

## 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 [H01L 27/01](#), [H01L 27/13](#); 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](#); 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 place 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

#### Limiting references

*This place does not cover:*

Thin-film or thick-film circuits	<a href="#">H01L 27/01</a> , <a href="#">H01L 27/13</a>
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#### 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	<a href="#">G12B</a>
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	<a href="#">H01R</a>

## Glossary of terms

In this place, the following terms or expressions are 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.
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## H05K 1/00

**Printed circuits (assemblies of a plurality of individual semiconductor or solid state devices [H01L 25/00](#); 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, [H01L 27/00](#))**

### Definition statement

*This place 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 [H05K 1/00](#) cover also the respective manufacturing aspects (e.g. [H05K 1/16](#), [H05K 1/185](#)).

### Relationships with other classification places

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

### Limiting references

*This place does not cover:*

Screening against electric or magnetic fields	<a href="#">H05K 9/00</a>
Electrostatic discharge protection for electric apparatus in general	<a href="#">H05K 9/0067</a> , <a href="#">H05K 9/0079</a>
Impedance arrangements, e.g. impedance matching, reduction of parasitic impedance for semiconductor devices	<a href="#">H01L 23/66</a>

Assemblies of a plurality of individual semiconductor or solid state devices	<a href="#">H01L 25/00</a>
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### **Informative references**

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

Backplanes	<a href="#">H05K 7/14</a>
Handling / Transporting	<a href="#">H05K 13/0061</a> , <a href="#">B65G</a> , <a href="#">H01L 21/68</a>
Cleaning	<a href="#">B08B</a>
Casting of metals	<a href="#">B22D</a>
Metal powder processing	<a href="#">B22F</a>
Mechanical drilling	<a href="#">B23B</a>
Mechanical milling	<a href="#">B23C</a>
Metal milling	<a href="#">B23C</a>
Slotting, etc.	<a href="#">B23D</a>
Erosion by electric discharge	<a href="#">B23H</a>
Soldering or welding	<a href="#">B23K</a>
Laser ablation	<a href="#">B23K 26/00</a>
Patterning by laser ablation	<a href="#">B23K 26/00</a>
Details of machining apparatus	<a href="#">B23Q</a>
Grinding	<a href="#">B24B</a>
Grinding, polishing	<a href="#">B24B</a>
Abrasive working	<a href="#">B24C</a>
Abrasive working	<a href="#">B24C</a>
Cutting, Punching	<a href="#">B26D</a> , <a href="#">B26F</a>
Laminating	<a href="#">B32B 37/00</a>
Printing forms, e.g. masks	<a href="#">B41C</a> , <a href="#">B41N</a>
Printing apparatus	<a href="#">B41F</a>
Inkjet printing	<a href="#">B41J 2/00</a>
Printing processes	<a href="#">B41M</a>
Selective transfer processes	<a href="#">B41M 5/00</a>
Handling flexible substrates	<a href="#">B65G</a>
Etching polymeric substrates	<a href="#">C08J 7/00</a>
Coating by dipping in molten metal	<a href="#">C23C 2/00</a>
Coating by spraying with molten metal	<a href="#">C23C 4/00</a>
Coating by physical vapour deposition or sputtering or ion implantation	<a href="#">C23C 14/00</a>
Coating by chemical deposition	<a href="#">C23C 16/00</a>
Coating by decomposition of compounds	<a href="#">C23C 18/00</a> , <a href="#">C23C 20/00</a>
Coating by electroless plating	<a href="#">C23C 18/16</a>
Conversion coating of metals	<a href="#">C23C 22/00</a>

Coating by powder methods	<a href="#">C23C 24/00</a>
Other coating methods	<a href="#">C23C 26/00</a>
Coating metal with enamel (glass)	<a href="#">C23D</a>
Corrosion protection of metal	<a href="#">C23F</a>
Cleaning or degreasing of metal	<a href="#">C23G</a>
Electroplating of metal	<a href="#">C25D</a>
Electroforming of metal	<a href="#">C25D 1/00</a>
Anodizing of metal	<a href="#">C25D 11/00</a>
Electrophoretic coating of metal	<a href="#">C25D 13/00</a>
Electrolytic etching of metal	<a href="#">C25F</a>
Lighting devices	<a href="#">F21K</a> , <a href="#">F21S</a> , <a href="#">F21V</a> , <a href="#">H05B</a>
Drying	<a href="#">F26B</a>
Testing, inspection of material	<a href="#">G01N</a>
Electrical testing	<a href="#">G01R 31/00</a>
Electro-optical devices comprising optical waveguides	<a href="#">G02B 6/00</a>
Modules /PCBs having optical waveguides	<a href="#">G02B 6/00</a>
Coupling light guides with opto-electronic components	<a href="#">G02B 6/42</a>
Liquid crystal displays	<a href="#">G02F 1/13</a>
LCD displays	<a href="#">G02F 1/13</a>
Photolithography masks	<a href="#">G03F 1/00</a>
Photoresists	<a href="#">G03F 7/00</a>
Other lithography	<a href="#">G03F 7/00</a>
Photolithography registration	<a href="#">G03F 9/00</a>
Electrography	<a href="#">G03G</a>
Computers	<a href="#">G06F</a>
Touch screens	<a href="#">G06F 3/00</a>
Designing of the conductive pattern	<a href="#">G06F 17/50</a>
Security details of computer components	<a href="#">G06F 21/70</a>
Chip cards	<a href="#">G06K 19/07</a>
Circuits for displays	<a href="#">G09F 9/00</a>
Disk drive suspensions	<a href="#">G11B 5/00</a>
Memory modules	<a href="#">G11C 5/00</a>
Cables	<a href="#">H01B</a>
Flat cables	<a href="#">H01B 7/00</a> , <a href="#">H01B 13/00</a>
Printed resistors	<a href="#">H01C</a>
Resistors	<a href="#">H01C</a>
Printed inductors	<a href="#">H01F</a>
Inductors	<a href="#">H01F</a>
Printed capacitors	<a href="#">H01G</a>
Capacitors	<a href="#">H01G</a>

