



OPERATING INSTRUCTIONS

SIR 320

Infrared Multi-Channel Receiver

Printed in Germany

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About this manual

Symbols

The meaning of the symbols and fonts used in this manual:



Indicates an important note, if not minded, the functionality of the unit, the security of your data, or your health are put at risk. Taking special care when you see this symbol as indicates important information!



Supplementary information, remarks, and tips follow this symbol.



Text which follows this symbol describes activities that must be performed in the order shown.

Texts in **bolded** letters require your special attention.



This product conforms to the rules of the following European regulations:
89/336/EWG

Council directive to the alignment of the rules, of rights of all member states about the electromagnetic compatibility, adapted through RL 91/263/EWG, 92/31/EWG and 93/68/EWG of the council. Further information is available on request.



! CAUTION !



YOU SHOULD PAY ATTENTION TO THE FOLLOWING SAFETY INSTRUCTIONS!

Before setting receivers with rechargeable batteries into operation:



As soon as the rechargeable batteries are inserted in the receivers, these have to be charged **immediately** and **completely** in the designated SIR C 50 Charging Tray (equipped with Original beyerdynamic power supply).



Remember: Receivers not charging about 2 or 3 month will result in total discharge. This will cause the destruction of the rechargeable batteries! Therefore total discharged or defective rechargeable batteries will not be longer charged and have to be exchanged. In such a case you only may insert a new set of rechargeable batteries.



We recommend charging the rechargeable batteries every month for approx. 8 hours.

Important tips

General information

Please read this manual carefully before starting operation. Keep this manual together with the units. If you pass on the units to other parties, please include this manual.

To avoid damages of the receiver please read the following tips for the use with disposable or rechargeable batteries carefully!



Don't use disposable and rechargeable batteries together in one receiver!
You will invalidate the warranty and damage the receiver.



In no case it is allowed to charge receivers with disposable batteries! They can leak or even explode.

Changing of batteries



When changing the batteries the receiver may stop reacting. In this case please carry out a hardware reset. (See paragraph Operation > Hardware reset)



The warranty invalidates, if you cause (generate, precipitate) inappropriate use or handling of the unit.

Safety information



Over prolonged period the unit should not be used at the maximum volume setting (value 15). Prolonged exposure to high sound pressure levels might damage your hearing!



The used headphones may not cross a sound pressure of 100dB SPL at max. adjusted volume value!
Preferably use the headphones indicated by us.



Take care in the use of the lanyard!

Attention! – Polarity



During insertion of new disposable/rechargeable batteries take care of the correct polarity. Wrongly inserted batteries will cause malfunctions. Wrongly inserted batteries can leak and destroy the equipment.

SIR 320 Infrared Multi-channel Receiver

Congratulations on buying the SIR 320 infrared receiver from beyerdynamic! You have invested in reliably conference equipment.

The SIR 320 multi-channel receiver uses the same standards and protocols, which govern all other beyerdynamic infrared transmission systems; this allows operation with other manufactures equipment operating to the same standards. The built-in PLL- (Phase-locked-loop) synthesiser guarantees a high sensitivity as well as good reception.

The new generation of the SIR receivers allows use in direct sunlight, e.g. outside or in places where normal infrared-reception would nearly be impossible due to high light intensity, as experienced at press conferences, on stages, etc.

Together with other system components the receiver enables wireless audio transmission.

Contents of basic delivery

- **SIR 320** Infrared Receiver Order # 484.539
- **Battery cover** incl. screw - fixed to receiver
- **Carrying clip** incl. spring - fixed to receiver

Accessories

- **DT 1** Single-sided headphone, 32 ohms,
cable length 0.8 m Order # 471.399
- **DT 2** Headphone, 16 ohms,
cable length 0.8 m Order # 471.437
- **DT 3** Neckworn headphone, 64 ohms,
cable length 0.8 m Order # 484.571
- NiMH –rechargeable batteries
(3 batteries are needed per receiver)..... Order # 484.504
- **SIR C 50** Transport case for SIR 320 receivers
incl. power supply, 230 V Order # 484.547

System components

The SIR 320 receiver operates as a single component in a wide system; a complete SIR language distribution system also requires the following components:

IR-transmitter e.g. SIR 800 (to modulate audio input)

IR-radiator e.g. SIR 801 (to transmit modulated audio by infrared light)

