

CPC**COOPERATIVE PATENT CLASSIFICATION****H04R****LOUDSPEAKERS, MICROPHONES, GRAMOPHONE PICK-UPS OR LIKE ACOUSTIC ELECTROMECHANICAL TRANSDUCERS; DEAF-AID SETS; PUBLIC ADDRESS SYSTEMS** (generating

mechanical vibrations in general [B06B](#); transducers for measuring particular variables [G01](#); transducers in clocks [G04](#); producing sounds with frequency not determined by supply frequency [G10K](#); transducers in recording or reproducing heads [G11B](#); transducers in motors [H02](#))

NOTE

This subclass covers :

- loudspeakers, microphones, {acoustic} transducers {therefor} producing acoustic waves or variations of electric current or voltage, or gramophone pick-ups;
- arrangements actuated by variations of electric current or voltage for cutting grooves in records;
- circuits for the above-mentioned {loudspeakers, microphones, acoustic transducers, gramophone pick-ups or} arrangements;
- monitoring or testing {of the above-mentioned loudspeakers, microphones, acoustic transducers, gramophone pick-ups or arrangements}

H04R 1/00**Details of transducers, {loudspeakers or microphones}****H04R 1/005**

- {using digitally weighted transducing elements}

H04R 1/02

- Casings; Cabinets; {Supports therefor;} Mountings therein ([H04R 1/28](#) takes precedence; {attachments for microphones [H04R 1/08](#); mounting of transducers in earpieces [H04R 1/1075](#)})

H04R 1/021

- • {incorporating only one transducer}

H04R 1/023

- • {Screens for loudspeakers}

H04R 1/025

- • {Arrangements for fixing loudspeaker transducers, e.g. in a box, furniture}

H04R 1/026

- • {Supports for loudspeaker casings}

H04R 1/028

- • {associated with devices performing functions other than acoustics, e.g. electric candles}

H04R 1/04

- • Structural association of microphone with electric circuitry therefor ([in deaf-aid sets \[H04R 25/00\]\(#\)](#))

H04R 1/06

- Arranging circuit leads; Relieving strain on circuit leads

H04R 1/08

- Mouthpieces; {Microphones;} Attachments therefor

H04R 1/083

- • {Special constructions of mouthpieces}

H04R 1/086

- • • {Protective screens, e.g. all weather or wind screens}

H04R 1/10

- Earpieces; Attachments therefor; {Earphones; Monophonic headphones ([H04R 1/28](#) takes precedence; stereophonic headphones [H04R 5/033](#))}

NOTES

1. This group covers details of headphones, both of monophonic and stereophonic type.

H04R 1/10
(continued)

2. When classifying in this group or in its subgroups, aspects relating to stereophonic headphones are to be classified in [H04R 5/033](#) as well
- H04R 1/1008 . . {Earpieces of the supra-aural or circum-aural type}
 - H04R 1/1016 . . {Earpieces of the intra-aural type}
 - H04R 1/1025 . . {Accumulators or arrangements for charging (secondary cells per se [H01M 10/00](#); charging in general [H02J 7/00](#))}
 - H04R 1/1033 . . {Cables or cables storage, e.g. cable reels (cord reels per se [H02G 11/02](#); arrangements for storing and repeatedly paying-out and re-storing lengths of conductors or cables [B65H 75/34](#); extensible conductors or cables, e.g. self-coiling cords [H01B 7/06](#))}
 - H04R 1/1041 . . {Mechanical or electronic switches, or control elements (switches in general [H01H](#))}
 - H04R 1/105 . . {Earpiece supports, e.g. ear hooks (for stereophonic headphones [H04R 5/0335](#))}
 - H04R 1/1058 . . {Manufacture or assembly}
 - H04R 1/1066 . . . {Constructional aspects of the interconnection between earpiece and earpiece support (earpiece support for monophonic headphones [H04R 1/105](#); earpiece support for stereophonic headphones [H04R 5/0335](#))}
 - H04R 1/1075 . . . {Mountings of transducers in earphones or headphones}
 - H04R 1/1083 . . {Reduction of ambient noise (active noise reduction per se [G10K 11/175](#); protective devices for the ear, e.g. providing acoustic protection [A61F 11/06](#))}
 - H04R 1/1091 . . {Details not provided for in groups [H04R 1/1008](#) to [H04R 1/1083](#)}
 - H04R 1/12 . Sanitary or hygienic devices for mouthpieces or earpieces, e.g. for protecting against infection
 - H04R 1/14 . Throat mountings for microphones
 - H04R 1/16 . Mounting or connecting stylus to transducer with or without damping means
 - H04R 1/18 . . Holders for styli; Mounting holders on transducers
 - H04R 1/20 . Arrangements for obtaining desired frequency or directional characteristics (for stereophonic purpose [H04R 5/00](#))
 - H04R 1/22 . . for obtaining desired frequency characteristic only (circuit for combining transducers having different responses [H04R 3/00](#) {for hearing aids [H04R 25/407](#)})
 - H04R 1/222 . . . {for microphones ([H04R 1/24](#), [H04R 1/26](#) take precedence)}
 - H04R 1/225 . . . {for telephonic receivers}
 - H04R 1/227 . . . {using transducers reproducing the same frequency band}
 - H04R 1/24 . . . Structural combinations of separate transducers or of two parts of the same transducer and responsive respectively to two or more frequency ranges
 - H04R 1/245 {of microphones}
 - H04R 1/26 . . . Spatial arrangements of separate transducers responsive to two or more frequency ranges
 - H04R 1/265 {of microphones}