Switches, fuses	<a href="#">H01H</a>
Plasma displays	<a href="#">H01J 17/49</a>
Semiconductor devices	<a href="#">H01L</a>
Inorganic semiconductor devices	<a href="#">H01L 21/00</a>
Semiconductor packages	<a href="#">H01L 21/48</a> , <a href="#">H01L 23/00</a> , <a href="#">H01L 25/00</a>
Treatment apparatus for semiconductor components	<a href="#">H01L 21/68</a>
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	<a href="#">H01L 27/00</a>
Thick film or thin film circuits	<a href="#">H01L 27/00</a>
Solar cells, Photovoltaic devices	<a href="#">H01L 31/00</a>
LEDs	<a href="#">H01L 33/00</a>
Thermoelectric devices	<a href="#">H01L 35/00</a>
Piezoelectric devices	<a href="#">H01L 41/00</a>
Polymeric semiconductor devices	<a href="#">H01L 51/00</a>
Batteries, Cells	<a href="#">H01M</a>
Waveguides	<a href="#">H01P</a>
Waveguides	<a href="#">H01P</a>
Printed antennas	<a href="#">H01Q</a>
Antennas	<a href="#">H01Q</a>
Non-printed means for electric connections to or between printed Circuits	<a href="#">H01R</a>
Connectors	<a href="#">H01R</a>
Laser devices	<a href="#">H01S</a>
Spark gaps, Overvoltage arresters	<a href="#">H01T</a>
Emergency protective circuits	<a href="#">H02H</a>
Power conversion	<a href="#">H02M</a>
Receivers / Transceivers (modules)	<a href="#">H04B 1/00</a>
Telephones	<a href="#">H04M</a>
Optical modules	<a href="#">H04N</a> , <a href="#">H01L 27/00</a> , <a href="#">G03B</a>
Electromechanical transducers	<a href="#">H04R</a>

### Special rules of classification

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**

{Cooling of mounted components ([H05K 1/0272](#) takes precedence)}

**References****Limiting references**

*This place does not cover:*

Adaptations for fluid transport, e.g. channels, holes	<a href="#">H05K 1/0272</a>
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**H05K 1/0204**

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

**References****Limiting references**

*This place does not cover:*

Using internal conductor planes parallel to the surface for thermal conduction, e.g. power planes	<a href="#">H05K 1/0207</a>
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**H05K 1/0213**

{Electrical arrangements not otherwise provided for (screening [H05K 9/00](#); emergency protective circuits [H02H](#))}

**References****Informative references**

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

Screening	<a href="#">H05K 9/00</a>
Emergency protective circuits	<a href="#">H02H</a>

**H05K 1/0216**

{Reduction of cross-talk, and noise or electromagnetic interference (grounding [H05K 1/0215](#))}

**References****Limiting references**

*This place does not cover:*

Grounding	<a href="#">H05K 1/0215</a>
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## H05K 1/0218

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

### References

#### Limiting references

*This place does not cover:*

Electromagnetic band-gap structures	<a href="#">H05K 1/0236</a>
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## H05K 1/0221

{Coaxially shielded signal lines comprising a continuous shielding layer partially or wholly surrounding the signal lines (coaxially shielded vias [H05K 1/0222](#))}

### References

#### Informative references

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

Coaxially shielded vias	<a href="#">H05K 1/0222</a>
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## H05K 1/0228

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

### References

#### Limiting references

*This place does not cover:*

Balanced signal pairs	<a href="#">H05K 1/0245</a>
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## H05K 1/023

{using auxiliary mounted passive components or auxiliary substances (printed passive components [H05K 1/16](#))}

### References

#### Limiting references

*This place does not cover:*

Incorporating printed electric components, e.g. printed resistor, capacitor, inductor	<a href="#">H05K 1/16</a>
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## H05K 1/0236

{Electromagnetic band-gap structures (conductive planes with an opening or a split [H05K 1/0225](#), [H05K 1/0227](#))}

### References

#### Informative references

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

Conductive planes with an opening or a split	<a href="#">H05K 1/0225</a> , <a href="#">H05K 1/0227</a>
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## H05K 1/025

{Impedance arrangements, e.g. impedance matching, reduction of parasitic impedance ([H05K 1/024](#) and [H05K 1/0243](#) take precedence; for semiconductor devices [H01L 23/66](#))}

### References

#### Limiting references

This place does not cover:

Dielectric details, e.g. changing the dielectric material around a transmission line	<a href="#">H05K 1/024</a>
Printed circuits associated with mounted high frequency components	<a href="#">H05K 1/0243</a>
Impedance arrangements of semiconductor or other solid state devices	<a href="#">H01L 23/64</a>
High frequency adaptations of semiconductor or other solid state devices	<a href="#">H01L 23/66</a>

### Special rules of classification

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

{Impedance adaptations of transmission lines by special lay-out of power planes, e.g. providing openings ([H05K 1/0251](#) takes precedence)}

### References

#### Limiting references

This place does not cover:

Impedance arrangements related to vias or transitions between vias and transmission lines	<a href="#">H05K 1/0251</a>
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### Special rules of classification

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

{High voltage adaptations; Electrical insulation details; Overvoltage or electrostatic discharge protection (electrostatic discharge protection for electric apparatus in general [H05K 9/0067](#), [H05K 9/0079](#)); Arrangements for regulating voltages or for using plural voltages}

### References

#### Limiting references

*This place does not cover:*

Devices for protecting against damage from electrostatic discharge	<a href="#">H05K 9/0067</a>
Electrostatic discharge protection, e.g. ESD treated surface for rapid dissipation of charges	<a href="#">H05K 9/0079</a>

## H05K 1/0263

{High current adaptations, e.g. printed high current conductors or using auxiliary non-printed means; Fine and coarse circuit patterns on one circuit board ([H05K 1/0293](#) takes precedence)}

