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)

Definition statement

This subclass/group covers:

Constructional features of

electronic circuit boards such as board design, interconnection models, material

casings / cabinets of electronic equipment having cooling and EMI shielding specifications

machines for mounting electronic components on circuit boards

printed circuits structurally associated with non-printed electric components

printed connectors

References relevant to classification in this subclass

This subclass/group does not cover:

Thin-film or thick-film circuits	H01L 27/01, H01L 27/13

Informative references

Attention is drawn to the following places, which may be of interest for search:

Details of instruments or comparable details of other apparatus not otherwise provided for	G12B

Non-printed means for electric connections to or between printed circuits, electric connections or line connectors, apparatus or processes for manufacturing, assembling, maintaining or repairing such connections or connectors	H01R

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

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.

H05K 1/00

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)

Definition statement

This subclass/group covers:

This main group covers:

Details of printed circuit boards [PCBs], use of materials for PCBs, printed elements for electrical connection to or between printed circuits, printed electric components, structural association of two or more PCBs, structural association of PCBs and non-printed electric components.

H05K 1/00 covers mainly structural aspects (incl. layout) of printed circuits and materials for printed circuits. However certain sub-groups of H05K1 cover also the respective manufacturing aspects (e.g. H05K 1/16, H05K 1/185).

Relationship between large subject matter areas

There is no clear boundary between the field of printed circuit boards and other more specific fields, e.g. inductors (H01F), antennas (H01Q), waveguides (H01P), chip cards (G06K 19/07), thin film and thick film circuits (H01L 27/00), other packaging levels (semiconductor packages H01L 21/48, H01L 23/00, H01L 25/00), connectors (H01R) and various electronic components. The materials and methods (deposition, patterning, connection etc) used for manufacture of printed circuit boards have their general fields.

Documents often contain information relevant to several technical fields and have to be circulated for classification in these fields, in particular to H01L (semiconductors) but also the other parts of H05K, H01R (connectors).

References relevant to classification in this main group

This subclass/group does not cover:

Electrostatic discharge protection for electric apparatus in general	H05K 9/0067, H05K 9/0079
Screening against electric or magnetic fields	H05K 9/00
Assemblies of a plurality of individual semiconductor or solid state devices	H01L 25/00
Impedance arrangements, e.g. impedance matching, reduction of parasitic impedance for semiconductor devices	H01L 23/66

Informative references

Attention is drawn to the following places, which may be of interest for search:

Attention is drawn to the following references which may be of interest for search.

Coupling light guides with opto-electronic components	G02B 6/42
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	H01L 27/00
Emergency protective circuits	H02H
Non-printed means for electric connections to or between printed Circuits	H01R
Security details of computer components	G06F 21/00N1
Handling / Transporting	H05K 13/0061, B65G, H01L 21/68
Handling flexible substrates	B65G
Laminating	B32B 37/00
Cleaning	B08B
Drying	F26B
Etching polymeric substrates	C08J 7/00
Laser ablation	B23K 26/00
Mechanical drilling	B23B
Mechanical milling	B23C
Slotting, etc.	B23D
Details of machining apparatus	B23Q
Cutting, Punching	B26D, B26F
Grinding	B24B
Abrasive working	B24C

Testing, inspection of material	G01N
Treatment apparatus for semiconductor components	H01L 21/68
Designing of the conductive pattern	G06F 17/50
Electrical testing	G01R 31/00
Photolithography masks	G03F 1/00
Photoresists	G03F 7/00
Photolithography registration	G03F 9/00
Other lithography	G03F 7/00
Electrography	G03G
Printing forms, e.g. masks	B41C, B41N
Printing processes	B41M
Printing apparatus	B41F
Inkjet printing	B41J 2/00
Selective transfer processes	B41M 5/00
Patterning by laser ablation	B23K 26/00
Casting of metals	B22D
Metal powder processing	B22F
Metal milling	B23C
Erosion by electric discharge	B23H
Soldering or welding	B23K
Grinding, polishing	B24B
Abrasive working	B24C

Coating by dipping in molten metal	C23C 2/00
Coating by spraying with molten metal	C23C 4/00
Coating by physical vapour deposition or sputtering or ion implantation	C23C 14/00
Coating by chemical deposition	C23C 16/00
Coating by electroless plating	C23C 18/16
Coating by decomposition of compounds	C23C 18/00 C23C 20/00
Conversion coating of metals	C23C 22/00
Coating by powder methods	C23C 24/00
Other coating methods	C23C 26/00
Coating metal with enamel (glass)	C23D
Corrosion protection of metal	C23F
Cleaning or degreasing of metal	C23G
Electroplating of metal	C25D
Electroforming of metal	C25D 1/00
Anodizing of metal	C25D 11/00
Electrophoretic coating of metal	C25D 13/00
Electrolytic etching of metal	C25F
Semiconductor packages	H01L 21/48, H01L 23/00, H01L 25/00
Inorganic semiconductor devices	H01L 21/00
Polymeric semiconductor devices	H01L 51/00
Thick film or thin film circuits	H01L 27/00

Printed capacitors	H01G
Printed resistors	H01C
Printed inductors	H01F
Printed antennas	H01Q
Chip cards	G06K 19/07
Disk drive suspensions	G11B 5/00
Touch screens	G06F 3/00
Liquid crystal displays	G02F 1/13
Waveguides	H01P
Flat cables	H01B 7/00, H01B 13/00
Computers	G06F
Backplanes	H05K 7/14
Memory modules	G11C 5/00
Power conversion	H02M
Lighting devices	F21K, F21S, F21V, H05B
Receivers / Transceivers (modules)	H04B 1/00
Telephones	H04M
Electro-optical devices comprising optical waveguides	G02B 6/00
LCD displays	G02F 1/13
Plasma displays	H01J 17/49
Circuits for displays	G09F 9/00
Optical modules	H04N, H01L 27/00, G03B

Modules /PCBs having optical waveguides	G02B 6/00
Cables	H01B
Resistors	H01C
Inductors	H01F
Capacitors	H01G
Switches, fuses	H01H
Semiconductor devices	H01L
Solar cells, Photovoltaic devices	H01L 31/00
LEDs	H01L 33/00
Thermoelectric devices	H01L 35/00
Piezoelectric devices	H01L 41/00
Batteries, Cells	H01M
Waveguides	H01P
Antennas	H01Q
Connectors	H01R
Laser devices	H01S
Spark gaps, Overvoltage arresters	H01T
Electromechanical transducers	H04R

Special rules of classification within this main group

In this main group, both "invention information" and "additional information" are classified by the appropriate CPC group symbol.

