TV

900 MHZ

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ADVANTAGES OF 900 MHz

- Does not require a “Gateway Device”
- Long distance signal transmission
- Relatively low power consumption
- Low delay from source to listener
- No echo problem and no lip synchronization when watching TV



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DRAWBACKS OF 900 MHz

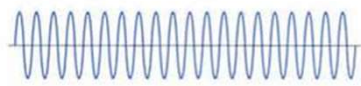
- Only 4 channels available for use
 - Not used or available all over the world
- Lower frequency so sharing less information than a 2.4 GHz signal
- Low Fidelity/sound quality



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2.4 GHz VS. 900 MHz



900 MHz



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WIRELESS TECHNOLOGY TODAY

BLUETOOTH (Traditional)



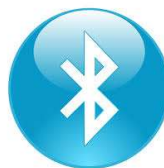
- RF signal - 100 meters
- Carrier Frequency = 2.4 GHz
- File transfers between devices
- Continuous Streaming
 - Lots of data at close range
- Garage-door
- Baby monitors
- Wireless headsets
- Wireless keyboards, speakers, printers

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ADVANTAGES OF BLUETOOTH

- Able to transmit over a longer distance than NFMI
 - 100 meters
- Open system
- Channel hops to minimize interference
- Compatibility – Bluetooth is by far the best known personal area networking technology in the world, and is backed by all the main manufacturers of consumer devices



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DRAWBACKS OF BLUETOOTH

- Delay in sound can cause a mismatch between audio and visual signals
- Uses a lot of power consumption
- Continuous drain/continuous streaming
- Expensive to use in devices



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WIRELESS TECHNOLOGY TODAY

BLUETOOTH LOW ENERGY

- RF signal - 100 meters
- Carrier Frequency = 2.4 GHz
- Introduced in 2011 as [Bluetooth 4.0](#).
- Low power consumption.
 - Exchange small amounts of data periodically.
 - Sleep mode except when connected
- Connection times a few mS vs. Bluetooth ~100mS.
- Data rates are so high at 1 Mb/s.
 - Blood pressure monitors
 - FitBit-like devices
 - Public transportation apps



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ADVANTAGES OF BLE

- Better battery consumption than traditional Bluetooth
- Simplicity – the radio is based on the familiar Classic Bluetooth radio, and its simple mode of operation can be managed by a small protocol stack
- Robust radio – designers can target a line-of-sight range of as much as 100m. A frequency-hopping scheme makes a Bluetooth LE radio highly resistant to interference
- Real-time operation – a connection between devices can be made, data transferred and the connection shut down, in just 3ms
- Compatibility – Bluetooth is by far the best known personal area networking technology in the world, and is backed by all the main manufacturers of consumer devices



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DRAWBACKS OF BLE



- Streaming BLE connections use less of the actual original signal due to the connection.
- Not backwards compatible with traditional Bluetooth devices



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WIRELESS TECHNOLOGY TODAY

- **Bluetooth vs. Bluetooth Low Energy – There is a Difference**
- In summary:
 1. Bluetooth & Bluetooth Low Energy are used for very different purposes
 2. **Bluetooth** can handle a lot of data, but consumes battery life quickly and costs a lot more
 3. **BLE** is used for applications that do not need to exchange large amounts of data, and can therefore run on battery power for years at a cheaper cost
 4. It all depends on what you're trying to accomplish



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WIRELESS TECHNOLOGY TODAY

- **ANDROID & BLE:**

- This allows Android apps to communicate with BLE devices that have low power requirements: proximity sensors, heart rate monitors, fitness devices.



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WIRELESS CONNECTION WITH THE PONTO

- **Ponto Streamer & Connect Line**

- Allows patients to connect to devices to help enhance listening abilities in all listening situations and scenarios
- Patient can control the many functionalities through one device with little to no loss of signal
- Easy to use
- Can be personalized to meet each patients specific listening needs. Allowing functionality to grow and change with the user
- Uses Wireless Bluetooth 2.4 GHz



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What is Ponto Streamer?




