

CPC**COOPERATIVE PATENT CLASSIFICATION****H03H**

**IMPEDANCE NETWORKS, e.g. RESONANT CIRCUITS ;
 RESONATORS** (measuring, testing [G01R](#) ; arrangements for producing a reverberation or echo sound [G10K 15/08](#) ; impedance networks or resonators consisting of distributed impedances, e.g. of the waveguide type, [H01P](#) ; control of amplification, e.g. bandwidth control of amplifiers, [H03G](#) ; tuning resonant circuits, e.g. tuning coupled resonant circuits, [H03J](#) ; networks for modifying the frequency characteristics of communication systems [H04B](#))

NOTE

This subclass covers :

networks comprising lumped impedance elements;

networks comprising distributed impedance elements together with lumped impedance elements;

networks comprising electromechanical or electro-acoustic elements;

networks simulating reactances and comprising discharge tubes or semiconductor devices;

constructions of electromechanical resonators.

In this subclass, the following expression is used with the meaning indicated:

"passive elements" means resistors, capacitors, inductors, mutual inductors or diodes.

Attention is drawn to the Notes following the titles of class [B81](#) and subclass [B81B](#) relating to "micro-structural devices" and "micro-structural systems".

In this subclass, main groups with a higher number take precedence.

Guidance heading:**H03H 1/00**

Constructional details of impedance networks whose electrical mode of operation is not specified or applicable to more than one type of network ([constructional details of electromechanical transducers H03H 9/00](#))

H03H 1/0007

. { of radio frequency interference filters }

H03H 1/02

. of RC networks, e.g. integrated networks

H03H 2/00

Networks using elements or techniques not provided for in groups [H03H 3/00](#) to [H03H 21/00](#)

H03H 2/001

. { comprising magnetostatic wave network elements }

H03H 2/003

. { comprising optical fibre network elements (optical elements per se [G02B](#) , [G02F](#) ; transmission systems using light waves [H04B 10/00](#)) }

- H03H 2/005 . { Coupling circuits between transmission lines or antennas and transmitters, receivers or amplifiers }
- H03H 2/006 . . { Transmitter or amplifier output circuits }
- H03H 2/008 . . { Receiver or amplifier input circuits }

H03H 3/00 **Apparatus or processes specially adapted for the manufacture of impedance networks, resonating circuits, resonators**

- H03H 3/007 . for the manufacture of electromechanical resonators or networks
- H03H 3/0072 . . { of micro-electro-mechanical resonators or networks (micro-membranes or micro-beams [B81B 3/00M2](#) ; manufacture of micro-structural devices in general [B81C](#)) }
- H03H 3/0073 . . . { Integration with other electronic structures }
- H03H 3/0075 . . . { Arrangements or methods specially adapted for testing micro-electro-mechanical resonators or networks }
- H03H 3/0076 . . . { for obtaining desired frequency or temperature coefficients }
- H03H 3/0077 { by tuning of resonance frequency }
- H03H 3/0078 { involving adjustment of the transducing gap }
- H03H 3/013 . . for obtaining desired frequency or temperature coefficient ({ [H03H 3/0076](#) } [H03H 3/04](#) , [H03H 3/10](#) take precedence)
- H03H 3/02 . . for the manufacture of piezo-electric or electrostrictive resonators or networks ([H03H 3/08](#) takes precedence)
- H03H 3/04 . . . for obtaining desired frequency or temperature coefficient
- H03H 3/06 . . for the manufacture of magnetostrictive resonators or networks
- H03H 3/08 . . for the manufacture of resonators or networks using surface acoustic waves
- H03H 3/10 . . . for obtaining desired frequency or temperature coefficient

H03H 5/00 **One-port networks comprising only passive electrical elements as network components**

- H03H 5/003 . { comprising distributed impedance elements together with lumped impedance elements }
- H03H 5/006 . { comprising simultaneously tunable inductance and capacitance }
- H03H 5/02 . without voltage- or current-dependent elements
- H03H 5/10 . . comprising at least one element with prescribed temperature coefficient
- H03H 5/12 . with at least one voltage- or current-dependent element

H03H 7/00 **Multiple-port networks comprising only passive electrical elements as network components (receiver input circuits [H04B 1/18](#) ; networks simulating a length of communication cable [H04B 3/40](#))**

- H03H 7/002 . { Gyration }
- H03H 7/004 . { Capacitive coupling circuits not otherwise provided for }

H03H 7/01	. Frequency selective two-port networks
H03H 7/0107	.. { Non-linear filters }
H03H 7/0115	.. { comprising only inductors and capacitors (H03H 7/075 , H03H 7/09 , H03H 7/12 , H03H 7/13 take precedence) }
H03H 7/0123	.. { comprising distributed impedance elements together with lumped impedance elements }
H03H 7/0138	.. { Electrical filters or coupling circuits }
H03H 7/0146	... { Coupling circuits between two tubes, not otherwise provided for }
H03H 7/0153	.. { Electrical filters; Controlling thereof }
H03H 7/0161	... { Bandpass filters (H03H 7/12 takes precedence) }
H03H 7/0169	.... { Intermediate frequency filters }
H03H 7/0176	..... { without magnetic core }
H03H 7/0184	..... { with ferromagnetic core }
H03H 7/03	.. comprising means for compensation of loss
H03H 7/06	.. including resistors (H03H 7/075 , H03H 7/09 , H03H 7/12 , H03H 7/13 take precedence)
H03H 7/065	... Parallel T-filters
H03H 7/07	... Bridged T-filters
H03H 7/075	.. Ladder networks, e.g. electric wave filters
H03H 7/09	.. Filters comprising mutual inductance
H03H 7/12	.. Bandpass or bandstop filters with adjustable bandwidth and fixed centre frequency (H03H 7/09 takes precedence; automatic control of bandwidth in amplifiers H03G 5/16)
H03H 7/13	.. using electro-optic elements
H03H 7/17	.. { Structural details of sub-circuits of frequency selective networks }

WARNING

not complete, pending reorganisation, see provisionally also [H03H 7/01](#) A, [H03H 7/0123](#) to [H03H 7/07](#) , [H03H 7/09](#) to [H03H 7/13](#) and [H03H 7/42](#)

H03H 7/1708	... { Comprising bridging elements, i.e. elements in a series path without own reference to ground and spanning branching nodes of another series path (H03H 7/07 takes precedence) }
H03H 7/1716	... { Comprising foot-point elements }
H03H 7/1725	.... { Element to ground being common to different shunt paths, i.e. Y-structure }
H03H 7/1733	.... { Element between different shunt or branch paths (H03H 7/425 takes precedence) }
H03H 7/1741	... { Comprising typical LC combinations, irrespective of presence and location of additional resistors (when resistors are present, also classify in H03H 7/06 to H03H 7/07) }
H03H 7/175	.... { Series LC in series path (H03H 7/1783 takes precedence) }
H03H 7/1758	.... { Series LC in shunt or branch path (H03H 7/1791 takes precedence) }
H03H 7/1766	.... { Parallel LC in series path (H03H 7/1783 takes precedence) }
H03H 7/1775	.... { Parallel LC in shunt or branch path (H03H 7/1791 takes precedence) }
H03H 7/1783	.... { Combined LC in series path }

- H03H 7/1791 { Combined LC in shunt or branch path }
- H03H 7/18 . Networks for phase shifting
- H03H 7/185 . . { comprising distributed impedance elements together with lumped impedance elements }
- H03H 7/19 . . Two-port phase shifters providing a predetermined phase shift, e.g. "all-pass" filters
- H03H 7/20 . . Two-port phase shifters providing an adjustable phase shift
- H03H 7/21 . . providing two or more phase shifted output signals, e.g. n-phase output
- H03H 7/24 . Frequency- independent attenuators
- H03H 7/25 . . comprising an element controlled by an electric or magnetic variable ([H03H 7/27](#) takes precedence)
- H03H 7/251 . . . { the element being a thermistor }
- H03H 7/253 . . . { the element being a diode }
- H03H 7/255 { the element being a PIN diode }
- H03H 7/256 { the element being a VARACTOR diode }
- H03H 7/258 . . . { using a galvano-magnetic device }
- H03H 7/27 . . comprising a photo-electric element
- H03H 7/30 . Time-delay networks { (analogue shift registers [G11C 27/04](#)) }
- H03H 7/32 . . with lumped inductance and capacitance
- H03H 7/325 . . . { Adjustable networks }
- H03H 7/34 . . with lumped and distributed reactance
- H03H 7/345 . . . { Adjustable networks }
- H03H 7/38 . Impedance-matching networks
- H03H 7/383 . . { comprising distributed impedance elements together with lumped impedance elements }
- H03H 7/40 . . Automatic matching of load impedance to source impedance
- H03H 7/42 . Balance/unbalance networks
- H03H 7/422 . . { comprising distributed impedance elements together with lumped impedance elements }
- H03H 7/425 . . { Balance-balance networks }

