Kanso® Sound Processor

User Guide

CP950

Hear now. And always

Cochlear®

This guide is intended for Cochlear implant recipients and their carers using the Cochlear™ Kanso® Sound Processor (model number: CP950).

The processor works with your implant to transfer sound to your ear. It is a self-contained unit that contains the processing unit, microphones, magnet and batteries.

You can control your processor by pressing the button, as shown in this guide.

You can also use a Cochlear Nucleus® CR210 Remote Control or Cochlear Nucleus CR230 Remote Assistant. They also provide extra troubleshooting functions. For more information, please see your remote's user guide.

NOTES
- Refer to the Cautions and Warnings sections for safety advice relating to the use of the Kanso Sound Processor, batteries and components.
- Please also refer to your *Patient Information* document for essential advice that applies to Cochlear implant systems.

Symbols used in this guide

NOTE
Important information or advice.

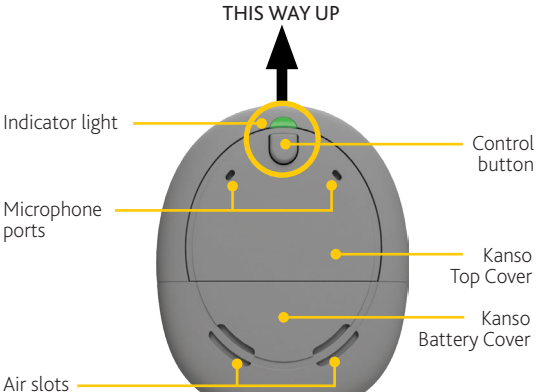
TIP
Time saving hint.

CAUTION (no harm)
Special care to be taken to ensure safety and effectiveness. Could cause damage to equipment.

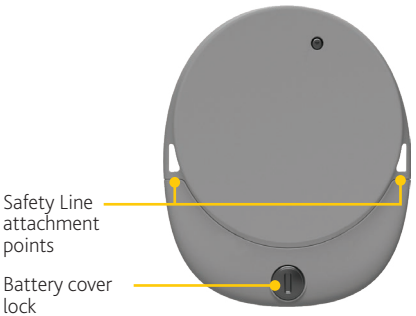
WARNING (harmful)
Potential safety hazards and serious adverse reactions. Could cause harm to person.

Kanso® Sound Processor

Front



Back



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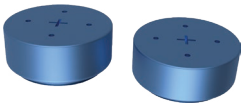
Batteries

For everyday use, the Kanso Sound Processor uses two high power 675 (PR44) zinc air disposable batteries designed for cochlear implant use.

NOTE
You will need to use other battery types only when you are using the Cochlear Nucleus Aqua+ for Kanso accessory. Please see its user guide for details.



Battery life

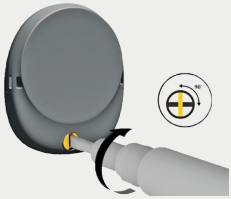
Batteries should be replaced as needed just as you would with any other electronic device. Battery life varies according to the programs used each day, your implant type and the thickness of skin covering your implant.

Your Kanso Sound Processor has been designed to provide the majority of users with a battery life of more than 16 hours for typical use with zinc air batteries. However this will vary depending on your system settings and hearing situations.

To help you get the longest life from the batteries, your sound processor will turn off two minutes after you take it off your implant.

Lock/unlock the battery cover

The battery cover has a tamper resistant lock to help prevent children opening the battery cover.



1. To lock, turn the locking screw clockwise with the battery cover locking tool until it is horizontal.

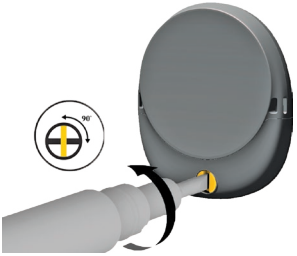
LOCKED

2. To unlock, turn the locking screw anticlockwise until it is vertical.

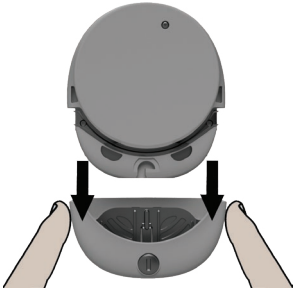
UNLOCKED

CAUTION
Always check the locking screw is unlocked before attaching or removing the battery cover.

Change the batteries



1. If the battery cover is locked, turn the lock screw anticlockwise to unlock it.

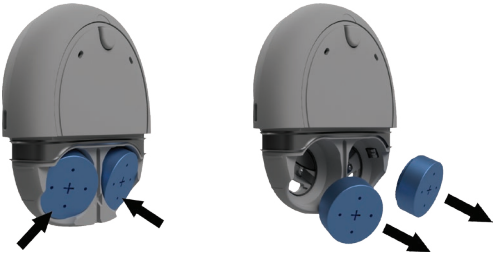


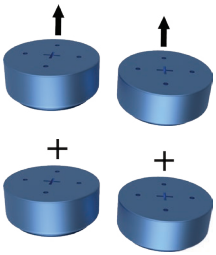
2. Remove the battery cover.

   Use your fingers on the sides to pull off the cover.

TIP
The cover is a secure fit, so pull firmly.

3. Push down on each battery with your thumb in the cutout section in the side. The batteries pop up. Pull the batteries out.

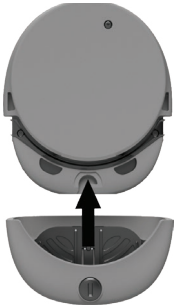




4. Remove the new batteries from the packet, and let them stand for a few seconds.

See *Batteries* on page 4.

5. Insert the batteries into the battery holder with the side with holes on it (positive terminal) facing out.

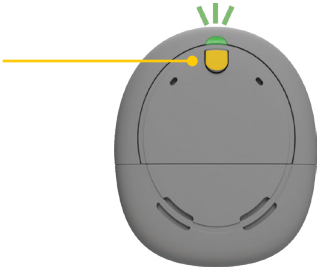


6. Replace the battery cover.
   Lock the cover if required.
   Your processor will automatically turn on.

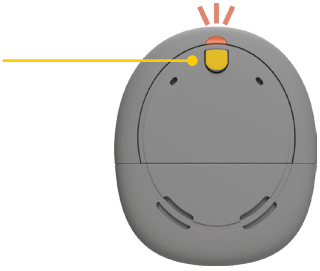
NOTE
If you do not put your sound processor on your implant, it will turn off automatically after two minutes.