- Works as a remote control
 - Will work as remote even when Streamer is turned off
- Oticon Medical branded
- It's worn around the neck
- Focus on making a wireless solution with little power consumption in the sound processor, to create least possible limitations on the sound processors output. 10 hours of constant streaming
- Open Ponto Streamer – Doesn't need to pair in Genie Medical
- Wireless > Bluetooth 2.4GHz
- User centric solution - One device to control the different
 - features with dedicated buttons
- Telecoil included
 - Ideal for looped areas



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Ponto Streamer Wearing Options

Ponto Streamer status	sends signal to	to be used
Open Streamer as it comes from factory	any Ponto Plus within 1 m 	- with neck loop
Linked Streamer (linking takes place in Genie Medical)	only to the linked Ponto Plus 	- with or without neck-loop
Demo Streamer (for demonstration purposes, cannot be linked)	any Ponto Plus within 1 m 	- with neck loop

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Oticon Medical Ponto Streamer

Using the Ponto Streamer without the neck loop

The Ponto Streamer can also be used without the neck loop, e.g. with the optional belt clip. The distance to the sound processor should then be less than one meter. You may experience drop-outs in sound, which is why we recommend using the neck loop. If the Ponto Streamer is used without the neck loop, then the Ponto Streamer functionalities depend upon whether the Ponto Streamer is open or linked; see the table below.

Functionality	Works in an open Ponto Streamer	Works in a linked Ponto Streamer
As a remote control	No	Yes
Hear the ring from an incoming call	Yes	Yes
Streaming of sound from e.g. TV, or phone calls	No	Yes

If the Ponto Streamer is used with the neck loop then it has all functionalities activated no matter whether the Ponto Streamer is open or linked.

IMPORTANT NOTICE

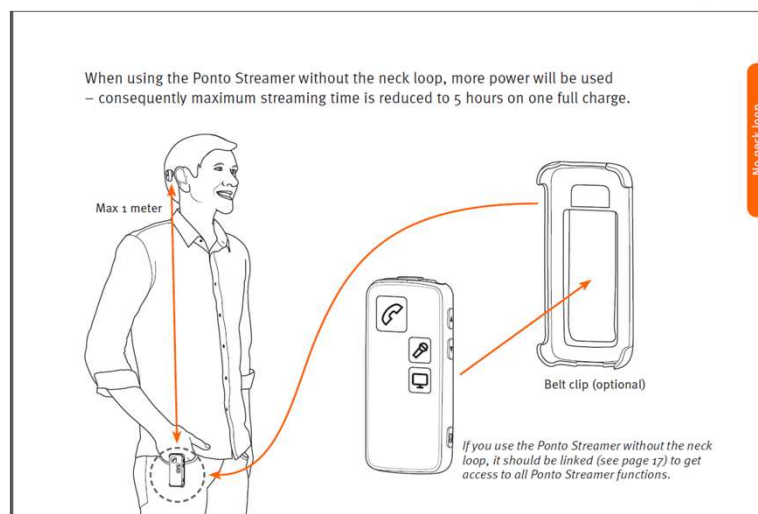
A defective neck loop should be replaced immediately.

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Ponto Streamer Without a Neck Loop

When using the Ponto Streamer without the neck loop, more power will be used – consequently maximum streaming time is reduced to 5 hours on one full charge.



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Ponto Streamer Fitting

- Optional linking Ponto Streamer and Ponto Plus

1. Attach the Ponto Streamer to the PC ConnectLine / Settings tool change the the status to 'Linked'



2. Enter the Streamer's serial number

PONTO STREAMER ☒

Serial number (optional)

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Ponto Streamer Battery Life

Battery capacity and charge time	
Battery capacity using neck loop	Up to 10 hours typical daily use: 2 hours phone, 6 hours TV and 2 hours standby (after 2 years the capacity will be approx. 8 hours typical daily use).
Battery capacity not using neck loop	Up to 5 hours typical use: 1 hour phone, 3 hours TV and 1 hour standby.
Battery charge time	2 hours for complete charge, using enclosed power supply.
Remote	If Ponto Streamer is turned off the remote functionality of the sound processor will still work; it will work for up to 6 months on a full charge.
Battery life expectancy	The battery in Ponto Streamer will last for more than 2 years if fully charged once a day. The battery can be replaced by your hearing care professional.

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OM Ponto Streamer vs. Oticon Streamer Pro



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Which Oticon Hearing Aids Can Be Used in a Bimodal Setup?

