COOPERATIVE PATENT CLASSIFICATION

ELECTRICITY

ELECTRIC TECHNIQUES NOT OTHERWISE PROVIDED FOR

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. layout 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 crosstalk, 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 23/066)]
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, inspection means 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 optoelectronic 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. fusible 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, i.e. inks which are sinterable at low temperatures]
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, ) 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. IMC (insert mounted components)]
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 3/3463, 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 3/4008 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. [Photoreists]
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)]
circuits in grooves by pressure H05K 3/107
{ ( H05K 3/1283
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 medically 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 platting 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 . . . . [tired 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 insulating foil (H05K 3/183 takes precedence)
3/284 . . . . . (for encapsulating the corrosion of the circuit, e.g. for preserving the solderability)
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)
connections to or between printed circuits

Improvement of the adhesion between the insulating substrate and the metal

Assembling printed circuits with other printed circuits

{Assembling flexible printed circuits with other printed circuits}

[by soldering]

{by abutting, i.e. without alloying process}

(substantially perpendicularly to each other)

(parallel to each other)

Manufacturing multilayer circuits

Plated through-holes (or plated via connections)

[Blind plated via connections]

(characterised by electroless plating method; pretreatment thereof)

(characterised by electroplating method)

(by direct electroplating)

(characterised by the sequence of steps for plating the through-holes or via connections in relation to the conductive pattern)

(initial plating of through-holes in substrates without metal)

(initial plating of through-holes in metal-clad substrates)

(initial plating of through-holes in substrates having a metal pattern)

[Plated through-holes specially for multilayer circuits, e.g. having connections to inner circuit layers]

Manufacture insulated metal core circuits

{or other insulated electrically conductive core circuits}

{for via connections in organic insulating substrates}

{having integrally laminated metal sheets or external circuit patterns or via connections the misalignment after lamination; Aligning before lamination; Detecting or measuring the electrical connections between the circuit boards being made during lamination}

{characterised by laminating only or mainly similar single-sided circuit boards}

{the circuit boards having internal via connections between two or more circuit layers before lamination, e.g. double-sided circuit boards (H05K 3/432 takes precedence)}

{characterised by the insulating layers or materials (H05K 3/4688 takes precedence)}

{laminating inorganic sheets comprising printed circuits, e.g. green ceramic sheets}

{laminating thermoplastic or uncured resin sheets comprising printed circuits without added adhesive materials between the sheets}

{laminating flexible circuit boards using additional insulating adhesive materials between the boards}

{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}

{having integrally laminated metal sheets or special power cores}
3/4644...[by building the multilayer 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 wherein 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 1/02, 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 display or control units]
5/0021.[Side-by-side or stacked arrangements]
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
7/03 Stackable modules
7/04 Multiple connections subassemblies
7/06 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 (H05K 7/18 takes precedence)
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 (for power drive units)
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 thereof]
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 assembly, e.g. cases and inner arrangements]
7/1488 . . . . [Cabinets therefore, e.g. chassis, racks]
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, defectors, 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]
e.g. 19-inch electronic racks }
{ for racks or cabinets of standardized dimensions, e.g. 19-inch computer racks }

{ Thermal management, e.g. cabinet temperature control }
{ for server racks or cabinets; for data centers, e.g. 19-inch computer racks }
9/00 Screenig of apparatus or components against
electric or magnetic fields (devices for absorbing
radiation from an antenna H05K 9/0062
(H05K 7/20972 takes precedence))

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 . [Casing (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,
caps, conformal shields]
9/0026 . [integratedly formed from metal sheet]
9/0028 . [with retainers or specific soldering
features]
9/003 . [made from electro-conductive plastic
material or combining different shielding
materials]
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 . [Ground layout on printed circuit board]
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 . [Construcional 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 9/0002 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-
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]
13/002 . [Placing of components on belts holding the
terminals]
13/0038 . [placing the components in a predetermined
order]
Feeding of components