H04R 1/28	. . .	Transducer mountings or enclosures modified by provision of mechanical or acoustic impedances, e.g. resonator, damping means {(combinations of transducers with horns, i.e. front-loaded horns H04R 1/30)}
H04R 1/2803	. . . .	{for loudspeaker transducers}
H04R 1/2807	. . . .	{Enclosures comprising vibrating or resonating arrangements (for the reduction of undesired resonances or vibrations H04R 1/2869)}
H04R 1/2811	. . . . .	{for loudspeaker transducers}
H04R 1/2815	. . . . .	{of the bass reflex type}
H04R 1/2819	. . . . .	{for loudspeaker transducers}
H04R 1/2823	. . . . .	{Vents, i.e. ports, e.g. shape thereof or tuning thereof with damping material (number or position of ports H04R 1/2815 ; vents in bandpass type enclosures H04R 1/2846)}
H04R 1/2826	. . . . .	{for loudspeaker transducers}
H04R 1/283	. . . . .	{using a passive diaphragm}
H04R 1/2834	. . . . .	{for loudspeaker transducers}
H04R 1/2838	. . . . .	{of the bandpass type}
H04R 1/2842	. . . . .	{for loudspeaker transducers}
H04R 1/2846	. . . . .	{Vents, i.e. ports, e.g. shape thereof or tuning thereof with damping material (number or position of ports H04R 1/2838 ; vents in bass reflex type enclosures H04R 1/2823)}
H04R 1/2849	. . . . .	{for loudspeaker transducers}
H04R 1/2853	. . . . .	{using an acoustic labyrinth or a transmission line}
H04R 1/2857	. . . . .	{for loudspeaker transducers}
H04R 1/2861	. . . . .	{using a back-loaded horn}
H04R 1/2865	. . . . .	{for loudspeaker transducers}
H04R 1/2869	. . . . .	{Reduction of undesired resonances, i.e. standing waves within enclosure, or of undesired vibrations, i.e. of the enclosure itself}
H04R 1/2873	. . . . .	{for loudspeaker transducers}
H04R 1/2876	. . . . .	{by means of damping material, e.g. as cladding (damping material for tuning desired resonances H04R 1/2807 , e.g. in vents H04R 1/2823 , H04R 1/2846)}
H04R 1/288	. . . . .	{for loudspeaker transducers}
H04R 1/2884	. . . . .	{by means of the enclosure structure, i.e. strengthening or shape of the enclosure (by means of Helmholtz resonators H04R 1/2869)}
H04R 1/2888	. . . . .	{for loudspeaker transducers}
H04R 1/2892	. . . . .	{Mountings or supports for transducers}
H04R 1/2896	. . . . .	{for loudspeaker transducers}
H04R 1/30	. . .	Combinations of transducers with horns, e.g. with mechanical matching means {, i.e. front-loaded horns} (horns in general G10K ; {transducer enclosures or mountings using a back-loaded horn H04R 1/2861 ; application of horns as guiding means to obtain a predetermined directivity characteristic H04R 1/345)}
H04R 1/32	. .	for obtaining desired directional characteristic only {(specially adapted for hearing aids H04R 25/40)}
H04R 1/323	. . .	{for loudspeakers (H04R 1/34 and H04R 1/40 take precedence)}

- H04R 1/326 . . . {for microphones ([H04R 1/34](#) and [H04R 1/40](#) take precedence)}
- H04R 1/34 . . . by using a single transducer with sound reflecting, diffracting, directing or guiding means {(specially adapted for hearing aids [H04R 25/402](#))}
- H04R 1/342 {for microphones}
- H04R 1/345 {for loudspeakers}
- H04R 1/347 {for obtaining a phase-shift between the front and back acoustic wave}
- H04R 1/36 by using a single aperture of dimensions not greater than the shortest operating wavelength
- H04R 1/38 in which sound waves act upon both sides of a diaphragm and incorporating acoustic phase-shifting means, e.g. pressure-gradient microphone
- H04R 1/40 . . . by combining a number of identical transducers {(specially adapted for hearing aids [H04R 25/405](#))}
- H04R 1/403 {loud-speakers}
- H04R 1/406 {microphones}
- H04R 1/42 . . Combinations of transducers with fluid-pressure or other non-electrical amplifying means
- H04R 1/44 . . Special adaptations for subaqueous use, e.g. for hydrophone
- H04R 1/46 . . Special adaptations for use as contact microphones, e.g. on musical instrument, on stethoscope ([throat mountings H04R 1/14](#))

H04R 3/00**Circuits for transducers {, loudspeakers or microphones}**

- H04R 3/002 . {Damping circuit arrangements for transducers, e.g. motional feedback circuits}
- H04R 3/005 . {for combining the signals of two or more microphones (specially adapted for hearing aids [H04R 25/407](#))}
- H04R 3/007 . {Protection circuits for transducers}
- H04R 3/02 . for preventing acoustic reaction {, i.e. acoustic oscillatory feedback (specially adapted for hearing aids [H04R 25/453](#))}
- H04R 3/04 . for correcting frequency response
- H04R 3/06 . . of electrostatic transducers
- H04R 3/08 . . of electromagnetic transducers
- H04R 3/10 . . of variable resistance microphones
- H04R 3/12 . for distributing signals to two or more loudspeakers {(specially adapted for hearing aids [H04R 25/407](#))}
- H04R 3/14 . . Cross-over networks

H04R 5/00**Stereophonic arrangements (stereophonic pick-ups [H04R 9/16](#), [H04R 11/12](#), [H04R 17/08](#), [H04R 19/10](#))****NOTE**

In this group, the expression "stereophonic arrangements" covers quadraphonic or similar arrangements.