Indexing Codes are also attributed to provide additional information when no

CPC sub-group exists, i.e. to subdivide subject matter belonging to a sub-group.

H05K 1/0203

[N: Cooling of mounted components (H05K1/0272 takes precedence)]

References relevant to classification in this group

This subclass/group does not cover:

Adaptations for fluid transport, e.g. channels, holes	H05K 1/0272

H05K 1/0204

[N: using means for thermal conduction connection in the thickness direction of the substrate (H05K1/0207 takes precedence)]

References relevant to classification in this group

This subclass/group does not cover:

Using internal conductor planes parallel to the surface for thermal conduction, e.g. power planes	H05K 1/0207

H05K 1/0213

[N: Electrical arrangements not otherwise provided for (screening H05K9/00; emergency protective circuits H02H)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Attention is drawn to the following places which may be of interest for search.

Screening	H05K 9/00
Emergency protective circuits	H02H

H05K 1/0216

[N: Reduction of cross-talk, and noise or electromagnetic interference (grounding H05K1/0215)]

References relevant to classification in this group

This subclass/group does not cover:

Grounding	H05K 1/0215

H05K 1/0218

[N: by printed shielding conductors, ground planes or power plane (H05K1/0236 takes precedence)]

References relevant to classification in this group

This subclass/group does not cover:

Electromagnetic band-gap structures	H05K 1/0236

H05K 1/0221

[N: Coaxially shielded signal lines comprising a continuous shielding layer partially or wholly surrounding the signal lines (coaxially shielded vias H05K1/0222)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Attention is drawn to the following places which may be of interest for search.

Coaxially shielded vias	H05K 1/0222

H05K 1/0228

[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 H05K1/0245)]

References relevant to classification in this group

This subclass/group does not cover:

Balanced signal pairs	H05K 1/0245

H05K 1/023

[N: using auxiliary mounted passive components or auxiliary substances (printed passive components H05K1/16)]

References relevant to classification in this group

This subclass/group does not cover:

Incorporating printed electric components, e.g. printed resistor, capacitor, inductor	H05K 1/16

Attention is drawn to the following places which may be of interest for search.

Conductive planes with an opening or a split	H05K 1/0225 H05K 1/0227

H05K 1/0236

[N: Electromagnetic band-gap structures (conductive planes with an opening or a split H05K1/0225, H05K1/0227)]

H05K 1/025

[N: Impedance arrangements, e.g. impedance matching, reduction of parasitic impedance (H05K1/024 and H05K1/0243 take precedence; for semiconductor devices H01L23/66)]

References relevant to classification in this group

This subclass/group does not cover:

Dielectric details, e.g. changing the dielectric material around a transmission line	H05K 1/024
Printed circuits associated with mounted high frequency components	H05K 1/0243

High frequency adaptations of semiconductor or other solid state devices	H01L 23/66
Impedance arrangements of semiconductor or other solid state devices	H01L 23/64

Special rules of classification within this group

Indexing Codes are used to additionally specify how impedance is adjusted, e.g. for change in trace width of differential pair H05K 1/0245.

H05K 1/0253

[N: Impedance adaptations of transmission lines by special lay-out of power planes, e.g. providing openings (H05K1/0251 takes precedence)]

References relevant to classification in this group

This subclass/group does not cover:

Impedance arrangements related to vias or transitions between vias and transmission lines	H05K 1/0251

Special rules of classification within this group

The lay-out of the power plane is additionally classified with Indexing Codes, e.g. when slotted H05K 1/0236. Except for H05K 1/0224 because that is the default layout in H05K 1/0253.

H05K 1/0254

[N: High voltage adaptations; Electrical insulation details; Overvoltage or electrostatic discharge protection (electrostatic discharge protection for electric apparatus in general H05K9/0067, H05K9/0079); Arrangements for regulating voltages or for using plural voltages]

References relevant to classification in this group

This subclass/group does not cover:

Devices for protecting against damage from electrostatic discharge	H05K 9/0067
Electrostatic discharge protection, e.g. ESD treated surface for rapid dissipation of charges	H05K 9/0079

H05K 1/0263

[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 (H05K1/0293 takes precedence) (H05K1/00E6 takes precedence)]

References relevant to classification in this group

This subclass/group does not cover:

Individual printed conductors which are adapted for modification, e.g. fusible or breakable conductors, printed switches	H05K 1/0293

H05K 1/0274

[N: Optical details, e.g. printed circuits comprising integral optical means ((H05K1/0269 takes precedence; Coupling light guides with opto-electronic components G02B6/42)]

References relevant to classification in this group

This subclass/group does not cover:

Marks, test patterns, inspection means or identification means for visual or optical inspection	H05K 1/0269
Coupling light guides with opto-electronic components	G02B 6/42

H05K 1/0275

[N: Security details, e.g. tampering prevention or detection

(security details of computer components G06F21/00N1)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Security details of computer components	G06F 21/00N1

H05K 1/0277

[N: Bendability or stretchability details (not used, see subgroups; H05K1/038, H05K3/4691 take precedence)]

References relevant to classification in this group

This subclass/group does not cover:

Textiles	H05K 1/038
Rigid-flexible multilayer circuits comprising rigid and flexible layers, e.g. having in the bending regions only flexible layers	H05K 3/4691

Special rules of classification within this group

Group H05K 1/0277 is not used, subject matter is classified in the subgroups thereof.

