CPC COOPERATIVE PATENT CLASSIFICATION

H ELECTRICITY

(NOTE omitted)

H05 ELECTRIC TECHNIQUES NOT OTHERWISE PROVIDED FOR

H05K PRINTED CIRCUITS; CASINGS OR CONSTRUCTIONAL DETAILS OF ELECTRIC APPARATUS; MANUFACTURE OF ASSEMBLAGES OF ELECTRICAL COMPONENTS

NOTES

1. This subclass covers:
   - combinations of a radio or television receiver with apparatus having a different main function;
   - printed circuits structurally associated with non-printed electric components.
2. In this subclass, the following expression is used with the meaning indicated:
   - "printed circuits" covers all kinds of mechanical constructions of circuits that consist of an insulating base or support carrying the conductor and are combined structurally with the conductor throughout their length, especially in a two-dimensional plane, the conductors of which are secured to the base in a non-dismountable manner, and also covers the processes or apparatus for manufacturing such constructions, e.g. forming the circuit by mechanical or chemical treatment of a conductive foil, paste, or film on an insulating support.

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 Printed circuits

1/02 . Details

1/0201 . . {Thermal arrangements, e.g. for cooling, heating or preventing overheating}

1/0203 . . . {Cooling of mounted components (H05K 1/0272 takes precedence)}

1/0204 . . . . {using means for thermal conduction connection in the thickness direction of the substrate (H05K 1/0207 takes precedence)}

1/0206 . . . . . {by printed thermal vias}

1/0207 . . . . {using internal conductor planes parallel to the surface for thermal conduction, e.g. power planes}

1/0209 . . . . {External configuration of printed circuit board adapted for heat dissipation, e.g. lay-out of conductors, coatings}

1/021 . . . . {Components thermally connected to metal substrates or heat-sinks by insert mounting}

1/0212 . . . {Printed circuits or mounted components having integral heating means}

1/0213 . . {Electrical arrangements not otherwise provided for}

1/0215 . . . {Grounding of printed circuits by connection to external grounding means}

1/0216 . . . {Reduction of cross-talk, noise or electromagnetic interference (grounding H05K 1/0215)}

1/0218 . . . . {by printed shielding conductors, ground planes or power plane (H05K 1/0236 takes precedence)}

1/0219 . . . . . {Printed shielding conductors for shielding around or between signal conductors, e.g. coplanar or coaxial printed shielding conductors}

1/0221 . . . . . {Coaxially shielded signal lines comprising a continuous shielding layer partially or wholly surrounding the signal lines}

1/0222 . . . . . {for shielding around a single via or around a group of vias, e.g. coaxial vias or vias surrounded by a grounded via fence}

1/0224 . . . . . {Patterned shielding planes, ground planes or power planes (H05K 1/0253 takes precedence)}

1/0225 . . . . . {Single or multiple openings in a shielding, ground or power plane (H05K 1/0227 takes precedence)}

1/0227 . . . . . {Split or nearly split shielding or ground planes}

1/0228 . . . . {Compensation of cross-talk by a mutually correlated lay-out of printed circuit traces, e.g. for compensation of cross-talk in mounted connectors (balanced signal pairs H05K 1/0245)}

1/023 . . . . {using auxiliary mounted passive components or auxiliary substances (printed passive components H05K 1/16)}

1/0231 . . . . . {Capacitors or dielectric substances}

1/0233 . . . . . {Filters, inductors or a magnetic substance}

1/0234 . . . . . {Resistors or by disposing resistive or lossy substances in or near power planes (H05K 1/0246 takes precedence)}

1/0236 . . . . {Electromagnetic band-gap structures}

1/0237 . . . {High frequency adaptations (H05K 1/0216 takes precedence)}

1/0239 . . . . {Signal transmission by AC coupling}

1/024 . . . . {Dielectric details, e.g. changing the dielectric material around a transmission line}
1/0242 . . . . {Structural details of individual signal conductors, e.g. related to the skin effect}
1/0243 . . . . {Printed circuits associated with mounted high frequency components}
1/0245 . . . . {Lay-out of balanced signal pairs, e.g. differential lines or twisted lines}
1/0246 . . . . {Termination of transmission lines}
1/0248 . . . . {Skew reduction or using delay lines}
1/025 . . . . {Impedance arrangements, e.g. impedance matching, reduction of parasitic impedance (H05K 1/024 and H05K 1/0243 take precedence; for semiconductor devices H01L 23/66)}
1/0251 . . . . . {related to vias or transitions between vias and transmission lines}
1/0253 . . . . . {Impedance adaptations of transmission lines by special lay-out of power planes, e.g. providing openings (H05K 1/0251 takes precedence)}
1/0254 . . . {High voltage adaptations; Electrical insulation details; Overvoltage or electrostatic discharge protection (electrostatic discharge protection for electric apparatus in general H05K 9/0067, H05K 9/0079); Arrangements for regulating voltages or for using plural voltages}
1/0256 . . . . {Electrical insulation details, e.g. around high voltage areas}
1/0257 . . . . {Overvoltage protection}
1/0259 . . . . . {Electrostatic discharge [ESD] protection}
1/026 . . . . . {Spark gaps}
1/0262 . . . . {Arrangements for regulating voltages or for using plural voltages}
1/0263 . . . {High current adaptations, e.g. printed high current conductors or using auxiliary non-printed means; Fine and coarse circuit patterns on one circuit board (H05K 1/0293 takes precedence)}
1/0265 . . . . {characterized by the lay-out of or details of the printed conductors, e.g. reinforced conductors, redundant conductors, conductors having different cross-sections}
1/0266 . . {Marks, test patterns or identification means}
1/0268 . . . {for electrical inspection or testing}
1/0269 . . . {for visual or optical inspection}
1/0271 . . {Arrangements for reducing stress or warp in rigid printed circuit boards, e.g. caused by loads, vibrations or differences in thermal expansion}
1/0272 . . {Adaptations for fluid transport, e.g. channels, holes}
1/0274 . . {Optical details, e.g. printed circuits comprising integral optical means (H05K 1/0269 takes precedence; coupling light guides with opto-electronic components G02B 6/42)}
1/0275 . . {Security details, e.g. tampering prevention or detection}
1/0277 . . {Bendability or stretchability details (H05K 1/038, H05K 3/4691 take precedence)}
1/0278 . . . {Rigid circuit boards or rigid supports of circuit boards locally made bendable, e.g. by removal or replacement of material}
1/028 . . . {Bending or folding regions of flexible printed circuits (H05K 1/0283 takes precedence)}
1/0281 . . . . {Reinforcement details thereof}
1/0283 . . . {Stretchable printed circuits}
1/0284 . . {Details of three-dimensional rigid printed circuit boards (H05K 1/119 takes precedence; shaping of the substrate H05K 3/0014)}
1/0286 . . {Programmable, customizable or modifiable circuits (by programmable non-printed jumper connections H05K 3/222)}
1/0287 . . . {having an universal lay-out, e.g. pad or land grid patterns or mesh patterns}
1/0289 . . . . {having a matrix lay-out, i.e. having selectively interconnectable sets of X-conductors and Y-conductors in different planes}
1/029 . . . {having a programmable lay-out, i.e. adapted for choosing between a few possibilities}
1/0292 . . . {having a modifiable lay-out, i.e. adapted for engineering changes or repair (H05K 1/0293 takes precedence)}
1/0293 . . . {Individual printed conductors which are adapted for modification, e.g. fusable or breakable conductors, printed switches}
1/0295 . . . {adapted for choosing between different types or different locations of mounted components}
1/0296 . . {Conductive pattern lay-out details not covered by sub groups H05K 1/02 - H05K 1/0295 (H05K 1/11 takes precedence; lay-out adapted to mounted component configuration H05K 1/18)}
1/0298 . . . {Multilayer circuits}
1/03 . . Use of materials for the substrate
1/0306 . . . {Inorganic insulating substrates, e.g. ceramic, glass}
1/0313 . . . {Organic insulating material}
1/032 . . . . {consisting of one material}

NOTE

{In this group, in the absence of an indication to the contrary, a material is classified in the last appropriate place.}

1/0326 . . . . . {containing O}
1/0333 . . . . . {containing S}
1/034 . . . . . {containing halogen}
1/0346 . . . . . {containing N}
1/0353 . . . . {consisting of two or more materials, e.g. two or more polymers, polymer + filler, + reinforcement}
1/036 . . . . . {Multilayers with layers of different types}
1/0366 . . . . . {reinforced, e.g. by fibres, fabrics (H05K 1/036 takes precedence)}
1/0373 . . . . . {containing additives, e.g. fillers (H05K 1/036 takes precedence)}
1/038 . . . {Textiles (used as reinforcing materials for organic insulating substrates H05K 1/0366)}
1/0386 . . . {Paper sheets (used as reinforcing materials for organic insulating substrates H05K 1/0366)}
1/0393 . . . {Flexible materials (H05K 1/038 takes precedence; specific organic compositions are classified in H05K 1/0313 and subgroups)}
1/05 . . . Insulated {conductive substrates, e.g. insulated} metal substrate

1/053 . . . . {the metal substrate being covered by an inorganic insulating layer}
1/056 . . . . {the metal substrate being covered by an organic insulating layer}
1/09 . . Use of materials for the {conductive, e.g. } metallic pattern
1/092 . . . {Dispersed materials, e.g. conductive pastes or inks}
1/095 . . . . {for polymer thick films, i.e. having a permanent organic polymeric binder}
1/097 . . . . {Inks comprising nanoparticles and specially adapted for being sintered at low temperature (H05K 1/095 takes precedence)}
1/11 . . Printed elements for providing electric connections to or between printed circuits
1/111 . . . {Pads for surface mounting, e.g. lay-out}
1/112 . . . . {directly combined with via connections}
1/113 . . . . . {Via provided in pad; Pad over filled via}
1/114 . . . . . {Pad being close to via, but not surrounding the via}
1/115 . . . {Via connections; Lands around holes or via connections (H05K 1/112 takes precedence)}
1/116 . . . . {Lands, clearance holes or other lay-out details concerning the surrounding of a via}
1/117 . . . {Pads along the edge of rigid circuit boards, e.g. for pluggable connectors}
1/118 . . . {specially for flexible printed circuits, e.g. using folded portions}
1/119 . . . {Details of rigid insulating substrates therefor, e.g. three-dimensional details (H05K 1/117 takes precedence)}
1/14 . . Structural association of two or more printed circuits (providing electric connection to or between printed circuits H05K 1/11, H01R 12/00)
1/141 . . . {One or more single auxiliary printed circuits mounted on a main printed circuit, e.g. modules, adapters (H05K 1/142 and H05K 1/147 take precedence)}
1/142 . . . {Arrangements of planar printed circuit boards in the same plane, e.g. auxiliary printed circuit insert mounted in a main printed circuit}
1/144 . . . {Stacked arrangements of planar printed circuit boards}
1/145 . . . {Arrangements wherein electric components are disposed between and simultaneously connected to two planar printed circuit boards, e.g. Cordwood modules}
1/147 . . . {at least one of the printed circuits being bent or folded, e.g. by using a flexible printed circuit (H05K 1/148 takes precedence)}
1/148 . . . {Arrangements of two or more hingeably connected rigid printed circuit boards, i.e. connected by flexible means}
1/16 . incorporating printed electric components, e.g. printed resistor, capacitor, inductor
1/162 . . {incorporating printed capacitors}
1/165 . . {incorporating printed inductors}
1/167 . . {incorporating printed resistors}
1/18 . Printed circuits structurally associated with non-printed electric components ({H05K 1/0201, H05K 1/023, H05K 1/0243, and} H05K 1/16 take precedence)
1/181 . . {associated with surface mounted components}
1/182 . . {associated with components mounted in the printed circuit board, e.g. insert mounted components [IMC]}
1/183 . . . {Components mounted in and supported by recessed areas of the printed circuit board}
1/184 . . . {Components including terminals inserted in holes through the printed circuit board and connected to printed contacts on the walls of the holes or at the edges thereof or protruding over or into the holes}
1/185 . . . {Components encapsulated in the insulating substrate of the printed circuit or incorporated in internal layers of a multilayer circuit (semiconductor chips encapsulated by interconnect and support structures H01L 23/5389, H01L 24/00)}
1/186 . . . . {manufactured by mounting on or connecting to patterned circuits before or during embedding}
1/187 . . . . . {the patterned circuits being prefabricated circuits, which are not yet attached to a permanent insulating substrate, e.g. on a temporary carrier}
1/188 . . . . {manufactured by mounting on or attaching to a structure having a conductive layer, e.g. a metal foil, such that the terminals of the component are connected to or adjacent to the conductive layer before embedding, and by using the conductive layer, which is patterned after embedding, at least partially for connecting the component}
1/189 . . {characterised by the use of a flexible or folded printed circuit (H05K 3/326 takes precedence)}

3/00 Apparatus or processes for manufacturing printed circuits

3/0002 . {for manufacturing artworks for printed circuits}
3/0005 . {for designing circuits by computer}
3/0008 . {for aligning or positioning of tools relative to the circuit board (H05K 3/4638, H05K 3/4679 take precedence; for manufacturing assemblages of components H05K 13/0015)}
3/0011 . {Working of insulating substrates or insulating layers}
3/0014 . . {Shaping of the substrate, e.g. by moulding}
3/0017 . . {Etching of the substrate by chemical or physical means}
3/002 . . . {by liquid chemical etching}
3/0023 . . . {by exposure and development of a photosensitive insulating layer}
3/0026 . . . {by laser ablation}
3/0029 . . . . {of inorganic insulating material}
3/0032 . . . . {of organic insulating material}
3/0035 . . . . . {of blind holes, i.e. having a metal layer at the bottom}
3/0038 . . . . . {combined with laser drilling through a metal layer}
3/0041 . . . {by plasma etching}
3/0044 . . {Mechanical working of the substrate, e.g. drilling or punching (H05K 3/0008 takes precedence)}
3/0047 . . . {Drilling of holes}
3/005 . . . {Punching of holes}
3/0052 . . . {Depaneling, i.e. dividing a panel into circuit boards; Working of the edges of circuit boards}