WARNING

not complete, pending reorganisation, see provisionally also [H03H 1/00](#) to [H03H 1/00 A](#), [H03H 7/01 A](#), [H03H 7/0123](#) to [H03H 7/07](#) , [H03H 7/09](#) to [H03H 7/13](#) , [H03H 7/42](#) and [H03H 7/42 B](#)

- H03H 7/427 . . . { Common-mode filters ([H02J 3/01](#) and [H02M 1/126](#) takes precedence) }

WARNING

not complete, pending reorganisation, see provisionally also [H03H 1/00](#) to [H03H 1/00 A](#), [H03H 7/01 A](#), [H03H 7/0123](#) to [H03H 7/07](#) , [H03H 7/09](#) to [H03H 7/13](#) and [H03H 7/42](#)

- H03H 7/46 . Networks for connecting several sources or loads, working on different frequencies or frequency bands, to a common load or source ([for use in multiplex transmission systems H04J 1/00](#))
- H03H 7/461 .. { particularly adapted for use in common antenna systems }
- H03H 7/463 .. { Duplexers }
- H03H 7/465 ... { having variable circuit topology, e.g. including switches }
- H03H 7/466 .. { particularly adapted as input circuit for receivers }
- H03H 7/468 .. { particularly adapted as coupling circuit between transmitters and antennas }
- H03H 7/48 . Networks for connecting several sources or loads, working on the same frequency or frequency band, to a common load or source ([phase shifters providing two or more output signals H03H 7/21](#))
- H03H 7/482 .. { particularly adapted for use in common antenna systems }
- H03H 7/485 .. { particularly adapted as input circuit for receivers }
- H03H 7/487 .. { particularly adapted as coupling circuit between transmitters and antennas }
- H03H 7/52 . One-way transmission networks, i.e. unilines
- H03H 7/54 . Modifications of networks to reduce influence of variations of temperature

H03H 9/00

**Networks comprising electromechanical or electro-acoustic devices ;
Electromechanical resonators** ([making single crystals C30B](#) ; [selection of materials thereof H01L](#) ; [piezo-electric, electrostrictive or magnetostrictive devices per se H01L 41/00](#) ; [electromechanical transducers H04R](#))

- H03H 9/0004 . { Impedance-matching networks ([H03H 9/145](#) takes precedence) }
- H03H 9/0009 .. { using surface acoustic wave devices }
- H03H 9/0014 .. { using bulk acoustic wave devices }
- H03H 9/0023 . { Balance-unbalance or balance-balance networks }
- H03H 9/0028 .. { using surface acoustic wave devices }
- H03H 9/0033 ... { having one acoustic track only }
- H03H 9/0038 { the balanced terminals being on the same side of the track }
- H03H 9/0042 { the balanced terminals being on opposite sides of the track }
- H03H 9/0047 ... { having two acoustic tracks ([H03H 9/008](#) , [H03H 9/0085](#) take precedence) }
- H03H 9/0052 { being electrically cascaded }
- H03H 9/0057 { the balanced terminals being on the same side of the tracks }
- H03H 9/0061 { the balanced terminals being on opposite sides of the tracks }
- H03H 9/0066 { being electrically parallel }
- H03H 9/0071 { the balanced terminals being on the same side of the tracks }
- H03H 9/0076 { the balanced terminals being on opposite sides of the tracks }
- H03H 9/008 ... { having three acoustic tracks ([H03H 9/0085](#) takes precedence) }
- H03H 9/0085 ... { having four acoustic tracks }
- H03H 9/009 { Lattice filters }
- H03H 9/0095 .. { using bulk acoustic wave devices }

H03H 9/02	. Details
H03H 9/02007	.. { of bulk acoustic wave devices }
H03H 9/02015	... { Characteristics of piezoelectric layers, e.g. cutting angles }
H03H 9/02023	.... { consisting of quartz }
H03H 9/02031	.... { consisting of ceramic }
H03H 9/02039	.... { consisting of a material from the crystal group 32, e.g. langasite, langatate, langanite }
H03H 9/02047	... { Treatment of substrates }
H03H 9/02055	.... { of the surface including the back surface }
H03H 9/02062	... { Details relating to the vibration mode }
H03H 9/0207	.... { the vibration mode being harmonic }
H03H 9/02078	.... { the vibration mode being overmoded }
H03H 9/02086	... { Means for compensation or elimination of undesirable effects }
H03H 9/02094	.... { of adherence }
H03H 9/02102	.... { of temperature influence (cutting angles H03H 9/02015) }
H03H 9/0211	.... { of reflections }
H03H 9/02118	.... { of lateral leakage between adjacent resonators }
H03H 9/02125	.... { of parasitic elements }
H03H 9/02133	.... { of stress }
H03H 9/02141	.... { of electric discharge due to pyroelectricity }
H03H 9/02149	.... { of ageing changes of characteristics, e.g. electro-acousto-migration }
H03H 9/02157	... { Dimensional parameters, e.g. ratio between two dimension parameters, length, width or thickness }
H03H 9/0222	.. { of interface-acoustic, boundary, pseudo-acoustic or Stonely wave devices }
H03H 9/02228	.. { Guided bulk acoustic wave devices or Lamb wave devices having interdigital transducers situated in parallel planes on either side of a piezoelectric layer }
H03H 9/02236	.. { of surface skimming bulk wave devices }
H03H 9/02244	.. { of micro-electro-mechanical resonators }
H03H 9/02259	... { Driving or detection means }
H03H 9/02275	.... { Comb electrodes }
H03H 9/02338	... { Suspension means }
H03H 9/02362	.... { Folded-flexure }
H03H 9/02377	..... { Symmetric folded-flexure }
H03H 9/02393	... { Post-fabrication trimming of parameters, e.g. resonance frequency, Q factor }
H03H 9/02401	.... { by annealing }
H03H 9/02409	.... { by application of a DC-bias voltage (H03H 9/02417 takes precedence) }
H03H 9/02417	.... { involving adjustment of the transducing gap }
H03H 9/02425	..... { by electrostatically pulling the beam }
H03H 9/02433	... { Means for compensation or elimination of undesired effects }
H03H 9/02448	.... { of temperature influence }
H03H 9/02535	.. { of surface acoustic wave devices }
H03H 9/02543	... { Characteristics of substrate, e.g. cutting angles }