### References

#### Limiting references

*This place does not cover:*

Individual printed conductors which are adapted for modification, e.g. fusible or breakable conductors, printed switches	<a href="#">H05K 1/0293</a>
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## H05K 1/0274

{Optical details, e.g. printed circuits comprising integral optical means ([H05K 1/0269](#) takes precedence; Coupling light guides with opto-electronic components [G02B 6/42](#))}

### References

#### Limiting references

*This place does not cover:*

Marks, test patterns, inspection means or identification means for visual or optical inspection	<a href="#">H05K 1/0269</a>
Coupling light guides with opto-electronic components	<a href="#">G02B 6/42</a>

**H05K 1/0275**

{Security details, e.g. tampering prevention or detection (security details of computer components [G06F 21/70](#))}

**References****Informative references**

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

Security details of computer components	<a href="#">G06F 21/70</a>
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**H05K 1/0277**

{Bendability or stretchability details (not used, see subgroups; [H05K 1/038](#), [H05K 3/4691](#) take precedence)}

**References****Limiting references**

This place does not cover:

Textiles	<a href="#">H05K 1/038</a>
Rigid-flexible multilayer circuits comprising rigid and flexible layers, e.g. having in the bending regions only flexible layers	<a href="#">H05K 3/4691</a>

**Special rules of classification**

Group [H05K 1/0277](#) is not used, subject matter is classified in the subgroups thereof.

**H05K 1/0284**

{Details of three-dimensional rigid printed circuit boards ([H05K 1/119](#) takes precedence; shaping of the substrate [H05K 3/0014](#))}

**References****Limiting references**

This place does not cover:

Details of rigid insulating substrates therefor, e.g. three-dimensional details	<a href="#">H05K 1/119</a>
Shaping of the substrate	<a href="#">H05K 3/0014</a>

**H05K 1/0286**

{Programmable, customizable or modifiable circuits (by programmable non-printed jumper connections [H05K 3/222](#))}

**References****Limiting references**

*This place does not cover:*

Completing of printed circuits by adding non-printed jumper connections	<a href="#">H05K 3/222</a>
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**H05K 1/0296**

{Conductive pattern lay-out details not covered by sub groups [H05K 1/02](#) - [H05K 1/0295](#) ([H05K 1/11](#) takes precedence; lay-out adapted to mounted component configuration [H05K 1/18](#))}

**References****Limiting references**

*This place does not cover:*

Printed elements for providing electric connections to or between printed circuits	<a href="#">H05K 1/11</a>
Lay-out adapted to mounted component configuration	<a href="#">H05K 1/18</a>

**References out of a residual place**

*Examples of places in relation to which this place is residual:*

Details	<a href="#">H05K 1/02</a> - <a href="#">H05K 1/0295</a>
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**H05K 1/03**

Use of materials for the substrate {(substrates for semiconductor chips [H01L 23/00](#))}

**References****Informative references**

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

Substrates for semiconductor chips	<a href="#">H01L 23/00</a>
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## H05K 1/05

Insulated metal substrate {or other insulated electrically conductive substrate (thermal coupling of mounted components and metal substrate [H05K 1/0204](#), [H05K 1/021](#))}

### Definition statement

*This place covers:*

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

### References

#### Informative references

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

Thermal coupling of mounted components and metal substrate	<a href="#">H05K 1/0204</a> , <a href="#">H05K 1/021</a>
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## H05K 1/14

Structural association of two or more printed circuits (providing electric connection to or between printed circuits [H05K 1/11](#), [H01R 9/09](#), [H01R 23/68](#))

### References

#### Limiting references

*This place does not cover:*

Printed elements for providing electric connections to or between printed circuits	<a href="#">H05K 1/11</a>
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#### Informative references

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

Connectors for printed circuits	<a href="#">H01R 9/09</a>
Two-part coupling devices for connection to or between printed circuits	<a href="#">H01R 23/68</a>

## H05K 1/16

incorporating printed electric components, e.g. printed resistor, capacitor, inductor {(thick-film or thin-film circuits [H01L 27/01](#), [H01L 27/13](#))}

### References

#### Informative references

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

Thick-film or thin-film circuits	<a href="#">H01L 27/01</a> , <a href="#">H01L 27/13</a>
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## H05K 1/18

**Printed circuits structurally associated with non-printed electric components** (**{[H05K 1/0201](#), [H05K 1/023](#), [H05K 1/0243](#), } [H05K 1/16](#) take precedence)**

### References

#### Limiting references

*This place does not cover:*

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

## H05K 3/00

**Apparatus or processes for manufacturing printed circuits (photomechanical production of textured or patterned surfaces, materials or originals therefor, apparatus specially adapted therefor, in general [G03F](#); involving the manufacture of semiconductor devices [H01L](#))**

### Definition statement

*This place 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](#)).

### Relationships with other classification places

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

### Limiting references

*This place does not cover:*

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

### Informative references

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

Working of metal by electro-erosion per se	<a href="#">B23H</a>
Machining by laser in general	<a href="#">B23K 26/00</a>
Laminates in general	<a href="#">B32B</a>
Printing apparatus in general	<a href="#">B41F</a>
Printing techniques in general	<a href="#">B41M</a>
Screens or stencils, manufacturing thereof in general	<a href="#">B41N 1/24</a> , <a href="#">B41C 1/14</a>
Covering metals by metal spraying	<a href="#">C23C 4/00</a>
Coating by vacuum evaporation	<a href="#">C23C 14/00</a>
Covering materials by cathodic sputtering	<a href="#">C23C 14/34</a>
Chemical coating of a substrate by decomposition in general	<a href="#">C23C 18/00</a>
Electroless plating in general	<a href="#">C23C 18/16</a>
Non-mechanical removal of metallic material from surfaces	<a href="#">C23F</a>
Local etching in general	<a href="#">C23F 1/02</a>
Apparatus for etching in general	<a href="#">C23F 1/08</a>
Etchants in general	<a href="#">C23F 1/10</a> - <a href="#">C23F 1/46</a>
Electroplating in general	<a href="#">C25D</a>
Photomechanical production of textured or patterned surfaces, materials or originals therefor, apparatus specially adapted therefor, in general	<a href="#">G03F</a>
Etching masks applied by electrographic, electrophotographic or magnetographic methods in general	<a href="#">G03G</a>
Electron-beam or ion-beam tubes for localised treatment	<a href="#">H01J 37/30</a>
Discharge devices for covering materials by cathodic sputtering	<a href="#">H01J 37/34</a>