3/0055 . . {After-treatment, e.g. cleaning or desmearing of holes}
3/0058 . {Laminating printed circuit boards onto other substrates, e.g. metallic substrates (H05K 1/0281 takes precedence)}
3/0061 . . {onto a metallic substrate, e.g. a heat sink (heat sinks for electric apparatus H05K 7/20)}
3/0064 . . {onto a polymeric substrate}
3/0067 . . {onto an inorganic, non-metallic substrate}
3/007 . {Manufacture or processing of a substrate for a printed circuit board supported by a temporary or sacrificial carrier (H05K 1/187, H05K 3/20 and H05K 3/4682 take precedence)}
3/0073 . {Masks not provided for in groups H05K 3/02 - H05K 3/46, e.g. for photomechanical production of patterned surfaces}
3/0076 . . {characterised by the composition of the mask}
3/0079 . . {characterised by the method of application or removal of the mask (H05K 3/0091 takes precedence)}
3/0082 . . {characterised by the exposure method of radiation-sensitive masks}
3/0085 . {Apparatus for treatments of printed circuits with liquids not provided for in groups H05K 3/02 - H05K 3/46; conveyors and holding means therefor (apparatus specially adapted for manufacturing assemblages of electric components, e.g. printed circuit boards, H05K 13/00)}
3/0088 . . {for treatment of holes}
3/0091 . {Apparatus for coating printed circuits using liquid non-metallic coating compositions}
3/0094 . {Filling or covering plated through-holes or blind plated vias, e.g. for masking or for mechanical reinforcement}
3/0097 . {Processing two or more printed circuits simultaneously, e.g. made from a common substrate, or temporarily stacked circuit boards (H05K 3/0052 takes precedence)}
3/02 . in which the conductive material is applied to the surface of the insulating support and is thereafter removed from such areas of the surface which are not intended for current conducting or shielding
3/022 . . {Processes for manufacturing precursors of printed circuits, i.e. copper-clad substrates}
3/025 . . . {by transfer of thin metal foil formed on a temporary carrier, e.g. peel-apart copper}
3/027 . . {the conductive material being removed by irradiation, e.g. by photons, alpha or beta particles}
3/04 . . the conductive material being removed mechanically, e.g. by punching
3/041 . . . {by using a die for cutting the conductive material}
3/043 . . . {by using a moving tool for milling or cutting the conductive material}
3/045 . . . {by making a conductive layer having a relief pattern, followed by abrading of the raised portions}
3/046 . . . {by selective transfer or selective detachment of a conductive layer}
3/048 . . . . {using a lift-off resist pattern or a release layer pattern}
3/06 . . the conductive material being removed chemically or electrolytically, e.g. by photo-etch process {(semi-additive methods H05K 3/108)}
3/061 . . . {Etching masks}
3/062 . . . . {consisting of metals or alloys or metallic inorganic compounds (H05K 3/065 takes precedence)}
3/064 . . . . {Photoresists}
3/065 . . . . {applied by electrographic, electrophotographic or magnetographic methods}
3/067 . . . {Etchants}
3/068 . . . {Apparatus for etching printed circuits}
3/07 . . . being removed electrolytically
3/08 . . the conductive material being removed by electric discharge, e.g. by spark erosion
3/10 . in which conductive material is applied to the insulating support in such a manner as to form the desired conductive pattern
3/101 . . {by casting or moulding of conductive material}
3/102 . . {by bonding of conductive powder, i.e. metallic powder (H05K 3/12 takes precedence)}
3/103 . . {by bonding or embedding conductive wires or strips}
3/105 . . {by conversion of non-conductive material on or in the support into conductive material, e.g. by using an energy beam}
3/106 . . . {by photographic methods}
3/107 . . {by filling grooves in the support with conductive material (H05K 3/045, H05K 3/101, H05K 3/1258 and H05K 3/465 take precedence)}
3/108 . . {by semi-additive methods; masks therefor (characterised by metallic etch mask H05K 3/062; electroplating methods or apparatus H05K 3/241)}
3/12 . . using {thick film techniques, e.g.} printing techniques to apply the conductive material {or similar techniques for applying conductive paste or ink patterns}
3/1208 . . . {Pretreatment of the circuit board, e.g. modifying wetting properties; Patterning by using affinity patterns (providing shape patterns H05K 3/1258; adhesion treatments H05K 3/38)}
3/1216 . . . {by screen printing or stencil printing}
3/1225 . . . . {Screens or stencils; Holders therefor}
3/1233 . . . . {Methods or means for supplying the conductive material and for forcing it through the screen or stencil}
3/1241 . . . {by ink-jet printing or drawing by dispensing}
3/125 . . . . {by ink-jet printing}
3/1258 . . . {by using a substrate provided with a shape pattern, e.g. grooves, banks, resist pattern}
3/1266 . . . {by electrographic or magnetographic printing}
3/1275 . . . {by other printing techniques, e.g. letterpress printing, intaglio printing, lithographic printing, offset printing}
3/1283 . . . {After-treatment of the printed patterns, e.g. sintering or curing methods}
3/1291 . . . . {Firing or sintering at relative high temperatures for patterns on inorganic boards, e.g. co-firing of circuits on green ceramic sheets}
3/14 . . using spraying techniques to apply the conductive material {, e.g. vapour evaporation}
3/143 . . . {Masks therefor (H05K 3/048 takes precedence)}

3/146 . . . {By vapour deposition}
3/16 . . . by cathodic sputtering
3/18 . . using precipitation techniques to apply the conductive material
3/181 . . . {by electroless plating (adhesives therefor H05K 3/387)}
3/182 . . . . {characterised by the patterning method}
3/184 . . . . . {using masks}
3/185 . . . . . {by making a catalytic pattern by photo-imaging}
3/187 . . . . {means therefor, e.g. baths, apparatus}
3/188 . . . {by direct electroplating}
3/20 . . by affixing prefabricated conductor pattern {(H05K 1/187, H05K 3/046, H05K 3/4658, H05K 3/4682 takes precedence)}
3/202 . . . {using self-supporting metal foil pattern}
3/205 . . . {using a pattern electroplated or electroformed on a metallic carrier}
3/207 . . . {using a prefabricated paste pattern, ink pattern or powder pattern}
3/22 . Secondary treatment of printed circuits {(H05K 3/1283 takes precedence; embedding circuits in grooves by pressure H05K 3/107)}
3/222 . . {Completing of printed circuits by adding non-printed jumper connections (printed jumper connections H05K 3/4685)}
3/225 . . {Correcting or repairing of printed circuits (H05K 1/0292, H05K 3/222, H05K 3/288, H05K 3/4685 take precedence)}
3/227 . . {Drying of printed circuits}
3/24 . . Reinforcing the conductive pattern {(by solder coating H05K 3/3457)}
3/241 . . . {characterised by the electroplating method; means therefor, e.g. baths or apparatus}
3/242 . . . . {characterised by using temporary conductors on the printed circuit for electrically connecting areas which are to be electroplated}
3/243 . . . {characterised by selective plating, e.g. for finish plating of pads (selective plating for making the circuit pattern H05K 3/108, H05K 3/182)}
3/244 . . . {Finish plating of conductors, especially of copper conductors, e.g. for pads or lands (selective plating methods H05K 3/243; finish plating of conductors made by printing techniques H05K 3/246; solder as finish H05K 3/3457, e.g. by plating H05K 3/3473)}
3/245 . . . {Reinforcing conductive patterns made by printing techniques or by other techniques for applying conductive pastes, inks or powders; Reinforcing other conductive patterns by such techniques}
3/246 . . . . {Reinforcing conductive paste, ink or powder patterns by other methods, e.g. by plating}
3/247 . . . . {Finish coating of conductors by using conductive pastes, inks or powders}
3/248 . . . . . {fired compositions for inorganic substrates}
3/249 . . . . . {comprising carbon particles as main constituent}
3/26 . . Cleaning or polishing of the conductive pattern
3/28 . . Applying non-metallic protective coatings {(H05K 3/0091 takes precedence; methods for intermediate insulating layers for build-up multilayer circuits H05K 3/4673)}
3/281 . . . {by means of a preformed insulating foil (H05K 3/284 takes precedence)}
3/282 . . . {for inhibiting the corrosion of the circuit, e.g. for preserving the solderability}
3/284 . . . {for encapsulating mounted components (H05K 1/185 takes precedence)}
3/285 . . . {Permanent coating compositions}
3/287 . . . . {Photosensitive compositions}
3/288 . . . {Removal of non-metallic coatings, e.g. for repairing}
3/30 . Assembling printed circuits with electric components, e.g. with resistor
3/301 . . {by means of a mounting structure (H05K 3/325 takes precedence)}
3/303 . . {Surface mounted components, e.g. affixing before soldering, aligning means, spacing means (H05K 3/32 takes precedence)}
3/305 . . . {Affixing by adhesive}
3/306 . . {Lead-in-hole components, e.g. affixing or retention before soldering, spacing means (H05K 3/32 takes precedence)}
3/308 . . . {Adaptations of leads (connectors to printed circuits H01R 12/00)}
3/32 . . electrically connecting electric components or wires to printed circuits
3/321 . . . {by conductive adhesives}
3/323 . . . . {by applying an anisotropic conductive adhesive layer over an array of pads}
3/325 . . . {by abutting or pinching, i.e. without alloying process; mechanical auxiliary parts therefor (adaptations of leads inserted in holes for press-fit connections H05K 3/308)}
3/326 . . . . {the printed circuit having integral resilient or deformable parts, e.g. tabs or parts of flexible circuits (H05K 3/365 takes precedence)}
3/328 . . . {by welding}
3/34 . . . by soldering
3/3405 . . . . {Edge mounted components, e.g. terminals}
3/341 . . . . {Surface mounted components}
3/3415 . . . . . {on both sides of the substrate or combined with lead-in-hole components}
3/3421 . . . . . {Leaded components}
3/3426 . . . . . {characterised by the leads}
3/3431 . . . . . {Leadless components}
3/3436 . . . . . {having an array of bottom contacts, e.g. pad grid array or ball grid array components}
3/3442 . . . . . {having edge contacts, e.g. leadless chip capacitors, chip carriers}
3/3447 . . . . {Lead-in-hole components (H05K 3/3415 takes precedence)}
3/3452 . . . . {Solder masks}
3/3457 . . . . {Solder materials or compositions; Methods of application thereof}
3/3463 . . . . . {Solder compositions in relation to features of the printed circuit board or the mounting process}
3/3468 . . . . . {Applying molten solder}
3/3473 . . . . . {Plating of solder}

3/3478 . . . . . {Applying solder preforms; Transferring prefabricated solder patterns}
3/3485 . . . . . {Applying solder paste, slurry or powder (thick film methods for applying conductive paste or ink patterns H05K 3/12)}
3/3489 . . . . {Composition of fluxes; Methods of application thereof; Other methods of activating the contact surfaces}
3/3494 . . . . {Heating methods for reflowing of solder (using integral heating means H05K 1/0212)}
3/36 . Assembling printed circuits with other printed circuits {(H05K 7/142 takes precedence)}
3/361 . . {Assembling flexible printed circuits with other printed circuits}
3/363 . . . {by soldering}
3/365 . . . {by abutting, i.e. without alloying process}
3/366 . . {substantially perpendicularly to each other (H05K 3/361 takes precedence)}
3/368 . . {parallel to each other (H05K 3/361 takes precedence)}
3/38 . Improvement of the adhesion between the insulating substrate and the metal
3/381 . . {by special treatment of the substrate}
3/382 . . {by special treatment of the metal}
3/383 . . . {by microetching}
3/384 . . . {by plating}
3/385 . . . {by conversion of the surface of the metal, e.g. by oxidation, whether or not followed by reaction or removal of the converted layer}
3/386 . . {by the use of an organic polymeric bonding layer, e.g. adhesive}
3/387 . . . {for electroless plating (H05K 3/4661 takes precedence)}
3/388 . . {by the use of a metallic or inorganic thin film adhesion layer}
3/389 . . {by the use of a coupling agent, e.g. silane}
3/40 . Forming printed elements for providing electric connections to or between printed circuits
3/4007 . . {Surface contacts, e.g. bumps (H05K 3/4092 takes precedence; deposition of finish layers on pads H05K 3/24; forming solder bumps H05K 3/3457)}
3/4015 . . . {using auxiliary conductive elements, e.g. pieces of metal foil, metallic spheres}
3/403 . . {Edge contacts; Windows or holes in the substrate having plural connections on the walls thereof (H05K 3/4092 takes precedence)}
3/4038 . . {Through-connections; Vertical interconnect access [VIA] connections (H05K 3/403, H05K 3/42 take precedence)}
3/4046 . . . {using auxiliary conductive elements, e.g. metallic spheres, eyelets, pieces of wire}
3/4053 . . . {by thick-film techniques}
3/4061 . . . . {for via connections in inorganic insulating substrates}
3/4069 . . . . {for via connections in organic insulating substrates}
3/4076 . . . {by thin-film techniques}
3/4084 . . . {by deforming at least one of the conductive layers}
3/4092 . . {Integral conductive tabs, i.e. conductive parts partly detached from the substrate}
3/42 . . Plated through-holes {or plated via connections}
3/421 . . . {Blind plated via connections (H05K 3/422, H05K 3/423 and H05K 3/425 take precedence)}
3/422 . . . {characterised by electroless plating method; pretreatment therefor}
3/423 . . . {characterised by electroplating method}
3/424 . . . . {by direct electroplating}
3/425 . . . {characterised by the sequence of steps for plating the through-holes or via connections in relation to the conductive pattern}
3/426 . . . . {initial plating of through-holes in substrates without metal}
3/427 . . . . {initial plating of through-holes in metal-clad substrates}
3/428 . . . . {initial plating of through-holes in substrates having a metal pattern}
3/429 . . . {Plated through-holes specially for multilayer circuits, e.g. having connections to inner circuit layers}
3/44 . Manufacturing insulated metal core circuits {or other insulated electrically conductive core circuits (H05K 3/0058, H05K 3/4608, and H05K 3/4641 take precedence)}
3/445 . . {having insulated holes or insulated via connections through the metal core}
3/46 . Manufacturing multilayer circuits
3/4602 . . {characterized by a special circuit board as base or central core whereon additional circuit layers are built or additional circuit boards are laminated}
3/4605 . . . {made from inorganic insulating material}
3/4608 . . . {comprising an electrically conductive base or core}
3/4611 . . {by laminating two or more circuit boards (H05K 3/4652 takes precedence)}
3/4614 . . . {the electrical connections between the circuit boards being made during lamination}
3/4617 . . . . {characterized by laminating only or mainly similar single-sided circuit boards}
3/462 . . . . {characterized by laminating only or mainly similar double-sided circuit boards}
3/4623 . . . {the circuit boards having internal via connections between two or more circuit layers before lamination, e.g. double-sided circuit boards (H05K 3/462 takes precedence)}
3/4626 . . . {characterised by the insulating layers or materials (H05K 3/4688 takes precedence)}
3/4629 . . . . {laminating inorganic sheets comprising printed circuits, e.g. green ceramic sheets}
3/4632 . . . . {laminating thermoplastic or uncured resin sheets comprising printed circuits without added adhesive materials between the sheets}
3/4635 . . . . {laminating flexible circuit boards using additional insulating adhesive materials between the boards}
3/4638 . . . {Aligning and fixing the circuit boards before lamination; Detecting or measuring the misalignment after lamination; Aligning external circuit patterns or via connections relative to internal circuits}
3/4641 . . . {having integrally laminated metal sheets or special power cores}