- Currently, there are 6 Oticon models that can be used bimodally with Ponto Streamer:

- **Sensei SP:**

- Sensei SP
- Sensei SP Pro

- **Dynamo:**

- Dynamo SP4
- Dynamo SP6
- Dynamo SP8
- Dynamo SP10



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The Ponto Streamer

The most connectivity opportunities in one system



The Ponto Streamer gives you all these communication possibilities / functionalities.

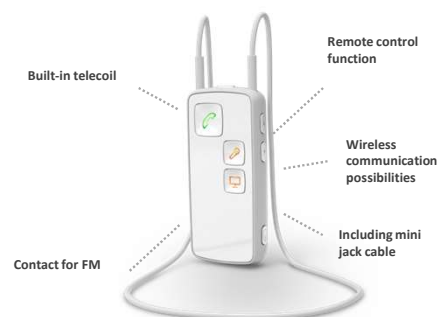


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Wireless Connectivity

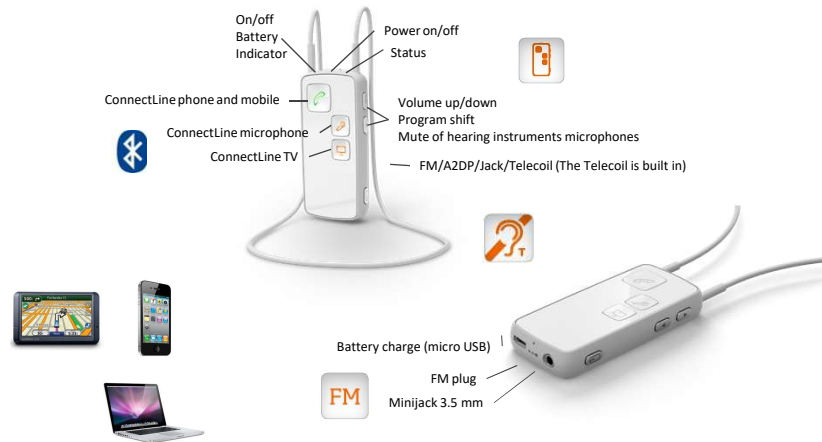
• Ponto Steamer



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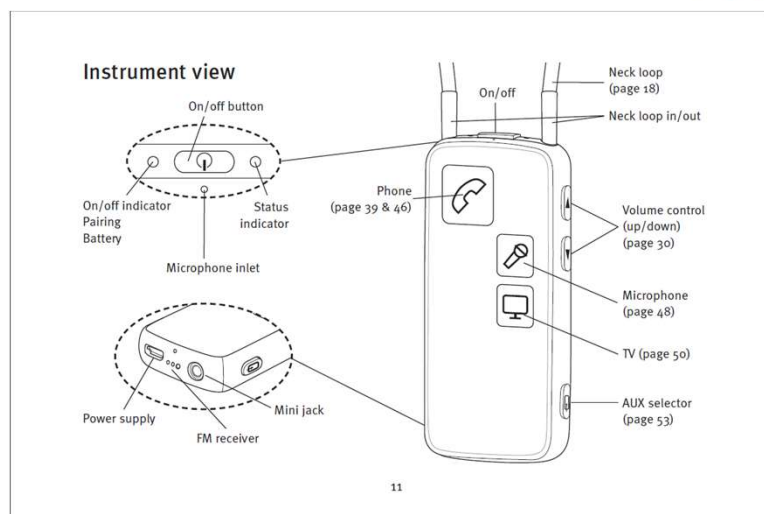
Ponto Streamer buttons/plugs



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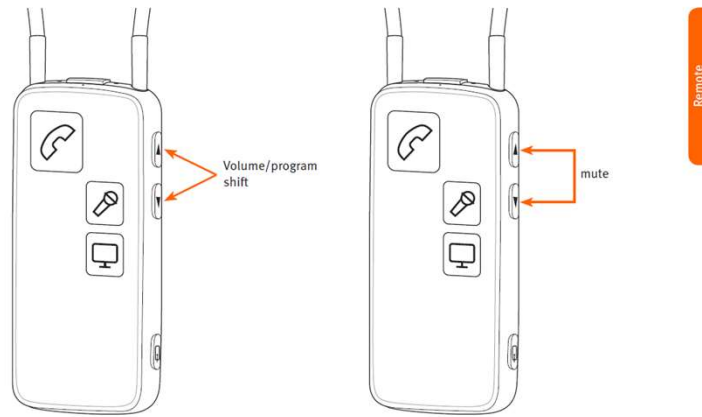
Ponto Streamer



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Ponto Streamer



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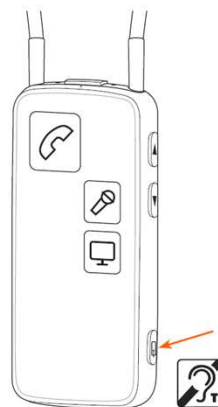
Ponto Streamer

T-coil (built-in)

Ponto Streamer has a built-in tele loop receiver (T-coil).

