

ECLA EUROPEAN CLASSIFICATION

H05K

PRINTED CIRCUITS; CASINGS OR CONSTRUCTIONAL DETAILS OF ELECTRIC APPARATUS; MANUFACTURE OF ASSEMBLAGES OF ELECTRICAL COMPONENTS (details of instruments or comparable details of other apparatus not otherwise provided for G12B; thin-film or thick-film circuits [H01L27/01](#), [H01L27/13](#); non-printed means for electric connections to or between printed circuits, [N: electric connections or line connectors, apparatus or processes for manufacturing, assembling, maintaining or repairing such connections or connectors] H01R; casings for, or constructional details of, particular types of apparatus, see the relevant subclasses; processes involving only a single technical art, e.g. heating, spraying, for which provision exists elsewhere, see the relevant classes)

Notes

H05K1/00

Printed circuits (assemblies of a plurality of individual semiconductor or solid state devices [H01L25/00](#); devices consisting of a plurality of solid state components formed in or on a common substrate, e.g. integrated circuits, thin-film or thick-film circuits, [H01L27/00](#))

- H05K1/02 . Details
- H05K1/02B . . [N: Thermal arrangements, e.g. for cooling, heating or preventing overheating] [C1203]
- H05K1/02B2 . . . [N: Cooling of mounted components ([H05K1/02F](#) takes precedence)] [N0101]
- H05K1/02B2B [N: using means for thermal conduction connection in the thickness direction of the substrate ([H05K1/02B2D](#) takes precedence)] [N0101] [C1109]
- H05K1/02B2B2 [N: by printed thermal vias] [N0101]
- H05K1/02B2D [N: using internal conductor planes parallel to the surface for thermal conduction, e.g. power planes] [N1109]
- H05K1/02B2E [N: External configuration of printed circuit board adapted for heat dissipation, e.g. lay-out of conductors, coatings] [N1109]
- H05K1/02B2G [N: Components thermally connected to metal substrates or heat-sinks by insert mounting] [N1109]
- H05K1/02B4 . . . [N: Printed circuits or mounted components having integral heating means] [N0101]
- H05K1/02C . . [N: Electrical arrangements not otherwise provided for ([screening H05K9/00](#); [emergency protective circuits H02H](#))] [C9702]
- H05K1/02C1 . . . [N: Grounding of printed circuits by connection to external grounding means] [N1109]
- H05K1/02C2 . . . [N: Reduction of cross-talk, and noise or electromagnetic interference ([grounding H05K1/02C1](#))] [N9702] [C1109]
- H05K1/02C2B [N: by printed shielding conductors, ground planes or power plane ([H05K1/02C2F](#) takes precedence)] [N9702] [C1203]
- H05K1/02C2B2 [N: Printed shielding conductors for shielding around or between signal conductors, e.g. coplanar or coaxial printed shielding conductors] [N0101] [C1203]

H05K1/02C2B2B	. . . . .	[N: Coaxially shielded signal lines comprising a continuous shielding layer partially or wholly surrounding the signal lines (coaxially shielded vias H05K1/02C2B2D)] [N1109]
H05K1/02C2B2D	. . . . .	[N: for shielding around a single via or around a group of vias, e.g. coaxial vias or vias surrounded by a grounded via fence] [N1109]
H05K1/02C2B4	. . . . .	[N: Patterned shielding planes, ground planes or power planes (H05K1/02C4Z4 takes precedence)] [N0101] [C1203]
H05K1/02C2B4M	. . . . .	[N: Single or multiple openings in a shielding, ground or power plane (H05K1/02C2B4S takes precedence)] [N1203]
H05K1/02C2B4S	. . . . .	[N: Split or nearly split shielding or ground planes] [N1203]
H05K1/02C2C	. . . . .	[N: 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 H05K1/02C4P)] [N0101] [C1109]
H05K1/02C2E	. . . . .	[N: using auxiliary mounted passive components or auxiliary substances (printed passive components H05K1/16)] [N0101]
H05K1/02C2E2	. . . . .	[N: Capacitors or dielectric substances] [N0101]
H05K1/02C2E4	. . . . .	[N: Filters, inductors or a magnetic substance] [N0101]
H05K1/02C2E6	. . . . .	[N: Resistors or by disposing resistive or lossy substances in or near power planes (H05K1/02C4R takes precedence)] [N1109]
H05K1/02C2F	. . . . .	[N: Electromagnetic band-gap structures (conductive planes with an opening or a split H05K1/02C2B4M , H05K1/02C2B4S)] [N1109] [C1203]
H05K1/02C4	. . . . .	[N: High frequency adaptations (H05K1/02C2 takes precedence)] [N9702] [C0101]
H05K1/02C4A	. . . . .	[N: Signal transmission by AC coupling] [N1109]
H05K1/02C4B	. . . . .	[N: Dielectric details, e.g. changing the dielectric material around a transmission line] [N0101] [C1109]
H05K1/02C4C	. . . . .	[N: Structural details of individual signal conductors, e.g. related to the skin effect] [N1109]
H05K1/02C4D	. . . . .	[N: Printed circuits associated with mounted high frequency components] [N0101]
H05K1/02C4P	. . . . .	[N: Lay-out of balanced signal pairs, e.g. differential lines or twisted lines] [C1109]
H05K1/02C4R	. . . . .	[N: Termination of transmission lines] [N1109]
H05K1/02C4T	. . . . .	[N: Skew reduction or using delay lines] [N1109]
H05K1/02C4Z	. . . . .	[N: Impedance arrangements, e.g. impedance matching, reduction of parasitic impedance (H05K1/02C4B and H05K1/02C4D take precedence; for semiconductor devices H01L23/66)] [N1109]
H05K1/02C4Z2	. . . . .	[N: related to vias or transitions between vias and transmission lines] [N1109]
H05K1/02C4Z4	. . . . .	[N: Impedance adaptations of transmission lines by special lay-out of power planes, e.g. providing openings (H05K1/02C4Z2 takes precedence)] [N1109]
H05K1/02C6	. . . . .	[N: High voltage adaptations; Electrical insulation details; Overvoltage or electrostatic discharge protection (electrostatic discharge protection for electric apparatus in general H05K9/00F , H05K9/00M3); Arrangements for regulating voltages or for using plural voltages] [N9702] [C1109]
H05K1/02C6B	. . . . .	[N: Electrical insulation details, e.g. around high voltage areas] [N1109]
H05K1/02C6C	. . . . .	[N: Overvoltage protection] [N1203]
H05K1/02C6C1	. . . . .	[N: Electrostatic discharge [ESD] protection] [N1203]

- H05K1/02C6C2 [N: Spark gaps (spark gaps per se H01T)] [N1203]
- H05K1/02C6D [N: Arrangements for regulating voltages or for using plural voltages] [N1109]
- H05K1/02C8 [N: High current adaptations, e.g. printed high current conductors or using auxiliary non-printed means; Fine and coarse circuit patterns on one circuit board ([H05K1/02M8](#) takes precedence) ([H05K1/00E6](#) takes precedence)] [N9702] [C1109]
- H05K1/02C8B [N: characterized by the lay-out of or details of the printed conductors, e.g. reinforced conductors, redundant conductors, conductors having different cross-sections] [N1109]
- H05K1/02D [N: Marks, test patterns, inspection means or identification means] [N1109]
- H05K1/02D2 [N: for electrical inspection or testing] [N0101]
- H05K1/02D4 [N: for visual or optical inspection] [N0101]
- H05K1/02E [N: Arrangements for reducing stress or warp in rigid printed circuit boards, e.g. caused by loads, vibrations or differences in thermal expansion] [N9805] [C1109]
- H05K1/02F [N: Adaptations for fluid transport, e.g. channels, holes] [N0101]
- H05K1/02G [N: Optical details, e.g. printed circuits comprising integral optical means ([H05K1/02D4](#) takes precedence; [Coupling light guides with opto-electronic components G02B6/42](#))] [N1109]
- H05K1/02H [N: Security details, e.g. tampering prevention or detection ([security details of computer components G06F21/00N1](#))] [N1109]
- H05K1/02J [N: Bendability or stretchability details ([not used, see subgroups; H05K1/03D, H05K3/46G2](#) take precedence)] [N1109]
- H05K1/02J2 [N: Rigid circuit boards or rigid supports of circuit boards locally made bendable, e.g. by removal or replacement of material] [N1109]
- H05K1/02J4 [N: Bending or folding regions of flexible printed circuits ([H05K1/02J6](#) takes precedence)] [N1109]
- H05K1/02J4B [N: Reinforcement details thereof] [N1109]
- H05K1/02J6 [N: Stretchable printed circuits] [N1109]
- H05K1/02K [N: Details of three-dimensional rigid printed circuit boards ([H05K1/11G](#) takes precedence; [shaping of the substrate H05K3/00K2](#))] [N1109]
- H05K1/02M [N: Programmable, customizable or modifiable circuits ([by programmable non-printed jumper connections H05K3/22A](#))] [N1109]
- H05K1/02M2 [N: having an universal lay-out, e.g. pad or land grid patterns or mesh patterns] [N1109]
- H05K1/02M2B [N: having a matrix lay-out, i.e. having slectively interconnectable sets of X-conductors and Y-conductors in different planes] [N1109]
- H05K1/02M4 [N: having a programmable lay-out, i.e. adapted for choosing between a few possibilities] [N1109]
- H05K1/02M6 [N: having a modifiable lay-out, i.e. adapted for engineering changes or repair ([H05K1/02M8](#) takes precedence)] [N1109]
- H05K1/02M8 [N: Individual printed conductors which are adapted for modification, e.g. fusable or breakable conductors, printed switches] [N1109]
- H05K1/02M10 [N: adapted for choosing between different types or different locations of mounted components] [N1109]
- H05K1/02N [N: Conductive pattern lay-out details not covered by sub groups [H05K1/02](#) to [H05K1/02M10](#) ([H05K1/11](#) takes precedence; [lay-out adapted to mounted component configuration H05K1/18](#))] [N1109]
- H05K1/02N2 [N: Multilayer circuits] [N1109]
- H05K1/03 Use of materials for the substrate [N: ([substrates for semiconductor chips](#))]