IR-receiver SIR 320 with headphone (to receive infrared light and convert to audio output)

Technical data

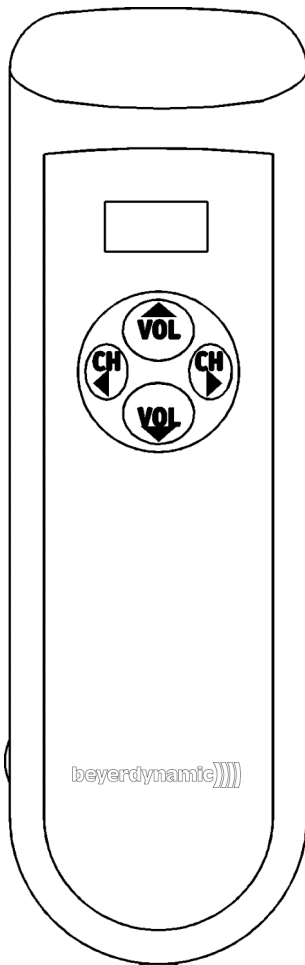
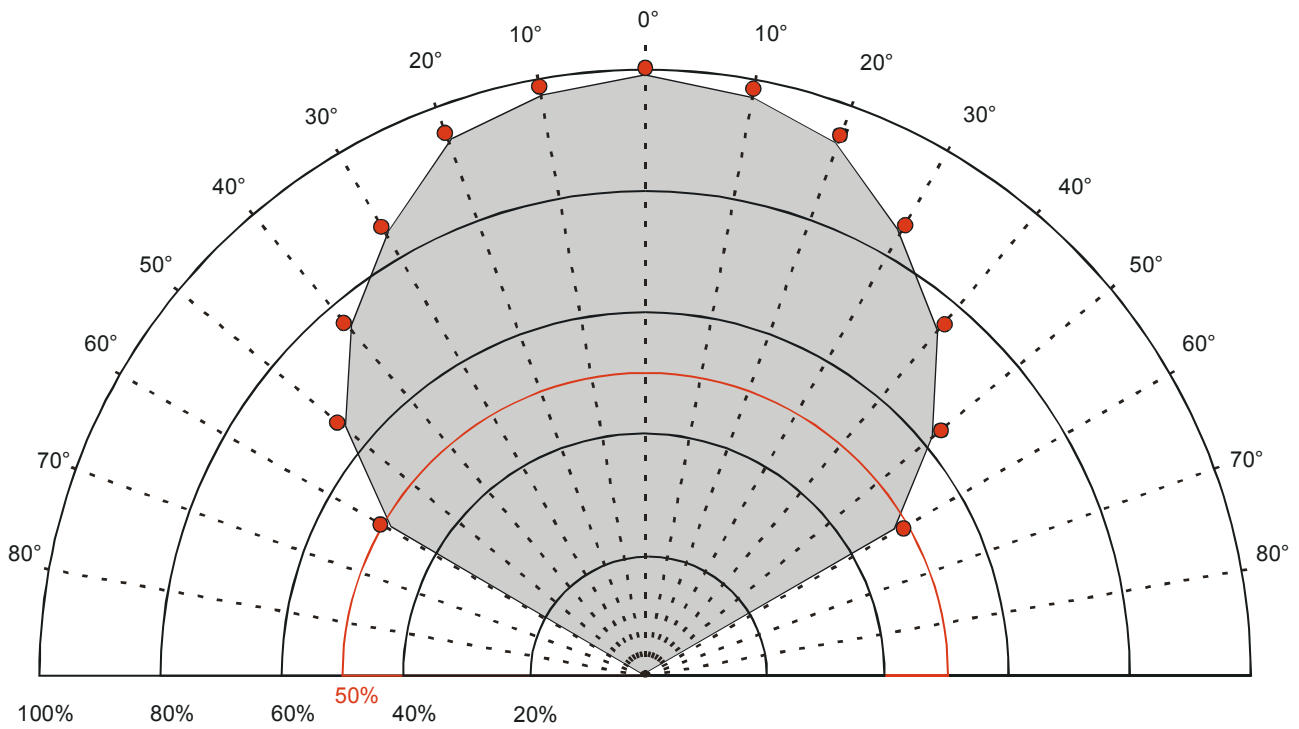
Complies with standards **IEC 914** and **IEC61603-3** (in normal operation)