3/4644 . . {by building the multilayer layer by layer, i.e. build-up multilayer circuits (making via holes in the insulating layers H05K 3/0011; special circuit boards as base or core whereon the multilayer is built H05K 3/4602)}

3/4647 . . . {by applying an insulating layer around previously made via studs}

3/465 . . . {by applying an insulating layer having channels for the next circuit layer}

3/4652 . . . {Adding a circuit layer by laminating a metal foil or a preformed metal foil pattern (H05K 3/4647 takes precedence)}

3/4655 . . . . {by using a laminate characterized by the insulating layer (general-purpose insulating materials H05K 1/03, H05K 3/4673)}

3/4658 . . . . {characterized by laminating a prefabricated metal foil pattern, e.g. by transfer}

3/4661 . . . {Adding a circuit layer by direct wet plating, e.g. electroless plating; insulating materials adapted therefor (other insulating materials H05K 3/387)}

3/4664 . . . {Adding a circuit layer by thick film methods, e.g. printing techniques or by other techniques for making conductive patterns by using pastes, inks or powders (H05K 3/4647 takes precedence)}

3/4667 . . . . {characterized by using an inorganic intermediate insulating layer}

3/467 . . . {Adding a circuit layer by thin film methods (H05K 3/4647 takes precedence)}

3/4673 . . . {Application methods or materials of intermediate insulating layers not specially adapted to any one of the previous methods of adding a circuit layer (similar methods for protective coatings H05K 3/28)}

3/4676 . . . . {Single layer compositions}

3/4679 . . . {Aligning added circuit layers or via connections relative to previous circuit layers}

3/4682 . . . {Manufacture of core-less build-up multilayer circuits on a temporary carrier or on a metal foil}

3/4685 . . {Manufacturing of cross-over conductors}

3/4688 . . {Composite multilayer circuits, i.e. comprising insulating layers having different properties (having a special base or central core H05K 3/4602)}

3/4691 . . . {Rigid-flexible multilayer circuits comprising rigid and flexible layers, e.g. having in the bending regions only flexible layers}

3/4694 . . . {Partitioned multilayer circuits having adjacent regions with different properties, e.g. by adding or inserting locally circuit layers having a higher circuit density (H05K 3/4691 takes precedence)}

3/4697 . . {having cavities, e.g. for mounting components (H05K 3/4691 takes precedence)}

5/00 Casings, cabinets or drawers for electric apparatus

5/0004 . {comprising several parts forming a closed casing}

5/0008 . . {assembled by screws}

5/0013 . . {assembled by resilient members}

5/0017 . {with operator interface units}

WARNING

Group H05K 5/0017 is impacted by reclassification into group H05K 5/0018.

Groups H05K 5/0017 and H05K 5/0018 should be considered in order to perform a complete search.

5/0018 . . {having an electronic display}

WARNING

Group H05K 5/0018 is incomplete pending reclassification of documents from group H05K 5/0017.

Groups H05K 5/0017 and H05K 5/0018 should be considered in order to perform a complete search.

5/0021 . {Side-by-side or stacked arrangements}

5/0026 . {provided with connectors and printed circuit boards [PCB], e.g. automotive electronic control units}

5/003 . . {having an integrally preformed housing}

5/0034 . . {having an overmolded housing covering the PCB}

5/0039 . . {having a tubular housing wherein the PCB is inserted longitudinally}

5/0043 . . {comprising a frame housing mating with two lids wherein the PCB is flat mounted on the frame housing}

5/0047 . . {having a two-part housing enclosing a PCB}

5/0052 . . . {characterized by joining features of the housing parts}

5/0056 . . . {characterized by features for protecting electronic components against vibration and moisture, e.g. potting, holders for relatively large capacitors}

5/006 . . . {characterized by features for holding the PCB within the housing}

5/0065 . . {wherein modules are associated together, e.g. electromechanical assemblies, modular structures}

5/0069 . . {having connector relating features for connecting the connector pins with the PCB or for mounting the connector body with the housing}

5/0073 . . {having specific features for mounting the housing on an external structure}

5/0078 . . {specially adapted for acceleration sensors, e.g. crash sensors, airbag sensors}

5/0082 . . {specially adapted for transmission control units, e.g. gearbox controllers}

5/0086 . {portable, e.g. battery operated apparatus (casings for switching devices H01H 9/02)}

5/0091 . {Housing specially adapted for small components (for resistors H01C; for capacitors H01G; for integrated circuits H01L 23/00)}

5/0095 . . {hermetically-sealed}

5/02 . Details

WARNING

Group H05K 5/02 is impacted by reclassification into groups H05K 5/0209, H05K 5/021, H05K 5/0211, H05K 5/0212, H05K 5/0214, H05K 5/0215 and H05K 5/0216.

All groups listed in this Warning should be considered in order to perform a complete search.

5/0204 . . {Mounting supporting structures on the outside of casings}

5/0208 . . {Interlock mechanisms; Means for avoiding unauthorised use or function, e.g. tamperproof}

5/0209 . . {Thermal insulation, e.g. for fire protection or for fire containment or for high temperature environments}

WARNING

Groups H05K 5/0209 - H05K 5/0211 are incomplete pending reclassification of documents from groups H05K 5/02 and H05K 5/0213.

All groups listed in this Warning should be considered in order to perform a complete search.

5/021 . . . {specially adapted for data recorders, e.g. for flight recorders}

5/0211 . . . {Thermal buffers, e.g. latent heat absorbers}

5/0212 . . {Condensation eliminators}

WARNING

Group H05K 5/0212 is incomplete pending reclassification of documents from groups H05K 5/02 and H05K 5/0213.

Groups H05K 5/02, H05K 5/0213 and H05K 5/0212 should be considered in order to perform a complete search.

5/0213 . . {Venting apertures; Constructional details thereof}

WARNING

Group H05K 5/0213 is impacted by reclassification into groups H05K 5/0209, H05K 5/021, H05K 5/0211, H05K 5/0212, H05K 5/0214, H05K 5/0215 and H05K 5/0216.

All groups listed in this Warning should be considered in order to perform a complete search.

5/0214 . . . {with means preventing penetration of rain water or dust (semi-permeable membranes H05K 5/0215, H05K 5/0216)}

WARNING

Group H05K 5/0214 is incomplete pending reclassification of documents from groups H05K 5/02 and H05K 5/0213.

Groups H05K 5/02, H05K 5/0213 and H05K 5/0214 should be considered in order to perform a complete search.

5/0215 . . . {with semi-permeable membranes attached to casings}

WARNING

Group H05K 5/0215 is incomplete pending reclassification of documents from groups H05K 5/02 and H05K 5/0213.

Groups H05K 5/02, H05K 5/0213 and H05K 5/0215 should be considered in order to perform a complete search.

5/0216 . . . {Venting plugs comprising semi-permeable membranes}

WARNING

Group H05K 5/0216 is incomplete pending reclassification of documents from groups H05K 5/02 and H05K 5/0213.

Groups H05K 5/02, H05K 5/0213 and H05K 5/0216 should be considered in order to perform a complete search.

5/0217 . . {Mechanical details of casings (covers, lids, hoods or members for covering apertures H05K 5/03)}

5/0221 . . . {Locks; Latches}

5/0226 . . . {Hinges}

5/023 . . . {Handles; Grips}

5/0234 . . . {Feet; Stands; Pedestals, e.g. wheels for moving casing on floor}

5/0243 . . . {for decorative purposes}

5/0247 . . {Electrical details of casings, e.g. terminals, passages for cables or wiring}

5/0252 . . {Labels, e.g. for identification, markings or configuration store}

5/0256 . . {of interchangeable modules or receptacles therefor, e.g. cartridge mechanisms}

5/026 . . . {having standardized interfaces (flash memory cards G06K 19/077)}

5/0265 . . . . {of PCMCIA type}

5/0269 . . . . . {Card housings therefor, e.g. covers, frames, PCB}

5/0273 . . . . . {having extensions for peripherals, e.g. LAN, antennas (details of antennas H01Q 1/2275)}

5/0278 . . . . {of USB type (details relating to connectors H01R 27/00)}

5/0282 . . . {Adapters for connecting cards having a first standard in receptacles having a second standard}

5/0286 . . . {Receptacles therefor, e.g. card slots, module sockets, card groundings}

5/0291 . . . . {for multiple cards}

5/0295 . . . . {having ejection mechanisms}

5/03 . . Covers

5/04 . Metal casings

5/06 . Hermetically-sealed casings {(specially adapted for small components H05K 5/0095)}

5/061 . . {sealed by a gasket held between a removable cover and a body, e.g. O-ring, packing}

5/062 . . {sealed by a material injected between a non-removable cover and a body, e.g. hardening in situ}

5/063 . . {sealed by a labyrinth structure provided at the joining parts}

5/064 . . {sealed by potting, e.g. waterproof resin poured in a rigid casing}
5/065 . . {sealed by encapsulation, e.g. waterproof resin forming an integral casing, injection moulding}
5/066 . . {sealed by fusion of the joining parts without bringing material; sealed by brazing}
5/067 . . {containing a dielectric fluid}
5/068 . . {having a pressure compensation device, e.g. membrane (venting means H05K 5/0213)}
5/069 . . {Other details of the casing, e.g. wall structure, passage for a connector, a cable, a shaft}

7/00 Constructional details common to different types of electric apparatus (casings, cabinets, drawers H05K 5/00)
7/005 . {arrangements of circuit components without supporting structure}
7/02 . Arrangements of circuit components or wiring on supporting structure
7/023 . . {Stackable modules}
7/026 . . {Multiple connections subassemblies}
7/04 . . on conductive chassis
7/06 . . on insulating boards {, e.g. wiring harnesses (for printed circuits H05K 1/18, H05K 3/30)}
7/08 . . . on perforated boards
7/10 . . Plug-in assemblages of components {, e.g. IC sockets}
7/1007 . . . {with means for increasing contact pressure at the end of engagement of coupling parts}
7/1015 . . . {having exterior leads}
7/1023 . . . . {co-operating by abutting, e.g. flat pack}
7/103 . . . . {co-operating by sliding, e.g. DIP carriers}
7/1038 . . . . . {with spring contact pieces (H05K 7/1046 takes precedence)}
7/1046 . . . . . {J-shaped leads}
7/1053 . . . {having interior leads}
7/1061 . . . . {co-operating by abutting}
7/1069 . . . . . {with spring contact pieces}
7/1076 . . . . {co-operating by sliding}
7/1084 . . . . . {pin grid array package carriers}
7/1092 . . . {with built-in components, e.g. intelligent sockets}
7/12 . . Resilient or clamping means for holding component to structure
7/14 . Mounting supporting structure in casing or on frame or rack
7/1401 . . {comprising clamping or extracting means (H05K 7/10 takes precedence)}
7/1402 . . . {for securing or extracting printed circuit boards}
7/1404 . . . . {by edge clamping, e.g. wedges}
7/1405 . . . . {by clips or resilient members, e.g. hooks}
7/1407 . . . . {by turn-bolt or screw member}
7/1408 . . . . {by a unique member which latches several boards, e.g. locking bars}
7/1409 . . . . {by lever-type mechanisms}
7/1411 . . . {for securing or extracting box-type drawers}
7/1412 . . . . {hold down mechanisms, e.g. avionic racks}
7/1414 . . . {with power interlock}
7/1415 . . . {manual gripping tools}
7/1417 . . {having securing means for mounting boards, plates or wiring boards (H05K 7/1461 takes precedence)}
7/1418 . . . {Card guides, e.g. grooves (H05K 7/1425 takes precedence)}
7/142 . . . {Spacers not being card guides}
7/1421 . . {Drawers for printed circuit boards}
7/1422 . . {Printed circuit boards receptacles, e.g. stacked structures, electronic circuit modules or box like frames}
7/1424 . . . {Card cages}
7/1425 . . . . {of standardised dimensions, e.g. 19"-subrack}
7/1427 . . . {Housings}
7/1428 . . . . {for small modular apparatus with terminal block}
7/1429 . . . . {for circuits carrying a CPU and adapted to receive expansion cards}
7/1431 . . . . . {Retention mechanisms for CPU modules}
7/1432 . . . . {specially adapted for power drive units or power converters}

WARNING

Group H05K 7/1432 is impacted by reclassification into groups H05K 7/14322, H05K 7/14324, H05K 7/14325, H05K 7/14327, H05K 7/14329, H05K 7/14337 and H05K 7/14339.

All groups listed in this Warning should be considered in order to perform a complete search.

7/14322 . . . . . {wherein the control and power circuits of a power converter are arranged within the same casing}

WARNING

Group H05K 7/14322 is incomplete pending reclassification of documents from group H05K 7/1432.

Groups H05K 7/1432 and H05K 7/14322 should be considered in order to perform a complete search.

7/14324 . . . . . {comprising modular units, e.g. DIN rail mounted units}

WARNING

Group H05K 7/14324 is incomplete pending reclassification of documents from group H05K 7/1432.

Groups H05K 7/1432 and H05K 7/14324 should be considered in order to perform a complete search.

7/14325 . . . . . {for cabinets or racks}

WARNING

Group H05K 7/14325 is incomplete pending reclassification of documents from group H05K 7/1432.

Groups H05K 7/1432 and H05K 7/14325 should be considered in order to perform a complete search.

7/14327 . . . . . {having supplementary functional units, e.g. data transfer modules or displays or user interfaces}

WARNING

Group H05K 7/14327 is incomplete pending reclassification of documents from group H05K 7/1432.

Groups H05K 7/1432 and H05K 7/14327 should be considered in order to perform a complete search.

7/14329 . . . . . {specially adapted for the configuration of power bus bars}

WARNING

Group H05K 7/14329 is incomplete pending reclassification of documents from group H05K 7/1432.

Groups H05K 7/1432 and H05K 7/14329 should be considered in order to perform a complete search.

7/14337 . . . . . {specially adapted for underwater operation}

WARNING

Group H05K 7/14337 is incomplete pending reclassification of documents from group H05K 7/1432.

Groups H05K 7/1432 and H05K 7/14337 should be considered in order to perform a complete search.

7/14339 . . . . . {specially adapted for high voltage operation}

WARNING

Group H05K 7/14339 is incomplete pending reclassification of documents from group H05K 7/1432.

Groups H05K 7/1432 and H05K 7/14339 should be considered in order to perform a complete search.