Turn on and off

1. Press the button to turn **on.**



2. To turn **off**, press and hold the button until the light is a steady orange.



NOTE
Your sound processor will also turn off automatically after being off your implant for two minutes.

INDICATOR LIGHTS	WHAT IT MEANS
 Green flashes	Turning on processor. The number of flashes indicates the number of the current program.
 Orange flashes	Processor is off the implant.
 Quick green flashes	Processor flashes while receiving sound from microphones (Child mode only).

Pair with remotes

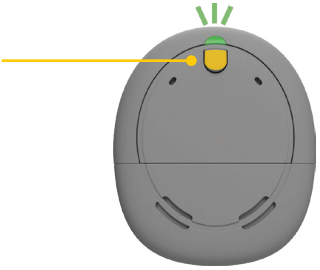
You need to pair your sound processor to your CR210 Remote Control or CR230 Remote Assistant to use their control and monitoring functions.

Please see your remote's user guide for details.

Change program

You can choose between programs to change the way your sound processor deals with sound, e.g. in noisy or quiet places. Usually two programs are all you need, but your clinician can give you up to four programs.

1. Press the button to switch between programs.



NOTE
If your clinician has enabled SCAN, your sound processor can automatically select the best program for you.

INDICATOR LIGHT	WHAT IT MEANS
Green flashes	Changing the program (Child mode only). The number of flashes indicates the number of the current program.

Change volume and sensitivity

If set up by your clinician, you can control the levels of volume or sensitivity (if available) using your CR210 Remote Control or CR230 Remote Assistant.

Please see your remote's user guide for details.

NOTE
You need to pair your sound processor with your remote first. See your remote's user guide for details.

Stream audio

Your processor can stream sound from external audio sources.

Telecoil (optional)

Your clinician can enable **Telecoil** if you want to listen to room hearing loops.

NOTE
Telecoil is not recommended for phone use with the Kanso Sound Processor. We recommend you use the Cochlear Wireless Phone Clip.

Wireless accessories

Cochlear True Wireless™ Accessories can wirelessly stream sound to your processor:

- The **Mini Microphone** or **TV Streamer** are controlled from your processor
- You use the Phone Clip controls for phone calls.

NOTE
You first need to pair your wireless accessories with your sound processor. See their user guide for details.

To control streaming

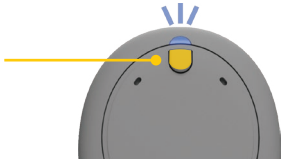
TIP
You can also use your remote to control streaming audio. See its user guide for details.

Each time you press the sound processor button, you cycle through the available audio sources in order:

PRESS	TELECOIL ENABLED	NO TELECOIL
1	Telecoil	Wireless accessory 1
2	Wireless accessory 1	Wireless accessory 2
3	Wireless accessory 2	Wireless accessory 3
4...	Telecoil...	Wireless accessory 1...

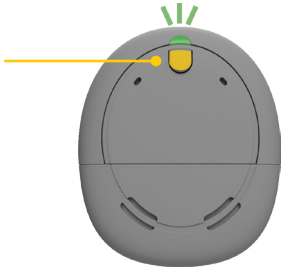
1. **Press and hold** the button for 2 seconds **then release** to stream audio.

   Press and release again if you need to cycle to the next audio source.



Blue: streaming audio.

2. **Tap** the button to stop streaming.

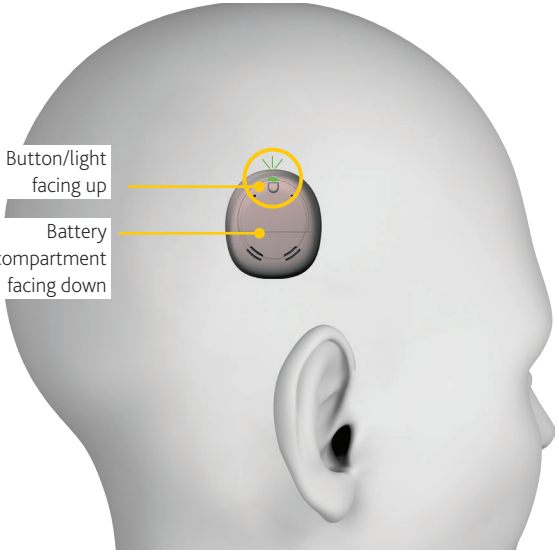


USE

Wear your processor

Place the processor on your implant with the button/light facing up and battery compartment facing down.

CAUTION
It is important to position your processor correctly to get the best performance, and so it does not fall off the implant.



INDICATOR LIGHTS	WHAT IT MEANS
Flash of orange every second	Processor is off your head (or connected to the wrong implant).

For users with two implants

Ask your clinician to give you coloured stickers (red for right, blue for left) to make identifying left and right processors easier.

CAUTION
If you have two implants, you must use the correct sound processor for each implant.

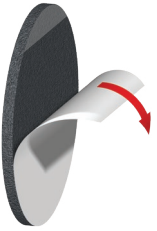
NOTE
Your sound processor will recognise the implant's ID, so it will not work on the wrong implant.

Attach a SoftWear pad

The Cochlear SoftWear™ pad is optional. If you experience discomfort when wearing your processor, you can attach this adhesive pad to the back of your processor.

NOTE
You may need to change to a stronger magnet after attaching a SoftWear pad.

1. Peel off the single backing strip on the adhesive side of the pad.



2. Attach the pad to the back of the processor – press down firmly.

3. Peel off the two semicircle backing covers on the cushion side of the pad.

4. Wear your processor as usual.

NOTE
If you use the SoftWear pad with the Headband, it may cause intermittent sound from your processor. Recipients and carers should monitor performance, and contact your clinician as appropriate.

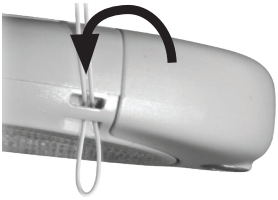
Attach a Safety Line

Standard and Long Safety Lines

To reduce the risk of losing your processor, you can attach a Safety Line that clips onto your clothing:

- Nucleus Safety Line–standard length
- Cochlear Safety Line (Long).

1. Pinch the loop on the end of the line between your finger and thumb.

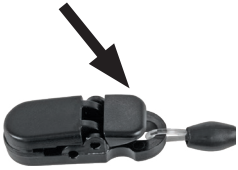


2. Pass the loop through the attachment hole in the sound processor from **front to back**.

TIP
Use the attachment hole that will be at the rear of the processor when it is on your head.

3. Pass the clip through the loop and pull the line tight.

4. **Lift** the tab to **open** the clip.