H03H 9/02551	....	{ of quartz substrates }
H03H 9/02559	....	{ of lithium niobate or lithium-tantalate substrates }
H03H 9/02566	....	{ of semiconductor substrates }
H03H 9/02574	....	{ of combined substrates, multilayered substrates, piezo-electrical layers on not-piezo- electrical substrate }
H03H 9/02582	....	{ of diamond substrates }
H03H 9/0259	....	{ of langasite substrates }
H03H 9/02598	....	{ of langatate substrates }
H03H 9/02606	....	{ of langanite substrates }
H03H 9/02614	...	{ Treatment of substrates, e.g. curved, spherical, cylindrical substrates ensuring closed round-about circuits for the acoustical waves }
H03H 9/02622	....	{ of the surface, including back surface }
H03H 9/02629	....	{ of the edges }
H03H 9/02637	...	{ Details concerning reflective or coupling arrays }
H03H 9/02645	....	{ Waffle-iron or dot arrays }
H03H 9/02653	....	{ Grooves or arrays buried in the substrate }
H03H 9/02661	.....	{ being located inside the interdigital transducers }
H03H 9/02669	....	{ Edge reflection structures, i.e. resonating structures without metallic reflectors, e.g. Bleustein-Gulyaev-Shimizu (BGS), shear horizontal (SH), shear transverse (ST), Love waves devices }
H03H 9/02677	.....	{ having specially shaped edges, e.g. stepped, U-shaped edges }
H03H 9/02685	....	{ Grating lines having particular arrangements }
H03H 9/02692	.....	{ Arched grating lines }
H03H 9/027	.....	{ U-shaped grating lines }
H03H 9/02708	.....	{ Shifted grating lines }
H03H 9/02716	.....	{ Tilted, fan shaped or slanted grating lines }
H03H 9/02724	.....	{ Comb like grating lines }
H03H 9/02732	.....	{ Bilateral comb like grating lines }
H03H 9/0274	.....	{ Intra-transducers grating lines }
H03H 9/02748	.....	{ Dog-legged reflectors }
H03H 9/02755	.....	{ Meandering floating or grounded grating lines }
H03H 9/02763	.....	{ Left and right side electrically coupled reflectors }
H03H 9/02771	.....	{ Reflector banks }
H03H 9/02779	....	{ Continuous surface reflective arrays }
H03H 9/02787	.....	{ having wave guide like arrangements }
H03H 9/02795	....	{ Multi-strip couplers as track changers }
H03H 9/02803	....	{ Weighted reflective structures }
H03H 9/02811	.....	{ Chirped reflective or coupling arrays }
H03H 9/02818	...	{ Means for compensation or elimination of undesirable effects }
H03H 9/02826	....	{ of adherence }
H03H 9/02834	....	{ of temperature influence (cut angles H03H 9/02543) }
H03H 9/02842	....	{ of reflections (H03H 9/6406 takes precedence) }
H03H 9/0285	.....	{ of triple transit echo }

H03H 9/02858	....	{ of wave front distortion }
H03H 9/02866	....	{ of bulk wave excitation and reflections }
H03H 9/02874	....	{ of direct coupling between input and output transducers }
H03H 9/02881	....	{ of diffraction of wave beam }
H03H 9/02889	....	{ of influence of mass loading }
H03H 9/02897	....	{ of strain or mechanical damage, e.g. strain due to bending influence }
H03H 9/02905	....	{ Measures for separating propagation paths on substrate }
H03H 9/02913	....	{ Measures for shielding against electromagnetic fields (shielding of electrical components in general H05K 9/00) }
H03H 9/02921	....	{ Measures for preventing electric discharge due to pyroelectricity }
H03H 9/02929	....	{ of ageing changes of characteristics, e.g. electro-acousto-migration }
H03H 9/02937	....	{ of chemical damage, e.g. corrosion }
H03H 9/02944	....	{ of ohmic loss }
H03H 9/02952	....	{ of parasitic capacitance }
H03H 9/0296	...	{ Surface acoustic wave [SAW] devices having both acoustic and non-acoustic properties }
H03H 9/02968	....	{ with optical devices (mounting in enclosures H03H 9/12) }
H03H 9/02976	....	{ with semiconductor devices }
H03H 9/02984	...	{ Protection measures against damaging }
H03H 9/02992	...	{ Details of bus bars, contact pads or other electrical connections for finger electrodes }
H03H 9/05	..	Holders ; Supports
H03H 9/0504	...	{ for bulk acoustic wave devices }
H03H 9/0509	....	{ consisting of adhesive elements }
H03H 9/0514	....	{ consisting of mounting pads or bumps }
H03H 9/0519	.....	{ for cantilever (H03H 9/1021 takes precedence) }
H03H 9/0523	.....	{ for flip-chip mounting }
H03H 9/0528	....	{ consisting of clips }
H03H 9/0533	....	{ consisting of wire }
H03H 9/0538	...	{ Constructional combinations of supports or holders with electromechanical or other electronic elements }
H03H 9/0542	....	{ consisting of a lateral arrangement (H03H 9/0566 takes precedence) }
H03H 9/0547	....	{ consisting of a vertical arrangement (H03H 9/0566 takes precedence) }
H03H 9/0552	.....	{ the device and the other elements being mounted on opposite sides of a common substrate }
H03H 9/0557	.....	{ the other elements being buried in the substrate }
H03H 9/0561	.....	{ consisting of a multilayered structure }
H03H 9/0566	....	{ for duplexers }
H03H 9/0571	.....	{ including bulk acoustic wave [BAW] devices }
H03H 9/0576	.....	{ including surface acoustic wave [SAW] devices }
H03H 9/058	...	{ for surface acoustic wave devices }
H03H 9/0585	....	{ consisting of an adhesive layer }
H03H 9/059	....	{ consisting of mounting pads or bumps }
H03H 9/0595	...	{ the holder support and resonator being formed in one body }

H03H 9/08	...	Holders with means for regulating temperature
H03H 9/09	...	Elastic or damping supports
H03H 9/10	...	Mounting in enclosures { (constructional combinations of enclosure with electromechanical and other electronic elements H03H 9/0538) }
H03H 9/1007	....	{ for bulk acoustic wave [BAW] devices }
H03H 9/1014	.....	{ the enclosure being defined by a frame built on a substrate and a cap, the frame having no mechanical contact with the BAW device }
H03H 9/1021	.....	{ the BAW device being of the cantilever type }
H03H 9/1028	.....	{ the BAW device being held between spring terminals }
H03H 9/1035	.....	{ the enclosure being defined by two sealing substrates sandwiching the piezoelectric layer of the BAW device }
H03H 9/1042	.....	{ the enclosure being defined by a housing formed by a cavity in a resin }
H03H 9/105	.....	{ the enclosure being defined by a cover cap mounted on an element forming part of the BAW device }
H03H 9/1057	....	{ for micro-electro-mechanical devices }
H03H 9/1064	....	{ for surface acoustic wave [SAW] devices }
H03H 9/1071	.....	{ the enclosure being defined by a frame built on a substrate and a cap, the frame having no mechanical contact with the SAW device }
H03H 9/1078	.....	{ the enclosure being defined by a foil covering the non-active sides of the SAW device }
H03H 9/1085	.....	{ the enclosure being defined by a non-uniform sealing mass covering the non-active sides of the BAW device }
H03H 9/1092	.....	{ the enclosure being defined by a cover cap mounted on an element forming part of the surface acoustic wave [SAW] device on the side of the IDT's }
H03H 9/12	....	for networks with interaction of optical and acoustic waves
H03H 9/125	..	Driving means, e.g. electrodes, coils
H03H 9/13	...	for networks consisting of piezo-electric or electrostrictive materials (H03H 9/145 takes precedence)
H03H 9/131	....	{ consisting of a multilayered structure }
H03H 9/132	....	{ characterized by a particular shape }
H03H 9/133	....	{ for electromechanical delay lines or filters }
H03H 9/135	...	for networks consisting of magnetostrictive materials (H03H 9/145 takes precedence)
H03H 9/145	...	for networks using surface acoustic waves
H03H 9/14502	....	{ Surface acoustic wave [SAW] transducers for a particular purpose }
H03H 9/14505	.....	{ Unidirectional SAW transducers }
H03H 9/14508	.....	{ Polyphase SAW } transducers }
H03H 9/14511	.....	{ SAW transducers for non-piezoelectric substrates }
H03H 9/14514	.....	{ Broad band transducers }
H03H 9/14517	....	{ Means for weighting }
H03H 9/1452	.....	{ by finger overlap length, apodisation }
H03H 9/14523	.....	{ Capacitive tap weighted transducers }
H03H 9/14526	.....	{ Finger withdrawal }
H03H 9/14529	.....	{ Distributed tap }

