

Nucleus[®]

COCHLEAR IMPLANT SYSTEM

User Manual

for the ESPril™ 3G

speech processor and accessories



User Manual
for the ESPrit™ 3G
speech processor and
accessories

Part Number: N95501F Issue 1

Contents

Introduction

The Nucleus Cochlear Implant System	7
Warranty, Registration and Patient Identification Card	8

Part One: Using your ESPrit 3G

ESPrit 3G	11
Overview	11
Battery Cover	12
Under the Battery Cover	14
ESPrit 3G Serial Number	14
Transmitting Coil and Cable	15
Transmitting Coil	15
Cable Lengths	17
Attaching the Coil and Cable to your ESPrit 3G	18
The Earhook	19
Adjusting the Earhook	21
Batteries	22
Replacing Batteries	23
Microphone	25
Top Controls	25
Program Selection Control	26
Rotary Control	26
Base Controls	27
Mode Setting Switch	27
Accessories Adaptor Socket	29

ESPrit 3G Built-in Telecoil	31
Overview	31
Telecoil and Microphone Mixing	32
Use with a Telephone	33
Use with a Room Loop	33
Use with a Neck Loop (or Personal Induction Loop)	34
Interference Noises	35

Connecting Accessories

(with the Accessories Adaptor)

(with the Accessories Adaptor)	37
Overview	37
Accessories Adaptor	38
Lapel Microphone	40
Personal Audio and TV/Hi-Fi Cables	41
Sound Mixing	41
Accessory Adaptor Cable	43
Personal Audio Cable	44
TV/Hi-Fi Cable	45
External Telecoil	46
FM Cable	47
Lapel Clip	47

FM Systems

FM Systems	49
Overview	49
FM Transmitters	49
FM Receivers	50
FM Cables	50
ESPrit 3G MicroLink Adaptor	53
Interference Problems	58

IR Systems

IR Systems	61
Overview	61

Part Two: Care and Troubleshooting

Daily Use of your ESPrit 3G	65
At the Start of Each Day	65
At the End of Each Day	65
Overnight Storage	66
Care and Maintenance	69
Cleaning	69
Longer Term Storage	70
Other Do's and Don'ts	70
Makeup and Hair Spray	70
Sand or Dirt.....	71
Water	71
Troubleshooting	73
Overview	73
Testing your ESPrit 3G	75
Steps to Identify the Fault	76
Switches and Controls	76
Batteries	77
Transmitting Coil and Cable	77
Microphone	78
Attached Accessory	78
ESPrit 3G MicroLink Adaptor	79
Optional Monitoring Accessories	80
Signal Check	80
Monitor Earphones	81

Part Three: Further Information

Programming Options	87
Overview	87
Program Selection	87
Adjusting the Rotary Control	88
Built-in Telecoil	89
General Information	91
Technical Information	91
Specifications	91
Operating Characteristics	92
International Labeling Symbols	94
Appendix (for Clinicians)	95
ESPrIt 3G Programming Cable	95

Introduction

The Nucleus[®] Cochlear Implant System

The Nucleus[®] cochlear implant system consists of three parts:

- a speech processor, in this case an ESPrit[™] 3G speech processor
- a transmitting coil and cable
- a Nucleus[®] cochlear implant

To produce hearing sensations, using the Nucleus cochlear implant system:

- Sounds are received by the microphone positioned at the top of your ESPrit 3G or its built-in telecoil, or a mix of both.
- Your ESPrit 3G codes those sounds.
- Your transmitting coil transmits the coding to your cochlear implant.
- The electrodes in your implant use this coded information to stimulate your cochlea's hearing nerve fibers.
- These hearing nerve fibers relay the sound signals to your brain, producing hearing sensations.

Your ESPrit 3G contains a specialized computer chip. Speech and environmental sounds are analyzed and digitized into coded signals by this chip. A custom modulation scheme transmits these signals to the electrodes on your implant's array. Signals from the electrodes electrically stimulate your cochlea's nerve fibers, generating sensations that your brain perceives as hearing.

The ESPrit 3G works with both the Nucleus[®] 24 cochlear implant models and the Nucleus[®] 22 cochlear implant. The only difference between the two speech processors is the transmitting coil and cable. These differences are outlined in the *Transmitting Coil and Cable* section following, in the *ESPrit 3G* chapter in Part One.

Warranty, Registration and Patient Identification Card

Your warranty is enclosed.

Please complete the registration card and return it to Cochlear within 30 days of receiving your product.

You should also complete the supplied patient identification card and carry it with you at all times.

Part One

Using your ESPrít™ 3G

ESPririt™ 3G

Overview

The ESPririt™ 3G speech processor is a small, lightweight, behind the ear speech processor (BTE) for use with Nucleus® cochlear implants.

The ESPririt 3G provides:

- a sleek stylish design
- a wide range of colors
- for use with Nucleus® 24 cochlear implants: a choice of coding strategies – ACE™, SPEAK and CIS
- for use with Nucleus® 22 cochlear implants: SPEAK coding strategy
- a directional microphone
- a built-in telecoil
 - to help you hear while using the phone
 - to enable wireless access to some assistive listening devices
- a Whisper Setting for soft sounds
- clearly visible and easy to use controls
- the choice of two listening programs, customized for different listening situations
- within each program, a choice between volume, sensitivity or autosensitivity/volume

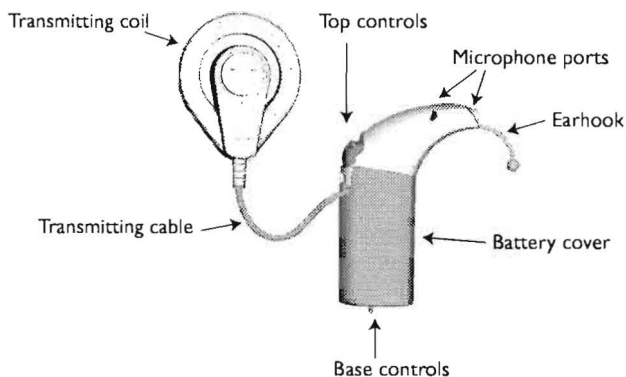


Figure 1: ESPrIt 3G

Battery Cover

The lower part of your ESPrIt 3G, the battery cover, is available in a variety of colors.

You need to remove the battery cover to:

- attach the transmitting coil and cable
- change the earhook
- change the batteries
- change the battery cover to another color
- view the serial number

To remove the battery cover:

1. Turn off the ESPrIt 3G.
2. Hold the top section between the fingers of one hand.
3. Hold the lower part of the battery cover between the fingers of your other hand.
4. Slightly squeezing the battery cover, slide it downwards.

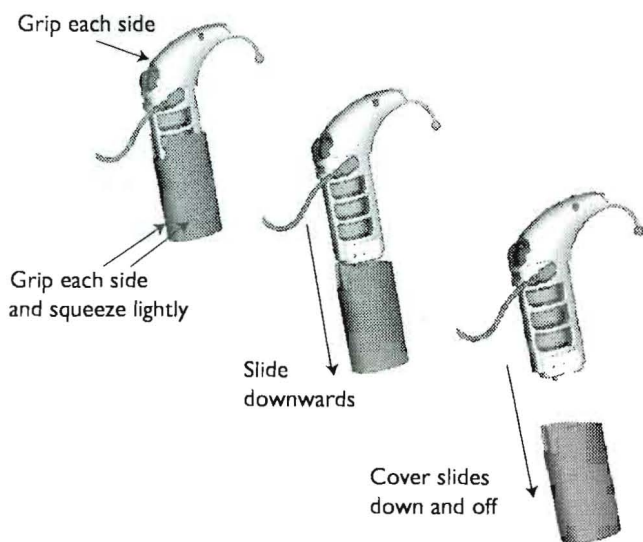


Figure 2: Removing the Battery Cover

To replace the battery cover:

1. Position the top of the cover at the ESPrIt 3G base.
2. Slide the cover upwards, until it clips into place.

Under the Battery Cover

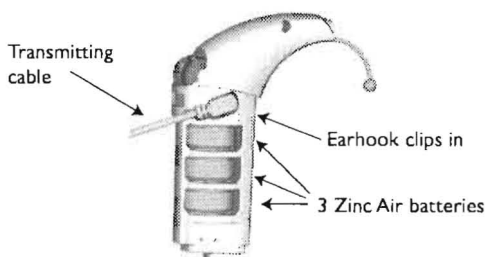


Figure 3: Under the Battery Cover

ESPrIt 3G Serial Number

The serial number is located under the battery cover, next to the batteries. For your future reference we suggest you write the number on your warranty card.

It is important that your registration card be filled out by you or your clinician and returned to Cochlear. This assists if repairs are required, and enables Cochlear to meet regulatory requirements.

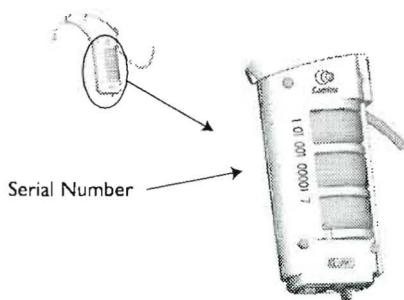


Figure 4: Serial Number

Transmitting Coil and Cable

The transmitting coil and cable form one unit. They are available in four colors: beige, brown, black and grey.

A magnet holds the transmitting coil in place on your head, over your cochlear implant.

Transmitting coils are not interchangeable between cochlear implants, nor between speech processors.

If you have a Nucleus 24 cochlear implant, you must use a transmitting coil designed for a Nucleus 24 cochlear implant. The same rule applies for a Nucleus 22 cochlear implant. In addition, you must not use a transmitting coil designed for an ESPrIt 3G speech processor with any other speech processor, and vice versa.