## Special rules of classification

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

{for aligning or positioning of tools relative to the circuit board ([H05K 3/4638](#), [H05K 3/4679](#) take precedence; for manufacturing assemblages of components [H05K 13/0015](#))}

## References

### Limiting references

*This place 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	<a href="#">H05K 3/4638</a>
Aligning added circuit layers or via connections relative to previous circuit layers	<a href="#">H05K 3/4679</a>
Apparatus or processes specially adapted for manufacturing or adjusting assemblages of electric components	<a href="#">H05K 13/0015</a>

## H05K 3/0011

{Working of insulating substrates or insulating layers (making copper-clad substrates [H05K 3/022](#); surface treatment for improvement of adhesion [H05K 3/381](#))}

## Definition statement

*This place 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

## References

### Informative references

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

Making copper-clad substrates	<a href="#">H05K 3/022</a>
Surface treatment for improvement of adhesion	<a href="#">H05K 3/38</a>

**H05K 3/0058**

{Laminating printed circuit boards onto other substrates, e.g. metallic substrates ([H05K 1/0281](#) takes precedence)}

**References****Limiting references**

*This place does not cover:*

Reinforcement details	<a href="#">H05K 1/0281</a>
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**H05K 3/007**

{Manufacture or processing of a substrate for a printed circuit board supported by a temporary or sacrificial carrier ([H05K 1/187](#), [H05K 3/20](#) and [H05K 3/4682](#) take precedence)}

**References****Limiting references**

*This place does not cover:*

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

**H05K 3/0073**

{Masks not provided for in groups [H05K 3/02](#) - [H05K 3/46](#), e.g. for photomechanical production of patterned surfaces}

**References****Limiting references**

*This place does not cover:*

Apparatus or processes for manufacturing printed circuits	<a href="#">H05K 3/02</a> - <a href="#">H05K 3/46</a>
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## H05K 3/0085

{Apparatus for treatments of printed circuits with liquids not provided for in groups [H05K 3/02](#) - [H05K 3/46](#); conveyors and holding means therefor (apparatus specially adapted for manufacturing assemblages of electric components, e.g. printed circuit boards, [H05K 13/00](#))}

### References

#### Limiting references

*This place does not cover:*

Apparatus or processes specially adapted for manufacturing or adjusting assemblages of electric components	<a href="#">H05K 13/00</a>
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#### References out of a residual place

*Examples of places in relation to which this place is residual:*

Apparatus or processes for manufacturing printed circuits	<a href="#">H05K 3/02</a> - <a href="#">H05K 3/46</a>
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## H05K 3/0097

{Processing two or more printed circuits simultaneously, e.g. made from a common substrate, or temporarily stacked circuit boards ([H05K 3/0052](#) takes precedence)}

### References

#### Limiting references

*This place does not cover:*

De-panelling, i.e. dividing a panel into circuit boards; Working of the edges of circuit boards	<a href="#">H05K 3/0052</a>
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## H05K 3/06

the conductive material being removed chemically or electrolytically, e.g. by photo-etch process {(Non-mechanical removal of metallic material from surfaces [C23F](#); semi-additive methods [H05K 3/108](#))}

### References

#### Limiting references

*This place does not cover:*

Semi-additive methods	<a href="#">H05K 3/108</a>
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#### Informative references

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

Non-mechanical removal of metallic material from surfaces	<a href="#">C23F</a>
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**H05K 3/08**

the conductive material being removed by electric discharge, e.g. by spark erosion {(working of metal by electro-erosion per se [B23H](#))}

**References****Informative references**

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

Working of metal by electro-erosion per se	<a href="#">B23H</a>
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**H05K 3/12**

using {thick film techniques, e.g.} printing techniques to apply the conductive material {or similar techniques for applying conductive paste or ink patterns (printing techniques in general [B41M](#), printing apparatus [B41F](#))}

**References****Informative references**

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

Printing apparatus	<a href="#">B41F</a>
Printing techniques in general	<a href="#">B41M</a>

**H05K 3/14**

using spraying techniques to apply the conductive material {including vapour evaporation; (covering metals by metal spraying [C23C 4/00](#); coating by vacuum evaporation [C23C 14/00](#))}

**References****Informative references**

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

Covering metals by metal spraying	<a href="#">C23C 4/00</a>
Coating by vacuum evaporation	<a href="#">C23C 14/00</a>

**H05K 3/16**

by cathodic sputtering {(covering materials by cathodic sputtering [C23C 14/34](#); discharge devices therefor [H01J 37/34](#))}

**References****Informative references**

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

Covering materials by cathodic sputtering	<a href="#">C23C 14/34</a>
Discharge devices therefor	<a href="#">H01J 37/34</a>

## H05K 3/18

using precipitation techniques to apply the conductive material {(chemical coating of a substrate by decomposition [C23C 18/00](#))}

### Definition statement

*This place covers:*

- Electroless plating
- Electroplating, e.g. electrodeposition

### References

#### Informative references

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

Chemical coating of a substrate by decomposition	<a href="#">C23C 18/00</a>
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## H05K 3/20

by affixing prefabricated conductor pattern {([H05K 1/187](#), [H05K 3/046](#), [H05K 3/4658](#), [H05K 3/4682](#) takes precedence)}