- [H01L23/00](#)]
- H05K1/03B . . . [N: Inorganic insulating substrates, e.g. ceramic, glass]
- H05K1/03C . . . [N: Organic insulating material]
- H05K1/03C2 [N: consisting of one material]
- [N: **Note**
In this group, in the absence of an indication to the contrary, a material is classified in the last appropriate place
]
- H05K1/03C2B [N: containing O]
- H05K1/03C2C [N: containing S]
- H05K1/03C2D [N: containing halogen]
- H05K1/03C2E [N: containing N]
- H05K1/03C4 [N: consisting of two or more materials, e.g. two or more polymers, polymer + filler, + reinforcement]
- H05K1/03C4B [N: Multilayers with layers of different types]
- H05K1/03C4C [N: reinforced, e.g. by fibres, fabrics ([H05K1/03C4B](#) takes precedence)]
- H05K1/03C4D [N: containing additives, e.g. fillers ([H05K1/03C4B](#) takes precedence)]
- H05K1/03D [N: Textiles (used as reinforcing materials for organic insulating substrates [H05K1/03C4C](#))] [N1109] [C1203]
- H05K1/03E [N: Paper sheets (used as reinforcing materials for organic insulating substrates [H05K1/03C4C](#))] [N1203]
- H05K1/03F [N: Flexible materials ([H05K1/03D](#) takes precedence; specific organic compositions are classified in [H05K1/03C](#) and subgroups)] [N1109]
- H05K1/05 Insulated metal substrate [N: or other insulated electrically conductive substrate (thermal coupling of mounted components and metal substrate [H05K1/02B2B](#), [H05K1/02B2G](#))] [C1109]
- H05K1/05B [N: the metal substrate being covered by an inorganic insulating layer] [N9805]
- H05K1/05C [N: the metal substrate being covered by an organic insulating layer] [N9805]
- H05K1/09 Use of materials for the metallic pattern [N: or other conductive pattern (materials for conductors [H01B1/00](#))]
- H05K1/09D [N: Dispersed materials, e.g. conductive pastes or inks (Conductive material dispersed in non-conductive material in general [H01B1/14](#) to [H01B1/24](#); Conductive inks in general [C09D11/00D](#))] [C1109]
- H05K1/09D2 [N: for polymer thick films, i.e. having a permanent organic polymeric binder]
- H05K1/09D4 [N: Inks comprising nanoparticles, i.e. inks which are sinterable at low temperatures] [N1109]
- H05K1/11 Printed elements for providing electric connections to or between printed circuits
- H05K1/11C [N: Pads for surface mounting, e.g. lay-out] [N9812]
- H05K1/11C2 [N: directly combined with via connections] [N9812]
- H05K1/11C2A [N: Via provided in pad; Pad over filled via] [N1203]
- H05K1/11C2B [N: Pad being close to via, but not surrounding the via] [N1203]
- H05K1/11D [N: Via connections; Lands around holes or via connections ([H05K1/11C2](#) takes precedence)] [N9812]
- H05K1/11D2 [N: Lands, clearance holes or other lay-out details concerning the surrounding of a via] [N9812] [C1109]

- H05K1/11E . . . [N: Pads along the edge of rigid circuit boards, e.g. for pluggable connectors] [N9812]
- H05K1/11F . . . [N: specially for flexible printed circuits, e.g. using folded portions] [N9812]
- H05K1/11G . . . [N: Details of rigid insulating substrates therefor, e.g. three-dimensional details ([H05K1/11E](#) takes precedence)] [N9812]
- H05K1/14 . . . Structural association of two or more printed circuits ([providing electric connection to or between printed circuits H05K1/11, H01R9/09, H01R23/68](#))
- H05K1/14B . . . [N: One or more single auxiliary printed circuits mounted on a main printed circuit, e.g. modules, adapters ([H05K1/14C](#) and [H05K1/14F](#) take precedence)] [N9602] [C0401]
- H05K1/14C . . . [N: Arrangements of planar printed circuit boards in the same plane, e.g. auxiliary printed circuit insert mounted in a main printed circuit] [N9602] [C0401]
- H05K1/14D . . . [N: Stacked arrangements of planar printed circuit boards] [N9602] [C0401]
- H05K1/14E . . . [N: Arrangements wherein electric components are disposed between and simultaneously connected to two planar printed circuit boards, e.g. Cordwood modules] [N9602] [C0401]
- H05K1/14F . . . [N: at least one of the printed circuits being bent or folded, e.g. by using a flexible printed circuit ([H05K1/14G](#) takes precedence)] [N0401]
- H05K1/14G . . . [N: Arrangements of two or more hingeably connected rigid printed circuit boards, i.e. connected by flexible means] [N0401]
- H05K1/16 . . . incorporating printed electric components, e.g. printed resistor, capacitor, inductor [N: ([thick-film or thin-film circuits H01L27/01, H01L27/13](#))]
- H05K1/16C . . . [N: incorporating printed capacitors] [N9910]
- H05K1/16L . . . [N: incorporating printed inductors] [N9910]
- H05K1/16R . . . [N: incorporating printed resistors] [N9910]
- H05K1/18 . . . Printed circuits structurally associated with non-printed electric components ([N: [H05K1/02B, H05K1/02C2E, H05K1/02C4D,](#)] [H05K1/16](#) take precedence) [C0101]
- H05K1/18B . . . [N: associated with surface mounted components]
- H05K1/18C . . . [N: associated with components mounted in the printed circuit board, e.g. IMC (insert mounted components)]
- H05K1/18C2 . . . [N: Components mounted in and supported by recessed areas of the printed circuit board] [N0101]
- H05K1/18C4 . . . [N: 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] [N0101]
- H05K1/18C6 . . . [N: 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 H01L23/538V, H01L24/00](#))] [N0101] [C1109]
- H05K1/18C6B . . . [N: manufactured by mounting on or connecting to patterned circuits before or during embedding] [N1109]
- H05K1/18C6B2 . . . [N: the patterned circuits being prefabricated circuits, which are not yet attached to a permanent insulating substrate, e.g. on a temporary carrier] [N1109]
- H05K1/18C6C . . . [N: 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] [N1109]

- H05K1/18F . . [N: characterised by the use of a flexible or folded printed circuit ([H05K3/32C2](#) takes precedence)] [N9812]

- H05K3/00** **Apparatus or processes for manufacturing printed circuits** (photomechanical production of textured or patterned surfaces, materials or originals therefor, apparatus specially adapted therefor, in general [G03E](#); involving the manufacture of semiconductor devices [H01L](#))

- H05K3/00B . [N: for manufacturing artworks for printed circuits]
- H05K3/00D . [N: for designing circuits by computer]
- H05K3/00E . [N: for aligning or positioning of tools relative to the circuit board ([H05K3/46B6](#), [H05K3/46C10](#) take precedence; for manufacturing assemblages of components [H05K13/00C](#))] [N0004] [M1203]
- H05K3/00K . [N: Working of insulating substrates or insulating layers (making copper-clad substrates [H05K3/02C](#); surface treatment for improvement of adhesion [H05K3/38B](#))] [C1109]
- H05K3/00K2 . . [N: Shaping of the substrate, e.g. by moulding]
- H05K3/00K3 . . [N: Etching of the substrate by chemical or physical means]
- H05K3/00K3C . . . [N: by liquid chemical etching] [N0101]
- H05K3/00K3F . . . [N: by exposure and development of a photosensitive insulating layer] [N0101]
- H05K3/00K3L . . . [N: by laser ablation] [N0101]
- H05K3/00K3L2 [N: of inorganic insulating material][N0101]
- H05K3/00K3L4 [N: of organic insulating material] [N0101]
- H05K3/00K3L4B [N: of blind holes, i.e. having a metal layer at the bottom] [N0101]
- H05K3/00K3L4C [N: combined with laser drilling through a metal layer] [N0101]
- H05K3/00K3P . . . [N: by plasma etching] [N0101]
- H05K3/00K4 . . [N: Mechanical working of the substrate, e.g. drilling or punching ([H05K3/00E](#) takes precedence)] [C0004]
- H05K3/00K4D . . . [N: Drilling of holes] [N0004]
- H05K3/00K4P . . . [N: Punching of holes] [N0004]
- H05K3/00K4S . . . [N: Depaneling, i.e. dividing a panel into circuit boards; Working of the edges of circuit boards] [N0004]
- H05K3/00K6 . . [N: After-treatment, e.g. cleaning or desmearing of holes] [N1109]

- H05K3/00L . [N: Laminating printed circuit boards onto other substrates, e.g. metallic substrates ([H05K1/02J4B](#) takes precedence)] [N9805] [C1203]
- H05K3/00L1 . . [N: onto a metallic substrate, e.g. a heat sink (heat sinks for electric apparatus [H05K7/20](#))] [N1203]
- H05K3/00L2 . . [N: onto a polymeric substrate] [N1203]
- H05K3/00L3 . . [N: onto an inorganic, non-metallic substrate] [N1203]

- H05K3/00M . [N: Manufacture or processing of a substrate for a printed circuit board supported by a temporary or sacrificial carrier ([H05K1/18C6B2](#), [H05K3/20](#) and [H05K3/46C12](#) take precedence)] [N1109]

- H05K3/00N . [N: Masks not provided for in groups [H05K3/02](#) to [H05K3/46](#), e.g. for photomechanical production of patterned surfaces]

