

CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H03 ELECTRONIC CIRCUITRY

H03H IMPEDANCE NETWORKS, e.g. RESONANT CIRCUITS; RESONATORS (waveguides, resonators, lines or other devices of the waveguide type H01P)

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 "microstructural devices" and "microstructural systems".
4. In this subclass, main groups with a higher number take precedence.

WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

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)	3/00	Apparatus or processes specially adapted for the manufacture of impedance networks, resonating circuits, resonators
1/0007	• {of radio frequency interference filters}	3/007	• for the manufacture of electromechanical resonators or networks
2001/0014	• {Capacitor filters, i.e. capacitors whose parasitic inductance is of relevance to consider it as filter}	2003/0071	• • {of bulk acoustic wave and surface acoustic wave elements in the same process}
2001/0021	• {Constructional details}	3/0072	• • {of microelectro-mechanical resonators or networks (micromembranes or microbeams B81B 2203/01 ; manufacture of microstructural devices in general B81C)}
2001/0028	• • {RFI filters with housing divided in two bodies}	3/0073	• • • {Integration with other electronic structures}
2001/0035	• • {Wound magnetic core}	3/0075	• • • {Arrangements or methods specially adapted for testing microelectro-mechanical resonators or networks}
2001/0042	• • {Wound, ring or feed-through type capacitor}	3/0076	• • • {for obtaining desired frequency or temperature coefficients}
2001/005	• • {Wound, ring or feed-through type inductor}	3/0077	• • • • {by tuning of resonance frequency}
2001/0057	• • {comprising magnetic material}	3/0078	• • • • {involving adjustment of the transducing gap}
2001/0064	• • {comprising semiconductor material}	3/013	• • for obtaining desired frequency or temperature coefficient ({ H03H 3/0076 } H03H 3/04 , H03H 3/10 take precedence)
2001/0071	• • {comprising zig-zag inductor}	3/02	• • for the manufacture of piezoelectric or electrostrictive resonators or networks (H03H 3/08 takes precedence)
2001/0078	• • {comprising spiral inductor on a substrate}	2003/021	• • • {the resonators or networks being of the air-gap type}
2001/0085	• • {Multilayer, e.g. LTCC, HTCC, green sheets}	2003/022	• • • {the resonators or networks being of the cantilever type}
2001/0092	• {Inductor filters, i.e. inductors whose parasitic capacitance is of relevance to consider it as filter}	2003/023	• • • {the resonators or networks being of the membrane type}
1/02	• RC networks, e.g. filters	2003/025	• • • {the resonators or networks comprising an acoustic mirror}
2/00	Networks using elements or techniques not provided for in groups H03H 3/00 - H03H 21/00		
2/001	• {comprising magnetostatic wave network elements}		
2/003	• {comprising optical fibre network elements (optical elements per se G02B , G02F ; transmission systems using light waves H04B 10/00)}		
2/005	• {Coupling circuits between transmission lines or antennas and transmitters, receivers or amplifiers}		
2/006	• • {Transmitter or amplifier output circuits}		
2/008	• • {Receiver or amplifier input circuits}		

2003/026	. . . {the resonators or networks being of the tuning fork type}	7/0161	. . . {Bandpass filters (H03H 7/12 takes precedence)}
2003/027	. . . {the resonators or networks being of the microelectro-mechanical [MEMS] type}	7/0169	. . . {Intermediate frequency filters}
2003/028	. . . {for obtaining desired values of other parameters}	7/0176	. . . {without magnetic core}
3/04	. . . for obtaining desired frequency or temperature coefficient	7/0184	. . . {with ferromagnetic core}
2003/0407	. . . {Temperature coefficient}	2007/0192	. . {Complex filters}
2003/0414	. . . {Resonance frequency}	7/03	. . comprising means for compensation of loss
2003/0421	. . . {Modification of the thickness of an element}	7/06	. . including resistors (H03H 7/075 , H03H 7/09 , H03H 7/12 , H03H 7/13 take precedence)
2003/0428	. . . {of an electrode}	7/065	. . . Parallel T-filters
2003/0435	. . . {of a piezoelectric layer}	7/07	. . . Bridged T-filters
2003/0442	. . . {of a non-piezoelectric layer}	7/075	. . Ladder networks, e.g. electric wave filters
2003/045	. . . {Modification of the area of an element}	7/09	. . Filters comprising mutual inductance
2003/0457	. . . {of an electrode}	7/12	. . Bandpass or bandstop filters with adjustable bandwidth and fixed centre frequency (H03H 7/09 takes precedence)
2003/0464	. . . {operating on an additional circuit element, e.g. a passive circuit element connected to the resonator}	7/13	. . using electro-optical elements
2003/0471	. . . {of a plurality of resonators at different frequencies}	7/17	. . {Structural details of sub-circuits of frequency selective networks}
2003/0478	. . . {in a process for mass production}	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)}
2003/0485	. . . {during the manufacture of a cantilever}	7/1716	. . . {Comprising foot-point elements}
2003/0492	. . . {during the manufacture of a tuning-fork}	7/1725	. . . {Element to ground being common to different shunt paths, i.e. Y-structure}
3/06	. . for the manufacture of magnetostrictive resonators or networks	7/1733	. . . {Element between different shunt or branch paths (H03H 7/425 takes precedence)}
3/08	. . for the manufacture of resonators or networks using surface acoustic waves	7/1741	. . . {Comprising typical LC combinations, irrespective of presence and location of additional resistors (when resistors are present, also classify in H03H 7/06 - H03H 7/07)}
3/10	. . . for obtaining desired frequency or temperature coefficient	7/175	. . . {Series LC in series path (H03H 7/1783 takes precedence)}
5/00	One-port networks comprising only passive electrical elements as network components	7/1758	. . . {Series LC in shunt or branch path (H03H 7/1791 takes precedence)}
5/003	. {comprising distributed impedance elements together with lumped impedance elements}	7/1766	. . . {Parallel LC in series path (H03H 7/1783 takes precedence)}
5/006	. {comprising simultaneously tunable inductance and capacitance}	7/1775	. . . {Parallel LC in shunt or branch path (H03H 7/1791 takes precedence)}
5/02	. without voltage- or current-dependent elements	7/1783	. . . {Combined LC in series path}
5/10	. . comprising at least one element with prescribed temperature coefficient	7/1791	. . . {Combined LC in shunt or branch path}
5/12	. with at least one voltage- or current-dependent element	7/18	. Networks for phase shifting
7/00	Multiple-port networks comprising only passive electrical elements as network components	7/185	. . {comprising distributed impedance elements together with lumped impedance elements}
7/002	. {Gyrators}	7/19	. . Two-port phase shifters providing a predetermined phase shift, e.g. "all-pass" filters
7/004	. {Capacitive coupling circuits not otherwise provided for}	7/20	. . Two-port phase shifters providing an adjustable phase shift
2007/006	. {MEMS}	7/21	. . providing two or more phase shifted output signals, e.g. n-phase output
2007/008	. . {the MEMS being trimmable}	7/24	. Frequency- independent attenuators
7/01	. Frequency selective two-port networks	7/25	. . comprising an element controlled by an electric or magnetic variable (H03H 7/27 takes precedence)
7/0107	. . {Non-linear filters}	7/251	. . . {the element being a thermistor}
7/0115	. . {comprising only inductors and capacitors (H03H 7/075 , H03H 7/09 , H03H 7/12 , H03H 7/13 take precedence)}	7/253	. . . {the element being a diode}
7/0123	. . {comprising distributed impedance elements together with lumped impedance elements}	7/255	. . . {the element being a PIN diode}
2007/013	. . {Notch or bandstop filters}	7/256	. . . {the element being a VARACTOR diode}
7/0138	. . {Electrical filters or coupling circuits}	7/258	. . . {using a galvano-magnetic device}
7/0146	. . . {Coupling circuits between two tubes, not otherwise provided for}	7/27	. . comprising a photo-electric element
7/0153	. . {Electrical filters; Controlling thereof}	7/30	. Time-delay networks {(analogue shift registers G11C 27/04)}
		7/32	. . with lumped inductance and capacitance