7/1434 . . . . {for electronics exposed to high gravitational force; Cylindrical housings}
7/1435 . . . {Expandable constructions}
7/1438 . . {Back panels or connecting means therefor; Terminals; Coding means to avoid wrong insertion}
7/1439 . . . {Back panel mother boards}
7/1441 . . . . {with a segmented structure}
7/1442 . . . . {with a radial structure}
7/1444 . . . . {Complex or three-dimensional-arrangements; Stepped or dual mother boards}
7/1445 . . . . {with double-sided connections}
7/1447 . . . {External wirings; Wiring ducts; Laying cables}
7/1448 . . . . {with connections to the front board}
7/1449 . . . . {with connections to the back board}
7/1451 . . . . {with connections between circuit boards or units}
7/1452 . . . {Mounting of connectors; Switching; Reinforcing of back panels}
7/1454 . . . . {Alignment mechanisms; Drawout cases}
7/1455 . . . . {Coding for prevention of wrong insertion}
7/1457 . . . {Power distribution arrangements}
7/1458 . . . {Active back panels; Back panels with filtering means}
7/1459 . . . {Circuit configuration, e.g. routing signals}
7/1461 . . {Slidable card holders; Card stiffeners; Control or display means therefor}
7/1462 . . {for programmable logic controllers [PLC] for automation or industrial process control}
7/1464 . . . {Functional units accommodated in the same PLC module housing}
7/1465 . . . {Modular PLC assemblies with separable functional units}
7/1467 . . . {PLC mounted in a cabinet or chassis}
7/1468 . . . {Mechanical features of input/output (I/O) modules}
7/1469 . . . . {Terminal blocks for connecting sensors}
7/1471 . . . . {Modules for controlling actuators}
7/1472 . . . . {Bus coupling modules, e.g. bus distribution modules}
7/1474 . . . {Mounting of modules, e.g. on a base or rail or wall}
7/1475 . . . {Bus assemblies for establishing communication between PLC modules}
7/1477 . . . . {including backplanes}
7/1478 . . . . {including a segmented bus}
7/1479 . . . . {including decentralized modules, e.g. connected to other modules using fieldbus}
7/1481 . . . {User interface, e.g. status displays; Programming interface, e.g. connector for computer programming; Monitoring}
7/1482 . . . {PLC power supply; PLC accessories, e.g. for safety}
7/1484 . . . {Electrical diagrams relating to constructional features, e.g. signal routing within PLC; Provisions for disaster recovery, e.g. redundant systems}
7/1485 . . {Servers; Data center rooms, e.g. 19-inch computer racks}
7/1487 . . . {Blade assemblies, e.g. blade cases or inner arrangements within a blade}
7/1488 . . . {Cabinets therefor, e.g. chassis or racks or mechanical interfaces between blades and support structures}
7/1489 . . . . {characterized by the mounting of blades therein, e.g. brackets, rails, trays (H05K 7/1491 takes precedence)}
7/1491 . . . . {having cable management arrangements (management of optical cables G02B 6/444; in telecommunication cabinets H04Q 1/06)}
7/1492 . . . . {having electrical distribution arrangements, e.g. power supply or data communications}
7/1494 . . . . {having hardware for monitoring blades, e.g. keyboards, displays (methods or software therefore H05K 7/1498)}
7/1495 . . . . {providing data protection in case of earthquakes, floods, storms, nuclear explosions, intrusions, fire}
7/1497 . . . {Rooms for data centers; Shipping containers therefor}

7/1498 . . . {Resource management, Optimisation arrangements, e.g. configuration, identification, tracking, physical location (thermal management H05K 7/20836)}
7/16 . . on hinges or pivots
7/18 . Construction of rack or frame
7/183 . . {support rails therefor}
7/186 . . {for supporting telecommunication equipment (selecting apparatus H04Q 1/02)}
7/20 . Modifications to facilitate cooling, ventilating, or heating
7/20009 . . {using a gaseous coolant in electronic enclosures (in cabinets of standardized dimensions H05K 7/20536; in server cabinets H05K 7/20709; in vehicle electronic casings H05K 7/20845; in power control electronics H05K 7/2089; in displays H05K 7/20954)}
7/20127 . . . {Natural convection}
7/20136 . . . {Forced ventilation, e.g. by fans (H05K 7/202 takes precedence)}
7/20145 . . . . {Means for directing air flow, e.g. ducts, deflectors, plenum or guides}
7/20154 . . . . {Heat dissipaters coupled to components}
7/20163 . . . . . {the components being isolated from air flow, e.g. hollow heat sinks, wind tunnels or funnels}
7/20172 . . . . {Fan mounting or fan specifications}
7/20181 . . . . {Filters; Louvers}
7/2019 . . . . {Fan safe systems, e.g. mechanical devices for non stop cooling}
7/202 . . . {Air circulating in closed loop within enclosure wherein heat is removed through heat-exchangers}
7/20209 . . . {Thermal management, e.g. fan control}
7/20218 . . {using a liquid coolant without phase change in electronic enclosures (in cabinets of standardized dimensions H05K 7/20536; in server cabinets H05K 7/20709; in vehicle electronic casings H05K 7/20845; in power control electronics H05K 7/2089; in displays H05K 7/20954)}
7/20236 . . . {by immersion}
7/20245 . . . {by natural convection; Thermosiphons}
7/20254 . . . {Cold plates transferring heat from heat source to coolant}
7/20263 . . . {Heat dissipaters releasing heat from coolant}
7/20272 . . . {Accessories for moving fluid, for expanding fluid, for connecting fluid conduits, for distributing fluid, for removing gas or for preventing leakage, e.g. pumps, tanks or manifolds}
7/20281 . . . {Thermal management, e.g. liquid flow control}
7/2029 . . {using a liquid coolant with phase change in electronic enclosures (in cabinets of standardized dimensions H05K 7/20536; in server cabinets H05K 7/20709; in vehicle electronic casings H05K 7/20845; in power control electronics H05K 7/2089; in displays H05K 7/20954)}
7/203 . . . {by immersion}
7/20309 . . . {Evaporators}
7/20318 . . . {Condensers}
7/20327 . . . {Accessories for moving fluid, for connecting fluid conduits, for distributing fluid or for preventing leakage, e.g. pumps, tanks or manifolds}
7/20336 . . . {Heat pipes, e.g. wicks or capillary pumps}
7/20345 . . . {Sprayers; Atomizers}
7/20354 . . . {Refrigerating circuit comprising a compressor}
7/20363 . . . {Refrigerating circuit comprising a sorber}
7/20372 . . . {Cryogenic cooling; Nitrogen liquid cooling}
7/20381 . . . {Thermal management, e.g. evaporation control}
7/2039 . . {characterised by the heat transfer by conduction from the heat generating element to a dissipating body (arrangements for increasing/decreasing heat-transfer, e.g. fins details, F28F 13/00)}
7/20409 . . . {Outer radiating structures on heat dissipating housings, e.g. fins integrated with the housing}
7/20418 . . . . {the radiating structures being additional and fastened onto the housing}
7/20427 . . . . {having radiation enhancing surface treatment, e.g. black coating}
7/20436 . . . {Inner thermal coupling elements in heat dissipating housings, e.g. protrusions or depressions integrally formed in the housing}
7/20445 . . . . {the coupling element being an additional piece, e.g. thermal standoff}
7/20454 . . . . . {with a conformable or flexible structure compensating for irregularities, e.g. cushion bags, thermal paste}
7/20463 . . . . . {Filling compound, e.g. potted resin}
7/20472 . . . . . {Sheet interfaces}
7/20481 . . . . . {characterised by the material composition exhibiting specific thermal properties}
7/2049 . . . . {Pressing means used to urge contact, e.g. springs}
7/205 . . . {Heat-dissipating body thermally connected to heat generating element via thermal paths through printed circuit board [PCB] (details of PCBs relating to heat transfer H05K 1/0201)}
7/20509 . . . {Multiple-component heat spreaders; Multi-component heat-conducting support plates; Multi-component non-closed heat-conducting structures}
7/20518 . . . {Unevenly distributed heat load, e.g. different sectors at different temperatures, localised cooling, hot spots}
7/20536 . . {for racks or cabinets of standardised dimensions, e.g. electronic racks for aircraft or telecommunication equipment}
7/20545 . . . {Natural convection of gaseous coolant; Heat transfer by conduction from electronic boards}
7/20554 . . . {Forced ventilation of a gaseous coolant (in closed loop H05K 7/206 or H05K 7/20609 or H05K 7/20618)}
7/20563 . . . . {within sub-racks for removing heat from electronic boards}
7/20572 . . . . {within cabinets for removing heat from sub-racks, e.g. plenum}
7/20581 . . . . . {Cabinets including a drawer for fans}
7/2059 . . . . {within rooms for removing heat from cabinets, e.g. by air conditioning device}

7/206 . . . {Air circulating in closed loop within cabinets wherein heat is removed through air-to-air heat-exchanger}
7/20609 . . . {Air circulating in closed loop within cabinets wherein heat is removed through air-to-liquid heat-exchanger}
7/20618 . . . {Air circulating in different modes under control of air guidance flaps}
7/20627 . . . {Liquid coolant without phase change}
7/20636 . . . . {within sub-racks for removing heat from electronic boards}
7/20645 . . . . {within cabinets for removing heat from sub-racks}
7/20654 . . . . {within rooms for removing heat from cabinets}
7/20663 . . . {Liquid coolant with phase change, e.g. heat pipes}
7/20672 . . . . {within sub-racks for removing heat from electronic boards}
7/20681 . . . . {within cabinets for removing heat from sub-racks}
7/2069 . . . . {within rooms for removing heat from cabinets}
7/207 . . . {Thermal management, e.g. cabinet temperature control}
7/20709 . . {for server racks or cabinets; for data centers, e.g. 19-inch computer racks}
7/20718 . . . {Forced ventilation of a gaseous coolant (in closed loop H05K 7/20754)}
7/20727 . . . . {within server blades for removing heat from heat source}
7/20736 . . . . {within cabinets for removing heat from server blades}
7/20745 . . . . {within rooms for removing heat from cabinets, e.g. by air conditioning device}
7/20754 . . . {Air circulating in closed loop within cabinets}
7/20763 . . . {Liquid cooling without phase change}
7/20772 . . . . {within server blades for removing heat from heat source}
7/20781 . . . . {within cabinets for removing heat from server blades}
7/2079 . . . . {within rooms for removing heat from cabinets}
7/208 . . . {Liquid cooling with phase change}
7/20809 . . . . {within server blades for removing heat from heat source}
7/20818 . . . . {within cabinets for removing heat from server blades}
7/20827 . . . . {within rooms for removing heat from cabinets, e.g. air conditioning devices}
7/20836 . . . {Thermal management, e.g. server temperature control}
7/20845 . . {for automotive electronic casings (H05K 7/2089 takes precedence)}
7/20854 . . . {Heat transfer by conduction from internal heat source to heat radiating structure (H05K 7/20863 takes precedence)}
7/20863 . . . {Forced ventilation, e.g. on heat dissipaters coupled to components}
7/20872 . . . {Liquid coolant without phase change}
7/20881 . . . {Liquid coolant with phase change}
7/2089 . . {for power electronics, e.g. for inverters for controlling motor}
7/209 . . . {Heat transfer by conduction from internal heat source to heat radiating structure (H05K 7/20909 takes precedence)}
7/20909 . . . {Forced ventilation, e.g. on heat dissipaters coupled to components}
7/20918 . . . . {the components being isolated from air flow, e.g. hollow heat sinks, wind tunnels or funnels}
7/20927 . . . {Liquid coolant without phase change}
7/20936 . . . {Liquid coolant with phase change}
7/20945 . . . {Thermal management, e.g. inverter temperature control}
7/20954 . . {for display panels}
7/20963 . . . {Heat transfer by conduction from internal heat source to heat radiating structure (H05K 7/20972 takes precedence)}
7/20972 . . . {Forced ventilation, e.g. on heat dissipaters coupled to components}
7/20981 . . . {Liquid coolant without phase change}
7/2099 . . . {Liquid coolant with phase change}

9/00 Screening of apparatus or components against electric or magnetic fields (devices for absorbing radiation from an antenna H01Q 17/00)

9/0001 . {Rooms or chambers (anechoic chambers G01R 29/0821)}
9/0003 . . {Shielded walls, floors, ceilings, e.g. wallpaper, wall panel, electro-conductive plaster, concrete, cement, mortar}
9/0005 . . {Shielded windows}
9/0007 . {Casings (standardised racks H05K 9/0062)}
9/0009 . . {with provisions to reduce EMI leakage through the joining parts}
9/0015 . . {Gaskets or seals}
9/0016 . . . {having a spring contact}
9/0018 . . {with provisions to reduce aperture leakages in walls, e.g. terminals, connectors, cables}
9/002 . . {with localised screening}
9/0022 . . . {of components mounted on printed circuit boards [PCB] (shields integrated within component packages H01L 23/552; shields integrated within PCB H05K 1/0218)}
9/0024 . . . . {Shield cases mounted on a PCB, e.g. cans or caps or conformal shields}

WARNING

Group H05K 9/0024 is impacted by reclassification into groups H05K 9/0029 and H05K 9/0031.

Groups H05K 9/0024, H05K 9/0029 and H05K 9/0031 should be considered in order to perform a complete search.

9/0026 . . . . . {integrally formed from metal sheet}
9/0028 . . . . . {with retainers or specific soldering features}

9/0029 . . . . . {made from non-conductive materials intermixed with electro-conductive particles (H05K 9/0031 takes precedence)}

WARNING

Group H05K 9/0029 is incomplete pending reclassification of documents from groups H05K 9/0024 and H05K 9/003.

All groups listed in this Warning should be considered in order to perform a complete search.

9/003 . . . . . {made from non-conductive materials comprising an electro-conductive coating (H05K 9/0031 takes precedence)}

WARNING

Group H05K 9/003 is impacted by reclassification into groups H05K 9/0029 and H05K 9/0031.

Groups H05K 9/003, H05K 9/0029 and H05K 9/0031 should be considered in order to perform a complete search.

9/0031 . . . . . {combining different shielding materials}

WARNING

Group H05K 9/0031 is incomplete pending reclassification of documents from groups H05K 9/0024 and H05K 9/003.

All groups listed in this Warning should be considered in order to perform a complete search.