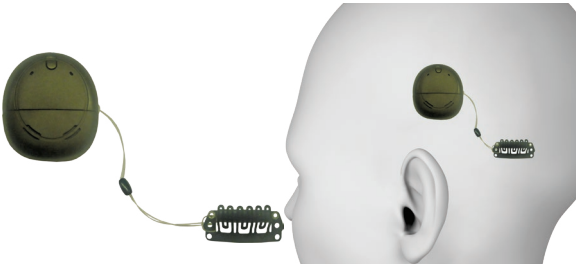
5. Place the clip on your clothing and press **down** to **close**.

6. Place your processor on your implant.

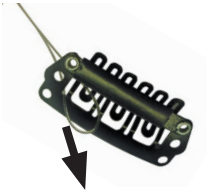
WARNING
Retention lines longer than the Safety Line (standard length) are not recommended for use by children as they may present a risk of strangulation.

Safety Line–Short Double Loop

To reduce the risk of losing your processor, you can attach a Safety Line that clips into your hair:

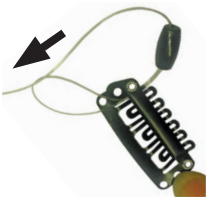


1. Pinch the loop on one end of the line between your finger and thumb.

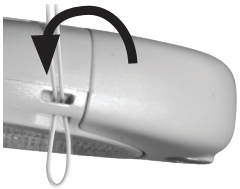


2. Pass the loop through the attachment hole in the hair clip.

TIP
Use the left hole for a left side processor, and the right hole for a right side processor.



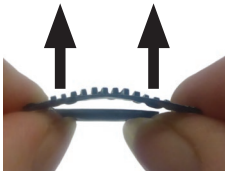
3. Pass the end of the line through the loop and pull the line tight.



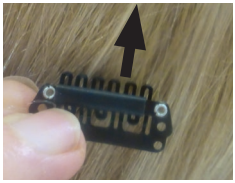
4. Pass the other loop through the attachment hole in the processor from **front to back**.

TIP
Use the attachment hole that will be at the rear of the processor when it is on your head.

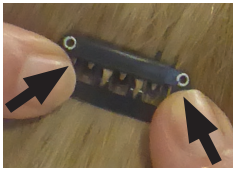
5. Pass the clip through the loop and pull the line tight.



6. Press up on the ends to open the clip.



7. With the teeth facing up and against your hair, push the clip up into your hair.



8. Press down on the ends to close the clip.

9. Place your processor on your implant.

Wear the Headband

The Cochlear Headband is an optional accessory that holds the processor in place on your implant. This is useful for children or for physical activities.

Headband sizing

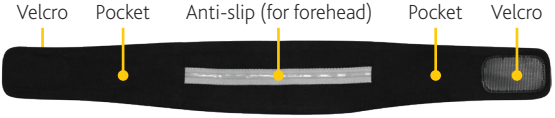
To choose a Headband, measure your head circumference:

SIZE	CIRCUMFERENCE	SIZE	CIRCUMFERENCE
XXS	41-47 cm (16-18 in.)	M	52-58 cm (20-23 in.)
XS	47-53 cm (18-21 in.)	L	54-62 cm (21-24 in.)
S	49-55 cm (19-22 in.)		

NOTE
The Headband may affect your sound processor's performance. If you notice any change, contact your clinician.

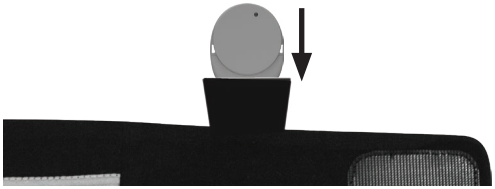
Fitting the Headband

1. Open the Headband and lay it flat, with the processor pockets facing up.



2. Pull the pocket lining out.

3. Insert your processor/s in the correct pocket/s:
   - the left processor in the left-side pocket, the right processor in the right-side pocket
   - the top of the processor at the top of the pocket
   - the side of the processor that fits onto your implant is facing up towards you.



4. Fold the pocket lining/s back over the processor/s.
5. Pick up the ends of the Headband, and place the anti-slip section against your forehead.
6. Join the ends behind your head. Adjust the velcro so the headband fits firmly, with your processor/s over your implant/s.

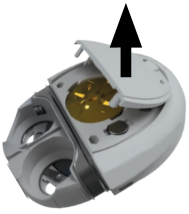
7. Press firmly on the ends to make sure they join together.

Change the magnet

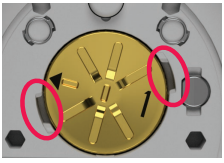
If your Kanso Magnet is too weak the processor may fall off, or if it is too strong it may cause discomfort. Magnet strength ranges from ½ (weakest) to 6 (strongest).for standard magnets and **½(I)** (weakest) to **4(I)** (strongest) for '**(I)**' magnets.

NOTE
If your clinician has provided you with a Kanso Magnet Reverse Polarity, use it as described here for a normal magnet.

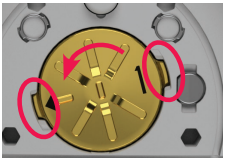
1. If the battery cover is locked, turn the lock screw anticlockwise to unlock it.
2. Remove the battery cover and batteries as shown in ***Change the batteries*** on page 6.
   Use your fingers on the sides to pull off the cover.

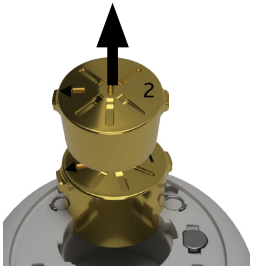


3. Use your thumbnail to remove the top cover.

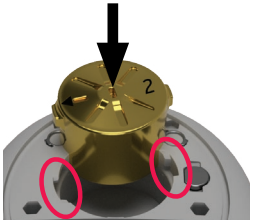


4. Press down with your finger and turn the magnet anticlockwise until the arrow and side tabs line up with the square notches in the processor case.

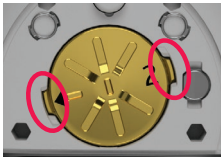


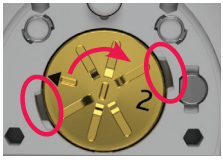


5. Use another magnet to pull the magnet from the processor.



6. Insert the new magnet in the processor, with the side tabs in the square notches in the processor case.





7. Press down with your finger and turn the magnet clockwise to lock the tab on the magnet under the processor's case.

8. Replace the top cover.
9. Replace the batteries and battery cover, and lock it if required, as shown in ***Change the batteries*** on page 6.