Transmitting Coil

If your transmitting coil and cable is not as shown below, please refer to the next page over.

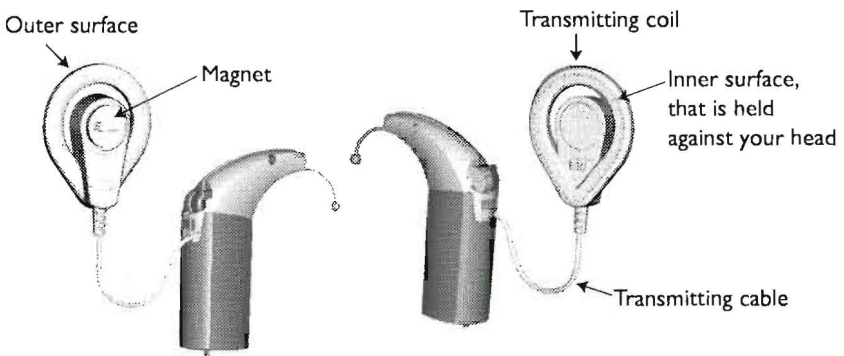


Figure 5: Transmitting Coil and Cable

You must use the transmitting coil and cable designated for your implant.

For the Nucleus 24 cochlear implant:

- The transmitting coil is marked E3G.
- The connector end is yellow.

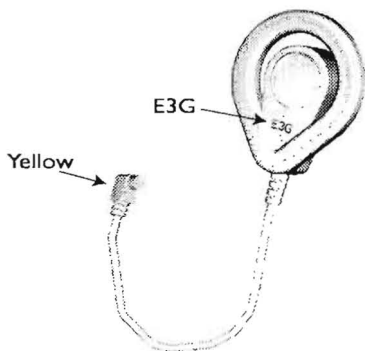


Figure 6: Transmitting Coil for Nucleus 24 implant

For the Nucleus 22 cochlear implant:

- The transmitting coil is marked N22.
- The connector end is green.

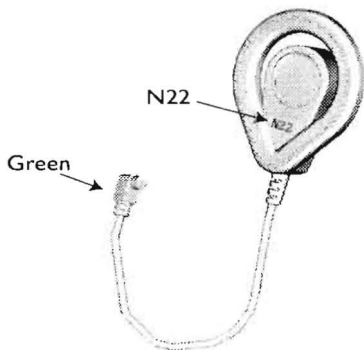


Figure 7: Transmitting Coil for Nucleus 22 implant

The magnet strength determines how tightly the coil is held against your head. Six magnet strengths are available.

If the magnet is too strong, it may cause discomfort, skin irritation or skin breakdown. If it is too weak, the coil may fall off. It is recommended you keep the hair around your coil area trimmed.

Your clinician will assist you to establish the magnetic strength that comfortably holds your coil in place.

To replace the magnet in your transmitting coil, place it in the space (with the groove facing up), then turn it until it is comfortable when worn.

Turn the magnet to adjust the magnet strength. Turn the magnet clockwise to hold the transmitting coil more firmly, counter-clockwise to hold it less firmly.

To remove the magnet, turn it counter-clockwise.

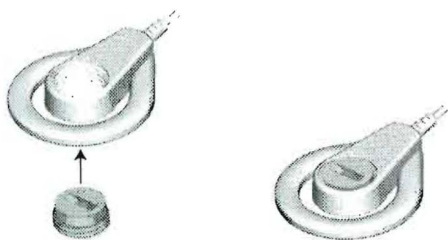


Figure 8: Inserting the Magnet

Cable Lengths

There are a variety of cable lengths available. A short cable is used when you wear the ESPrIt 3G on the side where your implant is located. A long cable can be used if you wear the ESPrIt 3G on the other side of your head.

Attaching the Coil and Cable to your ESPrIt 3G

To attach the transmitting cable to the ESPrIt 3G:

1. Remove the battery cover.

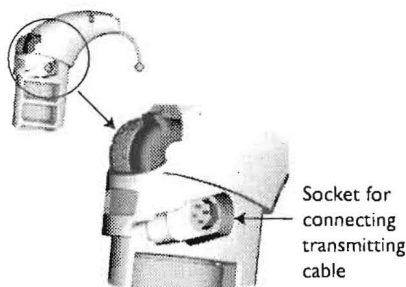


Figure 9: Socket for the Transmitting Cable

2. Plug the cable's 4 pin connector into the yellow 4 pin socket (hole). If you have a Nucleus 24 cochlear implant, the connector will be yellow. If you have a Nucleus 22 cochlear implant, the connector will be green.

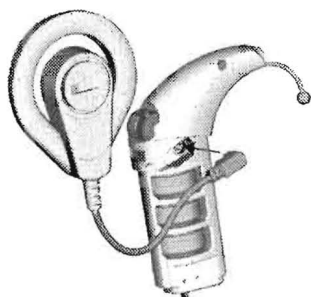


Figure 10: Connecting the Transmitting Cable

3. Lay the cable along the channel next to the socket, with the cable extending from the side of the ESPrIt 3G.
4. Replace the battery cover, sliding it until it clips into place.

The Earhook

Two earhook options are available to hold your ESPrIt 3G behind your ear:

- The flexible titanium earhook alone, or with an optional soft earhook cover.
- An earmold compatible earhook.
An earmold is a custom formed device which helps hold hearing aids in place. Please see your cochlear implant center for more details.

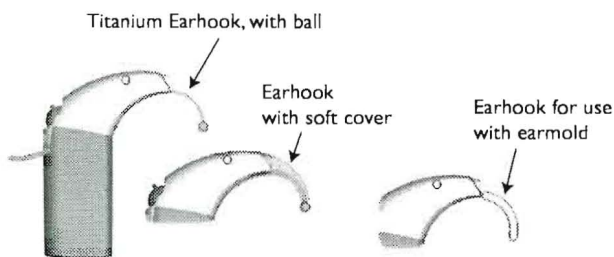


Figure 11: Earhooks Available

To remove the earhook:

1. Remove the battery cover.
2. Unclip the earhook.

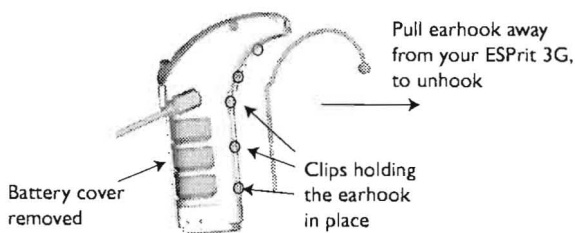


Figure 12: Removing the Earhook

To fit the flexible soft earhook cover:

1. Remove the earhook.
2. Starting at the narrow end of the earhook cover, feed the earhook through the channel of the earhook cover, until it sits against the ball of the earhook.

To replace either earhook:

1. Feed the metal end back into the ESPrIt 3G, clipping it into place.

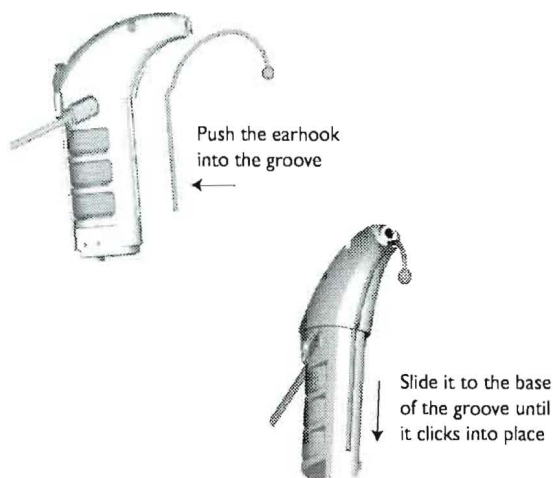


Figure 13: Replacing the Earhook

2. Replace the battery cover.

Adjusting the Earhook

The earhook can be gently bent to suit your ear.

To adjust the earhook:

1. Remove the battery cover.
2. Remove the earhook from your ESPrIt 3G.
3. Fit the earhook over your ear.
4. Gently bend the earhook so it is in the most comfortable position, to suit your ear.
5. Replace the earhook and the battery cover.

Note:

Take care when bending the earhook. Do not distort the straight end of the earhook wire (the part that goes back into the ESPrIt 3G).

Batteries

Your ESPrIt 3G uses three high power 675 size hearing-aid type batteries (button-type cells). High Power 675 Zinc Air batteries are recommended. However, in humid and cold conditions Silver Oxide S76 batteries may be more reliable.

Warning:

Batteries can be harmful if swallowed. Ensure that batteries are kept out of reach of young children. If swallowed, seek prompt medical attention at the nearest emergency center or call the National Button Battery Hotline collect on (202)625 3333.

Note:

The ESPrIt 3G requires three fresh batteries to operate. It only takes one low or flat battery to stop the processor from working. When replacing flat batteries, always replace all three.

Use only battery types recommended by your clinician or Cochlear. Other types may not have sufficient power to allow your ESPrIt 3G to function properly.

Your power requirements will vary, depending on:

- your program parameters
- humidity and temperature
- listening situations experienced
- thickness of the skin covering your implant

High Power 675 Zinc Air batteries are sealed, usually

with a tab. The seal should be removed before use for at least one minute, to allow for air circulation.

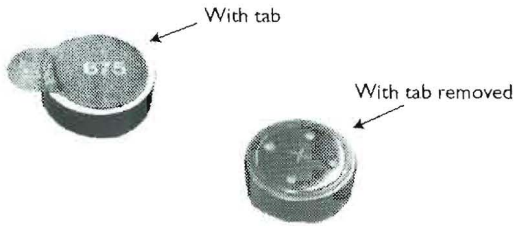


Figure 14: High Power Zinc Air Battery

Silver Oxide S76 batteries do not have holes, are not sealed, and do not require air circulation. Follow the instructions and warnings for the brand you are using.