- H04R 5/02 . Spatial or constructional arrangements of loudspeakers
- H04R 5/023 . . {in a chair, pillow}

- H04R 5/027 . Spatial or constructional arrangements of microphones, e.g. in dummy heads
- H04R 5/033 . Headphones for stereophonic communication {(details thereof, e.g. relating to batteries, cables or control elements [H04R 1/10](#))}
- H04R 5/0335 . . {Earpiece support, e.g. headbands or neckrests (for monophonic headphones [H04R 1/105](#))}
- H04R 5/04 . Circuit arrangements, {e.g. for selective connection of amplifier inputs/outputs to loudspeakers, for loudspeaker detection, or for adaptation of settings to personal preferences or hearing impairments (combinations of amplifiers [H03F 3/68](#); stereophonic systems [H04S](#))}

- H04R 7/00** **Diaphragms for electromechanical transducers (in general [F16J 3/00](#)); Cones**
(for musical instruments [G10](#)) {(cones, diaphragms or the like, for emitting or receiving sound in general [G10K 13/00](#); Mounting thereof)}
- H04R 7/02 . characterised by the construction
- H04R 7/04 . . Plane diaphragms
- H04R 7/045 . . . {using the distributed mode principle, i.e. whereby the acoustic radiation is emanated from uniformly distributed free bending wave vibration induced in a stiff panel and not from pistonic motion}
- H04R 7/06 . . . comprising a plurality of sections or layers
- H04R 7/08 comprising superposed layers separated by air or other fluid
- H04R 7/10 comprising superposed layers in contact
- H04R 7/12 . . Non-planar diaphragms or cones
- H04R 7/122 . . . {comprising a plurality of sections or layers}
- H04R 7/125 {comprising a plurality of superposed layers in contact}
- H04R 7/127 . . . {dome-shaped}
- H04R 7/14 . . . corrugated, pleated or ribbed
- H04R 7/16 . Mounting or tensioning of diaphragms or cones
- H04R 7/18 . . at the periphery
- H04R 7/20 . . . Securing diaphragm or cone resiliently to support by flexible material, springs, cords, or strands
- H04R 7/22 . . . Clamping rim of diaphragm or cone against seating
- H04R 7/24 . . Tensioning by means acting directly on free portions of diaphragm or cone
- H04R 7/26 . Damping by means acting directly on free portion of diaphragm or cone ([air damping \[H04R 1/28\]\(#\)](#))

- H04R 9/00** **Transducers of moving-coil, moving-strip, or moving-wire type**
- H04R 9/02 . Details
- H04R 9/022 . . {Cooling arrangements}
- H04R 9/025 . . {Magnetic circuit}
- H04R 9/027 . . . {Air gaps using a magnetic fluid}
- H04R 9/04 . . Construction, mounting, or centering of coil
- H04R 9/041 . . . {Centering}
- H04R 9/042 {by pressurised air}

- H04R 9/043 {Inner suspension or damper, e.g. spider (outer suspension or surround [H04R 7/16](#))}
- H04R 9/045 . . . {Mounting ([H04R 9/043](#) takes precedence)}
- H04R 9/046 . . . {Construction}
- H04R 9/047 {in which the windings of the moving coil lay in the same plane}
- H04R 9/048 {of the ribbon type}
- H04R 9/06 . . Loudspeakers
- H04R 9/063 . . {using a plurality of acoustic drivers ([H04R 1/24](#) and [H04R 1/403](#) take precedence)}
- H04R 9/066 . . {using the principle of inertia}
- H04R 9/08 . Microphones
- H04R 9/10 . Telephone receivers
- H04R 9/12 . Gramophone pick-ups using a stylus; Recorders using a stylus
- H04R 9/14 . . comprising two or more styli or transducers ([H04R 9/16](#) takes precedence)
- H04R 9/16 . . signals recorded or played back by vibration of a stylus in two orthogonal directions simultaneously
- H04R 9/18 . Resonant transducers, i.e. adapted to produce maximum output at a predetermined frequency

- H04R 11/00** **Transducers of moving-armature or moving-core type** (acoustic diaphragm of magnetisable material directly coacting with electromagnet [H04R 13/00](#))
- H04R 11/02 . Loudspeakers
- H04R 11/04 . Microphones
- H04R 11/06 . Telephone receivers
- H04R 11/08 . Gramophone pick-ups using a stylus; Recorders using a stylus
- H04R 11/10 . . comprising two or more styli or transducers ([H04R 11/12](#) takes precedence)
- H04R 11/12 . . signals being recorded or played back by vibration of a stylus in two orthogonal directions simultaneously
- H04R 11/14 . Resonant transducers, i.e. adapted to produce maximum output at a predetermined frequency

- H04R 13/00** **Transducers having an acoustic diaphragm of magnetisable material directly co-acting with electromagnet**
- H04R 13/02 . Telephone receivers