- (Loading or unloading of containers)
- (Interconnecting or unloading of containers, e.g. splicing of tapes)
- (with orientation of the elements)
- (with bending or straightening of the terminal leads)
- (of components having oppositely extending terminal leads)
- (of components having terminal leads in side by side relationship, e.g. using combing elements)
- (Fluid transport of components)
- (Simultaneously loading a plurality of loose objects, e.g. by means of vibrations, pressure differences, magnetic fields)
- (Feeding axial lead components, e.g. using vibrating bowls, magnetic fields)

Mounting of components, e.g. of leadless components

- (Pick-and-place heads or apparatus, e.g. with jaws)
- (Drive mechanisms for pick-and-place heads, e.g. details relating to power transmission, motors or vibration damping)
- (Incorporating a pick-up tool)
- (Suckling devices)
- (having multiple pick-up tools)
- (having multiple mounting heads)
- (with orientation of the component while holding it; Drive mechanisms for gripping tools, e.g. lifting, lowering or turning of gripping tools)
- (Feeding with belts or tapes)
- (tape feeders)
- (with treatment of the terminal leads)
- (for components being oppositely extending terminal leads)
- (Feeding one by one by other means than belts)
- (with containers)
- (incorporating means for treating the terminal leads only before insertion)
- (incorporating means for treating the terminal leads before and after insertion or only after insertion)
Indexing scheme relating to printed circuits covered by H05K 1/00

2201/00

Dielectrics

2201/001

Properties and characteristics in general

2201/001/04

Transparent

2201/001/12

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

2201/016

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. polylethylene terephthalate [PET], polylethylene naphthalate [PEN]

2201/015

Fluoropolymer, e.g. polytetrafluoroethylene [PTFE]

2201/0154

Polyimide

2201/0158

Polyalkene or polyolefin, e.g. polylethylene [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, etc. 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
Assemblies of printed circuits

Orthogonal PCBs

Details of backplane or midplane for mounting other without electrical connection

Stacked PCBs with their backs attached to each between or spaced from each other

Flexible circuits having mounted components in between

Stacked PCBs, i.e. having neither an empty space nor mounted components in between

Tab (forming integral conductive tabs)

Conductor shape

Intrinsically conductive polymer [ICP]; tin oxide [ITO]

Inorganic, non-metallic conductor, e.g. indium-

Carbon

Conductor crossing over a hole in the surface

Using different types of conductors

Conductor crossing over a hole in the substrate

Tab (forming integral conductive tabs)

Assemblies of printed circuits

Stacked PCBs, i.e. having neither an empty space nor mounted components in between
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, chamfered 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 2201/09723)
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)
Vertical aligned vias, holes or stacked vias
Via grid, i.e. two-dimensional array of vias or holes in a single plane (interposers H05K 2201/10178)
Via fence, i.e. one-dimensional array of vias
Special connections between adjacent vias, not for grounding vias (redundant conductors or connections H05K 2201/0979)
Details of adjacent, not connected vias
Patterning on via walls; Plural lands around one hole
Covering at least two types of conductors provided for in H05K 2201/09218 - H05K 2201/095
Divided layout, i.e. conductors divided in two or more parts (branched layout H05K 2201/09254)
Superposed layout, i.e. in different planes (parallel traces in one plane H05K 2201/09236)
Mesh conductors, e.g. as a ground plane
Apertured conductors
Alternating conductors, e.g. alternating different shaped pads, twisted pairs; Alternating components
Staggered pads, lands or terminals; Parallel conductors in different planes
Clearance holes
Varying width along a single conductor; Conductors or pads having different widths
Varying thickness of a single conductor; Conductors in the same plane having different thicknesses
Recess in conductor, e.g. in pad or in metallic substrate
Connector integrally incorporated in the PCB or in housing (mounted connector H05K 2201/10189)
Printed component having superposed conductors, but integrated in one circuit layer
Conductors directly under a component but not electrically connected to the component (cooling of mounted components by printed thermal vías H05K 1/0206)
Dummy conductors, i.e. not used for normal transport of current; Dummy electrodes of components
Redundant conductors or connections, i.e. more than one current path between two points
Special shape of the cross-section of conductors, e.g. very thick plated conductors
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)
Other shape and layout details not provided for in H05K 2201/09009 - H05K 2201/09209; Shape and layout details covering several of these groups
Tapered, e.g. tapered hole, via or groove (bevelled, chamfered or tapered edge H05K 2201/09154)
Oblique hole, via or bump