- H05K3/00N2 . . [N: characterised by the composition of the mask]
- H05K3/00N3 . . [N: characterised by the method of application or removal of the mask ([H05K3/00Q](#) takes precedence)] [C9709]
- H05K3/00N4 . . [N: characterised by the exposure method of radiation-sensitive masks]
- H05K3/00P . [N: Apparatus for treatments of printed circuits with liquids not provided for in groups [H05K3/02](#) to [H05K3/46](#); conveyers and holding means therefor (apparatus specially adapted for manufacturing assemblages of electric components, e.g. printed circuit boards, [H05K13/00](#))]
- H05K3/00P2 . . [N: for treatment of holes] [N9910]
- H05K3/00Q . [N: Apparatus for coating printed circuits using liquid non-metallic coating compositions] [N9709]
- H05K3/00R . [N: Filling or covering plated through-holes or blind plated vias, e.g. for masking or for mechanical reinforcement] [C1109]
- H05K3/00S . [N: Processing two or more printed circuits simultaneously, e.g. made from a common substrate, or temporarily stacked circuit boards ([H05K3/00K4S](#) takes precedence)] [N9609] [C0004]
- H05K3/02 . 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
- H05K3/02C . . [N: Processes for manufacturing precursors of printed circuits, i.e. copper-clad substrates (laminates in general [B32B](#))]
- H05K3/02C2 . . . [N: by transfer of thin metal foil formed on a temporary carrier, e.g. peel-apart copper]
- H05K3/02M . . [N: the conductive material being removed by irradiation, e.g. by photons, alpha, beta particles (machining by laser in general [B23K26/00](#); electron - or ion beam tubes therefor [H01J37/00](#))]
- H05K3/04 . . the conductive material being removed mechanically, e.g. by punching
- H05K3/04B . . . [N: by using a die for cutting the conductive material] [N0004]
- H05K3/04C . . . [N: by using a moving tool for milling or cutting the conductive material] [N0004]
- H05K3/04D . . . [N: by making a conductive layer having a relief pattern, followed by abrading of the raised portions] [N0004]
- H05K3/04E . . . [N: by selective transfer or selective detachment of a conductive layer] [N0004]
- H05K3/04E2 [N: using a lift-off resist pattern or a release layer pattern] [N0004]
- H05K3/06 . . the conductive material being removed chemically or electrolytically, e.g. by photo-etch process [N: (Non-mechanical removal of metallic material from surfaces [C23F](#); semi-additive methods [H05K3/10S](#))]
- H05K3/06B . . . [N: Etching masks (local etching [C23F1/02](#))]
- H05K3/06B2 [N: consisting of metals or alloys or metallic inorganic compounds ([H05K3/06B4](#) takes precedence)]
- H05K3/06B3 [N: Photoresists]
- H05K3/06B4 [N: applied by electrographic, electrophotographic or magnetographic methods (in general [G03G](#))]
- H05K3/06C . . . [N: Etchants (in general [C23F1/10](#) to [C23F1/46](#))]
- H05K3/06D . . . [N: Apparatus for etching printed circuits (in general [C23F1/08](#))]
- H05K3/07 . . . being removed electrolytically

- H05K3/08 . . the conductive material being removed by electric discharge, e.g. by spark erosion [N: working of metal by electro-erosion per se [B23H](#)]
- H05K3/10 . in which conductive material is applied to the insulating support in such a manner as to form the desired conductive pattern
- H05K3/10A . . [N: by casting or moulding of conductive material] [N0401]
- H05K3/10B . . [N: by bonding of conductive powder, i.e. metallic powder ([H05K3/12](#) takes precedence)] [C1109]
- H05K3/10C . . [N: by bonding or embedding conductive wires or strips] [N1109]
- H05K3/10D . . [N: by conversion of non-conductive material on or in the support into conductive material, e.g. by using an energy beam]
- H05K3/10D2 . . . [N: by photographic methods (in general [G03C](#))]
- H05K3/10E . . [N: by filling grooves in the support with conductive material ([H05K3/04D](#), [H05K3/10A](#), [H05K3/12D](#) and [H05K3/46C3](#) take precedence)] [C0401]
- H05K3/10S . . [N: by semi-additive methods; masks therefor (characterised by metallic etch mask [H05K3/06B2](#); electroplating methods or apparatus [H05K3/24B](#))]
- H05K3/12 . . [N: using thick film techniques, e.g. printing techniques to apply the conductive material or similar techniques for applying conductive paste or ink patterns (printing techniques in general B41M, printing apparatus B41F)] [C1109]
- H05K3/12A . . . [N: Pretreatment of the circuit board, e.g. modifying wetting properties; Patterning by using affinity patterns (providing shape patterns [H05K3/12D](#); adhesion treatments [H05K3/38](#))] [N1109]
- H05K3/12B . . . [N: by screen printing or stencil printing] [N9512]
- H05K3/12B2 [N: Screens or stencils (in general [B41N1/24](#); manufacturing of screens or stencils [B41C1/14](#)); Holders therefor (stencil holders for applying liquids [B05C17/08](#))] [M1203]
- H05K3/12B4 [N: Methods or means for supplying the conductive material and for forcing it through the screen or stencil] [N0005]
- H05K3/12C . . . [N: by ink-jet printing or drawing by dispensing] [N0401]
- H05K3/12C2 [N: by ink-jet printing (in general B41J)] [N1109]
- H05K3/12D . . . [N: by using a substrate provided with a shape pattern, e.g. grooves, banks, resist pattern] [N0401] [C1109]
- H05K3/12E . . . [N: by electrographic or magnetographic printing (in general G03G)] [N1109]
- H05K3/12G . . . [N: by other printing techniques, e.g. letterpress printing, intaglio printing, lithographic printing, offset printing] [N1109]
- H05K3/12H . . . [N: After-treatment of the printed patterns, e.g. sintering or curing methods] [N1109]
- H05K3/12H2 [N: Firing or sintering at relative high temperatures for patterns on inorganic boards, e.g. co-firing of circuits on green ceramic sheets] [N1109]
- H05K3/14 . . using spraying techniques to apply the conductive material [N: including vapour evaporation; (covering metals by metal spraying [C23C4/00](#); coating by vacuum evaporation [C23C14/00](#))]
- H05K3/14B . . . [N: Masks therefor ([H05K3/04E2](#) takes precedence)] [C0004]
- H05K3/14C . . . [N: By vapour deposition]
- H05K3/16 . . . by cathodic sputtering [N: (covering materials by cathodic sputtering [C23C14/34](#); discharge devices therefor [H01J37/34](#))]
- H05K3/18 . . using precipitation techniques to apply the conductive material [N: (chemical coating of a substrate by decomposition [C23C18/00](#))]
- H05K3/18B . . . [N: by electroless plating (adhesives therefor [H05K3/38D2](#); electroless plating in

- general [C23C18/16](#)][C0401]
- H05K3/18B2 [N: characterised by the patterning method]
- H05K3/18B2B [N: using masks]
- H05K3/18B2C [N: by making a catalytic pattern by photo-imaging]
- H05K3/18B3 [N: means therefor, e.g. baths, apparatus]
- H05K3/18C [N: by direct electroplating]
- H05K3/20 . . . by affixing prefabricated conductor pattern [N: ([H05K1/18C6B2](#), [H05K3/04E](#), [H05K3/46C4D](#), [H05K3/46C12](#) takes precedence)] [C1109]
- H05K3/20B [N: using self-supporting metal foil pattern]
- H05K3/20D [N: using a pattern electroplated or electroformed on a metallic carrier] [N0004]
- H05K3/20G [N: using a prefabricated paste pattern, ink pattern or powder pattern] [N0004] [C1109]
- H05K3/22 . . . Secondary treatment of printed circuits [N: ([H05K3/12H](#) takes precedence; embedding circuits in grooves by pressure [H05K3/10E](#))] [C1109]
- H05K3/22A . . . [N: Completing of printed circuits by adding non-printed jumper connections (printed jumper connections [H05K3/46D](#))] [N9910]
- H05K3/22B . . . [N: Correcting or repairing of printed circuits ([H05K1/02M6](#), [H05K3/22A](#), [H05K3/28R](#), [H05K3/46D](#) take precedence)] [C1109]
- H05K3/22C . . . [N: Drying of printed circuits]
- H05K3/24 . . . Reinforcing the conductive pattern [N: (by solder coating [H05K3/34F](#))] [C9609]
- H05K3/24B [N: characterised by the electroplating method; means therefor, e.g. baths, apparatus (electroplating in general [C25D](#))]
- H05K3/24B2 [N: characterised by using temporary conductors on the printed circuit for electrically connecting areas which are to be electroplated] [N0101]
- H05K3/24D [N: characterised by selective plating, e.g. for finish plating of pads (selective plating for making the circuit pattern [H05K3/10S](#), [H05K3/18B2](#))] [N9812]
- H05K3/24F [N: Finish plating of conductors, especially of copper conductors, e.g. for pads or lands (selective plating methods [H05K3/24D](#); finish plating of conductors made by printing techniques [H05K3/24G2](#); solder as finish [H05K3/34F](#), e.g. by plating [H05K3/34F4](#))] [N1109]
- H05K3/24G [N: 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] [N9812] [C1109]
- H05K3/24G2 [N: Reinforcing conductive paste, ink or powder patterns by other methods, e.g. by plating] [N1109]
- H05K3/24G4 [N: Finish coating of conductors by using conductive pastes, inks or powders] [N1109]
- H05K3/24G4B [N: fired compositions for inorganic substrates] [N1109]
- H05K3/24G4D [N: comprising carbon particles as main constituent] [N1109]
- H05K3/26 . . . Cleaning or polishing of the conductive pattern
- H05K3/28 . . . Applying non-metallic protective coatings [N: ([H05K3/00Q](#) takes precedence; methods for intermediate insulating layers for build-up multilayer circuits [H05K3/46C8](#))] [C1109]
- H05K3/28B [N: by means of a preformed insulating foil ([H05K3/28D](#) takes precedence)] [C9709]
- H05K3/28C [N: for inhibiting the corrosion of the circuit, e.g. for preserving the solderability] [N9709]

