

**DIN EN 60194**

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**Konstruktion, Herstellung und Bestückung von Leiterplatten –  
Begriffe und Definitionen (IEC 60194:2006);  
Deutsche Fassung EN 60194:2006, Text Englisch**

Printed board design, manufacture and assembly –  
Terms and definitions (IEC 60194:2006);  
German version EN 60194:2006, text in English

Conception, fabrication et assemblage des cartes imprimées –  
Termes et définitions (CEI 60194:2006);  
Version allemande EN 60194:2006, texte en anglais

Gesamtumfang 126 Seiten

DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik im DIN und VDE

## **Beginn der Gültigkeit**

Die von CENELEC am 2006-06-01 angenommene EN 60194 gilt als DIN-Norm ab 2007-03-01.

## **Nationales Vorwort**

*Vorausgegangener Norm-Entwurf: E DIN IEC 60194:2004-09.*

Für diese Norm ist das nationale Arbeitsgremium K 682 „Montageverfahren für elektronische Baugruppen“ der DKE Deutsche Kommission Elektrotechnik Elektronik Informationstechnik im DIN und VDE (<http://www.dke.de>) zuständig.

Die enthaltene IEC-Publikation wurde vom TC 91 „Electronics assembly technology“ erarbeitet.

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Der Zusammenhang der zitierten Normen mit den entsprechenden Deutschen Normen ergibt sich, soweit ein Zusammenhang besteht, grundsätzlich über die Nummer der entsprechenden IEC-Publikation. Beispiel: IEC 60068 ist als EN 60068 als Europäische Norm durch CENELEC übernommen und als DIN EN 60068 ins Deutsche Normenwerk aufgenommen.

Konstruktion, Herstellung und Bestückung von Leiterplatten –  
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Diese Europäische Norm wurde von CENELEC am 2006-06-01 angenommen. Die CENELEC-Mitglieder sind gehalten, die CEN/CENELEC-Geschäftsordnung zu erfüllen, in der die Bedingungen festgelegt sind, unter denen dieser Europäischen Norm ohne jede Änderung der Status einer nationalen Norm zu geben ist.

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## CENELEC

Europäisches Komitee für Elektrotechnische Normung  
European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique

**Zentralsekretariat: rue de Stassart 35, B-1050 Brüssel**

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Ref. Nr. EN 60194:2006 D

## Foreword

The text of the International Standard IEC 60194:2006, prepared by IEC TC 91, "Electronics assembly technology", was submitted to the Unique Acceptance Procedure and was approved by CENELEC as EN 60194 on 2006-06-01 without any modification.

This European Standard should be used in conjunction with IEC 60050-541 which provides for basic technical terms for board assembly technology not included in this standard.

The following dates were fixed:

- |   |                                                                                                                                              |        |            |
|---|----------------------------------------------------------------------------------------------------------------------------------------------|--------|------------|
| – | latest date by which the EN has to be implemented<br>at national level by publication of an identical<br>national standard or by endorsement | (dop): | 2007-06-01 |
| – | latest date by which the national standards conflicting<br>with the EN have to be withdrawn                                                  | (dow): | 2009-06-01 |

Annex ZA has been added by CENELEC.

## Endorsement notice

The text of the International Standard IEC 60194:2006 was approved by CENELEC as a European Standard without any modification.

## 1 Scope

This International Standard defines the terminology used in the field of printed circuit boards and printed circuit board assembly products.

## 2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60050(541), *International Electrotechnical Vocabulary (IEV) – Chapter 541: Printed circuits*

## 3 General

The terms have been classified according to the decimal classification code (DCC) and this DCC number appears to the right of the defined term. The DCC numbering is explained fully in Annex A.

In order to avoid two ID numbers, the usual practice of numbering every paragraph (every term and definition) in front of the paragraph has not been followed in this standard. The official IEC number is the number which follows the DCC and the period (21.xxxx). Annex B provides a list of acronyms listed numerically according to the DCC number.

## 4 Terms and definitions

**Abrasion Resistance** 54.1821  
The ability of a material to withstand surface wear.

**Abrasive Trimming** 54.1318  
Adjusting the value of a film component by notching it with a finely-adjusted stream of an abrasive material against the resistor surface.

**Absorption Coefficients** 40.1727  
The degree to which various materials absorb heat or radiant energy when compared to each other.

**Absorptivity, Infra-red** 40.0087  
The ratio (or percentage) of the amount of energy absorbed by a substrate as compared with the total amount of incident energy.

**Accelerated Aging** 93.0001  
A test in which the parameters such as voltage and temperature are increased above normal operating values to obtain observable or measurable deterioration in a relatively short period of time.

**Accelerated Life Test** 93.0119  
See "Accelerated Aging".

**Accelerated Test** 93.0216  
A test to check the life expectancy of an electronic component or electronic assembly in a short period of time by applying physically severe condition(s) to the unit under test.

**Accelerator** 53.0002  
See "Catalyst".

**Acceleration Factor (AF)** 93.0260  
The ratio of stress in reliability testing to the normal operating condition.

**Acceptance Quality Level (AQL)** 90.0003  
The maximum number of defectives likely to exist within a population (lot) that can be considered to be contractually tolerable; normally associated with statistically derived sampling plans.

**Acceptance Tests** 92.0004  
Those tests deemed necessary to determine the acceptability of a product and as agreed to by both purchaser and vendor.

**Acceptance Inspection (Criteria)** 92.0288  
An inspection that determines conformance of a product to design specifications as the basis for acceptance.

**Access Hole** 60.1319  
A series of holes in successive layers of a multilayer board, each set having their centres on the same axis. These holes provide access to the surface of the land on one of the layers of the board. (See Figure A.1.)

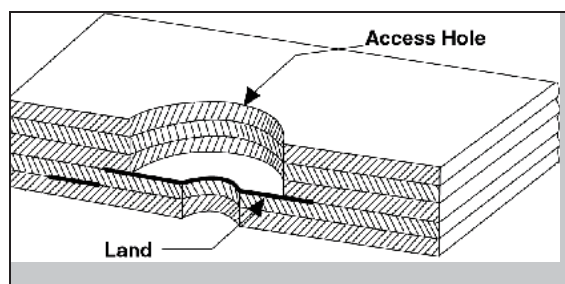


Figure A.1 – Access Hole

**Access Protocol** 21.0005  
An agreed principle for establishing how nodes in a network communicate electronically.

**Accordion Contact** 36.0006  
A type of connector contact that consists of a flat spring formed into a "Z" shape in order to permit high deflection without overstress.

**Accuracy** 90.0007  
The deviation of the measured or observed value from the true value.

**Acid Flux** 46.0009  
A solution of an acid and an inorganic, organic, or water soluble organic flux. (See also "Inorganic Flux", "Organic Flux", and "Water Soluble Organic Flux".)

**Acid Number** 54.0010  
The amount of potassium hydroxide in milligrams that is required to neutralize one gram of an acid medium.

**Acid Value** 54.1217  
See "Acid Number"

**Acid-Core Solder** 46.0008  
Wire solder with a self-contained acid flux.

**Actinic Radiation** 52.0011  
Light energy that reacts with a photosensitive material in order to produce an image.

**Active Desiccant** 30.0397  
Desiccant that is either fresh (new) or has been baked according to the manufacturer's recommendations to renew desiccant to original specifications.

**Activated Rosin Flux** 46.0012  
A mixture of rosin and small amounts of organic-halide or organic-acid activators. (See also "Synthetic Activated Flux".)

**Activating** 53.0013  
A treatment that renders nonconductive material receptive to electroless deposition.

**Activating Layer** 53.0014  
A layer of material that renders a nonconductive material receptive to electroless deposition.

**Activator** 46.0015  
A substance that improves the ability of a flux to remove surface oxides from the surfaces being joined.

**Active Device** 30.0016  
An electronic component whose basic character changes while operating on an applied signal. (This includes diodes, transistors, thyristors, and integrated circuits that are used for the rectification, amplification, switching, etc., of analog or digital circuits in either monolithic or hybrid form.)

**Active Metal** 36.0017  
A metal that has a very high electromotive force.

**Active Trimming** 54.1321  
Adjusting the value of a film circuit element in order to obtain a specified functional output from the circuit while it is electrically activated.

**Actual Size** 90.0018  
The measured size.

**Additive Process** 53.1322  
A Process for obtaining conductive patterns by the selective deposition of conductive material on clad or unclad base material. (See also "Semi-Additive Process" and "Fully-Additive Process".)

**Add-On Component** 30.0019  
Discrete or integrated packaged or chip components that are attached to a film circuit in order to complete the circuit's function.

**Adhesion**  
**(Pressure Sensitive Tape)** 46.2038  
The bond produced by contact between pressure-sensitive adhesive and a surface.

**Adhesive** 46.1728  
A substance such as glue or cement used to fasten objects together. In surface mounting, an epoxy adhesive is used to adhere SMDs to the substrate.

**Adhesion Failure** 96.0020  
The rupture of an adhesive bond such that the separation appears to be at the adhesive-adherent interface.

**Adhesion Layer** 74.0021  
The metal layer that adheres a barrier metal to a metal land on the surface of an integrated circuit.

**Adhesion Promotion** 53.0022  
The chemical process of preparing a surface to enhance its ability to be bonded to another surface or to accept an over-plate.

**Adhesive Coated Substrate** 41.0438  
A base material upon which an adhesive coating is applied, for the purpose of retaining the conductive material (either additively applied or attached as foil for subtractive processing), that becomes part of a metal-clad dielectric.

**Adhesive-Coated Catalyzed Laminate****41.1320**

A base material with a thin polymer coating, that contains a plating catalyst, that is subsequently treated in order to obtain a microporous surface.

**Adhesive-Coated Uncatalyzed Laminate****41.1323**

A base material with a thin polymer coating, that does not contain a plating catalyst, that is subsequently treated in order to obtain a microporous surface.

**Adhesive Transfer****(Pressure Sensitive Tape)****75.0558**

The transfer of adhesive from its normal position on the pressure sensitive tape to the surface to which the tape was attached, either during unwind or removal.

**Adsorbed Contaminant****96.0023**

A contaminant attracted to the surface of a material that is held captive in the form of a gas, vapour or condensate.

**Advanced Statistical Method****91.0024**

A statistical process analysis and control technique that is more- sophisticated and less widely-applicable than basic statistical methods.

**Aging****90.0025**

The change of a property, e.g. solderability, with time. (See also "Accelerated Aging".)

**Air Contamination****14.0026**

See "Air Pollution"

**Air Pollution****14.0027**

Contamination of the atmosphere with substances that are toxic or otherwise harmful.

**Algorithm****11.0849**

A set of procedures for the solution of a problem in a series of steps.

**Alignment Mark****22.0030**

A stylized pattern that is selectively positioned on a substrate material to assist in alignment. (See Figure A.2.)



**Figure A.2 – Alignment Mark**

**Aliphatic Solvents****76.0031**

"Straight chain" solvents, derived from petroleum, of low solvent power.

**Alkaline Cleaner****76.0032**

A material blended from alkali hydroxides and alkaline salts.

**All Metal Package****33.0579**

A hybrid circuit package made solely of metal, without glass or ceramic.

**Allowable Temperature****75.0609**

The temperature range that an electronic circuit or component can perform its intended functions.

**Alloy, Tin Bismuth (Sn-Bi)****45.1947**

An alloy that is used as a lead free solder and consisting of tin and bismuth as the main constituents. Sn-Bi58 has a low melting point of 138 °C, but is not widely used because of its brittle properties.

**Alloy, Tin Copper (Sn-Cu)****45.1948**

An alloy that is used as a lead free solder consisting of tin and copper considered to be applicable for wave or reflow soldering.

**Alloy, Tin Silver (Sn-Ag)****45.1949**

An alloy that is used as a lead free solder and consisting of tin and silver as the main constituents used as a high temperature solder.