- H04R 15/00** **Magnetostrictive transducers** (magnetostrictive elements in general [H01L 41/00](#))
- H04R 15/02 . Resonant transducers, i.e. adapted to produce maximum output at a predetermined frequency

- H04R 17/00** **Piezo-electric transducers; Electrostrictive transducers** (piezo-electric or electrostrictive elements in general [H01L 41/00](#); details of piezo-electric or electrostrictive motors, generators or positioners {[H01L 41/00](#)})
- H04R 17/005 . {using a piezo-electric polymer}
- H04R 17/02 . Microphones
- H04R 17/025 . . {using a piezo-electric polymer}

H04R 17/04	<ul style="list-style-type: none"> Gramophone pick-ups using a stylus; Recorders using a stylus
H04R 17/06	<ul style="list-style-type: none"> <ul style="list-style-type: none"> comprising two or more styli or transducers (H04R 17/08 takes precedence)
H04R 17/08	<ul style="list-style-type: none"> <ul style="list-style-type: none"> signals being recorded or played back by vibration of a stylus in two orthogonal directions simultaneously
H04R 17/10	<ul style="list-style-type: none"> Resonant transducers, i.e. adapted to produce maximum output at a predetermined frequency
H04R 19/00	Electrostatic transducers
H04R 19/005	<ul style="list-style-type: none"> {using semiconductor materials}
H04R 19/01	<ul style="list-style-type: none"> characterised by the use of electrets
H04R 19/013	<ul style="list-style-type: none"> <ul style="list-style-type: none"> {for loudspeakers}
H04R 19/016	<ul style="list-style-type: none"> <ul style="list-style-type: none"> {for microphones}
H04R 19/02	<ul style="list-style-type: none"> Loudspeakers (H04R 19/01 takes precedence)
H04R 19/04	<ul style="list-style-type: none"> Microphones (H04R 19/01 takes precedence)
H04R 19/06	<ul style="list-style-type: none"> Gramophone pick-ups using a stylus; Recorders using a stylus (H04R 19/01 takes precedence)
H04R 19/08	<ul style="list-style-type: none"> <ul style="list-style-type: none"> comprising two or more styli or transducers (H04R 19/10 takes precedence)
H04R 19/10	<ul style="list-style-type: none"> <ul style="list-style-type: none"> signals being recorded or played back by vibration of a stylus in two orthogonal directions simultaneously
H04R 21/00	Variable-resistance transducers (gaseous resistance transducers H04R 23/00 ; magneto-resistive transducers H04R 23/00)
H04R 21/02	<ul style="list-style-type: none"> Microphones
H04R 21/021	<ul style="list-style-type: none"> <ul style="list-style-type: none"> {with granular resistance material}
H04R 21/023	<ul style="list-style-type: none"> <ul style="list-style-type: none"> {with more than one granular chamber}
H04R 21/025	<ul style="list-style-type: none"> <ul style="list-style-type: none"> {disposition of the granular chamber in microphones}
H04R 21/026	<ul style="list-style-type: none"> <ul style="list-style-type: none"> {in which the sound is perpendicular to the current crossing the transducer material}
H04R 21/028	<ul style="list-style-type: none"> <ul style="list-style-type: none"> {with a fluid as resistance material}
H04R 21/04	<ul style="list-style-type: none"> Gramophone pick-ups using a stylus; Recorders using a stylus
H04R 23/00	Transducers other than those covered by groups H04R 9/00 to H04R 21/00 {(diaphragms for transducers of the distributed-mode type H04R 7/045)}
H04R 23/002	<ul style="list-style-type: none"> {using electrothermic-effect transducer}
H04R 23/004	<ul style="list-style-type: none"> {using ionised gas}
H04R 23/006	<ul style="list-style-type: none"> {using solid state devices (solid state devices per se H01L)}
H04R 23/008	<ul style="list-style-type: none"> {using optical signals for detecting or generating sound}
H04R 23/02	<ul style="list-style-type: none"> Transducers using more than one principle simultaneously

H04R 25/00

Deaf-aid sets {providing an auditory perception; Electric tinnitus maskers providing an auditory perception} (constructions of transducers per se [H04R 9/00](#) to [H04R 23/00](#); {non-electric hearing aids [A61F 11/008](#); replacing direct auditory perception by another kind of perception [A61F 11/04](#); electrical stimulation of auditory nerves to promote the auditory function [A61N 1/36032](#)} ; structural combination with spectacle frames [G02C 11/06](#); processing of speech signals [G10L 21/00](#))

NOTE

Classification should be directed to groups [H04R 25/02](#), [H04R 25/04](#) or [H04R 25/50](#) and its subgroups, if and only if the technical subject in consideration cannot be classified elsewhere under the main group [H04R 25/00](#)

[H04R 25/02](#)

- adapted to be supported entirely by ear

[H04R 25/04](#)

- comprising pocket amplifiers

[H04R 25/30](#)

- {Monitoring or testing of hearing aids, e.g. functioning, settings, battery power (testing arrangements for electro-acoustic transducers in general [H04R 29/00](#); battery testing in general [G01R 31/36](#))}

[H04R 25/305](#)

- . {Self-monitoring or self-testing}

[H04R 25/35](#)

- {using translation techniques}

[H04R 25/353](#)

- . {Frequency, e.g. frequency shift or compression}

[H04R 25/356](#)

