

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 togetherwith lumped impedance elements;

networks comprising electromechanical or electro-acoustic elements;

networks simulating reactances and comprising dischargetubes or semiconductor devices;

constructions of electromechanical resonators.

In this subclass, the following expression is used with the meaningindicated:
"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.

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 . {Gyrators}

- 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 7/01A](#), [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 1/00A](#), [H03H 7/01A](#), [H03H 7/0123](#) to [H03H 7/07](#), [H03H 7/09](#) to [H03H 7/13](#), [H03H 7/42](#) and [H03H 7/42B](#)

- 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 1/00A](#), [H03H 7/01A](#), [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**
- [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 ... Gytrators (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}

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. Lam? 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**
- [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

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

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**