Replacing Batteries

Batteries should be replaced when the low battery warning ‘beeps’ are heard, or the sound you are hearing stops or your speech perception drops. Refer to the *Troubleshooting* section for further information.

Immediately remove flat batteries. Over a period of time Zinc Air batteries may leak corrosive fluids. These can damage your ESPrIt 3G.

To change the batteries:

1. Before using Zinc Air batteries, remember to remove their seal and let them stand for one minute.
2. Turn off the speech processor.
3. Remove the battery cover: slide it down the ESPrIt 3G. See *Battery Cover* section.

- Remove the flat batteries by tipping the ESPrIt 3G to one side. They slide out from one side only.

Your battery cover can be used to push the battery out. Alternately, use your transmitting coil's magnet to draw the batteries out.

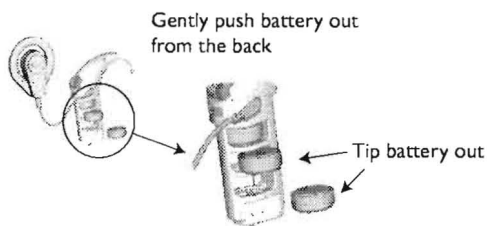


Figure 15: Removing the Batteries

- Using the cleaning brush, regularly clean the battery area and contacts, to prevent a build up of grime deposits. *Never use abrasive materials or a blade.*
- Slide the fresh batteries into place.

They only fit when:

- inserted from the side where the transmitting coil attaches, and
- when the positive battery terminal (the side with the holes) faces up.

- Replace the battery cover by sliding it up from the bottom until it clips into place.

Note:

Store batteries in ambient temperatures. Do not leave in sunlight or near any other heat sources. Do not place in an oven.

Dispose of flat batteries in accordance with your local regulations.

Microphone

The ESPrIt 3G features a directional microphone, with a front and rear microphone port. Because it is a directional microphone, it is more sensitive to sounds originating from the front of your ESPrIt 3G, and less sensitive to sounds originating from the side or rear.

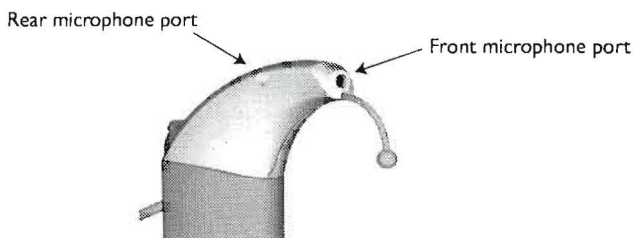


Figure 16: Microphone Ports

Position your head so the front microphone port points towards your desired sound source.

Refer to *Part Two: Care and Troubleshooting* for further information.

Top Controls

At the top of the ESPrIt 3G there are two sets of controls:

- The program selection control, for Off, P1 and P2.
- A rotary control, which may be programmed to act as either a volume or sensitivity control.

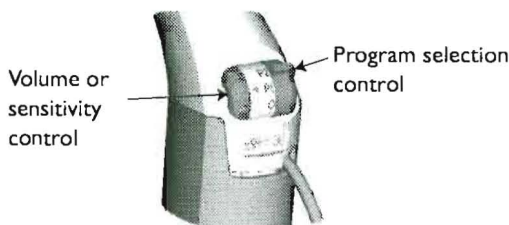


Figure 17: Top Controls

Program Selection Control

The ESPrIt 3G offers you two different program settings, labeled P1 and P2.

To change the programs, or to turn off the ESPrIt 3G, move the program selection control switch, on the right, to the desired position.

Note:

Turn off your ESPrIt 3G when you are not using it. It continues to use power unless turned off.

When not using your ESPrIt 3G for an extended period of time, remember to remove the batteries.

Rotary Control

The rotary control on the left controls the volume or level of loudness perceived.

To adjust the level, turn the control until you find a comfortable listening level. Your clinician will tell you the approximate setting you should use for each program. The setting may differ for each program.

Note:

If you adjust the sensitivity or volume setting often, or such adjustments cause you discomfort, the programs in your ESPrIt 3G may need adjustment. Consult your clinician. Refer to the *Troubleshooting* section in Part Two.

Base Controls

On the base of the ESPrIt 3G there is a:

- switch for mode settings
- socket for attaching accessories via an adaptor

Refer to *Connecting Accessories (with the Accessories Adaptor)* for further information on the Accessories Adaptor and the devices or accessories available.

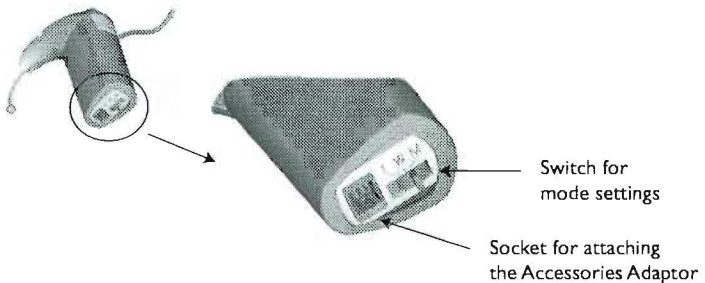


Figure 18: Base Controls

Mode Setting Switch

The mode setting switch at the base of your ESPrIt 3G provides options for receiving sound in different listening situations.

It has three positions:

- 'M' setting for microphone only
- 'W' setting for Whisper Setting
- 'T' setting for the built-in telecoil

Slide the switch to use a particular mode.

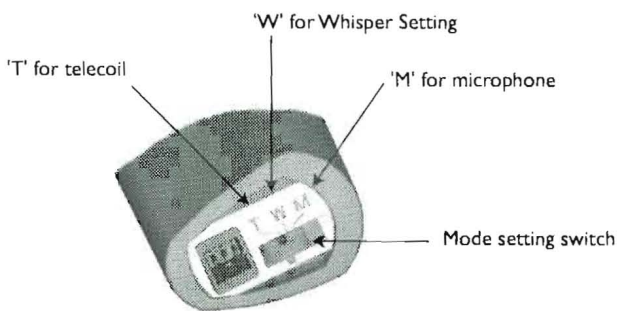


Figure 19: Mode Settings

Microphone Setting

The 'M' or microphone setting is the normal operating position.

Whisper Setting

The 'W' or Whisper Setting makes soft sounds audible.

Built-in Telecoil Setting

The 'T' setting activates your ESPrIt 3G's built-in telecoil.

To use the built-in telecoil:

1. Move the mode setting switch to the 'T' position.
2. Move the volume/sensitivity control to the point where you experience sufficient loudness.
3. Further adjust your volume control as you require.

If your ESPrít 3G has been programmed to mix the telecoil and microphone signal, the level of the combined signal changes when either the sensitivity or volume is adjusted, using the top rotary control. When the built-in telecoil operates alone, the rotary control adjusts the level of the telecoil signal.

Refer to the *ESPrít 3G Built-in Telecoil* section, for further information.

Accessories Adaptor Socket

Your Accessories Adaptor plugs into the socket at the base of your ESPrít 3G.

A cover will be in the socket when you receive your ESPrít 3G. Remove the socket cover before inserting your Accessories Adaptor. When the adaptor is not being used, a socket cover should be inserted into the socket.

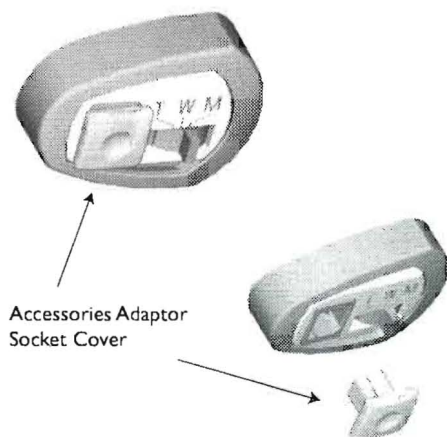


Figure 20: Socket Cover

Warning:

Store spare socket covers safely. These small parts may be hazardous if swallowed or may cause choking if inhaled.

Switch off your ESPrIt 3G before connecting or removing an accessory, and switch it on again once the device is in place. This allows your ESPrIt 3G to recognize the new system.

ESPrít™ 3G Built-in Telecoil

Overview

The ‘T’ setting at the base of your ESPrít™ 3G speech processor activates your built-in telecoil, which allows you to receive signals from a hearing aid compatible telephone, a room fitted with an induction loop, or a personal induction loop, such as a neck loop (commercially available devices).

The sound signal from an amplifier, TV or Hi-Fi can also be conveyed from an induction loop to the telecoil.

When used with a neck loop, the built-in telecoil may also be connected to FM or IR systems, or an external telecoil.

The strength of the electrical current ‘induced’ in the telecoil varies. To find the strongest signal, you may need to experiment with:

- the telephone position, for a phone conversation
- where you sit in a room, with an induction loop.

Note:

If the induction loop strength is not sufficient then the reception will not be good.

Telecoil and Microphone Mixing

The built-in telecoil can operate either:

- mixed with microphone signals, or
- on its own.

Microphone/Telecoil Mix Setting

When your ‘T’ setting has been programmed to receive a mixed microphone and telecoil signal, the acoustic signal received by the microphone, and the signal received by the built-in telecoil are both detected, simultaneously. For example, when using a telephone with an induction loop, you hear the person on the other end of the telephone and your own voice.