Number of channels:	up to 32 (in dependence of type) regarding IEC 61603-2 and IEC 61603-7
Modulation:	FM
Transmission frequencies:	55 kHz - 1335 kHz in 40 kHz pattern for OR - Ch31
Intermediate frequency:	455 kHz
Operating mode:	Superhet receiver with PLL Synthesizer
Angle of reception:	120° horizontal / 100° vertical
Frequency response:	125 - 8.000 Hz
Distortion factor:	< 2 %
Signal / Noise ratio:	> 55 dB
Headphone socket:	3,5mm (DIN 455838)
Headphone impedance:	32 - 600 Ohm
Operating voltage:	3.6 ... 4.5 Volts
Power supply:	3 x rechargeable batteries NiMH 1.2V / 750 mA/h (AAA) or 3 x disposable batteries 1,5V (AAA)
Operating time	up to 75 hours (rechargeable batteries) up to 120 hours (disposable batteries)
Display:	seven-segment 2 digit LCD (L iquid C rystal D isplay) back lighted (white text / black ground)
Test functions:	Battery voltage and IR-field strength via LCD
Temperature range:	(operating) +10°C ... +40°C (storage) -20°C ... +50°C
Humidity:	< 80%, not condensed
Size:	150 x 50 x 25 mm
Housing:	ABS-plastic, grey
Weight:	approx. 150g (incl. batteries)