**Alloy, Tin Silver Bismuth (Sn-Ag-Bi)****45.1950**

An alloy that is used as a lead free solder and consisting of tin, silver and bismuth as the main constituents. The Bi in Sn-Ag-Bi alloy reduces the melting temperature. The higher the Bi content is, higher the mechanical strength, but with poorer elongation capability. There is a limit to Bi content.

**Alloy, Tin Silver Copper (Sn-Ag-Cu)****45.1951**

An alloy that is used as a lead free solder consisting of tin, silver and copper as the main constituents.

**Alloy, Tin Zinc (Sn-Zn)** 45.1952  
An alloy that is used as a lead free solder and consisting of tin and zinc as the main constituents. Zn09 alloy has the melting point of 199 °C, closest to the melting point of Sn-Pb alloy among lead free solders, which allows soldering work at present soldering temperatures, but tends to form a stable oxide film, causing difficulty in securing a good solder wetting.

**Alpha Error** 91.0033  
The size of a Type I error or the probability of rejecting a hypothesis that is true.

**Alphanumeric** 25.1729  
Pertaining to data that contain the letters of an alphabet, the decimal digits, and may contain control characters, special characters and the space character.

**Alpha Particle** 35.0612  
A  $\text{He}^4$  nucleus generated from a nuclear decay that is capable of generating hole-electron pairs in microelectronic devices and switching cells causing soft errors in some devices.

**Alternating Current (ac)** 21.1793  
A current that varies with time, commonly applied to a power source that switches polarity many times per second, in the shape of a sinusoidal, square, or triangular wave.

**Alternative Hypothesis** 93.1324  
The supposition that a significant difference exists between the desired results of two comparable populations. (See also "Null Hypothesis" and "Statistical Hypothesis".)

**Alumina Substrate** 43.1730  
Aluminum oxide used as a ceramic substrate material.

**Ambient** 29.0034  
The surrounding environment coming into contact with the system or component in question.

**Amorphous Polymer** 40.0035  
A polymer with a random and unstructured molecular configuration.

**Amplitude, Voltage** 21.0036  
The magnitude of a voltage as measured with respect to a reference, such as a ground plane.

**Analog Circuit** 21.0037  
An electrical circuit that provides a continuous relationship between its input and output.

**Analysis of Variance (ANOVA)** 91.0038  
The systematic method of statistically evaluating experimental results in order to separate the sources of variation.

**Anchoring Spur** 22.1325  
An extension of a land on a flexible printed board that extends beneath the coverlayer to assist in holding the land to the base material. (See Figure A.3.)

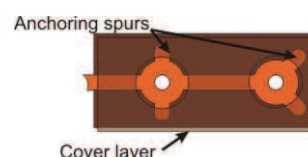


Figure A.3 – Lands with anchoring spurs

**Angled Bond** 74.0039  
The impression of the first and second bonds that are not in a straight line.

**Anisotropic Conductive Contact** 75.0675  
An electrical connection using an anisotropic conductive film or paste wherein conductive particles of gold, silver, nickel, solder, etc. are dispersed. When it is compressed, an electrical connection is attained only in the direction of compression.

**Anisotropy** 40.0685  
The condition for a substance having differing values for properties, such as permittivity, depending on the direction within the material.

**Annotation** 22.0040  
Text, notes, or other identification, constructed by a computer-aided system, intended to be inserted on a drawing, map or diagram.

**Annular Ring  
(Annular Width)**

**60.0041**

That portion of conductive material completely surrounding a hole. (See Figure A.4.)

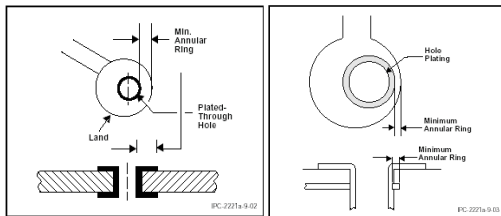


**Figure A.4 – Annular Ring (Annular Width)**

**Anode (BGA)**

**33.0689**

The electrode from which the forward current flows within the device.

**Anodic Cleaning**

**57.0042**

Electrolytic cleaning in which the work is the anode.

**Aperture (stencil)**

**73.0690**

An opening in the stencil-foil.

**Apparent Field-of-View Angle**

**92.0043**

The angular subtense of the field-of-view in the image space of an optical system.

**Application Specific Integrated Circuit  
(ASIC)**

**33.0692**

A semiconductor device intended to satisfy a unique complete circuit function.

**Aqueous Flux**

**46.0044**

See "Water Soluble Organic Flux"

**Aramid**

**44.0045**

See "Para-aramid"

**Arc Resistance**

**92.0047**

The resistance of a material to the effects of a high voltage, low current arc (under prescribed conditions) passing across the surface of the material. (The resistance is stated as a measure of total elapsed time at that voltage required to form a conductive path on the surface - material carbonized by the arc).

**Architecture**

**11.0046**

The structure of a computer's functional elements that makes it possess specific maximum and minimum capabilities.

**Area Array**

**34.0751**

A bonding pattern in which edge and additional pads on the inner surface area of the chip are addressed in the bonding scheme. (See Figure A.5).

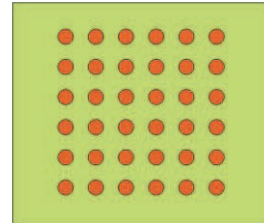


**Figure A.5 – Area Array**

**Area Array Tape Automated  
Bonding**

**74.0048**

Tape automated Bonding where some carrier tape terminations are made to lands within the perimeter of the die.

**Area Ratio**

**73.0758**

The ratio of the area of aperture opening to the area of aperture walls.

**Array**

**22.0049**

A group of elements or circuits arranged in rows and columns on a base material.

**Artificial Intelligence**

**11.0050**

The capacity of a machine to perform functions that are normally associated with human intelligence, such as reasoning and learning.

**Artwork**

**22.0051**

An accurately-scaled configuration that is used to produce the "Artwork Master" or "Production Master". (See Figure A.6.)

**Artwork Master**

**24.0052**

An accurately-scaled, usually 1:1, pattern that is used to produce the "Production Master". (See Figure A.6.)

**As-Fired**

**45.0054**

The condition (values) of thick-film components or the smoothness of ceramic base materials, after they have been processed in a firing furnace and prior to trimming or polishing.

**Aspect Ratio (Film)**

**74.0055**

The ratio of the length of a film component to its width.

**Aspect Ratio (Hole)** 53.0056

The ratio of the length or depth of a hole to its preplated diameter. (See Figure A.7.)

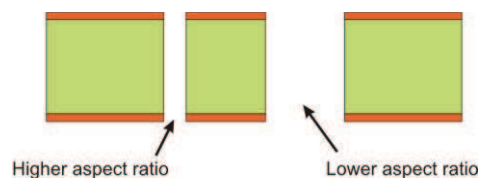


Figure A.7 – Aspect Ratio (Hole)

**Aspect Ratio (stencil)** 73.0808

The ratio of the width of the aperture to the thickness of the stencil-foil.

**Assembled Board** 80.0057

See “Assembly”.

**Assembly** 80.1327

A number of parts, subassemblies or combinations thereof joined together. (Note: This term can be used in conjunction with other terms listed herein, e.g. “Printed Board Assembly”.)

**Assembly Drawing** 26.1328

A document that depicts the physical relationship of two or more parts, a combination of parts and subordinate assemblies, or a group of assemblies required to form an assembly of a higher order.

**Assembly Language** 11.0058

A computer language made up of brief expressions that an assembler program can translate into a machine language.

**Assembly Manufacturer** 70.1911

The individual, organization, or company responsible for the assembly process and verification operations necessary to ensure full compliance of assemblies.

**Assignable Cause** 91.0059

See “Special Cause”.

**Asymmetric Stripline** 21.0060

A stripline signal conductor that is embedded, but not centred, between two ground planes. (See Figure A.8.)

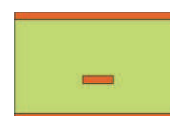


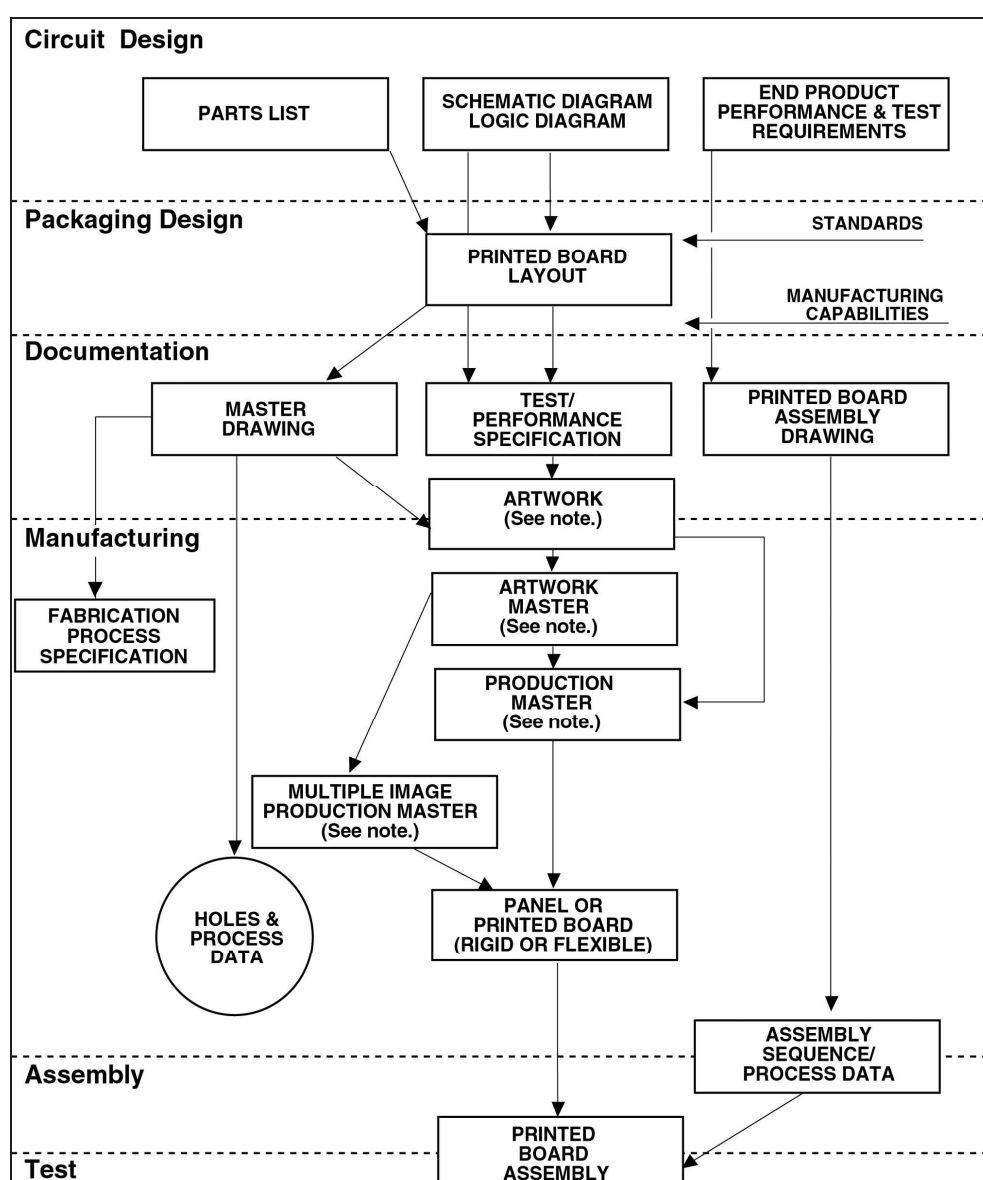
Figure A.8 – Asymmetric Stripline

**Attachment Density** 22.1823

The average number of surface mount or through hole solder joints, based on pitch and land size, that may be accommodated in a prescribed unit area e.g. cm<sup>2</sup>, considering land size within the unit area to accommodate solder joint attachment.