- . {Amplitude, e.g. amplitude shift or compression}

[H04R 25/40](#)

- {Arrangements for obtaining a desired directivity characteristic}

[H04R 25/402](#)

- . {using contructional means}

[H04R 25/405](#)

- . {by combining a plurality of transducers}

[H04R 25/407](#)

- . {Circuits for combining signals of a plurality of transducers}

[H04R 25/43](#)

- {Electronic input selection or mixing based on input signal analysis, e.g. mixing or selection between microphone and telecoil or between microphones with different directivity characteristics ([H04R 25/407](#) takes precedence)}

WARNING

Not complete pending a reorganization, see also [H04R 25/00](#)

[H04R 25/45](#)

- {Prevention of acoustic reaction, i.e. acoustic oscillatory feedback}

[H04R 25/453](#)

- . {electronically (in general [H04R 3/02](#))}

[H04R 25/456](#)

- . {mechanically}

[H04R 25/48](#)

- {using constructional means for obtaining a desired frequency response ([H04R 25/652](#) takes precedence; in general [H04R 1/22](#))}

[H04R 25/50](#)

- {Customised settings for obtaining desired overall acoustical characteristics}

[H04R 25/502](#)

- . {using analog signal processing}

[H04R 25/505](#)

- . {using digital signal processing}

[H04R 25/507](#)

- . . {implemented by neural network or fuzzy logic}

[H04R 25/55](#)

- {using an external connection, either wireless or wired}

[H04R 25/552](#)

- . {Binaural}

- H04R 25/554 . . {using a wireless connection, e.g. between microphone and amplifier or using T-coils ([near-field transmission in general H04B 5/00](#))}
- H04R 25/556 . . {External connectors, e.g. plugs or modules}
- H04R 25/558 . . {Remote control, e.g. of amplification, frequency ([remote control of amplifications, tone, or bandwidth H03G 1/02](#); [remote control, e.g. for Hi-Fi systems or audio/video combinations H04B 1/202](#); [remote control in general G05F](#))}
- H04R 25/60 . {Mounting, assembling or interconnection of hearing aid parts, e.g. inside tips, housing or to ossicles; Apparatus or processes therefor}
- H04R 25/602 . . {Arrangements for mounting batteries ([batteries in general H01M 2/02](#))}
- H04R 25/604 . . {Arrangements for mounting transducers}
- H04R 25/606 . . . {acting directly on the eardrum, the ossicles or the skull, e.g. mastoid, tooth, maxillary or mandibular bone, or mechanically stimulating the cochlea, e.g. at the oval window}
- H04R 25/608 . . {Apparatus or processes specially adapted for mounting, assembling or interconnecting hearing aid parts inside tips, moulds or housings}

WARNING

Not complete pending a reorganization, see also [H04R 25/60](#) or its other subgroups

- H04R 25/65 . {Housing parts, e.g. shells, tips or moulds, or their manufacture}
- H04R 25/652 . . {Ear tips; Ear moulds}
- H04R 25/654 . . . {Ear wax retarders}
- H04R 25/656 . . . {Non-customized, universal ear tips, i.e. ear tips which are not specifically adapted to the size or shape of the ear or ear canal}

WARNING

Not complete pending a reorganization, see also [H04R 25/652](#)

- H04R 25/658 . . {Manufacture of housing parts}

WARNING

Not complete pending a reorganization, see also [H04R 25/65](#) or its other subgroups

- H04R 25/70 . {Adaptation of deaf aid to hearing loss, e.g. initial electronic fitting}
- H04R 25/75 . {Electric tinnitus maskers providing an auditory perception ([evaluating tinnitus A61B 5/128](#); [devices or methods to cause a change in the state of consciousness A61M 21/00](#); [masking sound in general G10K 11/175](#))}

WARNING

Not complete pending a reorganization, see also [H04R 25/00](#)

H04R 27/00 **Public address systems** (circuits for preventing acoustic reaction [H04R 3/02](#); circuits for distributing signals to loudspeakers [H04R 3/12](#); {monitoring or testing arrangements for public address systems [H04R 29/007](#); amplifiers [H03F](#)})

- H04R 27/02 . Amplifying systems for the deaf
- H04R 27/04 . Electric megaphones