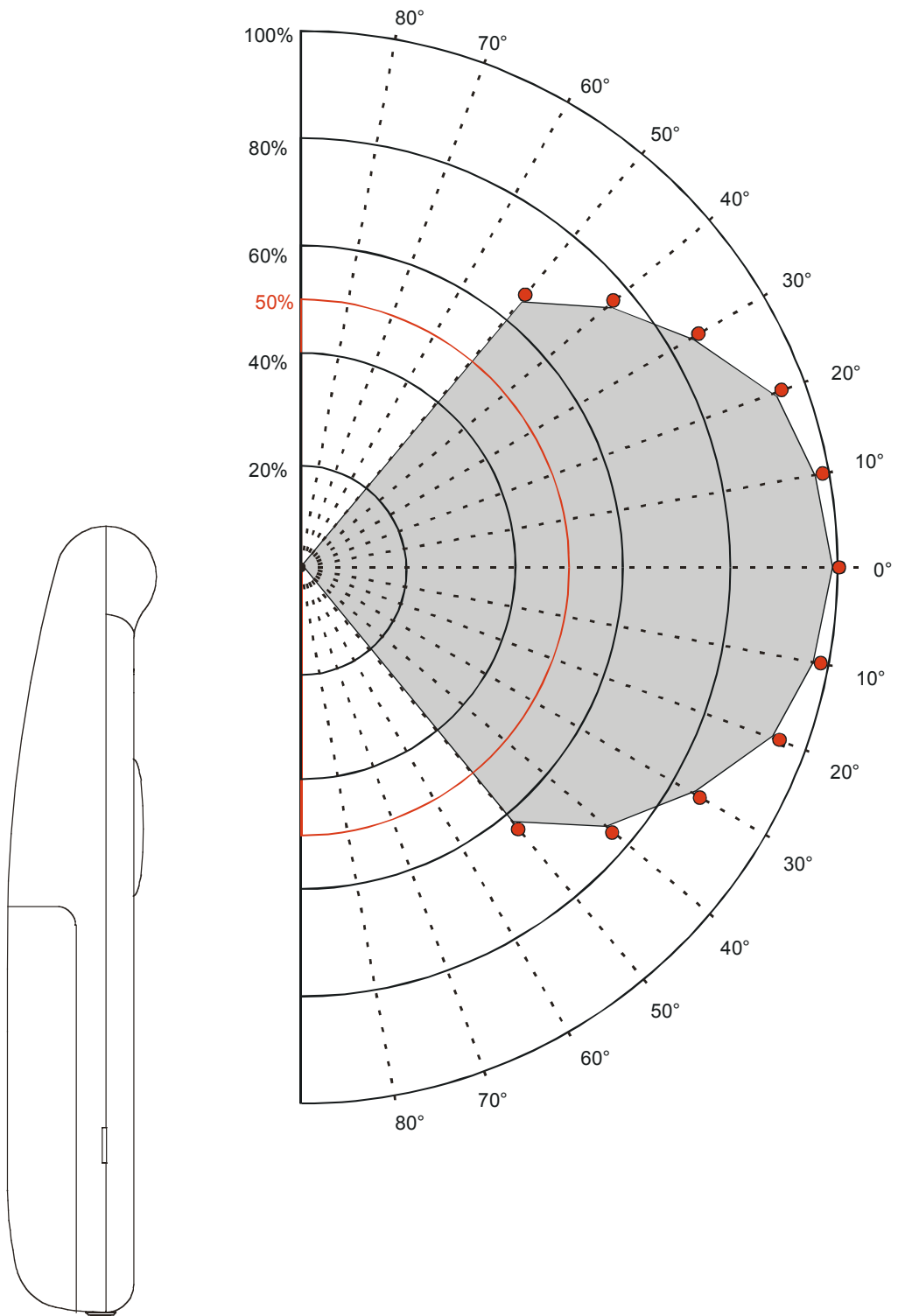
Characteristics of reception

Horizontal

120° (+ / - 60°)

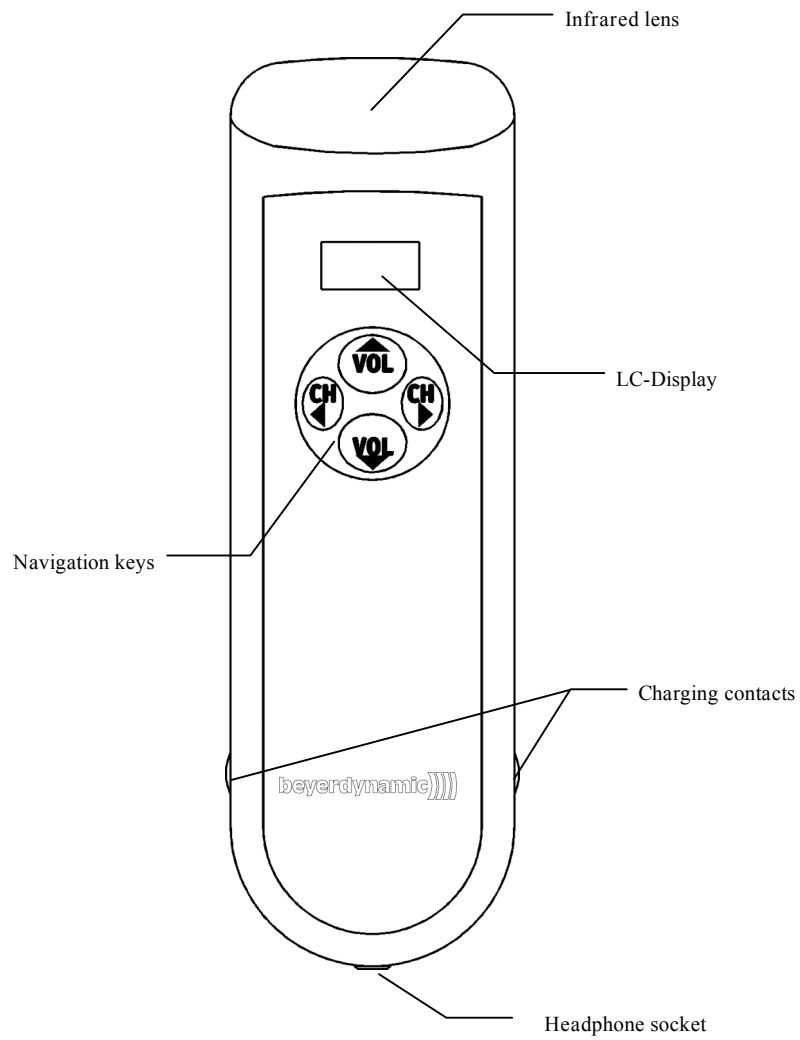


Vertical
100° (+ / - 50°)



Operating controls

Front view



Infrared lens

... for receiving of infrared signals.



Note: To avoid disturbances the IR-lens should not be covered!

LC-Display

The LCD (Liquid Crystal Display) is a seven-segment display (two digits) and gives information on different functions and the condition of the receiver.

The following list is a key to the information that can be displayed.