H05K 1/0284

[N: Details of three-dimensional rigid printed circuit boards (H05K1/119 takes precedence; shaping of the substrate H05K3/0014)]

References relevant to classification in this group

This subclass/group does not cover:

Details of rigid insulating substrates therefor, e.g. three-dimensional details	H05K 1/119
Shaping of the substrate	H05K 3/0014

H05K 1/0286

[N: Programmable, customizable or modifiable circuits]

References relevant to classification in this group

This subclass/group does not cover:

Completing of printed circuits by adding non-printed jumper connections	H05K 3/222

H05K 1/0296

[N: Conductive pattern lay-out details not covered by sub groups H05K1/02 to H05K1/0295] (H05K1/11 takes precedence; lay-out adapted to mounted component configuration H05K1/18)

References relevant to classification in this group

This subclass/group does not cover:

Printed elements for providing electric connections to or between printed circuits	H05K 1/11
Lay-out adapted to mounted component configuration	H05K 1/18

Details	H05K 1/02 - H05K 1/0295

H05K 1/03

Use of materials for the substrate [N: (substrates for semiconductor chips H01L23/00)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Substrates for semiconductor chips	H01L 23/00

H05K 1/05

Insulated metal substrate [N: or other insulated electrically conductive substrate (thermal coupling of mounted components and metal substrate H05K1/0204, H05K1/021)]

Definition statement

This subclass/group covers:

Insulated electrically conductive substrates, e.g. insulated metal substrates

Informative references

Attention is drawn to the following places, which may be of interest for search:

Thermal coupling of mounted components and metal substrate	H05K 1/0204, H05K 1/021

H05K 1/14

Structural association of two or more printed circuits (providing electric connection to or between printed circuits H05K1/11, H01R9/09, H01R23/68)

Informative references

Attention is drawn to the following places, which may be of interest for search:

Providing electric connection to or between printed circuits	H05K 1/11, H01R 9/09, H01R 23/68

H05K 1/16

incorporating printed electric components, e.g. printed resistor, capacitor, inductor [N: (thick-film or thin-film circuits H01L27/01, H01L27/13)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Thick-film or thin-film circuits	H01L 27/01, H01L 27/13

H05K 1/18

Printed circuits structurally associated with non-printed electric components ([N: H05K1/0201, H05K1/023, H05K1/0243,] H05K1/16 take precedence)

References relevant to classification in this group

This subclass/group does not cover:

Thermal arrangements, e.g. for cooling, heating or preventing overheating	H05K 1/0201
Reduction of cross-talk, and noise or electromagnetic interference using auxiliary mounted passive components or auxiliary substances	H05K 1/023
Printed circuits associated with mounted high frequency components	H05K 1/0243
Incorporating printed electric components, e.g. printed resistor, capacitor, inductor	H05K 1/16

H05K 3/00

Apparatus or processes for manufacturing printed circuits

Definition statement

This subclass/group covers:

General processing of printed circuit boards (PCBs) including processing of insulating substrates and layers for PCBs and processing of conductive layers for PCBs; forming printed elements for providing electric connection to or between printed circuits; manufacturing multilayer printed circuits; manufacturing metal core printed circuits; secondary treatment of PCBs; assembling PCBs with electric components and/or other PCBs.

H05K 3/00 covers mainly manufacturing (apparatuses and process) of printed circuits. However certain sub-groups of H05K 3/00 cover also the respective structural aspects (e.g. H05K 3/303, H05K 3/306) and materials (e.g. H05K 3/386).

Relationship between large subject matter areas

There is no clear boundary between the field of printed circuit boards and other more specific fields, e.g. inductors (H01F), antennas (H01Q), waveguides (H01P), chip cards (G06K 19/07), thin film and thick film circuits (H01L 27/00), other packaging levels (semiconductor packages H01L 21/48, H01L 23/00, H01L 25/00), connectors (H01R) and various electronic components. The materials and methods (deposition, patterning, connection etc) used for manufacture of printed circuit boards have their general fields.

Documents often contain information relevant to several technical fields and have to be circulated for classification in these fields, in particular to H01L (semiconductors) but also the other parts of H05K, H01R (connectors) etc. (see Annex 2).

References relevant to classification in this group

This subclass/group does not cover:

Apparatus specially adapted for manufacturing assemblages of electric components, e.g. printed circuit boards	H05K 13/00
Mounting of components	H05K 13/04
Processes or apparatus adapted for the manufacture or treatment of semiconductor or solid state devices or of parts thereof	H01L 21/00
Connectors for printed circuits	H01R 9/091
Electrically-conductive connections between two or more conductive members in direct contact using electrically conductive adhesives, in general	H01R 4/04
Selection of soldering or welding materials proper, i.e. solder compositions per se	B23K 35/24
Soldering, e.g. brazing, or unsoldering in general	B23K 1/00
Tools, devices, or special appurtenances for soldering, e.g. brazing, or unsoldering, not specially	B23K 3/00

adapted for particular methods	

Informative references

Attention is drawn to the following places, which may be of interest for search:

Apparatus for etching in general	C23F 1/08
Chemical coating of a substrate by decomposition in general	C23C 18/00
Coating by vacuum evaporation	C23C 14/00
Covering materials by cathodic sputtering	C23C 14/34
Covering metals by metal spraying	C23C 4/00
Discharge devices for covering materials by cathodic sputtering	H01J 37/34
Electroless plating in general	C23C 18/16
Electron-beam or ion-beam tubes for localised treatment	H01J 37/30
Electroplating in general	C25D
Etchants in general	C23F 1/10 to C23F 1/46
Etching masks applied by electrographic, electrophotographic or magnetographic methods in general	G03G
Laminates in general	B32B
Local etching in general	C23F 1/02
Machining by laser in general	B23K 26/00
Non-mechanical removal of metallic material from surfaces	C23F
Photomechanical production of textured or patterned surfaces,	G03F

materials or originals therefor, apparatus specially adapted therefor, in general	
Printing apparatus in general	B41F
Printing techniques in general	B41M
Screens or stencils, manufacturing thereof in general	B41N 1/24, B41C 1/14
Working of metal by electro-erosion per se	B23H

Special rules of classification within this group

In this main group, both "invention information" and "additional information" are classified by the appropriate CPC group symbol.

Indexing Codes are also attributed to provide additional information when no CPC sub-group exists, i.e. to subdivide subject matter belonging to a sub-group.

