

**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](#))

**NOTES**

1. 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.
2. In this subclass, the following expression is used with the meaning indicated:  
 "passive elements" means resistors, capacitors, inductors, mutual inductors or diodes.
3. Attention is drawn to the Notes following the titles of class [B81](#) and subclass [B81B](#) relating to "micro-structural devices" and "micro-structural systems".
4. 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 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 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 2003/0071 . . {of bulk acoustic wave and surface acoustic wave elements in the same process}
- H03H 3/0072 . . {of micro-electro-mechanical resonators or networks (micro-membranes or micro-beams [B81B 2203/01](#); 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 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 3/04 . . . 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 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 2007/006	. {MEMS}
H03H 2007/008	. . {the MEMS being trimmable}
H03H 7/01	. Frequency selective two-port networks
H03H 7/0107	. . {Non-linear filters}
H03H 7/0115	. . {comprising only inductors and capacitors ( <a href="#">H03H 7/075</a> , <a href="#">H03H 7/09</a> , <a href="#">H03H 7/12</a> , <a href="#">H03H 7/13</a> take precedence)}
H03H 7/0123	. . {comprising distributed impedance elements together with lumped impedance elements}
H03H 2007/013	. . {Notch or bandstop filters}
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 ( <a href="#">H03H 7/12</a> takes precedence)}
H03H 7/0169	. . . . {Intermediate frequency filters}
H03H 7/0176	. . . . . {without magnetic core}
H03H 7/0184	. . . . . {with ferromagnetic core}

- H03H 2007/0192 . . {Complex filters}
- 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 7/0107](#), [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 2007/386 . . {Multiple band impedance matching}
- 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 1/0007](#), [H03H 7/0107](#), [H03H 7/0123](#) to [H03H 7/07](#), [H03H 7/09](#) to [H03H 7/13](#), [H03H 7/42](#) and [H03H 7/422](#)

- 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 1/0007](#), [H03H 7/0107](#), [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
<b>H03H 9/00</b>	<b>Networks comprising electromechanical or electro-acoustic devices; Electromechanical resonators (making single crystals <a href="#">C30B</a>; selection of materials thereof <a href="#">H01L</a>; piezo-electric, electrostrictive or magnetostrictive devices per se <a href="#">H01L 41/00</a>; electromechanical transducers <a href="#">H04R</a>)</b>
H03H 9/0004	. {Impedance-matching networks ( <a href="#">H03H 9/145</a> takes precedence)}
H03H 9/0009	. . {using surface acoustic wave devices}
H03H 9/0014	. . {using bulk acoustic wave devices}
H03H 2009/0019	. {Surface acoustic wave multichip}
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 ( <a href="#">H03H 9/008</a> , <a href="#">H03H 9/0085</a> 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 ( <a href="#">H03H 9/0085</a> 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 <a href="#">H03H 9/02015</a> )}
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 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 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 2009/02251	. . .	{Design}
H03H 9/02259	. . .	{Driving or detection means}
H03H 2009/02267	. . . .	{having dimensions of atomic scale, e.g. involving electron transfer across vibration gap}
H03H 9/02275	. . . .	{Comb electrodes}
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 9/02338	. . .	{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 9/02362	. . . .	{Folded-flexure}
H03H 2009/0237	. . . . .	{applied at the center}
H03H 9/02377	. . . . .	{Symmetric folded-flexure}
H03H 2009/02385	. . . .	{Anchors for square resonators, i.e. resonators comprising a square vibrating membrane}
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 ( <a href="#">H03H 9/02417</a> 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 2009/0244	. . . . .	{Anchor loss}
H03H 9/02448	. . . . .	{of temperature influence}
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 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 ( <a href="#">cut angles H03H 9/02543</a> )}
H03H 9/02842	. . . . .	{of reflections ( <a href="#">H03H 9/6406</a> 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 ( <a href="#">shielding of electrical components in general H05K 9/00</a> )}
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 ( <a href="#">mounting in enclosures H03H 9/12</a> )}
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 ( <a href="#">H03H 9/1021 takes precedence</a> )}
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 ( <a href="#">H03H 9/0566 takes precedence</a> )}
H03H 9/0547	. . . . {consisting of a vertical arrangement ( <a href="#">H03H 9/0566 takes precedence</a> )}
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 {( <a href="#">constructional combinations of enclosure with electromechanical and other electronic elements H03H 9/0538</a> )}
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 ( <a href="#">H03H 9/145</a> 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 ( <a href="#">H03H 9/145</a> 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 ( <a href="#">weighting H03H 9/14517</a> )}
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 ( <a href="#">H03H 9/6406</a> takes precedence)}
H03H 9/14558	. . . . .	{Slanted, tapered or fan shaped transducers ( <a href="#">H03H 9/14561</a> , <a href="#">H03H 9/14564</a> 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 ( <a href="#">H03H 9/25</a> takes precedence)
H03H 2009/155	. . . . .	. {using MEMS techniques}
H03H 9/17	. . . . .	. having a single resonator ( <a href="#">crystal tuning forks H03H 9/21</a> )
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 ( <a href="#">H03H 9/177</a> , <a href="#">H03H 9/178</a> 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 ( <a href="#">crystal tuning forks H03H 9/21</a> )
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 2009/241	. . . . .	. {Bulk-mode MEMS resonators}