Normal operation display

- 00** Original channel (unshifted) (Default display is the channel selection)
 - 01 ... 31** channels 01 to 31 (Default display is the channel selection)
 - or** Original channel (shifted)
 - `00 ... `15** Volume setting
- (Only displayed when volume button depressed, display reverts to channel display after 3 seconds)

Service Mode display

- SE** Service mode, flashes alternately with a two-digit number 'XX', indicating the firmware version.
- XX** Two-digit number 'XX', indicating the firmware version, e.g. 26 (Version 2.6)
- bA** Battery status, flashes alternately with a two-digit number
- 43** Two-digit number, flashes alternately with bA (battery status), the number shows battery status, '43' = 4.3 V (operating voltage)
- rF** Display of the IR field-strength, flashes alternately with two letters indicating IR field-strength Lo, no, Hi and the channel number. IR field-strength of other channels can be checked by pressing "VOL ▲" or "VOL ▼".
- Lo** Lo (Low), IR field-strength less than 28 dBa
- no** no (Normal), IR field-strength between 30 and 40 dBa
- Hi** Hi (High), IR field-strength higher than 40 dBa
- XX** Two-digit number 'XX', indicating the channel number (flashes alternately with rF)
- `GU** Guard module is installed and activated (changing is not possible)
- P1 ... P3** Factory test settings (test only)
- Ur** Muting, Default = ON
- SH** Channel Shift, Default = OFF
- En / nd** (flashes alternately) End of menu in service mode and exit point.
 - exit with "CH ▶" or "VOL ▲" or "VOL ▼"
 - or with hardware reset
 - or automatically after 120sec.

Navigation keys

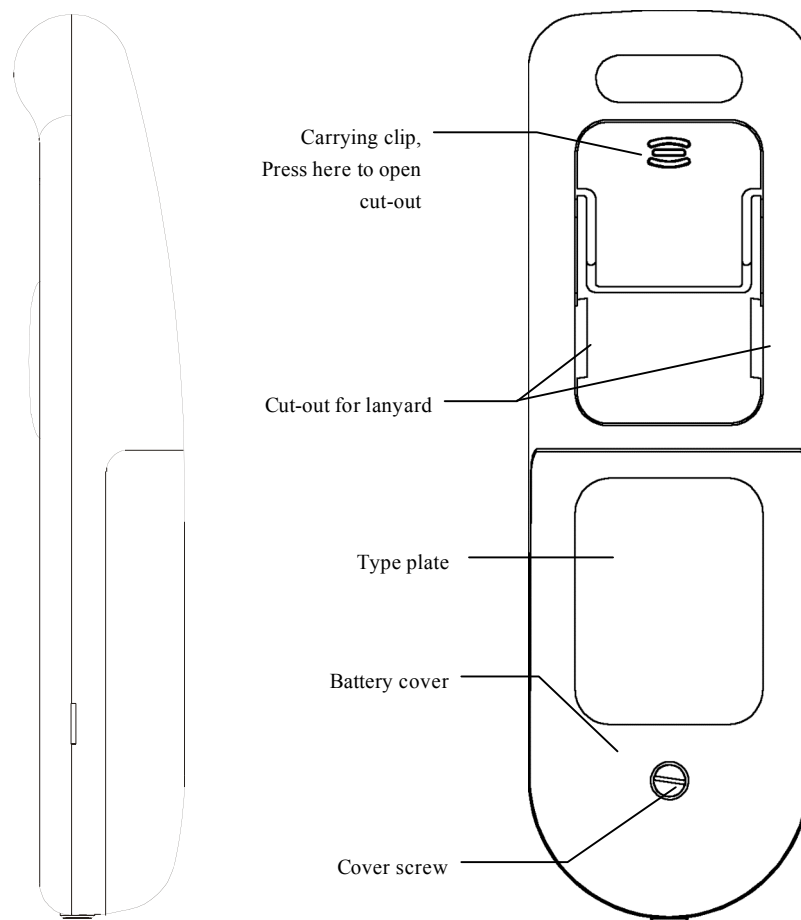
- (VOL ▲) Volume up
- (VOL ▼) Volume down
- (CH ◀) Channel up
- (CH ▶) Channel down

Charging contacts

The charging contacts will be used to recharge the receiver. Therefore the receiver must be equipped with rechargeable batteries and the storage tray has to be connected to the power supply (see accessories).


Headphone socket

... for connecting a dedicated headphone (see accessories).