H05K 3/0008

[N: for aligning or positioning of tools relative to the circuit board (H05K3/4638, H05K3/4679 take precedence; for manufacturing assemblages of components H05K13/0015)]

References relevant to classification in this group

This subclass/group does not cover:

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	H05K 3/4638
Aligning added circuit layers or via connections relative to previous circuit layers	H05K 3/4679
Apparatus or processes specially adapted for manufacturing or adjusting assemblages of electric	H05K 13/0015

components	

H05K 3/0011

[N: Working of insulating substrates or insulating layers (making copper-clad substrates H05K3/022; surface treatment for improvement of adhesion H05K3/381)]

Definition statement

This subclass/group covers:

Shaping of the substrate, e.g. by moulding

Etching of the substrate by chemical or physical means

Mechanical working of the substrate, e.g. drilling or punching

After-treatment, e.g. cleaning or desmearing of holes

Informative references

Attention is drawn to the following places, which may be of interest for search:

Making copper-clad substrates	H05K 3/022
Surface treatment for improvement of adhesion	H05K 3/38

H05K 3/0058

[N: Laminating printed circuit boards onto other substrates, e.g. metallic substrates (H05K1/0281 takes precedence)]

References relevant to classification in this group

This subclass/group does not cover:

Reinforcement details	H05K 1/0281

H05K 3/007

[N: Manufacture or processing of a substrate for a printed circuit board supported by a temporary or sacrificial carrier

(H05K1/187, H05K3/20 and H05K3/4682 take precedence)]

References relevant to classification in this group

This subclass/group does not cover:

Patterned circuits being prefabricated circuits, which are not yet attached to a permanent insulating substrate, e.g. on a temporary carrier	H05K 1/187
Applying conductive material to the insulating support by affixing prefabricated conductor pattern	H05K 3/20
Manufacture of core-less build-up multilayer circuits on a temporary carrier or on a metal foil	H05K 3/4682

H05K 3/0073

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

References relevant to classification in this group

This subclass/group does not cover:

Apparatus or processes for manufacturing printed circuits	H05K 3/02 - H05K 3/46

H05K 3/0085

[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)]

References relevant to classification in this group

This subclass/group does not cover:

Apparatus or processes specially adapted for manufacturing or adjusting assemblages of electric components	H05K 13/00

Apparatus or processes for manufacturing printed circuits	H05K 3/02 - H05K 3/46

H05K 3/0097

[N: Processing two or more printed circuits simultaneously, e.g. made from a common substrate, or temporarily stacked circuit boards (H05K3/0052 takes precedence)]

References relevant to classification in this group

This subclass/group does not cover:

De-panelling, i.e. dividing a panel into circuit boards; Working of the edges of circuit boards	H05K 3/0052

H05K 3/06

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 H05K3/108)]

References relevant to classification in this group

This subclass/group does not cover:

Semi-additive methods	H05K 3/108

Informative references

Attention is drawn to the following places, which may be of interest for search:

Non-mechanical removal of metallic material from surfaces	C23F

H05K 3/08

the conductive material being removed by electric discharge, e.g. by spark erosion [N: working of metal by electro-erosion per se B23H]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Working of metal by electro-erosion per se	B23H

H05K 3/12

[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)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Printing techniques in general	B41M
Printing apparatus	B41F

H05K 3/14

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)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Covering metals by metal spraying	C23C 4/00
Coating by vacuum evaporation	C23C 14/00

H05K 3/16

by cathodic sputtering [N: (covering materials by cathodic sputtering C23C14/34; discharge devices therefor H01J37/34)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Covering materials by cathodic sputtering	C23C 14/34
Discharge devices therefor	H01J 37/34

H05K 3/18

using precipitation techniques to apply the conductive material [N: (chemical coating of a substrate by decomposition C23C18/00)]

Definition statement

This subclass/group covers:

Electroless plating

Electroplating, e.g. electrodeposition

Informative references

Attention is drawn to the following places, which may be of interest for search:

Chemical coating of a substrate by decomposition	C23C 18/00

H05K 3/20

by affixing prefabricated conductor pattern [N: (H05K1/187, H05K3/046, H05K3/4658, H05K3/4682 takes precedence)]

References relevant to classification in this group

This subclass/group does not cover:

Patterned circuits being prefabricated circuits, which are not yet attached to a permanent insulating substrate, e.g. on a temporary carrier	H05K 1/187

Selective transfer or selective detachment of a conductive layer	H05K 3/046
Adding a circuit layer by laminating a metal foil or a preformed metal foil pattern	H05K 3/4658
Manufacture of core-less build-up multilayer circuits on a temporary carrier or on a metal foil	H05K 3/4682

H05K 3/22

Secondary treatment of printed circuits [N: (H05K3/1283 takes precedence; embedding circuits in grooves by pressure H05K3/107)]

Definition statement

This subclass/group covers:

Completing of printed circuits by adding non-printed jumper connections

Correcting or repairing of printed circuits

Drying of printed circuits

Reinforcing the conductive pattern

Cleaning or polishing of the conductive pattern

Applying non-metallic protective coatings

References relevant to classification in this group

This subclass/group does not cover:

Embedding circuits in grooves by pressure	H05K 3/107
After-treatment of the printed patterns, e.g. sintering or curing methods	H05K 3/1283

H05K 3/225

[N: Correcting or repairing of printed circuits (H05K1/0292, H05K3/222, H05K3/288, H05K3/4685 take precedence)]

References relevant to classification in this group

This subclass/group does not cover:

Completing of printed circuits by adding non-printed jumper connections	H05K 3/222
Programmable, customizable or modifiable circuits	H05K 1/0286
Removal of non-metallic coatings, e.g. for repairing	H05K 3/288

H05K 3/24

Reinforcing the conductive pattern [N: (by solder coating H05K3/3457)]

References relevant to classification in this group

This subclass/group does not cover:

By solder coating	H05K 3/3457

H05K 3/28

Applying non-metallic protective coatings [N: (H05K3/0091 takes precedence; methods for intermediate insulating layers for build-up multilayer circuits H05K3/4673)]

References relevant to classification in this group

This subclass/group does not cover:

Apparatus for coating printed circuits using liquid non-metallic coating compositions	H05K 3/0091
Methods for intermediate insulating layers for build-up multilayer circuits	H05K 3/4673

H05K 3/284

[N: for encapsulating mounted components (H05K1/185 takes precedence)]

References relevant to classification in this group

This subclass/group does not cover:

Components encapsulated in the insulating substrate of the printed circuit or incorporated in internal layers of a multilayer circuit	H05K 1/185

H05K 3/34

by soldering [N: (soldering or desoldering apparatus H05K13/04, B23K1/00, B23K3/00)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Soldering or de-soldering apparatus	H05K 13/04, B23K 1/00, B23K 3/00

H05K 3/36

Assembling printed circuits with other printed circuits [N: H05K7/142 takes precedence]

References relevant to classification in this group

This subclass/group does not cover:

Spacers not being card guides	H05K 7/142

Special rules of classification within this group

H05K 3/36 relates to the method of assembling at least two printed circuits to form a single entity as a final product, whereas H05K 3/0097 relates to processing two printed circuits at the same time. This implicitly means that after processing, the printed circuits are again separated from one another.