### References

#### Limiting references

*This place does not cover:*

Patterned circuits being prefabricated circuits, which are not yet attached to a permanent insulating substrate, e.g. on a temporary carrier	<a href="#">H05K 1/187</a>
Selective transfer or selective detachment of a conductive layer	<a href="#">H05K 3/046</a>
Adding a circuit layer by laminating a metal foil or a preformed metal foil pattern	<a href="#">H05K 3/4658</a>
Manufacture of core-less build-up multilayer circuits on a temporary carrier or on a metal foil	<a href="#">H05K 3/4682</a>

## H05K 3/22

Secondary treatment of printed circuits {([H05K 3/1283](#) takes precedence; embedding circuits in grooves by pressure [H05K 3/107](#))}

### Definition statement

*This place 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

### Limiting references

*This place does not cover:*

Embedding circuits in grooves by pressure	<a href="#">H05K 3/107</a>
After-treatment of the printed patterns, e.g. sintering or curing methods	<a href="#">H05K 3/1283</a>

## H05K 3/225

{Correcting or repairing of printed circuits ([H05K 1/0292](#), [H05K 3/222](#), [H05K 3/288](#), [H05K 3/4685](#) take precedence)}

## References

### Limiting references

*This place does not cover:*

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

## H05K 3/24

Reinforcing the conductive pattern {(by solder coating [H05K 3/3457](#))}

## References

### Limiting references

*This place does not cover:*

By solder coating	<a href="#">H05K 3/3457</a>
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## H05K 3/28

Applying non-metallic protective coatings {([H05K 3/0091](#) takes precedence; methods for intermediate insulating layers for build-up multilayer circuits [H05K 3/4673](#))}

## References

### Limiting references

*This place does not cover:*

Apparatus for coating printed circuits using liquid non-metallic coating compositions	<a href="#">H05K 3/0091</a>
Methods for intermediate insulating layers for build-up multilayer circuits	<a href="#">H05K 3/4673</a>

**H05K 3/284**

{for encapsulating mounted components ([H05K 1/185](#) takes precedence)}

**References****Limiting references**

*This place does not cover:*

Components encapsulated in the insulating substrate of the printed circuit or incorporated in internal layers of a multilayer circuit	<a href="#">H05K 1/185</a>
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**H05K 3/34**

by soldering {(soldering or desoldering apparatus [H05K 13/04](#), [B23K 1/00](#), [B23K 3/00](#))}

**References****Informative references**

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

Soldering or de-soldering apparatus	<a href="#">H05K 13/04</a> , <a href="#">B23K 1/00</a> , <a href="#">B23K 3/00</a>
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**H05K 3/36**

Assembling printed circuits with other printed circuits {([H05K 7/142](#) takes precedence)}

**References****Limiting references**

*This place does not cover:*

Spacers not being card guides	<a href="#">H05K 7/142</a>
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**Special rules of classification**

[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 {or other insulated electrically conductive core circuits ([H05K 3/0058](#), [H05K 3/4641](#), [H05K 3/4608](#) take precedence)}**

### References

#### Limiting references

*This place does not cover:*

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

## H05K 3/46

**Manufacturing multilayer circuits {(incorporating non-printed electric components in internal layers [H05K 1/185](#))}**

### References

#### Informative references

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

Incorporating non-printed electric components in internal layers	<a href="#">H05K 1/185</a>
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## H05K 5/00

**Casings, cabinets or drawers for electric apparatus (in general [A47B](#); radio receiver cabinets [H04B 1/08](#); television receiver cabinets [H04N 5/64](#); {constructional details or arrangements for computers [G06F 1/16](#)})**

### Definition statement

*This place 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

### Limiting references

*This place does not cover:*

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

### Informative references

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

Electric distribution centers in vehicle in general	<a href="#">B60R 16/0238</a>
Electronic boxes of vehicles in general	<a href="#">B60R 16/0239</a>
Handles and grip in general	<a href="#">B65D</a>
Locks and Latches in general	<a href="#">E05B</a> , <a href="#">E05C</a>
Hinges in general	<a href="#">E05D</a>
Sealing in general	<a href="#">F16J 15/00</a>
Stands and supports for apparatus in general	<a href="#">F16M 11/00</a>
Constructional details of record carriers in general	<a href="#">G06K 7/00</a>
Connectors in general	<a href="#">H01R</a>
Details for decorative purposes in mobiles phones	<a href="#">H04M 1/0283</a>

## H05K 5/06

**Hermetically-sealed casings {(specially adapted for small components  
[H05K 5/0095](#))}**

## References

### Limiting references

*This place does not cover:*

Specially adapted for small components	<a href="#">H05K 5/0095</a>
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## H05K 7/00

### Constructional details common to different types of electric apparatus (casings, cabinets, drawers [H05K 5/00](#))

#### Definition statement

*This place covers:*

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

##### Limiting references

*This place does not cover:*

Constructional details of optoelectronic equipments	<a href="#">G02B 6/42</a>
Program control systems PLC without constructional details	<a href="#">G05B 19/00</a>
Inner arrangements of desktop and laptop computers	<a href="#">G06F 1/18</a>
Cooling arrangements of desktop and laptop computers	<a href="#">G06F 1/20</a>
Bus systems and interfaces of computers	<a href="#">G06F 13/409</a>
Constructional details of record carriers	<a href="#">G06K 7/00</a>
Constructional details of Hard disk drives	<a href="#">G11B 33/00</a>
CPU cooling; Cooling of electronic components not using the housing for the heat transfer	<a href="#">H01L 23/34</a>
Cooling of batteries	<a href="#">H01M 10/60</a>
Telecommunication distribution frames and equipments	<a href="#">H04Q 1/00</a>

##### Informative references

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

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

## H05K 7/10

Plug-in assemblages of components, {e.g. IC sockets (for connection on printed circuit board [H01R 23/6806](#))}

### References

#### Informative references

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

IC sockets for connection on printed circuit board	<a href="#">H01R 12/00</a>
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## H05K 7/12