7/325	. . . {Adjustable networks}	9/0047	. . . {having two acoustic tracks (H03H 9/008 , H03H 9/0085 take precedence)}
7/34	. . with lumped and distributed reactance	9/0052	. . . . {being electrically cascaded}
7/345	. . . {Adjustable networks}	9/0057	. . . . . {the balanced terminals being on the same side of the tracks}
7/38	. Impedance-matching networks	9/0061	. . . . . {the balanced terminals being on opposite sides of the tracks}
7/383	. . {comprising distributed impedance elements together with lumped impedance elements}	9/0066	. . . . . {being electrically parallel}
2007/386	. . {Multiple band impedance matching}	9/0071	. . . . . {the balanced terminals being on the same side of the tracks}
7/40	. . Automatic matching of load impedance to source impedance	9/0076	. . . . . {the balanced terminals being on opposite sides of the tracks}
7/42	. Networks for transforming balanced signals into unbalanced signals and vice versa, e.g. baluns	9/008	. . . {having three acoustic tracks (H03H 9/0085 takes precedence)}
7/422	. . {comprising distributed impedance elements together with lumped impedance elements}	9/0085	. . . {having four acoustic tracks}
7/425	. . {Balance-balance networks}	9/009	. . . . {Lattice filters}
7/427	. . . {Common-mode filters (H02J 3/01 and H02M 1/126 takes precedence)}	9/0095	. . {using bulk acoustic wave devices}
7/46	. Networks for connecting several sources or loads, working on different frequencies or frequency bands, to a common load or source	9/02	. Details
7/461	. . {particularly adapted for use in common antenna systems}	9/02007	. . {of bulk acoustic wave devices}
7/463	. . {Duplexers}	9/02015	. . . {Characteristics of piezoelectric layers, e.g. cutting angles}
7/465	. . . {having variable circuit topology, e.g. including switches}	9/02023	. . . . {consisting of quartz}
7/466	. . {particularly adapted as input circuit for receivers}	9/02031	. . . . {consisting of ceramic}
7/468	. . {particularly adapted as coupling circuit between transmitters and antennas}	9/02039	. . . . {consisting of a material from the crystal group 32, e.g. langasite, langatate, langanite}
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)	9/02047	. . . {Treatment of substrates}
7/482	. . {particularly adapted for use in common antenna systems}	9/02055	. . . . {of the surface including the back surface}
7/485	. . {particularly adapted as input circuit for receivers}	9/02062	. . . {Details relating to the vibration mode}
7/487	. . {particularly adapted as coupling circuit between transmitters and antennas}	9/0207	. . . . {the vibration mode being harmonic}
7/52	. One-way transmission networks, i.e. unilines	9/02078	. . . . {the vibration mode being overmoded}
7/54	. Modifications of networks to reduce influence of variations of temperature	9/02086	. . . {Means for compensation or elimination of undesirable effects}
9/00	Networks comprising electromechanical or electro-acoustic elements; Electromechanical resonators (electro-acoustic transducers such as loudspeakers, microphones or gramophone pick-ups H04R; piezoelectric, electrostrictive or magnetostrictive devices with mechanical input or output, e.g. actuators or sensors, H10N 30/00, H10N 35/00)	9/02094	. . . . {of adherence}
9/0004	. {Impedance-matching networks (H03H 9/145 takes precedence)}	9/02102	. . . . {of temperature influence (cutting angles H03H 9/02015)}
9/0009	. . {using surface acoustic wave devices}	9/0211	. . . . {of reflections}
9/0014	. . {using bulk acoustic wave devices}	9/02118	. . . . {of lateral leakage between adjacent resonators}
2009/0019	. {Surface acoustic wave multichip}	9/02125	. . . . {of parasitic elements}
9/0023	. {Networks for transforming balanced signals into unbalanced signals and vice versa, e.g. baluns, or networks having balanced input and output}	9/02133	. . . . {of stress}
9/0028	. . {using surface acoustic wave devices}	9/02141	. . . . {of electric discharge due to pyroelectricity}
9/0033	. . . {having one acoustic track only}	9/02149	. . . . {of ageing changes of characteristics, e.g. electro-acousto-migration}
9/0038	. . . . {the balanced terminals being on the same side of the track}	9/02157	. . . {Dimensional parameters, e.g. ratio between two dimension parameters, length, width or thickness}
9/0042	. . . . {the balanced terminals being on opposite sides of the track}	2009/02165	. . {Tuning}
		2009/02173	. . . {of film bulk acoustic resonators [FBAR]}
		2009/02181	. . . . {by application of heat from a heat source}
		2009/02188	. . . . {Electrically tuning}
		2009/02196	. . . . . {operating on the FBAR element, e.g. by direct application of a tuning DC voltage}
		2009/02204	. . . . . {operating on an additional circuit element, e.g. applying a tuning DC voltage to a passive circuit element connected to the resonator}
		2009/02212	. . . . {Magnetically tuning}
		9/0222	. . {of interface-acoustic, boundary, pseudo-acoustic or Stonely wave devices}
		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}