When programmed to receive the mixed telecoil and microphone signal, when either the sensitivity or volume is adjusted, using the top rotary control, the level of the combined signal changes.

Telecoil Only Setting

You only hear the signals picked up by the telecoil (e.g. from the telephone or the loop around a room), when your ‘T’ setting has been programmed for ‘telecoil only’. No sound is heard through the microphone: you do not hear your own voice, sounds of other people, or the immediate environment.

When the built-in telecoil operates alone, the rotary control adjusts the level of the telecoil signal.

Your clinician will program the most appropriate setting based on your needs.

Use with a Telephone

Hearing aid compatible telephones have an induction loop, either built into the handset or separately fitted.

To use a telephone fitted with an induction loop, hold the telephone near your ESPrit 3G and move your ESPrit 3G's mode setting switch to the 'T' position.

To find the place where the strongest signal is heard, move the telephone handset close to your ESPrit 3G, listening for the clearest and loudest signal. Different phones may require a slightly different placement.

Where interfering magnetic fields are strong, effective telephone communication with a telecoil may not be possible.

Use with a Room Loop

The built-in telecoil can operate with an induction loop running around a room, or under flooring.

Public places often have signs indicating they have induction loops. These could include halls, auditoriums, train stations, places of worship and movie houses or cinemas.



Figure 21: Telecoil Sign

To listen using a room-fitted induction loop:

1. Make sure the speaker is using the microphone system supplying signals to your neck loop and receiver.
2. Make sure the loop system in the room is connected and switched on.
3. Move the mode setting switch on your ESPrit 3G to the 'T' position.

The quality of the signal received from a room loop can vary. You may need to move to another location within the room to obtain the best sound.

Degraded performance may occur if the loop itself is faulty, or interference is present.

Use with a Neck Loop (or Personal Induction Loop)

Your built-in telecoil can also operate with an induction loop worn around the neck, connected to a receiver.

To listen, using a neck loop and the built-in telecoil:

1. Make sure the speaker is using the microphone system supplying signals to your neck loop and receiver.
2. Place the loop around your neck.
3. Move the mode switch of your ESPrit 3G to the 'T' position.

Your neck loop may be used directly. Alternately, it may be attached to either FM or IR systems: the earphone socket of either the FM or IR receiver is plugged into the neck loop. Refer to *FM Systems* and *IR Systems* sections following for further information.

Interference Noises

When your ESPrit 3G is on the 'T' setting, strong magnetic fields from appliances, power lines and transformers, fluorescent lights, computers and other electronic equipment may interfere with your sound quality. These may create unwanted buzzing, whistling, crackling or hissing sounds.

To try to minimize such interference switch off any unnecessary equipment or appliances. Move away from the noise source, to where the interfering electromagnetic field is weakest.

Alternately, a separately available external telecoil may help when this local environmental noise stops the built-in telecoil from clearly processing sounds, e.g. when a computer monitor interferes with your reception.

Connecting Accessories (with the Accessories Adaptor)

Overview

The following devices can be connected to your ESPrit™ 3G speech processor, using the Accessories Adaptor:

- lapel microphone
- Personal Audio cable*
- TV/Hi-Fi cable*
- external telecoil
- FM cable

Monitor earphones, for use by your clinician, family and friends to check if the microphone is working correctly, can be attached using the socket on the side of the Adaptor.

A lapel clip, to hold either the Accessory Adaptor cable or the lapel microphone cable in position, is also available.

Refer to the sections following for further information.

The above devices (accessories) may not be available in all regions. Please contact your cochlear implant center if you have questions about their availability.

* An Accessory Adaptor cable is required to connect both the TV/Hi-Fi and Personal Audio cables to the Accessories Adaptor.

Accessories Adaptor

The Accessories Adaptor plugs into the socket at the base of the ESPrit 3G. *It should always be used*, when using accessories.

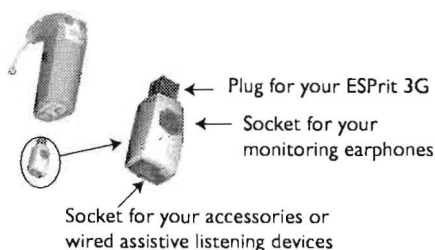


Figure 22: Accessories Adaptor

Using an Accessory

To use an accessory:

1. Turn off the ESPrit 3G (top controls) and remove it from your head.

Always switch your ESPrit 3G 'Off' before you attach or remove the accessory, and then 'On' again after the accessory has been attached or removed. This will reset the connection within your ESPrit 3G.

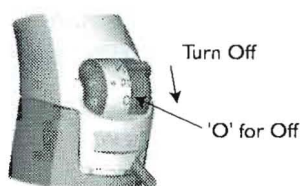


Figure 23: Turning Off your ESPrit 3G

2. Remove the socket cover from your Accessories Adaptor socket, at the base of your ESPrit 3G.

Warning:

Parents and caregivers should be counseled that the external implant system contains small parts that may be hazardous if swallowed or may cause choking if inhaled.

3. Push the adaptor firmly into the socket at the base of the ESPrit 3G, until it snaps into place.

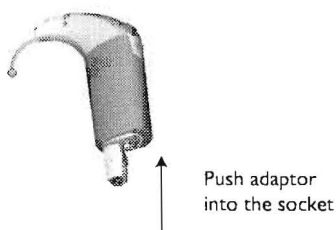


Figure 24: Adaptor Attached to your ESPrit 3G

4. Attach the accessory and/or monitor earphones.
5. Place your ESPrit 3G back on your head and switch it to P1 or P2 (top controls).



Figure 25: Re-setting your Top Controls

6. Set the sensitivity or volume control initially to 4. Your clinician will tell you the approximate range of sensitivity or volume you should use.

7. Increase or decrease the sensitivity or volume control to the desired level.

If your ESPrIt 3G does not work, switch it 'Off' and 'On' again. This will reset your ESPrIt 3G.

Lapel Microphone

The lapel microphone can improve communication in noisy environments, e.g. at restaurants, in a car.

The microphone of your ESPrIt 3G is disabled when connected to the lapel microphone.



Figure 26: Lapel Microphone

The lapel microphone plugs into the Accessories Adaptor.

Point the microphone toward the speaker's mouth. In general place the microphone no more than 40 inches (1 meter) from the speaker. The surrounding noise level will influence how closely you hold the microphone.

Some suggestions for placing your lapel microphone to get the best input signal are:

- When speaking with one person, clip the microphone to their clothing, or ask them to hold it.
- When talking in a small group, pass the microphone from speaker to speaker or place it on the table.

- In a car, clip the microphone to the clothing of the other person, or where you wish to hear a number of people, attach it to the overhead light.
- In a group setting, some people clip their lapel microphone to a glass, a sugar bowl or something similar.

Personal Audio and TV/Hi-Fi Cables

The Personal Audio cable can be used to connect *battery-powered equipment* to your ESPrit 3G, e.g. a portable or personal radio, cassette or CD player.

The TV/Hi-Fi cable is used to connect a TV, stereo or personal computer to your ESPrit 3G. It can be used with devices that either plug into wall outlets or are battery operated.

Note:

Always use the TV/Hi Fi cable when the TV, stereo or personal computer is connected to a wall outlet. The cable's electrical isolation is designed to prevent electric shock from occurring.

The Accessory Adaptor cable must be used to connect the Personal Audio cable or the TV/Hi-Fi cable.

Sound Mixing

Unless programmed otherwise, *sound can be heard simultaneously* from both your ESPrit 3G microphone and the Personal Audio cable or the TV/Hi-Fi cable. This is called sound or audio mixing.

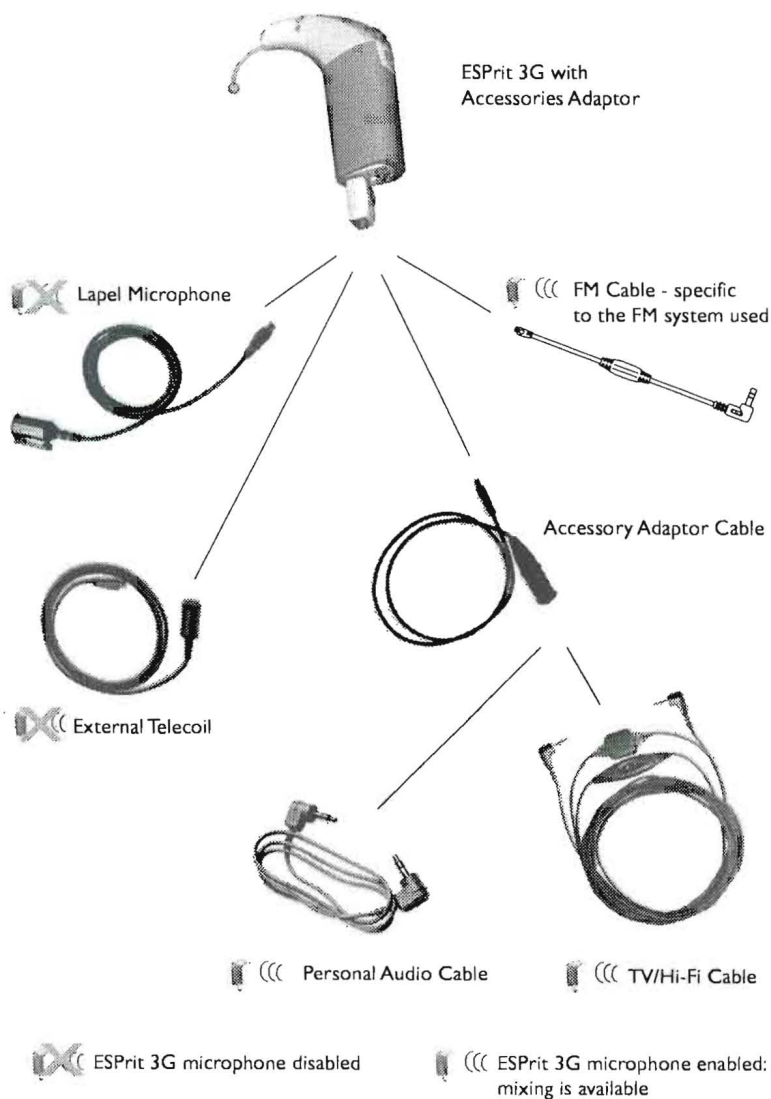


Figure 27: Wired Assistive Listening Devices

To obtain a good balance between the two sound sources, use the volume or sensitivity control. To hear more environmental sounds, turn up the control. To hear less environmental sound, turn down your control.