Stepped hole, via, edge, bump or conductor
Hole or via having special cross-section, e.g. elliptical
Concave hole or via
Insulating conformal coating (foil encapsulation H05K 2203/1311)
Coating only between conductors, i.e. flush with the conductors
Coating free areas, e.g. areas other than pads or lands free of solder resist
Coating over pads, e.g. solder resist partly over pads
Special local insulating pattern, e.g. as dam around component
Optically detected marks used for aligning tool relative to the PCB, e.g. for mounting of components
Machine readable code, e.g. bar code
Marks, inscriptions, etc. for information
Universal aspects, e.g. universal inner layers or via grid, or anisotropic interposer
More mounting possibilities, e.g. on same place of PCB, or by using different sets of edge pads
Programming circuit by using small elements, e.g. small PCBs
Partitioned, e.g. portions of a PCB dedicated to different functions; Boundary lines therefore; Portions of a PCB being processed separately or differently
Metallised walls
Circuit printed on or in housing, e.g. housing as PCB; Circuit printed on the case of a component; PCB affixed to housing
Details of components or other objects attached to or integrated in a printed circuit board
Types of components
Non-printed capacitor
Non-printed resistor
Non-printed inductor
Printed or non-printed battery
Mount network component having plural terminals
Switch
Non-printed filter
Non-printed resonator
Non-printed oscillator
Electromechanical or electro-acoustic component, e.g. microphone
Electromotor
Component for radio transmission, e.g. Radio Frequency Identification Tag [RFID]
Light emitting diode [LED]
Lamp
Optical component, e.g. opto-electronic component
Display
Liquid Crystal display [LCD]
Solar cell
Sensor
Memory
Transistor
Diode
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 . . . 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 3/3403; 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 . . . Ledged 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 . . . Ledged Integrated Circuit [IC] package, e.g. dual-in-line [DIL]
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
Other details of electrical connections

- Using different connection materials, e.g. different solders, for the same connection
- 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)
- Leads folded back, i.e. bent with an angle of 180 deg
- Leads having locally deformed portion, e.g. for retention
- Leads having protrusions, e.g. for retention or insert stop
- Details of lead tips, e.g. pointed
- Tapered leads, i.e. leads having changing width or diameter
- Special cross-section of a lead; Different cross-sections of different leads; Matching cross-section, e.g. matched to a land
- Flat leads
- Distorted or twisted flat leads, i.e. deformed by torque
- having a curved or folded cross-section
- Notched leads
- Thinned leads
- Divided leads, e.g. by slot in length direction of lead, or by branching of the lead
- Adaptations of leads or holes for facilitating insertion
- Leads having an integral insert stop
- Means for retention of a lead in a hole
- Other details
- Grouped leads, i.e. element comprising multiple leads distributed around but not through a common insulator
- Lead partly inserted in hole or via
- Materials of terminal, e.g. of leads or electrodes of components
- Terminals having auxiliary metallic piece, e.g. for soldering
- Leads formed from a punched metal foil (affixing a prefabricated self-supporting metal foil pattern H05K 3/202)
- Exposed leads, i.e. encapsulation of component partly removed for exposing a part of lead, e.g. for soldering purposes
- Lead of component used as a connector
- Leads attached onto leadless component after manufacturing the component
- Component not directly connected to the PCB
- Metallic case or integral heatsink of component electrically connected to a pad on PCB
- Encapsulated connections (applying non-metallic protective coatings for encapsulating mounted components H05K 3/284)
- 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)

Using different connection materials, e.g. different solders, for the same connection