H03H 9/14532	.....	{ Series weighting; Transverse weighting }
H03H 9/14535	.....	{ Position weighting }
H03H 9/14538	....	{ Formation }
H03H 9/14541	.....	{ Multilayer finger or busbar electrode }
H03H 9/14544	....	{ Transducers of particular shape or position (weighting H03H 9/14517) }
H03H 9/14547	.....	{ Fan shaped; Tilted; Shifted; Slanted; Tapered; Arched; Stepped finger transducers }
H03H 9/1455	.....	{ constituted of N parallel or series transducers }
H03H 9/14552	.....	{ comprising split fingers }
H03H 9/14555	.....	{ Chirped transducers (H03H 9/6406 takes precedence) }
H03H 9/14558	.....	{ Slanted, tapered or fan shaped transducers (H03H 9/14561 , H03H 9/14564 take precedence) }
H03H 9/14561	.....	{ Arched, curved or ring shaped transducers }
H03H 9/14564	.....	{ Shifted fingers transducers }
H03H 9/14567	.....	{ Stepped-fan shaped transducers }
H03H 9/1457	.....	{ Transducers having different finger widths }
H03H 9/14573	.....	{ Arrow type transducers }
H03H 9/14576	.....	{ Transducers whereby only the last fingers have different characteristics with respect to the other fingers, e.g. different shape, thickness or material, split finger }
H03H 9/14579	.....	{ the last fingers having a different shape }
H03H 9/14582	.....	{ the last fingers having a different pitch }
H03H 9/14585	.....	{ the last fingers being split }
H03H 9/14588	.....	{ Horizontally-split transducers }
H03H 9/14591	.....	{ Vertically-split transducers }
H03H 9/14594	.....	{ Plan-rotated or plan-tilted transducers }
H03H 9/14597	....	{ Matching SAW transducers to external electrical circuits }
H03H 9/15	.	Constructional features of resonators consisting of piezo-electric or electrostrictive material (H03H 9/25 takes precedence)
H03H 9/17	..	having a single resonator (crystal tuning forks H03H 9/21)
H03H 9/171	...	{ implemented with thin-film techniques, i.e. of the film bulk acoustic resonator (FBAR) type }
H03H 9/172	....	{ Means for mounting on a substrate, i.e. means constituting the material interface confining the waves to a volume }
H03H 9/173	.....	{ Air-gaps }
H03H 9/174	.....	{ Membranes }
H03H 9/175	.....	{ Acoustic mirrors }
H03H 9/176	...	{ consisting of ceramic material (H03H 9/177 , H03H 9/178 take precedence) }
H03H 9/177	...	{ of the energy-trap type }
H03H 9/178	...	{ of a laminated structure of multiple piezoelectric layers with inner electrodes }
H03H 9/19	...	consisting of quartz
H03H 9/205	..	having multiple resonators (crystal tuning forks H03H 9/21)
H03H 9/21	..	Crystal tuning forks
H03H 9/215	...	consisting of quartz

- H03H 9/22 . Constructional features of resonators consisting of magnetostrictive material
- H03H 9/24 . Constructional features of resonators of material which is not piezo-electric, electrostrictive, or magnetostrictive
 - H03H 9/2405 .. { of micro-electro-mechanical resonators }
 - H03H 9/2426 ... { in combination with other electronic elements }
 - H03H 9/2431 ... { Ring resonators }
 - H03H 9/2436 ... { Disk resonators }
 - H03H 9/2447 ... { Beam resonators ([H03H 9/2468](#) takes precedence) }
 - H03H 9/2452 { Free-free beam resonators }
 - H03H 9/2457 { Clamped-free beam resonators }
 - H03H 9/2463 { Clamped-clamped beam resonators }
 - H03H 9/2468 ... { Tuning fork resonators }
 - H03H 9/2473 { Double-Ended Tuning Fork (DETF) resonators }
 - H03H 9/2478 { Single-Ended Tuning Fork resonators }
 - H03H 9/2484 { with two fork tines, e.g. Y-beam cantilever }
 - H03H 9/2489 { with more than two fork tines }
 - H03H 9/2494 { H-shaped, i.e. two tuning forks with common base }
- H03H 9/25 . Constructional features of resonators using surface acoustic waves { (devices for manipulating acoustic surface waves in general [G10K 11/36](#)) }
- H03H 9/30 . Time-delay networks
 - H03H 9/36 .. with non-adjustable delay time ([H03H 9/40](#) , [H03H 9/42](#) take precedence)
 - H03H 9/38 .. with adjustable delay time ([H03H 9/40](#) , [H03H 9/42](#) take precedence)
 - H03H 9/40 .. Frequency dependent delay lines, e.g. dispersive delay lines ([H03H 9/42](#) takes precedence)
 - H03H 9/42 .. using surface acoustic waves { (devices for manipulating acoustic surface waves in general [G10K 11/36](#)) }
 - H03H 9/423 ... { with adjustable delay time }
 - H03H 9/426 ... { Magneto-elastic surface waves }
 - H03H 9/44 ... Frequency dependent delay lines, e.g. dispersive delay lines
- H03H 9/46 . Filters (multiple-port electromechanical filters [H03H 9/70](#))
 - H03H 9/462 .. { Micro-electro-mechanical filters }
 - H03H 9/465 ... { in combination with other electronic elements }
 - H03H 9/467 ... { Post-fabrication trimming of parameters, e.g. center frequency }
 - H03H 9/48 .. Coupling means therefor
 - H03H 9/485 ... { for micro-electro-mechanical filters }
 - H03H 9/50 ... Mechanical coupling means
 - H03H 9/505 { for micro-electro-mechanical filters }
 - H03H 9/52 ... Electric coupling means
 - H03H 9/525 { for micro-electro-mechanical filters }
 - H03H 9/54 .. comprising resonators of piezo-electric or electrostrictive material ([H03H 9/64](#))

		takes precedence)
H03H 9/542	...	{ including passive elements (H03H 9/545 takes precedence) }
H03H 9/545	...	{ including active elements }
H03H 9/547	...	{ Notch filters, e.g. notch BAW or thin film resonator filters }
H03H 9/56	...	Monolithic crystal filters
H03H 9/562	....	{ comprising a ceramic piezoelectric layer }
H03H 9/564	....	{ implemented with thin-film techniques }
H03H 9/566	....	{ Electric coupling means therefor (H03H 9/0095 takes precedence) }
H03H 9/568	.....	{ consisting of a ladder configuration }
H03H 9/58	...	Multiple crystal filters
H03H 9/581	....	{ comprising ceramic piezoelectric layers }
H03H 9/582	....	{ implemented with thin-film techniques }
H03H 9/583	.....	{ comprising a plurality of piezoelectric layers acoustically coupled }
H03H 9/584	.....	{ Coupled Resonator Filters (CFR) }
H03H 9/585	.....	{ Stacked Crystal Filters (SCF) }
H03H 9/586	.....	{ Means for mounting to a substrate, i.e. means constituting the material interface confining the waves to a volume }
H03H 9/587	.....	{ Air-gaps }
H03H 9/588	.....	{ Membranes }
H03H 9/589	.....	{ Acoustic mirrors }
H03H 9/60	....	Electric coupling means therefor { (H03H 9/0095 takes precedence) }
H03H 9/605	.....	{ consisting of a ladder configuration }
H03H 9/62	..	comprising resonators of magnetostrictive material (H03H 9/64 takes precedence)
H03H 9/64	..	using surface acoustic waves
H03H 9/6403	...	{ Programmable filters }
H03H 9/6406	...	{ Filters characterised by a particular frequency characteristic }
H03H 9/6409	....	{ SAW notch filters }
H03H 9/6413	....	{ SAW comb filters }
H03H 9/6416	....	{ SAW matched filters, e.g. surface acoustic wave compressors, chirped or coded surface acoustic wave filters }
H03H 9/642	.....	{ SAW transducers details for remote interrogation systems, e.g. surface acoustic wave transducers details for ID-tags (remote interrogation systems per se G06K 7/10009 , G01S 13/74) }
H03H 9/6423	...	{ Means for obtaining a particular transfer characteristic }
H03H 9/6426	....	{ Combinations of the characteristics of different transducers }
H03H 9/643	....	{ the transfer characteristic being determined by reflective or coupling array characteristics }
H03H 9/6433	....	{ Coupled resonator filters }
H03H 9/6436	.....	{ having one acoustic track only }
H03H 9/644	.....	{ having two acoustic tracks }
H03H 9/6443	.....	{ being acoustically coupled }
H03H 9/6446	.....	{ by floating multistrip couplers (H03H 9/645 , H03H 9/6453 take precedence) }
H03H 9/645	.....	{ by grating reflectors overlapping both tracks }