The control level should be set at 2 or more, so the microphone operates more effectively when using these accessories.

Where applicable, the volume control of the attached device can also be adjusted.

Accessory Adaptor Cable

The Accessory Adaptor cable must be used to connect either the Personal Audio cable or the TV/Hi-Fi cable to your ESPrIt 3G. It plugs into the Accessories Adaptor, at the base of your ESPrIt 3G.

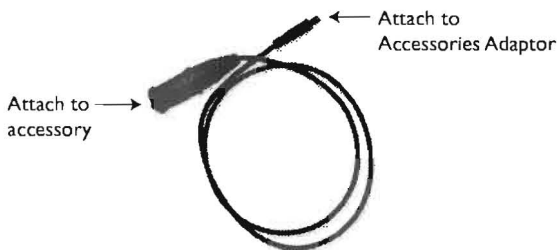


Figure 28: Accessory Adaptor Cable

To attach the Accessory Adaptor cable to the ESPrIt 3G:

1. Plug the Accessory Adaptor cable into either the TV/Hi-Fi cable, or the Personal Audio cable.
2. Plug the connector end of the Accessory Adaptor cable (marked 'Cochlear') into the bottom socket of the Accessories Adaptor.

3. Turn off your ESPrIt 3G.
4. Plug the Accessories Adaptor into its base.
5. Turn on your ESPrIt 3G.

Personal Audio Cable



Figure 29: Personal Audio Cable

To connect your battery powered equipment:

1. Plug the connector marked 'WALK1' on the Personal Audio cable into the output socket of your battery powered equipment.
2. Plug the connector marked 'Cochlear' into the Accessory Adaptor cable and connect as described for connecting an accessory.

Since the Personal Audio cable does not have a volume control, to find a comfortable level you may need to adjust the volume control on the battery powered equipment.

Caution:

DO NOT USE the Personal Audio cable to connect to equipment using a wall outlet.

TV/Hi-Fi Cable

Caution:

Do not use this cable during electrical storms. As a precaution, always remove any accessory cable from your ESPrit 3G during an electrical storm.



Figure 30: TV/Hi-Fi Cable

To use your TV/Hi-Fi cable:

1. Plug the cable connector marked 'TV1' into the earphone or headphone output socket of your TV, stereo or personal computer.
2. Plug the cable connector marked 'Cochlear' into the Accessory Adaptor cable and connect as described for connecting an accessory.
3. Adjust the volume or sensitivity level on your ESPrit 3G to balance the environmental noises with the sound source.
4. Adjust the volume of your audio equipment using the control knob on the TV/Hi-Fi cable.

Your clinician will advise you on the program settings to

use with your TV, stereo or personal computer:

- On position 1 the volume is very low and few sounds are picked up from the sound source.
- On position 5 the maximum volume is picked up from the sound source.

External Telecoil

While the built-in telecoil will meet most needs, an external telecoil device can be used when local environmental noise does not allow the built-in telecoil to process sounds clearly, e.g. a computer monitor prevents clear reception. The external telecoil allows you to remain a small distance from a source of local interference.

The external telecoil may be used with your Accessories Adaptor, or with a neck loop.

The microphone of your ESPrit 3G is disabled when the external telecoil is connected.



Figure 31: External Telecoil

FM Cable

Refer to the section on *FM Systems* following for further information.

Unless programmed otherwise, *sound can be heard simultaneously* from both your ESPrIt 3G microphone and the device, when using the FM cable.

Lapel Clip

The lapel clip can be used to hold either the Accessory Adaptor cable or the lapel microphone cable in position.

To hold the cable securely in one position:

1. Place one prong of the lapel clip through the rubber band.
2. Pass the cable through the rubber band as shown.

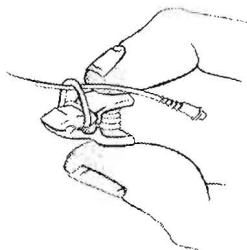


Figure 32: Cable in Clip

3. Loop the rubber band twice around the inner slot of the lapel clip.
4. Gently pull the cable through the jaws of the clip to fit in the same slot as the rubber band.

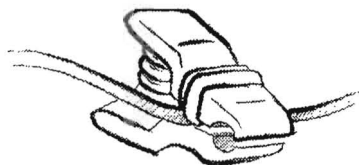


Figure 33: Cable Fitted with Rubber Band

5. Attach the clip to your clothing.

You can move the cable through the clip by opening the jaws and gently pulling the cable through its slot. You can then attach the clip to a convenient place on your clothing.

FM Systems

Overview

FM systems use FM radio waves to transmit the signal from transmitter to receiver.

Countries allocate particular FM frequencies for use with FM hearing systems. Hence both the transmitter and receiver you use should be compatible with that operating in your country.

Refer to the instructions that accompany any assistive listening devices that you use.

FM Transmitters

Each FM system usually consists of a single transmitter broadcasting to one or more receivers, tuned to the same channel.

Since each system can use its own broadcast frequency, several systems may operate simultaneously at one location without interfering with one another.

With FM systems, sound is received by the transmitter, through either:

- a microphone placed close to the desired sound source (the closer the better), or
- a direct audio feed e.g. a cable from a TV, VCR or stereo.

The transmitter then sends the signal to an FM receiver.

When a microphone is used, the FM transmitter should be compatible with your receiver, and its operating frequency.

FM Receivers

There are three ways for your ESPrít™ 3G speech processor to receive the FM signal:

- **Using an FM cable**

An FM cable connects the FM receiver to your ESPrít 3G, via the Accessories Adaptor.

- **Using an ESPrít™ 3G MicroLink™ adaptor**

An ESPrít™ 3G MicroLink™ adaptor allows you to use a Phonak MicroLink™ MLx FM receiver* with your ESPrít 3G.

- **Using the built-in telecoil (wireless)**

An FM receiver attaches to an induction loop, such as a room loop or neck loop, with your ESPrít 3G mode setting switch set to 'T'.

FM Cables

The FM cable transfers audio signals from a commercially available FM listening system to your ESPrít 3G.

Use the Accessories Adaptor to attach the cable to your ESPrít 3G. Refer to the section *Connecting Accessories (with the Accessories Adaptor)* for further information.

* Available through Phonak AG



Figure 34: FM Cable

With a choice of lengths available, you should order the cable according to your FM system. The following FM cables are available from Cochlear.

FM System	Transmitter	Receiver	FM Cable
Connevens	CRMT 200	CRMR 200	FM12-E
Panasonic	WX-1600	RD-544/11	FM18-E
Phonak Microvox	MTxxxxx (with com1 output module)	MRxxxxx*	FM14-E
Phonic Ear Easy Listener	PE 300T	PE 300 R	FM 2-E
Phonic Ear Easy Listener	PE 300T	PE 350 R	FM 2-E
Phonic Ear	PE 471 T	PE 475 R	FM 13-E
Phonic Ear	PE 481 FST	PE 475 R	FM 10-E
Phonic Ear Solaris	PE 571 T	PE 575 R	FM 19-E
Sennheiser Mikroport	SK 2013 PLL	EK 2013 PLL	FM 15-E

- * For the Phonak Microvox, only transmitters and receivers with five digit serial numbers, MT xxxxx and MR xxxxx, are compatible. Any system with six digit serial numbers, M xxxxxx, will not provide satisfactory transmitting range.

Table 1: FM Cable Compatibility

To connect the FM cable to your speech processor:

1. Switch off your ESPril 3G and set the microphone sensitivity, or volume to below 1.5.
2. Remove the socket cover from the base of your ESPril 3G and push the Accessories Adaptor firmly into the socket, until it snaps into place.
3. Push the FM cable into the adaptor.

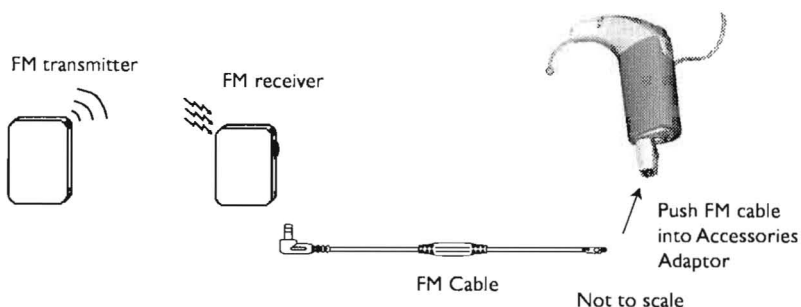


Figure 35: Connecting the FM System

4. Switch on the FM system to check it is working, then switch it off again.
5. Connect the FM cable to the FM receiver.
6. Place your ESPril 3G back on your head and switch it to either P1 or P2.

Note:

It is important that the FM cable is connected *before* your speech processor is switched on, otherwise no sound will be heard from the FM system.