H05K3/28D	. . .	[N: for encapsulating mounted components (H05K1/18C6 takes precedence)] [N9709] [C0101]
H05K3/28G	. . .	[N: Permanent coating compositions] [N9709]
H05K3/28G2	. . . .	[N: Photosensitive compositions] [N9709]
H05K3/28R	. . .	[N: Removal of non-metallic coatings, e.g. for repairing] [N9910]
H05K3/30	. . .	Assembling printed circuits with electric components, e.g. with resistor
H05K3/30B	. . .	[N: by means of a mounting structure (H05K3/32C takes precedence)] [C9602]
H05K3/30C	. . .	[N: Surface mounted components, e.g. affixing before soldering, aligning means, spacing means (H05K3/32 takes precedence)] [C9602]
H05K3/30C2	. . . .	[N: Affixing by adhesive] [N9910]
H05K3/30D	. . .	[N: Lead-in-hole components, e.g. affixing or retention before soldering, spacing means (H05K3/32 takes precedence)] [N9602]
H05K3/30D2	. . . .	[N: Adaptations of leads (connectors to printed circuits H01R9/09B)] [N9602]
H05K3/32	. . .	electrically connecting electric components or wires to printed circuits
H05K3/32B	. . . .	[N: by conductive adhesive (in general H01R4/04)]
H05K3/32B2	. . . . .	[N: by applying an anisotropic conductive adhesive layer over an array of pads] [N0005]
H05K3/32C	. . . .	[N: by abutting or pinching, i.e. without alloying process; mechanical auxiliary parts therefor (adaptations of leads inserted in holes for press-fit connections H05K3/30D2)] [N9602] [C9812]
H05K3/32C2	. . . . .	[N: the printed circuit having integral resilient or deformable parts, e.g. tabs or parts of flexible circuits (H05K3/36B4 takes precedence)] [N9812]
H05K3/32D	. . . .	[N: by welding] [N9602]
H05K3/34	. . . .	by soldering [N: (soldering or desoldering apparatus H05K13/04 , B23K1/00 , B23K3/00)] [C9609]
H05K3/34B	. . . . .	[N: Edge mounted components, e.g. terminals] [N9812]
H05K3/34C	. . . . .	[N: Surface mounted components]
H05K3/34C2	. . . . .	[N: on both sides of the substrate or combined with lead-in-hole components] [N9505] [C9609]
H05K3/34C3	. . . . .	[N: Leaded components] [N9505]
H05K3/34C3B	. . . . .	[N: characterised by the leads] [N9812]
H05K3/34C4	. . . . .	[N: Leadless components] [N9505]
H05K3/34C4B	. . . . .	[N: having an array of bottom contacts, e.g. pad grid array or ball grid array components] [N9812]
H05K3/34C4C	. . . . .	[N: having edge contacts, e.g. leadless chip capacitors, chip carriers] [N9812]
H05K3/34D	. . . . .	[N: Lead-in-hole components (H05K3/34C2 takes precedence)]
H05K3/34E	. . . . .	[N: Solder masks]
H05K3/34F	. . . . .	[N: Solder materials or compositions (solder compositions per se B23K35/24); Methods of application thereof] [C9910]
H05K3/34F1	. . . . .	[N: Solder compositions in relation to features of the printed circuit board or the mounting process][N9812][C9910]
H05K3/34F2	. . . . .	[N: Applying molten solder] [N9609] [C1203]
H05K3/34F4	. . . . .	[N: Plating of solder] [N9609]
H05K3/34F6	. . . . .	[N: Applying solder paste, particles or preforms; Transferring prefabricated solder patterns] [N9609]

- H05K3/34F6B [N: Paste or slurry or powder (screen printing or stencil printing of solder paste [H05K3/12B](#))] [N9609] [C9812]
- H05K3/34G [N: Composition of fluxes; Methods of application thereof; Other methods of activating the contact surfaces] [C9609]
- H05K3/34H [N: Heating methods for reflowing of solder (using integral heating means [H05K1/02B4](#))] [N9609] [C0101]
- H05K3/36 Assembling printed circuits with other printed circuits [N: [H05K7/14D3](#) takes precedence]
- H05K3/36B [N: Assembling flexible printed circuits with other printed circuits] [N9505]
- H05K3/36B2 [N: by soldering] [N9505]
- H05K3/36B4 [N: by abutting, i.e. without alloying process] [N9812]
- H05K3/36C [N: substantially perpendicularly to each other ([H05K3/36B](#) takes precedence)] [N9505]
- H05K3/36D [N: parallel to each other ([H05K3/36B](#) takes precedence)] [N9505]
- H05K3/38 Improvement of the adhesion between the insulating substrate and the metal (Laminates per se [B32B](#))
- H05K3/38B [N: by special treatment of the substrate]
- H05K3/38C [N: by special treatment of the metal]
- H05K3/38C2 [N: by microetching] [N0005]
- H05K3/38C4 [N: by plating] [N0005]
- H05K3/38C6 [N: by conversion of the surface of the metal, e.g. by oxidation, whether or not followed by reaction or removal of the converted layer] [N0005]
- H05K3/38D [N: by the use of an organic polymeric bonding layer, e.g. adhesive]
- H05K3/38D2 [N: for electroless plating ([H05K3/46C5](#) takes precedence)] [N0401]
- H05K3/38E [N: by the use of a metallic or inorganic thin film adhesion layer] [N9910]
- H05K3/38F [N: by the use of a coupling agent, e.g. silane] [N9910]
- H05K3/40 Forming printed elements for providing electric connections to or between printed circuits
- H05K3/40B [N: Surface contacts, e.g. bumps ([H05K3/40T](#) takes precedence; deposition of finish layers on pads [H05K3/24](#); forming solder bumps [H05K3/34F](#))] [C9812]
- H05K3/40B1 [N: using auxiliary conductive elements, e.g. pieces of metal foil, metallic spheres] [N9812]
- H05K3/40C [N: Edge contacts; Windows or holes in the substrate having plural connections on the walls thereof ([H05K3/40T](#) takes precedence)] [C9812]
- H05K3/40D [N: Through-connections or via connections ([H05K3/40C](#) and [H05K3/42](#) take precedence)] [C9812]
- H05K3/40D1 [N: using auxiliary conductive elements, e.g. metallic spheres, eyelets, pieces of wire] [N9812]
- H05K3/40D2 [N: by thick-film techniques]
- H05K3/40D2B [N: for via connections in inorganic insulating substrates] [N0401]
- H05K3/40D2C [N: for via connections in organic insulating substrates] [N0401]
- H05K3/40D4 [N: by thin-film techniques]
- H05K3/40D6 [N: by deforming at least one of the conductive layers] [N9411]
- H05K3/40T [N: Integral conductive tabs, i.e. conductive parts partly detached from the

- substrate] [N9812]
- H05K3/42 . . Plated through-holes [N: or plated via connections] [C0401]
- H05K3/42B . . . [N: Blind plated via connections ([H05K3/42C](#), [H05K3/42D](#) and [H05K3/42E](#) take precedence)] [N0401]
- H05K3/42C . . . [N: characterised by electroless plating method; pretreatment therefor]
- H05K3/42D . . . [N: characterised by electroplating method]
- H05K3/42D2 [N: by direct electroplating]
- H05K3/42E [N: characterised by the sequence of steps for plating the through-holes or via connections in relation to the conductive pattern] [C0401]
- H05K3/42E2 [N: initial plating of through-holes in substrates without metal]
- H05K3/42E3 [N: initial plating of through-holes in metal-clad substrates]
- H05K3/42E4 [N: initial plating of through-holes in substrates having a metal pattern]
- H05K3/42M [N: Plated through-holes specially for multilayer circuits, e.g. having connections to inner circuit layers] [C0401]

- H05K3/44 . Manufacture insulated metal core circuits [N: or other insulated electrically conductive core circuits ([H05K3/00L](#), [H05K3/46B8](#), [H05K3/46A4](#) take precedence)] [C1109]
- H05K3/44B . . [N: having insulated holes or insulated via connections through the metal core] [N9805]

- H05K3/46 . Manufacturing multilayer circuits [N: ([incorporating non-printed electric components in internal layers](#) [H05K1/18C6](#))] [C1109]
- H05K3/46A . . [N: characterized by a special circuit board as base or central core whereon additional circuit layers are built or additional circuit boards are laminated] [N1109]
- H05K3/46A2 . . . [N: made from inorganic insulating material] [N1109]
- H05K3/46A4 . . . [N: comprising an electrically conductive core] [N1109]
- H05K3/46B . . [N: by laminating two or more circuit boards ([H05K3/46C4](#) takes precedence)] [C9709]
- H05K3/46B2 . . . [N: the electrical connections between the circuit boards being made during lamination] [N9505]
- H05K3/46B2B [N: characterized by laminating only or mainly similar single-sided circuit boards] [N1109]
- H05K3/46B2D [N: characterized by laminating only or mainly similar double-sided circuit boards] [N1109]
- H05K3/46B4 . . . [N: the circuit boards having internal via connections between two or more circuit layers before lamination, e.g. double-sided circuit boards ([H05K3/46B2D](#) takes precedence)] [N9709] [C1109]
- H05K3/46B5 . . . [N: characterised by the insulating layers or materials ([H05K3/46G](#) takes precedence)] [C1109]
- H05K3/46B5B [N: laminating inorganic sheets comprising printed circuits, e.g. green ceramic sheets] [N1109]
- H05K3/46B5C [N: laminating thermoplastic or uncured resin sheets comprising printed circuits without added adhesive materials between the sheets] [N1109]
- H05K3/46B5D [N: laminating flexible circuit boards using additional insulating adhesive materials between the boards] [N1109]
- H05K3/46B6 . . . [N: 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] [N9709] [C1109]
- H05K3/46B8 . . . [N: having integrally laminated metal sheets or special power cores] [N9805]