Side- / Rear view**Carrying clip**

There are different ways to “wear” the receiver. The built-in clip allows secure fastening to your shirt or jacket pocket. The clip is not intended using at a belt; this could obscure the lens from the IR signal. Another way is to use the lanyard wearing the receiver around your neck.

Lanyard

 The lanyard should pass through both cut-out positions in the carrying clip on the rear of the receiver, so allowing the clip lying flush to the body of the receiver. In the event of the lanyard being pulled, the carrying clip will release from the receiver housing, this is a designed safety function. The clip’s spring is secured to the clip to prevent loss. If the clip becomes detached it is easily pushed back into place.

Battery cover

... for covering the battery tray. To remove the battery cover the cover screw must be released. The screw is retained in the battery cover and cannot be lost. (Further hints see batteries / rechargeable batteries)

Operation

Starting the receiver

To start the receiver, just press one of the buttons on the navigation pad. The receiver will now display for a short time the firmware version number and then the last selected channel number. The back light of the display will high light for approx. 3 sec. and then switch automatically off to low light to conserve battery power.

Channel selection is via the navigation pad, press “CH ◀” (to decrease) or “CH ▶” (to increase). The display shows the selected channel. During the channel selection the audio signal will be muted. If the buttons are held down when pressed, you can scroll through the channels more quickly.



Channel display

The display shows the selected channel. When switched off the last selected channel will be stored and the receiver will default to that channel when switched on again.



Display of the Original channel



In case of using Shift Mode with a 32-channel receiver, the channel display can switch up to channel 38; however the IR- transmission is supported up to channel 31. This means that the maximum number of channels that can be used in Shift mode will be 25 (OR+24). Shift mode is a channel offset by a factor of 7 and is selected when interference is experienced with switched energy saving lamps. In case of interference the disturbances are audible up to channel 5 or 6. The interference comes from the first, second, and third harmonic of the lighting system. Adjustment to Shift mode – if required - will be made by the installing company or from an authorised technician.



Display of the Original channel in “Shift Mode”

Volume control / memory function



The volume control is adjusted by “VOL▲” and “VOL▼”. During volume adjustment a dot will appear in the top left hand corner of the display to differentiate between volume and channel selection (without dot).

The minimum volume is displayed as “00”; maximum volume is displayed as “15”. The factory default setting is “01”. After use the receiver keeps its last settings. When used again the receiver defaults to these settings. This applies not only to the volume but also to the channel selection. When the volume settings are “00” or higher than “08” the receiver automatically reverts to the factory default setting of, “01” after switch-off.

This allows the next user to initially hear the audio signal and to protect the users hearing during switch-on.



The volume should not be at the maximum value (“15”) over a long period as this may affect or damage your hearing.



The receiver has an automatic gain control, which protects it from strong signals within a short distance of the IR radiator panel. A too wide distance between the IR radiator and receiver will result in background noise. An optimised IR radiator installation guarantees a good distribution of the IR-signal, resulting in reception without background noise.

Auto Switch-off function

The following will cause the receiver to switch off automatically:

- after approx. 15sec., when no headphone is connected
or
- after approx. 60sec., when no infrared signal is received
or
- directly, when you put it out of the charging tray

Disposable / rechargeable batteries

The receiver was designed to meet the demands of different power supplies. It is equipped with charging contacts and charging regulators are integrated. This gives the advantage to use the receiver with disposable or rechargeable batteries (NiMH – types).

Disposable batteries

Type: VARTA Electric Power V8003
Size: LR03, AAA
Number: 3 pcs.

Rechargeable batteries

Type: SANYO HR-4U
Size and number as before.



Attention!

Do not use disposable and rechargeable batteries within the same receiver! Otherwise you will invalidate the warranty and damage the receiver itself.



Attention! – Polarity

During insertion of new disposable/rechargeable batteries take care of the correct polarity. Wrongly inserted batteries will leak and damage the equipment.



Charging of the receivers

Take care that you **recharge receivers fitted with rechargeable batteries only** in combination with the charging tray. Receivers with disposable batteries must not be recharged! Attempts to do so will invalidate the warranty and damage the receiver.

If the battery tray is empty you should only put in the receiver in the charging trays when no power supply is connected. The receiver can be damaged!