To receive sound from the tele loop receiver, **press and hold the AUX selector for approx. 2 seconds.**

Please note: if desired, the operation can be changed so the T-coil can be activated by a brief press.



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Ponto Streamer

Replacement neck loops

Replacement neck loops are available in three sizes: Short (51 cm), medium (66 cm) and long (81 cm) from your hearing care professional.



Belt clip

A belt clip is available from your hearing care professional.



Charger Base

A Charger Base for charging the Ponto Streamer is available from your hearing care professional.



Additional

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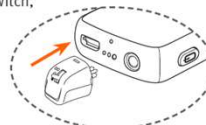
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FM receiver (optional)

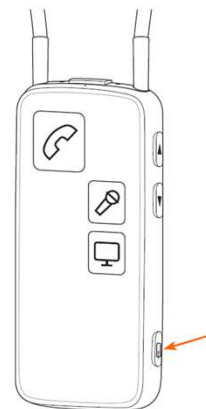
An FM receiver can be plugged into the Euro pin socket. The receiver is used to receive FM signals from an FM transmitter, typically worn by a school teacher.

Simply plug in the FM receiver and briefly press the AUX selector. When the FM transmitter and receiver are synchronized and on the same channel, the FM signal will be received in the sound processor.

If your FM receiver has a toggle switch, position the switch into the OO position.



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Ponto Streamer and FM/Ponto 3 – Step By Step



1. Turn the hearing instruments on and place them on headband or abutment. Place the Streamer neck loop over the head



2. For the Oticon Medical Streamer; Press the on/off button on the top of the Oticon Medical Streamer for approximately 2 seconds until all lights on the front and top flash to indicate it is powered on. Release the on/off button. The power indicator on the top of the Streamer should now fade to green

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Ponto Streamer and FM/Ponto 3 – Step By Step



3. Plug in the FM receiver



4. For Oticon Amigo FM receivers, place the toggle switch in the OO position. The LED light on the FM receiver will be on

*Universally compatible with all the FM receivers that have a Europin

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Ponto Streamer and FM/Ponto 3 – Step By Step



5. Turn on the Amigo Transmitter. The LED light on the FM receiver should be on indicating FM transmission between the Transmitter and the R2. If light not on, give a short/quick press to the AUX selector on the Streamer



6. The orange light will be on

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Ponto Streamer and FM/Ponto 3 – Step By Step



7. If devices are not synced, press the channel seek button on the receiver



8. Sound will now be received from the FM transmitter microphone and sent to the hearing instruments via the FM receiver and Streamer

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Ponto Streamer and FM/Ponto 3 – Step By Step



9. Place the Streamer in the protective skin.
This provides increased protection if the Streamer is accidentally dropped

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Connecting an FM receiver to Ponto Plus

FM

On **Ponto Plus/ Ponto Plus Power** there isn't a connection socket on the sound processor. Instead you connect it through the connection socket in the bottom of the Ponto Streamer. The FM plug used for Ponto Streamer looks like this:



Known FM receivers which can be used together with Ponto Plus and Ponto Plus Power are:

- Oticon Amigo R2 & Oticon Amigo R1
- Phonak MLxi universal receiver & Phonak Roger X universal receiver
- Widex universal receiver
- Comfort Audio DT-20

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Connecting an FM receiver to Ponto / Ponto Pro



On **Ponto / Ponto Pro / Ponto Pro Power** you attach the FM receiver directly to the sound processor through the DAI socket in the sound processor itself. The FM plug used for Ponto / Ponto Pro / Ponto Pro Power looks like this:



FM receivers which can be used together with Ponto, Ponto Pro and Ponto Pro Power are:

- Oticon Amigo R2BA
- Phonak MLxi BAHA
- Phonak MLxS BAHA

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FM solution through Ponto/Ponto Streamer