- Details of printed circuits not provided for in H05K 2201/01 - H05K 2201/10
- Reinforced areas, e.g. for a specific part of a flexible printed circuit
- Presence of a frame in a printed circuit or printed circuit assembly
- Guiding means, e.g. for guiding flexible circuits
- Permanent spacer or stand-off in a printed circuit or printed circuit assembly (pattern for applying drops or paste H05K 2203/0545)
- Protection against vibrations
- Light-reflecting surface, e.g. conductors, substrates, coatings, dielectrics
- mixed adhesion layer containing metallic/inorganic and polymeric materials
- Anchoring, i.e. one structure gripping into another (providing micro- or nanometer scale roughness on a metal surface H05K 2203/0307)
- Compound repelling a metal, e.g. solder
- 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

- Tools for processing; Objects used during processing
- for patterning or coating
- Male die used for patterning, punching or transferring
- Female die used for patterning or transferring, e.g. temporary substrate having recessed pattern
- Pattern shaped electrode used for patterning, e.g. plating or etching
- Patterning, e.g. plating or etching by moving electrode
- Dispenser, e.g. for solder paste, for supplying conductive paste for screen printing or for filling holes
- Inkjet printing, e.g. for printing insulating material or resist (using ink-jet printing to form a conductive pattern H05K 3/125)
- Drum, e.g. rotary drum or dispenser with a plurality of openings
- Blade or squeegee, e.g. for screen printing or filling of holes
- Using a roller; Specific shape thereof; Providing locally adhesive portions thereof
- Carriers and holders
- 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)
- Temporary polymeric carrier or foil, e.g. for processing or transferring
- Temporary inorganic, non-metallic carrier, e.g. for processing or transferring
- Holder for holding a Printed Circuit Board [PCB] during processing, e.g. during screen printing
- Using a temporary frame during processing
- Template for holding a PCB having mounted components thereon
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 metallurgical 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 PTH during processing (solder filled plated through-hole in the final product H05K 2201/09572)
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
2203/051 . . . Diffusion patterning
2203/0514 . . . Photodevelopable thick film, e.g. conductive or insulating paste
2203/0517 . . . Electrographic patterning
2203/052 . . . Magneto graphic patterning
2203/0522 . . . Using an adhesive pattern
2203/0525 . . . Patterning by phototackifying or by photopatterning adhesive
Lamination
to the whole PCB

by local heating or welding, before lamination of
Binding insulating layers without adhesive, e.g.
by local heating or welding, before lamination of the whole PCB
Treatments characterised by their effect, e.g.
- Using laser light
- Using electric, magnetic and electromagnetic fields; Using laser light
- Using microwaves, e.g. for curing ink patterns or adhesive
- Using magnetic force, e.g. to align particles or for a temporary connection during processing
- Using an electrical field; Special methods of applying an electric potential (electroplating H05K 2203/0723)
- Using laser light (shaping a substrate by laser ablation H05K 3/0026)
- Using a plurality of lasers or laser light with a plurality of wavelengths

Treatments characterised by their effect, e.g.
- Heating or thermal processing not related to soldering, firing, curing or laminating, e.g. for shaping the substrate or during finish plating
- Preheating, e.g. before soldering
- Resistance heating, e.g. by current through the PCB conductors or through a metallic mask
- Cooling, e.g. specific areas of a PCB being cooled during reflow soldering (details related to cooling of mounted components H05K 1/0203)
- Firing, i.e. heating a powder or paste above the melting temperature of at least one of its constituents
- Sintering, i.e. fusing of metal particles to achieve or improve electrical conductivity
- Conversion of insulating material into conductive material, e.g. by pyrolysis
- Conversion of conductive material into insulating material or into dissolvable compound
- Sealing or impregnating, e.g. of pores
- Replicating the surface structure of a sacrificial layer, e.g. for roughening
- Using means for chemical reduction
- Chemical reaction, e.g. heating solder by exothermic reaction (oxidising metal H05K 2203/0315)

Treatments involving gases
- Evaporation or sublimation of a compound, e.g. gas bubble generating agent
- Using vacuum or low pressure
- Using an inert gas
- Using a reactive gas
- Using a vapour or mist, e.g. cleaning using water vapor
- Treating holes before another process, e.g. applying catalyst before applying plating resist
-Applying catalyst before applying plating resist
-Using means for chemical reduction
- Chemical reaction, e.g. heating solder by exothermic reaction (oxidising metal H05K 2203/0315)