Resilient or clamping means for holding component to structure (holding two-part couplings together [H01R 13/00](#))

### References

#### Informative references

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

Holding two-part couplings together	<a href="#">H01R 13/00</a>
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## H05K 7/14

Mounting supporting structure in casing or on frame or rack {([H05K 7/18](#) takes precedence; test adapters [G01R 31/2808](#))}

### References

#### Limiting references

This place does not cover:

Construction of rack or frame	<a href="#">H05K 7/18</a>
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#### Informative references

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

Test adapters	<a href="#">G01R 31/2808</a>
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## H05K 7/20

Modifications to facilitate cooling, ventilating, or heating {(of printed circuits [H05K 1/0201](#); of resistors [H01C](#); of capacitors [H01G](#); of individual semiconductor components [H01L 23/34](#), [H01L 31/024](#); of LEDs [H01L 33/64](#); of personal computers [G06F 1/20](#))}

### Definition statement

This place 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

## References

### Informative references

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

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

## H05K 9/00

**Screening of apparatus or components against electric or magnetic fields (devices for absorbing radiation from an aerial [H01Q 17/00](#); {screening of semiconductor devices [H01L 24/00](#), [H01L 23/58](#); screening structurally associated with dynamo-electric machines [H02K 11/00](#); shielding against nuclear radiation [G21F](#)})**

### Definition statement

*This place 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

### Limiting references

*This place does not cover:*

Screening of human body against electromagnetic influences	<a href="#">A61N 1/16</a>
Anechoic chambers	<a href="#">G01R 29/0821</a>
Shielding of Nuclear magnetic Resonance devices	<a href="#">G01R 33/42</a>
Grounding and RFI shielding of Desktop and laptop computers	<a href="#">G06F 1/182</a>
Screening against nuclear radiation	<a href="#">G21F</a>
Magnetic shielding of transformers	<a href="#">H01F 27/28</a>
Screening of semiconductor devices	<a href="#">H01L 23/552</a> , <a href="#">H01L 24/00</a>

Device for absorbing radiation from aerial	<a href="#">H01Q 17/00</a>
Screening of dynamo-electric machines	<a href="#">H02K 11/00</a>

### **Informative references**

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

Conductive materials in general	<a href="#">H01B 1/00</a>
Magnetic materials in general	<a href="#">H01F 1/00</a>
RFI Filter construction	<a href="#">H03H 1/0007</a>
Prevention of electrostatic charge in general	<a href="#">H05F 1/00</a>

## **H05K 10/00**

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

### **Special rules of classification**

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 {(combined with clocks [G04B 47/00](#); controlled by a clock [G04C 21/28](#))}**

### **Special rules of classification**

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 place covers:*

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

### **References**

#### **Limiting references**

*This place does not cover:*

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

**Informative references**

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

Manipulators	<a href="#">B25J</a>
Packaging, Packing or unpacking	<a href="#">B65B</a>

**Special rules of classification**

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**

In patent documents, the following abbreviations are often used:

PCB	Printed Circuit Board
Substrate	Printed Circuit Board

**H05K 13/0007**

{using handtools (for mounting on a circuit board [H05K 13/0447](#))}

**Definition statement**

*This place covers:*

Hand-tools specially adapted for adjusting assemblages of electric components

**References****Limiting references**

*This place does not cover:*

Hand-tools for mounting electric components on a circuit board	<a href="#">H05K 13/0447</a>
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**H05K 13/0015**

{Orientation; Alignment; Positioning}

**Definition statement**

*This place covers:*

orientation, alignment and positioning only of the printed circuit boards

**References****Limiting references**

*This place does not cover:*

Orientation, alignment and positioning of the printed circuit boards for testing	<a href="#">G01R 31/00</a>
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**H05K 13/0023**

{Making assemblies of electric components, e.g. modules ([H05K 13/04](#) take precedence)}

**References****Limiting references**

*This place does not cover:*

Mounted modules or finished printed circuit boards in casings, drawers or apparatus	<a href="#">H05K 5/00</a>
Mounting of components, e.g. of leadless components	<a href="#">H05K 13/04</a>

**H05K 13/003**

{Placing of components on belts holding the terminals}

**Definition statement**

*This place covers:*

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

**References****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	<a href="#">B65B 15/04</a>
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**Special rules of classification**

Only concerns filling of belts as a separate operation

**H05K 13/0038**

{placing the components in a predetermined order}

**Definition statement**

*This place covers:*

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

**References****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	<a href="#">B65B 15/04</a>
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**Special rules of classification**

Must concern different type of components

**Glossary of terms**

*In this place, 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
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**H05K 13/0046**

**{Encapsulation of electrical assemblies in resins (hermetically-sealed casings [H05K 5/06](#))}**

**References****Informative references**

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

Encapsulations into casings	<a href="#">H05K 5/06</a>
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**Special rules of classification**

This group is not used.

**H05K 13/0053**

**{Means for helping with the manual mounting of components, e.g. special tables, light spots indicating the place for mounting (handtools [H05K 13/0447](#))}**

**Definition statement**

*This place covers:*

Manual mounting posts for components on PCB

**References****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	<a href="#">H05K 13/0447</a>
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**H05K 13/0061**

**{Tools for holding the circuit boards during processing; handling transport of printed circuit boards}**

**Definition statement**

*This place covers:*

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

Gripping PCBs for transport or conveyance

## References

### Informative references

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

Transport of articles, e.g. conveyors	<a href="#">B65G</a>
Apparatus specially adapted for handling semiconductor or electric solid state devices during manufacture or treatment thereof	<a href="#">H01L 21/67</a>

### Special rules of classification

Documents must include movement of printed circuit board

## H05K 13/0069

{Holders for printed circuit boards}

### Definition statement

*This place covers:*

Fixation of printed circuit boards inside mounting machines

### References

#### Limiting references

*This place does not cover:*

Fixation of printed circuit boards in testing machines	<a href="#">G01R 31/00</a>
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### Special rules of classification

Printed circuit board must be static relative to holder.

### Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Chuck	Holder, usually using vacuum
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## H05K 13/0076

{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 [H05K 13/0473](#))}

### Definition statement

*This place covers:*

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

## References

### *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	<a href="#">H05K 13/0473</a>
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## Special rules of classification

Components are not definitively fixed.

## H05K 13/0084

**{Containers and magazines for components, e.g. tube-like magazines}**

### Definition statement

*This place covers:*

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

Details of component tubes, trays or belts.

## References

### *Limiting references*

*This place does not cover:*

Filling of containers	<a href="#">H05K 13/02</a>
Use of said containers in mounting machines	<a href="#">H05K 13/04</a>

### *Informative references*

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

Containers for storage or transport	<a href="#">B65D</a>
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## Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Stick	tube-like container
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## H05K 13/0092

**{Treatment of the terminal leads as a separate operation (during transport [H05K 13/0076](#), [H05K 13/023](#); during mounting [H05K 13/04](#))}**

### Definition statement

*This place covers:*

Preparing leads of components before bringing to mounting machines

Special separate machines for lead treatment.

## References

### Limiting references

*This place does not cover:*

Treatment of the terminal leads as a separate operation during transport	<a href="#">H05K 13/0076</a> , <a href="#">H05K 13/023</a>
Treatment of leads after fitting in printed circuit boards	<a href="#">H05K 13/04</a>

### Special rules of classification

Must be a separate machine.

### Glossary of terms

*In this place, the following terms or expressions are used with the meaning indicated:*

Clinching	bending of leads
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## H05K 13/02

### Feeding of components (in general [B65G](#))

#### Definition statement

*This place covers:*

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

### References

#### Limiting references

*This place does not cover:*

Emptying of containers by the mounting machine itself	<a href="#">H05K 13/04</a>
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#### Informative references

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

Feeding of components in general	<a href="#">B65G</a>
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## H05K 13/021

{Loading or unloading of containers ([H05K 13/028](#) takes precedence)}

#### Definition statement

*This place covers:*

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

## References

### Limiting references

*This place does not cover:*

Simultaneously loading a plurality of loose objects, e.g. by means of vibrations, pressure differences, magnetic fields	<a href="#">H05K 13/028</a>
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## Special rules of classification

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

### H05K 13/022

{with orientation of the elements (orientation while mounting [H05K 13/0413](#); in general [B23P 19/00](#))}

### Definition statement

*This place covers:*

Giving orientation to components before feeding into containers

## References

### Limiting references

*This place does not cover:*

Orientation of components during mounting	<a href="#">H05K 13/0413</a>
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### Informative references

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

Orientation in general	<a href="#">B23P 19/00</a>
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### H05K 13/023

{with bending or straightening of the terminal leads (bending and cutting after the mounting on a p.c. board [H05K 13/0473](#))}

### Definition statement

*This place covers:*

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

## References

### Limiting references

*This place does not cover:*

Treatment of leads after fitting component into printed circuit boards	<a href="#">H05K 13/04</a>
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**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)	<a href="#">H05K 13/0092</a>
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**Special rules of classification**

Not during or after mounting of component.

**H05K 13/024**

{Straightening or aligning terminal leads}

**Definition statement**

*This place covers:*

Straightening or aligning leads during the feeding

**H05K 13/025**

{of components having oppositely extending terminal leads}

**Definition statement**

*This place covers:*

Straightening or aligning leads of e.g. resistors

**H05K 13/026**

{of components having terminal leads in side by side relationship, e.g. using combing elements}

**Definition statement**

*This place covers:*

Straightening or aligning lead of chips.

**Glossary of terms**

*In this place, the following terms or expressions are used with the meaning indicated:*

Dual in line	chip with two rows of parallel leads
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**H05K 13/027**

{Fluid transport of components}

**Definition statement**

*This place covers:*

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

**H05K 13/028**

**{Simultaneously loading a plurality of loose objects, e.g. by means of vibrations, pressure differences, magnetic fields}**

**Definition statement**

*This place covers:*

Feeding bulk components simultaneously to containers

**References****Informative references**

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

Orientation of the elements	<a href="#">H05K 13/022</a>
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**H05K 13/029**

**{Feeding axial lead components, e.g. using vibrating bowls, magnetic fields  
([H05K 13/022](#) takes precedence)}**

**Definition statement**

*This place covers:*

Feeding bulk axial components to containers.

**References****Limiting references**

*This place does not cover:*

Orientation of the elements	<a href="#">H05K 13/022</a>
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**H05K 13/04**

**Mounting of components {, e.g. of leadless components}**

**Definition statement**

*This place covers:*

Mounting machines for components on printed circuit boards.

Attaching containers to mounting machines for components delivery.

**References****Limiting references**

*This place does not cover:*

Assembling printed circuits with electric components	<a href="#">H05K 3/30</a>
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**Informative references**

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

Manipulators	<a href="#">B25J</a>
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**H05K 13/0404**

{pick and place heads or apparatus, e.g. with jaws}

**Definition statement**

*This place covers:*

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

**References****Limiting references**

*This place does not cover:*

Vacuum grippers	<a href="#">H05K 13/0408</a>
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**Informative references**

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

Manipulators	<a href="#">B25J</a>
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**Special rules of classification**

Orientation while holding component is not classified here

**Glossary of terms**

*In this place, the following terms or expressions are used with the meaning indicated:*

Jaws	gripping device having means moving towards each other for pinching component
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**H05K 13/0408**

{incorporating a sucking device ([H05K 13/0413](#) takes precedence)}

**Definition statement**

*This place 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****Limiting references**

*This place does not cover:*

Gripping devices	<a href="#">H05K 13/0404</a>
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**Informative references**

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

Manipulators	<a href="#">B25J</a>
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**Special rules of classification**

Orientation while holding component is not classified here

**Glossary of terms**

In this place, the following terms or expressions are used with the meaning indicated:

Nozzle	vacuum or air suction device
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**H05K 13/0413**

{with orientation of the component while holding it (orientation while feeding [H05K 13/022](#))}

**Definition statement**

*This place 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****Limiting references**

*This place does not cover:*

Orientation while feeding	<a href="#">H05K 13/022</a>
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**Glossary of terms**

In this place, the following terms or expressions are used with the meaning indicated:

Vision system	camera
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**H05K 13/0417**

{Feeding with belts}

**Definition statement**

*This place 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**

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

**Synonyms and Keywords**

Blister	component belt in rolls
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**H05K 13/0421**

{with treatment of the terminal leads (bending and cutting after fitting on a circuit board [H05K 13/0473](#))}

**Definition statement**

*This place covers:*

Treatment of leads during or after picking up.