- Binaural Solution = Only 1 FM Receiver
 - An FM receiver connected to the Ponto Streamer transmits to both Ponto sound processors at the same time
- Connectivity in Classroom
 - Attending classes is often not just a matter of listening to the teacher's voice. Sometimes students also need to listen to sound on PC's, or to TV programs or music



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FM solution through Ponto/Ponto Streamer

- Possible benefits for parents
 - Choosing a solution is not only about focusing on the child's life in school.
 - Parents may find it beneficial that their child could connect the Ponto Streamer to their cell phone
- Other advantages outside school
 - In other cases outside of school, it could also be relevant for a child to use the Ponto Streamer, e.g. when he or she is watching TV, listening to music, using Skype, etc.



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The Ponto Streamer

The most connectivity opportunities in one system



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What is Connectline?

- A series of devices that helps users connect to a wide variety of communication and entertainment applications
- It's the one solution which offers most connectivity opportunities in one system
- Must be paired to the Ponto Streamer
- Not Oticon Medical branded



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ConnectLine and accessories

Extending the communication possibilities



The ConnectLine products are the same as for Oticon Streamer and hearing aids.

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Accessories - Connect Line TV Adapter



- The ConnectLine TV adapter is connected to the TV and transmits sound directly to the Ponto Plus sound processor through Ponto Streamer. To listen to the TV, all you have to do is to push the TV button on the Ponto Streamer
 - Oticon product
 - Transmission range up to 100 feet (30 meters)



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Accessories - Connect Line microphone



- The discreet microphone is worn by the conversation partner and connects wirelessly to Ponto Streamer, allowing you to hear the other person's voice directly in the Ponto Plus sound processor.
 - Oticon product
 - Transmission range up to 50 feet



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Accessories - Connect Line Phone Adapter



- The Connect Line phone adapter makes it possible to use the Ponto Streamer with a traditional analog landline phone. The solution supports both incoming and outgoing phone calls. During a phone call, the sound processor is used as a headset and the microphone on body worn Streamer enables hands-free operation
 - Oticon product
 - Transmission range up to 100 feet (30 meters)



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Connect line and the SSD patient

- Remote control
- Companion mic for car / restaurant (improve s/n ratio)
- Hands free phone calls to Ponto Plus keep the good ear open
- Option of extra year warranty if not interested in Streamer



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Oticon Medical Streamer and ConnectLine App



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What devices/Operating Systems can the ConnectLine App be used with?

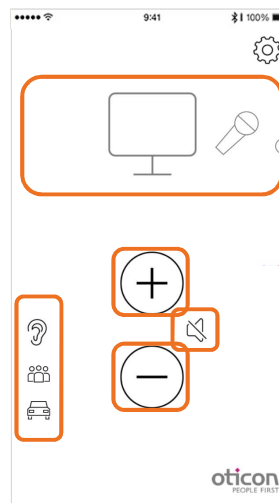
- Requires iOS 7 or later in order to install the ConnectLine App. Compatible with iPhone, iPad, and iPod touch
- The ConnectLine App for Android smartphones and tablets works with Android 4.x. (Ice Cream Sandwich) or later.

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Understanding the Home Screen

- The app will automatically show the external devices connected to the Streamer in the menu on top. Scroll sideways – click on an icon to choose the device.
- The volume in the instruments can be controlled by the (+) and (–)
- The programs in the sound processor(s) can be changed by tapping the icons on the left
- The sound processor(s) can be muted by tapping the loudspeaker between the (+) and (–) buttons.



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Managing phone functionalities

- **How to change the functionality of the Streamer - phone**
 - In the 'Streamer & ConnectLine' section, the functionality of how the Streamer controls the phone can be adjusted. The descriptions will be displayed by tapping the 'i'.

Last Number Redial:

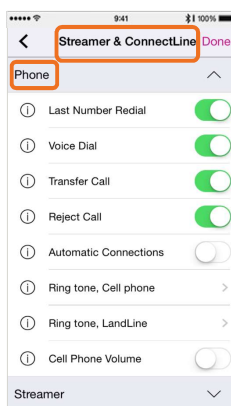
If enabled, last number redial can be started by pressing and holding the phone button on the Streamer (if supported by the cell phone).

Voice Dial:

If enabled, briefly pressing the phone button on the Streamer will enable voice dial (if supported by your cell phone and you are not in range of a ConnectLine phone adapter).