9/02236	. . .	{of surface skimming bulk wave devices}	9/02574	. . . .	{of combined substrates, multilayered substrates, piezoelectrical layers on not-piezoelectrical substrate}
9/02244	. . .	{of microelectro-mechanical resonators}	9/02582	. . . .	{of diamond substrates}
2009/02251	. . .	{Design}	9/0259	. . . .	{of langasite substrates}
9/02259	. . .	{Driving or detection means}	9/02598	. . . .	{of langatate substrates}
2009/02267	. . . .	{having dimensions of atomic scale, e.g. involving electron transfer across vibration gap}	9/02606	. . . .	{of langanite substrates}
9/02275	. . . .	{Comb electrodes}	9/02614	. . .	{Treatment of substrates, e.g. curved, spherical, cylindrical substrates ensuring closed round-about circuits for the acoustical waves}
2009/02283	. . .	{Vibrating means}	9/02622	. . . .	{of the surface, including back surface}
2009/02291	. . . .	{Beams}	9/02629	. . . .	{of the edges}
2009/02299	. . . .	{Comb-like, i.e. the beam comprising a plurality of fingers or protrusions along its length}	9/02637	. . .	{Details concerning reflective or coupling arrays}
2009/02307	. . . .	{Dog-bone-like structure, i.e. the elongated part of the "bone" is doubly clamped}	9/02645	. . . .	{Waffle-iron or dot arrays}
2009/02314	. . . .	{forming part of a transistor structure}	9/02653	. . . .	{Grooves or arrays buried in the substrate}
2009/02322	. . . .	{Material}	9/02661	. . . .	{being located inside the interdigital transducers}
2009/0233	. . . .	{comprising perforations}	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}
9/02338	. . .	{Suspension means}	9/02677	. . . .	{having specially shaped edges, e.g. stepped, U-shaped edges}
2009/02346	. . . .	{Anchors for ring resonators}	9/02685	. . . .	{Grating lines having particular arrangements}
2009/02354	. . . .	{applied along the periphery, e.g. at nodal points of the ring}	9/02692	. . . .	{Arched grating lines}
9/02362	. . . .	{Folded-flexure}	9/027	. . . .	{U-shaped grating lines}
2009/0237	. . . .	{applied at the center}	9/02708	. . . .	{Shifted grating lines}
9/02377	. . . .	{Symmetric folded-flexure}	9/02716	. . . .	{Tilted, fan shaped or slanted grating lines}
2009/02385	. . . .	{Anchors for square resonators, i.e. resonators comprising a square vibrating membrane}	9/02724	. . . .	{Comb like grating lines}
9/02393	. . .	{Post-fabrication trimming of parameters, e.g. resonance frequency, Q factor}	9/02732	. . . .	{Bilateral comb like grating lines}
9/02401	. . . .	{by annealing}	9/0274	. . . .	{Intra-transducers grating lines}
9/02409	. . . .	{by application of a DC-bias voltage (H03H 9/02417 takes precedence)}	9/02748	. . . .	{Dog-legged reflectors}
9/02417	. . . .	{involving adjustment of the transducing gap}	9/02755	. . . .	{Meandering floating or grounded grating lines}
9/02425	. . . .	{by electrostatically pulling the beam}	9/02763	. . . .	{Left and right side electrically coupled reflectors}
9/02433	. . .	{Means for compensation or elimination of undesired effects}	9/02771	. . . .	{Reflector banks}
2009/0244	. . . .	{Anchor loss}	9/02779	. . . .	{Continuous surface reflective arrays}
9/02448	. . . .	{of temperature influence}	9/02787	. . . .	{having wave guide like arrangements}
2009/02456	. . . .	{Parasitic elements or effects, e.g. parasitic capacitive coupling between input and output}	9/02795	. . . .	{Multi-strip couplers as track changers}
2009/02464	. . . .	{Pull-in}	9/02803	. . . .	{Weighted reflective structures}
2009/02472	. . . .	{Stiction}	9/02811	. . . .	{Chirped reflective or coupling arrays}
2009/0248	. . . .	{Strain}	9/02818	. . .	{Means for compensation or elimination of undesirable effects}
2009/02488	. . .	{Vibration modes}	9/02826	. . . .	{of adherence}
2009/02496	. . . .	{Horizontal, i.e. parallel to the substrate plane}	9/02834	. . . .	{of temperature influence (cut angles H03H 9/02543)}
2009/02503	. . . .	{Breath-like, e.g. Lam [?] mode, wine-glass mode}	9/02842	. . . .	{of reflections (H03H 9/6406 takes precedence)}
2009/02511	. . . .	{Vertical, i.e. perpendicular to the substrate plane}	9/0285	. . . .	{of triple transit echo}
2009/02519	. . . .	{Torsional}	9/02858	. . . .	{of wave front distortion}
2009/02527	. . . .	{Combined}	9/02866	. . . .	{of bulk wave excitation and reflections}
9/02535	. . .	{of surface acoustic wave devices}	9/02874	. . . .	{of direct coupling between input and output transducers}
9/02543	. . .	{Characteristics of substrate, e.g. cutting angles}	9/02881	. . . .	{of diffraction of wave beam}
9/02551	. . . .	{of quartz substrates}	9/02889	. . . .	{of influence of mass loading}
9/02559	. . . .	{of lithium niobate or lithium-tantalate substrates}	9/02897	. . . .	{of strain or mechanical damage, e.g. strain due to bending influence}
9/02566	. . . .	{of semiconductor substrates}			