7. Switch on the FM transmitter, then switch on the FM receiver.

8. Check the settings of the FM system are those recommended by your clinician.

If there is no sound, switch your ESPrIt 3G off, then on.

Monitor earphones can be used by a hearing person to check the sound is being received. Refer to the *Monitor Earphones* section for further information.

Sounds from the FM system are heard simultaneously with environmental sounds picked up by your ESPrIt 3G microphone. This is called audio mixing. Refer to the section *Connecting Accessories (with the Accessories Adaptor)* for further information on sound mixing when using a cable device.

ESPrIt™ 3G MicroLink™ Adaptor

An ESPrIt 3G MicroLink adaptor allows you to use a Phonak MicroLink MLx FM receiver* with your ESPrIt 3G. The MicroLink MLx receiver can be used on any brand of narrow-band FM transmitter that operates on the same frequency. The Sennheiser FM transmitter is not recommended, because it is a wider-band transmitter.

ESPrIt 3G MicroLink Adaptor settings

Your ESPrIt 3G MicroLink adaptor has two settings:

1. **‘FM+M’ setting: mix of FM and ESPrIt 3G microphone signals**

The ‘FM+M’ setting allows you to hear both the sounds transmitted from the FM system and those picked up by the ESPrIt 3G’s microphone. This can be

* Available through Phonak AG

used when there is classroom participation, or in meetings.

When using the 'FM+M' setting, to control the microphone sensitivity, move the rotary control at the top of the ESPrIt 3G. This changes the level of sound received from the microphone.

2. 'FM' setting: FM input only

When using the 'FM' setting, you only hear the sound transmitted by the FM system. No sound will be heard from the microphone of your ESPrIt 3G. You may choose the 'FM' setting when you wish to focus on a particular speaker.

When using the 'FM' setting, move the rotary control on the top of your ESPrIt 3G to change the FM sound level.



Figure 36: ESPrIt 3G MicroLink Adaptor Settings

Note:

When the ESPrIt 3G MicroLink adaptor is on 'FM+M', and the rotary control is adjusted, the signal from the ESPrIt 3G microphone will vary.

When the ESPrIt 3G MicroLink adaptor is on 'FM', and the rotary control is adjusted, the FM input signal will vary.

MicroLink MLx settings

The MicroLink MLx has three settings, as marked on the base of the MicroLink MLx:

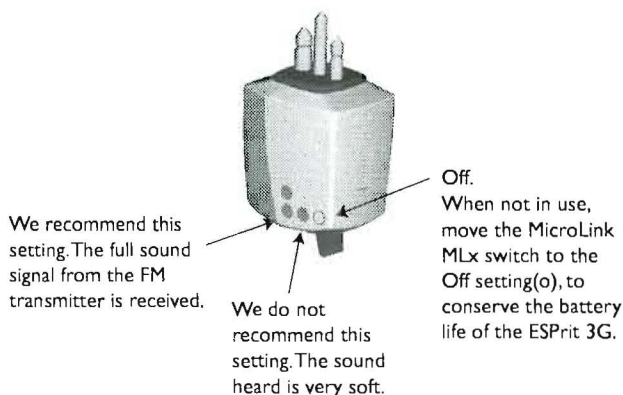


Figure 37: MicroLink MLx Settings

When using the MicroLink MLx with your ESPrIt 3G **ALWAYS:**

- Turn off your ESPrIt 3G at the top control, before attaching the adaptor.
- Switch the mode setting switch to 'M' (microphone setting), at the base of your ESPrIt 3G.

We suggest you first join the ESPrIt 3G MicroLink adaptor to the MicroLink MLx, to form a 'combined unit', and then attach that combined unit to your ESPrIt 3G.

To join your ESPrIt 3G MicroLink adaptor to the MicroLink MLx:

1. Turn off the MicroLink MLx.

2. Move the ESPrIt 3G MicroLink adaptor switch to either 'FM' or 'FM+M', as you choose.
3. Plug the MicroLink MLx into the ESPrIt 3G MicroLink adaptor. Be sure to line up the wider pin with the larger (inside) socket hole.

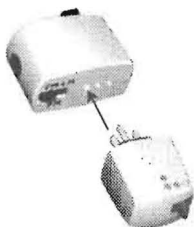


Figure 38: Joining to the ESPrIt 3G MicroLink Adaptor

To join the combined unit with your ESPrIt 3G:

1. Push the combined unit into the socket at the base of your ESPrIt 3G.

If the battery cover slides down a little, push it firmly back in place.

2. Turn on your MicroLink MLx.

We recommend you move the switch on the MicroLink MLx to the ●● position. This will provide the most appropriate level of sound. We do not recommend using the ● position as sound will be too soft.



Figure 39: Joining to the ESPrIt 3G

3. Put on your ESPrIt 3G.
4. Move the top control on your ESPrIt 3G to the program setting you wish to use, i.e. either P1 or P2. Your clinician can advise you on which program to use.
5. Turn on the FM transmitter, or check it is operating. If using a Phonak HandyMic™ transmitter, we recommend you use the Zoom microphone setting.

Note:

The ESPrIt 3G battery life may be reduced by up to approximately 15% when the MicroLink MLx unit is on.

To remove the combined unit:

1. Turn off the MicroLink MLx.
2. Turn off your ESPrIt 3G.
3. Remove the combined unit.
4. Move the mode setting switch at the base of your ESPrIt 3G to the setting you next want to use, i.e. either 'M', 'W' or 'T'.

5. Move the top control to the program setting you wish to use, i.e. to either P1 or P2.

We recommend where possible you store the MicroLink MLx and adaptor as a combined unit. It will simplify re-fitting it for your next use and help preserve their service life.

When not in use, always turn off the MicroLink MLx: turn the switch on the base to o (Off).

For queries about your Phonak MicroLink MLx, contact your local Phonak distributor.

For queries about the ESPril 3G MicroLink adaptor contact your local Cochlear representative.

Interference Problems

Signals received from an FM transmitter must compete with other electrical signals. These competing electrical signals may include electrical interference.

Interference generally increases with the distance between the FM transmitter and receiver, or with proximity to the source of interference.

Interfering signals can arise from:

- a TV or PC monitor
- nearby transmitting towers
- electric motors
- domestic appliances and electronic equipment
- fluorescent lighting

When there is a significant distance between the FM transmitter and receiver such as occurs in an auditorium or large classroom, you may notice some interference.

To minimize any interference:

- Ensure there is a clear signal path between the FM transmitter and your FM receiver.
- Move closer to the FM transmitter.
- Spend a few minutes experimenting with the position or orientation of the FM cable and FM receiver.
- Move your FM receiver and its cables away from the interference source, including your ESPrIt 3G.

IR Systems

Overview

IR (infrared light) systems are an additional wireless technology to assist in hearing.

Refer to the instructions that accompany any assistive listening devices that you use.

IR systems use invisible infrared light to carry the sound from the source to a receiver. The signal from either a microphone or audio feed passes through a transmitter, which comprises a number of infrared emitters. The signal travels to one or more receivers, all set or tuned to the same channel.

IR systems are similar to FM systems, with the following exceptions:

- Receivers should generally be in 'line of sight' (depending on the emitter power and reflective surfaces) of the emitter. (This is similar to many TV remote controls.)
- The signal can only be received inside a covered room, away from strong light.

The IR receiver may be used with the ESPrIt™ 3G speech processor via either:

- a compatible neck loop (or personal induction loop),
or
- the Accessories Adaptor and a cable appropriate for the IR receiver. Attach the IR receiver cable to the Personal Audio cable. This is then plugged into the Accessory Adaptor cable, which in turn plugs into the Accessories Adaptor.

Part Two

Care and Troubleshooting

Daily Use of your ESPrit™ 3G

At the Start of Each Day

1. Remove your ESPrit™ 3G speech processor from your ESPrit 3G case.
2. Place your ESPrit 3G and transmitting coil on your head.
3. Turn on your ESPrit 3G.

At the End of Each Day

1. Turn off your ESPrit 3G.
2. Remove your ESPrit 3G from your head.
3. Place your ESPrit 3G in your ESPrit 3G case with an activated drying capsule to dry out any moisture. This is particularly important for those in humid climates, or after physical or sporting activities.

Refer to the *Overnight Storage* section following for further information.

Caution:

The stimulation levels of your ESPrit 3G are programmed to your individual needs. Never swap your ESPrit 3G with another person. It is important to ensure children do not use someone else's speech processor. Use of a speech processor that has not been programmed to your specific

needs could result in stimulation above your comfort level (C-level).

Overnight Storage

Your ESPrit 3G case, with an activated drying capsule, acts as a drying kit.

We recommend that you store your ESPrit 3G *overnight*, or whenever you are not using it, in your ESPrit 3G case. This will prevent moisture building up internally.

In particular, moisture may accumulate when you live in a humid environment, or perspire heavily.

To use your ESPrit 3G case as a drying kit:

1. Turn off your ESPrit 3G.
2. Make sure an activated drying capsule is in place in your ESPrit 3G case.
3. Place your ESPrit 3G and transmitting coil and cable in the case.

In excessively humid conditions, remove the batteries from your ESPrit 3G before placing it in the case. This will allow the contacts to dry overnight.

4. Close your ESPrit 3G case, and leave it overnight.

Your ESPrit 3G case should *always* be kept closed. If left open, the life of the drying capsule will be shortened.

The drying capsule can be re-used until the indicator has completely changed color.

The effective life of a drying capsule depends on the amount of humidity in the air.

Suitable drying kits are also available from a hearing-aid dealer, pharmacy, electronics store or Cochlear.