Transfer Call:

If enabled, pressing and holding the phone button on the Streamer will transfer a call back to the cell phone.



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Reject Call:

If enabled, an incoming cell phone call can be rejected by pressing volume down on the Streamer.

Automatic Connections:

Allow automatic connections from e.g., SMS/text notifications and music players.

Ring tone, Cell phone:

Ring tone associated with calls from your cell phone(s).

Ring tone, Landline:

Ring tone associated with calls from the ConnectLine phone solution (Phone Adapter).

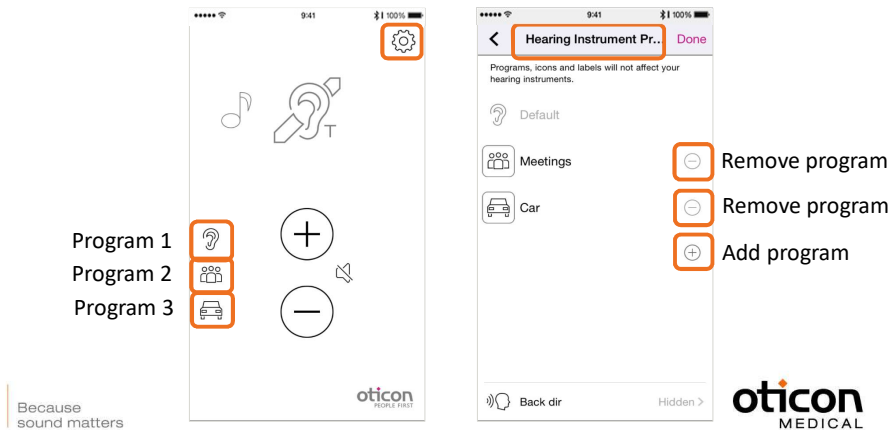
Cell Phone Volume:

Enables you to adjust the volume of the call using the phone's volume buttons.

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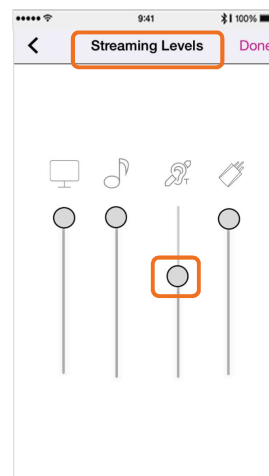
Labeling sound processor programs

- The app will show an ear for program 1. Additional icons and text labels can be added in the 'Settings' under 'Hearing Instrument Programs'



How to: Adjusting streaming volume levels

- The streaming volume level can be adjusted for the connected devices. The streaming level is set in 'Settings' under 'Streaming Levels'



How can I tell if my Streamer works with the ConnectLine App?

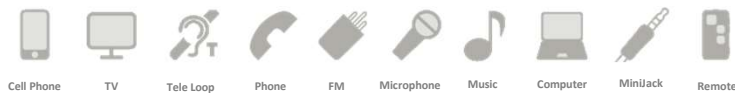
Check the serial number on the bottom of the Oticon Medical Streamer to ensure that the last two digits are **A3**.



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The Ponto Streamer The most connectivity opportunities in one system



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The Ponto Streamer: Discrete, simple control



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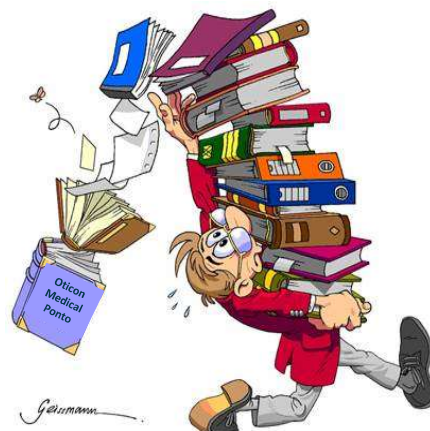
With the Ponto Streamer and the ConnectLine App, you can control your sound processors and ConnectLine system devices via iPhone®, iPad®, iPod touch®, Android™ smartphones and tablets

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Summary

- Not all wireless connections in hearing devices are the same.
- Oticon Medical provides you with a flexible way to transmit wirelessly with superior sound quality.
- The Ponto Streamer allows patients to connect wirelessly using multiple connection options.



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THANK YOU!!!!

Questions?



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