Battery status (Battery voltage)

The battery status can be checked within the Service-mode (SE). Exchange exhausted batteries as soon as possible; exhausted batteries should not be left in the receiver!

Min./Max. Battery voltage for disposable batteries: 3.3V – 4.5V

Min./Max. Battery voltage for rechargeable batteries: 3.9V – 4.2V



Changing of batteries

When changing the batteries the receiver may stop reacting. In this case please carry out a hardware reset.

(See paragraph Operation > Hardware reset)



Important!

Please remember: Exhausted batteries should not be thrown into the domestic waste! Handle the batteries as hazardous waste and dispose it in accordance with the instructions to product recycling!

Service mode

The service mode is useful to check the receiver-settings or adjust the receiver to special parameters needed like:

- Check of firmware version
- Check of battery voltage
- Measurement of IR field-strength
- Display of factory test settings
- Activating/deactivating of muting
- Activating/deactivating of shift-mode

Activation of the service mode



The “CH ◀” and the “CH ▶” key must be pressed simultaneously for about 5 sec.



Service mode activated



Display of version (e.g. 3.0)

You will see “SE” within the display: starting point for adjustments.

“SE” flashes within the display, alternating with the version number of the firmware (e.g. 24 or higher).

By repeatedly pressing the “CH ◀” or “CH ▶” key you can scroll through the Service mode for further activities.

The structure is as follows:

- SE**
- └ **bA** Battery voltage
- └ **rF** Hi / no / Lo and channel number
- └ **GU** Guard installed
- └ **P1**
- └ **P2**
- └ **P3**
- └ **UΓ** oF / On
- └ **SH** oF / On and channel number
- └ **En / nd** (End)

Battery voltage



In service mode press “CH ▶” to check the battery voltage.



The battery voltage can be read alternately with the sign “bA” and a two-digit number. The display should be interpreted as follows: voltage is e.g. “38” this equates to 3.8 Volts.

Min./Max. battery voltage:
Disposable batteries 3.3V – 4.5V
Rechargeable batteries 3.9V – 4.2V

Display of battery check (bA)

IR-field strength



Press “CH ▶” again to scroll to the IR-field strength meter “rF” will be displayed alternately with “Hi” (high), “no” (normal) or “Lo” (low) and the last chosen channel number (2-digit).

For instance: (rF.....Hi.....rF..... Hi.....rF.....01.....rF.....Hi.....)

The IR-field strength of other channels can be checked by pressing “VOL ▲” or “VOL ▼”.

Low: Field strength lower than 28 dBA
Normal: Field strength between 30 and 40 dBA
High: Field strength higher than 40 dBA



Display of the IR-field strength (rF)



Signal > 40 dBA

IR-field strength „Hi“ (optimum reception)



If muting is activated and the IR-field strength is lower than 20dBA, the audio signal will be automatically switched off.

Guard function (option)



Press “CH ▶” to scroll to the Guard test function “GU” can be displayed.



If the Guard-module is installed and the menu item is activated it can be checked by pushing “VOL ▲”. The Guard signal will switch on for a period of 5 sec. You can hear a clear non continuous peeping sound. If no sound is heard either the Guard module is not installed or another problem is occurred. Pushing “VOL ▼” will stop the test immediately.

Display if GUARD Module is installed

System parameters P1, P2, P3



Press “CH ▶” to scroll to the system parameters “P1, P2, P3”.

The displayed values are for testing purposes only and can not be modified.

Muting



Press “CH ▶” to scroll to “UF”.



This function means muting of the audio signal in the infrared field if there is a weak signal e.g. less than 20 dBA field strength (reasonable values are 36-43 dBA field strength). The muting function is normally on (factory default), you may see that at the display with the letters “on”. Deactivation (“oF”) can be made with “VOL ▼” key, activation (“on”) via “VOL ▲” key.

Display of the Muting function

Channel shift



Press “CH ▶” to scroll through to “SH”.



The Shift mode is identified with “SH” and is normally in the off-position (factory default), displayed as “oF”. To activate the Shift mode push the “VOL ▲” key, for deactivate push the “VOL ▼” key. This offsets reception frequencies by 7 channels to a higher channel position. This shifting avoids interference from lighting systems. After activation the original floor language will be displayed as “or” instead of “00”.