9/0032 . . . . . {having multiple parts, e.g. frames mating with lids}

9/0033 . . . . . {disposed on both PCB faces}

9/0035 . . . . . {with retainers mounted beforehand on the PCB, e.g. clips}

9/0037 . . . . {Housings with compartments containing a PCB, e.g. partitioning walls}

9/0039 . . . {Galvanic coupling of ground layer on printed circuit board [PCB] to conductive casing (printed shielding conductors, ground planes or power planes for reduction of cross-talk or noise in printed circuits H05K 1/0218)}

9/0041 . . {Ventilation panels having provisions for screening}

9/0043 . . {being flexible containers, e.g. pouch, pocket, bag}

9/0045 . . {being rigid plastic containers having a coating of shielding material}

9/0047 . . {being rigid plastic containers having conductive particles, fibres or mesh embedded therein}

9/0049 . . {being metallic containers}

9/005 . . {being nesting containers}

9/0052 . . {Shielding other than Faraday cages}

9/0054 . . {specially adapted for display applications}

9/0056 . . {specially adapted for microwave applications}

9/0058 . . {specially adapted for optoelectronic applications}

9/006 . . {specially adapted for signal processing applications, e.g. CATV, tuner, antennas amplifier}

9/0062 . {Structures of standardised dimensions, e.g. 19" rack, chassis for servers or telecommunications}

9/0064 . {Earth or grounding circuit}

9/0066 . {Constructional details of transient suppressor}

9/0067 . {Devices for protecting against damage from electrostatic discharge}

9/0069 . {Methods for measuring the shielding efficiency; Apparatus therefor; Isolation container for testing}

9/0071 . {Active shielding}

9/0073 . {Shielding materials (H05K 9/0003 takes precedence)}

9/0075 . . {Magnetic shielding materials}

9/0077 . . . {comprising superconductors}

9/0079 . . {Electrostatic discharge protection, e.g. ESD treated surface for rapid dissipation of charges}

9/0081 . . {Electromagnetic shielding materials, e.g. EMI, RFI shielding (H05K 9/0003 takes precedence)}

9/0083 . . . {comprising electro-conductive non-fibrous particles embedded in an electrically insulating supporting structure, e.g. powder, flakes, whiskers (H05K 9/0086 takes precedence)}

9/0084 . . . {comprising a single continuous metallic layer on an electrically insulating supporting structure, e.g. metal foil, film, plating coating, electro-deposition, vapour-deposition}

9/0086 . . . {comprising a single discontinuous metallic layer on an electrically insulating supporting structure, e.g. metal grid, perforated metal foil, film, aggregated flakes, sintering}

9/0088 . . . {comprising a plurality of shielding layers; combining different shielding material structure}

9/009 . . . {comprising electro-conductive fibres, e.g. metal fibres, carbon fibres, metallised textile fibres, electro-conductive mesh, woven, non-woven mat, fleece, cross-linked}

9/0092 . . . {comprising electro-conductive pigments, e.g. paint, ink, tampon printing}

9/0094 . . {being light-transmitting, e.g. transparent, translucent}

9/0096 . . . {for television displays, e.g. plasma display panel}

9/0098 . . {for shielding electrical cables}

10/00 Arrangements for improving the operating reliability of electronic equipment, e.g. by providing a similar standby unit

11/00 Combinations of a radio or television receiver with apparatus having a different main function {(combined with clocks G04B 47/00; controlled by a clock G04C 21/28)}

11/02 . with vehicles

13/00 Apparatus or processes specially adapted for manufacturing or adjusting assemblages of electric components

13/0007 . {using handtools (for mounting on a circuit board H05K 13/0447)}

13/0015 . {Orientation; Alignment; Positioning}

13/003 . {Placing of components on belts holding the terminals}

13/0038 . . {placing the components in a predetermined order}

13/0053 . {Arrangements for assisting the manual mounting of components, e.g. special tables or light spots indicating the place for mounting}
13/0061 . {Tools for holding the circuit boards during processing; handling transport of printed circuit boards}
13/0069 . . {Holders for printed circuit boards}
13/0076 . . {Straightening or aligning terminal leads of pins mounted on boards, during transport of the boards}
13/0084 . {Containers and magazines for components, e.g. tube-like magazines}
13/0092 . {Treatment of the terminal leads as a separate operation (during transport H05K 13/0076, H05K 13/023; during mounting H05K 13/04)}
13/02 . Feeding of components
13/021 . . {Loading or unloading of containers (H05K 13/028 takes precedence)}
13/0215 . . {Interconnecting of containers, e.g. splicing of tapes}
13/022 . . {with orientation of the elements}
13/023 . . {with bending or straightening of the terminal leads}
13/024 . . . {Straightening or aligning terminal leads}
13/025 . . . . {of components having oppositely extending terminal leads}
13/026 . . . . {of components having terminal leads in side by side relationship, e.g. using combing elements}
13/027 . . {Fluid transport of components}
13/028 . . {Simultaneously loading a plurality of loose objects, e.g. by means of vibrations, pressure differences, magnetic fields}
13/029 . . {Feeding axial lead components, e.g. using vibrating bowls, magnetic fields (H05K 13/022 takes precedence)}
13/04 . Mounting of components {, e.g. of leadless components}
13/0404 . . {Pick-and-place heads or apparatus, e.g. with jaws}
13/0406 . . . {Drive mechanisms for pick-and-place heads, e.g. details relating to power transmission, motors or vibration damping}
13/0408 . . . {Incorporating a pick-up tool}
13/0409 . . . . {Sucking devices}
13/041 . . . . {having multiple pick-up tools}
13/0411 . . . {having multiple mounting heads}
13/0413 . . . {with orientation of the component while holding it; Drive mechanisms for gripping tools, e.g. lifting, lowering or turning of gripping tools}
13/0417 . . {Feeding with belts or tapes}
13/0419 . . . {tape feeders}
13/0421 . . . {with treatment of the terminal leads}
13/0426 . . . {for components being oppositely extending terminal leads (H05K 13/0421 takes precedence)}
13/043 . . {Feeding one by one by other means than belts}
13/0434 . . . {with containers}
13/0439 . . . {incorporating means for treating the terminal leads only before insertion}
13/0443 . . . {incorporating means for treating the terminal leads before and after insertion or only after insertion}
13/0447 . . {Hand tools therefor}
13/0452 . . {Mounting machines or lines comprising a plurality of tools for guiding different components to the same mounting place (H05K 13/0406, H05K 13/041 take precedence)}
13/0456 . . {simultaneously punching the circuit board}
13/046 . . {Surface mounting (surface mounted components H05K 3/341)}
13/0465 . . . {by soldering (H05K 13/0469 takes precedence)}
13/0469 . . . {by applying a glue or viscous material}
13/0473 . . {Cutting and clinching the terminal ends of the leads after they are fitted on a circuit board}
13/0478 . . {Simultaneously mounting of different components}
13/0482 . . . {using templates; using magazines, the configuration of which corresponds to the sites on the boards where the components have to be attached}
13/0486 . . {Replacement and removal of components}
13/0491 . . . {Hand tools therefor}
13/0495 . . {having a plurality of work-stations}
13/06 . Wiring by machine
13/065 . . {Accessories therefor, e.g. light spots}
13/08 . Monitoring manufacture of assemblages
13/081 . . {Integration of optical monitoring devices in assembly lines; Processes using optical monitoring devices specially adapted for controlling devices or machines in assembly lines}
13/0812 . . . {the monitoring devices being integrated in the mounting machine, e.g. for monitoring components, leads, component placement}
13/0813 . . . {Controlling of single components prior to mounting, e.g. orientation, component geometry (H05K 13/0812 takes precedence)}
13/0815 . . . {Controlling of component placement on the substrate during or after manufacturing}
13/0817 . . . {Monitoring of soldering processes (inspection of solder joints or of printed solder paste G01N 21/95684)}
13/0818 . . . {Setup of monitoring devices prior to starting mounting operations; Teaching of monitoring devices for specific products; Compensation of drifts during operation, e.g. due to temperature shifts}
13/082 . . {Integration of non-optical monitoring devices, i.e. using non-optical inspection means, e.g. electrical means, mechanical means or X-rays}
13/083 . . {Quality monitoring using results from monitoring devices, e.g. feedback loops (H05K 13/084 takes precedence)}
13/084 . . {Product tracking, e.g. of substrates during the manufacturing process; Component traceability}
13/085 . . {Production planning, e.g. of allocation of products to machines, of mounting sequences at machine or facility level}
13/0853 . . . {Determination of transport trajectories inside mounting machines}
13/0857 . . . {Product-specific machine setup; Changeover of machines or assembly lines to new product type}
13/086 . . {Supply management, e.g. supply of components or of substrates}

13/087 . . {Equipment tracking or labelling, e.g. tracking of nozzles, feeders or mounting heads}

13/0882 . . {Control systems for mounting machines or assembly lines, e.g. centralized control, remote links, programming of apparatus and processes as such (H05K 13/083 takes precedence)}

13/0885 . . {Power supply}

13/0888 . . {Ergonomics; Operator safety; Training; Failsafe systems}

13/089 . . {Calibration, teaching or correction of mechanical systems, e.g. of the mounting head}

13/0895 . . {Maintenance systems or processes, e.g. indicating need for maintenance}

2201/00 Indexing scheme relating to printed circuits covered by H05K 1/00

2201/01 . Dielectrics

2201/0104 . . Properties and characteristics in general

2201/0108 . . . Transparent

2201/0112 . . . Absorbing light, e.g. dielectric layer with carbon filler for laser processing

2201/0116 . . . Porous, e.g. foam

2201/012 . . . Flame-retardant; Preventing of inflammation

2201/0125 . . . Shrinkable, e.g. heat-shrinkable polymer

2201/0129 . . . Thermoplastic polymer, e.g. auto-adhesive layer; Shaping of thermoplastic polymer

2201/0133 . . . Elastomeric or compliant polymer (elastomeric conductor H05K 2201/0314)

2201/0137 . . Materials

2201/0141 . . . Liquid crystal polymer [LCP]

2201/0145 . . . Polyester, e.g. polyethylene terephthalate [PET], polyethylene naphthalate [PEN]

2201/015 . . . Fluoropolymer, e.g. polytetrafluoroethylene [PTFE]

2201/0154 . . . Polyimide

2201/0158 . . . Polyalkene or polyolefin, e.g. polyethylene [PE], polypropylene [PP]

2201/0162 . . . Silicon containing polymer, e.g. silicone

2201/0166 . . . Polymeric layer used for special processing, e.g. resist for etching insulating material or photoresist used as a mask during plasma etching

2201/017 . . . Glass ceramic coating, e.g. formed on inorganic substrate (inorganic, non-metallic substrates H05K 1/0306)

2201/0175 . . . Inorganic, non-metallic layer, e.g. resist or dielectric for printed capacitor

2201/0179 . . . Thin film deposited insulating layer, e.g. inorganic layer for printed capacitor

2201/0183 . . Dielectric layers

2201/0187 . . . with regions of different dielectrics in the same layer, e.g. in a printed capacitor for locally changing the dielectric properties

2201/0191 . . . wherein the thickness of the dielectric plays an important role

2201/0195 . . . Dielectric or adhesive layers comprising a plurality of layers, e.g. in a multilayer structure

2201/02 . Fillers; Particles; Fibers; Reinforcement materials

2201/0203 . . Fillers and particles

2201/0206 . . . Materials

2201/0209 . . . . Inorganic, non-metallic particles

2201/0212 . . . . Resin particles

2201/0215 . . . . Metallic fillers

2201/0218 . . . . Composite particles, i.e. first metal coated with second metal

2201/0221 . . . . Insulating particles having an electrically conductive coating

2201/0224 . . . . Conductive particles having an insulating coating

2201/0227 . . . . Insulating particles having an insulating coating

2201/023 . . . . Hard particles, i.e. particles in conductive adhesive at least partly penetrating an electrode

2201/0233 . . . . Deformable particles (insulating particles having an electrically conductive coating H05K 2201/0221)

2201/0236 . . . . Plating catalyst as filler in insulating material (catalytic ink H05K 2203/0709)

2201/0239 . . . . Coupling agent for particles (using a coupling agent to improve the adhesion between an insulating substrate and a metal H05K 3/389)

2201/0242 . . . Shape of an individual particle

2201/0245 . . . . Flakes, flat particles or lamellar particles

2201/0248 . . . . Needles or elongated particles; Elongated cluster of chemically bonded particles (microfibers H05K 2201/0251; stacked conductors H05K 2201/0379)

2201/0251 . . . . Non-conductive microfibers (relatively short elongated particles H05K 2201/0248)

2201/0254 . . . . Microballoons or hollow filler particles

2201/0257 . . . . Nanoparticles (inks comprising nanoparticles H05K 1/097)

2201/026 . . . . Nanotubes or nanowires

2201/0263 . . . Details about a collection of particles

2201/0266 . . . . Size distribution

2201/0269 . . . . Non-uniform distribution or concentration of particles

2201/0272 . . . . Mixed conductive particles, i.e. using different conductive particles, e.g. differing in shape

2201/0275 . . Fibers and reinforcement materials

2201/0278 . . . Polymeric fibers

2201/0281 . . . Conductive fibers

2201/0284 . . . Paper, e.g. as reinforcement (paper sheet substrates H05K 1/0386)

2201/0287 . . . Unidirectional or parallel fibers

2201/029 . . . Woven fibrous reinforcement or textile (textile substrates H05K 1/038)

2201/0293 . . . Non-woven fibrous reinforcement

2201/0296 . . . Fibers with a special cross-section, e.g. elliptical

2201/03 . Conductive materials

2201/0302 . . Properties and characteristics in general

2201/0305 . . . Solder used for other purposes than connections between PCB or components, e.g. for filling vias or for programmable patterns

2201/0308 . . . Shape memory alloy [SMA]

2201/0311 . . . Metallic part with specific elastic properties, e.g. bent piece of metal as electrical contact

2201/0314 . . . Elastomeric connector or conductor, e.g. rubber with metallic filler (elastomeric dielectric H05K 2201/0133)