H05K 3/44

Manufacture insulated metal core circuits [N: or other insulated electrically conductive core circuits (H05K3/0058, H05K3/4641, H05K3/4608 take precedence)]

References relevant to classification in this group

This subclass/group does not cover:

Laminating printed circuit boards onto other substrates, e.g. metallic substrates	H05K 3/0058
Laminating two or more circuit boards having integrally laminated metal sheets or special power cores	H05K 3/4641
Special circuit board as base or central core comprising an electrically conductive core	H05K 3/4608

H05K 3/46

Manufacturing multilayer circuits [N: (incorporating non-printed electric components in internal layers H05K1/185)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Incorporating non-printed electric components in internal layers	H05K 1/185

H05K 5/00

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

Definition statement

This subclass/group covers:

Constructional features of electronic housings when the inner electronic arrangement is not described in the document such as:

- assembling means of the housing parts

- association means of several housings

- venting means

- sealing means

- interlocking means

- displaying and controlling means

- mounting and fixing means

- handling means

References relevant to classification in this group

This subclass/group does not cover:

Desktop and laptop computer housings	G06F 1/16
CRT Television housings	H04N 5/00
Plasma display panels	H01J 29/00
LCD display panels	G02F 1/13
Projectors	G03B 21/00
Mobile phone housings	H04M 1/0202
Receptacles of batteries	H01M 2/10
Furniture/cabinets	A47B 87/00
Casings and housings of instrument	G12B 9/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Locks and Latches in general	E05B, E05C

Hinges in general	E05D
Handles and grip in general	B65D
Details for decorative purposes in mobiles phones	H04M 1/0283
Connectors in general	H01R
Sealing in general	F16J 15/00
Stands and supports for apparatus in general	F16M 11/00
Electronic boxes of vehicles in general	B60R 16/0239
Electric distribution centers in vehicle in general	B60R 16/0238
Constructional details of record carriers in general	G06K 7/00

H05K 5/06

Hermetically-sealed casings [N: (specially adapted for small components H05K5/0095)]

References relevant to classification in this group

This subclass/group does not cover:

Specially adapted for small components	H05K 5/0095

H05K 7/00

Constructional details common to different types of electronic apparatus; (in general A47B; radio receiver cabinets H04B1/08; television receiver cabinets H04N5/64; [N: constructional details or arrangements for computers G06F1/16])

Definition statement

This subclass/group covers:

- constructional features of electronic housings when the inner electronic arrangement is described in,

- constructional features of standardized electronic cabinets and racks for receiving Printed Circuit Boards (PCB) such as guides, retainers, drawers, plug-in modules;

- constructional features of Servers, Data Center Rooms, 19-inch computer racks such as mounting means of blades within cabinets, cable management, power distribution, mobile data centers arranged in shipping containers;

- constructional features of industrial controllers such as PLCs;

- cooling features of electronic housings,

- cooling features of standardized electronic cabinets and racks for receiving Printed Circuit Boards (PCB);

- cooling features of Servers, Data Center Rooms, 19-inch computer racks;

- cooling features of power electronics, such as inverters;

- cooling features of vehicle control units;

- cooling features of display panels;

- cooling features of outdoor telecommunication equipments, such as base stations.

References relevant to classification in this group

This subclass/group does not cover:

Inner arrangements of desktop and laptop computers	G06F 1/18
Cooling arrangements of desktop and laptop computers	G06F 1/20
CPU cooling; Cooling of electronic components not using the housing for the heat transfer	H01L 23/34
Constructional details of optoelectronic equipments	G02B 6/42
Cooling of batteries	H01M 10/50

Constructional details of Hard disk drives	G11B 33/00
Constructional details of record carriers	G06K 7/00
Program control systems PLC without constructional details	G05B 19/00
Bus systems and interfaces of computers	G06F 13/409
Telecommunication distribution frames and equipments	H04Q 1/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Stacked arrangements of semiconductor devices	H01L 25/065
Blowers and fans in general	F04D 29/00
Cooling tubular elements with fins for cooling	F28F 1/10
Cooling element with means for increasing heat exchange area	F28F 3/02

H05K 7/10

Plug-in assemblages of components,[N: e.g. IC sockets (for connection on printed circuit board H01R23/6806)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

IC sockets for connection on printed circuit board	H01R 12/00

H05K 7/12

Resilient or clamping means for holding component to structure (holding two-part couplings together H01R13/00)

Informative references

Attention is drawn to the following places, which may be of interest for search:

Holding two-part couplings together	H01R 13/00

H05K 7/14

Mounting supporting structure in casing or on frame or rack [N: (H05K7/18 takes precedence; test adapters G01R31/2808)]

References relevant to classification in this group

This subclass/group does not cover:

Construction of rack or frame	H05K 7/18

Informative references

Attention is drawn to the following places, which may be of interest for search:

Test adapters	G01R 31/2808

H05K 7/20

Modifications to facilitate cooling, ventilating, or heating [N: (of printed circuits H05K1/0201; of resistors H01C; of capacitors H01G; of individual semiconductor components H01L23/34, H01L31/024; of LEDs H01L33/64; of personal computers G06F1/20)]

Definition statement

This subclass/group covers:

Arrangements for cooling, ventilating or heating of electric apparatus by:

using a gaseous coolant in electronic enclosures

using a liquid coolant without phase change in electronic enclosures

using a liquid coolant with phase change in electronic enclosures

heat transfer by conduction from the heat generating element to a dissipating body