**Attenuation** 21.0061

The reduction in the amplitude of a signal due to losses in the media through which it is transmitted. The unit of measure is decibels (dB).



**NOTE** The term “original” may be used to preface any of the drafting and photographic-tooling terms used in this figure. The “original” is not usually used in manufacturing processes. In the event that a “copy” is made, the copy must be of sufficient accuracy to meet its intended purpose if it is to take on the name of any one of the terms used in this figure. Other adjectives may also be used to help describe the kind of copy, i.e. “nonstable”, “first generation”, “record,” etc.

**Figure A.6 – Simplified flow chart of printed board design/fabrication sequence**

**Attributes Data****94.0062**

Qualitative data that can be counted for recording and analysis purposes.

**Automated Component Insertion****72.0063**

The act or operation of assembling discrete components to printed boards by means of electronically-controlled equipment.

**Automatic Component Placement****22.0029**

Software that automatically optimizes the layout of components on a printed board.

**Automatic Conductor Routing****22.0124**

Software that automatically determines the placement of interconnections on a printed board.

**Automatic Dimensioning****25.1329**

A computer-aided drafting function that automatically generates dimensions, leaders, arrowheads, etc., that make up a complete set of documented dimensions.

**Automatic Test Equipment****92.0064**

Equipment that automatically analyses functional or static parameters in order to evaluate performance.

**Automatic Test Generation****92.0065**

Computer generation of a test program based solely on circuit topology with little or no manual programming effort.

**Axial Lead****31.0067**

Lead wire extending from a component or module body along its longitudinal axis. (See Figure A.9.)

**Figure A.9 – Axial Lead****Azeotrope****49.0068**

See “Azeotropic Mixture”

**Azeotropic Mixture (Azeotrope)****49.1330**

A liquid mixture of two or more substances that behaves like a single substance. The vapour produced by partial evaporation of the liquid has the same composition as the liquid.

**B****B-Stage****41.1343**

An intermediate stage in the reaction of a thermosetting resin in which the material softens when heated and swells, but does not entirely fuse or dissolve when it is in contact with certain liquids. (See also “C-Staged Resin”.)

**B-Staged Material****41.0069**

See “Prepreg”.

**B-Staged Resin****41.0070**

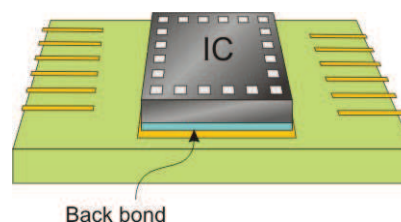
A thermosetting resin that is in an intermediate state of cure. (See also “C-Staged Resin”.)

**Back Annotation****21.0072**

The process of extracting appropriate information from a completed printed board design and inserting it on the boards schematic diagram.

**Back Bonding****74.0073**

Attaching a die to a base material with its circuitry facing away from the base material. (See Figure B.1.)

**Figure B.1 – Back Bonding****Back Mounting****74.0079**

See “Back Bonding”.

**Back Taper(s)****51.0081**

The constant decrease in diameter along the length of the body of a drill.

**Back-Bared Land****22.0071**

A land in flexible printed wiring that has a portion of the side normally bonded to the base dielectric material exposed by a clearance hole. (See Figure B.2.)

**Figure B.2 – Back-Bared Land**

**Backdriving** 92.0074  
An in-circuit testing technique that drives digital circuitry outputs to a given logic level, by supplying pulses of sufficient electrical current magnitude in parallel with the outputs, in order to overdrive the logic state conditions of the next digital device inputs.

**Backfill** 36.0075  
Filling a hybrid circuit package with a dry inert gas prior to hermetic sealing.

**Background (Artwork)** 22.0076  
The nonfunctional area of a phototool.

**Background Variable** 94.0077  
A parameter of no experimental interest that is not held at a constant value.

**Backlighting** 24.0078  
Viewing or photographing by placing an object between a light source and the eye or recording medium.

**Backpanel** 85.0080  
See "Backplane".

**Backplane** 85.1331  
An interconnection device used to provide point-to-point electrical interconnections. (It is usually a printed board that has discrete wiring terminals on one side and connector receptacles on the other side.) (See also "Mother Board".)

**Backup Pin** 70.0972  
A supporting pin that is located under a printed board to prevent deflection of the board during component mounting.

**Backward Crosstalk** 21.1332  
Noise induced into a quiet line, as seen at the end of the quiet line that is closest to the signal source, because the quiet line has been placed next to an active line. (See also "Forward Crosstalk".)

**Bake Out** 56.0082  
Subjecting a product to an elevated temperature in order to remove moisture and unwanted gasses prior to certain steps in the printed board manufacturing process or prior to final coating.

**Balanced Transmission Line** 21.1333  
A transmission line that has distributed inductance, capacitance, resistance, and conductance elements that are equally distributed between its conductors.

**Ball** 34.0976  
A raised metal, (or other conductive material) feature on a package substrate used to facilitate bonding to the next level of interconnect.

**Ball Array** 34.1086  
A group of balls arranged in rows and columns.

**Ball Bond** 74.0083  
The welded connection of a bond wire to the bond pad of an integrated circuit die. The bond wire is melted to form a ball and the ball is bonded by use of thermocompression or thermosonic techniques.

**Ball Grid Array (BGA)** 34.1096  
A surface mount package wherein the bumps for terminations are formed in a grid on the bottom of a package. (See Figure B.3.)

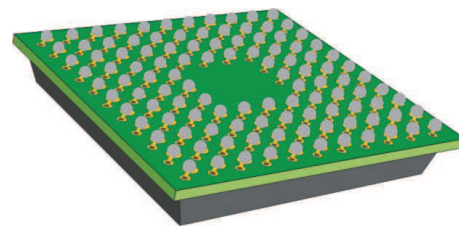


Figure B.3 – Ball Grid Array (BGA)

**Ball Lift** 74.2127  
A category of ball bond failure in which the ball lifts from the surface of the integrated circuit die bond pad metallization or lifts the metallization from the surface of the underlying oxide or silicon.

**Bar** 70.1238  
The dark element of a bar code.

**Bar Code** 70.1292  
A linear arrangement of bars and spaces in a predetermined pattern.

**Bar Code Marking** 70.1731  
An identification code consisting of a pattern of vertical bars whose width and spacing identifies the item marked.

**Bar Code Printer** 70.1353  
A printer with the ability to print bar coded labels and forms.

**Bar Code Scanner/Reader** 70.1354  
A device used for machine reading of a bar code. Readers may be hand held-wands, fixed optical beams, or moving optical beams.

**Bar Code Symbol****70.1370**

A printed or photographically reproduced bar code composed of parallel bars and spaces of various widths. A bar code symbol contains a leading quiet zone, a start character, data characters, a stop character, and a trailing quiet zone. In some cases, a check character is included.

**Bare Board****60.0084**

An unassembled (unpopulated) printed board.

**Barrel Crack****96.1444**

A crack of the plated metal on the internal wall of a through-hole. (See also "Circumferential Crack".) (See Figure B.4.)

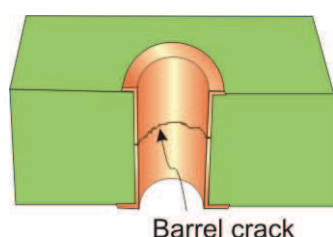


Figure B.4 – Barrel Crack

**Barrier Metal****74.0085**

A metal used to seal the semiconductor-die lands.

**Base Film (relating to Flexible Circuits)****40.1471**

The film that is the base material for the flexible printed wiring board and on the surface of which the conductive pattern can be formed. When the heat resistance is required, polyimide film is mostly used, and polyester film is usually used when the heat resistance is not required.

**Base Material****40.1334**

The insulating material upon which a conductive pattern may be formed. (The base material may be rigid or flexible, or both. It may be a dielectric or insulated metal sheet.)

**Base Material Thickness****22.1604**

The thickness of the base material excluding conductive foil or material deposited on the surfaces.

**Base Metal****45.0088**

See "Basis Metal".

**Base Metal (Solder)****46.1491**

The underlying metal surface to be wetted by solder, also referred to as basis metal.

**Base Plane****30.2011**

The plane that includes the lowest point of the mounting surface of the package, except for packages using stand-offs.

**Base Solderability****92.0089**

The ease with which a metal or metal alloy surface can be wetted by molten solder under minimum realistic conditions.

**Baseline Dimensioning****26.0086**

The maximum variation between two features that is equal to the sum of the tolerances on the two feature location dimensions taken from the same origin. (See Figure B.5.)

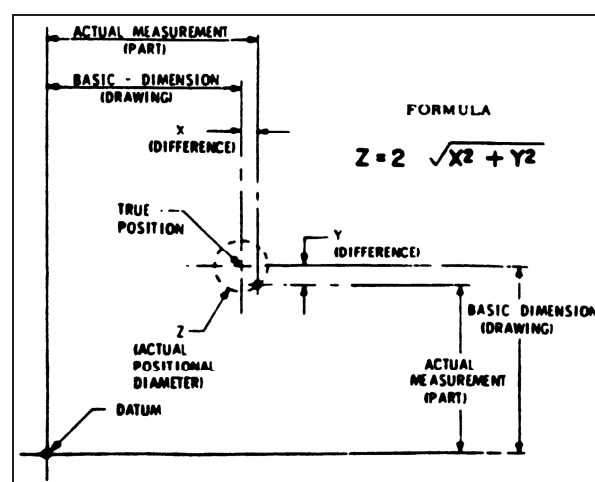


Figure B.5 – Example of feature location using baseline dimensions

**Basic Dimension****26.1335**

A numerical value used to describe the theoretical exact location of a feature or hole. (It is the basis from which permissible variations are established by tolerance on other dimensions in notes or by feature control symbols.)

**Basic Specification (BS)****26.1778**

A document that describes the common elements for a set, family or group of products, materials, or services.

**Basic Statistical Method****91.1336**

The application of a theory of variation through the use of basic problem-solving techniques and statistical process control. (This includes control and capability analysis for both variables and attributes data.)

**Basic Wettability** 70.0090  
The ease with which a metal or metal alloy can be wetted by molten solder.

**Basis Material** 40.0091  
Material upon which coatings are deposited.

**Basis Metal** 45.0092  
A metal upon which coatings are deposited.

**Batch Oven** 56.0093  
A large temperature-controlled oven that is used to heat clean rolls of fabric.

**Batch Processing** 11.0094  
Executing a computer-aided program without human input.

**Batch Size** 17.0095  
See "Lot Size"

**Bathtub Curve** 93.0096  
A plot of failures versus time. (See Figure B.6.)

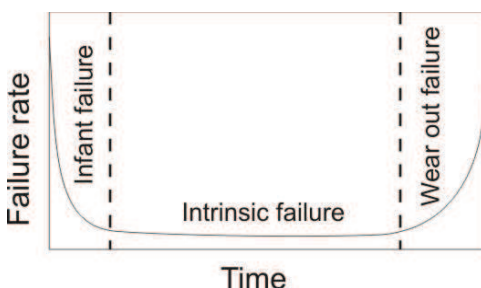


Figure B.6 – Bathtub Curve

**Baume** 92.0097  
An arbitrary scale of specific gravities used in the gradation of hydrometers.

**Bead (Discrete Wiring)** 64.1555  
The external (surface) annular ring of copper plating around a plated-through hole on a fully additive circuit board which functions to conduct heat and promote solder wicking during the soldering of components.

**Beam Lead** 33.0100  
A component terminal in the form of a long metallic structural member that is not supported along its length.

**Beaming** 44.0099  
The operation in which yarn from several section beams is combined on the final warp beam.

**Beam-Lead Device** 33.0098  
An active or passive chip component with beam leads for interconnecting it to lands on a base material. (See Figure B.7.)

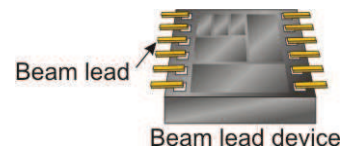


Figure B.7 – Beam-Lead Device

**Bed-of-Nails Fixture** 92.0101  
A test fixture consisting of a frame and a holder containing a field of spring-loaded pins that make electrical contact with a planar test object.