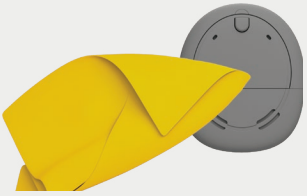
Sport and exercise

TIP
Always ensure the battery cover is locked when you exercise or play sport.

NOTE
If you want to use your processor while bathing, swimming or showering, ask your clinician about the Cochlear Aqua+ for Kanso.

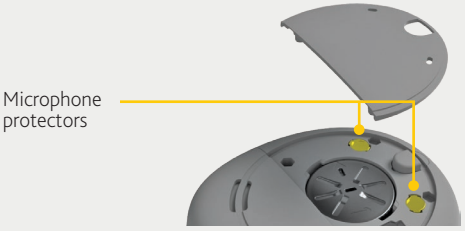
1. Use accessories such as the Safety Line or Cochlear Headband to help hold your processor in place when you play sport or exercise.

2. After exercise, wipe your processor with a soft cloth to remove sweat or grime.



3. Then check your microphone protectors for dirt.

See *Change microphone protectors* on page 30.



Travel

NOTE
Visit *www.cochlear.com/clinic-finder* to find the nearest clinic in places you are travelling.

- Take a printout from your clinician of your most recent program in case you need help with your processor.
- If you have a backup sound processor, check that it is programmed correctly and take it with you.
- It's okay to move through metal detectors and full body scanners with your sound processor on. To avoid any possible buzzing sounds in your ear, turn off the telecoil.
- Ask your clinician for a Patient Identification Card. In the unlikely event that your implant sets off a metal detector the ID card will help explain that you have an implanted medical device.
- If you need to remove your sound processor as you move through airport security, place it in a case in your hand luggage.
- Your sound processor will not interfere with a plane's navigation system so you won't need to turn it off during takeoff and landing. If you use a remote control for your processor, switch it off before takeoff as it transmits high frequency radio waves when switched on.

Regular care

CAUTIONS
- Do not use cleaning agents or alcohol to clean your processor.
- Turn your processor off before cleaning or performing maintenance.

Every day

- Check all parts and any accessories you use (e.g. SoftWear pad, Safety Line) for dirt and moisture. Wipe the processor with a soft dry cloth.
- Keep your processor free from moisture by drying it every night in your dry aid kit.
- Check the microphone protectors for signs of dirt or grime and replace if needed. See *Change microphone protectors* on page 30.

Every month

- Remove batteries and check for signs of dirt or grime. Wipe the contacts with a soft dry cloth.
- Replace a SoftWear pad (if used) if it is worn or damaged, or has accumulated dirt or moisture that cannot be wiped off. If you have any problem with comfort, that is not helped by changing the SoftWear pad, contact your clinician. See *Attach a SoftWear pad* on page 16.
- Check if the Safety Line (if used) is showing signs of wear. Replace as needed. See *Attach a Safety Line* on page 18.

Every two months

- Replace the dry brick in your dry aid kit.

Every three months

- Replace the microphone protectors – this is very important for the quality of sound. See *Change microphone protectors* on page 30.

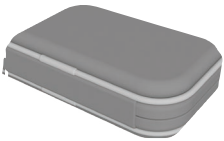
Storage

Dry aid kit

Store your processor at night in the dry aid kit provided by Cochlear. Store the processor fully assembled for 8 hours for optimal drying effect.

Storage case

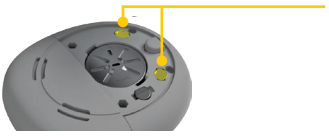
For long term storage, remove the batteries and store so they do not touch each other. Storage cases are available from Cochlear.

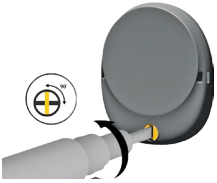


Change microphone protectors

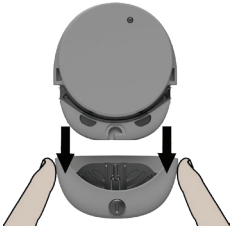
Replace your microphone protectors every three months, or if they look dirty or you notice any loss in sound quality. Always replace both microphone protectors at the same time, using the Kanso Microphone Protector Kit.

Step 1: Remove microphone protectors

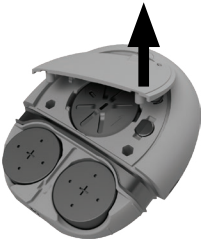




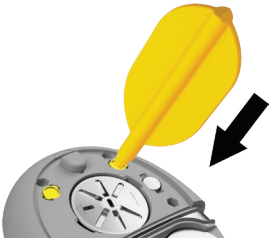
1. If the battery cover is locked, turn the lock screw anticlockwise to unlock it.



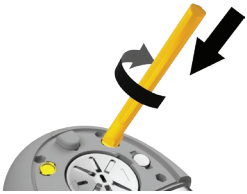
2. Remove the battery cover.
   Use your fingers on the sides to pull off the cover.



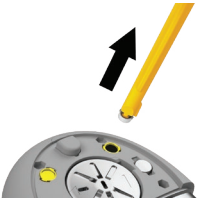
3. Use your thumbnail to remove the top cover.



4. **Firmly push** the tip of the removal tool into the middle of the microphone protector.



5. **Firmly push**, and then turn the tool 90° clockwise.



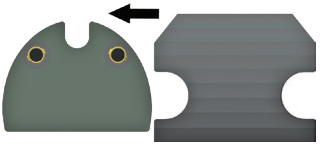
6. Lift out the used microphone protector.

7. Pull the used microphone protector from the tool and discard.

8. Repeat steps 4 to 7 to remove the other microphone protector.

Step 2: Insert new microphone protectors

1. Pull the microphone protector applicator out of its sleeve.



2. With the microphone protectors facing down, lay the applicator over the processor, with protectors over the microphones.

3. Press the microphone protectors down with your finger.

4. Remove the applicator carefully, peeling it upwards from the side.

5. Replace the top cover.
6. Replace the battery cover. Lock the cover if required.

Water, sand and dirt

Your processor is protected against failure from dust penetration or splashing water (IP54 rated).

However, it is still a precision electronic device so you should take the following precautions.

If your processor ever gets wet, dry it with a soft cloth.

Then remove the batteries, dry them and the contacts with a soft cloth, and replace them.

Replace the microphone protectors and place your processor in the dry aid kit provided by Cochlear for 8 hours.

See *Change the batteries* on page 6.