Informative references

Attention is drawn to the following places, which may be of interest for search:

Cooling, ventilating, or heating of printed circuits	H05K 1/0201
Cooling, ventilating, or heating of resistors	H01C
Cooling, ventilating, or heating of capacitors	H01G
Cooling, ventilating, or heating of individual semiconductor components	H01L 23/34, H01L 31/024
Cooling, ventilating, or heating of LEDs	H01L 33/64
Cooling, ventilating, or heating of personal computers	G06F 1/20

H05K 9/00

Screening of apparatus or components against electric or magnetic fields (devices for absorbing radiation from an aerial H01Q17/00; [N: screening of semiconductor devices H01L24/00, H01L23/58; screening structurally associated with dynamo-electric machines H02K11/00 ; shielding against nuclear radiation G21F])

Definition statement

This subclass/group covers:

- screening of electronic equipments against magnetic and electromagnetic fields, transient and electrostatic discharges and shielding features applied to rooms or buildings protecting against external electromagnetic interference;

- shielded electronic casings achieving electromagnetic compatibility;

- shielding features of electronic equipments having standardized dimensions, such as 19-inch racks;

- constructional features of transient suppressors;

- protection of electronic apparatuses against Electrostatic Discharge (ESD);

- shielding materials achieving electromagnetic compatibility of electronic apparatuses.

References relevant to classification in this group

This subclass/group does not cover:

Screening of human body against electromagnetic influences	A61N 1/16
Anechoic chambers	G01R 29/0821
Shielding of Nuclear magnetic Resonance devices	G01R 33/42
Grounding and RFI shielding of Desktop and laptop computers	G06F 1/182
Screening against nuclear radiation	G21F
Magnetic shielding of transformers	H01F 27/28
Device for absorbing radiation from aerial	H01Q 17/00
Screening of semiconductor devices	H01L 23/552, H01L 24/00
Screening of dynamo-electric machines	H02K 11/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Prevention of electrostatic charge in general	H05F 1/00
Conductive materials in general	H01B 1/00
Magnetic materials in general	H01F 1/00

RFI Filter construction	H03H 1/0007

H05K 10/00

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

Special rules of classification within this group

This IPC group is not used in CPC for classification.

H05K 11/00

Combination of a radio or television receiver with apparatus having a different main function

Special rules of classification within this group

This IPC group is not used in CPC for classification

H05K 13/00

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

Definition statement

This subclass/group covers:

Apparatus and methods for placing components onto the printed circuit boards.

References relevant to classification in this group

This subclass/group does not cover:

Manufacture of printed circuit boards	H05K 1/00
Assembling printed circuits with electric components	H05K 3/30
Apparatus and methods for soldering	B23K
Manufacture or treatments of solid state devices	H01L 21/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Manipulators	B25J
Packaging, Packing or unpacking	B65B

Special rules of classification within this group

These groups only concern bare printed circuit boards and not circuit boards already fitted in an apparatus (thus no displays, no hard disks etc)

Synonyms and Keywords

PCB	Printed Circuit Board
Substrate	Printed Circuit Board

H05K 13/0007

[N: using handtools (for mounting on a circuit board H05K13/0447)]

Definition statement

This subclass/group covers:

Hand-tools specially adapted for adjusting assemblages of electric ocmponents

References relevant to classification in this group

This subclass/group does not cover:

Hand-tools for mounting electric components on a circuit board	H05K 13/0447

H05K 13/0015

[N: Orientation; Alignment; Positioning]

Definition statement

This subclass/group covers:

orientation, alignment and positioning only of the printed circuit boards

References relevant to classification in this group

This subclass/group does not cover:

Orientation, alignment and positioning of the printed circuit boards for testing	G01R 31/00

H05K 13/0023

[N: Making assemblies of electric components, e.g. modules (H05K13/04 take precedence]

References relevant to classification in this group

This subclass/group does not cover:

Mounted modules or finished printed circuit boards in casings, drawers or apparatus	H05K 5/00
Mounting of components, e.g. of leadless components	H05K 13/04

H05K 13/003

[N: Placing of components on belts holding the terminals]

Definition statement

This subclass/group covers:

preparing the components before delivering to mounting machines by grouping the components for batch mounting

Informative references

Attention is drawn to the following places, which may be of interest for search:

Attaching a series of articles, e.g. small electrical components, to a continuous web	B65B 15/04

Special rules of classification within this group

Only concerns filling of belts as a separate operation

H05K 13/0038

[N: placing the components in a predetermined order]

Definition statement

This subclass/group covers:

Filling of belts according to the mounting order of different types of components.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Attaching a series of articles, e.g. small electrical components, to a continuous web	B65B 15/04

Special rules of classification within this group

Must concern different type of components

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Belt	continuous web holding the components in order to be delivered in rolls to the mounting machines

H05K 13/0046

[N: Encapsulation of electrical assemblies in resins (hermetically-sealed casings H05K5/06)]

Informative references

Attention is drawn to the following places, which may be of interest for search:

Encapsulations into casings	H05K 5/06

Special rules of classification within this group

This group is not used.

H05K 13/0053

[N: Means for helping with the manual mounting of components, e.g. special tables, light spots indicating the place for mounting (handtools H05K13/0447)]

Definition statement

This subclass/group covers:

Manual mounting posts for components on PCB

Informative references

Attention is drawn to the following places, which may be of interest for search:

Hand-tools for mounting electric components on a circuit board	H05K 13/0447

H05K 13/0061

[N: Tools for holding the circuit boards during processing; handling transport of printed circuit boards]

Definition statement

This subclass/group covers:

Provision for displacing printed circuit boards [PCB] between machines or for displacing PCBs inside mounting machines

Gripping PCBs for transport or conveyance

Informative references

Attention is drawn to the following places, which may be of interest for search:

Transport of articles, e.g. conveyors	B65G

Apparatus specially adapted for handling semiconductor or electric solid state devices during manufacture or treatment thereof	H01L 21/67

Special rules of classification within this group

Documents must include movement of printed circuit board

H05K 13/0069

[N: Holders for printed circuit boards]

Definition statement

This subclass/group covers:

Fixation of printed circuit boards inside mounting machines

References relevant to classification in this group

This subclass/group does not cover:

Fixation of printed circuit boards in testing machines	G01R 31/00

Special rules of classification within this group

Printed circuit board must be static relative to holder.