Display of Shift mode

Exit the service mode



Press “CH ▶” to scroll to “En” flashing alternately with “nd” in the display. At this position you can leave the Service mode by pressing the “VOL▲”, “VOL▼” or “CH ▶” key. The IR- receiver will return to the newly adjusted settings in the operation mode.



The display back light illuminates and the display itself shows the version number and afterwards turns back to the starting channel.

Display of Exit service mode



If you do not leave the Service mode as described above, the receiver will return after approx. 2 minutes automatically to the normal operation mode and all settings will be stored.

Hardware reset

In case the receiver fails to respond to button push please carry out a hardware reset to factory default settings. The hardware reset brings back all factory defaults and is activated by the keys “VOL▲” and “VOL▼” simultaneously.

Behaviour in the charging tray

In the charging tray (SIR C 50) the receiver shows “bA” alternating with “XX” (battery voltage) in the display e.g. 37.

If you take out the receiver from the charging tray the receiver switches off itself.

If you put the receiver in the charging tray, it switches directly into the charging mode. Display: “bA” and “XX” (battery voltage) alternately

Trouble shooting

Fault	Possible reason	Action
No sound at headphone	Headphone not connected	Plug in headphone
No sound at headphone	Receiver not switched-on	Push one button at the navigation dial with headphone connected
No sound at headphone	Display at the receiver not lighting after switching on. Batteries not inserted, empty or weak.	Insert new batteries and carry out a hardware reset
Receiver can not be switched-on	Undefined working order	Carry out a hardware reset
After switching-on, the back light is shining only, no further keystroke is possible	Undefined working order	Carry out a hardware reset
Receiver gets noise at the headphone only	No IR - reception	Switch on IR-transmitter
Receiver gets noise at the headphone only	No IR - reception	Connect the radiators with active IR-transmitter
Receiver gets noise at the headphone only	No IR - reception	Change IR-channel to other position
Receiver gets noise at the headphone only	Selected IR-channel has no transmission	Check IR-transmitter using correct adjustment
Receiver gets noise at the headphone only	Receiver is in Shift mode setting (instead displaying „00“ (OR-ch) you will see „or“	Deactivate the Shift mode (See Service mode)
No sound at headphone	Volume to low	Adjust volume (VOL up)
No sound at headphone	Wrong headphone used	Use the correct headphone (see accessories)
Receiver switched off after approx. 15 sec.	No reception signal	Check whether the IR-transmitter and the radiators are switched-on
Receiver switched off after approx. 15 sec.	Reception channel will not be transferred from IR-transmitter	Change channel setting (channel up or down)

Table of frequencies and channels

For normal and shift operation for each receiver version:

32 channel receiver SIR 320

Normal operation			Shift operation		
Channel	Frequency	LC-Display	Channel	Frequency	LC-Display
K0	55 kHz	00	K7	335 kHz	or
K1	95 kHz	01	K8	375 kHz	01
...
K31	1335 kHz	31	K31 (K38)	1615 kHz	24(31)



Remark: The intermediate frequency is 455 kHz

Warranty

beyerdynamic GmbH & Co. KG provides you with two years' guarantee on brand-new devices from the date of purchase. Please save your sales receipt and this guarantee supplement. Without this proof repairs can fundamentally only be carried out for a charge. The guaranteeing includes materials and working time for the elimination of demonstrable defects in material or workmanship. The guarantee claim is void in the case of operating errors, improper operation, electric and mechanical damage, as well as in the case of improper repairs by unauthorised workshops.

Excluded from the guarantee claim are batteries and rechargeable batteries included in the delivery, as well as parts that are subject to natural wear and tear during usage, such as connecting cables, ear cups, headband pads, etc.

The guarantee can be claimed in all countries in which legal provisions do not stand in the way of the guaranteeing.

Valid in all countries in addition to the legal provisions are the guarantees provided by beyerdynamic sales locations.

beyerdynamic rejects any guarantee, if the safety label with the serial number is removed.

beyerdynamic declares itself to agree to exchange or repair defective components due to faulty materials or manufacturing, dependent on following procedure:

1) The client declares that the fault is not due to empty, discharged, wrongly inserted, or faulty batteries.

2) You may send the defective product to:

beyerdynamic GmbH Service & Logistik Center
August-Häußer-Str. 9
D-74080 Heilbronn
Germany

3) Should it turn out that the fault was caused through inattentiveness or inappropriate use, the service and shipping charges will be added to the clients account.

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