See *Change microphone protectors* on page 30.

If sand or dirt ever enter the processor, remove it by carefully brushing all indents and holes in the processor's casing.

Lights

Your clinician can set up your processor to show some or all of the following light indications.

Turning on and off

LIGHT	WHAT IT MEANS
 Quick green flashes	Processor flashes while receiving sound from microphones (Child mode only).
 Quick green flashes	Turning on and changing programs. Number of flashes indicates the number of the current program.
 Long flash of orange	Turning off processor.

Alerts

LIGHT	WHAT IT MEANS
 Flash of orange every second	Processor flashes while it is off your head (or connected to the wrong implant).
 Orange flashes	Processor batteries are low. Change batteries.
 Steady orange	Fault. Contact your clinician. Stays on until the issue is resolved.

Audio sources

LIGHT	WHAT IT MEANS
 Quick blue flash	Processor flashes when pairing to wireless accessory is successful.
 Quick blue flashes	Processor flashes while receiving audio from an audio source (Child mode only).

Beeps

Your clinician can set up your processor so you can hear the following beeps. The beeps are only audible to the recipient.

Turning on and off

BEEP	WHAT IT MEANS
 Short high beeps	Changing the program. The number of beeps indicates the number of the selected program.
 Short high beep	Changing volume or sensitivity level (if available).
 Short high then short low beep	When changing volume or sensitivity, indicates upper or lower limit of volume/ sensitivity reached.

Wireless accessories

BEEP	WHAT IT MEANS
 3-tone chime	Connecting with wireless accessory to begin streaming audio.
 Short beep	When stopping streaming.

Telecoil

BEEP	WHAT IT MEANS
 Long high beep	Switching between using the microphones and the telecoil.

Alerts

BEEP	WHAT IT MEANS
 2 Short low beeps	Processor batteries are low. Replace batteries.
 Short low beeps for 4 seconds	Batteries are empty and processor is turning off. Replace batteries.
 4 long low beeps over 4 seconds	General fault. Consult your clinician.

Adjusting bass and treble *

BEEP	WHAT IT MEANS
 Loud medium beep	Adjusting master volume level.
 Loud long high beep	Adjusting treble level.
 Loud long low beep	Adjusting bass level.

* If available, Remote Assistant only

Troubleshoot

Contact your clinician if you have any concerns regarding the operation or safety of your sound processor.

PROBLEM	RESOLUTION
Processor will not turn on/button will not respond	1. Try turning the processor on again. See *Turn on and off* on page 8. 2. Replace the batteries. See *Change the batteries* on page 6. 3. If you have two implants, check that you are wearing the correct sound processor on each implant. 4. If the problem continues, contact your clinician.
The processor switches off	1. This is normal operation, as the processor automatically switches off when not connected to the implant for more than two minutes. 2. Replace the batteries. See *Change the batteries* on page 6.
The processor will not turn off	1. Remove the batteries from the processing unit. See *Change the batteries* on page 6.
You want to perform a regular check on your processor	See *Regular care* on page 28.

PROBLEM	RESOLUTION
You are not sure what processor beeps or light flashes mean	See *Lights* on page 34 and *Beeps* on page 36.
You want to confirm your processor is receiving sound	1. Check the light on the top of the processor (if enabled). See *Lights* on page 34. 2. If you use a CR230 Remote Assistant, check the sound meter on the status screen. 3. If the problem continues, contact your clinician.
The processor becomes hot	1. Remove the processor from your head immediately and contact your clinician.
You experience tightness, discomfort or develop a skin irritation at your implant site	1. Try using an adhesive SoftWear pad. See *Attach a SoftWear pad* on page 16. 2. If you are using a retention aid, such as a headband, this may be placing pressure on your processor. Adjust your retention aid, or try a different aid. 3. Your processor magnet may be too strong. Ask your clinician to change to a weaker magnet (and use a retention aid such as the Safety Line if required). See *Change the magnet* on page 24. 4. If the problem continues, contact your clinician.

PROBLEM	RESOLUTION
You do not hear sound or sound is intermittent	1. Try a different program. See *Change program* on page 10. 2. Replace the batteries. See *Change the batteries* on page 6. 3. Make sure you are using the correct magnet for your implant. If unsure, contact your clinician. 4. Make sure the sound processor is properly oriented on your head, see *Wear your processor* on page 14. 5. If the problem continues, contact your clinician.
You do not hear sound from a wireless accessory	1. Check that the wireless accessory is charged and turned on. 2. Check that the wireless accessory is paired with your processor. 3. Check the volume of the wireless accessory. 4. If you use a CR230 Remote Assistant, use the Streaming menu to check the connection to the accessory. 5. If you use a CR230 Remote Assistant, check and adjust the accessory/ microphone mixing ratio. 6. If available, try a different processor. 7. For more troubleshooting, see the *True Wireless Accessory User Guide*.

PROBLEM	RESOLUTION
You hear intermittent sound, a buzzing sound or distorted speech	1. Check for sources of interference such as radio and TV transmission towers (within approximately 1.6 km or 1 mile), shopping centres, airport security systems and mobile phones. 2. Try moving away from any source of magnetic or electronic interference. 3. If the problem continues, contact your clinician.
Sound is too loud or uncomfortable	1. Try a different program. See *Change program* on page 10. 2. If you use a CR210 Remote Control, turn down the volume. 3. If you have two sound processors (one for each side), ensure you have them on the correct side. 4. If the problem continues, remove your external equipment immediately (sound processor, etc) and contact your clinician.
Sound is too quiet or muffled	1. Try a different program. See *Change program* on page 10. 2. If you use a CR210 Remote Control, turn up the volume. 3. Try changing the microphone protectors. See *Change microphone protectors* on page 30. 4. If the problem continues, contact your clinician.

PROBLEM	RESOLUTION
The processor gets wet	1. Dry the processor with a soft cloth, change the microphone protectors and place it in the dry aid kit provided by Cochlear for 8 hours. See *Water, sand and dirt* on page 33
Batteries are not lasting as long as usual	1. Clean the battery contacts carefully without bending them. Use the cleaning brush, then wipe the processor with a soft cloth. 2. If you are using a non-recommended retention aid that covers your sound processor, replace it with an aid recommended by Cochlear. 3. Check that you are using the recommended batteries. See *Batteries* on page 4. 4. Make sure you are using the correct magnet for your implant. If unsure, contact your clinician. 5. Don't forget to let new batteries stand for a few seconds before putting them in the sound processor. 6. If the problem continues, contact your clinician.