**Bellows Contact** 36.1337  
A type connector contact that consists of a flat spring that has been folded to provide a very uniform spring rate over the full tolerance range of the mating part.

**Benchmark, Computer** 11.0102  
A standard measure of the performance of computers relative to each other, including set-up time, program generation, and data processing capability.

**Benchmark, Testing** 92.0103  
A standard measure of the performance of testers relative to each other, including set-up time, test program generation, and fixturing.

**Bending Resistance** 92.1565  
The ability of a material to withstand repeated bending to specified parameters without producing cracks and breaks in excess of the specification allowance.

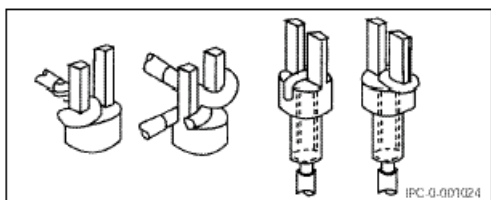
**Beta Error** 91.0104  
The size of a Type II error or the probability of accepting a hypothesis that is false.

**Bias (Fabric)** 44.0105  
Filling yarn that is off-square with the warp ends of a fabric.

**Bifurcated Contact** 36.1810  
A type of connector contact that usually consists of a flat spring that has been slotted length-wise in order to provide independent contact points with the mating part.

**Bifurcated Solder Terminal****37.0106**

A solder terminal with a slot or slit opening through which one or more wires are placed prior to soldering. (See Figure B.8.)

**Figure B.8 – Bifurcated Solder Terminal****Bilateral Tolerance****26.1572**

A tolerance in which variation is permitted in both directions from the specified dimension.

**Binder****47.0107**

Material added to thick-film compositions and unfired base materials to give them additional strength for pre-fire handling. (See also "Glass Binder".)

**Binomial Distribution****94.0108**

A discrete probability distribution that, with certain assumptions, describes the variation of an attribute (proportion).

**Biochemical Oxygen Demand****92.0109**

A standardized measure used for estimating the degree of contamination of water.

**Biocide****76.0110**

A general name for any substance that kills or inhibits the growth of micro-organisms.

**Bipolar Device****33.1573**

A device in which both majority and minority carriers are present. Bi-polar and Metal-Oxide Semi-conductor (MOS) are the two most common device types.

**Birdcage****37.1338**

Stranded wire whereby the strands in the stripped portion between the covering of an insulated wire and a soldered connection, or an end-tinned lead, have separated from the normal lay of the strands.

**Bismaleimide****41.0111**

A resin that has the generic chemical structure of an aromatic chemical group that is attached to two (or "Bis") maleimide groups.

**Bismaleimide Triazine****41.0112**

A resin that contains a mixture of bismaleimide and triazine resins.

**Blank****41.1339**

An unprocessed or partially processed piece of base material or metal-clad base material, that has been cut from a sheet or panel, that has the rough dimensions of a printed board. (See also "Panel".)

**Blanking****51.1574**

Cutting a sheet of material into pieces to the specified blank design.

**Bleeding****52.0113**

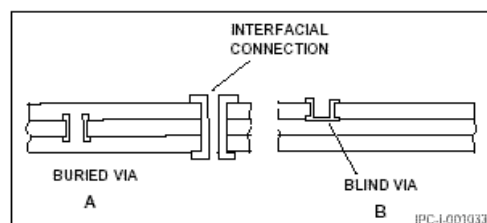
A condition in which a plated hole discharges process material or solution from crevices or voids or a condition in which a resist migrates beyond the image area.

**Blends****41.0114**

Mixtures of resins.

**Blind Via****22.0115**

A via extending only to one surface of a printed board. (See Figure B.9.)

**Figure B.9 – Blind and Buried Via****Blister****96.1340**

Delamination in the form of a localized swelling and separation between any of the layers of a lamination base material, or between base material and conductive foil or protective coating.

**Blocking Variables****94.0116**

A relatively-homogeneous set of conditions within which different conditions of primary variables are compared.

**Blow Hole****53.0117**

A void caused by outgassing.

**Board****60.0118**

See "Printed Board", and "Multilayer Printed Board".

**Board Fabricator** 50.1912  
The individual, organization, or company responsible for the fabrication of the bare printed board, including all process and verification operations necessary to ensure full compliance with customer requirements.

**Board Thickness** 41.1583  
The thickness of the metal-clad base material or printed wiring board including the conductive layer.

**Body Land Clearance** 51.1341  
That portion of the land diameter of a drill that is decreased in order to provide clearance behind the margin.

**Bond** 74.0120  
An interconnection that performs a permanent electrical and/or mechanical function.

**Bond Deformation** 74.0123  
The plastic-flow change in the form of a lead caused by a bonding tool during a termination process.

**Bond Enhancement Treatment** 74.0125  
The improvement of the adhesion of a metal foil surface to an adjacent layer of material to which it is being attached.

**Bond Envelope** 74.0126  
The range of termination parameters within which acceptable bonds may be formed.

**Bond Interface** 74.0133  
The common area between a lead and a land to which it has been terminated.

**Bond Land** 74.0134  
See "Bonding Area".

**Bond Lift-Off** 74.0135  
The failure mode whereby a bonded lead separates from the surface to which it has been joined.

**Bond Schedule** 74.0136  
The values of termination machine parameters.

**Bond Separation** 74.0137  
The distance between the termination points of the first bond and the second bond.

**Bond Site** 74.0138  
That portion of the bonding area where the actual termination takes place.

**Bond Strength** 60.0139  
The force perpendicular to a board's surface required to separate two adjacent layers of the board, expressed as force per unit area.

**Bond Surface** 74.0141  
See "Bonding Area".

**Bond-to-Bond Distance** 74.0121  
The distance from the bonding site on a die to the corresponding bonding site on a lead frame, interconnecting base material, etc.

**Bond-to-Die Distance** 74.0122  
The distance from the heel of a beam lead to the die.

**Bondability** 74.1342  
Those surface characteristics and conditions of cleanliness of a bonding area that must exist in order to provide for the capability to achieve a successful termination.

**Bonding Area** 74.0128  
The area defined by the extent of a land or portion of a terminal to which a lead is to be bonded.

**Bonding, Die** 74.0127  
See "Die Bonding".

**Bonding Island** 74.0129  
See "Bonding Area".

**Bonding Layer** 55.0130  
An adhesive layer used in bonding together other discrete layers of a multilayer printed board during lamination.

**Bonding Pad (IC)** 33.1585  
An area of metallization on an integrated circuit die that permit connection of fine wires or circuit element to the die.

**Bonding Time** 70.1586  
The time duration from the commencement of thermo heat-up until the reflow profile is completed.

**Bonding Tool** 74.0131  
The instrument used to position leads or discrete wires over a land and to impart sufficient energy to complete the termination.

**Bonding Wire** 74.0132  
Fine gold or aluminum wire used for making electrical connections between lands, lead frames, and terminals.

**Border Area** 22.0142

The region on a base material that is external to that of the end-product being fabricated within it.

**Border Data** 22.0143

Patterns that appear in the border area, such as tooling features, test patterns, and registration marks.

**Boss** 22.0144

See "Land".

**Boss (Connector)** 37.0145

A raised section on a connector that fits into a specific slot in the positive polarization or keying feature of a mating connector.

**Bounce Pad (Discrete Wiring)** 64.1588

An isolated area in a copper plane which acts solely as a stop for the laser drilling operation.

**Bow (Fabric)** 44.0146

Filling yarn that lies in an arc across the width of a fabric.

**Bow (Sheet, Panel, or Printed Board)** 60.1218

The deviation from flatness of a board characterized by a roughly cylindrical or spherical curvature such that, if the product is rectangular, its four corners are in the same plane. (See also "Twist".)

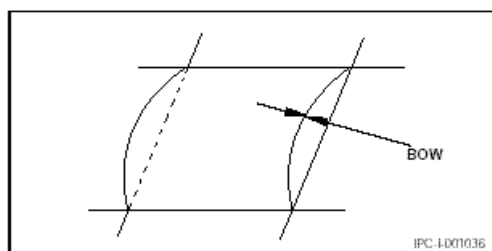


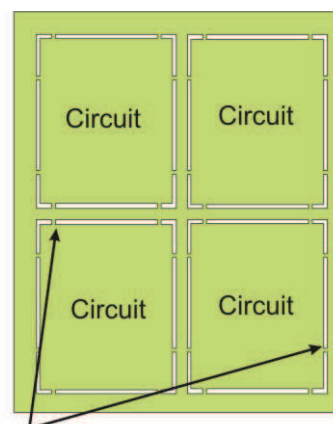
Figure B.10 – Bow

**Brainstorming** 94.0147

The generation of an all-inclusive list of potential causal factors that are possible contributors to process problems.

**Breakaway** 54.1589

The function of excising printed boards or printed board assemblies from their panel structure after all processing has been completed. (See Figure B.11.)



Break away tabs

Figure B.11 – Breakaway

**Breakout** 60.0148

See "Hole Breakout".

**Bridging, Electrical** 70.0149

The unintentional formation of a conductive path between conductors. (See also "Solder Bridging".)

**Brightness** 24.0150

See "Luminance".

**Broken Pick** 35.0151

A filling yarn that is missing from a portion of the width of a fabric.

**Brominated Epoxy** 41.0152

An epoxy resin containing chemically-bound bromine which is added to act as a flame retardant.

**Brown Streak (Base Materials)** 40.1590

A thin vein or stain seen in the reinforcement that can range from light amber to nearly chocolate brown. It usually runs within a fibre bundle for 3 mm to 13 mm (0,13 in to 0,512 in). It is most commonly found in the warp yarns and may appear singly or in multiples, or in a pattern. It is due to the remnants of the glass binder agent, which the weaver did not remove.

**Brown Thread (Base Materials)** 40.1591

See "Brown Streak"

**Bubble Effect** 76.0153

The entrapment of air, solvent or moisture bubbles in a protective coating.

**Buffer Material** 76.0154  
A resilient material that is used to protect a crack-sensitive component from the stresses generated by a conformal coating.

**Bugging Height** 74.0155  
The distance between a land and the lower surface of a beam lead caused by the deformation of the lead during bonding.

**Build-up Process** 61.1593  
See "Sequential Lamination"

**Bulge** 60.0156  
A swelling of a printed board that is usually caused by internal delamination or separation of fibres.

**Bulk Conductance** 92.0157  
Conductance between two points of a homogeneous material.

**Bulls-Eye** 20.0158  
A stylized pattern that is located in the border area in order to aid in alignment.

**Bulk Packaging** 30.1596  
A method for packaging loose parts, into a bag or case.

**Bulk Reflow** 75.1597  
Reflow of multiple components, with simultaneous attachment, by an infrared (IR), convection/IR, convection, or vapour phase reflow (VPR) process.

**Bump** 34.1598  
A means of providing a (electrical) connection to the terminal area of a device. A small mound is formed on the device or substrate pads and is used as a contact for face-down loading.

**Bump (Die)** 74.0159  
A raised metal feature on a die land or tape carrier tape that facilitates inner-lead bonding.

**Bump Array** 34.1599  
A group of bumps arranged in rows and columns.

**Bump Contact** 34.1601  
A contacting pad that rises substantially above the surface level of the chip.

**Bumped Die** 74.0160  
A semiconductor die with raised metal features that facilitate inner-lead bonding. (See Figure B.12.)

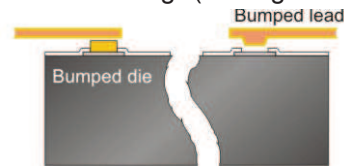


Figure B.12 – Bumped Die

**Bumped Tape** 74.0161  
Carrier tape with raised metal features that facilitate inner-lead bonding.

**Bumped Wafer** 74.0162  
A semiconductor wafer with raised metal feature on its die lands that facilitate inner-lead bonding.