Caution:

Drying kit chemicals should be kept away from young children, as swallowing this material can cause serious internal injuries. If this occurs contact your physician, local hospital or Poisons Information Center.

Care and Maintenance

Cleaning

Regular cleaning prevents dirt building up.

Wipe external parts gently with an alcohol swab or a cloth slightly dampened with a mild detergent.

Use the cleaning brush provided to clean both the internal and external parts. In particular, use the cleaning brush to clean the battery contacts. Do not use abrasives or a blade.

The microphone ports should be kept clear, clean and dry to maintain your microphone's sound quality and directional ability. It is important to keep out both moisture and dirt.

Regularly use the microphone puffer to clean the microphone. From time to time, *gently* shake your ESPrit™ 3G speech processor to remove any moisture and dirt.

If it is necessary to clean the microphone ports more extensively, gently clean the edge of the openings using a cotton swab.

Caution:

Never push anything sharp down the microphone ports. To do so could permanently damage the microphone diaphragm.

Longer Term Storage

When not using your ESPrit 3G:

- Remove the batteries from the battery compartment.
- Store your ESPrit 3G and transmitting coil and cable in your ESPrit 3G case, with an activated drying capsule.

Caution:

Over a period of time, Zinc Air batteries may leak corrosive fluids which could damage your ESPrit 3G.

To reduce the risk of damage from a leaking battery:

- Remove flat batteries immediately.
- Remove all batteries before storage of your ESPrit 3G if you will not be using it for a long period of time.

Other Do's and Don'ts

The following situations can cause damage to your ESPrit 3G. If you still experience difficulties after attempting these suggestions, contact your clinician, implant center or nearest Cochlear office to arrange repair.

Makeup and Hair Spray

Take off your ESPrit 3G when applying powder, makeup or hair spray. These substances can impair the operation of the battery contacts, switches and microphone.

Sand or Dirt

Avoid getting sand or dirt into any part of the system. If you do, shake out as much sand or dirt as possible.

Water

Do not wear any external part of your cochlear implant system while showering or bathing. Cochlear cannot guarantee that it will be able to repair any water-damaged part.

If Dropped in Water

If you drop your speech processor into water, take the following steps *as soon as possible*, to minimize damage:

1. Remove the batteries.
2. If dropped in dirty, contaminated or salt water rinse briefly with running drinking water.

If possible, position your ESPrIt 3G under the running water as closely as possible to mirror the direction in which it had been originally immersed in the water.

In particular, salt can cause damage to the microphone and switches of your ESPrIt 3G.

3. Gently shake off as much water as you can.
4. Place the ESPrIt 3G to dry in your ESPrIt 3G case with an activated drying tablet.
5. Close your ESPrIt 3G case, and leave overnight.
6. Test to check the sound quality the next day.

If the sound quality has deteriorated, return your water damaged ESPrIt 3G for repair *as soon as possible* to your clinician, implant center or nearest Cochlear office.

Troubleshooting

Overview

Problems in hearing using your ESPrIt™ 3G speech processor can arise from any of the following:

- the cochlear implant system, that is, the ESPrIt 3G, the transmitting coil and cable, or the cochlear implant
- the program(s) inside your ESPrIt 3G
- the listening environment, including electromagnetic interference
- other factors such as your general health and tinnitus (ringing in the ears)

Problems in any of these areas can lead to no sound, or intermittent sound. There are several system checks you may make that will often resolve or identify problems. If you are unable to resolve the problem, contact your clinician.

Your Programs

Your programs are established by your clinician. They should be checked regularly, and sometimes adjusted.

Listening Environments

Soft speech and loud background noise are the two main factors that may influence your ability to understand speech in a particular environment. Sometimes room acoustics that cause echoes and background noise cannot be resolved.

The Whisper Setting ('W' on the base of your ESPrIt 3G) may assist in soft speech situations. Your built-in telecoil and/or other assistive listening devices may help in other situations. Information in the previous chapters may assist you in dealing with these problems.

Electromagnetic Interference

The cables of your ESPrIt 3G act like antennae that may pick up environmental electromagnetic fields (EMI), which can cause intermittent buzzing, or distorted speech.

These fields can be produced by all types of electrical and electronic devices. EMI sources may not always be readily visible.

Some of the strongest sources of EMI include:

- radio and TV transmission towers
- shopping center and airport security systems
- computer or television monitors
- some digital mobile telephones
- hairdryers and electrical shavers
- power tools

If you hear intermittent buzzing or distorted speech, look for electronic equipment that may be the source of EMI, and move away from it.

The ESPrit 3G may process EMI as environmental noise. While this interference may be annoying, it will be no louder than your programmed comfort levels and will not hurt you or damage your ESPrit 3G or cochlear implant.

If the problem continues, consult your clinician.

Other Factors

There are many other factors not related to the performance of your ESPrit 3G that may influence your ability to understand speech in a particular situation.

These include:

- tinnitus (ringing in the ears)
- loss of concentration due to illness or fatigue
- quick changes of topic in conversation
- poor position of the speaker or poor lighting, causing difficulty in seeing any visual cues provided by the speaker

If you continue to have problems, contact your clinician.

Testing your ESPrit™ 3G

If there is no sound, sound volume is low, background noise is too high, or the sound is intermittent, it may be because:

- Your ESPrit 3G needs re-setting: switch 'Off' momentarily, and then 'On' again.
- Your volume or sensitivity control needs adjusting.
- The mode setting needs changing.

- The battery contacts need cleaning.
- One or more batteries are low or flat.
- The wrong battery type is being used.
- The microphone is faulty or its ports are blocked.
- The transmitting coil and cable set is faulty.
- The transmitting coil and cable set is not connected.
- Your ESPrit 3G has a fault.

Steps to Identify the Fault

Follow the steps below to identify where the fault may be. After each step, check to see if you can hear sound.

If you still cannot hear sound after taking the following actions, contact your clinician, implant center or your nearest Cochlear office.

Switches and Controls

Take the following actions to check the switches and controls:

- Switch the ESPrit 3G 'Off' for about three seconds, and then 'On' again (top control: O, P1, P2).
- Adjust the volume or sensitivity control (top control: numbers).
- Adjust the mode switch to the correct setting for your current use (base control: T, W, M).

Batteries

Take the following actions to check your batteries' operation:

- Clean the battery contacts using the cleaning brush provided.
- Wipe the battery contacts with a soft clean cloth, to remove any moisture.
- When using new High Power Zinc Air batteries, be sure to wait for one minute after removing the protective tabs before placing them into the ESPrIt 3G.
- If you experience intermittencies or cut-outs, it is most likely time to change your batteries. If you continue to experience intermittences or cut outs, contact your clinician.

Note:

A single flat battery will cause the ESPrIt 3G to cease transmitting signals.

Transmitting Coil and Cable

Check your transmitting coil and cable's operation to make sure that:

- The transmitting coil is correctly positioned over your implant.
- The transmitting coil is not damaged.
- The cable is not bent, twisted, worn or broken.
- The cable plug is secure in the socket of your ESPrIt 3G.

If there is no signal, replace the transmitting coil and cable, and check if you can hear any sound.

If there is still no signal, test using the Signal Check, an optional accessory (in some countries) available from Cochlear. Refer to the *Optional Monitoring Accessories; Signal Check* section for further information.

Microphone

If the signal from the microphone decreases significantly:

1. Use the microphone puffer to remove any moisture.
2. Attach and use the lapel microphone. If you can hear sound, your ESPril 3G microphone is faulty. As a temporary measure you can continue to use the lapel microphone until you can have your ESPril 3G microphone repaired.
3. Using the monitor earphones, have a hearing person, e.g. friend, parent or caregiver, check the microphone signal (sound output). Refer to the *Optional Monitoring Accessories; Monitor Earphones* section for further information.

If the signal still is not satisfactory, return the ESPril 3G to your Cochlear representative or distributor.

Attached Accessory

If there is no sound being received from an attached accessory, in addition to the above, check:

- The accessory and cables are properly connected.
- The accessory equipment is switched 'On', and the setting is appropriate.

- Your ESPrit 3G has registered that the accessory has been attached by switching your ESPrit 3G ‘Off’ and then ‘On’ again.

Have someone use the monitor earphones to check if there is a sound signal.

If there still is no sound, return your ESPrit 3G to your clinician to have your program and accessory cables checked.

ESPrit™ 3G MicroLink™ Adaptor

When no sound is heard or the reception is noisy or poor, check your ESPrit 3G speech processor’s operation:

- Check the mode setting switch is on ‘M’.
- Check that your MicroLink™ MLx is turned on.
- Re-set your ESPrit 3G: switch ‘Off’ momentarily, and then ‘On’ again.
- Check the connections between your MicroLink MLx, the MicroLink adaptor and your ESPrit 3G, to ensure there are no loose connections.

Take the following actions to check the FM transmitter’s operation:

- Check the FM transmitter is on.
- Check the transmitter frequency matches the receiver frequency of your MicroLink MLx.
- Check the batteries in the FM transmitter.

- Check the FM transmitter connections, specifically its microphone connections, e.g. check its microphone is snapped into place; replace the lapel microphone, if necessary.

Check for electromagnetic interference: if you hear buzzing sounds it may be due to electromagnetic interference. If possible, move away from potential sources, to reduce the interfering sound.

Optional Monitoring Accessories

Signal Check

The Signal Check, an optional accessory in some countries, is available from Cochlear.

It is used to check whether the transmitting coil is sending a signal across the skin to the implant, i.e. whether the signal is going beyond the transmitting coil.

To check the signal:

1. With your ESPril 3G in position on your head, turn 'On' your ESPril 3G.
2. Place the Signal Check over the transmitting coil.