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Chuck	Holder, usually using vacuum

H05K 13/0076

[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

H05K13/0473)]

Definition statement

This subclass/group covers:

Transport of boards temporary fitted with components before definitive fixation, e.g. soldering.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Straightening or aligning terminal leads of pins mounted on boards, during the mounting operation, after fitting components on the board	H05K 13/0473

Special rules of classification within this group

Components are not definitively fixed.

H05K 13/0084

[N: Containers and magazines for components, e.g. tube-like magazines]

Definition statement

This subclass/group covers:

Any type of container for delivering components to mounting machines and manufacture thereof

Details of component tubes, trays or belts.

References relevant to classification in this group

This subclass/group does not cover:

Filling of containers	H05K 13/02
Use of said containers in mounting machines	H05K 13/04

Informative references

Attention is drawn to the following places, which may be of interest for search:

Containers for storage or transport	B65D

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Stick	tube-like container

H05K 13/0092

[N: Treatment of the terminal leads as a separate operation (during transport H05K13/0076, H05K13/023 and subgroups; during mounting H05K13/04)]

Definition statement

This subclass/group covers:

Preparing leads of components before bringing to mounting machines

Special separate machines for lead treatment.

References relevant to classification in this group

This subclass/group does not cover:

Treatment of the terminal leads as a separate operation during transport	H05K 13/0076 H05K 13/023
Treatment of leads after fitting in printed circuit boards	H05K 13/04

Special rules of classification within this group

Must be a separate machine.

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Clinching	bending of leads

H05K 13/02

Feeding of components (in general B65G)

Definition statement

This subclass/group covers:

Feeding of components to containers before fitting said container to machines, e.g. filling or refilling of containers

References relevant to classification in this group

This subclass/group does not cover:

Emptying of containers by the mounting machine itself	H05K 13/04

Informative references

Attention is drawn to the following places, which may be of interest for search:

Feeding of components in general	B65G

H05K 13/021

[N: Loading or unloading of containers (H05K13/028 takes precedence)]

Definition statement

This subclass/group covers:

Loading or unloading containers with components, the containers not being in use by the mounting machine.

References relevant to classification in this group

This subclass/group does not cover:

Simultaneously loading a plurality of loose objects, e.g. by means of vibrations, pressure differences, magnetic fields	H05K 13/028

Special rules of classification within this group

Do not classify here documents concerning pick and place in the mounting machine

H05K 13/022

[N: with orientation of the elements (orientation while mounting H05K13/0413; in general B23P19/00)]

Definition statement

This subclass/group covers:

Giving orientation to components before feeding into containers

References relevant to classification in this group

This subclass/group does not cover:

Orientation of components during mounting	H05K 13/0413

Informative references

Attention is drawn to the following places, which may be of interest for search:

Orientation in general	B23P 19/00

H05K 13/023

[N: with bending or straightening of the terminal leads (bending and cutting after the mounting on a p.c. board H05K13/0473)]

Definition statement

This subclass/group covers:

Feeding of components with bending or straightening of the terminal leads, e.g. in order to fit into containers

References relevant to classification in this group

This subclass/group does not cover:

Treatment of leads after fitting component into printed circuit boards	H05K 13/04

Informative references

Attention is drawn to the following places, which may be of interest for search:

Treatment of the terminal leads as a separate operation (not during transport)	H05K 13/0092

Special rules of classification within this group

Not during or after mounting of component.

H05K 13/024

[N: Straightening or aligning terminal leads]

Definition statement

This subclass/group covers:

Straightening or aligning leads during the feeding

H05K 13/025

[N: of components having oppositely extending terminal leads]

Definition statement

This subclass/group covers:

Straightening or aligning leads of e.g. resistors

H05K 13/026

[N: of components having terminal leads in side by side relationship, e.g. using combing elements]

Definition statement

This subclass/group covers:

Straightening or aligning lead of chips.

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Dual in line	chip with two rows of parallel leads

H05K 13/027

[N: Fluid transport of components]

Definition statement

This subclass/group covers:

Transport of components using fluids, e.g. jets of air, water.

H05K 13/028

[N: Simultaneously loading a plurality of loose objects, e.g. by means of vibrations, pressure differences, magnetic fields]

Definition statement

This subclass/group covers:

Feeding bulk components simultaneously to containers

Informative references

Attention is drawn to the following places, which may be of interest for search:

Orientation of the elements	H05K 13/022

H05K 13/029

[N: Feeding axial lead components, e.g. using vibrating bowls, magnetic fields (H05K13/022 takes precedence)]

Definition statement

This subclass/group covers:

Feeding bulk axial components to containers.

References relevant to classification in this group

This subclass/group does not cover:

Orientation of the elements	H05K 13/022

H05K 13/04

Mounting of components [N: e.g. of leadless components]

Definition statement

This subclass/group covers:

Mounting machines for components on printed circuit boards.

Attaching containers to mounting machines for components delivery.

References relevant to classification in this group

This subclass/group does not cover:

Assembling printed circuits with electric components	H05K 3/30

Informative references

Attention is drawn to the following places, which may be of interest for search:

Manipulators	B25J

H05K 13/0404

[N: pick and place heads or apparatus, e.g. with jaws]

Definition statement

This subclass/group covers:

Pick-and-place-heads for picking components out of a container and placing them on a printed circuit board using gripping devices.

References relevant to classification in this group

This subclass/group does not cover:

Vacuum grippers	H05K 13/0408

Informative references

Attention is drawn to the following places, which may be of interest for search:

Manipulators	B25J

Special rules of classification within this group

Orientation while holding component is not classified here

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Jaws	gripping device having means moving towards each other for pinching component

H05K 13/0408

[N: incorporating a sucking device (H05K13/0413 takes precedence)]

Definition statement

This subclass/group covers:

Pick-and-place-heads for picking components out of a container and placing them on a printed circuit board by suction, e.g. using vacuum.