2201/0317 . . . Thin film conductor layer; Thin film passive component

2201/032 . . Materials

2201/0323 . . . Carbon
2201/0326 . . . Inorganic, non-metallic conductor, e.g. indium-tin oxide [ITO]
2201/0329 . . . Intrinsically conductive polymer [ICP]; Semiconductive polymer
2201/0332 . . Structure of the conductor
2201/0335 . . . Layered conductors or foils
2201/0338 . . . . Layered conductor, e.g. layered metal substrate, layered finish layer, layered thin film adhesion layer (etched tri-metal structure H05K 2201/0361)
2201/0341 . . . . Intermediate metal, e.g. before reinforcing of conductors by plating
2201/0344 . . . . Electroless sublayer, e.g. Ni, Co, Cd or Ag; Transferred electroless sublayer
2201/0347 . . . . Overplating, e.g. for reinforcing conductors or bumps; Plating over filled vias (reinforcing the conductive pattern H05K 3/24)
2201/035 . . . . Paste overlayer, i.e. conductive paste or solder paste over conductive layer
2201/0352 . . . . Differences between the conductors of different layers of a multilayer
2201/0355 . . . . Metal foils
2201/0358 . . . . Resin coated copper [RCC]
2201/0361 . . . . Etched tri-metal structure, i.e. metal layers or metal patterns on both sides of a different central metal layer which is later at least partly etched
2201/0364 . . . Conductor shape
2201/0367 . . . . Metallic bump or raised conductor not used as solder bump (solder materials or compositions and methods of application thereof H05K 3/3457)
2201/037 . . . . Hollow conductors, i.e. conductors partially or completely surrounding a void, e.g. hollow waveguides
2201/0373 . . . . Conductors having a fine structure, e.g. providing a plurality of contact points with a structured tool (providing micro- or nanometer scale roughness on a metal surface H05K 2203/0307)
2201/0376 . . . . Flush conductors, i.e. flush with the surface of the printed circuit
2201/0379 . . . . Stacked conductors
2201/0382 . . . . Continuously deformed conductors
2201/0385 . . . . Displaced conductors
2201/0388 . . . Other aspects of conductors
2201/0391 . . . . Using different types of conductors
2201/0394 . . . . Conductor crossing over a hole in the substrate or a gap between two separate substrate parts
2201/0397 . . . . Tab (forming integral conductive tabs H05K 3/4092)
2201/04 . Assemblies of printed circuits
2201/041 . . Stacked PCBs, i.e. having neither an empty space nor mounted components in between
2201/042 . . Stacked spaced PCBs; Planar parts of folded flexible circuits having mounted components in between or spaced from each other
2201/043 . . Stacked PCBs with their backs attached to each other without electrical connection
2201/044 . . Details of backplane or midplane for mounting orthogonal PCBs
2201/045 . . Hierarchy auxiliary PCB, i.e. more than two levels of hierarchy for daughter PCBs are important
2201/046 . . Planar parts of folded PCBs making an angle relative to each other (assembling printed circuits perpendicularly to each other H05K 3/366)
2201/047 . . Box-like arrangements of PCBs
2201/048 . . Second PCB mounted on first PCB by inserting in window or holes of the first PCB
2201/049 . . PCB for one component, e.g. for mounting onto mother PCB
2201/05 . Flexible printed circuits [FPCs]
2201/051 . . Rolled
2201/052 . . Branched
2201/053 . . Tails
2201/055 . . Folded back on itself
2201/056 . . Folded around rigid support or component
2201/057 . . Shape retainable
2201/058 . . Direct connection between two or more FPCs or between flexible parts of rigid PCBs
2201/06 . Thermal details
2201/062 . . Means for thermal insulation, e.g. for protection of parts
2201/064 . . Fluid cooling, e.g. by integral pipes
2201/066 . . Heatsink mounted on the surface of the PCB (heatsink inserted in the PCB H05K 2201/10416)
2201/068 . . wherein the coefficient of thermal expansion is important
2201/07 . Electric details
2201/0707 . . Shielding
2201/0715 . . . provided by an outer layer of PCB
2201/0723 . . . provided by an inner layer of PCB
2201/073 . . High voltage adaptations (overvoltage protection H05K 1/0257)
2201/0738 . . . Use of voltage responsive materials, e.g. voltage switchable dielectric or varistor materials
2201/0746 . . . Protection against transients, e.g. layout adapted for plugging of connector
2201/0753 . . Insulation
2201/0761 . . . Insulation resistance, e.g. of the surface of the PCB between the conductors
2201/0769 . . . Anti metal-migration, e.g. avoiding tin whisker growth
2201/0776 . . Resistance and impedance
2201/0784 . . . Uniform resistance, i.e. equalizing the resistance of a number of conductors
2201/0792 . . . Means against parasitic impedance; Means against eddy currents
2201/08 . Magnetic details
2201/083 . . Magnetic materials
2201/086 . . . for inductive purposes, e.g. printed inductor with ferrite core
2201/09 . Shape and layout
2201/09009 . . Substrate related
2201/09018 . . . Rigid curved substrate
2201/09027 . . . Non-rectangular flat PCB, e.g. circular
2201/09036 . . . Recesses or grooves in insulating substrate (recess in metallic substrate H05K 2201/09745)
2201/09045 . . . Locally raised area or protrusion of insulating substrate (rigid curved substrate H05K 2201/09018)
2201/09054 . . . Raised area or protrusion of metal substrate

2201/09063 . . . Holes or slots in insulating substrate not used for electrical connections
2201/09072 . . . Hole or recess under component or special relationship between hole and component
2201/09081 . . . Tongue or tail integrated in planar structure, e.g. obtained by cutting from the planar structure
2201/0909 . . . Preformed cutting or breaking line
2201/091 . . . Locally and permanently deformed areas including dielectric material
2201/09109 . . . Locally detached layers, e.g. in multilayer
2201/09118 . . . Moulded substrate
2201/09127 . . . PCB or component having an integral separable or breakable part
2201/09136 . . . Means for correcting warpage
2201/09145 . . Edge details
2201/09154 . . . Bevelled, chamferred or tapered edge
2201/09163 . . . Slotted edge
2201/09172 . . . Notches between edge pads
2201/09181 . . . Notches in edge pads
2201/0919 . . . Exposing inner circuit layers or metal planes at the side edge of the PCB or at the walls of large holes (shielding provided by an inner layer of PCB H05K 2201/0723)
2201/092 . . . Exposing inner circuit layers or metal planes at the walls of high aspect ratio holes (forming plated-through holes H05K 3/42; cutting around hole H05K 2203/0242)
2201/09209 . . Shape and layout details of conductors
2201/09218 . . . Conductive traces
2201/09227 . . . . Layout details of a plurality of traces, e.g. escape layout for Ball Grid Array [BGA] mounting
2201/09236 . . . . Parallel layout (layout of balanced signal pairs H05K 1/0245; superposed layout H05K 2201/09672)
2201/09245 . . . . Crossing layout (alternating conductors H05K 2201/097)
2201/09254 . . . . Branched layout
2201/09263 . . . . Meander
2201/09272 . . . . Layout details of angles or corners
2201/09281 . . . . Layout details of a single conductor (meander H05K 2201/09263; layout details of angles or corners H05K 2201/09272)
2201/0929 . . . Conductive planes
2201/093 . . . . Layout of power planes, ground planes or power supply conductors, e.g. having special clearance holes therein (reduction of cross-talk, noise or interference by patterned shielding planes, ground planes or power planes H05K 1/0224)
2201/09309 . . . . Core having two or more power planes; Capacitive laminate of two power planes
2201/09318 . . . . Core having one signal plane and one power plane
2201/09327 . . . . Special sequence of power, ground and signal layers in multilayer PCB
2201/09336 . . . . Signal conductors in same plane as power plane
2201/09345 . . . . Power and ground in the same plane; Power planes for two voltages in one plane
2201/09354 . . . . Ground conductor along edge of main surface (edge contacts H05K 3/403)
2201/09363 . . . . wherein only contours around conductors are removed for insulation
2201/09372 . . . Pads and lands
2201/09381 . . . . Shape of non-curved single flat metallic pad, land or exposed part thereof; Shape of electrode of leadless component (notches in edge pads H05K 2201/09181)
2201/0939 . . . . Curved pads, e.g. semi-circular or elliptical pads or lands
2201/094 . . . . Array of pads or lands differing from one another, e.g. in size, pitch, thickness; Using different connections on the pads (using different types of conductors H05K 2201/0391)
2201/09409 . . . . Multiple rows of pads, lands, terminals or dummy patterns; Multiple rows of mounted components
2201/09418 . . . . Special orientation of pads, lands or terminals of component, e.g. radial or polygonal orientation
2201/09427 . . . . Special relation between the location or dimension of a pad or land and the location or dimension of a terminal
2201/09436 . . . . Pads or lands on permanent coating which covers the other conductors
2201/09445 . . . . Pads for connections not located at the edge of the PCB, e.g. for flexible circuits
2201/09454 . . . . Inner lands, i.e. lands around via or plated through-hole in internal layer of multilayer PCB
2201/09463 . . . . Partial lands, i.e. lands or conductive rings not completely surrounding the hole (landless plated-through hole or via H05K 2201/09545)
2201/09472 . . . . Recessed pad for surface mounting (recess in pad H05K 2201/09745); Recessed electrode of component
2201/09481 . . . . Via in pad; Pad over filled via (if used for surface mounting H05K 1/113)
2201/0949 . . . . Pad close to a hole, not surrounding the hole (if used for surface mounting H05K 1/114)
2201/095 . . . Conductive through-holes or vias
2201/09509 . . . . Blind vias, i.e. vias having one side closed
2201/09518 . . . . . Deep blind vias, i.e. blind vias connecting the surface circuit to circuit layers deeper than the first buried circuit layer
2201/09527 . . . . . Inverse blind vias, i.e. bottoms outwards in multilayer PCB; Blind vias in centre of PCB having opposed bottoms
2201/09536 . . . . Buried plated through-holes, i.e. plated through-holes formed in a core before lamination
2201/09545 . . . . Plated through-holes or blind vias without lands
2201/09554 . . . . Via connected to metal substrate
2201/09563 . . . . Metal filled via (plated through-hole filled with insulating material H05K 2201/0959)
2201/09572 . . . . Solder filled plated through-hole in the final product (soldering lead-in-hole components H05K 3/3447)
2201/09581 . . . . Applying an insulating coating on the walls of holes
2201/0959 . . . . Plated through-holes or plated blind vias filled with insulating material

2201/096 . . . . Vertically aligned vias, holes or stacked vias
2201/09609 . . . . Via grid, i.e. two-dimensional array of vias or holes in a single plane (interposers H05K 2201/10378)
2201/09618 . . . . Via fence, i.e. one-dimensional array of vias
2201/09627 . . . . Special connections between adjacent vias, not for grounding vias (redundant conductors or connections H05K 2201/0979)
2201/09636 . . . . Details of adjacent, not connected vias
2201/09645 . . . . Patterning on via walls; Plural lands around one hole
2201/09654 . . . covering at least two types of conductors provided for in H05K 2201/09218 - H05K 2201/095
2201/09663 . . . . Divided layout, i.e. conductors divided in two or more parts (branched layout H05K 2201/09254)
2201/09672 . . . . Superposed layout, i.e. in different planes (parallel traces in one plane H05K 2201/09236)
2201/09681 . . . . Mesh conductors, e.g. as a ground plane
2201/0969 . . . . Apertured conductors
2201/097 . . . . Alternating conductors, e.g. alternating different shaped pads, twisted pairs; Alternating components
2201/09709 . . . . Staggered pads, lands or terminals; Parallel conductors in different planes
2201/09718 . . . . Clearance holes
2201/09727 . . . . Varying width along a single conductor; Conductors or pads having different widths
2201/09736 . . . . Varying thickness of a single conductor; Conductors in the same plane having different thicknesses
2201/09745 . . . . Recess in conductor, e.g. in pad or in metallic substrate
2201/09754 . . . . Connector integrally incorporated in the PCB or in housing (mounted connecter H05K 2201/10189)
2201/09763 . . . . Printed component having superposed conductors, but integrated in one circuit layer
2201/09772 . . . . Conductors directly under a component but not electrically connected to the component (cooling of mounted components by printed thermal vias H05K 1/0206)
2201/09781 . . . . Dummy conductors, i.e. not used for normal transport of current; Dummy electrodes of components
2201/0979 . . . . Redundant conductors or connections, i.e. more than one current path between two points
2201/098 . . . . Special shape of the cross-section of conductors, e.g. very thick plated conductors
2201/09809 . . . . Coaxial layout (reduction of cross-talk, noise or interference by printed shielding conductors for shielding around a single via or around a group of vias H05K 1/0222)
2201/09818 . . Shape or layout details not covered by a single group of H05K 2201/09009 - H05K 2201/09809
2201/09827 . . . Tapered, e.g. tapered hole, via or groove (bevelled, chamferred or tapered edge H05K 2201/09154)
2201/09836 . . . Oblique hole, via or bump
2201/09845 . . . Stepped hole, via, edge, bump or conductor
2201/09854 . . . Hole or via having special cross-section, e.g. elliptical
2201/09863 . . . Concave hole or via
2201/09872 . . . Insulating conformal coating (foil encapsulation H05K 2203/1311)
2201/09881 . . . Coating only between conductors, i.e. flush with the conductors
2201/0989 . . . Coating free areas, e.g. areas other than pads or lands free of solder resist
2201/099 . . . Coating over pads, e.g. solder resist partly over pads
2201/09909 . . . Special local insulating pattern, e.g. as dam around component
2201/09918 . . . Optically detected marks used for aligning tool relative to the PCB, e.g. for mounting of components
2201/09927 . . . Machine readable code, e.g. bar code
2201/09936 . . . Marks, inscriptions, etc. for information
2201/09945 . . . Universal aspects, e.g. universal inner layers or via grid, or anisotropic interposer
2201/09954 . . . More mounting possibilities, e.g. on same place of PCB, or by using different sets of edge pads
2201/09963 . . . Programming circuit by using small elements, e.g. small PCBs
2201/09972 . . . Partitioned, e.g. portions of a PCB dedicated to different functions; Boundary lines therefore; Portions of a PCB being processed separately or differently
2201/09981 . . . Metallised walls
2201/09985 . . . Hollow waveguide combined with printed circuit
2201/0999 . . . Circuit printed on or in housing, e.g. housing as PCB; Circuit printed on the case of a component; PCB affixed to housing
2201/10 . Details of components or other objects attached to or integrated in a printed circuit board
2201/10007 . . Types of components
2201/10015 . . . Non-printed capacitor
2201/10022 . . . Non-printed resistor
2201/1003 . . . Non-printed inductor
2201/10037 . . . Printed or non-printed battery
2201/10045 . . . Mounted network component having plural terminals
2201/10053 . . . Switch
2201/1006 . . . Non-printed filter
2201/10068 . . . Non-printed resonator
2201/10075 . . . Non-printed oscillator
2201/10083 . . . Electromechanical or electro-acoustic component, e.g. microphone
2201/1009 . . . Electromotor
2201/10098 . . . Components for radio transmission, e.g. radio frequency identification [RFID] tag, printed or non-printed antennas
2201/10106 . . . Light emitting diode [LED]
2201/10113 . . . Lamp
2201/10121 . . . Optical component, e.g. opto-electronic component
2201/10128 . . . Display
2201/10136 . . . . Liquid Crystal display [LCD]
2201/10143 . . . Solar cell
2201/10151 . . . Sensor
2201/10159 . . . Memory
2201/10166 . . . Transistor