**References****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	<a href="#">H05K 13/043</a>
Bending and cutting after fitting on a circuit board	<a href="#">H05K 13/0473</a>

**H05K 13/0426**

{for components being oppositely extending terminal leads ([H05K 13/0421](#) takes precedence)}

**Definition statement**

*This place covers:*

For resistor type components.

**References****Limiting references**

*This place does not cover:*

Treatment of the terminal leads (bending and cutting after fitting on a circuit board	<a href="#">H05K 13/0421</a>
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**H05K 13/043**

{Feeding one by one by other means than belts}

**Definition statement**

*This place covers:*

Delivery of single components by other type of containers.

**H05K 13/0434****{with containers}****Definition statement***This place covers:*

Delivery with containers, e.g. trays.

**References****Limiting references***This place does not cover:*

Components belts	<a href="#">H05K 13/0417</a>
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**H05K 13/0439****{incorporating means for treating the terminal leads only before insertion}****Definition statement***This place covers:*

Treatment of leads before insertion.

**H05K 13/0443****{incorporating means for treating the terminal leads before and after insertion or only after insertion}****Definition statement***This place covers:*

Treatment of leads before and/or only after insertion.

**H05K 13/0452****{different components being guided to the same mounting place}****Definition statement***This place 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**

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

**Glossary of terms**

*In this place, the following terms or expressions are used with the meaning indicated:*

Revolver head	turning multiple head with multiple nozzles or grippers
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**H05K 13/0456**

**{simultaneously punching the circuit board}**

**Definition statement**

*This place covers:*

Mounting machines including hole puncher

**References****Limiting references**

*This place does not cover:*

Hole shaping and details of holes	<a href="#">H05K 3/00</a>
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**H05K 13/046**

**{Surface mounting (surface mounted components [H05K 3/341](#))}**

**Definition statement**

*This place covers:*

Methods and apparatus for surface mounting electric components in general

**References****Limiting references**

*This place does not cover:*

Details of fixation between component and PCB	<a href="#">H05K 3/00</a>
Surface mounted components	<a href="#">H05K 3/341</a>

**Glossary of terms**

*In this place, the following terms or expressions are used with the meaning indicated:*

SMD	Surface mounted device
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**H05K 13/0465**

**{by soldering ([H05K 13/0469](#) takes precedence; soldering apparatus in general [B23K](#))}**

**Definition statement**

*This place covers:*

Soldering machines of surface mounted components

## References

### Limiting references

*This place does not cover:*

Details of processes for soldering surface mounted components on printed circuit boards	<a href="#">H05K 3/341</a>
Reflow soldering apparatus and process; Soldering process per se	<a href="#">B23K</a>

### Informative references

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

Surface mounting on PCBs by soldering	<a href="#">H05K 3/341</a>
Surface mounting by applying a glue or viscous material	<a href="#">H05K 13/0469</a>

## H05K 13/0469

**{by applying a glue or viscous material}**

### Definition statement

*This place covers:*

Use of glue or viscous material with dispenser nozzles.

## References

### Limiting references

*This place does not cover:*

Details of glue fixation between component and PC board	<a href="#">H05K 3/00</a>
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## H05K 13/0473

**{Cutting and clinching the terminal ends of the leads after they are fitted on a circuit board (during transport [H05K 13/0076](#))}**

### Definition statement

*This place covers:*

Treatment of leads after insertion out of mounting process

## References

### Limiting references

*This place does not cover:*

Cutting and clinching the terminal ends of the leads after they are fitted on a circuit board during transport	<a href="#">H05K 13/0076</a>
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**H05K 13/0478****{Simultaneously mounting of different components}****Definition statement***This place covers:*

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

**H05K 13/0482****{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 place covers:*

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

Templates, trays and special multi heads.

**H05K 13/0486****{Replacement and removal of components}****Definition statement***This place covers:*

Method and apparatus for taking off or replacing misplaced components

**Special rules of classification**

No recycling.

May include a de-soldering device

**H05K 13/0491****{Hand tools therefor}****Definition statement***This place covers:*

Hand tools for repairing printed circuit boards or exchanging components.

**Special rules of classification**

No recycling.

**H05K 13/0495****{having a plurality of work-stations}****Definition statement***This place covers:*

Arrangements of mounting machines in clusters or lines

## H05K 13/06

### Wiring by machine

#### Definition statement

*This place covers:*

Placing of wires on or in printed circuit boards by machines; machines therefor.

#### References

##### Limiting references

*This place does not cover:*

Multiplex wire bundles for vehicles	<a href="#">B60R</a>
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## H05K 13/065

### {Accessories therefor, e.g. light spots}

#### Definition statement

*This place covers:*

Accessories for wiring, e.g. special tables or light spots.

## H05K 13/08

### Monitoring manufacture of assemblages

#### Definition statement

*This place covers:*

Control or planning of manufacturing processes of assemblages, e.g. of processes for mounting components on printed circuit boards

Control of apparatuses therefor

Planning of production facility and apparatus layout

Vision control after placing of components.

#### References

##### Limiting references

*This place does not cover:*

Electrical control of finished printed circuit boards	<a href="#">G01R 31/00</a>
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