References relevant to classification in this group

This subclass/group does not cover:

Gripping devices	H05K 13/0404

Informative references

Attention is drawn to the following places, which may be of interest for search:

Manipulators	B25J

Special rules of classification within this group

Orientation while holding component is not classified here

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Nozzle	vacuum or air suction device

H05K 13/0413

[N: with orientation of the component while holding it (orientation while feeding H05K13/022)]

Definition statement

This subclass/group covers:

Orientation of component held by mounting head just before or during mounting.

Mechanical and vacuum holders for components with orientation provisions.

Vision devices for orientation or correct placing of components.

Includes camera looking at the PC boards before mounting

References relevant to classification in this group

This subclass/group does not cover:

Orientation while feeding	H05K 13/022

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Vision system	camera

H05K 13/0417

[N: Feeding with belts]

Definition statement

This subclass/group covers:

Mounting machines with components delivery via belts.

Fastening of belt containers and methods of picking up of components by mounting head.

Special rules of classification within this group

Presence of belts. Control of components correctness in position or quality

Synonyms and Keywords

Blister	component belt in rolls

H05K 13/0421

[N: with treatment of the terminal leads (bending and cutting after fitting on a circuit board H05K13/0473)]

Definition statement

This subclass/group covers:

Treatment of leads during or after picking up.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Feeding one by one by other means than belts	H05K 13/043
Bending and cutting after fitting on a circuit board	H05K 13/0473

H05K 13/0426

[N: for components being oppositely extending terminal leads

(H05K13/0421 takes precedence)]

Definition statement

This subclass/group covers:

For resistor type components.

References relevant to classification in this group

This subclass/group does not cover:

Treatment of the terminal leads (bending and cutting after fitting on a circuit board	H05K 13/0421

H05K 13/043

[N: Feeding one by one by other means than belts]

Definition statement

This subclass/group covers:

Delivery of single components by other type of containers.

H05K 13/0434

[N: with containers]

Definition statement

This subclass/group covers:

Delivery with containers, e.g. trays.

References relevant to classification in this group

This subclass/group does not cover:

Components belts	H05K 13/0417

H05K 13/0439

[N: incorporating means for treating the terminal leads only before insertion]

Definition statement

This subclass/group covers:

Treatment of leads before insertion.

H05K 13/0443

[N: incorporating means for treating the terminal leads before and after insertion or only after insertion]

Definition statement

This subclass/group covers:

Treatment of leads before and/or only after insertion.

H05K 13/0452

[N: different components being guided to the same mounting place]

Definition statement

This subclass/group covers:

Mounting machine for several types of components.

Mounting of different type of components to the same mounting place.

Multi nozzle machines

Machines with several holders for pc boards

Special rules of classification within this group

Multiple work tables and multiple heads , e.g. revolver heads, are classified here

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Revolver head	turning multiple head with multiple nozzles or grippers

H05K 13/0456

[N: simultaneously punching the circuit board]

Definition statement

This subclass/group covers:

Mounting machines including hole puncher

References relevant to classification in this group

This subclass/group does not cover:

Hole shaping and details of holes	H05K 3/00

H05K 13/046

[N: Surface mounting (surface mounted components H05K3/341)]

Definition statement

This subclass/group covers:

Methods and apparatus for surface mounting electric components in general

References relevant to classification in this group

This subclass/group does not cover:

Details of fixation between component and PCB	H05K 3/00
Surface mounted components	H05K 3/341

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

SMD	Surface mounted device

H05K 13/0465

[N: by soldering (H05K13/0469 takes precedence; soldering apparatus in general B23K)]

Definition statement

This subclass/group covers:

Soldering machines of surface mounted components

References relevant to classification in this group

This subclass/group does not cover:

Reflow soldering apparatus and process; Soldering process per se	B23K

Informative references

Attention is drawn to the following places, which may be of interest for search:

Surface mounting on PCBs by soldering	H05K 3/341
Surface mounting by applying a glue or viscous material	H05K 13/0469

H05K 13/0469

[N: by applying a glue or viscous material]

Definition statement

This subclass/group covers:

Use of glue or viscous material with dispenser nozzles.

References relevant to classification in this group

This subclass/group does not cover:

Details of glue fixation between component and PC board	H05K 3/00

H05K 13/0473

[N: Cutting and clinching the terminal ends of the leads after they are fitted on a circuit board (during transport H05K13/0076)]

Definition statement

This subclass/group covers:

Treatment of leads after insertion out of mounting process

References relevant to classification in this group

This subclass/group does not cover:

Cutting and clinching the terminal ends of the leads after they are fitted on a circuit board during transport	H05K 13/0076

H05K 13/0478

[N: Simultaneously mounting of different components]

Definition statement

This subclass/group covers:

simultaneous mounting of different components placed on PC board at the same moment.

H05K 13/0482

[N: using templates; using magazines, the configuration of which corresponds to the sites on the boards where the components have to be attached]

Definition statement

This subclass/group covers:

Simultaneous mounting of different components being arranged beforehand in preset positions.

Templates, trays and special multi heads.

H05K 13/0486

[N: Replacement and removal of components]

Definition statement

This subclass/group covers:

Method and apparatus for taking off or replacing misplaced components

Special rules of classification within this group

No recycling.

May include a de-soldering device

H05K 13/0491

[N: Hand tools therefor]

Definition statement

This subclass/group covers:
Hand tools for repairing printed circuit boards or exchanging components.

Special rules of classification within this group

No recycling.

H05K 13/0495

[N: having a plurality of work-stations]

Definition statement

This subclass/group covers:
Mounting machines in clusters or lines

H05K 13/06

Wiring by machine

Definition statement

This subclass/group covers:
Machines for placing of wires on or in printed circuit boards.

References relevant to classification in this group

This subclass/group does not cover:

Multiplex wire bundles for vehicles	B60R

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H05K 13/065

[N: Accessories therefor, e.g. light spots]

Definition statement

This subclass/group covers:
Accessories for wiring, e.g. special tables or light spots.

H05K 13/08

Monitoring manufacture of assemblages

Definition statement

This subclass/group covers:
Control or planning of mounting processes or apparatus.

Programming of apparatus and processes

Vision control after placing of components.

References relevant to classification in this group

This subclass/group does not cover:

Electrical control of finished printed circuit boards	G01R 31/00