Cautions

- Young children who are developing motor skills are at greater risk of an impact to the head from a hard object (e.g. table or chair). Impact to the sound processor may cause damage to the processor or its parts. Impact to the head in the area of the Cochlear implant could damage it and result in its failure.
- Most patients can benefit from electrical stimulation levels that are considered safe, based on animal experimental data. The long-term effects of such stimulation in humans are unknown.

Warnings

For parents and carers

- Removable parts of the system (e.g. microphone protectors, batteries, magnets, battery cover, Safety Line) can be lost or may be a choking or strangulation hazard. Keep out of reach of children or lock the tamper-proof screw on the battery cover.
- Keep the dry brick from the dry aid kit away from small children. Swallowing this material can cause serious internal injuries.
- Carers must routinely check the device for signs of overheating and for signs of discomfort or skin irritation at the implant site. Remove the processor immediately if there is any discomfort or pain (e.g. if device becomes hot, or sound is uncomfortably loud) and inform clinician.
- Carers must monitor for signs of discomfort or skin irritation if a retention aid (e.g. headband) is used that applies pressure to the sound processor. Remove the aid immediately if there is any discomfort or pain, and inform clinician.
- Dispose of used batteries promptly and carefully, in accordance with local regulations. Keep away from children.
- Do not allow children to replace batteries without adult supervision.

Processors and parts

- Each processor is programmed specifically for each implant. Never wear another person's processor or lend yours to another person.
- Use your Cochlear implant system only with approved devices and accessories.
- If you experience a significant change in performance, remove your processor and contact your clinician.
- Your processor and other parts of the system contain complex electronic parts. These parts are durable but must be treated with care.
- No modification of this equipment is allowed. Warranty will be void if modified.
- If you experience tightness or pain at the implant site, or develop significant skin irritation, stop using your sound processor and contact your clinician.
- Do not apply continued pressure to the processor when in contact with the skin (e.g. sleeping while lying on processor, or using tight fitting headwear).
- Do not push the volume too high for comfort in case a loud noise occurs nearby.

- If you need to adjust the volume often, or if adjusting volume ever causes discomfort, consult your clinician.
- Do not place the processor or parts in any household devices (e.g. microwave oven, dryer).
- Do not use a dry aid kit that has an Ultra Violet C (UVC) lamp (e.g. do not use the Freedom™ Dry and Store).
- The magnetic attachment of your sound processor to your implant may be affected by other magnetic sources.
- Store spare magnets safely and away from cards that may have a magnetic strip (e.g. credit cards, bus tickets).
- Your device contains magnets that should be kept away from life supporting devices (e.g. cardiac pacemakers and ICDs (implantable cardioverter defibrillators) and magnetic ventricular shunts), as the magnets may affect the function of these devices. Keep your processor at least 15 cm (6 in) from such devices. Contact the manufacturer of the specific device to find out more.
- Your sound processor and remote control radiate electromagnetic energy that may interfere with life supporting devices (e.g. cardiac pacemakers and ICDs). Keep your processor and remote control at least 15 cm (6 in) from such devices. Contact the manufacturer of the specific device to find out more.
- Do not place the device or accessories inside any part of your body (e.g. nose, mouth).

- Seek medical advice before entering any environment that may adversely affect the operation of your Cochlear implant, including areas protected by a warning notice preventing entry by patients fitted with a pacemaker.
- Some types of digital mobile telephones (e.g. Global System for Mobile communications (GSM) as used in some countries), may interfere with the operation of your external equipment. You may hear distorted sound when close, 1-4 m (~3-12 ft), to a digital mobile telephone in use.
- For Cochlear Nucleus cochlear implant recipients only, the maximum diving depth is 40 m (~131 ft). Seek medical advice before diving to ensure you do not have any conditions that might make diving contraindicated (e.g. middle ear infection). When wearing a mask, avoid pressure over the implant site.
- Before activities that create electrostatic discharge (e.g. playing on plastic slides), remove your processor. In rare cases, discharge of static electricity can damage or cause your sound processor to shut down. If your processor shuts down, it should resume normal operation after restarting it. If static electricity is present (e.g. when putting on clothes over your head, or getting out of a car), before the Cochlear implant system touches any object or person, you should touch something conductive such as a metal door handle.

Batteries

- Use only Cochlear supplied or recommended 675 (PR44) zinc air batteries for everyday use. Other batteries may only be used with the Aqua+ for Kanso accessory (see its user guide for details).
- Insert batteries in the correct orientation.
- Do not mix disposable batteries that differ by manufacturer, brand, type, age or previous usage.
- Do not short-circuit batteries (e.g. do not let terminals of batteries contact each other, do not place batteries loose in pockets, etc.).
- If batteries are short-circuited the processor will not work and its temperature can reach 42° C. Remove the processor immediately and contact your clinician.
- Do not disassemble, deform, immerse in water or dispose of batteries in fire.
- Store unused batteries in original packaging, in a clean and dry place.
- When processor is not in use, remove the batteries and store separately in a clean and dry place.
- Wipe batteries with a clean dry cloth if they become dirty.

- Do not expose batteries to heat (e.g. never leave batteries in sunlight, behind a window or in a car).
- Do not use damaged or deformed batteries. If skin or eyes come into contact with battery fluid or liquid, wash out with water and seek medical attention immediately.
- Never put batteries in mouth. If swallowed, contact your physician or local poison information service.

Medical treatments

Magnetic resonance imaging (MRI)

The Kanso Sound Processor, remote and related accessories (such as the Wireless Programming Pod) are MR Unsafe.

Full MRI safety information is available at *www.cochlear.com/warnings* or by calling your regional Cochlear office (contact numbers available at the end of this document).

Medical treatments generating induced currents, heat and vibration

Having a cochlear implant means extra care must be taken when receiving some medical treatments. Before starting medical treatment, the information in this section should be discussed with the recipient's physician.

The sound processor must be removed before starting any of the medical treatments listed in this section.

Some medical treatments generate induced currents that may cause tissue damage or permanent damage to the implant. Before initiating any of the following treatments deactivate the device.

Warnings for specific treatments are provided below.

CONDITION	WARNING
Diathermy	Do not use therapeutic or medical diathermy (thermopenetration) using electromagnetic radiation (magnetic induction coils or microwave). High currents induced into the electrode lead can cause tissue damage to the cochlea/brainstem or permanent damage to the implant. Medical diathermy using ultrasound may be used below the head and neck.
Electroconvulsive therapy	Do not use electroconvulsive therapy on an implant patient under any circumstances. Electroconvulsive therapy can cause tissue damage or damage to the implant.