- H03H 9/6453 { by at least an interdigital transducer overlapping both tracks }
- H03H 9/6456 { being electrically coupled }
- H03H 9/6459 { via one connecting electrode }
- H03H 9/6463 { the tracks being electrically cascaded }
- H03H 9/6466 { each track containing more than two transducers }
- H03H 9/6469 { via two connecting electrodes }
- H03H 9/6473 { the electrodes being electrically interconnected }
- H03H 9/6476 { the tracks being electrically parallel }
- H03H 9/6479 { Capacitively coupled SAW resonator filters }
- H03H 9/6483 { Ladder SAW filters }
- H03H 9/6486 { having crossing or intersecting acoustic tracks, e.g. intersection in a perpendicular or diagonal orientation }
- H03H 9/6489 ... { Compensation of undesirable effects }
- H03H 9/6493 { Side lobe suppression }
- H03H 9/6496 { Reducing ripple in transfer characteristic }
- H03H 9/66 . Phase shifters
- H03H 9/68 .. using surface acoustic waves
- H03H 9/70 . Multiple-port networks for connecting several sources or loads, working on different frequencies or frequency bands, to a common load or source
- H03H 9/703 .. { Networks using bulk acoustic wave devices }
- H03H 9/706 ... { Duplexers }
- H03H 9/72 .. Networks using surface acoustic waves
- H03H 9/725 ... { Duplexers }
- H03H 9/74 . Multiple-port networks for connecting several sources or loads, working on the same frequency or frequency band, to a common load or source ([networks for phase shifting H03H 9/66](#))
- H03H 9/76 .. Networks using surface acoustic waves

H03H 11/00 Networks using active elements

WARNING

Group [H03H 11/11](#) does not correspond to former or current IPC groups.
 Concordance CPC : IPC for these groups is as follows: - [H03H 11/11](#) - [H03H 11/04](#)

- H03H 11/02 . Multiple-port networks
- H03H 11/025 .. { using current conveyors }
- H03H 11/04 .. Frequency selective two-port networks
- H03H 11/0405 ... { Non-linear filters }
- H03H 11/0416 ... { using positive impedance converters ([H03H 11/08](#) takes precedence) }
- H03H 11/0422 ... { using transconductance amplifiers, e.g. gmC filters }
- H03H 11/0427 { Filters using a single transconductance amplifier; Filters derived from a single transconductor filter, e.g. by element substitution, cascading, parallel }

		connection (H03H 11/0433 to H03H11/C10 take precedence) }
H03H 11/0433	....	{ Two integrator loop filters (H03H 11/0455 takes precedence) }
H03H 11/0438	.....	{ Tow-Thomas biquad }
H03H 11/0444	....	{ Simulation of ladder networks }
H03H 11/045	.....	{ Leapfrog structures }
H03H 11/0455	....	{ Multiple integrator loop feedback filters }
H03H 11/0461	....	{ Current mode filters }
H03H 11/0466	....	{ Filters combining transconductance amplifiers with other active elements, e.g. operational amplifiers, transistors, voltage conveyors }
H03H 11/0472	....	{ Current or voltage controlled filters }
H03H 11/06	...	comprising means for compensation of loss
H03H 11/08	...	using gyrators
H03H 11/10	...	using negative impedance converters (H03H 11/08 takes precedence)
H03H 11/11	...	{ using current conveyors }
H03H 11/12	...	using amplifiers with feedback ({ H03H 11/0422 } , H03H 11/08 , H03H 11/10 take precedence)
H03H 11/1204	....	{ Distributed RC filters }
H03H 11/1208	....	{ comprising an electromechanical resonator }
H03H 11/1213	....	{ using transistor amplifiers (H03H 11/1204 takes precedence; parallel-T filters H03H 11/1295) }
H03H 11/1217	....	{ using a plurality of operational amplifiers (H03H 11/1204 takes precedence; parallel-T filters H03H 11/1295) }
H03H 11/1221	.....	{ Theory; Synthesis (H03H 11/1226 to H03H 11/1252 take precedence) }
H03H 11/1226	.....	{ Filters using operational amplifier poles }
H03H 11/123	.....	{ Modifications to reduce sensitivity }
H03H 11/1234	.....	{ Modifications to reduce detrimental influences of amplifier imperfections, e.g. limited gain-bandwidth product, limited input impedance }
H03H 11/1239	.....	{ Modifications to reduce influence of variations of temperature }
H03H 11/1243	.....	{ Simulation of ladder networks }
H03H 11/1247	.....	{ Leapfrog structures }

WARNING

Not complete, pending reorganisation, see provisionally also
[H03H 11/1217](#) to [H03H 11/1252](#)

H03H 11/1252	.....	{ Two integrator-loop-filters }
H03H 11/1256	.....	{ Tow-Thomas biquad }

WARNING

Not complete, pending reorganisation, see provisionally also
[H03H 11/1217](#) to [H03H 11/1252](#)

H03H 11/126	....	{ using a single operational amplifier (H03H 11/1204 takes precedence; parallel-T filters H03H 11/1295) }
H03H 11/1265	.....	{ Synthesis (H03H 11/1269 to H03H 11/1282 take precedence) }

H03H 11/1269	.....	{ Filters using the operational amplifier pole }
H03H 11/1273	.....	{ Modifications to reduce sensitivity }
H03H 11/1278	.....	{ Modifications to reduce detrimental influences of amplifier imperfections, e.g. limited gain-bandwidth product, limited input impedance }
H03H 11/1282	.....	{ Modifications to reduce influence of variations of temperature }
H03H 11/1286	.....	{ Sallen-Key biquad }

WARNING

Not complete, pending reorganisation, see provisionally also
[H03H 11/126](#) to [H03H 11/1282](#)

H03H 11/1291	....	{ Current or voltage controlled filters }
H03H 11/1295	....	{ Parallel-T filters }
H03H 11/14	...	using electro-optic devices
H03H 11/16	..	Networks for phase shifting
H03H 11/18	...	Two-port phase shifters providing a predetermined phase shift, e.g. "all-pass" filters
H03H 11/20	...	Two-port phase shifters providing an adjustable phase shift
H03H 11/22	...	providing two or more phase shifted output signals, e.g. n-phase output
H03H 11/24	..	Frequency-independent attenuators
H03H 11/245	...	{ using field-effect transistor }
H03H 11/26	..	Time-delay networks (analogue shift registers G11C 27/04)
H03H 11/265	...	{ with adjustable delay }
H03H 11/28	..	Impedance matching networks
H03H 11/30	...	Automatic matching of source impedance to load impedance
H03H 11/32	..	Balance-unbalance networks
H03H 11/34	..	Networks for connecting several sources or loads working on different frequencies or frequency bands, to a common load or source (for use in multiplex transmission systems H04J 1/00)
H03H 11/342	...	{ particularly adapted for use in common antenna systems }
H03H 11/344	...	{ Duplexers }
H03H 11/346	...	{ particularly adapted as input circuit for receivers }
H03H 11/348	...	{ particularly adapted as coupling circuit between transmitters and antenna }
H03H 11/36	..	Networks for connecting several sources or loads, working on the same frequency band, to a common load or source (phase shifters providing two or more output signals H03H 11/22)
H03H 11/362	...	{ particularly adapted for use in common antenna systems }
H03H 11/365	...	{ particularly adapted as input circuit for receivers }
H03H 11/367	...	{ particularly adapted as coupling circuit between transmitters and antenna }
H03H 11/38	..	One-way transmission networks, i.e. unilines
H03H 11/40	..	Impedance converters
H03H 11/405	...	{ Positive impedance converters (H03H 11/42 takes precedence; used in frequency selective networks H03H 11/0416) }
H03H 11/42	...	Gyrators (used in frequency selective networks H03H 11/08)
H03H 11/44	...	Negative impedance converters (H03H 11/42 takes precedence; used in

frequency selective networks [H03H 11/10](#))

- H03H 11/46 . One-port networks
- H03H 11/48 . . . simulating reactances
- H03H 11/481 . . . { Simulating capacitances }

WARNING

Not complete, pending reorganisation, see provisionally also [H03H 11/48](#) to [H03H 11/52](#)

- H03H 11/483 . . . { Simulating capacitance multipliers }

WARNING

Not complete, pending reorganisation, see provisionally also [H03H 11/48](#) to [H03H 11/52](#)

- H03H 11/485 . . . { Simulating inductances using operational amplifiers }

WARNING

Not complete, pending reorganisation, see provisionally also [H03H 11/48](#) to [H03H 11/52](#)

- H03H 11/486 . . . { Simulating inductances using transconductance amplifiers }

WARNING

Not complete, pending reorganisation, see provisionally also [H03H 11/48](#) to [H03H 11/52](#)

- H03H 11/488 . . . { Simulating inductances using current conveyors }

WARNING

Not complete, pending reorganisation, see provisionally also [H03H 11/48](#) to [H03H 11/52](#)