**Buried Via** 22.0163  
A via that does not extend to the surface of a printed board.

**Burn-In** 95.0164  
The process of electrically stressing a device at an elevated temperature, for a sufficient amount of time to cause the failure of marginal devices (Infant Mortality).

**Burn-In, Dynamic** 95.0165  
Burn-in at high temperatures that simulates the effects of actual or simulated operating conditions.

**Burn-In, Static** 95.0166  
Burn-in at high temperatures with unvarying voltage, either forward or reverse bias.

**Burn-Off** 74.0167  
See "Flame-Off".

**Burnt Resin (Base Materials)** 40.1602  
See "Treater Dirt"

**Burr** 92.1603  
Small lumps or masses with an irregular shape, convex to a surface, which a result of a machine process such as drilling or gouging.

**Bus** 21.0168  
One or more conductors used for transmitting data signals or power.

**Bus Bar** 37.0169  
A conduit, such as a component or conductor on a printed board, that is used for distributing electrical energy. (See also "Plating Bar".)

**Butt Leads** 36.1732  
A SMT lead form. Leads extending horizontally from about the centre of a component body, formed down at a 90 degree angle and ending immediately below the component body without additional bends.

**Butter Coat** 41.0170  
An increased amount of resin on the outer surface of a base material.

## C

**C-Staged Resin** 41.0171  
A resin in its final state of cure. (See also "B-Staged Resin".)

**Camber** 92.0172  
The planar deflection of a flat cable or flexible laminate from a straight line.

**Cap Lamination** 55.0176  
A process for making multilayer printed boards with surface layers of metal-clad laminate bonded in a single operation. (See also "Foil Lamination".)

**Capability Detail Specification (CapDS)** 26.1780  
A document that establishes the specific requirements, noted in a detailed specification, in order to establish the level of capability that a manufacturer possesses when he has demonstrated that he has met those requirements.

**Capability Index (Cp)** 91.0306  
See "Capability Performance Index".

**Capability Performance Index (Cp)** 79.1806  
The ratio of the measured performance of a process compared to specified limits.

**Capability Performance, Lower (Cpkl)** 91.1367  
A measure of the relationship between the performance of a process and the lower specification limit. (See also "Capability Performance, Upper".)

**Capability Performance, Upper (Cpku)** 91.1344  
A measure of the relationship between the performance of a process and the upper specification limit. (See also "Capability Performance, Lower".)

**Capability Test Board (CTB)** 94.1784  
A printed board specifically designed to act as a capability qualifying component (CQC), or to be used by manufacturer to evaluate process variation, process control, or continuous improvement procedures.

**Capability Test Segment (CTS)** 94.1785  
A segment or portion of a capability test board (CTB), containing a set or group of individual test patterns (ITP), intended to be used to demonstrate a specific level of printed board complexity or manufacturing capability.

**Capacitance** 21.1794  
A measure of the ability of two adjacent conductors separated by an insulator to hold a charge when a voltage is impressed between them.

**Capacitance Density** 21.0173  
The amount of capacitance available per unit area.

**Capacitive Coupling** 21.0174  
The electrical interaction between two conductors that is caused by the capacitance between them.

**Capillary** 74.0175  
A hollow bonding tool used to guide wire to the bonding site and to be used to apply pressure during the bonding cycle. (See also "Wedge Tool")

**Capture Land** 22.2116  
A land where the microvia starts which varies in shape and size based on use (i.e. component mounting, via entrance, and conductor).

**Card** 60.0177  
See "Printed Board".

**Card-Edge Connector** 22.0178  
See "Edge-Board Connector".

**Card-Insertion Connector** 22.0179  
See "Edge-Board Connector".

**Carrier** 30.1605  
Container that directly holds components, such as a tray, tube, or tape and reel.

**Carrier (Foil)** 45.0180  
A temporary support medium that facilitates the handling of thin and soft-metal foils.

**Carrier Tape** 36.1345  
The carrier for conductors used in tape-automated bonding. (See also "Multilayer Carrier Tape", "Single-Layer Carrier Tape", "Two-Layer Carrier Tape" and "Three-Layer Carrier Tape".)

**Carry-Out** 51.0181  
The curved back portion of the flute of a drill.

**Cartridge** 30.1606  
A container for components that facilitates the loading and unloading of them.

**Castellation** 33.0182  
A recessed metalized feature on the edge of a leadless chip carrier that is used to interconnect conducting surface or planes within or on the chip carrier. (See Figure C.1.)

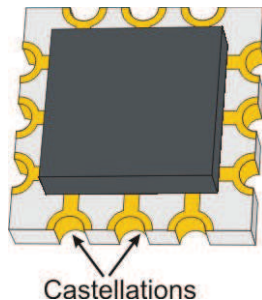


Figure C.1 – Castellation

**Catalyst (Resin)** 40.0183  
A chemical that is used to initiate the reaction or increase the speed of the reaction between a resin and a curing agent.

**Catalyzing** 53.0184  
See "Activating".

**Cathodic Cleaning** 57.0185  
Electrolytic cleaning in which the work is the cathode.

**Cation Exchange** 59.0186  
See "Ion Exchange".

**Cationic Reagent** 59.0187  
Surface-active substances that have the active constituent in the positive ion.

**Cause-and-Effect Diagram** 94.0188  
A problem solving tool that uses a graphic description of various process elements in order to analyse potential sources of process variation.

**Centre-to-Centre Spacing** 22.1346  
The nominal distance between the centres of adjacent features on any single layer of a printed board. (See also "Pitch".)

**Centring Force** 73.1733  
The force required by the pick-up tooling to center a surface mounting device in its proper location on a substrate.

**Centrewire Break** 74.0189  
A failure mode in a wire pull test whereby the wire fractures at approximately its midspan.

**Central Line** 91.0190  
The line on a control chart that depicts the average or median value of the items being plotted.

**Ceramic Dual-in-line Package (CERDIP)** 31.1611  
A dual in-line-package that has a package body of ceramic material and hermetically sealed by a glass. (See also "Dual-in-line Package".)

**Ceramic Pin Grid Array** 31.1612  
A pin grid array package (PGA) made of a ceramic material, hermetically sealed by metal, with leads formed on a grid extending from the bottom of the package.

**Ceramic QUAD Flat Pack (CQFP)** 33.1613  
A quad flat package (QFP) made of a ceramic material, hermetically sealed by metal, with leads extending from all four sides.

**Certification** 17.0191  
The verification that specified training or testing has been performed and that required proficiency or parameter values have been attained.

**Chain Dimensioning** 26.0192  
The maximum variation between two features that is equal to the sum of the tolerances on the intermediate distances.

**Chamfer (Drill)** 51.0193  
The angle at the end of a drill shank.

**Character** 70.1615  
A letter, digit, or other special form that is used to represent data in a bar code symbol. (See also "Bar Code Symbol".)

**Characteristic Curve** 24.1347

A plot of photographic product optical-density data versus the logarithm of the exposure used to characterize the response of the material to exposure and development.

**Characteristic Impedance** 21.0194

The resistance of a parallel conductor structure to the flow of alternating current (AC), usually applied to high speed circuits, and normally consisting of a constant value over a wide range of frequencies.

**Check List** 94.1219

A compilation of the specified criteria that may be evaluated during an audit or inspection.

**Check Plot** 94.0195

An interim drawing used for graphical data verification.

**Check Sheet** 94.0196

A form that is used for data collection.

**Chelate Compound** 76.0197

A compound in which metal is contained as an integral part of a ring structure.

**Chelating Agent** 76.0198

A compound capable of forming a chelate compound with a metal ion.

**Chemical Conversion Coating** 57.0199

A protective coating produced by the chemical reaction of a metal with a chemical solution.

**Chemical Resistance** 40.1616

The resistance of an insulating material to the degradation of surface characteristics, such as surface roughness, swelling, tackiness, blistering or colour change, beyond the specified allowance by exposure to chemicals such as acids, alkalis, salts, or solvents.

**Chemical Vapour Deposition** 45.0202

The deposition of a film onto the surface of a substrate by the chemical reduction of a vapour on contact with the base material.

**Chemical Wire Stripping** 37.0203

The process of removing insulation from wire using chemical compounds.

**Chemically-Deposited Printed Circuit** 50.0201

See "Additive Process".

**Chemically-Deposited Printed Wiring** 50.0200

See "Additive Process".

**Chemisorption** 74.1348

The formation of bonds between the surface molecules of a metal, or other material of high surface energy, and another gas or liquid substance in contact with it.

**Chessman** 74.0204

A disk, knob or lever used to manually control the position of a bonding tool with respect to land.

**Chip** 35.0205

See "Die".

**Chip Carrier** 33.0208

A low-profile, usually square, surface-mount component semiconductor package whose die cavity or die mounting area is a large fraction of the package size and whose external connections are usually on all four sides of the package. (It may be leaded or leadless.)

**Chip-and-Wire** 74.0206

An assembly method that uses discrete wires to interconnect back-bonding die to lands, lead frames, etc.

**Chip-in-Board (CIB)** 74.1617

An electronic component where a chip is inserted into an opening of a ceramic or glass-epoxy substrate and bonded by wire bonding or TAB techniques. The object of this technique is to reduce the thickness of the COB assembly. The chip may be covered by a resin after bonding.

**Chip-on-Board (COB)** 86.0207

A printed board assembly technology that places unpackaged semiconductor dice and interconnects them by wire bonding or similar attachment techniques. Silicon area density is usually less than of the printed board. (See Figure C.2.)

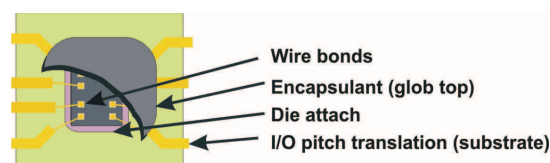


Figure C.2 – Chip-on-Board (COB)

**Chip-on-Board Assembly** 74.1618  
A printed board assembly using a combination of uncased chips and other devices. The silicon area density is less than 30 %.

**Chip-on-Flex (COF)** 74.1619  
Semiconductor chip mounted directly onto flexible printed board.

**Chip-on-Glass (COG)** 74.1620  
An assembly technology that uses an unpackaged semiconductor die mounted directly on a glass substrate such as a glass plate for liquid crystal display (LCD).

**Chipped Point** 51.0209  
A condition whereby the amount of chips on the leading edge of a drill point exceeds an allowable value.

**Chipping** 51.0257  
A piece of a panel or board that has broken away.

**Chisel** 74.0210  
A tool used for wedge and ultrasonic bonding.

**Chisel-Edge Angle** 51.0211  
The angle between the leading cutting edge and the intersection of the primary and secondary relief facets of a drill point.

**Chopped Bond** 74.0212  
A bond with excessive deformation such that the strength of the bond is greatly reduced.

**Circuit** 21.0213  
A number of electrical elements and devices that have been interconnected to perform a desired electrical function.

**Circuit Board** 60.1625  
See "Printed Circuit".

**Circuit Card** 60.0214  
See "Printed Board".

**Circuit Density** 22.1824  
The average quantity of electronic components (prefabricated or part of the interconnecting structure) on a unit area of a printed board considering one or both sides for component mounting.

**Circuitry Layer** 22.0215  
A layer of a printed board containing conductors, including ground and voltage planes.

**Circumferential Separation** 96.1349  
A crack or void in the plating extending around the entire circumference of a plated through hole, a solder fillet around lead wire or eyelet, or the interface between a solder fillet and a land.

**Circumferential Thermodes** 74.1734  
A contact tool used for inner-lead and outer-lead gang bonding.

**Clad (adj.)** 55.1350  
A condition of the base material to which a relatively-thin layer or sheet of metal foil has been bonded to one or both of its sides, e.g. "a metal-clad base material".

**Clearance Hole** 22.1811  
A hole in a conductive pattern that is larger than, and coaxial with a hole in the base material of a printed board.