- H05K3/46C . . [N: by building the multilayer layer by layer, i.e. build-up multilayer circuits (making via holes in the insulating layers [H05K3/00K](#); special circuit boards as base or core whereon the multilayer is built [H05K3/46A](#))] [C1109]
- H05K3/46C2 . . . [N: by applying an insulating layer around previously made via studs] [N9709] [C0401]
- H05K3/46C3 . . . [N: by applying an insulating layer having channels for the next circuit layer] [N0401]
- H05K3/46C4 . . . [N: Adding a circuit layer by laminating a metal foil or a preformed metal foil pattern ([H05K3/46C2](#) takes precedence)] [N9709] [C1109]
- H05K3/46C4B [N: by using a laminate characterized by the insulating layer (general-purpose insulating materials [H05K1/03](#), [H05K3/46C8](#))] [N1109]
- H05K3/46C4D [N: characterized by laminating a prefabricated metal foil pattern, e.g. by transfer] [N1109]
- H05K3/46C5 . . . [N: Adding a circuit layer by direct wet plating, e.g. electroless plating; insulating materials adapted therefor (other insulating materials [H05K3/38D2](#))] [N0101] [C1109]
- H05K3/46C6 . . . [N: 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 ([H05K3/46C2](#) takes precedence)] [N9709] [C1208]
- H05K3/46C6B [N: characterized by using an inorganic intermediate insulating layer] [N1109]
- H05K3/46C7 . . . [N: Adding a circuit layer by thin film methods ([H05K3/46C2](#) takes precedence)] [N0101]
- H05K3/46C8 . . . [N: 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 [H05K3/28](#))] [N1109]
- H05K3/46C8C [N: Single layer compositions] [N1109]
- H05K3/46C10 . . . [N: Aligning added circuit layers or via connections relative to previous circuit layers] [N1109]
- H05K3/46C12 . . . [N: Manufacture of core-less build-up multilayer circuits on a temporary carrier or on a metal foil] [N1109]
- H05K3/46D . . [N: Manufacturing of cross-over conductors]
- H05K3/46G . . [N: Composite multilayer circuits, i.e. comprising insulating layers having different properties (having a special base or central core [H05K3/46A](#))] [N1109]
- H05K3/46G2 . . . [N: Rigid-flexible multilayer circuits comprising rigid and flexible layers, e.g. having in the bending regions only flexible layers] [N1109]
- H05K3/46G4 . . . [N: Partitioned multilayer circuits having adjacent regions with different properties, e.g. by adding or inserting locally circuit layers having a higher circuit density ([H05K3/46G2](#) takes precedence)] [N1109]
- H05K3/46H . . [N: having cavities, e.g. for mounting components ([H05K3/46G2](#) takes precedence)] [N1109]

H05K5/00 **Casings, cabinets or drawers for electric apparatus** (in general [A47B](#); radio receiver cabinets [H04B1/08](#); television receiver cabinets [H04N5/64](#); [N: constructional details or arrangements for computers [G06F1/16](#)])

- H05K5/00B . [N: comprising several parts forming a closed casing]
- H05K5/00B1 . . [N: assembled by screws]
- H05K5/00B2 . . [N: assembled by resilient members]
- H05K5/00C . [N: with display or control units]

- H05K5/00D . [N: Side-by-side or stacked arrangements]
- H05K5/00E . [N: provided with connectors and printed circuit boards (PCB), e.g. automotive electronic control units] [C1112]
- H05K5/00E2 . . [N: having an integrally preformed housing] [N1112]
- H05K5/00E3 . . [N: having an overmolded housing covering the PCB] [N1112]
- H05K5/00E4 . . [N: having a tubular housing wherein the PCB is inserted longitudinally] [N1112]
- H05K5/00E5 . . [N: comprising a frame housing mating with two lids wherein the PCB is flat mounted on the frame housing] [N1112]
- H05K5/00E6 . . [N: having a two-part housing enclosing a PCB] [N1112]
- H05K5/00E6A . . . [N: characterized by joining features of the housing parts] [N1112]
- H05K5/00E6B . . . [N: characterized by features for protecting electronic components against vibration and moisture, e.g. potting, holders for relatively large capacitors] [N1112]
- H05K5/00E6C . . . [N: characterized by features for holding the PCB within the housing] [N1112]
- H05K5/00E7 . . [N: wherein modules are associated together, e.g. electromechanical assemblies, modular structures] [N1112]
- H05K5/00E11 . . [N: having connector relating features for connecting the connector pins with the PCB or for mounting the connector body with the housing] [N1112]
- H05K5/00E12 . . [N: having specific features for mounting the housing on an external structure] [N1112]
- H05K5/00E20 . . [N: specially adapted for acceleration sensors, e.g. crash sensors, airbag sensors] [N1112]
- H05K5/00E30 . . [N: specially adapted for transmission control units, e.g. gearbox controllers] [N1112]
- H05K5/00F . [N: portable, e.g. battery operated apparatus (**casings for switching devices** [H01H9/02](#))] [C9612]
- H05K5/00G . [N: Housing specially adapted for small components (**for resistors H01C; for capacitors H01G; for integrated circuits [H01L23/00](#)**)]
- H05K5/00G1 . . [N: hermetically-sealed]
- H05K5/02 . Details
- H05K5/02B . . [N: Mounting supporting structure on the outside of casings (**mounting supporting structure in casings [H05K7/14](#)**)]
- H05K5/02C . . [N: Interlock mechanisms; Means for avoiding unauthorised use or function, e.g. tamperproof]
- H05K5/02D . . [N: Thermal insulation; Venting means; Condensation eliminators]
- H05K5/02E . . [N: Mechanical details of casings ([G06F1/16P](#), [H01M2/10](#), [H04M1/02A](#) **take precedence**)] [C1109]
- H05K5/02E2 . . . [N: Locks; Latches] [N1109]
- H05K5/02E3 . . . [N: Hinges ([H02B1/38](#) **takes precedence**)] [N1109]
- H05K5/02E4 . . . [N: Handles; Grips] [N1109]
- H05K5/02E5 . . . [N: Feet; Stands; Pedestals, e.g. wheels for moving casing on floor] [N1109]
- H05K5/02E6 . . . [N: Lids; Hoods, e.g. members for covering aperture] [N1109]
- H05K5/02E7 . . . [N: for decorative purposes] [N1109]

- H05K5/02F . . [N: Electrical details of casings, e.g. terminals, passages for cables or wiring] [C1109]
- H05K5/02G . . [N: Labels, e.g. for identification, markings or configuration store] [N1109]
- H05K5/02H . . [N: of interchangeable modules or receptacles therefor, e.g. cartridge mechanisms] [C1109]
- H05K5/02H2 . . . [N: having standardized interfaces (flash memory cards [G06K19/077](#))] [N1109]
- H05K5/02H2B [N: of PCMCIA type] [N1109]
- H05K5/02H2B2 [N: Card housings therefor e.g. covers, frames, PCB] [N1109]
- H05K5/02H2B3 [N: having extensions for peripherals e.g. LAN, antennas (details of antennas [H01Q1/22G4](#))] [N1109]
- H05K5/02H2C [N: of USB type (details relating to connectors [H01R27/00](#))] [N1109]
- H05K5/02H4 . . . [N: Adapters for connecting cards having a first standard in receptacles having a second standard] [N1109]
- H05K5/02H6 . . . [N: Receptacles therefor e.g. card slots, module sockets, card groundings] [N1109]
- H05K5/02H6B [N: for multiple cards] [N1109]
- H05K5/02H6C [N: having ejection mechanisms] [N1109]
- H05K5/03 . . Covers
- H05K5/04 . Metal casings
- H05K5/06 . Hermetically-sealed casings [N: (specially adapted for small components H05K5/00G1)] [C0611]
- H05K5/06B . . [N: sealed by a gasket held between a removable cover and a body, e.g. O-ring, packing] [N0611]
- H05K5/06C . . [N: sealed by a material injected between a non-removable cover and a body, e.g. hardening in situ] [N0611]
- H05K5/06D . . [N: sealed by a labyrinth structure provided at the joining parts] [N0611]
- H05K5/06E . . [N: sealed by potting, e.g. waterproof resin poured in a rigid casing] [N0611]
- H05K5/06F . . [N: sealed by encapsulation, e.g. waterproof resin forming an integral casing, injection moulding] [N0611]
- H05K5/06G . . [N: sealed by fusion of the joining parts without bringing material; sealed by brazing] [N0611]
- H05K5/06H . . [N: containing a dielectric fluid] [N0611]
- H05K5/06K . . [N: having a pressure compensation device, e.g. membrane (venting means H05K5/02D)] [N0611]
- H05K5/06L . . [N: Other details of the casing, e.g. wall structure, passage for a connector, a cable, a shaft] [N0611]
- H05K7/00** **Constructional details common to different types of electric apparatus (casings, cabinets, drawers [H05K5/00](#))**
- H05K7/00B . [N: arrangements of circuit components without supporting structure]
- H05K7/02 . Arrangements of circuit components or wiring on supporting structure
- H05K7/02B . . [N: Stackable modules]
- H05K7/02C . . [N: Multiple connections subassemblies]

- H05K7/04 . . on conductive chassis
- H05K7/06 . . on insulating boards [N: e.g. wiring harnesses (for printed circuits [H05K1/18](#), [H05K3/30](#))]
- H05K7/08 . . . on perforated boards
- H05K7/10 . . Plug-in assemblages of components,[N: e.g. IC sockets (for connection on printed circuit board [H01R23/68A](#))]
- H05K7/10D . . . [N: with means for increasing contact pressure at the end of engagement of coupling parts]
- H05K7/10E . . . [N: having exterior leads]
- H05K7/10E2 [N: co-operating by abutting, e.g. flat pack]
- H05K7/10E3 [N: co-operating by sliding, e.g. DIP carriers]
- H05K7/10E3B [N: with spring contact pieces ([H05K7/10E3C](#) takes precedence)]
- H05K7/10E3C [N: J-shaped leads]
- H05K7/10F . . . [N: having interior leads]
- H05K7/10F2 [N: co-operating by abutting]
- H05K7/10F2B [N: with spring contact pieces]
- H05K7/10F3 [N: co-operating by sliding]
- H05K7/10F3B [N: pin grid array package carriers]
- H05K7/10G . . . [N: with built-in components, e.g. intelligent sockets]
- H05K7/12 . . Resilient or clamping means for holding component to structure (holding two-part couplings together [H01R13/00](#))