- 9/02905 {Measures for separating propagation paths on substrate}
- 9/02913 {Measures for shielding against electromagnetic fields ([shielding of electrical components in general H05K 9/00](#))}
- 9/02921 {Measures for preventing electric discharge due to pyroelectricity}
- 9/02929 {of ageing changes of characteristics, e.g. electro-acousto-migration}
- 9/02937 {of chemical damage, e.g. corrosion}
- 9/02944 {of ohmic loss}
- 9/02952 {of parasitic capacitance}
- 9/0296 . . . {Surface acoustic wave [SAW] devices having both acoustic and non-acoustic properties}
- 9/02968 {with optical devices ([mounting in enclosures H03H 9/12](#))}
- 9/02976 {with semiconductor devices}
- 9/02984 . . . {Protection measures against damaging}
- 9/02992 . . . {Details of bus bars, contact pads or other electrical connections for finger electrodes}
- 9/05 . . . Holders or supports
- 9/0504 . . . {for bulk acoustic wave devices}
- 9/0509 {consisting of adhesive elements}
- 9/0514 {consisting of mounting pads or bumps}
- 9/0519 {for cantilever ([H03H 9/1021 takes precedence](#))}
- 9/0523 {for flip-chip mounting}
- 9/0528 {consisting of clips}
- 9/0533 {consisting of wire}
- 9/0538 . . . {Constructional combinations of supports or holders with electromechanical or other electronic elements}
- 9/0542 {consisting of a lateral arrangement ([H03H 9/0566 takes precedence](#))}
- 9/0547 {consisting of a vertical arrangement ([H03H 9/0566 takes precedence](#))}
- 9/0552 {the device and the other elements being mounted on opposite sides of a common substrate}
- 9/0557 {the other elements being buried in the substrate}
- 9/0561 {consisting of a multilayered structure}
- 9/0566 {for duplexers}
- 9/0571 {including bulk acoustic wave [BAW] devices}
- 9/0576 {including surface acoustic wave [SAW] devices}
- 9/058 . . . {for surface acoustic wave devices}
- 9/0585 {consisting of an adhesive layer}
- 9/059 {consisting of mounting pads or bumps}
- 9/0595 . . . {the holder support and resonator being formed in one body}
- 9/08 . . . Holders with means for regulating temperature
- 9/09 . . . Elastic or damping supports
- 9/10 . . . Mounting in enclosures ([constructional combinations of enclosure with electromechanical and other electronic elements H03H 9/0538](#))}
- 9/1007 {for bulk acoustic wave [BAW] devices}
- 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}
- 9/1021 {the BAW device being of the cantilever type}
- 9/1028 {the BAW device being held between spring terminals}
- 9/1035 {the enclosure being defined by two sealing substrates sandwiching the piezoelectric layer of the BAW device}
- 9/1042 {the enclosure being defined by a housing formed by a cavity in a resin}
- 9/105 {the enclosure being defined by a cover cap mounted on an element forming part of the BAW device}
- 9/1057 {for microelectro-mechanical devices}
- 9/1064 {for surface acoustic wave [SAW] devices}
- 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}
- 9/1078 {the enclosure being defined by a foil covering the non-active sides of the SAW device}
- 9/1085 {the enclosure being defined by a non-uniform sealing mass covering the non-active sides of the SAW device}
- 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}
- 9/12 for networks with interaction of optical and acoustic waves
- 9/125 . . . Driving means, e.g. electrodes, coils
- 9/13 . . . for networks consisting of piezoelectric or electrostrictive materials ([for networks using surface acoustic waves H03H 9/145](#))}
- 9/131 {consisting of a multilayered structure}
- 9/132 {characterized by a particular shape}
- 9/133 {for electromechanical delay lines or filters}
- 9/135 . . . for networks consisting of magnetostrictive materials ([H03H 9/145 takes precedence](#))}
- 9/145 . . . for networks using surface acoustic waves
- 9/14502 {Surface acoustic wave [SAW] transducers for a particular purpose}
- 9/14505 {Unidirectional SAW transducers}
- 9/14508 {Polyphase SAW transducers}
- 9/14511 {SAW transducers for non-piezoelectric substrates}
- 9/14514 {Broad band transducers}
- 9/14517 {Means for weighting}
- 9/1452 {by finger overlap length, apodisation}
- 9/14523 {Capacitive tap weighted transducers}
- 9/14526 {Finger withdrawal}
- 9/14529 {Distributed tap}
- 9/14532 {Series weighting; Transverse weighting}
- 9/14535 {Position weighting}
- 9/14538 {Formation}
- 9/14541 {Multilayer finger or busbar electrode}
- 9/14544 {Transducers of particular shape or position ([weighting H03H 9/14517](#))}
- 9/14547 {Fan shaped; Tilted; Shifted; Slanted; Tapered; Arched; Stepped finger transducers}
- 9/1455 {constituted of N parallel or series transducers}