**Clinched Lead** 72.1351  
A component lead that is inserted through a hole in a printed board and is then formed in order to retain the component in place and in order to make metal-to-metal contact with a land prior to soldering. (See also "Partially-Clinched Lead".)

**Clinched-Wire Interfacial Connection** 72.0217  
See "Clinched-Wire Through Connection".

**Clinched-Wire Through Connection** 72.1352  
A connection made by a bare wire that has been passed through a hole in a printed board and subsequently formed (clinched) and soldered to the conductive pattern on each side of the board.

**Closed-Entry Contact** 37.0218  
A type of female connector contact that prevents the entry of an oversized mating part. (See also "Open-Entry Contact".)

**Co-Firing** 56.0219  
The simultaneous processing of thick-film circuit elements during one firing cycle.

**Coaxial Cable** 37.0220  
A cable in the form of a central wire surrounded by a conductor tubing or sheathing that serves as a shield and return.

**Code 39** 70.1626  
A type of bar code named because it contains nine elements, bars and spaces, with three wide elements and six narrow elements.

**Code Density** 70.1627  
The number of characters per unit length in a bar code symbol.

**Coefficient of Thermal Expansion (CTE)** 40.0221  
The linear dimensional change of a material per unit change in temperature. (See also "Thermal Expansion Mismatch".)

**Cohesion (Pressure Sensitive Tape)** 75.1628  
The ability of a pressure sensitive adhesive to resist splitting.

**Cohesion Failure** 96.0222  
The rupture of an adhesive bond such that the separation appears to be within the adhesive.

**Coined Lead** 22.0223  
The end of a round lead that has been formed to have parallel surfaces that approximate the shape of a ribbon lead.

**Cold Flow (Pressure Sensitive Tape)** 75.1629  
The tendency of some pressure sensitive adhesives to act like a heavy viscous liquid and exhibit a limited amount of flow over a period of hours or days at room temperature.

**Cold Hand Cleaning** 76.0224  
Cleaning with a soft brush and rinsing in a small open tank of non-chlorinated solvent or isopropanol (Propan-2-ol.).

**Cold Machine Cleaning** 76.0225  
Cleaning with a non-chlorinated solvent and an inline brush or wave cleaner.

**Cold Solder Connection** 97.0226  
A solder connection that exhibits poor wetting, and that is characterized by a grayish porous appearance. (This is due to excessive impurities in the solder, inadequate cleaning prior to soldering, and/or the insufficient application of heat during the soldering process.) (See also "Rosin Solder Connection".)

**Colour Selectivity** 24.1630  
The preferential absorption of thermal radiation in the visible band with wavelength of from 0,39 microns to 0,78 microns.

**Colour Temperature** 24.1355  
A measure of the energy distribution over the visible spectral range of a light source with a continuous spectrum, expressed in degrees Kelvin (K). (See also "Effective Colour Temperature".)

**Comb Pattern** 22.0227  
A set of interdigitated comblike arrays of uniformly-spaced conductors. (See Figure C.3.)

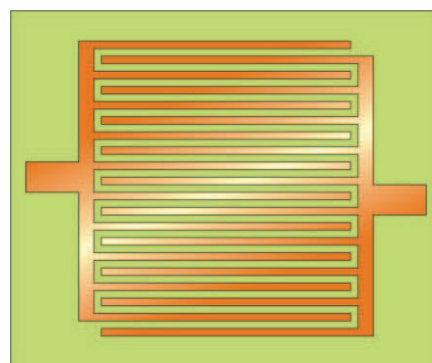


Figure C.3 – Comb Pattern

**Combination Mask** 47.1631  
A type of screen mask that is composed of two areas wherein the one is located in the centre of the screen mask and is made by a metal screen mesh with a printing image, and the other is located in the periphery of the screen mask and is made by a thin elastic material.

**Comment Record** 25.0228  
A record that provides, or refers to, additional descriptive material that further clarifies the control of a data set.

**Common Cause** 91.0229  
A source of variation that affects all the individual values of the output of a process.

**Compensated Artwork** 24.0230  
Production master or artwork data that has been enlarged or reduced in order to meet the needs of subsequent processing requirements.

**Compensation Circuit**

**21.0231**

An electrical circuit that alters the functioning of another circuit to which it is applied to achieve desired performance.

**Compiler**

**11.0232**

A software module that analyses and converts programs from a high-level language to binary machine codes.

**Complex Ion**

**76.0233**

An ion composed of two or more ions or radicals that are capable of an independent existence.

**Compliant Bond**

**74.0235**

A bond that uses an elastically- and/or plastically-deformable member to impart the required energy to the lead.

**Component**

**30.0236**

An individual part or combination of parts that, when together, perform a design function(s). (See also "Discrete Component".)

**Component Density**

**22.0237**

The quantity of components on a unit area of printed board.

**Component Hole**

**20.0238**

A hole that is used for the attachment and/or electrical connection of component terminations, including pins and wires, to a printed board.

**Component Lead**

**30.1356**

The solid or stranded wire or formed conductor that extends from a component to serve as a mechanical or electrical connector, or both. (See also "Component Pin".)

**Component Mounting**

**70.0239**

The act of attaching components to a printed board the manner in which they are attached, or both.

**Component Mounting Orientation**

**22.1357**

The direction in which the components on a printed board or other assembly are lined up electrically with respect to the polarity of polarized components, with respect to one another, and/or with respect to the board outline.

**Component Mounting Site**

**70.1632**

A location on a Packaging and Interconnecting structure (P&I) that consists of a land pattern and conductor fan-out to additional lands for testing or vias that are associated with the mounting of a single component.

**Component Pin**

**30.0240**

A component lead that is not readily formable without being damaged. (See also "Component Lead".)

**Component Side**

**22.0241**

See "Primary Side".

**Component Thermal Masses**

**30.1735**

The ability of a part to absorb or retain heat energy, usually relative to its overall size and weight.

**Composite (Phototool)**

**24.0242**

A photograph that consists of a combination two separate (aligned) images.

**Composite Record**

**25.1358**

A collection of records that make up an electrical pattern that is used repeatedly in a design. (The definition and relationship of such records are covered and referred to as "subroutine definition" and "subroutine definition call".)

**Composite Test Pattern (CTP)**

**24.1792**

A grouping of individual test patterns into specific arrangements, to reflect control and precision capability of a manufacturer or manufacturing process.

**Compound Die Set**

**51.1633**

A set consisting of a punch and matching die used to punch holes, details or the outlines of panels and/or printed wiring boards.

**Compression Seal**

**36.0243**

A tight joint made between an component package and its leads that is formed as heated metal cools and shrinks around a glass insulator.

**Computer Numerical Control (CNC)**

**11.0244**

A system that utilizes a computer and software as the primary numerical control technique. (See also "Numerical Control".)

**Computer-Aided Design (CAD) 22.1359**

The interactive use of computer systems, programs, and procedures in the design process wherein the decision-making activity rests with the human operator and a computer provides the data manipulation function.

**Computer-Aided Engineering (CAE) 21.1360**

The interactive use of computer systems, programs, and procedures in an engineering process wherein the decision-making activity rests with the human operator and a computer provides the data manipulation function.

**Computer-Aided Manufacturing (CAM) 25.1361**

The interactive use of computer systems, programs, and procedures in various phases of a manufacturing process wherein the decision-making activity rests with the human operator and a computer provides the data manipulation functions.

**Concentration Polarization 54.0245**

That portion of polarization electrode produced by concentration changes at the metal-environment interface.

**Condensation Soldering 75.1681**

See "Vapour Phase Soldering".

**Conditional End-of-Test 25.0246**

A command in a test program to stop the execution of the program when a particular condition, or set of conditions, is reached.

**Conditioning 92.0247**

The time-related exposure of a test specimen to a specified environment(s) prior to or after testing and before evaluation.

**Conductance 40.1635**

A measure of conductivity of a material, and the reciprocal of the electric resistance.

**Conducting Salt 54.0248**

A salt added to a plating solution in order to increase its conductivity.

**Conductive Foil 45.0249**

A thin sheet of metal that is intended for forming a conductive pattern on a base material.

**Conductive Pattern 22.1362**

The configuration or design of the conductive material on a base material. (This includes conductors, lands, vias, heatsinks and passive components when these are integral part of the printed board manufacturing process.)

**Conductive Paint 45.1636**

A paint with a suspended powder of an electrically conductive material.

**Conductive Paste 45.1637**

A conductive material used to make conductive patterns and through holes on a base material consisting of silver, copper, nickel, carbon, etc. in a cream-like form.

**Conductivity (Electrical) 40.0250**

The ability of a substance or material to conduct electricity.

**Conductor 22.0251**

A single conductive path in a conductive pattern.

**Conductor Base Spacing 60.0252**

The spacing between conductor at the plane of the surface of a base material. (See also "Design Spacing of Conductors".) (See Figure C.4.)

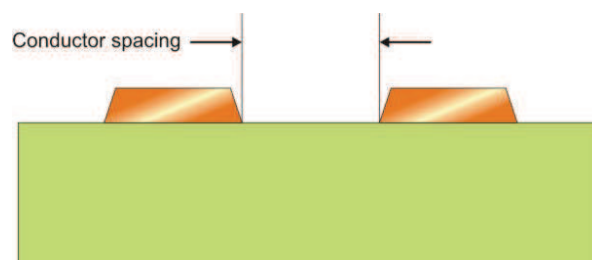


Figure C.4 – Conductor Base Spacing

**Conductor Base Width 60.0253**

The width of a conductor at the plane of the surface of a base material. (See also "Conductor Width" and "Design Width of Conductors".)

**Conductor Layer No.1 25.0254**

The first layer of a printed board that has a conductive pattern on or adjacent to its primary side.

**Conductor Line 22.0256**

See "Conductor".

**Conductor Layer** 22.0848  
The total conductive pattern formed on one side of a single layer of a base material. (This may include all or a portion of ground and voltage planes.)

**Conductor Nick** 96.1932  
A reduction in a conductor cross-sectional area (internal or external) which may or may not expose the base material.

**Conductor Path** 22.0257  
See "Conductor".

**Conductor Pattern** 22.0258  
See "Conductive Pattern".

**Conductor Pitch** 22.1638  
The distance between the centres of adjacent conductors.

**Conductor Protrusion** 96.1640  
A random extension of conductor pattern that reduces the conductor spacing below the minimum requirement.

**Conductor Side** 22.0259  
The side of a single-sided printed board that contains the conductive pattern.

**Conductor Spacing** 60.1363  
The observable distance between adjacent edges (not centre-to-centre spacing) of isolated conductive patterns in a conductor layer. (See also "Centre-to-Centre Spacing".)

**Conductor Thickness** 22.1707  
Thickness of a conductor including additional metallic coatings but excluding non-conductive coatings.

**Conductor Track** 22.0261  
See "Conductor".

**Conductor Width** 60.1364  
The observable width of a conductor at any point chosen at random on a printed board as viewed from directly above unless otherwise specified. (See also "Design Width of Conductor" and "Conductor Base Width".)

**Confidence Interval** 94.1365  
The determination, with a specified degree of confidence, as to whether or not a particular characteristic is within ascertained limits of a population.

**Confirmation Run** 94.0262  
A test of the results that are obtained during an experimental design in order to prove if the results are reproducible in an actual application.

**Conformal Coating** 76.0263  
An insulating protective covering that conforms to the configuration of the objects coated (e.g. Printed Boards, Printed Board Assembly) providing a protective barrier against deleterious effects from environmental conditions.

**Conformal Test Coupon Set** 92.1641  
A complement of test coupons which are comprised of various coupon types, each of which is designed for a specific test or tests, but which were all made in the same manufacturing lot.

**Conformal Via** 22.1644  
A type of build-up via in which the conductor layer of a uniform thickness is formed conforming to the shape of a hole in the insulating layer.