- H03H 11/50 . . . using gyrators
- H03H 11/52 . . . simulating negative resistances
- H03H 11/525 . . . { Simulating frequency dependent negative resistance [FDNR] }

WARNING

Not complete, pending reorganisation, see provisionally also [H03H 11/52](#)

- H03H 11/53 . . { simulating resistances; simulating resistance multipliers }

WARNING

Not complete, pending reorganisation, see provisionally also [H03H 11/48](#) to [H03H 11/52](#)

- H03H 11/54 . Modifications of networks to reduce influence of variations of temperature

H03H 15/00 **Transversal filters** ([electromechanical filters H03H 9/46](#) , [H03H 9/70](#))

- H03H 15/02 . using analogue shift registers
- H03H 15/023 .. { with parallel-input configuration }

H03H 17/00 **Networks using digital techniques**

- H03H 17/0009 . { Time-delay networks }
- H03H 17/0018 .. { Realizing a fractional delay }
- H03H 17/0027 ... { by means of a non-recursive filter }
- H03H 17/0036 ... { by means of a recursive filter }
- H03H 17/0045 . { Impedance matching networks }
- H03H 17/0054 . { Attenuators }
- H03H 17/0063 . { R, L, C, simulating networks }
- H03H 17/02 . Frequency selective networks { ([digital computers for complex mathematical operations G06F 17/10](#)) }
- H03H 17/0201 .. { Wave digital filters }
- H03H 17/0202 .. { Two or more dimensional filters; Filters for complex signals ([multidimensional convolutions G06F 17/153](#)) }
- H03H 17/0211 .. { using specific transformation algorithms, e.g. WALSH functions, Fermat transforms, Mersenne transforms, polynomial transforms, Hilbert transforms ([correlation computation G06F 17/156](#)) }
- H03H 17/0213 ... { Frequency domain filters using Fourier transforms }
- H03H 17/0216 ... { Quefrequency domain filters }
- H03H 17/0217 ... { Number theoretic transforms }
- H03H 17/0219 .. { Compensation of undesirable effects, e.g. quantisation noise, overflow ([stability problems H03H 17/0461](#)) }
- H03H 17/0223 .. { Computation saving measures; Accelerating measures ([computations per se G06F](#)) }
- H03H 17/0225 ... { Measures concerning the multipliers }
- H03H 17/0226 { comprising look-up tables }
- H03H 17/0227 ... { Measures concerning the coefficients }
- H03H 17/0229 { reducing the number of taps }
- H03H 17/023 { reducing the wordlength, the possible values of coefficients }
- H03H 17/0233 ... { Measures concerning the signal representation }
- H03H 17/0235 { reducing the wordlength of signals }
- H03H 17/0236 { using codes }
- H03H 17/0238 ... { Measures concerning the arithmetic used ([performing computations G06F 7/60](#)) }
- H03H 17/0239 { Signed digit arithmetic }
- H03H 17/0241 { Distributed arithmetic }

H03H 17/0242	....	{ Residue number arithmetic }
H03H 17/0248	..	{ Filters characterised by a particular frequency response or filtering method }
H03H 17/025	...	{ Notch filters }
H03H 17/0251	...	{ Comb filters }
H03H 17/0252	...	{ Elliptic filters }
H03H 17/0254	...	{ Matched filters }
H03H 17/0255	...	{ Filters based on statistics (adaptive filters H03H 21/0029) }
H03H 17/0257	....	{ KALMAN filters }
H03H 17/0258	....	{ ARMA filters }
H03H 17/026	...	{ Averaging filters }
H03H 17/0261	...	{ Non linear filters }
H03H 17/0263	....	{ Rank order filters }
H03H 17/0264	...	{ Filter sets with mutual related characteristics }
H03H 17/0266	....	{ Filter banks }
H03H 17/0267	.....	{ comprising non-recursive filters }
H03H 17/0269	.....	{ comprising recursive filters }
H03H 17/027	....	{ Complementary filters; Phase complementary filters }
H03H 17/0272	....	{ Quadrature mirror filters }
H03H 17/0273	....	{ Polyphase filters }
H03H 17/0275	.....	{ comprising non-recursive filters }
H03H 17/0276	.....	{ having two phases }
H03H 17/0277	.....	{ comprising recursive filters }
H03H 17/0279	.....	{ having two phases }
H03H 17/028	...	{ Polynomial filters }
H03H 17/0282	...	{ Sinc or gaussian filters (H03H 17/0671 takes precedence) }
H03H 17/0283	..	{ Filters characterised by the filter structure (H03H 17/0202 , H03H 17/0219 to H03H 17/0248 take precedence) }
H03H 17/0285	...	{ Ladder or lattice filters }
H03H 17/0286	...	{ Combinations of filter structures }
H03H 17/0288	....	{ Recursive, non-recursive, ladder, lattice structures }
H03H 17/0289	....	{ Digital and active filter structures }
H03H 17/0291	....	{ Digital and sampled data filters }
H03H 17/0292	...	{ Time multiplexed filters; Time sharing filters }
H03H 17/0294	..	{ Variable filters; Programmable filters }
H03H 17/04	..	Recursive filters
H03H 17/0405	...	{ comprising a ROM addressed by the input and output data signals }
H03H 17/0411	...	{ using DELTA modulation }
H03H 17/0416	...	{ with input-sampling frequency and output-delivery frequency which differ, e.g. extrapolation; Anti-aliasing }
H03H 17/0422	....	{ the input and output signals being derived from two separate clocks, i.e. asynchronous sample rate conversion }
H03H 17/0427	....	{ characterized by the ratio between the input-sampling and output-delivery frequencies }

H03H 17/0433	.....	{ the ratio being arbitrary or irrational }
H03H 17/0438	.....	{ the ratio being integer }
H03H 17/0444	.....	{ where the output-delivery frequency is higher than the input sampling frequency, i.e. interpolation }
H03H 17/045	.....	{ where the output-delivery frequency is lower than the input sampling frequency, i.e. decimation }
H03H 17/0455	.....	{ the ratio being rational }
H03H 17/0461	...	{ Quantisation; Rounding; Truncation; Overflow oscillations or limit cycles eliminating measures }
H03H 17/06	..	Non-recursive filters
H03H 17/0607	...	{ comprising a ROM addressed by the input data signals }
H03H 17/0614	...	{ using Delta-modulation }
H03H 17/0621	...	{ with input-sampling frequency and output-delivery frequency which differ, e.g. extrapolation; Anti-aliasing }
H03H 17/0628	....	{ the input and output signals being derived from two separate clocks, i.e. asynchronous sample rate conversion }
H03H 17/0635	....	{ characterized by the ratio between the input-sampling and output-delivery frequencies }
H03H 17/0642	.....	{ the ratio being arbitrary or irrational }
H03H 17/065	.....	{ the ratio being integer }
H03H 17/0657	.....	{ where the output-delivery frequency is higher than the input sampling frequency, i.e. interpolation }
H03H 17/0664	.....	{ where the output-delivery frequency is lower than the input sampling frequency, i.e. decimation }
H03H 17/0671	.....	{ Cascaded integrator-comb [CIC] filters }
H03H 17/0685	.....	{ the ratio being rational }
H03H 17/08	.	Networks for phase shifting
H03H 19/00		Networks using time-varying elements, e.g. N-path filters
H03H 19/002	.	{ N-path filters }
H03H 19/004	.	{ Switched capacitor networks }
H03H 19/006	..	{ simulating one-port networks }
H03H 19/008	.	{ with variable switch closing time }
H03H 21/00		Adaptive networks
H03H 21/0001	.	{ Analogue adaptive filters }
H03H 21/0003	..	{ comprising CCD devices }
H03H 21/0005	..	{ comprising SAW devices }
H03H 21/0007	..	{ comprising switched capacitor [SC] devices }
H03H 21/0012	.	{ Digital adaptive filters }