9/14552	. . . . .	{comprising split fingers}	9/2436	. . .	{Disk resonators}
9/14555	. . . . .	{Chirped transducers (H03H 9/6406 takes precedence)}	2009/2442	. . .	{Square resonators}
9/14558	. . . . .	{Slanted, tapered or fan shaped transducers (H03H 9/14561, H03H 9/14564 take precedence)}	9/2447	. . .	{Beam resonators (H03H 9/2468 takes precedence)}
9/14561	. . . . .	{Arched, curved or ring shaped transducers}	9/2452	. . . . .	{Free-free beam resonators}
9/14564	. . . . .	{Shifted fingers transducers}	9/2457	. . . . .	{Clamped-free beam resonators}
9/14567	. . . . .	{Stepped-fan shaped transducers}	9/2463	. . . . .	{Clamped-clamped beam resonators}
9/1457	. . . . .	{Transducers having different finger widths}	9/2468	. . .	{Tuning fork resonators}
9/14573	. . . . .	{Arrow type transducers}	9/2473	. . . . .	{Double-Ended Tuning Fork [DETF] resonators}
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}	9/2478	. . . . .	{Single-Ended Tuning Fork resonators}
9/14579	. . . . .	{the last fingers having a different shape}	9/2484	. . . . .	{with two fork tines, e.g. Y-beam cantilever}
9/14582	. . . . .	{the last fingers having a different pitch}	9/2489	. . . . .	{with more than two fork tines}
9/14585	. . . . .	{the last fingers being split}	9/2494	. . . . .	{H-shaped, i.e. two tuning forks with common base}
9/14588	. . . . .	{Horizontally-split transducers}	9/25	. . .	Constructional features of resonators using surface acoustic waves {(devices for manipulating acoustic surface waves in general G10K 11/36)}
9/14591	. . . . .	{Vertically-split transducers}	9/30	. . .	Time-delay networks
9/14594	. . . . .	{Plan-rotated or plan-tilted transducers}	9/36	. . .	with non-adjustable delay time (H03H 9/40, H03H 9/42 take precedence)
9/14597	. . . . .	{Matching SAW transducers to external electrical circuits}	9/38	. . .	with adjustable delay time (H03H 9/40, H03H 9/42 take precedence)
9/15	. . .	Constructional features of resonators consisting of piezoelectric or electrostrictive material (H03H 9/25 takes precedence)	9/40	. . .	Frequency dependent delay lines, e.g. dispersive delay lines (H03H 9/42 takes precedence)
2009/155	. . .	{using MEMS techniques}	9/42	. . .	using surface acoustic waves {(devices for manipulating acoustic surface waves in general G10K 11/36)}
9/17	. . .	having a single resonator (crystal tuning forks H03H 9/21)	9/423	. . .	{with adjustable delay time}
9/171	. . .	{implemented with thin-film techniques, i.e. of the film bulk acoustic resonator [FBAR] type}	9/426	. . .	{Magneto-elastic surface waves}
9/172	. . . . .	{Means for mounting on a substrate, i.e. means constituting the material interface confining the waves to a volume}	9/44	. . .	Frequency dependent delay lines, e.g. dispersive delay lines
9/173	. . . . .	{Air-gaps}	9/46	. . .	Filters (multiple-port electromechanical filters H03H 9/70)
9/174	. . . . .	{Membranes}	9/462	. . .	{Microelectro-mechanical filters}
9/175	. . . . .	{Acoustic mirrors}	9/465	. . . . .	{in combination with other electronic elements}
9/176	. . .	{consisting of ceramic material (H03H 9/177, H03H 9/178 take precedence)}	9/467	. . .	{Post-fabrication trimming of parameters, e.g. center frequency}
9/177	. . .	{of the energy-trap type}	9/48	. . .	Coupling means therefor
9/178	. . .	{of a laminated structure of multiple piezoelectric layers with inner electrodes}	9/485	. . .	{for microelectro-mechanical filters}
9/19	. . .	consisting of quartz	9/50	. . .	Mechanical coupling means
9/205	. . .	having multiple resonators (crystal tuning forks H03H 9/21)	9/505	. . . . .	{for microelectro-mechanical filters}
9/21	. . .	Crystal tuning forks	9/52	. . .	Electric coupling means
9/215	. . .	consisting of quartz	9/525	. . . . .	{for microelectro-mechanical filters}
9/22	. . .	Constructional features of resonators consisting of magnetostrictive material	9/54	. . .	comprising resonators of piezoelectric or electrostrictive material (comprising resonators using surface acoustic waves H03H 9/64)
9/24	. . .	Constructional features of resonators of material which is not piezoelectric, electrostrictive, or magnetostrictive	9/542	. . .	{including passive elements (H03H 9/545 takes precedence)}
9/2405	. . .	{of microelectro-mechanical resonators}	9/545	. . .	{including active elements}
2009/241	. . .	{Bulk-mode MEMS resonators}	9/547	. . .	{Notch filters, e.g. notch BAW or thin film resonator filters}
2009/2415	. . . . .	{with concave shape [CBAR]}	9/56	. . .	Monolithic crystal filters
2009/2421	. . . . .	{with I shape [IBAR]}	9/562	. . . . .	{comprising a ceramic piezoelectric layer}
9/2426	. . .	{in combination with other electronic elements}	9/564	. . . . .	{implemented with thin-film techniques}
9/2431	. . .	{Ring resonators}	9/566	. . . . .	{Electric coupling means therefor (H03H 9/0095 takes precedence)}
			9/568	. . . . .	{consisting of a ladder configuration}
			9/58	. . .	Multiple crystal filters
			9/581	. . . . .	{comprising ceramic piezoelectric layers}
			9/582	. . . . .	{implemented with thin-film techniques}