**Confounding** 94.0264  
A situation whereby certain effects cannot be separated from other effects.

**Connector** 37.0265  
A device used to provide mechanical connect/disconnect service for electrical terminations.

**Connector Area** 22.0269  
That portion of printed wiring used for the purpose of providing external connections.

**Connector Contact** 22.0270  
The conducting member of a connecting device that provides a separable connection.

**Connector Housing** 37.0271  
A plastic shell that holds electrical contacts in a specific field pattern that may also have polarization/keying bosses or slots.

**Connector, One-Part** 22.0266  
See "Edge-Board Connector".

**Connector Tang** 37.0272  
That portion of a printed board that mates with an edge-board connector.

**Connector, Two-Part** 22.0267  
A connector containing two sets of discretely-formed mating metal contacts.

**Connector, Two-Part, Printed Board** 37.0268  
A two-part connector wherein at least one set of contacts is mechanically and electrically attached to a printed board.

**Constraining Core** 44.0273  
A supporting plane that is internal to a packaging and interconnecting structure.

**Consumer's Risk** 94.0274  
See "Beta Error".

**Contact Angle (Bonding)** 74.0275  
The angle between the bonding lead or wire and the bonding land.

**Contact Angle (Soldering)** 75.1326  
The angle of a solder fillet that is enclosed between a plane that is tangent to the solder/basis-metal surface and a plane that is tangent to the solder/air interface.

**Contact Area** 22.0276  
The common area between a conductor and a connector through which the flow of electricity takes place.

**Contact Corrosion** 96.0277  
See "Crevice Corrosion".

**Contact Length** 96.0278  
The distance of travel made by a contact in touch with another during the insertion and removal of a connector.

**Contact Plating** 53.1647  
The plating applied to the parts of a printed wiring board that are used as the electrical contact to the circuit outside.

**Contact Printing** 24.1366  
A photographic light-exposure process that transfers an image from one base material to the photosensitive surface of another base material while both base materials are in mechanical contact with each other.

**Contact Resistance** 70.0279  
The electrical resistance of metallic surfaces, under specified conditions, at their interface in the contact area.

**Contact Retention Force** 96.0280  
The minimum axial load in either direction that a contact withstands while it is in its normal position in a connector insert.

**Contact Spacing** 22.0281  
See "Pitch".

**Contact Spring** 37.0282  
The spring member of a socket-type contact that forces the engaging pin- type contact into a position of positive intimate contact.

**Contained Paste Transfer Head** 73.1648  
A stencil printer head that holds, in a single replaceable component, the squeegee blades and a pressurized chamber filled with solder paste.

**Contamination Host Material** 76.0283  
The material within which contamination is deposited or entrapped.

**Continuity** 92.0284  
An uninterrupted path for the flow of electrical current in a circuit.

**Continuity Test** 92.1649  
Resistance test to insure all the required points have electrical continuity.

**Contract Services** 17.0285  
Printed-board manufacturing processing operations that are performed for or by another vendor outside the manufacturer's facility.

**Control Chart** 91.1368  
A graphic representation of a characteristic of a process that shows plotted values of some statistic gathered from characteristic, a central line, and one or two statistically-derived control limits.

**Control Console** 11.0286  
A device terminal used to manipulate and maintain the operating system of a computer.

**Control Drawing** 22.0287  
See "Master Drawing".

**Control Limits** 91.0290  
The maximum allowable variation of a process characteristic due alone to common causes.

**Controlled Collapse, Component Connection** 75.0289  
See "Controlled Collapse Soldering".

**Controlled Collapse Bonding** 74.1650  
A bonding technique that makes termination by reflowing the solder bump on a chip and connecting it to the land on the printed circuit board.

**Controlled Collapse Soldering** 75.1651  
A technique for soldering a component (i.e. flip chip, chip scale package, BGA) to a substrate, where the component connection surface tension forces of the liquid solder supports the weight of the component and controls the height of the joint.

**Convected Energy** 75.1736  
Heat transferred through circulation of fluid or gas.

**Convection** 21.1652  
Heat transfer that occurs at the interface of a solid and a fluid or gas that is due to their differences in temperature.

**Convection Controlled** 21.1653  
Thermal transfer in which the characteristics, such as flow rate, velocity, and temperature are precisely controlled.

**Convection Forced** 21.1654  
Transfer of heat energy by convention that is forced by moving fluid or gas.

**Conveyor, Edge** 70.0291  
A transporting mechanism that supports a product by the edges.

**Conveyor, Mesh** 70.0292  
A transporting mechanism that fully supports the product.

**Conveyor, Secondary** 70.0293  
A transporting mechanism used beneath the edge conveyor to catch a fallen product.

**Cooldown** 75.1655  
The period of time during which the solder joints go through a liquidus phase and become solid.

**Coordinatograph** 92.0294  
An X- and Y-coordinate plotting and measuring machine.

**Coplanar Leads** 33.0295  
The flat beam leads of a component package that have been formed so that they can simultaneously contact one plane of a base material.

**Coplanarity** 33.1656  
The distance in height between the lowest and highest leads when the component is in its seating plane.

**Copolymerize** 49.0847  
The creation of a polymer by the joining of two or more different monomers in repeating chain.

**Copper Thickness** 41.1657  
The thickness dimension of the copper cladding on a base material.

**Copper Weight** 41.1658  
The mass of copper per unit area for a foil expressed in g/m<sup>2</sup>, often also expressed in ounces per square foot or micrometers (µm) in the industry.

**Copper-Mirror Test** 92.0296  
A test of the corrosivity of a flux on a copper film that is vacuum- deposited on a glass plate.

**Corner Crack (Knee Crack)** 96.1569  
A crack in the plated metal at the knee (the intersection of the hole barrel and the pad or land) of a plated through-hole.

**Corner Marks** 22.0297  
The marks at the corners of artwork whose inside edges establish, or help to establish, the borders and contour of a printed board.

**Coronizing** 44.0298  
Continuous heat cleaning and weave setting.

**Corrosion (Chemical/Electrolytic)** 76.0299  
The attack of chemicals, flux, and flux residues on base metals.

**Corrosive Flux** 75.0300  
Flux that contains levels of halides, amines, or organic acids that cause corrosion of copper.

**Cosine Law (Illumination) 24.1369**

A law of illumination that states that the flux radiated or received in a given direction varies with the projected area of the receiver or emitter in a plane that is perpendicular to the direction of the flux.

**Cost of Quality 94.0301**

The money spent in the creation, control, and evaluation of quality and the consequences of the failure to meet specified requirements.

**Coupon 92.0302**  
See "Test Coupon".**Coupon (Breakaway) 92.1220**

Coupons made as an integral part of the end product board and connected as one piece, except one edge of the coupon has perforations or a thin section connected to the board which can be easily broken off without damaging either the coupon or the board.

**Coverfilm 42.2139**

A film of dielectric material with adhesive, usually identical with the base layer, which is bonded over the etched conductor runs to insulate them.

**Cover Coat 42.0303**  
See "Coverlayer".**Coverlayer (Flexible Circuit) 42.0304**

The layer of insulating material that is applied totally or partially over a conductive pattern on the outer surfaces of a printed board.

**Cover Layer (Discrete Wiring) 64.1660**

A polymeric material which is applied to a circuit board over surface wired levels.

**Cpk Index (Cpk) 91.0307**

A measure of the relationship between the scaled distance between the process mean value and the closest specification limit.

**Crack, Foil 90.0308**

A break or separation that extends partially or completely through a layer of metallic foil.

**Crack, Plating 90.0309**

A break or separation that extends partially or completely through a metallic coating(s), its overplate, or both.

**Cracking 90.0310**

A condition that makes breaks or separations in coatings that extend through to an underlying surface.

**Cratering 74.0311**

A defect in which a portion of a die under is torn loose by an excessive amount of ultrasonic wire-bonding energy.

**Crazing (Base Material) 51.0312**

An internal condition that occurs in reinforced laminate base material whereby glass fibres are separated from the resin at the weave intersections. (This condition manifests itself in the form of connected white spots or crosses that are below the surface of the base material.) It is usually related to mechanically-induced stress. (See "Measling".)

**Crazing (Conformal Coating) 76.0313**

A network of fine cracks on the surface of, or within, a conformal coating.

**Crease 92.0314**

A ridge in a material that is caused by a fold or wrinkle being placed under pressure.

**Creel 44.0315**

A device used as a yarn package rack to hold warp ends for a section beam.

**Creep 40.0316**

Time-dependent strain occurring under stress.

**Creep Endurance 40.1661**

Resistance against a time dependent strain occurring under stress on a material.

**Crevice Corrosion 97.0317**

Localized corrosion that is the result of the formation of a crevice between a metal and a nonmetal, or between two metal surfaces.

**Crimp Contact 37.0318**

A type of connector contact whose nonmating end is a hollow cylinder that can be crimped onto a wire inserted within it.

**Critical Current Density 53.0319**

The current density above which a new and sometimes undesirable reaction occurs.

**Critical Defect 94.0320**

Any anomaly specified as being unacceptable.

**Critical Humidity** 76.1371  
The relative humidity above which the atmospheric corrosion rate of a given metal increases sharply or above which the insulation decreases sharply.

**Critical Operation** 91.0321  
One procedure of a total process that has a significant impact on the characteristics of the completed product.

**Critical Solution Temperature** 76.0322  
The temperature above or below which two liquids are miscible in all proportions.

**Crop Marks** 22.0323  
See "Corner Marks".

**Cross-Over (Discrete Wiring)** 64.1662  
A point where two or more discrete insulated wires intersect and cross each other.

**Cross-Sectioning** 92.0324  
See "Microsectioning"

**Cross-Hatching** 22.0325  
The breaking up of large conductive areas by the use of a pattern of voids in the conductive material. (See Figure C.5.)

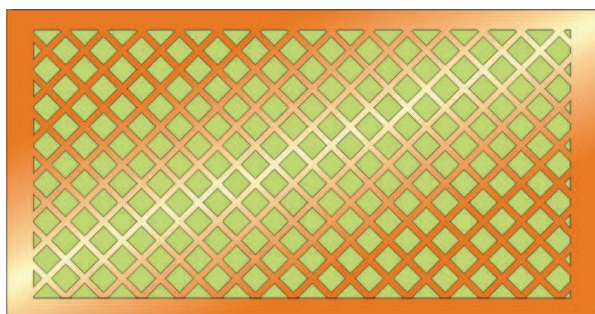


Figure C.5 – Cross-Hatching

**Crossing Count** 22.1372  
The unit for measuring optimum component placement characteristics that is based on the number of times there are crossovers of the signal conductor that are used to provide electrical interconnection between devices.

**Crosslink** 40.0326  
The formation of chemical bonds between molecules in a thermosetting resin.

**Crosstalk** 21.0327  
The undesirable interference caused by the coupling of energy between signal paths. (See also "Backward Crosstalk" and "Forward Crosstalk".)

**Cratering (CHIP-OUT)** 95.1663  
A category of ball bond failure in which the ball lifts from the surface of the integrated circuit die bond pad, taking with it a portion of the bond pad metallization and the underlying oxide or silicon.

**Creep Resistant Holding Power (Pressure Sensitive Tape)** 46.1869  
The ability of a pressure sensitive adhesive tape to resist static forces of shear applied to the same plane as the backing.

**Crystalline Polymer** 40.0328  
A polymer with a regular, structured molecular configuration.

**Cubic Components** 30.1737  
A part with a three-dimensional shape having the form of a cube.

**Cumulative Tolerance** 22.1373  
The summation of the tolerances that are permitted between functionally-related features. (See also "Baseline Dimensioning", "Basic Dimension", "Chain Dimensioning" and "Direct Dimensioning".)

**Cup Solder Terminal** 37.0329  
A cylindrical solder terminal with a hollow opening into which one or more wires are placed prior to soldering.

**Cure** 56.0330  
A chemical reaction that changes the physical properties of a substance, e.g. an adhesive.

**Cure Time** 56.0331  
The time at which ultimate physical properties of a curing thermosetting plastic composition are reached.