H04R 29/00	Monitoring arrangements; Testing arrangements {(for hearing aids H04R 25/30; detection of loudspeaker connection H04R 5/04; sound-field adaptation dependent on speaker detection H04S 7/308)}
H04R 29/001	<ul style="list-style-type: none"> • {for loudspeakers (H04R 29/007 takes precedence)}
H04R 29/002	<ul style="list-style-type: none"> • . {Loudspeaker arrays}
H04R 29/003	<ul style="list-style-type: none"> • . {of the moving-coil type}
H04R 29/004	<ul style="list-style-type: none"> • {for microphones (H04R 29/007 takes precedence)}
H04R 29/005	<ul style="list-style-type: none"> • . {Microphone arrays}
H04R 29/006	<ul style="list-style-type: none"> • . . {Microphone matching}
H04R 29/007	<ul style="list-style-type: none"> • {for public address systems (public address systems per se H04R 27/00)}
H04R 29/008	<ul style="list-style-type: none"> • {Visual indication of individual signal levels (visual indication of stereophonic sound image H04S 7/40)}
H04R 31/00	Apparatus or processes specially adapted for the manufacture of transducers or diaphragms therefor {(manufacture of microstructural arrangements of deformable or non-deformable structures in general B81C 1/00182)}
H04R 31/003	<ul style="list-style-type: none"> • {for diaphragms or their outer suspension}
H04R 31/006	<ul style="list-style-type: none"> • {Interconnection of transducer parts (of diaphragm and outer suspension by moulding H04R 31/003)}
H04R 2201/00	Details of transducers, loudspeakers or microphones covered by H04R 1/00 but not provided for in any of its subgroups (not used, see subgroups)
H04R 2201/003	<ul style="list-style-type: none"> • Mems transducers or their use (of the electrostatic type H04R 19/005)
H04R 2201/02	<ul style="list-style-type: none"> • Details casings, cabinets or mounting therein for transducers covered by H04R 1/02 but not provided for in any of its subgroups
H04R 2201/021	<ul style="list-style-type: none"> • . Transducers or their casings adapted for mounting in or to a wall or ceiling
H04R 2201/023	<ul style="list-style-type: none"> • . Transducers incorporated in garment, rucksacks or the like
H04R 2201/025	<ul style="list-style-type: none"> • . Transducer mountings or cabinet supports enabling variable orientation of transducer of cabinet
H04R 2201/028	<ul style="list-style-type: none"> • . Structural combinations of loudspeakers with built-in power amplifiers, e.g. in the same acoustic enclosure (H04R 2499/10 takes precedence; Single (sub)woofer with two or more satellite loudspeakers for mid- and high-frequency band reproduction driven via the (sub)woofer H04R 2205/026)
H04R 2201/029	<ul style="list-style-type: none"> • . Manufacturing aspects of enclosures transducers
H04R 2201/10	<ul style="list-style-type: none"> • Details of earpieces, attachments therefor, earphones or monophonic headphones covered by H04R 1/10 but not provided for in any of its subgroups
H04R 2201/103	<ul style="list-style-type: none"> • . Combination of monophonic or stereophonic headphones with audio players, e.g. integrated in the headphone
H04R 2201/105	<ul style="list-style-type: none"> • . Manufacture of mono- or stereophonic headphone components
H04R 2201/107	<ul style="list-style-type: none"> • . Monophonic and stereophonic headphones with microphone for two-way hands free communication
H04R 2201/109	<ul style="list-style-type: none"> • . Arrangements to adapt hands free headphones for use on both ears
H04R 2201/34	<ul style="list-style-type: none"> • Directing or guiding sound by means of a phase plug

- H04R 2201/40
 - Details of arrangements for obtaining desired directional characteristic by combining a number of identical transducers covered by [H04R 1/40](#) but not provided for in any of its subgroups
- H04R 2201/401
 - • 2D or 3D arrays of transducers
- H04R 2201/403
 - • Linear arrays of transducers
- H04R 2201/405
 - • Non-uniform arrays of transducers or a plurality of uniform arrays with different transducer spacing
- H04R 2203/00**

Details of circuits for transducers, loudspeakers or microphones covered by [H04R 3/00](#) but not provided for in any of its subgroups (not used, see subgroups)
- H04R 2203/12
 - Beamforming aspects for stereophonic sound reproduction with loudspeaker arrays
- H04R 2205/00**

Details of stereophonic arrangements covered by [H04R 5/00](#) but not provided for in any of its subgroups (not used, see subgroups)
- H04R 2205/021
 - Aspects relating to docking-station type assemblies to obtain an acoustical effect, e.g. the type of connection to external loudspeakers or housings, frequency improvement
- H04R 2205/022
 - Plurality of transducers corresponding to a plurality of sound channels in each earpiece of headphones or in a single enclosure
- H04R 2205/024
 - Positioning of loudspeaker enclosures for spatial sound reproduction
- H04R 2205/026
 - Single (sub)woofer with two or more satellite loudspeakers for mid- and high-frequency band reproduction driven via the (sub)woofer
- H04R 2205/041
 - Adaptation of stereophonic signal reproduction for the hearing impaired
- H04R 2207/00**

Details of diaphragms or cones for electromechanical transducers or their suspension covered by [H04R 7/00](#) but not provided for in [H04R 7/00](#) or in [H04R 2307/00](#) (not used, see subgroup)
- H04R 2207/021
 - Diaphragm extensions, not necessarily integrally formed, e.g. skirts, rims, flanges
- H04R 2209/00**

Details of transducers of the moving-coil, moving-strip, or moving-wire type covered by [H04R 9/00](#) but not provided for in any of its subgroups (not used, see subgroups)
- H04R 2209/021
 - Reduction of eddy currents in the magnetic circuit of electrodynamic loudspeaker transducer
- H04R 2209/022
 - Aspects regarding the stray flux internal or external to the magnetic circuit, e.g. shielding, shape of magnetic circuit, flux compensation coils
- H04R 2209/024
 - Manufacturing aspects of the magnetic circuit of loudspeaker or microphone transducers
- H04R 2209/026
 - Transducers having separately controllable opposing diaphragms, e.g. for ring-tone and voice ([H04R 2400/03 takes precedence](#))
- H04R 2209/027
 - Electrical or mechanical reduction of yoke vibration
- H04R 2209/041
 - Voice coil arrangements comprising more than one voice coil unit on the same bobbin
- H04R 2209/043
 - Short circuited voice coils driven by induction