- 9/583 {comprising a plurality of piezoelectric layers acoustically coupled}
- 9/584 {Coupled Resonator Filters [CFR]}
- 9/585 {Stacked Crystal Filters [SCF]}
- 9/586 {Means for mounting to a substrate, i.e. means constituting the material interface confining the waves to a volume}
- 9/587 {Air-gaps}
- 9/588 {Membranes}
- 9/589 {Acoustic mirrors}
- 9/60 Electric coupling means therefor
{(H03H 9/0095 takes precedence)}
- 9/605 {consisting of a ladder configuration}
- 9/62 comprising resonators of magnetostrictive material (H03H 9/64 takes precedence)
- 9/64 using surface acoustic waves
- 9/6403 {Programmable filters}
- 9/6406 {Filters characterised by a particular frequency characteristic}
- 9/6409 {SAW notch filters}
- 9/6413 {SAW comb filters}
- 9/6416 {SAW matched filters, e.g. surface acoustic wave compressors, chirped or coded surface acoustic wave filters}
- 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)}
- 9/6423 {Means for obtaining a particular transfer characteristic}
- 9/6426 {Combinations of the characteristics of different transducers}
- 9/643 {the transfer characteristic being determined by reflective or coupling array characteristics}
- 9/6433 {Coupled resonator filters}
- 9/6436 {having one acoustic track only}
- 9/644 {having two acoustic tracks}
- 9/6443 {being acoustically coupled}
- 9/6446 {by floating multistrip couplers
(H03H 9/645, H03H 9/6453 take precedence)}
- 9/645 {by grating reflectors overlapping both tracks}
- 9/6453 {by at least an interdigital transducer overlapping both tracks}
- 9/6456 {being electrically coupled}
- 9/6459 {via one connecting electrode}
- 9/6463 {the tracks being electrically cascaded}
- 9/6466 {each track containing more than two transducers}
- 9/6469 {via two connecting electrodes}
- 9/6473 {the electrodes being electrically interconnected}
- 9/6476 {the tracks being electrically parallel}
- 9/6479 {Capacitively coupled SAW resonator filters}
- 9/6483 {Ladder SAW filters}
- 9/6486 {having crossing or intersecting acoustic tracks, e.g. intersection in a perpendicular or diagonal orientation}
- 9/6489 {Compensation of undesirable effects}
- 9/6493 {Side lobe suppression}
- 9/6496 {Reducing ripple in transfer characteristic}
- 9/66 Phase shifters
- 9/68 using surface acoustic waves
- 9/70 Multiple-port networks for connecting several sources or loads, working on different frequencies or frequency bands, to a common load or source
- 9/703 {Networks using bulk acoustic wave devices}
- 9/706 {Duplexers}
- 9/72 Networks using surface acoustic waves
- 9/725 {Duplexers}
- 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)
- 9/76 Networks using surface acoustic waves
- 11/00 Networks using active elements**
- 11/02 Multiple-port networks
- 11/025 {using current conveyors}
- 11/04 Frequency selective two-port networks
- 11/0405 {Non-linear filters}
- 2011/0411 {Rank order or median filters}
- 11/0416 {using positive impedance converters
(H03H 11/08 takes precedence)}
- 11/0422 {using transconductance amplifiers, e.g. gmC filters}
- 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 - H03H 11/0472 take precedence)}
- 11/0433 {Two integrator loop filters (H03H 11/0455 takes precedence)}
- 11/0438 {Tow-Thomas biquad}
- 11/0444 {Simulation of ladder networks}
- 11/045 {Leapfrog structures}
- 11/0455 {Multiple integrator loop feedback filters}
- 11/0461 {Current mode filters}
- 11/0466 {Filters combining transconductance amplifiers with other active elements, e.g. operational amplifiers, transistors, voltage conveyors}
- 11/0472 {Current or voltage controlled filters}
- 2011/0477 {using current feedback operational amplifiers}
- 2011/0483 {using operational transresistance amplifiers [OTRA]}
- 2011/0488 {Notch or bandstop filters}
- 2011/0494 {Complex filters}
- 11/06 comprising means for compensation of loss
- 11/08 using gyrators
- 11/10 using negative impedance converters
(H03H 11/08 takes precedence)
- 11/11 {using current conveyors}
- 11/12 using amplifiers with feedback
(H03H 11/0422), H03H 11/08, H03H 11/10 take precedence)
- 11/1204 {Distributed RC filters}
- 11/1208 {comprising an electromechanical resonator}
- 11/1213 {using transistor amplifiers (H03H 11/1204 takes precedence; parallel-T filters H03H 11/1295)}

11/1217	. . . . {using a plurality of operational amplifiers (H03H 11/1204 takes precedence; parallel-T filters H03H 11/1295)}	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)
11/1221	. . . . . {Theory; Synthesis (H03H 11/1226 - H03H 11/1252 take precedence)}	11/362	. . . {particularly adapted for use in common antenna systems}
11/1226	. . . . . {Filters using operational amplifier poles}	11/365	. . . {particularly adapted as input circuit for receivers}
11/123	. . . . . {Modifications to reduce sensitivity}	11/367	. . . {particularly adapted as coupling circuit between transmitters and antenna}
11/1234	. . . . . {Modifications to reduce detrimental influences of amplifier imperfections, e.g. limited gain-bandwidth product, limited input impedance}	11/38	. . One-way transmission networks, i.e. unilines
11/1239	. . . . . {Modifications to reduce influence of variations of temperature}	11/40	. . Impedance converters
11/1243	. . . . . {Simulation of ladder networks}	11/405	. . . {Positive impedance converters (H03H 11/42 takes precedence; used in frequency selective networks H03H 11/0416)}
11/1247	. . . . . {Leapfrog structures}	11/42	. . . Gyrators (used in frequency selective networks H03H 11/08)
11/1252	. . . . . {Two integrator-loop-filters}	11/44	. . . Negative impedance converters (H03H 11/42 takes precedence)
11/1256	. . . . . {Tow-Thomas biquad}	11/46	. One-port networks
11/126	. . . . {using a single operational amplifier (H03H 11/1204 takes precedence; parallel-T filters H03H 11/1295)}	11/48	. . simulating reactances
11/1265	. . . . . {Synthesis (H03H 11/1269 - H03H 11/1282 take precedence)}	11/481	. . . {Simulating capacitances}
11/1269	. . . . . {Filters using the operational amplifier pole}	11/483	. . . {Simulating capacitance multipliers}
11/1273	. . . . . {Modifications to reduce sensitivity}	11/485	. . . {Simulating inductances using operational amplifiers}
11/1278	. . . . . {Modifications to reduce detrimental influences of amplifier imperfections, e.g. limited gain-bandwidth product, limited input impedance}	11/486	. . . {Simulating inductances using transconductance amplifiers}
11/1282	. . . . . {Modifications to reduce influence of variations of temperature}	11/488	. . . {Simulating inductances using current conveyors}
11/1286	. . . . . {Sallen-Key biquad}	11/50	. . . using gyrators
11/1291	. . . . {Current or voltage controlled filters}	11/52	. . simulating negative resistances
11/1295	. . . . {Parallel-T filters}	11/525	. . . {Simulating frequency dependent negative resistance [FDNR]}
11/14	. . . using electro-optical devices	11/53	. . {simulating resistances; simulating resistance multipliers}
11/16	. . Networks for phase shifting	11/54	. Modifications of networks to reduce influence of variations of temperature
11/18	. . . Two-port phase shifters providing a predetermined phase shift, e.g. "all-pass" filters	15/00	Transversal filters (electromechanical filters H03H 9/46 , H03H 9/70)
11/20	. . . Two-port phase shifters providing an adjustable phase shift	2015/002	. {Computation saving measures}
11/22	. . . providing two or more phase shifted output signals, e.g. n-phase output	2015/005	. {comprising capacitors implemented with MEMS technology}
11/24	. . Frequency-independent attenuators	2015/007	. {Programmable filters}
11/245	. . . {using field-effect transistor}	15/02	. using analogue shift registers
11/26	. . Time-delay networks	15/023	. . {with parallel-input configuration}
11/265	. . . {with adjustable delay}	2015/026	. {Matched filters in charge domain}
11/28	. . Impedance matching networks	17/00	Networks using digital techniques
11/30	. . . Automatic matching of source impedance to load impedance	17/0009	. {Time-delay networks}
11/32	. . Networks for transforming balanced signals into unbalanced signals and <i>vice versa</i> , e.g. baluns	17/0018	. . {Realizing a fractional delay}
11/34	. . Networks for connecting several sources or loads working on different frequencies or frequency bands, to a common load or source	17/0027	. . . {by means of a non-recursive filter}
11/342	. . . {particularly adapted for use in common antenna systems}	17/0036	. . . {by means of a recursive filter}
11/344	. . . {Duplexers}	17/0045	. {Impedance matching networks}
11/346	. . . {particularly adapted as input circuit for receivers}	17/0054	. {Attenuators}
11/348	. . . {particularly adapted as coupling circuit between transmitters and antenna}	17/0063	. {R, L, C, simulating networks}
		2017/0072	. {Theoretical filter design}
		2017/0081	. . {of FIR filters}
		2017/009	. . {of IIR filters}
		17/02	. Frequency selective networks {(digital computers for complex mathematical operations G06F 17/10)}
		17/0201	. . {Wave digital filters}