Treatments involving charged particles
- Plasma, e.g. for treating a substrate to improve adhesion with a conductor or for cleaning holes
- Corona discharge
- Using electric, magnetic and electromagnetic fields; Using laser light
- Using microwaves, e.g. for curing ink patterns or adhesive
- Using magnetic force, e.g. to align particles or for a temporary connection during processing
- Using an electrical field; Special methods of applying an electric potential (electroplating H05K 2203/0723)
- Using laser light (shaping a substrate by laser ablation H05K 3/0026)
- Using a plurality of lasers or laser light with a plurality of wavelengths

Treatments involving gases
- Evaporation or sublimation of a compound, e.g. gas bubble generating agent
- Using vacuum or low pressure
- Using an inert gas
- Using a reactive gas
- Using a vapour or mist, e.g. cleaning using water vapor
- Treating holes before another process, e.g. applying catalyst before applying plating resist
-Applying catalyst before applying plating resist
-Using means for chemical reduction
- Chemical reaction, e.g. heating solder by exothermic reaction (oxidising metal H05K 2203/0315)
. Treating holes after another process, e.g. coating holes after coating the substrate (metal used as mask for etching vias H05K 2203/0554)

. Treatment after insertion of lead into hole, e.g. bending, cutting, caulking or curing of adhesive but excluding soldering

. Applying the circuit pattern before another process, e.g. before filling of vias with conductive paste, before making printed resistors

. Applying or finishing the circuit pattern after another process, e.g. after filling of vias with conductive paste, after making printed resistors

. Circuit made after mounting or encapsulation of the components

. Same or similar kind of process performed in phases, e.g. coarse patterning followed by fine patterning

. Simultaneous treatments, e.g. soldering lead-in-hole components simultaneously with surface mounted components

. Periodical treatments, e.g. pulse plating of through-holes

. Position of the PCB during processing

. Horizontally held PCB

. Vertically held PCB

. Obliquely held PCB

. Temporarily stacked PCBs

. Continuous processing, i.e. involving rolls moving a band-like or solid carrier along a continuous production path

. Rotating or turning the PCB in a continuous manner

. Reversing the PCB

. 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

. Treating the backside of the PCB, e.g. for heating during soldering or providing a liquid coating on the backside

. Using gravitational force; Processing against the gravity direction; Using centrifugal force

. Inspection; Monitoring; Aligning

. Using chemical substances, e.g. colored or fluorescent, for facilitating optical or visual inspection

. Testing a finished product, e.g. heat cycle testing of solder joints (patterns for electrical inspection or testing H05K 1/0268)

. Monitoring a manufacturing process

. Stabilizing, e.g. temperature stabilization

. Alignment or registration; Control of registration

. Using mechanical means for positioning, alignment or registration, e.g. using rod-in-hole alignment

. Wrong mounting prevention

. Post-manufacturing processes

. Tuning, e.g. by trimming of printed components or high frequency circuits

. Adding connections between adjacent pads or conductors, e.g. for modifying or repairing (programmable, customizable or modifiable circuits H05K 1/0286)

. Configurations of connections suitable for easy deletion, e.g. modifiable circuits or temporary conductors for electroplating; Processes for deleting connections

. Removing, replacing or disconnecting component; Easily removable component (thermal arrangements, e.g. to prevent overheating H05K 1/0201)

. Demolishing, e.g. recycling, reverse engineering, destroying for security purposes; Using biodegradable materials

. Details of processes not otherwise provided for in H05K 2203/01 - H05K 2203/17

. Bending a rigid substrate; Breaking rigid substrates by bending (rigid circuit boards or rigid supports locally made bendable H05K 1/0278)

. Protecting a component during manufacturing

. Lifting the component during or after mounting; Increasing the gap between component and PCB

. Sacrificial means, e.g. for temporarily filling a space for making a via or a cavity or for making rigid-flexible PCBs

**Dummy groups for the purpose of scheme testing, logistics of documents or the like**

999/00 dummy group

**WARNING**

This group and its subgroups are not real classification places. They are used only for the purpose of scheme testing, logistics of documents or the like.

999/99 dummy group