- H05K7/14 . . Mounting supporting structure in casing or on frame or rack [N: ([H05K7/18](#) takes precedence; test adapters [G01R31/28B4B](#))]
- H05K7/14B . . [N: comprising clamping or extracting means ([H05K7/10](#) takes precedence)]
- H05K7/14B2 . . . [N: for securing or extracting printed circuit boards]
- H05K7/14B2A [N: by edge clamping, e.g. wedges]
- H05K7/14B2B [N: by clips or resilient members, e.g. hooks]
- H05K7/14B2C [N: by turn-bolt or screw member]
- H05K7/14B2D [N: by a unique member which latches several boards, e.g. locking bars]
- H05K7/14B2E [N: by lever-type mechanisms]
- H05K7/14B3 . . . [N: for securing or extracting box-type drawers]
- H05K7/14B3B [N: hold down mechanisms, e.g. avionic racks]
- H05K7/14B4 . . . [N: with power interlock]
- H05K7/14B5 . . . [N: manual gripping tools]
- H05K7/14D . . [N: having securing means for mounting boards, plates or wiring boards ([H05K7/14H](#) takes precedence)]
- H05K7/14D2 . . . [N: Card guides, e.g. grooves ([H05K7/14F5B](#) takes precedence)] [C9804]
- H05K7/14D3 . . . [N: Spacers not being card guides]
- H05K7/14E . . [N: Drawers for printed circuit boards]
- H05K7/14F . . [N: Printed circuit boards receptacles, e.g. stacked structures, electronic circuit modules or box like frames] [C9710]
- H05K7/14F5 . . . [N: Card cages] [N9710]
- H05K7/14F5B [N: of standardised dimensions, e.g. 19"-subrack] [N9710]
- H05K7/14F7 . . . [N: Housings] [N9710]

- H05K7/14F7B [N: for small modular apparatus with terminal block] [N9710]
- H05K7/14F7C [N: for circuits carrying a CPU and adapted to receive expansion cards] [N9710]
- H05K7/14F7C2 [N: Retention mechanisms for CPU modules] [N0103]
- H05K7/14F7D [N: for power drive units] [N9710] [C1202]
- H05K7/14F7E [N: for electronics exposed to high gravitational force; Cylindrical housings] [N9710]
- H05K7/14F9 [N: Expandable constructions] [N9710]
- H05K7/14F9B [N: for programmable controllers] [N9710]
- [N: **WARNING**
[N1202] As of 1.2.2012 this group is no longer used for classifying new documents; the backlog of this group is continuously reclassified to [H05K7/14P](#) and subgroups thereof
]
- H05K7/14G . . . [N: Back panels or connecting means therefor; Terminals; Coding means to avoid wrong insertion]
- H05K7/14G2 [N: Back panel mother boards] [N9710]
- H05K7/14G2B [N: with a segmented structure] [N9710]
- H05K7/14G2C [N: with a radial structure] [N9710]
- H05K7/14G2D [N: Complex or three-dimensional-arrangements; Stepped or dual mother boards] [N9710]
- H05K7/14G2E [N: with double-sided connections] [N9710]
- H05K7/14G3 [N: External wirings; Wiring ducts; Laying cables] [N9710]
- H05K7/14G3B [N: with connections to the front board] [N9710]
- H05K7/14G3C [N: with connections to the back board] [N9710]
- H05K7/14G3D [N: with connections between circuit boards or units] [N9710]
- H05K7/14G4 [N: Mounting of connectors; Switching; Reinforcing of back panels] [N9710]
- H05K7/14G4B [N: Alignment mechanisms; Drawout cases] [N9710]
- H05K7/14G4C [N: Coding for prevention of wrong insertion] [N9710]
- H05K7/14G5 [N: Power distribution arrangements] [N9710]
- H05K7/14G6 [N: Active back panels; Back panels with filtering means] [N9710]
- H05K7/14G7 [N: Circuit configuration, e.g. routing signals] [N9710]
- H05K7/14H . . . [N: Slidable card holders; Card stiffeners; Control or display means therefor]
- H05K7/14P . . . [N: for programmable logic controllers [PLC] for automation and/or industrial process control ([programmable logic controllers per se G05B19/05](#))] [N1202]
- H05K7/14P2 [N: Functional units accommodated in the same PLC module housing] [N1202]
- H05K7/14P4 [N: Modular PLC assemblies with separable functional units] [N1202]
- H05K7/14P6 [N: PLC mounted in a cabinet or chassis] [N1202]
- H05K7/14P8 [N: Mechanical features of input/output (I/O) modules] [N1202]
- H05K7/14P8B [N: Terminal blocks for connecting sensors (**terminal blocks in general H01R9/24**)] [N1202]
- H05K7/14P8C [N: Modules for controlling actuators] [N1202]
- H05K7/14P8D [N: Bus coupling modules, e.g. bus distribution modules] [N1202]
- H05K7/14P10 [N: Mounting of modules, e.g. on a base or rail or wall] [N1202]
- H05K7/14P12 [N: Bus assemblies for establishing communication between PLC modules]

		N1202]
H05K7/14P12B	. . . .	[N: including backplanes] [N1202]
H05K7/14P12C	. . . .	[N: including a segmented bus] [N1202]
H05K7/14P12D	. . . .	[N: including decentralized modules, e.g. connected to other modules using fieldbus] [N1202]
H05K7/14P14	. . .	[N: User interface, e.g. status displays; Programming interface, e.g. connector for computer programming; Monitoring] [N1202]
H05K7/14P16	. . .	[PLC power supply; PLC accessories, e.g. for safety] [N1202]
H05K7/14P20	. . .	[N: Electrical diagrams relating to constructional features, e.g. signal routing within PLC; Provisions for disaster recovery, e.g. redundant systems] [N1202]
H05K7/14S	. .	[N: Servers; Data center rooms, e.g. 19-inch computer racks] [N1109]
H05K7/14S2	. . .	[N: Blade assembly, e.g. cases and inner arrangements] [N1109]
H05K7/14S4	. . .	[N: Cabinets therefore, e.g. chassis, racks] [N1109]
H05K7/14S4B	. . . .	[N: characterized by the mounting of blades therein, e.g. brackets, rails, trays (H05K7/14S4D takes precedence)] [N1109]
H05K7/14S4D	. . . .	[N: having cable management arrangements (management of optical cables G02B6/44C8A ; in telecommunication cabinets H04Q1/06)] [N1109]
H05K7/14S4F	. . . .	[N: having electrical distribution arrangements, e.g. power supply or data communications] [N1109]
H05K7/14S4H	. . . .	[N: having hardware for monitoring blades, e.g. keyboards, displays (methods or software therefore H05K7/14S8)] [N1109]
H05K7/14S4J	. . . .	[N: providing data protection in case of earthquakes, floods, storms, nuclear explosions, intrusions, fire] [N1109]
H05K7/14S6	. . .	[N: Rooms for data centers; Shipping containers therefor] [N1109]
H05K7/14S8	. . .	[N: Resource management, Optimisation arrangements, e.g. configuration, identification, tracking, physical location (thermal management H05K7/20S90)] [N1109]
H05K7/16	. .	on hinges or pivots
H05K7/18	. .	Construction of rack or frame
H05K7/18B	. .	[N: support rails therefor]
H05K7/18C	. .	[N: for supporting telecommunication equipment (selecting apparatus H04Q1/02)]
H05K7/20	. .	Modifications to facilitate cooling, ventilating, or heating [N: (of printed circuits H05K1/02B ; of resistors H01C ; of capacitors H01G ; of individual semiconductor components H01L23/34 , H01L31/024 ; of LEDs H01L33/00B7 ; of personal computers G06F1/20)] [C0804]
H05K7/20B	. .	[N: using a gaseous coolant in electronic enclosures (in cabinets of standardized dimensions H05K7/20R ; in server cabinets H05K7/20S ; in vehicle electronic casings H05K7/20V ; in power control electronics H05K7/20W ; in displays H05K7/20Z)] [C0911]
H05K7/20B5	. . .	[N: Natural convection] [N0911]
H05K7/20B10	. . .	[N: Forced ventilation, e.g. by fans (H05K7/20B15 takes precedence)] [N0911]
H05K7/20B10B	. . . .	[N: Means for directing air flow, e.g. ducts, deflectors, plenum or guides] [N0911]
H05K7/20B10C	. . . .	[N: Heat dissipaters coupled to components] [N0911]
H05K7/20B10C2	. . . . .	[N: the components being isolated from air flow, e.g. hollow heat sinks, wind tunnels or funnels] [N0911]