2201/10174 . . . Diode
2201/10181 . . . Fuse
2201/10189 . . . Non-printed connector
2201/10196 . . . Variable component, e.g. variable resistor
2201/10204 . . . Dummy component, dummy PCB or template, e.g. for monitoring, controlling of processes, comparing, scanning
2201/10212 . . . Programmable component
2201/10219 . . . Thermoelectric component
2201/10227 . . Other objects, e.g. metallic pieces
2201/10234 . . . Metallic balls (solder balls H05K 2203/041)
2201/10242 . . . Metallic cylinders (small solder preforms other than balls H05K 2203/0415)
2201/1025 . . . Metallic discs (small solder preforms other than balls H05K 2203/0415)
2201/10257 . . . Hollow pieces of metal, e.g. used in connection between component and PCB
2201/10265 . . . Metallic coils or springs, e.g. as part of a connection element
2201/10272 . . . Busbars, i.e. thick metal bars mounted on the PCB as high-current conductors (metal strips H05K 2201/1028)
2201/1028 . . . Thin metal strips as connectors or conductors
2201/10287 . . . Metal wires as connectors or conductors
2201/10295 . . . Metallic connector elements partly mounted in a hole of the PCB
2201/10303 . . . . Pin-in-hole mounted pins
2201/1031 . . . Surface mounted metallic connector elements
2201/10318 . . . . Surface mounted metallic pins
2201/10325 . . . Sockets, i.e. female type connectors comprising metallic connector elements integrated in, or bonded to a common dielectric support
2201/10333 . . . Individual female type metallic connector elements
2201/1034 . . . Edge terminals, i.e. separate pieces of metal attached to the edge of the PCB (tab H05K 2201/0397)
2201/10348 . . . Fuzz's as connector elements, i.e. small pieces of metallic fiber to make connection
2201/10356 . . . Cables
2201/10363 . . . Jumpers, i.e. non-printed cross-over connections
2201/10371 . . . Shields or metal cases
2201/10378 . . . Interposers
2201/10386 . . . Clip leads; Terminals gripping the edge of a substrate
2201/10393 . . . Clamping a component by an element or a set of elements
2201/10401 . . . Eyelets, i.e. rings inserted into a hole through a circuit board
2201/10409 . . . Screws
2201/10416 . . . Metallic blocks or heatsinks completely inserted in a PCB (metallic supports H05K 3/0061)
2201/10424 . . . Frame holders
2201/10431 . . Details of mounted components (printed components H05K 1/16)
2201/10439 . . . Position of a single component
2201/10446 . . . . Mounted on an edge (soldering edge mounted components H05K 3/3405; edge terminals H05K 2201/1034)
2201/10454 . . . . Vertically mounted
2201/10462 . . . . Flat component oriented parallel to the PCB surface
2201/10469 . . . . Asymmetrically mounted component
2201/10477 . . . . Inverted
2201/10484 . . . . Obliquely mounted
2201/10492 . . . . Electrically connected to another device (mounted components directly electrically connected to each other H05K 2201/1053)
2201/105 . . . . Mechanically attached to another device (attached components H05K 2201/10537)
2201/10507 . . . Involving several components
2201/10515 . . . . Stacked components
2201/10522 . . . . Adjacent components
2201/1053 . . . . Mounted components directly electrically connected to each other, i.e. not via the PCB
2201/10537 . . . . Attached components
2201/10545 . . . . Related components mounted on both sides of the PCB
2201/10553 . . . Component over metal, i.e. metal plate in between bottom of component and surface of PCB
2201/1056 . . . Metal over component, i.e. metal plate over component mounted on or embedded in PCB
2201/10568 . . . Integral adaptations of a component or an auxiliary PCB for mounting, e.g. integral spacer element
2201/10575 . . . Insulating foil under component (permanent spacer or stand-off H05K 2201/2036)
2201/10583 . . . Cylindrically shaped component; Fixing means therefore
2201/1059 . . . Connections made by press-fit insertion
2201/10598 . . . Means for fastening a component, a casing or a heat sink whereby a pressure is exerted on the component towards the PCB
2201/10606 . . . Permanent holder for component or auxiliary PCB mounted on a PCB (clamping a component by an element or a set of elements H05K 2201/10393)
2201/10613 . . Details of electrical connections of non-printed components, e.g. special leads
2201/10621 . . . Components characterised by their electrical contacts
2201/10628 . . . . Leaded surface mounted device (soldering surface mounted leaded components H05K 3/3421)
2201/10636 . . . . Leadless chip, e.g. chip capacitor or resistor
2201/10643 . . . . Disc shaped leadless component
2201/10651 . . . . Component having two leads, e.g. resistor, capacitor
2201/10659 . . . . Different types of terminals for the same component, e.g. solder balls combined with leads
2201/10666 . . . . Plated through-hole for surface mounting on PCB
2201/10674 . . . . Flip chip
2201/10681 . . . . Tape Carrier Package [TCP]; Flexible sheet connector
2201/10689 . . . . Leaded Integrated Circuit [IC] package, e.g. dual-in-line [DIL]
2201/10696 . . . . Single-in-line [SIL] package
2201/10704 . . . . Pin grid array [PGA]
2201/10712 . . . . Via grid array, e.g. via grid array capacitor
2201/10719 . . . . Land grid array [LGA]

2201/10727 . . . . Leadless chip carrier [LCC], e.g. chip-modules for cards
2201/10734 . . . . Ball grid array [BGA]; Bump grid array
2201/10742 . . . Details of leads
2201/1075 . . . . Shape details
2201/10757 . . . . . Bent leads
2201/10765 . . . . . . Leads folded back, i.e. bent with an angle of 180 deg
2201/10772 . . . . . . Leads of a surface mounted component bent for providing a gap between the lead and the pad during soldering
2201/1078 . . . . . Leads having locally deformed portion, e.g. for retention
2201/10787 . . . . . Leads having protrusions, e.g. for retention or insert stop
2201/10795 . . . . . Details of lead tips, e.g. pointed
2201/10803 . . . . . Tapered leads, i.e. leads having changing width or diameter
2201/1081 . . . . . Special cross-section of a lead; Different cross-sections of different leads; Matching cross-section, e.g. matched to a land
2201/10818 . . . . . Flat leads
2201/10825 . . . . . Distorted or twisted flat leads, i.e. deformed by torque
2201/10833 . . . . . having a curved or folded cross-section
2201/1084 . . . . . Notched leads
2201/10848 . . . . . Thinned leads
2201/10856 . . . . . Divided leads, e.g. by slot in length direction of lead, or by branching of the lead
2201/10863 . . . . . Adaptations of leads or holes for facilitating insertion
2201/10871 . . . . . Leads having an integral insert stop
2201/10878 . . . . . Means for retention of a lead in a hole
2201/10886 . . . . Other details
2201/10893 . . . . . Grouped leads, i.e. element comprising multiple leads distributed around but not through a common insulator
2201/10901 . . . . . Lead partly inserted in hole or via
2201/10909 . . . . . Materials of terminal, e.g. of leads or electrodes of components
2201/10916 . . . . . Terminals having auxiliary metallic piece, e.g. for soldering
2201/10924 . . . . . Leads formed from a punched metal foil (affixing a prefabricated self-supporting metal foil pattern H05K 3/202)
2201/10931 . . . . . Exposed leads, i.e. encapsulation of component partly removed for exposing a part of lead, e.g. for soldering purposes
2201/10939 . . . . . Lead of component used as a connector
2201/10946 . . . . . Leads attached onto leadless component after manufacturing the component
2201/10954 . . . Other details of electrical connections
2201/10962 . . . . Component not directly connected to the PCB
2201/10969 . . . . Metallic case or integral heatsink of component electrically connected to a pad on PCB
2201/10977 . . . . Encapsulated connections (applying non-metallic protective coatings for encapsulating mounted components H05K 3/284)
2201/10984 . . . . Component carrying a connection agent, e.g. solder, adhesive (soldering leadless components having an array of bottom contacts H05K 3/3436; BGA components H05K 2201/10734)
2201/10992 . . . . Using different connection materials, e.g. different solders, for the same connection
2201/20 . Details of printed circuits not provided for in H05K 2201/01 - H05K 2201/10
2201/2009 . . Reinforced areas, e.g. for a specific part of a flexible printed circuit
2201/2018 . . Presence of a frame in a printed circuit or printed circuit assembly
2201/2027 . . Guiding means, e.g. for guiding flexible circuits
2201/2036 . . Permanent spacer or stand-off in a printed circuit or printed circuit assembly (pattern for applying drops or paste H05K 2203/0545)
2201/2045 . . Protection against vibrations
2201/2054 . . Light-reflecting surface, e.g. conductors, substrates, coatings, dielectrics
2201/2063 . . mixed adhesion layer containing metallic/inorganic and polymeric materials
2201/2072 . . Anchoring, i.e. one structure gripping into another (providing micro- or nanometer scale roughness on a metal surface H05K 2203/0307)
2201/2081 . . Compound repelling a metal, e.g. solder
2201/209 . . Auto-mechanical connection between a component and a PCB or between two PCBs

2203/00 Indexing scheme relating to apparatus or processes for manufacturing printed circuits covered by H05K 3/00

2203/01 . Tools for processing; Objects used during processing
2203/0104 . . for patterning or coating
2203/0108 . . . Male die used for patterning, punching or transferring
2203/0113 . . . Female die used for patterning or transferring, e.g. temporary substrate having recessed pattern
2203/0117 . . . Pattern shaped electrode used for patterning, e.g. plating or etching
2203/0121 . . . Patterning, e.g. plating or etching by moving electrode
2203/0126 . . . Dispenser, e.g. for solder paste, for supplying conductive paste for screen printing or for filling holes
2203/013 . . . Inkjet printing, e.g. for printing insulating material or resist (using ink-jet printing to form a conductive pattern H05K 3/125)
2203/0134 . . . Drum, e.g. rotary drum or dispenser with a plurality of openings
2203/0139 . . . Blade or squeegee, e.g. for screen printing or filling of holes
2203/0143 . . . Using a roller; Specific shape thereof; Providing locally adhesive portions thereon
2203/0147 . . Carriers and holders
2203/0152 . . . Temporary metallic carrier, e.g. for transferring material (affixing a prefabricated conductor pattern formed by electroplating or electroforming on a metallic carrier H05K 3/205)
2203/0156 . . . Temporary polymeric carrier or foil, e.g. for processing or transferring

2203/016 . . . Temporary inorganic, non-metallic carrier, e.g. for processing or transferring
2203/0165 . . . Holder for holding a Printed Circuit Board [PCB] during processing, e.g. during screen printing
2203/0169 . . . Using a temporary frame during processing
2203/0173 . . . Template for holding a PCB having mounted components thereon
2203/0178 . . Projectile, e.g. for perforating substrate
2203/0182 . . Using a temporary spacer element or stand-off during processing
2203/0186 . . Mask formed or laid on PCB, the mask having recesses or openings specially designed for mounting components or body parts thereof
2203/0191 . . Using tape or non-metallic foil in a process, e.g. during filling of a hole with conductive paste
2203/0195 . . Tool for a process not provided for in H05K 3/00, e.g. tool for handling objects using suction, for deforming objects, for applying local pressure
2203/02 . Details related to mechanical or acoustic processing, e.g. drilling, punching, cutting, using ultrasound
2203/0207 . . Partly drilling through substrate until a controlled depth, e.g. with end-point detection
2203/0214 . . Back-up or entry material, e.g. for mechanical drilling
2203/0221 . . Perforating
2203/0228 . . Cutting, sawing, milling or shearing
2203/0235 . . Laminating followed by cutting or slicing perpendicular to plane of the laminate; Embedding wires in an object and cutting or slicing the object perpendicular to direction of the wires
2203/0242 . . Cutting around hole, e.g. for disconnecting land or Plated Through-Hole [PTH] or for partly removing a PTH
2203/025 . . Abrading, e.g. grinding or sand blasting (deburring, rounding, bevelling or smoothing conductor edges H05K 2203/0346)
2203/0257 . . Brushing, e.g. cleaning the conductive pattern by brushing or wiping
2203/0264 . . Peeling insulating layer, e.g. foil, or separating mask
2203/0271 . . Mechanical force other than pressure, e.g. shearing or pulling
2203/0278 . . Flat pressure, e.g. for connecting terminals with anisotropic conductive adhesive
2203/0285 . . Using ultrasound, e.g. for cleaning, soldering or wet treatment
2203/0292 . . Using vibration, e.g. during soldering or screen printing
2203/03 . Metal processing
2203/0307 . . Providing micro- or nanometer scale roughness on a metal surface, e.g. by plating of nodules or dendrites
2203/0315 . . Oxidising metal
2203/0323 . . Working metal substrate or core, e.g. by etching, deforming
2203/033 . . Punching metal foil, e.g. solder foil (affixing a prefabricated self-supporting metal foil pattern H05K 3/202)
2203/0338 . . Transferring metal or conductive material other than a circuit pattern, e.g. bump, solder, printed component (affixing a prefabricated conductor pattern H05K 3/20)
2203/0346 . . Deburring, rounding, bevelling or smoothing conductor edges
2203/0353 . . Making conductive layer thin, e.g. by etching (selective thinning for providing different thickness H05K 2203/0369)
2203/0361 . . Stripping a part of an upper metal layer to expose a lower metal layer, e.g. by etching or using a laser
2203/0369 . . Etching selective parts of a metal substrate through part of its thickness, e.g. using etch resist
2203/0376 . . Etching temporary metallic carrier substrate
2203/0384 . . Etch stop layer, i.e. a buried barrier layer for preventing etching of layers under the etch stop layer
2203/0392 . . Pretreatment of metal, e.g. before finish plating, etching (improvement of the adhesion between an insulating substrate and a metal by special treatment of the metal H05K 3/382)
2203/04 . Soldering or other types of metallurgic bonding (using molten metal H05K 2203/128)
2203/0405 . . Solder foil, tape or wire
2203/041 . . Solder preforms in the shape of solder balls (soldering leadless components having an array of bottom contacts H05K 3/3436)
2203/0415 . . Small preforms other than balls, e.g. discs, cylinders or pillars
2203/042 . . Remote solder depot on the PCB, the solder flowing to the connections from this depot
2203/0425 . . Solder powder or solder coated metal powder
2203/043 . . Reflowing of solder coated conductors, not during connection of components, e.g. reflowing solder paste
2203/0435 . . Metal coated solder, e.g. for passivation of solder balls
2203/044 . . Solder dip coating, i.e. coating printed conductors, e.g. pads by dipping in molten solder or by wave soldering
2203/0445 . . Removing excess solder on pads; removing solder bridges, e.g. for repairing or reworking
2203/045 . . Solder-filled plated through-hole [PTH] during processing wherein the solder is removed from the PTH after processing
2203/0455 . . PTH for surface mount device [SMD], e.g. wherein solder flows through the PTH during mounting
2203/046 . . Means for drawing solder, e.g. for removing excess solder from pads
2203/0465 . . Shape of solder, e.g. differing from spherical shape, different shapes due to different solder pads
2203/047 . . Soldering with different solders, e.g. two different solders on two sides of the PCB
2203/0475 . . Molten solder just before placing the component
2203/048 . . Self-alignment during soldering; Terminals, pads or shape of solder adapted therefor
2203/0485 . . Tacky flux, e.g. for adhering components during mounting
2203/049 . . Wire bonding
2203/0495 . . Cold welding
2203/05 . Patterning and lithography; Masks; Details of resist
2203/0502 . . Patterning and lithography
2203/0505 . . . Double exposure of the same photosensitive layer
2203/0508 . . . Flood exposure