CONDITION	WARNING
Electrosurgery	Electrosurgical instruments can induce radio frequency currents that could flow through the electrode. Monopolar electrosurgical instruments must not be used on the head or neck of an implant patient as induced currents could cause damage to cochlear/neural tissues or permanent damage to the implant. When using bipolar electrosurgical instruments on the head and neck of a patient, the cautery electrodes must not contact the implant and should be kept more than 1 cm (½ in.) from the electrodes.
Ionising radiation therapy	Do not use ionizing radiation therapy directly over the implant. It may cause damage to the implant.
Neurostimulation	Do not use neurostimulation directly over the implant. High currents induced into the electrode lead can cause tissue damage to the cochlea/ brainstem or permanent damage to the implant.
Therapeutic ultrasound	Do not use therapeutic levels of ultrasound energy directly over the implant. It may inadvertently concentrate the ultrasound field and cause tissue damage or damage to the implant.

Other information

Physical configuration

The processing unit comprises:

- Two omni-directional microphones for receiving sound.
- An internal telecoil for receiving magnetic fields radiated by room loops.
- Custom analogue and digital integrated circuits with digital signal processing (DSP) and bi-directional wireless communication capabilities.
- A tri-colour visual indication of processor function or problem.
- One button allowing user control of key features.

The batteries provide power to the processor, which transfers energy and data to the implant.

Materials

- Processing unit: polyamide.
- Magnet casing is made of acrylonitrile butadiene styrene (ABS).

Batteries

Check the battery manufacturer's recommended operating conditions for disposable batteries used in your processor.

Wireless communication link

The remote control/remote assistant wireless communication link operates in the 2.4 GHz ISM band using GFSK (Gaussian frequency shift keying) on 5 channels. The link uses a proprietary bi-directional communication protocol and operates over a distance of up to 2 metres from the processor. When interference is present, the wireless communication link switches between the 5 channels to find a channel where the interference least affects the operation of the link. The remotes indicate via their displays when the processor is not within operating distance, and when the link has been interrupted due to interference (see the relevant remote user guide for more information).

The wireless audio streaming accessory communication operates in the 2.4 GHz ISM band and follows GN ReSound's proprietary Proximity2 protocol. The operating distance varies across streaming accessory types and is noted in Operating Characteristics – Wireless technology. The protocol uses frequency hopping and error recovery to reduce the effect of interference sources. The CR230 Remote Assistant provides a visual indication when the wireless audio streaming accessory is out of range.

Sound Processor to implant inductive link

The inductive link between the sound processor coil and the implant performs two functions: it transfers power from the sound processor to the implant; and provides a bi-directional data communication link. Both power and data are transferred in the reactive near H-field. The link uses a Cochlear proprietary embedded protocol employing a series of 4 or 5 consecutive pulses clocked at 5 MHz and operates over a distance of 1-10 mm. Data validity and parity checking is used to ensure correct data transfer. In the presence of interference, the sound processor triggers a "coil-off" orange light indication and the CR230 Remote Assistant provides a visual indication that the coil is decoupled from the implant.

Environmental conditions

CONDITION	MINIMUM	MAXIMUM
Storage & transport temperature	-10°C (14°F)	+55°C (131°F)
Storage & transport humidity	0% RH	90% RH
Operating temperature	+5°C (41°F)	+40°C (104°F)
Operating relative humidity	0% RH	90% RH
Operating pressure	700 hPa	1060 hPa

Product dimensions *(Typical values)*

COMPONENT	LENGTH	WIDTH	DEPTH
Kanso processing unit	40.9 mm	35.2 mm	11.4 mm

Product weight *(Typical values)*

COMPONENT	WEIGHT
Kanso processing unit (no batteries or magnet)	8.3 g
Kanso processing unit (including 1M magnet)	11.6 g
Kanso processing unit (including 1M magnet and two zinc air batteries)	13.9 g

Coil

CHARACTERISTIC	VALUE
Technology	Inductive power and data transfer using coupled resonant coils
Operating voltage	2.0 V
Data rate	1.25 Mbps (4 CPC), 1 Mbps (5 CPC)
Protocols	Cochlear's proprietary embedded protocol employing a series of 4 or 5 consecutive pulses at 5 MHz
Separation between coil and implant	1-10 mm

Operating characteristics

CHARACTERISTIC	VALUE/RANGE
Sound input frequency range	100 Hz to 8 kHz
Operating voltage	2.0 V to 3.1 V
Power consumption	20 mW to 60 mW
Button functions	Turn processor on and off, turn audio sources on and off, change program
Remote communication range	Up to 2 m
Batteries	Two PR44 (zinc air) button cell batteries, 1.45V (nominal) each Cochlear recommends 675 zinc air batteries designed for cochlear implant use

Wireless technology

CHARACTERISTIC	VALUE/RANGE
Technology	Proprietary low power bi-directional wireless link
Power output	1 mW (0 dBm)
RF frequency	2.4 GHz (range 2.40 – 2.48 GHz)
Radiated power	-3.2 dBm
Channel spacing	2 MHz
Data rate	2 Mbps
Modulation	GFSK
Protocols	Wireless Data Protocol (WDLP): Cochlear's proprietary low power bi-directional wireless link Proximity2 protocol: GN ReSound's proprietary low power bi-directional wireless link
Wireless transmission range	3-7 m depending on accessory Up to 2 m for CR210 and CR230

Electromagnetic compatiblity (EMC)

Guidance and manufacturer's declaration – electromagnetic emissions

The Kanso Sound Processor is intended for use in the electromagnetic environment specified below. The customer or the user of the Kanso Sound Processor should assure that it is used in such an environment.

EMISSIONS TEST	COMPLIANCE	ELECTROMAGNETIC ENVIRONMENT – GUIDANCE
RF emissions CISPR 11	Group 1	The Kanso Sound Processor uses RF energy only for its internal function. Therefore, its RF emissions are very low and are not likely to cause any interference in nearby electronic equipment.
	Class A	(Wired Programming Mode) The Kanso Sound Processor is suitable for use in clinics and hospitals.
	Class B	(Normal Mode, Wireless Programming Mode) The Kanso Sound Processor is suitable for use in all establishments, including domestic and those directly connected to the public low voltage power supply network that supplies buildings used for domestic purposes.
Harmonic emissions IEC 61000-3-2	Not applicable	
Voltage fluctuations/ flicker emissions IEC 61000-3-3	Not applicable	

Guidance and manufacturer's declaration – electromagnetic immunity

The Kanso Sound Processor is intended for use in the electromagnetic environment specified below. The customer or the user of the Kanso Sound Processor should assure that it is used in such an environment.