H03H 21/0014	.. { Lattice filters }
H03H 21/0016	.. { Non linear filters }
H03H 21/0018	.. { Matched filters }
H03H 21/002	.. { Filters with a particular frequency response (H03H 21/0014 to H03H 21/0018 take precedence) }
H03H 21/0021	... { Notch filters }
H03H 21/0023	... { Comb filters }
H03H 21/0025	.. { Particular filtering methods }
H03H 21/0027	... { filtering in the frequency domain }
H03H 21/0029	... { based on statistics }
H03H 21/003	.... { KALMAN filters }
H03H 21/0032	.... { ARMA filters }
H03H 21/0043	.. { Adaptive algorithms }
H03H 21/0067	.. { Means or methods for compensation of undesirable effects }

Guidance heading:

H03H 2001/00	Constructional details of impedance networks whose electrical mode of operation is not specified or applicable to more than one type of network (constructional details of electromechanical transducers H03H 9/00)
H03H 2001/0014	. Capacitor filters, i.e. capacitors whose parasitic inductance is of relevance to consider it as filter
H03H 2001/0021	. Constructional details
H03H 2001/0028	.. RFI filters with housing divided in two bodies
H03H 2001/0035	.. Wound magnetic core
H03H 2001/0042	.. Wound, ring or feed-through type capacitor
H03H 2001/005	.. Wound, ring or feed-through type inductor
H03H 2001/0057	.. comprising magnetic material
H03H 2001/0064	.. comprising semiconductor material
H03H 2001/0071	.. comprising zig-zag inductor
H03H 2001/0078	.. comprising spiral inductor on a substrate
H03H 2001/0085	.. Multilayer, e.g. LTCC, HTCC, green sheets (inside PCB filters H05K)
H03H 2001/0092	. Inductor filters, i.e. inductors whose parasitic capacitance is of relevance to consider it as filter
H03H 2003/00	Apparatus or processes specially adapted for the manufacture of impedance networks, resonating circuits, resonators
H03H 2003/007	. for the manufacture of electromechanical resonators or networks
H03H 2003/0071	.. of bulk acoustic wave and surface acoustic wave elements in the same process
H03H 2003/02	.. for the manufacture of piezo-electric or electrostrictive resonators or networks (H03H 3/08 takes precedence)

H03H 2003/021	...	the resonators or networks being of the air-gap type
H03H 2003/022	...	the resonators or networks being of the cantilever type
H03H 2003/023	...	the resonators or networks being of the membrane type
H03H 2003/025	...	the resonators or networks comprising an acoustic mirror
H03H 2003/026	...	the resonators or networks being of the tuning fork type
H03H 2003/027	...	the resonators or networks being of the micro-electro-mechanical [MEMS] type
H03H 2003/028	...	for obtaining desired values of other parameters
H03H 2003/04	...	for obtaining desired frequency or temperature coefficient
H03H 2003/0407	....	Temperature coefficient
H03H 2003/0414	....	Resonance frequency
H03H 2003/0421	.....	Modification of the thickness of an element
H03H 2003/0428	.....	of an electrode
H03H 2003/0435	.....	of a piezoelectric layer
H03H 2003/0442	.....	of a non-piezoelectric layer
H03H 2003/045	.....	Modification of the area of an element
H03H 2003/0457	.....	of an electrode
H03H 2003/0464	.....	operating on an additional circuit element, e.g. a passive circuit element connected to the resonator
H03H 2003/0471	.....	of a plurality of resonators at different frequencies
H03H 2003/0478	.....	in a process for mass production
H03H 2003/0485	.....	during the manufacture of a cantilever
H03H 2003/0492	.....	during the manufacture of a tuning-fork

H03H 2007/00 **Multiple-port networks comprising only passive electrical elements as network components** (receiver input circuits [H04B 1/18](#) ; networks simulating a length of communication cable [H04B 3/40](#))

H03H 2007/006	.	MEMS
H03H 2007/008	..	the MEMS being trimmable
H03H 2007/01	.	Frequency selective two-port networks
H03H 2007/013	..	Notch or bandstop filters
H03H 2007/0192	..	Complex filters
H03H 2007/38	.	Impedance-matching networks
H03H 2007/386	..	Multiple band impedance matching

H03H 2009/00 **Networks comprising electromechanical or electro-acoustic devices ; Electromechanical resonators** (making single crystals [C30B](#) ; selection of materials thereof [H01L](#) ; piezo-electric, electrostrictive or magnetostrictive devices per se [H01L 41/00](#) ; electromechanical transducers [H04R](#))

H03H 2009/0019	.	Surface acoustic wave multichip
H03H 2009/02	.	Details

H03H 2009/02165	..	Tuning
H03H 2009/02173	...	of film bulk acoustic resonators [FBAR]
H03H 2009/02181	....	by application of heat from a heat source
H03H 2009/02188	....	Electrically tuning
H03H 2009/02196	.....	operating on the FBAR element, e.g. by direct application of a tuning DC voltage
H03H 2009/02204	.....	operating on an additional circuit element, e.g. applying a tuning DC voltage to a passive circuit element connected to the resonator
H03H 2009/02212	....	Magnetically tuning
H03H 2009/02244	..	{ of micro-electro-mechanical resonators }
H03H 2009/02251	...	Design
H03H 2009/02259	...	{ Driving or detection means }
H03H 2009/02267	....	having dimensions of atomic scale, e.g. involving electron transfer across vibration gap
H03H 2009/02283	...	Vibrating means
H03H 2009/02291	....	Beams
H03H 2009/02299	.....	Comb-like, i.e. the beam comprising a plurality of fingers or protrusions along its length
H03H 2009/02307	.....	Dog-bone-like structure, i.e. the elongated part of the "bone" is doubly clamped
H03H 2009/02314	.....	forming part of a transistor structure
H03H 2009/02322	.....	Material
H03H 2009/0233	....	comprising perforations
H03H 2009/02338	...	{ Suspension means }
H03H 2009/02346	....	Anchors for ring resonators
H03H 2009/02354	.....	applied along the periphery, e.g. at nodal points of the ring
H03H 2009/02362	....	{ Folded-flexure }
H03H 2009/0237	.....	applied at the center
H03H 2009/02385	....	Anchors for square resonators, i.e. resonators comprising a square vibrating membrane
H03H 2009/02433	...	{ Means for compensation or elimination of undesired effects }
H03H 2009/0244	....	Anchor loss
H03H 2009/02456	....	Parasitic elements or effects, e.g. parasitic capacitive coupling between input and output
H03H 2009/02464	....	Pull-in
H03H 2009/02472	....	Stiction
H03H 2009/0248	....	Strain
H03H 2009/02488	...	Vibration modes
H03H 2009/02496	....	Horizontal, i.e. parallel to the substrate plane
H03H 2009/02503	.....	Breath-like, e.g. Lamé mode, wine-glass mode
H03H 2009/02511	....	Vertical, i.e. perpendicular to the substrate plane
H03H 2009/02519	....	Torsional
H03H 2009/02527	....	Combined
H03H 2009/15	.	Constructional features of resonators consisting of piezo-electric or electrostrictive

- material ([H03H 9/25](#) takes precedence)
- [H03H 2009/155](#) .. using MEMS techniques
- [H03H 2009/24](#) . Constructional features of resonators of material which is not piezo-electric, electrostrictive, or magnetostrictive
- [H03H 2009/2405](#) .. { of micro-electro-mechanical resonators }
- [H03H 2009/241](#) ... Bulk-mode MEMS resonators
- [H03H 2009/2415](#) with concave shape [CBAR]
- [H03H 2009/2421](#) with I shape [IBAR]
- [H03H 2009/2442](#) ... Square resonators

H03H 2011/00 Networks using active elements

WARNING

Group [H03H 11/11](#) does not correspond to former or current IPC groups.
Concordance CPC : IPC for these groups is as follows: - [H03H 11/11](#) - [H03H 11/04](#)

- [H03H 2011/02](#) . Multiple-port networks
- [H03H 2011/04](#) .. Frequency selective two-port networks
- [H03H 2011/0405](#) ... { Non-linear filters }
- [H03H 2011/0411](#) Rank order or median filters
- [H03H 2011/0477](#) ... using current feedback operational amplifiers
- [H03H 2011/0483](#) ... using operational transresistance amplifiers [OTRA]
- [H03H 2011/0488](#) ... Notch or bandstop filters
- [H03H 2011/0494](#) ... Complex filters

H03H 2015/00 Transversal filters (electromechanical filters [H03H 9/46](#) , [H03H 9/70](#))