- 17/0202 . . {Two or more dimensional filters; Filters for complex signals ([multidimensional convolutions G06F 17/153](#))}
- 2017/0204 . . . {Comb filters}
- 2017/0205 . . . {Kalman filters}
- 2017/0207 . . . {Median filters}
- 2017/0208 . . . {using neural networks}
- 2017/021 . . . {Wave digital filters}
- 17/0211 . . {using specific transformation algorithms, e.g. WALSH functions, Fermat transforms, Mersenne transforms, polynomial transforms, Hilbert transforms ([correlation computation G06F 17/156](#))}
- 17/0213 . . . {Frequency domain filters using Fourier transforms}
- 2017/0214 {with input-sampling frequency and output-delivery frequency which differ, e.g. interpolation, extrapolation; anti-aliasing}
- 17/0216 . . . {Quefrequency domain filters}
- 17/0217 . . . {Number theoretic transforms}
- 17/0219 . . {Compensation of undesirable effects, e.g. quantisation noise, overflow ([stability problems H03H 17/0461](#))}
- 2017/022 . . . {Rounding error}
- 2017/0222 . . . {Phase error}
- 17/0223 . . {Computation saving measures; Accelerating measures ([computations per se G06F](#))}
- 17/0225 . . . {Measures concerning the multipliers}
- 17/0226 {comprising look-up tables}
- 17/0227 . . . {Measures concerning the coefficients}
- 17/0229 {reducing the number of taps}
- 17/023 {reducing the wordlength, the possible values of coefficients}
- 2017/0232 {Canonical signed digit [CSD] or power of 2 coefficients}
- 17/0233 . . . {Measures concerning the signal representation}
- 17/0235 {reducing the wordlength of signals}
- 17/0236 {using codes}
- 17/0238 . . . {Measures concerning the arithmetic used ([performing computations G06F 7/60](#))}
- 17/0239 {Signed digit arithmetic}
- 17/0241 {Distributed arithmetic}
- 17/0242 {Residue number arithmetic}
- 2017/0244 . . . {Measures to reduce settling time}
- 2017/0245 . . . {Measures to reduce power consumption}
- 2017/0247 . . . {Parallel structures using a slower clock}
- 17/0248 . . {Filters characterised by a particular frequency response or filtering method}
- 17/025 . . . {Notch filters}
- 17/0251 . . . {Comb filters}
- 17/0252 . . . {Elliptic filters}
- 17/0254 . . . {Matched filters}
- 17/0255 . . . {Filters based on statistics ([adaptive filters H03H 21/0029](#))}
- 17/0257 {KALMAN filters}
- 17/0258 {ARMA filters}
- 17/026 . . . {Averaging filters}
- 17/0261 . . . {Non linear filters}
- 17/0263 {Rank order filters}
- 17/0264 . . . {Filter sets with mutual related characteristics}
- 17/0266 {Filter banks}
- 17/0267 {comprising non-recursive filters}
- 17/0269 {comprising recursive filters}
- 17/027 {Complementary filters; Phase complementary filters}
- 17/0272 {Quadrature mirror filters}
- 17/0273 {Polyphase filters}
- 17/0275 {comprising non-recursive filters}
- 17/0276 {having two phases}
- 17/0277 {comprising recursive filters}
- 17/0279 {having two phases}
- 17/028 . . . {Polynomial filters}
- 17/0282 . . . {Sinc or gaussian filters ([H03H 17/0671 takes precedence](#))}
- 17/0283 . . {Filters characterised by the filter structure ([H03H 17/0202](#), [H03H 17/0219](#) - [H03H 17/0248 take precedence](#))}
- 17/0285 . . . {Ladder or lattice filters}
- 17/0286 . . . {Combinations of filter structures}
- 17/0288 {Recursive, non-recursive, ladder, lattice structures}
- 17/0289 {Digital and active filter structures}
- 17/0291 {Digital and sampled data filters}
- 17/0292 . . . {Time multiplexed filters; Time sharing filters}
- 17/0294 . . {Variable filters; Programmable filters}
- 2017/0295 . . . {Changing between two filter characteristics}
- 2017/0297 . . . {Coefficients derived from input parameters}
- 2017/0298 . . {DSP implementation}
- 17/04 . . . Recursive filters
- 17/0405 . . . {comprising a ROM addressed by the input and output data signals}
- 17/0411 . . . {using DELTA modulation}
- 17/0416 . . . {with input-sampling frequency and output-delivery frequency which differ, e.g. extrapolation; Anti-aliasing}
- 17/0422 {the input and output signals being derived from two separate clocks, i.e. asynchronous sample rate conversion}
- 17/0427 {characterized by the ratio between the input-sampling and output-delivery frequencies}
- 17/0433 {the ratio being arbitrary or irrational}
- 17/0438 {the ratio being integer}
- 17/0444 {where the output-delivery frequency is higher than the input sampling frequency, i.e. interpolation}
- 17/045 {where the output-delivery frequency is lower than the input sampling frequency, i.e. decimation}
- 17/0455 {the ratio being rational}
- 17/0461 . . . {Quantisation; Rounding; Truncation; Overflow oscillations or limit cycles eliminating measures}
- 2017/0466 {Reduction of limit cycle oscillation}
- 2017/0472 . . . {based on allpass structures}
- 2017/0477 . . . {Direct form I}
- 2017/0483 {Transposed}
- 2017/0488 . . . {Direct form II}
- 2017/0494 {Transposed}
- 17/06 . . . Non-recursive filters
- 17/0607 . . . {comprising a ROM addressed by the input data signals}
- 17/0614 . . . {using Delta-modulation}