H05K7/20B10F	. . . .	[N: Fan mounting or fan specifications (blowers in general F04D29/60C)] [N0911]
H05K7/20B10G	. . . .	[N: Filters; Louvers (filters in general B01D46/00)] [N0911]
H05K7/20B10H	. . . .	[N: Fan safe systems, e.g. mechanical devices for non stop cooling] [N0911]
H05K7/20B15	. . . .	[N: Air circulating in closed loop within enclosure wherein heat is removed through heat-exchangers] [N0911]
H05K7/20B90	. . . .	[N: Thermal management, e.g. fan control] [N0911]
H05K7/20D	. . . .	[N: using a liquid coolant without phase change in electronic enclosures (in cabinets of standardized dimensions H05K7/20R ; in server cabinets H05K7/20S ; in vehicle electronic casings H05K7/20V ; in power control electronics H05K7/20W ; in displays H05K7/20Z)] [C0911]
H05K7/20D3	. . . .	[N: by immersion] [N0911]
H05K7/20D4	. . . .	[N: by natural convection; Thermosiphons] [N0911]
H05K7/20D5	. . . .	[N: Cold plates transferring heat from heat source to coolant] [N0911]
H05K7/20D6	. . . .	[N: Heat dissipaters releasing heat from coolant] [N0911]
H05K7/20D7	. . . .	[N: 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] [N0911]
H05K7/20D90	. . . .	[N: Thermal management, e.g. liquid flow control] [N0911]
H05K7/20E	. . . .	[N: using a liquid coolant with phase change in electronic enclosures (in cabinets of standardized dimensions H05K7/20R ; in server cabinets H05K7/20S ; in vehicle electronic casings H05K7/20V ; in power control electronics H05K7/20W ; in displays H05K7/20Z)] [N0911]
H05K7/20E3	. . . .	[N: by immersion] [N0911]
H05K7/20E5	. . . .	[N: Evaporators] [N0911]
H05K7/20E6	. . . .	[N: Condensers] [N0911]
H05K7/20E7	. . . .	[N: Accessories for moving fluid, for connecting fluid conduits, for distributing fluid or for preventing leakage, e.g. pumps, tanks or manifolds] [N0911]
H05K7/20E30	. . . .	[N: Heat pipes, e.g. wicks or capillary pumps] [N0911]
H05K7/20E40	. . . .	[N: Sprayers; Atomizers] [N0911]
H05K7/20E50	. . . .	[N: Refrigerating circuit comprising a compressor] [N0911]
H05K7/20E60	. . . .	[N: Refrigerating circuit comprising a sorber] [N0911]
H05K7/20E70	. . . .	[N: Cryogenic cooling; Nitrogen liquid cooling] [N0911]
H05K7/20E90	. . . .	[N: Thermal management, e.g. evaporation control] [N0911]
H05K7/20F	. . . .	[N: 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, F28F13/00)] [C0804]
H05K7/20F3	. . . .	[N: Outer radiating structures on heat dissipating housings, e.g. fins integrated with the housing] [N0804]
H05K7/20F3B	. . . .	[N: the radiating structures being additional and fastened onto the housing] [N0804]
H05K7/20F3D	. . . .	[N: having radiation enhancing surface treatment, e.g. black coating] [N0804]
H05K7/20F4	. . . .	[N: Inner thermal coupling elements in heat dissipating housings, e.g. protrusions or depressions integrally formed in the housing] [N0804]
H05K7/20F4B	. . . .	[N: the coupling element being an additional piece, e.g. thermal standoff] [N0804]
H05K7/20F4B2	. . . .	[N: with a conformable or flexible structure compensating for irregularities, e.g. cushion bags, thermal paste] [N0804] [C0903]

H05K7/20F4B3	. . . . .	[N: Filling compound, e.g. potted resin] [N0804] [C0903]
H05K7/20F4B4	. . . . .	[N: Sheet interfaces] [N0804]
H05K7/20F4B4B	. . . . .	[N: characterised by the material composition exhibiting specific thermal properties] [N0804]
H05K7/20F4D	. . . . .	[N: Pressing means used to urge contact, e.g. springs] [N0804] [C0903]
H05K7/20F5	. . . . .	[N: Thermal paths through the printed circuit board (PCB) (details of PCBs related to heat transfer H05K1/02B)] [N0804]
H05K7/20F6	. . . . .	[N: Cold plates, e.g. multi-component heat spreader, support plates, non closed structures] [N0804] [C0903]
H05K7/20F7	. . . . .	[N: Unevenly distributed heat load, e.g. different sectors at different temperatures, localised cooling, hot spots] [N0804] [C0903]
H05K7/20R	. . . . .	[N: for racks or cabinets of standardized dimensions, e.g. 19-inch electronic racks] [N0911]
H05K7/20R5	. . . . .	[N: Natural convection of gaseous coolant; Heat transfer by conduction from electronic boards] [N0911] [C1106]
H05K7/20R10	. . . . .	[N: Forced ventilation of a gaseous coolant (in closed loop H05K7/20R15 or H05K7/20R16 or H05K7/20R17)] [N0911]
H05K7/20R10B	. . . . .	[N: within sub-racks for removing heat from electronic boards] [N0911]
H05K7/20R10C	. . . . .	[N: within cabinets for removing heat from sub-racks, e.g. plenum] [N0911]
H05K7/20R10C2	. . . . .	[N: Cabinets including a drawer for fans] [N0911]
H05K7/20R10D	. . . . .	[N: within rooms for removing heat from cabinets, e.g. by air conditioning device] [N0911]
H05K7/20R15	. . . . .	[N: Air circulating in closed loop within cabinets wherein heat is removed through air-to-air heat-exchanger] [N0911]
H05K7/20R16	. . . . .	[N: Air circulating in closed loop within cabinets wherein heat is removed through air-to-liquid heat-exchanger] [N0911]
H05K7/20R17	. . . . .	[N: Air circulating in different modes under control of air guidance flaps] [N0911]
H05K7/20R20	. . . . .	[N: Liquid coolant without phase change] [N0911]
H05K7/20R20B	. . . . .	[N: within sub-racks for removing heat from electronic boards] [N0911]
H05K7/20R20C	. . . . .	[N: within cabinets for removing heat from sub-racks] [N0911]
H05K7/20R20D	. . . . .	[N: within rooms for removing heat from cabinets] [N0911]
H05K7/20R30	. . . . .	[N: Liquid coolant with phase change, e.g. heat pipes] [N0911]
H05K7/20R30B	. . . . .	[N: within sub-racks for removing heat from electronic boards] [N0911]
H05K7/20R30C	. . . . .	[N: within cabinets for removing heat from sub-racks] [N0911]
H05K7/20R30D	. . . . .	[N: within rooms for removing heat from cabinets] [N0911]
H05K7/20R90	. . . . .	[N: Thermal management, e.g. cabinet temperature control] [N0911]
H05K7/20S	. . . . .	[N: for server racks or cabinets; for data centers, e.g. 19-inch computer racks] [N0911]
H05K7/20S10	. . . . .	[N: Forced ventilation of a gaseous coolant (in closed loop H05K7/20S15)] [N0911]
H05K7/20S10B	. . . . .	[N: within server blades for removing heat from heat source] [N0911]
H05K7/20S10C	. . . . .	[N: within cabinets for removing heat from server blades] [N0911]
H05K7/20S10D	. . . . .	[N: within rooms for removing heat from cabinets, e.g. by air conditioning device] [N0911]
H05K7/20S15	. . . . .	[N: Air circulating in closed loop within cabinets] [N0911]
H05K7/20S20	. . . . .	[N: Liquid cooling without phase change] [N0911]

- H05K7/20S20B [N: within server blades for removing heat from heat source] [N0911]
- H05K7/20S20C [N: within cabinets for removing heat from server blades] [N0911]
- H05K7/20S20D [N: within rooms for removing heat from cabinets] [N0911]
- H05K7/20S30 [N: Liquid cooling with phase change] [N0911]
- H05K7/20S30B [N: within server blades for removing heat from heat source] [N0911]
- H05K7/20S30C [N: within cabinets for removing heat from server blades] [N0911]
- H05K7/20S30D [N: within rooms for removing heat from cabinets, e.g. air conditioning devices] [N0911]
- H05K7/20S90 [N: Thermal management, e.g. server temperature control] [N0911]
- H05K7/20V [N: for vehicle electronic casings] [N0911]
- H05K7/20V5 [N: Heat transfer by conduction from internal heat source to heat radiating structure ([H05K7/20V10](#) takes precedence)] [N0911]
- H05K7/20V10 [N: Forced ventilation, e.g. on heat dissipaters coupled to components] [N0911]
- H05K7/20V20 [N: Liquid coolant without phase change] [N0911]
- H05K7/20V30 [N: Liquid coolant with phase change] [N0911]
- H05K7/20W [N: for power electronics, e.g. for inverters for controlling motor] [N0911]
- H05K7/20W5 [N: Heat transfer by conduction from internal heat source to heat radiating structure ([H05K7/20W10](#) takes precedence)] [N0911]
- H05K7/20W10 [N: Forced ventilation, e.g. on heat dissipaters coupled to components] [N0911]
- H05K7/20W10B [N: the components being isolated from air flow, e.g. hollow heat sinks, wind tunnels or funnels] [N0911]
- H05K7/20W20 [N: Liquid coolant without phase change] [N0911]
- H05K7/20W30 [N: Liquid coolant with phase change] [N0911]
- H05K7/20W90 [N: Thermal management, e.g. inverter temperature control] [N0911]
- H05K7/20Z [N: for display panels (cooling means for computer displays [G06F1/20](#); heating or cooling of liquid crystal cells [G02F1/133T](#); cooling for projectors [G03B21/16](#); plasma display panels per se [H01J17/49](#))] [N0911]
- H05K7/20Z5 [N: Heat transfer by conduction from internal heat source to heat radiating structure ([H05K7/20Z10](#) takes precedence)] [N0911]
- H05K7/20Z10 [N: Forced ventilation, e.g. on heat dissipaters coupled to components] [N0911]
- H05K7/20Z20 [N: Liquid coolant without phase change] [N0911]
- H05K7/20Z30 [N: Liquid coolant with phase change] [N0911]

H05K9/00

Screening of apparatus or components against electric or magnetic fields (devices for absorbing radiation from an aerial [H01Q17/00](#); [N: screening of semiconductor devices [H01L23/00V](#), [H01L23/58](#); screening structurally associated with dynamo-electric machines [H02K11/00](#); shielding against nuclear radiation [G21F](#)]) [C9712]

- H05K9/00A . . . [N: Rooms, chambers (building construction in general E04B; anechoic room G01R29/08A3B; Nuclear magnetic resonance G01R33/42)] [C0611]
- H05K9/00A2 . . . [N: Shielded walls, floors, ceilings, e.g. wallpaper, wall panel, electro-conductive plaster, concrete, cement, mortar] [N0611]
- H05K9/00A3 . . . [N: Shielded windows (window for building construction in general E06B5/00)] [N0611]
- H05K9/00B . . . [N: Casings (standardised racks [H05K9/00C](#))] [C0712]
- H05K9/00B1 . . . [N: with provisions to reduce EMI leakage through the joining parts] [N0712]