H04R 2217/00	Details of magnetostrictive, piezo-electric, or electrostrictive transducers covered by H04R 15/00 or H04R 17/00 but not provided for in any of their subgroups (not used, see subgroup)
H04R 2217/01	<ul style="list-style-type: none"> Non-planar magnetostrictive, piezo-electric or electrostrictive benders
H04R 2217/03	<ul style="list-style-type: none"> Parametric transducers where sound is generated or captured by the acoustic demodulation of amplitude modulated ultrasonic waves
H04R 2225/00	Details of deaf aids covered by H04R 25/00, not provided for in any of its subgroups
H04R 2225/021	<ul style="list-style-type: none"> Behind the ear [BTE] hearing aids (H04R 2225/63 takes precedence)
H04R 2225/023	<ul style="list-style-type: none"> Completely in the canal [CIC] hearing aids
H04R 2225/025	<ul style="list-style-type: none"> In the ear hearing aids [ITE] hearing aids
H04R 2225/31	<ul style="list-style-type: none"> Aspects of the use of accumulators in hearing aids, e.g. rechargeable batteries or fuel cells
H04R 2225/33	<ul style="list-style-type: none"> Aspects relating to adaptation of the battery voltage, e.g. its regulation, increase or decrease
H04R 2225/39	<ul style="list-style-type: none"> Aspects relating to automatic logging of sound environment parameters and the performance of the hearing aid during use, e.g. histogram logging, or of user selected programs or settings in the hearing aid, e.g. usage logging
H04R 2225/41	<ul style="list-style-type: none"> Detection or adaptation of hearing aid parameters or programs to listening situation, e.g. pub, forest
H04R 2225/43	<ul style="list-style-type: none"> Signal processing in hearing aids to enhance the speech intelligibility
H04R 2225/49	<ul style="list-style-type: none"> Reducing the effects of electromagnetic noise on the functioning of hearing aids, by e.g. shielding, signal processing adaptation, selective (de)activation of electronic parts in hearing aid
H04R 2225/51	<ul style="list-style-type: none"> Aspects of antennas and their circuitry in and for hearing aids
H04R 2225/53	<ul style="list-style-type: none"> Hearing aid for unilateral hearing impairment using Contralateral Routing Of Signals [CROS]
H04R 2225/55	<ul style="list-style-type: none"> Communication between hearing aids and external devices via a network for data exchange
H04R 2225/59	<ul style="list-style-type: none"> Arrangements for selective connection between one or more amplifiers and one or more receivers within one hearing aid
H04R 2225/61	<ul style="list-style-type: none"> Aspects relating to mechanical or electronic switches or control elements in hearing aids (H04R 2225/43 takes precedence)
H04R 2225/63	<ul style="list-style-type: none"> Aspects relating to ear hooks or their connection to the hearing aid housing or ear mould
H04R 2225/67	<ul style="list-style-type: none"> Implantable hearing aids or parts thereof not covered by H04R 25/606
H04R 2225/77	<ul style="list-style-type: none"> Design aspects, e.g. CAD, of hearing aid tips, moulds or housings
H04R 2225/81	<ul style="list-style-type: none"> Aspects of electrical fitting of hearing aids related to problems arising from the emotional state of a hearing aid user, e.g. nervousness or unwillingness during fitting
H04R 2225/83	<ul style="list-style-type: none"> Aspects of electrical fitting of hearing aids related to problems arising from growth of the hearing aid user, e.g. children
H04R 2227/00	Details of public address [PA] systems covered by H04R 27/00 but not provided for in any of its subgroups

H04R 2227/001	<ul style="list-style-type: none"> Adaptation of signal processing in PA systems in dependence of presence of noise
H04R 2227/003	<ul style="list-style-type: none"> Digital PA systems using e.g. LAN or internet
H04R 2227/005	<ul style="list-style-type: none"> Audio distribution systems for home, i.e. multi-room use
H04R 2227/007	<ul style="list-style-type: none"> Electronic adaptation of audio signals to reverberation of the listening space for PA
H04R 2227/009	<ul style="list-style-type: none"> Signal processing in [PA] systems to enhance the speech intelligibility
H04R 2231/00	Details of apparatus or processes specially adapted for the manufacture of transducers or diaphragms therefor covered by H04R 31/00, not provided for in its subgroups
H04R 2231/001	<ul style="list-style-type: none"> Moulding aspects of diaphragm or surround
H04R 2231/003	<ul style="list-style-type: none"> Manufacturing aspects of the outer suspension of loudspeaker or microphone diaphragms or of their connecting aspects to said diaphragms
H04R 2307/00	Details of diaphragms or cones for electromechanical transducers, their suspension or their manufacture covered by H04R 7/00 or H04R 31/003, not provided for in any of its subgroups
H04R 2307/021	<ul style="list-style-type: none"> Diaphragms comprising cellulose-like materials, e.g. wood, paper, linen
H04R 2307/023	<ul style="list-style-type: none"> Diaphragms comprising ceramic-like materials, e.g. pure ceramic, glass, boride, nitride, carbide, mica and carbon materials
H04R 2307/025	<ul style="list-style-type: none"> Diaphragms comprising polymeric materials
H04R 2307/027	<ul style="list-style-type: none"> Diaphragms comprising metallic materials
H04R 2307/029	<ul style="list-style-type: none"> Diaphragms comprising fibres
H04R 2307/201	<ul style="list-style-type: none"> Damping aspects of the outer suspension of loudspeaker diaphragms by addition of additional damping means
H04R 2307/204	<ul style="list-style-type: none"> Material aspects of the outer suspension of loudspeaker diaphragms
H04R 2307/207	<ul style="list-style-type: none"> Shape aspects of the outer suspension of loudspeaker diaphragms
H04R 2400/00	Loudspeakers
	<u>NOTE</u>
	H04R 2400/00 itself is only to be used for those cases where the classification does not allow specification the type of transducer and the type is important, e.g. frequency control circuit (H04R 3/04 and subgroups) may require different circuits for microphones or for loudspeakers
H04R 2400/01	<ul style="list-style-type: none"> Transducers used as a loudspeaker to generate sound aswell as a microphone to detect sound
H04R 2400/03	<ul style="list-style-type: none"> Transducers capable of generating both sound as well as tactile vibration e.g. as used in cellular phones
H04R 2400/07	<ul style="list-style-type: none"> Suspension between moving magnetic core and housing
H04R 2400/11	<ul style="list-style-type: none"> Aspects regarding the frame of loudspeaker transducers
H04R 2400/13	<ul style="list-style-type: none"> Use or details of compression drivers
H04R 2410/00	Microphones
	<u>NOTE</u>