17/0621	. . . {with input-sampling frequency and output-delivery frequency which differ, e.g. extrapolation; Anti-aliasing}	2021/0052	. . . . {combined with stochastic gradient algorithm}
17/0628	. . . . {the input and output signals being derived from two separate clocks, i.e. asynchronous sample rate conversion}	2021/0054	. . . . {Affine projection}
17/0635	. . . . {characterized by the ratio between the input-sampling and output-delivery frequencies}	2021/0056	. . . {Non-recursive least squares algorithm [LMS]}
17/0642	. . . . . {the ratio being arbitrary or irrational}	2021/0058	. . . . {Block LMS, i.e. in frequency domain}
17/065	. . . . . {the ratio being integer}	2021/0059	. . . . {Delayed LMS}
17/0657	. . . . . {where the output-delivery frequency is higher than the input sampling frequency, i.e. interpolation}	2021/0061	. . . . {Normalized LMS [NLMS]}
17/0664	. . . . . {where the output-delivery frequency is lower than the input sampling frequency, i.e. decimation}	2021/0063	. . . . . {Proportionate NLMS}
17/0671	. . . . . {Cascaded integrator-comb [CIC] filters}	2021/0065	. . . . {Sign-sign LMS}
2017/0678	. . . . . {with parallel structure, i.e. parallel CIC [PCIC]}	21/0067	. . {Means or methods for compensation of undesirable effects}
17/0685	. . . . . {the ratio being rational}	2021/0069	. . . {Finite wordlength}
2017/0692	. . . {Transposed}	2021/007	. . {Computation saving measures; Accelerating measures}
17/08	. Networks for phase shifting	2021/0072	. . . {Measures relating to the coefficients}
19/00	Networks using time-varying elements, e.g. N-path filters	2021/0074	. . . . {Reduction of the update frequency}
19/002	. {N-path filters}	2021/0076	. . . {Measures relating to the convergence time (H03H 2021/0072 takes precedence)}
19/004	. {Switched capacitor networks}	2021/0078	. . . . {varying the step size}
19/006	. . {simulating one-port networks}	2021/0079	. . . {using look-up tables}
19/008	. {with variable switch closing time}	2021/0081	. . {Details}
21/00	Adaptive networks	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}
21/0001	. {Analogue adaptive filters}	2021/0085	. . {Applications}
21/0003	. . {comprising CCD devices}	2021/0087	. . . {Prediction}
21/0005	. . {comprising SAW devices}	2021/0089	. . . {System identification, i.e. modeling}
21/0007	. . {comprising switched capacitor [SC] devices}	2021/009	. . . . {with recursive filters}
2021/0009	. . {Details}	2021/0092	. . . {Equalization, i.e. inverse modeling}
2021/001	. . . {Analog multipliers}	2021/0094	. . . {Interference Cancelling}
21/0012	. {Digital adaptive filters}	2021/0096	. . {with input-sampling frequency and output-delivery frequency which differ, e.g. extrapolation; anti-aliasing}
21/0014	. . {Lattice filters}	2021/0098	. {Adaptive filters comprising analog and digital structures}
21/0016	. . {Non linear filters}	2210/00	Indexing scheme relating to details of tunable filters
21/0018	. . {Matched filters}	2210/01	. Tuned parameter of filter characteristics
21/002	. . {Filters with a particular frequency response (H03H 21/0014 - H03H 21/0018 take precedence)}	2210/012	. . Centre frequency; Cut-off frequency
21/0021	. . . {Notch filters}	2210/015	. . Quality factor or bandwidth
21/0023	. . . {Comb filters}	2210/017	. . Amplitude, gain or attenuation
21/0025	. . {Particular filtering methods}	2210/02	. Variable filter component
21/0027	. . . {filtering in the frequency domain}	2210/021	. . Amplifier, e.g. transconductance amplifier
21/0029	. . . {based on statistics}	2210/023	. . . Tuning of transconductance via tail current source
21/003	. . . . {KALMAN filters}	2210/025	. . Capacitor
21/0032	. . . . {ARMA filters}	2210/026	. . Inductor
2021/0034	. . . {Blind source separation}	2210/028	. . Resistor
2021/0036	. . . . {of convolutive mixtures}	2210/03	. Type of tuning
2021/0038	. . . . {of instantaneous mixtures}	2210/033	. . Continuous
2021/004	. . . . {using state space representation}	2210/036	. . Stepwise
2021/0041	. . . {Subband decomposition}	2210/04	. Filter calibration method
21/0043	. . {Adaptive algorithms}	2210/043	. . by measuring time constant
2021/0045	. . . {Equation error}	2210/046	. . Leader-follower
2021/0047	. . . . {Combined output and equation error}	2218/00	Indexing scheme relating to details of digital filters
2021/0049	. . . {Recursive least squares algorithm}	2218/02	. Coefficients
2021/005	. . . . {with forgetting factor}	2218/025	. . updated selectively, e.g. by, in the presence of noise, temporally cancelling the update and outputting a predetermined value
		2218/04	. In-phase and quadrature [I/Q] signals

H03H

- 2218/06 . Multiple-input, multiple-output [MIMO]; Multiple-input, single-output [MISO]
- 2218/08 . Resource sharing
- 2218/085 . . Multipliers
- 2218/10 . Multiplier and or accumulator units
- 2218/12 . Signal conditioning
- 2218/14 . Non-uniform sampling

2220/00 Indexing scheme relating to structures of digital filters

- 2220/02 . Modular, e.g. cells connected in cascade
- 2220/04 . Pipelined
- 2220/06 . Systolic
- 2220/08 . Variable filter length

2222/00 Indexing scheme relating to digital filtering methods

- 2222/02 . using fuzzy logic
- 2222/04 . using neural networks
- 2222/06 . using wavelets

2240/00 Indexing scheme relating to filter banks

2250/00 Indexing scheme relating to dual- or multi-band filters

2260/00 Theory relating to impedance networks