IMMUNITY TEST	COMPLIANCE LEVEL	ELECTROMAGNETIC ENVIRONMENT – GUIDANCE
Electrostatic discharge (ESD) IEC 61000-4-2	± 8 kV contact ± 15 kV air	Floors should be wood, concrete or ceramic tile. If floors are covered with synthetic material, the relative humidity should be at least 30%.
Electrical fast transient/burst IEC 61000-4-4	Not applicable	Not applicable
Surge IEC 61000-4-5	Not applicable	Not applicable
Voltage dips, short interruptions and voltage variations on power supply input lines IEC 61000-4-11	Not applicable	Not applicable
Power frequency (50/60 Hz) magnetic field IEC 61000-4-8	30 A/m	Power frequency magnetic fields should be at levels characteristic of a typical location in a typical commercial or hospital environment.

Guidance and manufacturer's declaration – electromagnetic immunity

The Kanso Sound Processor is intended for use in the electromagnetic environment specified below. The customer or the user of the Kanso Sound Processor should assure that it is used in such an environment.

ELECTROMAGNETIC ENVIRONMENT – GUIDANCE
Portable and mobile RF communications equipment should be used no closer to any part of the Kanso Sound Processor, including cables, than the recommended separation distance calculated from the equation applicable to the frequency of the transmitter.
IMMUNITY TEST: Conducted RF IEC 61000-4-6 **COMPLIANCE LEVEL:** 3 V 0.15 to 80 MHz; 6 V in ISM 0.15 to 80 MHz Recommended separation distance $d=1.16\sqrt{P}$
IMMUNITY TEST: Radiated RF IEC 61000-4-3 **COMPLIANCE LEVEL:** 10 V/m 80 MHz to 2.7 GHz $d=0.35\sqrt{P}$ 80 MHz to 800 MHz $d=0.70\sqrt{P}$ 800 MHz to 2.7 GHz where P is the maximum output power rating of the transmitter in watts (W) according to the transmitter manufacturer and d is the recommended separation distance in metres (m). Field strengths from fixed RF transmitters, as determined by an electromagnetic site survey, should be less than the compliance level in each frequency range. Interference may occur in the vicinity of equipment marked with the following symbol: 

ELECTROMAGNETIC ENVIRONMENT – GUIDANCE
IMMUNITY TEST: Proximity fields from RF wireless communications equipment IEC 61000-4-3
COMPLIANCE LEVEL: 385 MHz (27 V/m); 450, 810, 870, 930, 1720, 1845, 1970, 2450 MHz (28 V/m); 710, 745, 780, 5240, 5500, 5785 MHz (9 V/m)

WARNING
Portable RF communications equipment (including peripherals such as antenna cables and external antennas) should be used no closer than 30 cm (12 in.) to any part of your Kanso Sound Processor, including cables specified by the manufacturer. Otherwise, degradation of the performance of this equipment could result.

NOTE 1: At 80 MHz and 800 MHz, the higher frequency range applies.

NOTE 2: These guidelines may not apply in all situations. Electromagnetic propagation is affected by absorption and reflection from structures, objects and people.

NOTE 3: If abnormal performance is observed, additional measures may be necessary, such as reorienting or relocating the Kanso Sound Processor.

Equipment classification

Your sound processor is internally powered equipment Type B applied part as described in the international standard IEC 60601-1:2005/A1:2012, Medical Electrical Equipment – Part 1: General Requirements for Basic Safety and Essential Performance.

Radio compliance for Japan

This device is granted pursuant to the Japanese Radio Law (電波法).

This device should not be modified (otherwise the granted designation number will become invalid).

R 202-LSD088

Radio compliance for Korea

1. Equipment name/model name:
   특정소출력 무선기기(무선데이터통신시스템용 무선기기) / CP950
2. Registration number: MSIP-CRM-COH-CP950
3. Company name: Cochlear Limited
4. Manufactured date: 2015
5. Manufacturer/Country of Origin:
   Cochlear Limited/Australia

WARNING
This radio equipment has the possibility of radio interference during operation.

This equipment is suitable for electromagnetic equipment for home (Class B) and it can be used in all areas.

FCC (Federal Communications Commission) and Canadian IC compliance

This device complies with part 15 of the FCC Rules and with RSS-210 of Industry Canada. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications made to this equipment not expressly approved by Cochlear Limited may void the FCC authorisation to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

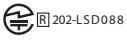
- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet or a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC ID: WTO-CP950
IC: 8039A-CP950
CAN ICES-3 (B)/NMB-3(B)

Labelling symbols

The following symbols may appear on your processor or remote components and/or packaging:

	Refer to instruction manual
	Specific warnings or precautions associated with the device, which are not otherwise found on the label
	Manufacturer
M/N	Model number
	Authorised representative in the European Community
	Catalogue number
	Serial number
	Batch code
	Date of manufacture
	Use by date
	Temperature limits
	CE registration mark with notified body number

	Radio compliance certification for Australia and New Zealand
	Radio compliance certification for Japan
	Radio compliance certification for Korea
Rx Only	By prescription
	Recyclable material
	Dispose of electrical components in accordance with your local regulations
	Type B applied part
IP54	Ingress Protection Rating • Protected against failure from dust penetration • Protected against failure from splashing with water

Cochlear implant compatibility

The Kanso Sound Processor is compatible with the following Nucleus Cochlear Implants:

- CI24M and CI24M Double array,
- CI24R (CA), CI24R (ST), and CI24R (CS),
- CI24RE Series: CI24RE (CA), CI24RE (ST), CI24RE Hybrid™ L24* and CI422,
- CI500 Series: CI512, CI522, and CI532.

* The Cochlear Nucleus Hybrid acoustic component is not compatible with the Kanso Sound Processor. Recipients of the Nucleus Hybrid Implant will be unable to use the acoustic component in conjunction with the Kanso Sound Processor. For this reason, the Kanso Sound Processor is not intended to be used by Hybrid L24 Cochlear Implant recipients who receive benefit from the acoustic component.

Privacy and the collection of personal information

During the process of receiving a Cochlear device, personal information about the user/recipient or their parent, guardian, carer and hearing health professional will be collected for use by Cochlear and others involved in care with regard to the device.

For more information please read Cochlear's Privacy Policy on *www.cochlear.com* or request a copy from Cochlear at the address nearest you.

Legal statement

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

Notes

Hear now. And always

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