H04R 2410/00
(continued)

[H04R 2410/00](#) itself is only to be used for those cases where the classification does not allow specification the type of transducer and the type is important, e.g. frequency control circuit ([H04R 3/04](#) and subgroups) may require different circuits for microphones or for loudspeakers

- H04R 2410/01 . Noise reduction using microphones having different directional characteristics
- H04R 2410/03 . Reduction of intrinsic noise in microphones
- H04R 2410/05 . Noise reduction with a separate noise microphone
- H04R 2410/07 . Mechanical or electrical reduction of wind noise generated by wind passing a microphone

H04R 2420/00 Details of connection covered by [H04R](#), not provided for in its groups

- H04R 2420/01 . Input selection or mixing for amplifiers or loudspeakers ([for hearing aids H04R 25/43](#))
- H04R 2420/03 . Connection circuits to selectively connect loudspeakers or headphones to amplifiers
- H04R 2420/05 . Detection of connection of loudspeakers or headphones to amplifiers
- H04R 2420/07 . Applications of wireless loudspeakers or wireless microphones
- H04R 2420/09 . Applications of special connectors, e.g. USB, XLR, in loudspeakers, microphones or headphones

H04R 2430/00 Signal processing covered by [H04R](#), not provided for in its groups

- H04R 2430/01 . Aspects of volume control, not necessarily automatic, in sound systems
- H04R 2430/03 . Synergistic effects of band splitting and sub-band processing
- H04R 2430/20 . Processing of the output signals of the acoustic transducers of an array for obtaining a desired directivity characteristic ([H04R 2203/12 takes precedence](#))
- H04R 2430/21 . . Direction finding using differential microphone array [DMA]
- H04R 2430/23 . . Direction finding using a sum-delay beam-former
- H04R 2430/25 . . Array processing for suppression of unwanted side-lobes in directivity characteristics, e.g. a blocking matrix

H04R 2440/00 Bending wave transducers covered by [H04R](#), not provided for in its groups

- H04R 2440/01 . Acoustic transducers using travelling bending waves to generate or detect sound
- H04R 2440/03 . Resonant bending wave transducer used as a microphone
- H04R 2440/05 . Aspects relating to the positioning and way or means of mounting of exciters to resonant bending wave panels
- H04R 2440/07 . Loudspeakers using bending wave resonance and piston motion to generate sound

H04R 2460/00 Details of hearing devices, i.e. of ear- or headphones covered by [H04R 1/10](#) or [H04R 5/033](#) but not provided for in any of their subgroups, or of hearing aids covered by [H04R 25/00](#) but not provided for in any of its subgroups

- H04R 2460/01 . Hearing devices using active noise cancellation
- H04R 2460/03 . Aspects of the reduction of energy consumption in hearing devices
- H04R 2460/05 . Electronic compensation of the occlusion effect

- H04R 2460/07
 - Use of position data from wide-area or local-area positioning systems in hearing devices, e.g. program or information selection
- H04R 2460/09
 - Non-occlusive ear tips, i.e. leaving the ear canal open, for both custom and non-custom tips ([H04R 2460/11 takes precedence](#))
- H04R 2460/11
 - Aspects relating to vents, e.g. shape, orientation, acoustic properties in ear tips of hearing devices to prevent occlusion
- H04R 2460/13
 - Hearing devices using bone conduction transducers
- H04R 2460/15
 - Determination of the acoustic seal of ear moulds or ear tips of hearing devices
- H04R 2460/17
 - Hearing device specific tools used for storing or handling hearing devices or parts thereof, e.g. placement in the ear, replacement of cerumen barriers, repair, cleaning hearing devices

- H04R 2499/00**
Aspects covered by [H04R](#) or [H04S](#) not otherwise provided for in their subgroups
 - General technical reviews, overviews, tutorials
- H04R 2499/01
 - General applications
- H04R 2499/10
 - • Transducers incorporated or for use in hand-held devices, e.g. mobile phones, PDA's, camera's
- H04R 2499/11
 - • Acoustic transducers and sound field adaptation in vehicles
- H04R 2499/13
 - • Transducers incorporated in visual displaying devices, e.g. televisions, computer displays, laptops
- H04R 2499/15