Only place the Signal Check close enough to the coil to cause the red light to light up.

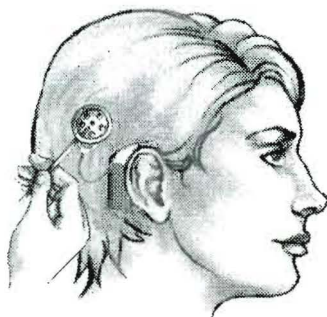


Figure 40: Signal Check

A red light in the center of the Signal Check will light up when the transmitting coil is sending the signal or 'sound'.

If the center light does not light up 'red', the signal is not going beyond the transmitting coil, i.e. there is a fault in the system. Follow *Steps to Identify the Fault* to try to determine the cause of the failure.

If after following those steps, the red light still does not light up, contact your clinician.

Monitor Earphones

Monitor earphones are an optional accessory available from Cochlear. They may be used with the Accessories Adaptor or ESPrIt 3G MicroLink adaptor to allow a hearing person to check the sound being received from the ESPrIt 3G microphone or the FM system. They are particularly useful for checking the microphone output of a child's ESPrIt 3G.

Your clinician must ensure that your ESPrIt 3G has a program that is compatible with the monitor earphones. If you do not hear anything when using the monitor earphones contact your clinician.

Note:

Monitor earphones only confirm if a signal is present. They do not ‘hear’ the ‘processed’ sound and therefore cannot be used to assess the quality of the signal.



Figure 41: Monitor Earphones

To use the monitor earphones:

1. Turn off the ESPrIt 3G.
2. Attach the Accessories Adaptor or ESPrIt 3G MicroLink adaptor to the base of your ESPrIt 3G.
3. Attach the monitor earphones to the side socket.
4. Place the ESPrIt 3G on your head.
5. Place the monitor earphones over the ears of the hearing person.
6. Turn ‘On’ the ESPrIt 3G.

7. Holding the microphone approximately 8 inches (15 to 20 cm) from the sound source, turn the volume control to between '3' and '4', or until the sound is heard.

If no sound or distorted sound is heard through the monitor earphones, contact your clinician for advice.

Part Three

Further Information

Programming Options

Overview

Your clinician will program and fit your ESPrin™ 3G speech processor. At that time there are a number of options available.

Your clinician will discuss the choice most suitable for you and program your ESPrin 3G accordingly.

Program Selection

The ESPrin 3G offers two program settings, labeled P1 and P2. These allow choices between programs for different listening environments, or a backup program.

Program options include using:

- different forms of loudness controls, e.g. one program with Volume Control and the other with Sensitivity Control; or one program with Autosensitivity/Volume Control and one without
- a mix of telecoil and microphone on one program and telecoil alone on the second program
- the same program on both settings
- for people with the Nucleus® 24 cochlear implant, a choice of speech coding strategies.

Your clinician will create the two programs for you.

To change between programs, or to turn off the ESPrIt 3G, move the top right hand program control switch to the position required.

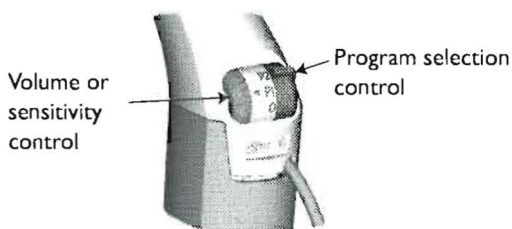


Figure 42: Program and Loudness Controls

Adjusting the Rotary Control

There are four commonly used options for programming your ESPrIt 3G for loudness or volume control:

- sensitivity
- fixed sensitivity
- volume
- autosensitivity/volume

The settings in programs P1 and P2 determine which volume options you have.

When programmed for sensitivity, the top rotary control changes the level of sound picked up by the microphone.

Turn your rotary control down to reduce the sensitivity. This reduces both the low level sound and the background noise received.

Turn your rotary control up to increase the sensitivity in quiet environments. This allows you to hear very soft

sounds. However in noisy situations it also increases the background noises picked up.

The second option, fixed sensitivity, is generally used for children or those who cannot reliably set sensitivity.

When this occurs, changing the rotary control has no effect.

When programmed for volume, the rotary control adjusts the perception of loudness.

When autosensitivity/volume is programmed, in noisy situations the setting adjusts automatically to keep the background noise at a constant low level. The rotary control continues to be available to change the volume of sound.

In noisy situations when programmed for sensitivity or autosensitivity, move your rotary control to get a good balance between hearing soft sound without too much background noise.

Turn your rotary control down if sounds are too loud, or increase the volume if speech, including your own voice, is too soft.

Built-in Telecoil

The 'T' setting of your ESPrit 3G can be programmed to operate as either a telecoil alone, or as a mix of telecoil and microphone.

Refer to *ESPrit 3G Built-in Telecoil* section in *Part One* for information on these programming options.

General Information

Technical Information

Specifications

Materials

Speech Processor:

ABS plastic case and battery cover

Internal epoxy fiberglass and polyimide printed circuits with electronic circuitry

Titanium earhook

Coil and Cable:

Polypropylene body and ABS cover

Internal epoxy fiberglass printed circuits with electronics

Cable attached

Dimensions

Speech Processor:

2 in. x $\frac{3}{4}$ in. x $\frac{9}{16}$ in. (51 mm x 19 mm x 14 mm)

Coil and Cable:

1 $\frac{1}{5}$ in. x 1 $\frac{1}{2}$ in. x $\frac{1}{3}$ in. (31 mm x 36.7 mm x 8.4 mm)

Weight

Speech Processor:

0.42 oz. (12 g) including 3 x 675 Zinc Air batteries

Coil and Cable:

With screw in magnet:

0.12 oz. (3.5 g) including cable (not including magnet)

0.2 oz. (5.8 g) including cable (with 2 strength magnet)

With cover and screws:

0.14 oz. (4 g) including cable (not including magnets and spacers)

Circuitry

Custom analog/digital integrated circuit, Automatic Gain Control (AGC) and telecoil

Operating Characteristics

Batteries

675 High Power Zinc Air or S76 Silver Oxide

Power Consumption

40 mW maximum

External Audio Inputs

Adaptor with custom connector for connection to external audio accessories

Signal Level Range

700 μ V p-p to 5 mV p-p

Transmitting Cable and Coil Connection

Via (4-pin) connector

A battery cover conceals the connector.

Controls

OFF - P1 - P2 power/function switch

Sensitivity - Volume rotary control

Mode settings

Audio Amplification

Pre-amplifier with digitally controlled 31.5 dB wide

AGC and programmable decay time constant

Digitally controlled sensitivity range of 31.5 dB

Noise Suppression

Automatic sensitivity function (program option) is available to ensure optimum signal to noise ratio under all conditions.

Programmability Features

2 x 256 byte EEPROM

Data and Power Transmission

Encoded radio frequency inductive link transmitted by the RF coil to the implant, using a 5 MHz carrier with Nucleus 24 cochlear implants and 2.5 MHz carrier with Nucleus 22 cochlear implants.

Signal Processing

Programmable speech coding strategies:

- ACESM, SPEAK and CIS, with Nucleus 24 cochlear implants
- SPEAK, with Nucleus 22 cochlear implants

Up to 20 high resolution bandpass filters provide spectral energy estimates over the frequency range 100 - 10,000 Hz, depending on the MAP settings. Filters with the maximum outputs can be selected. These can be varied. The program determines the filters selected, and hence the electrodes stimulated.

Environmental Conditions

Storage Temperature:

-4° F (-20° C) to +122° F (+50° C)

Storage Relative Humidity:

0% to 90%

Operating Temperature:

+41° F (+5° C) to +104° F (+40° C)

Operating Relative Humidity:

0% to 90%

Note:

Check battery manufacturer's recommended operating conditions for batteries used in the ESPrIt™ 3G speech processor.

International Labeling Symbols

The symbols in the following table are found on the ESPrIt 3G, and the ESPrIt 3G components and packaging.





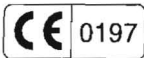
Symbol	Meaning
	See Instructions
	Fragile
	Temperature Limit
	Humidity Limit
	CE Registration Mark

Table 2: International Labeling Symbols

Appendix (for Clinicians)

ESPrít™ 3G Programming Cable

The ESPrít™ 3G speech processor programming cable is provided separately to clinicians using either a Portable Programming System (PPS) or a Clinical Programming System (CPS).

The ESPrít 3G programming cable has a yellow plug that plugs into the ESPrít 3G socket.

To attach the programming cable to the ESPrít 3G:

1. Remove the battery cover.
2. *Remove at least the bottom battery* from the ESPrít 3G, to enable the processor to be powered by the programming system.
3. Push the yellow plug into the socket at the base of the ESPrít 3G until it clips into place.

No contact will be made until the final clicking action occurs.

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The Nucleus[®] 24 and Nucleus[®] 22 cochlear implant systems are covered by one or more of the following USA patents:

4267410, 4408608, 4441202, 4462401, 4462402, 4487210, 4516820, 4532930, 4552209, 4654880, 4726378, 4730603, 4736747, 4741339, 4785827, 4809712, 4813417, 4823795, 4856525, 4898183, 4944301, 4947844, 4961434, 5000194, 5042084, 5095904, 5271397, 5507303, 5545219, 5562716, 5578084, 5584870, 5645585, 5653742, 5674264, 5720099, 5741314, 5755747, 5758651, 5991663, 5991664, 6064913, 6151400, 6205360, 6246911, 6289246, 6301505, 6377075, 6421569, 6496734. Other patents pending.

The statements made in this manual are believed to be true and correct in every detail as of the date of publication. However, specifications are subject to change without notice.



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