2203/0511 . . . Diffusion patterning
2203/0514 . . . Photodevelopable thick film, e.g. conductive or insulating paste
2203/0517 . . . Electrographic patterning
2203/052 . . . Magnetographic patterning
2203/0522 . . . Using an adhesive pattern
2203/0525 . . . Patterning by phototackifying or by photopatterning adhesive
2203/0528 . . . Patterning during transfer, i.e. without preformed pattern, e.g. by using a die, a programmed tool or a laser
2203/0531 . . . Decalcomania, i.e. transfer of a pattern detached from its carrier before affixing the pattern to the substrate
2203/0534 . . . Offset printing, i.e. transfer of a pattern from a carrier onto the substrate by using an intermediate member
2203/0537 . . . Transfer of pre-fabricated insulating pattern
2203/054 . . . Continuous temporary metal layer over resist, e.g. for selective electroplating
2203/0542 . . . Continuous temporary metal layer over metal pattern (reinforcing the conductive pattern characterised by the electroplating method H05K 3/241)
2203/0545 . . . Pattern for applying drops or paste; Applying a pattern made of drops or paste (using thick film techniques to apply conductive material by using a substrate with a shape pattern H05K 3/1258)
2203/0548 . . Masks
2203/0551 . . . Exposure mask directly printed on the PCB
2203/0554 . . . Metal used as mask for etching vias, e.g. by laser ablation
2203/0557 . . . Non-printed masks
2203/056 . . . Using an artwork, i.e. a photomask for exposing photosensitive layers
2203/0562 . . Details of resist
2203/0565 . . . Resist used only for applying catalyst, not for plating itself
2203/0568 . . . Resist used for applying paste, ink or powder
2203/0571 . . . Dual purpose resist, e.g. etch resist used as solder resist, solder resist used as plating resist
2203/0574 . . . Stacked resist layers used for different processes
2203/0577 . . . Double layer of resist having the same pattern
2203/058 . . . Additional resists used for the same purpose but in different areas, i.e. not stacked
2203/0582 . . . Coating by resist, i.e. resist used as mask for application of insulating coating or of second resist
2203/0585 . . . Second resist used as mask for selective stripping of first resist
2203/0588 . . . Second resist used as pattern over first resist
2203/0591 . . . Organic non-polymeric coating, e.g. for inhibiting corrosion thereby preserving solderability
2203/0594 . . . Insulating resist or coating with special shaped edges
2203/0597 . . . Resist applied over the edges or sides of conductors, e.g. for protection during etching or plating (coating over pads H05K 2201/09818)
2203/06 . Lamination
2203/061 . . of previously made multilayered subassemblies (laminating only or mainly similar single-sided circuit boards H05K 3/4617; laminating only or mainly similar double-sided circuit boards H05K 3/462)
2203/063 . . of preperforated insulating layer
2203/065 . . Binding insulating layers without adhesive, e.g. by local heating or welding, before lamination of the whole PCB
2203/066 . . Transfer laminating of insulating material, e.g. resist as a whole layer, not as a pattern (transferring an insulating pattern H05K 2203/0537)
2203/068 . . Features of the lamination press or of the lamination process, e.g. using special separator sheets
2203/07 . Treatments involving liquids, e.g. plating, rinsing
2203/0703 . . Plating
2203/0706 . . . Inactivating or removing catalyst, e.g. on surface of resist
2203/0709 . . . Catalytic ink or adhesive for electroless plating (catalyst filler H05K 2201/0236)
2203/0713 . . . Plating poison, e.g. for selective plating or for preventing plating on resist
2203/0716 . . . Metallic plating catalysts, e.g. for direct electroplating of through holes; Sensitising or activating metallic plating catalysts
2203/072 . . . Electroless plating, e.g. finish plating or initial plating
2203/0723 . . . Electroplating, e.g. finish plating
2203/0726 . . . Electroforming, i.e. electroplating on a metallic carrier thereby forming a self-supporting structure
2203/073 . . . Displacement plating, substitution plating or immersion plating, e.g. for finish plating
2203/0733 . . . Method for plating stud vias, i.e. massive vias formed by plating the bottom of a hole without plating on the walls
2203/0736 . . Methods for applying liquids, e.g. spraying
2203/074 . . . Features related to the fluid pressure
2203/0743 . . . Mechanical agitation of fluid, e.g. during cleaning of the conductive pattern
2203/0746 . . . Local treatment using a fluid jet, e.g. for removing or cleaning material; Providing mechanical pressure using a fluid jet
2203/075 . . . Global treatment of printed circuits by fluid spraying, e.g. cleaning a conductive pattern using nozzles
2203/0753 . . . Reversing fluid direction, e.g. in holes
2203/0756 . . Uses of liquids, e.g. rinsing, coating, dissolving
2203/0759 . . . Forming a polymer layer by liquid coating, e.g. a non-metallic protective coating or an organic bonding layer
2203/0763 . . . Treating individual holes or single row of holes, e.g. by nozzle
2203/0766 . . . Rinsing, e.g. after cleaning or polishing a conductive pattern
2203/0769 . . . Dissolving insulating materials, e.g. coatings, not used for developing resist after exposure
2203/0773 . . . Dissolving the filler without dissolving the matrix material; Dissolving the matrix material without dissolving the filler
2203/0776 . . . Uses of liquids not otherwise provided for in H05K 2203/0759 - H05K 2203/0773

2203/0779 . . characterised by the specific liquids involved
2203/0783 . . . Using solvent, e.g. for cleaning; Regulating solvent content of pastes or coatings for adjusting the viscosity
2203/0786 . . . Using an aqueous solution, e.g. for cleaning or during drilling of holes
2203/0789 . . . . Aqueous acid solution, e.g. for cleaning or etching
2203/0793 . . . . Aqueous alkaline solution, e.g. for cleaning or etching
2203/0796 . . . . Oxidant in aqueous solution, e.g. permanganate
2203/08 . Treatments involving gases
2203/081 . . Blowing of gas, e.g. for cooling or for providing heat during solder reflowing
2203/082 . . Suction, e.g. for holding solder balls or components
2203/083 . . Evaporation or sublimation of a compound, e.g. gas bubble generating agent
2203/085 . . Using vacuum or low pressure
2203/086 . . Using an inert gas
2203/087 . . Using a reactive gas
2203/088 . . Using a vapour or mist, e.g. cleaning using water vapor
2203/09 . Treatments involving charged particles
2203/092 . . Particle beam, e.g. using an electron beam or an ion beam
2203/095 . . Plasma, e.g. for treating a substrate to improve adhesion with a conductor or for cleaning holes
2203/097 . . . Corona discharge
2203/10 . Using electric, magnetic and electromagnetic fields; Using laser light
2203/101 . . Using electrical induction, e.g. for heating during soldering
2203/102 . . Using microwaves, e.g. for curing ink patterns or adhesive
2203/104 . . Using magnetic force, e.g. to align particles or for a temporary connection during processing
2203/105 . . Using an electrical field; Special methods of applying an electric potential (electroplating H05K 2203/0723)
2203/107 . . Using laser light (shaping a substrate by laser ablation H05K 3/0026)
2203/108 . . . Using a plurality of lasers or laser light with a plurality of wavelengths
2203/11 . Treatments characterised by their effect, e.g. heating, cooling, roughening
2203/1105 . . Heating or thermal processing not related to soldering, firing, curing or laminating, e.g. for shaping the substrate or during finish plating
2203/111 . . Preheating, e.g. before soldering
2203/1115 . . Resistance heating, e.g. by current through the PCB conductors or through a metallic mask
2203/1121 . . Cooling, e.g. specific areas of a PCB being cooled during reflow soldering (details related to cooling of mounted components H05K 1/0203)
2203/1126 . . Firing, i.e. heating a powder or paste above the melting temperature of at least one of its constituents
2203/1131 . . Sintering, i.e. fusing of metal particles to achieve or improve electrical conductivity
2203/1136 . . Conversion of insulating material into conductive material, e.g. by pyrolysis
2203/1142 . . Conversion of conductive material into insulating material or into dissolvable compound
2203/1147 . . Sealing or impregnating, e.g. of pores
2203/1152 . . Replicating the surface structure of a sacrificial layer, e.g. for roughening
2203/1157 . . Using means for chemical reduction
2203/1163 . . Chemical reaction, e.g. heating solder by exothermic reaction (oxidising metal H05K 2203/0315)
2203/1168 . . Graft-polymerization
2203/1173 . . Differences in wettability, e.g. hydrophilic or hydrophobic areas
2203/1178 . . Means for venting or for letting gases escape
2203/1184 . . Underetching, e.g. etching of substrate under conductors or etching of conductor under dielectrics; Means for allowing or controlling underetching
2203/1189 . . Pressing leads, bumps or a die through an insulating layer
2203/1194 . . Thermal treatment leading to a different chemical state of a material, e.g. annealing for stress-relief, aging
2203/12 . Using specific substances
2203/121 . . Metallo-organic compounds
2203/122 . . Organic non-polymeric compounds, e.g. oil, wax, thiol (using solvent H05K 2203/0783)
2203/124 . . . Heterocyclic organic compounds, e.g. azole, furan
2203/125 . . Inorganic compounds, e.g. silver salt
2203/127 . . Lubricants, e.g. during drilling of holes
2203/128 . . Molten metals, e.g. casting thereof, or melting by heating and excluding molten solder (spraying droplets of molten metal H05K 2203/1344)
2203/13 . Moulding and encapsulation; Deposition techniques; Protective layers
2203/1305 . . Moulding and encapsulation
2203/1311 . . . Foil encapsulation, e.g. of mounted components
2203/1316 . . . Moulded encapsulation of mounted components
2203/1322 . . . Encapsulation comprising more than one layer
2203/1327 . . . Moulding over PCB locally or completely (applying non-metallic protective coatings for encapsulating mounted components H05K 3/284)
2203/1333 . . Deposition techniques, e.g. coating
2203/1338 . . . Chemical vapour deposition
2203/1344 . . . Spraying small metal particles or droplets of molten metal
2203/135 . . . Electrophoretic deposition of insulating material
2203/1355 . . . Powder coating of insulating material
2203/1361 . . . Coating by immersion in coating bath (applying molten solder H05K 3/3468)
2203/1366 . . . Spraying coating (apparatus for coating printed circuit boards using liquid non-metallic coating compositions H05K 3/0091)
2203/1372 . . . Coating by using a liquid wave (solder dip coating H05K 2203/04)
2203/1377 . . Protective layers
2203/1383 . . . Temporary protective insulating layer
2203/1388 . . . Temporary protective conductive layer
2203/1394 . . . Covering open PTHs, e.g. by dry film resist or by metal disc

2203/14 . Related to the order of processing steps
2203/1407 . . Applying catalyst before applying plating resist
2203/1415 . . Applying catalyst after applying plating resist
2203/1423 . . Applying catalyst before etching, e.g. plating catalyst in holes before etching circuit
2203/143 . . Treating holes before another process, e.g. coating holes before coating the substrate
2203/1438 . . Treating holes after another process, e.g. coating holes after coating the substrate (metal used as mask for etching vias H05K 2203/0554)
2203/1446 . . Treatment after insertion of lead into hole, e.g. bending, cutting, caulking or curing of adhesive but excluding soldering
2203/1453 . . Applying the circuit pattern before another process, e.g. before filling of vias with conductive paste, before making printed resistors
2203/1461 . . Applying or finishing the circuit pattern after another process, e.g. after filling of vias with conductive paste, after making printed resistors
2203/1469 . . . Circuit made after mounting or encapsulation of the components
2203/1476 . . Same or similar kind of process performed in phases, e.g. coarse patterning followed by fine patterning
2203/1484 . . Simultaneous treatments, e.g. soldering lead-in-hole components simultaneously with surface mounted components
2203/1492 . . Periodical treatments, e.g. pulse plating of through-holes
2203/15 . Position of the PCB during processing
2203/1509 . . Horizontally held PCB
2203/1518 . . Vertically held PCB
2203/1527 . . Obliquely held PCB
2203/1536 . . Temporarily stacked PCBs
2203/1545 . . Continuous processing, i.e. involving rolls moving a band-like or solid carrier along a continuous production path
2203/1554 . . Rotating or turning the PCB in a continuous manner
2203/1563 . . Reversing the PCB
2203/1572 . . Processing both sides of a PCB by the same process; Providing a similar arrangement of components on both sides; Making interlayer connections from two sides
2203/1581 . . Treating the backside of the PCB, e.g. for heating during soldering or providing a liquid coating on the backside
2203/159 . . Using gravitational force; Processing against the gravity direction; Using centrifugal force
2203/16 . Inspection; Monitoring; Aligning
2203/161 . . Using chemical substances, e.g. colored or fluorescent, for facilitating optical or visual inspection
2203/162 . . Testing a finished product, e.g. heat cycle testing of solder joints (patterns for electrical inspection or testing H05K 1/0268)
2203/163 . . Monitoring a manufacturing process
2203/165 . . Stabilizing, e.g. temperature stabilization
2203/166 . . Alignment or registration; Control of registration
2203/167 . . Using mechanical means for positioning, alignment or registration, e.g. using rod-in-hole alignment
2203/168 . . Wrong mounting prevention
2203/17 . Post-manufacturing processes
2203/171 . . Tuning, e.g. by trimming of printed components or high frequency circuits
2203/173 . . Adding connections between adjacent pads or conductors, e.g. for modifying or repairing (programmable, customizable or modifiable circuits H05K 1/0286)
2203/175 . . Configurations of connections suitable for easy deletion, e.g. modifiable circuits or temporary conductors for electroplating; Processes for deleting connections
2203/176 . . Removing, replacing or disconnecting component; Easily removable component (thermal arrangements, e.g. to prevent overheating H05K 1/0201)
2203/178 . . Demolishing, e.g. recycling, reverse engineering, destroying for security purposes; Using biodegradable materials
2203/30 . Details of processes not otherwise provided for in H05K 2203/01 - H05K 2203/17
2203/302 . . Bending a rigid substrate; Breaking rigid substrates by bending (rigid circuit boards or rigid supports locally made bendable H05K 1/0278)
2203/304 . . Protecting a component during manufacturing
2203/306 . . Lifting the component during or after mounting; Increasing the gap between component and PCB
2203/308 . . Sacrificial means, e.g. for temporarily filling a space for making a via or a cavity or for making rigid-flexible PCBs

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