- [H03H 2015/002](#) . Computation saving measures
- [H03H 2015/005](#) . comprising capacitors implemented with MEMS technology
- [H03H 2015/007](#) . Programmable filters
- [H03H 2015/026](#) . Matched filters in charge domain

H03H 2017/00 Networks using digital techniques

- [H03H 2017/0072](#) . Theoretical filter design
- [H03H 2017/0081](#) .. of FIR filters
- [H03H 2017/009](#) .. of IIR filters
- [H03H 2017/02](#) . Frequency selective networks { (digital computers for complex mathematical operations [G06F 17/10](#)) }

H03H 2017/0202	..	{ Two or more dimensional filters; Filters for complex signals (multidimensional convolutions G06F 17/153) }
H03H 2017/0204	...	Comb filters
H03H 2017/0205	...	Kalman filters
H03H 2017/0207	...	Median filters
H03H 2017/0208	...	using neural networks
H03H 2017/021	...	Wave digital filters
H03H 2017/0211	..	{ using specific transformation algorithms, e.g. WALSH functions, Fermat transforms, Mersenne transforms, polynomial transforms, Hilbert transforms (correlation computation G06F 17/156) }
H03H 2017/0213	...	{ Frequency domain filters using Fourier transforms }
H03H 2017/0214	....	with input-sampling frequency and output-delivery frequency which differ, e.g. interpolation, extrapolation ; anti-aliasing
H03H 2017/0219	..	{ Compensation of undesirable effects, e.g. quantisation noise, overflow (stability problems H03H 17/0461) }
H03H 2017/022	...	Rounding error
H03H 2017/0222	...	Phase error
H03H 2017/0223	..	{ Computation saving measures; Accelerating measures (computations per se G06F) }
H03H 2017/0227	...	{ Measures concerning the coefficients }
H03H 2017/023	....	{ reducing the wordlength, the possible values of coefficients }
H03H 2017/0232	.....	Canonical signed digit [CSD] or power of 2 coefficients
H03H 2017/0244	...	Measures to reduce settling time
H03H 2017/0245	...	Measures to reduce power consumption (H03H 17/0223 takes preference)
H03H 2017/0247	...	Parallel structures using a slower clock
H03H 2017/0294	..	{ Variable filters; Programmable filters }
H03H 2017/0295	...	Changing between two filter characteristics
H03H 2017/0297	...	Coefficients derived from input parameters
H03H 2017/0298	..	DSP implementation
H03H 2017/04	..	Recursive filters
H03H 2017/0461	...	{ Quantisation; Rounding; Truncation; Overflow oscillations or limit cycles eliminating measures }
H03H 2017/0466	....	Reduction of limit cycle oscillation
H03H 2017/0472	...	based on allpass structures
H03H 2017/0477	...	Direct form I
H03H 2017/0483	....	Transposed
H03H 2017/0488	...	Direct form II
H03H 2017/0494	....	Transposed
H03H 2017/06	..	Non-recursive filters
H03H 2017/0621	...	{ with input-sampling frequency and output-delivery frequency which differ, e.g. extrapolation; Anti-aliasing }
H03H 2017/0635	....	{ characterized by the ratio between the input-sampling and output-delivery frequencies }
H03H 2017/0671	.....	{ Cascaded integrator-comb [CIC] filters }
H03H 2017/0678	.....	with parallel structure, i.e. parallel CIC [PCIC]

[H03H 2017/0692](#) . . . Transposed

H03H 2021/00 Adaptive networks

[H03H 2021/0001](#) . { Analogue adaptive filters }

[H03H 2021/0009](#) . . Details

[H03H 2021/001](#) . . . Analog multipliers

[H03H 2021/0012](#) . { Digital adaptive filters }

[H03H 2021/0025](#) . . { Particular filtering methods }

[H03H 2021/0034](#) . . . Blind source separation

[H03H 2021/0036](#) of convolutive mixtures

[H03H 2021/0038](#) of instantaneous mixtures

[H03H 2021/004](#) using state space representation

[H03H 2021/0041](#) . . . Subband decomposition

[H03H 2021/0043](#) . . { Adaptive algorithms }

[H03H 2021/0045](#) . . . Equation error

[H03H 2021/0047](#) Combined output and equation error

[H03H 2021/0049](#) . . . Recursive least squares algorithm

[H03H 2021/005](#) with forgetting factor

[H03H 2021/0052](#) combined with stochastic gradient algorithm

[H03H 2021/0054](#) Affine projection

[H03H 2021/0056](#) . . . Non-recursive least squares algorithm [LMS]

[H03H 2021/0058](#) Block LMS, i.e. in frequency domain

[H03H 2021/0059](#) Delayed LMS

[H03H 2021/0061](#) Normalized LMS [NLMS]

[H03H 2021/0063](#) Proportionate NLMS

[H03H 2021/0065](#) Sign-sign LMS

[H03H 2021/0067](#) . . { Means or methods for compensation of undesirable effects }

[H03H 2021/0069](#) . . . Finite wordlength

[H03H 2021/007](#) . . Computation saving measures ; Accelerating measures

[H03H 2021/0072](#) . . . Measures relating to the coefficients

[H03H 2021/0074](#) Reduction of the update frequency

[H03H 2021/0076](#) . . . Measures relating to the convergence time ([H03H 2021/0072](#) takes preference)

[H03H 2021/0078](#) varying the step size

[H03H 2021/0079](#) . . . using look-up tables

[H03H 2021/0081](#) . . Details

[H03H 2021/0083](#) . . . Shadow filter, i.e. one of two filters which are simultaneously adapted, wherein the results of adapting the shadow filter are used for adapting the other filter

[H03H 2021/0085](#) . . Applications

[H03H 2021/0087](#) . . . Prediction

[H03H 2021/0089](#) . . . System identification, i.e. modeling

- H03H 2021/009 with recursive filters
- H03H 2021/0092 . . . Equalization, i.e. inverse modeling
- H03H 2021/0094 . . . Interference Cancelling
- H03H 2021/0096 . . with input-sampling frequency and output-delivery frequency which differ, e.g. extrapolation ; anti-aliasing
- H03H 2021/0098 . Adaptive filters comprising analog and digital structures

Guidance heading:

H03H 2210/00 Indexing scheme relating to details of tunable filters

- H03H 2210/01 . Tuned parameter of filter characteristics
- H03H 2210/012 . . Centre frequency ; Cut-off frequency
- H03H 2210/015 . . Quality factor or bandwidth
- H03H 2210/017 . . Amplitude, gain or attenuation
- H03H 2210/02 . Variable filter component
- H03H 2210/021 . . Amplifier, e.g. transconductance amplifier
- H03H 2210/023 . . . Tuning of transconductance via tail current source
- H03H 2210/025 . . Capacitor
- H03H 2210/026 . . Inductor
- H03H 2210/028 . . Resistor
- H03H 2210/03 . Type of tuning
- H03H 2210/033 . . Continuous
- H03H 2210/036 . . Stepwise
- H03H 2210/04 . Filter calibration method
- H03H 2210/043 . . by measuring time constant
- H03H 2210/046 . . Master -slave

Guidance heading:

H03H 2218/00 Indexing scheme relating to details of digital filters

- H03H 2218/02 . Coefficients
- H03H 2218/025 . . updated selectively, e.g. by, in the presence of noise, temporally cancelling the update and outputting a predetermined value
- H03H 2218/04 . In-phase and quadrature [I/Q] signals
- H03H 2218/06 . Multiple-input, multiple-output [MIMO] ; Multiple-input, single-output [MISO]
- H03H 2218/08 . Resource sharing

H03H 2218/085	. . Multipliers
H03H 2218/10	. Multiplier and or accumulator units
H03H 2218/12	. Signal conditioning
H03H 2218/14	. Non-uniform sampling
H03H 2220/00	Indexing scheme relating to structures of digital filters
H03H 2220/02	. Modular, e.g. cells connected in cascade
H03H 2220/04	. Pipelined
H03H 2220/06	. Systolic
H03H 2220/08	. Variable filter length
H03H 2222/00	Indexing scheme relating to digital filtering methods
H03H 2222/02	. using fuzzy logic
H03H 2222/04	. using neural networks
H03H 2222/06	. using wavelets
H03H 2240/00	Indexing scheme relating to filter banks
H03H 2250/00	Indexing scheme relating to dual- or multi-band filters
H03H 2260/00	Theory relating to impedance networks