- H03H 2009/2415 . . . . {with concave shape [CBAR]}
- H03H 2009/2421 . . . . {with I shape [IBAR]}
- H03H 9/2426 . . . {in combination with other electronic elements}
- H03H 9/2431 . . . {Ring resonators}
- H03H 9/2436 . . . {Disk resonators}
- H03H 2009/2442 . . . {Square 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 ( <a href="#">H03H 9/0095</a> 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 ( <a href="#">H03H 9/64</a> 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 <a href="#">G06K 7/10009</a> , <a href="#">G01S 13/74</a> )}
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 ( <a href="#">H03H 9/645</a> , <a href="#">H03H 9/6453</a> 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**
- 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 2011/0411 . . . . . {Rank order or median 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 H03H 11/0472 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 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 11/06	. . . . .	comprising means for compensation of loss
H03H 11/08	. . . . .	using gyrators
H03H 11/10	. . . . .	using negative impedance converters ( <a href="#">H03H 11/08</a> takes precedence)
H03H 11/11	. . . . .	{using current conveyors}
H03H 11/12	. . . . .	using amplifiers with feedback ( <a href="#">H03H 11/0422</a> ), <a href="#">H03H 11/08</a> , <a href="#">H03H 11/10</a> take precedence)
H03H 11/1204	. . . . .	{Distributed RC filters}
H03H 11/1208	. . . . .	{comprising an electromechanical resonator}
H03H 11/1213	. . . . .	{using transistor amplifiers ( <a href="#">H03H 11/1204</a> takes precedence; parallel-T filters <a href="#">H03H 11/1295</a> )}
H03H 11/1217	. . . . .	{using a plurality of operational amplifiers ( <a href="#">H03H 11/1204</a> takes precedence; parallel-T filters <a href="#">H03H 11/1295</a> )}
H03H 11/1221	. . . . .	{Theory; Synthesis ( <a href="#">H03H 11/1226</a> to <a href="#">H03H 11/1252</a> 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 ( <a href="#">H03H 11/1204</a> takes precedence; parallel-T filters <a href="#">H03H 11/1295</a> )}
H03H 11/1265	. . . . . {Synthesis ( <a href="#">H03H 11/1269</a> to <a href="#">H03H 11/1282</a> 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 ( <a href="#">analogue shift registers G11C 27/04</a> )
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 ( <a href="#">for use in multiplex transmission systems H04J 1/00</a> )
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 ( <a href="#">phase shifters providing two or more output signals H03H 11/22</a> )
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 2015/002 . {Computation saving measures}
- H03H 2015/005 . {comprising capacitors implemented with MEMS technology}
- H03H 2015/007 . {Programmable filters}
- H03H 15/02 . using analogue shift registers
- H03H 15/023 . . {with parallel-input configuration}
- H03H 2015/026 . {Matched filters in charge domain}

### **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 2017/0072 . {Theoretical filter design}
- H03H 2017/0081 . . {of FIR filters}
- H03H 2017/009 . . {of IIR filters}
- 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 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 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 2017/0214 . . . . {with input-sampling frequency and output-delivery frequency which differ, e.g. interpolation, extrapolation; anti-aliasing}

H03H 17/0216	. . .	{Quefrency domain filters}
H03H 17/0217	. . .	{Number theoretic transforms}
H03H 17/0219	. .	{Compensation of undesirable effects, e.g. quantisation noise, overflow (stability problems <a href="#">H03H 17/0461</a> )}
H03H 2017/022	. . .	{Rounding error}
H03H 2017/0222	. . .	{Phase error}
H03H 17/0223	. .	{Computation saving measures; Accelerating measures (computations per se <a href="#">G06F</a> )}
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 2017/0232	. . . . .	{Canonical signed digit [CSD] or power of 2 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 <a href="#">G06F 7/60</a> )}
H03H 17/0239	. . . .	{Signed digit arithmetic}
H03H 17/0241	. . . .	{Distributed arithmetic}
H03H 17/0242	. . . .	{Residue number arithmetic}
H03H 2017/0244	. . .	{Measures to reduce settling time}
H03H 2017/0245	. . .	{Measures to reduce power consumption ( <a href="#">H03H 17/0223</a> takes precedence)}
H03H 2017/0247	. . .	{Parallel structures using a slower clock}
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 <a href="#">H03H 21/0029</a> )}
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 ( <a href="#">H03H 17/0671</a> takes precedence)}
H03H 17/0283	. . {Filters characterised by the filter structure ( <a href="#">H03H 17/0202</a> , <a href="#">H03H 17/0219</a> to <a href="#">H03H 17/0248</a> 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 2017/0295	. . . {Changing between two filter characteristics}
H03H 2017/0297	. . . {Coefficients derived from input parameters}
H03H 2017/0298	. . {DSP implementation}
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 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 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 2017/0678	. . . . . {with parallel structure, i.e. parallel CIC [PCIC]}
H03H 17/0685	. . . . . {the ratio being rational}
H03H 2017/0692	. . . {Transposed}
H03H 17/08	. Networks for phase shifting
<b>H03H 19/00</b>	<b>Networks using time-varying elements, e.g. N-path filters</b>
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}
<b>H03H 21/00</b>	<b>Adaptive networks</b>
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 2021/0009	. . {Details}
H03H 2021/001	. . . {Analog multipliers}
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 ( <a href="#">H03H 21/0014</a> to <a href="#">H03H 21/0018</a> 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 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 21/0043	. .	{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 21/0067	. .	{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 ( <a href="#">H03H 2021/0072</a> takes precedence)}
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

<b>H03H 2222/00</b>	<b>Indexing scheme relating to digital filtering methods</b>
H03H 2222/02	. using fuzzy logic
H03H 2222/04	. using neural networks
H03H 2222/06	. using wavelets
<b>H03H 2240/00</b>	<b>Indexing scheme relating to filter banks</b>
<b>H03H 2250/00</b>	<b>Indexing scheme relating to dual- or multi-band filters</b>
<b>H03H 2260/00</b>	<b>Theory relating to impedance networks</b>