- H05K9/00B2 . . [N: Gaskets or seals]
- H05K9/00B2B . . . [N: having a spring contact]
- H05K9/00B3 . . [N: with provisions to reduce aperture leakages in walls, e.g. terminals, connectors, cables] [C0712]
- H05K9/00B4 . . [N: with localised screening]
- H05K9/00B4A . . . [N: of components mounted on printed circuit boards [PCB] (shields integrated within component packages [H01L23/552](#); shields integrated within PCB [H05K1/02C2B](#))[C1109]
- H05K9/00B4A2 [N: Shield cases mounted on a PCB, e.g. cans, caps, conformal shields] [N1109]
- H05K9/00B4A2B [N: integrally formed from metal sheet] [N1109]
- H05K9/00B4A2B2 [N: with retainers or specific soldering features] [N1109]
- H05K9/00B4A2C [N: made from electro-conductive plastic material or combining different shielding materials] [N1109]
- H05K9/00B4A2D [N: having multiple parts, e.g. frames mating with lids] [N1109]
- H05K9/00B4A2D2 [N: disposed on both PCB faces] [N1109]
- H05K9/00B4A2D4 [N: with retainers mounted beforehand on the PCB, e.g. clips] [N1109]
- H05K9/00B4A4 [N: Housings with compartments containing a PCB, e.g. partitioning walls] [N1109]
- H05K9/00B4B . . . [N: Ground layout on printed circuit board]
- H05K9/00B5 . . [N: Ventilation panels having provisions for screening]
- H05K9/00B6 . . [N: being flexible containers, e.g. pouch, pocket, bag] [N0712]
- H05K9/00B7 . . [N: being rigid plastic containers having a coating of shielding material] [N0712]
- H05K9/00B8 . . [N: being rigid plastic containers having conductive particles, fibres or mesh embedded therein] [N0712]
- H05K9/00B9 . . [N: being metallic containers] [N0712]
- H05K9/00B10 . . [N: being nesting containers] [N0712]
- H05K9/00B11 . . [N: Shielding other than Faraday cages] [N0712]
- H05K9/00B30 . . [N: specially adapted for display applications] [N0712]
- H05K9/00B31 . . [N: specially adapted for microwave applications] [N0712]
- H05K9/00B32 . . [N: specially adapted for optoelectronic applications] [N0712]
- H05K9/00B33 . . [N: specially adapted for signal processing applications, e.g. CATV, tuner, antennas amplifier] [N0712]
- H05K9/00C . . [N: Structures of standardised dimensions, e.g. 19" rack, chassis for servers or telecommunications] [N0712]
- H05K9/00D . . [N: Earth or grounding circuit]
- H05K9/00E . . [N: Constructional details of transient suppressor (protective circuit [H02H](#))]
- H05K9/00F . . [N: Devices for protecting against damage from electrostatic discharge (materials see H05K9/00M3)] [C0611]
- H05K9/00G . . [N: Methods for measuring the shielding efficiency; Apparatus therefor; Isolation container for testing] [C0712]
- H05K9/00K . . [N: Active shielding] [N0712]

- H05K9/00M . [N: Shielding materials (H05K9/00A2 takes precedence)] [N0611]
- H05K9/00M2 . . [N: Magnetic shielding materials (magnetic material in general H01F1/00; for electrical motor H02K11/00; for transformer H01F27/28)] [N0611]
- H05K9/00M2B . . . [N: comprising superconductors (superconductors in general H01L39/00)] [N0611]
- H05K9/00M3 . . [N: Electrostatic discharge protection, e.g. ESD treated surface for rapid dissipation of charges] [N0611]
- H05K9/00M4 . . [N: Electromagnetic shielding materials, e.g. EMI, RFI shielding (H05K9/00A2 takes precedence)] [N0611]
- H05K9/00M4B . . . [N: comprising electro-conductive non-fibrous particles embedded in an electrically insulating supporting structure, e.g. powder, flakes, whiskers (H05K9/00M4D takes precedence)] [N0611]
- H05K9/00M4C . . . [N: comprising a single continuous metallic layer on an electrically insulating supporting structure, e.g. metal foil, film, plating coating, electro-deposition, vapour-deposition] [N0611]
- H05K9/00M4D . . . [N: comprising a single discontinuous metallic layer on an electrically insulating supporting structure, e.g. metal grid, perforated metal foil, film, aggregated flakes, sintering] [N0611]
- H05K9/00M4E . . . [N: comprising a plurality of shielding layers; combining different shielding material structure] [N0611]
- H05K9/00M4F . . . [N: comprising electro-conductive fibres, e.g. metal fibres, carbon fibres metallised textile fibres, electro-conductive mesh, woven, non-woven mat, fleece, cross-linked (Screening during electrotherapy A61N1/16)] [N0611]
- H05K9/00M4G . . . [N: comprising electro-conductive pigments, e.g. paint, ink, tampon printing] [N0611]
- H05K9/00M5 . . [N: being light-transmitting, e.g. transparent, translucent] [N0611]
- H05K9/00M5B . . . [N: for television displays, e.g. plasma display panel] [N0611]
- H05K9/00M6 . . [N: for shielding electrical cables] [N0611]

- H05K10/00** **Arrangements for improving the operating reliability of electronic equipment, e.g. by providing a similar standby unit [N1110]**

- H05K11/00** **Combination of a radio or television receiver with apparatus having a different main function [N: (combined with clocks [G04B47/00](#); controlled by a clock [G04C21/28](#))]**
- H05K11/02 . with vehicles

- H05K13/00** **Apparatus or processes specially adapted for manufacturing or adjusting assemblages of electric components**
- H05K13/00B . [N: using handtools (for mounting on a circuit board [H05K13/04D](#))]
- H05K13/00C . [N: Orientation; Alignment; Positioning]
- H05K13/00D . [N: Making assemblies of electric components, e.g. modules ([H05K13/04](#) take precedence)]
- H05K13/00H . [N: Placing of components on belts holding the terminals]

- H05K13/00H1 . . [N: placing the components in a predetermined order]
- H05K13/00K . [N: Encapsulation of electrical assemblies in resins (hermetically-sealed casings [H05K5/06](#))]
- H05K13/00M . [N: Means for helping with the manual mounting of components, e.g. special tables, light spots indicating the place for mounting ([handtools H05K13/04D](#))]
- H05K13/00N . [N: Tools for holding the circuit boards during processing; handling transport of printed circuit boards]
- H05K13/00N1 . . [N: Holders for printed circuit boards]
- H05K13/00N2 . . [N: Straightening or aligning terminal leads of pins mounted on boards, during transport of the boards (during the mounting operation, after fitting components on the board [H05K13/04H](#))]
- H05K13/00P . [N: Containers and magazines for components, e.g. tube-like magazines]
- H05K13/00R . [N: Treatment of the terminal leads as a separate operation (during transport [H05K13/00N2](#), [H05K13/02E](#); during mounting [H05K13/04](#))]
- H05K13/02 . Feeding of components (in general [B65G](#))
- H05K13/02B . . [N: Loading or unloading of containers ([H05K13/02H](#) takes precedence)]
- H05K13/02D . . [N: with orientation of the elements (orientation while mounting [H05K13/04A4](#); in general [B23P19/00](#))]
- H05K13/02E . . [N: with bending or straightening of the terminal leads (bending and cutting after the mounting on a p.c. board [H05K13/04H](#))]
- H05K13/02E1 . . . [N: Straightening or aligning terminal leads]
- H05K13/02E1B [N: of components having oppositely extending terminal leads]
- H05K13/02E1C [N: of components having terminal leads in side by side relationship, e.g. using combing elements]
- H05K13/02G . . [N: Fluid transport of components]
- H05K13/02H . . [N: Simultaneously loading a plurality of loose objects, e.g. by means of vibrations, pressure differences, magnetic fields]
- H05K13/02J . . [N: Feeding axial lead components, e.g. using vibrating bowls, magnetic fields ([H05K13/02D](#) takes precedence)]
- H05K13/04 . Mounting of components [N: e.g. of leadless components]
- H05K13/04A . . [N: pick and place heads or apparatus, e.g. with jaws]
- H05K13/04A2 . . . [N: incorporating a sucking device ([H05K13/04A4](#) takes precedence)]
- H05K13/04A4 . . . [N: with orientation of the component while holding it (orientation while feeding [H05K13/02D](#))]
- H05K13/04B . . [N: Feeding with belts]
- H05K13/04B1 . . . [N: with treatment of the terminal leads (bending and cutting after fitting on a circuit board [H05K13/04H](#))]
- H05K13/04B2 . . . [N: for components being oppositely extending terminal leads ([H05K13/04B1](#) takes precedence)]
- H05K13/04C . . [N: Feeding one by one by other means than belts]
- H05K13/04C1 . . . [N: with containers]
- H05K13/04C2 . . . [N: incorporating means for treating the terminal leads only before insertion]

- H05K13/04C3 . . . [N: incorporating means for treating the terminal leads before and after insertion or only after insertion]
- H05K13/04D . . [N: Hand tools therefor]
- H05K13/04E . . [N: different components being guided to the same mounting place]
- H05K13/04F . . [N: simultaneously punching the circuit board]
- H05K13/04G . . [N: Surface mounting (surface mounted components [H05K3/34C](#))]
- H05K13/04G2 . . . [N: by soldering ([H05K13/04G4](#) takes precedence; soldering apparatus in general [B23K](#))]
- H05K13/04G4 . . . [N: by applying a glue or viscous material]
- H05K13/04H . . [N: Cutting and clinching the terminal ends of the leads after they are fitted on a circuit board (during transport [H05K13/00N2](#))]
- H05K13/04I . . [N: Simultaneously mounting of different components]
- H05K13/04I1 . . . [N: using templates; using magazines, the configuration of which corresponds to the sites on the boards where the components have to be attached]
- H05K13/04K . . [N: Replacement and removal of components]
- H05K13/04K1 . . . [N: Hand tools therefor]
- H05K13/04L . . [N: having a plurality of work-stations]
- H05K13/06 . Wiring by machine
- H05K13/06B . . [N: Accessories therefor, e.g. light spots]
- H05K13/08 . Monitoring manufacture of assemblages

Guide heading: Dummy groups for the purpose of scheme testing, logistics of documents or the like

H05K999/00 dummy group [N0907]

[N: **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. [N1208]
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H05K999/99 . dummy group [N0907]