**Curing Agent** 56.0332  
A chemical substance that can react with a resin in order to physically harden the resin.

**Current** 21.1795  
The flow or movement of electrons in a conductor as the result of a voltage difference between the ends of the conductive path.

**Current-Carrying Capacity 21.1374**

The maximum electrical current that can be carried continuously by a conductor, under specified conditions, without causing objectionable degradation of electrical and mechanical properties of the product.

**Customer Detail Specification (CDS) 26.1779**

A document that establishes the specific requirements, noted in a detailed specification, in order to tailor these to meet the needs of a custom product, material, or service.

**Customer Test Data 92.1664**

Normal performance data generated at incoming inspection by the customer.

**Cusum Chart 91.0333**

A diagram that depicts cumulative deviation from a target.

**Cut-and-Peel 24.0334**

See "Cut-and-Strip".

**Cut-and-Strip 24.0335**

The making of artwork by cutting a pattern in a resist and stripping away the unwanted areas or resist.

**Cut-Off 74.0336**

The operation that follows the final bonding step that separates the bond from the source of the wire.

**Cylindrical Components 30.1738**

A part having the shape of a cylinder.

**D****D Curve 24.0347**

See "Characteristic Curve".

**Damage 94.1665**

The result of an event that degrades a product, e.g. component, printed board, module, etc., beyond the form, fit and function limits of the governing document.

**Dambar 36.1666**

A portion of the lead frame that prevents mold compound from flowing to end of the lead frame.

**Data Capture 25.0340**

The automatic collection of information from a given machine or other information source.

**Data File 11.0341**

A database organized in a specific manner for a specific application.

**Data Layer 25.0342**

A specific group of related records that are within any individual data- information module.

**Data Logging 11.0343**

The ability of a host computer or test analyser to store analysed data along with statistical data.

**Data-Entry Device 25.0337**

A device terminal used to enter information into a computer system. (See also "Control Console".)

**Data-Information Module (DIM) 25.0338**

A group of records that contain related data that describe a specific function or task.

**Database 11.0339**

A comprehensive collection of information that is so structured that some or all of its data may be used to create queries about related items contained within it.

**Date Code 30.1739**

Marking of products to indicate their date of manufacture.

**Datum 22.0344**

The theoretically-exact point, axis or plane that is the origin from which the location of geometric characteristics of features of a part are established.

**Datum Axis 22.1667**

The theoretical axis derived from the true geometric counterpart of a specified feature (i.e. tooling hole, fiducial) as established by the extremities of contacting points of the actual datum feature.

**Datum Feature 22.0345**

An actual feature of a part that is used to establish a datum.

**Datum Reference 22.0346**

A defined point, line or plane that is used to locate a pattern or layer for manufacturing purposes, inspection purposes, or both.

**Datum Target 22.1668**

A specified point or area on a printed board used to establish a datum.

|                                                                                                                                                                                                                                      |                |                                                                                                                                                                                   |                |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| <b>Daughter Board</b>                                                                                                                                                                                                                | <b>81.1669</b> | <b>Dendritic Growth</b>                                                                                                                                                           | <b>90.0353</b> |
| A printed board that is fastened to a mother board and electrically connected.                                                                                                                                                       |                | Metallic filaments that grow between conductors in the presence of condensed moisture and an electric bias. (See also "Whiskers".)                                                |                |
| <b>Decoupling</b>                                                                                                                                                                                                                    | <b>21.1375</b> | <b>Dendritic Migration</b>                                                                                                                                                        | <b>90.0354</b> |
| The absorbing of noise pulses in power supply lines, that was generated by switching logic devices, so as to prevent the lines from disturbing other logic devices in the same power-supply circuit.                                 |                | Migration that proceeds through an insulator in a "treeing" fashion.                                                                                                              |                |
| <b>Defect</b>                                                                                                                                                                                                                        | <b>90.0348</b> | <b>Denier</b>                                                                                                                                                                     | <b>44.0355</b> |
| A nonconformance or other risk factors as identified by the manufacturer. A process and/or material nonconformance that could result in a reduction of functional capability, design life or reliability.                            |                | The weight, in grams, of 9 000 m of fibre, filament or yarn.                                                                                                                      |                |
| <b>Defect Identification</b>                                                                                                                                                                                                         | <b>90.0349</b> | <b>Densitometer</b>                                                                                                                                                               | <b>24.0356</b> |
| The provision for recording the location of a detected anomaly.                                                                                                                                                                      |                | An instrument that is used to measure the amount of light that has been absorbed by a photographic film.                                                                          |                |
| <b>Definition</b>                                                                                                                                                                                                                    | <b>52.1701</b> | <b>Density (Material)</b>                                                                                                                                                         | <b>40.1675</b> |
| Degree of conformity of the pattern edges with the production master.                                                                                                                                                                |                | The mass of a substance per unit volume.                                                                                                                                          |                |
| <b>Definition (Phototool)</b>                                                                                                                                                                                                        | <b>24.0350</b> | <b>Density (Phototool)</b>                                                                                                                                                        | <b>24.0357</b> |
| The clarity of detail in an optically-produced image.                                                                                                                                                                                |                | The logarithm of the value of opacity.                                                                                                                                            |                |
| <b>Degradation</b>                                                                                                                                                                                                                   | <b>90.0351</b> | <b>Dent</b>                                                                                                                                                                       | <b>45.0358</b> |
| A decrease in the performance characteristics or service life of a product.                                                                                                                                                          |                | A smooth depression in conductive foil that does not significantly reduce the foil's thickness.                                                                                   |                |
| <b>Degrees of Freedom (df)</b>                                                                                                                                                                                                       | <b>94.0352</b> | <b>Dentrices</b>                                                                                                                                                                  | <b>90.0359</b> |
| The number of comparisons that are available in order to learn about an event.                                                                                                                                                       |                | See "Dendritic Migration".                                                                                                                                                        |                |
| <b>Delamination</b>                                                                                                                                                                                                                  | <b>55.1376</b> | <b>Dependent of Feature Size</b>                                                                                                                                                  | <b>22.0360</b> |
| A separation between plies within a base material, between a base material and a conductive foil, or any other planar separation with a printed board. (See also "Blister".)                                                         |                | The concept that permits tolerances of form or position to vary in proportion to, and dependent on, a feature's size.                                                             |                |
| <b>Delivered Panel (DP)</b>                                                                                                                                                                                                          | <b>50.1788</b> | <b>Depth of Field (Optical)</b>                                                                                                                                                   | <b>24.0361</b> |
| A production or prototype panel, or portion of either, intended to contain one or more printed boards in a specific arrangement or cluster, in order to facilitate economic assembly and testing in the next level of manufacturing. |                | The range of distances along the axis of an optical instrument, usually a camera lens, through which an object will produce a relatively distinct image.                          |                |
| <b>Delivery Inspection</b>                                                                                                                                                                                                           | <b>92.1670</b> | <b>Desiccant</b>                                                                                                                                                                  | <b>30.1679</b> |
| See "Final Inspection".                                                                                                                                                                                                              |                | An absorbent material used to maintain a low relative humidity.                                                                                                                   |                |
|                                                                                                                                                                                                                                      |                | <b>Design Automation</b>                                                                                                                                                          | <b>20.1377</b> |
|                                                                                                                                                                                                                                      |                | The use of computer systems, programs, and procedures in the design process wherein, the computer is responsible for the decision-making activity and data manipulation function. |                |

**Design Spacing of Conductors 22.0364**

The spacing between conductors as delineated or otherwise noted on the master drawing. (See also "Conductor Base Spacing".)

**Design Width of Conductors 22.0365**

The width of conductors as delineated or otherwise noted on the master drawing. (See also "Conductor Base Width" and "Conductor Width".)

**Design Rule 22.0363**

Guidelines that determine automatic conductor routing behavior with respect to specified design parameters.

**Design-Rule Checking 22.0362**

The use of a computer-aided design program to perform continuity verification of all conductor routing in accordance with appropriate design rules.

**Desmear 57.0366**

The removal of friction-melted resin and drilling debris from a hole wall.

**Destructive Physical Analysis (DPA) 92.1680**

A process of determination of device construction or failure modes.

**Detail Specification 26.1740**

A detailed written description of a part or a process.

**Detailed Specification (DS) 26.1781**

A document that describes the exact requirements for a specific product, material, or service.

**Detection 91.0367**

A strategy that attempts to identify and separate acceptable and unacceptable outputs from a process.

**Developing (Phototool) 24.0368**

The chemical treatment of radiation-modified photosensitive material in order to produce an image.

**Development (Resist) 52.1682**

The process of exposing a photoresist to a chemical solution which dissolves unwanted material and without affecting wanted material. The standard method of distinguishing between wanted and unwanted material is by polymerizing the resist so as to make it less soluble in the development solvent.

**Device 30.0369**

An individual electrical circuit element that cannot be further reduced without destroying its stated function.

**Dewetting 97.0370**

A condition that results when molten solder coats a surface and then recedes to leave irregularly-shaped mounds of solder that are separated by areas that are covered with a thin film of solder and with the basis metal not exposed. (See Figure D.1.)

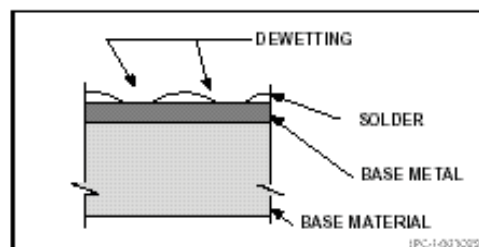


Figure D1 – Dewetting

**Dewetting (Base Materials) 40.1684**

A loss or reduction of resin coverage from localized or large areas of reinforcement.

**Diazo Material 24.0371**

A nonsilver, room-light hardening, ultraviolet-sensitive coating material.

**Dibasic Acid 76.0372**

An acid containing two atoms of acidic hydrogen in a molecule.

**Dice 35.0373**

Two or more die.

**Dicing 35.1685**

The separating of semi-conductor wafers into individual die.

**Dicyandiamide 41.0374**

A solid curing agent for epoxy resins.

**Die 35.0375**

The uncased and normally leadless form of an electronic component that is either active or passive, discrete or integrated. (See also "Dice".)

**Die Attached Pad 35.1688**

See "Die Pad"

**Die Bonding 74.0376**

The attachment of a die to base material.

**Die Mount Pad 35.1689**

See "Die Pad"

**Die Pad** **35.1687**  
A land on which the integrated circuit die is mounted during the assembly process.

**Die Paddle** **35.1686**  
The central portion of the lead frame on which the die and adhesive are placed during the attachment process.

**Die Shrink** **35.1690**  
Method of reducing silicon area used for the same circuitry by reducing layout feature size by a common percentage for all levels.

**Die Stamping (Conductor)** **53.1691**  
A process to make a conductive circuit in which the patterns are stamped out of a metal sheet.

**Dielectric** **40.0377**  
A material with a high resistance to the flow of direct current, and which is capable of being polarized by an electrical field.

**Dielectric Breakdown** **21.1378**  
The complete failure of a dielectric material that is characterized by a disruptive electrical discharge through the material that is due to deterioration of material or due to an excessive sudden increase in applied voltage.

**Dielectric Constant** **21.1379**  
The ratio of the capacitance of a configuration of electrodes with a specific material as the dielectric between them to the capacitance of the same electrode configuration with a vacuum or air as the dielectric. See "Permittivity".

**Dielectric Fluid** **21.0378**  
A fluid that has excellent dielectric strength, excellent volume resistivity, a low dielectric constant, and a low dissipation factor.

**Dielectric Strength** **21.1380**  
The maximum voltage that a dielectric can withstand under specified conditions without resulting in a voltage breakdown, usually expressed as volts per unit dimension.

**Differential Etching** **54.1692**  
The process of removing copper from a conductive pattern that has been plated on a starting thin copper foil such that the portions of the thin starting foil are completely removed and the thicker plated portions are slightly reduced by the etchant.

**Diffusion Bond** **74.0379**  
A bond formed in the absence of any liquid phase at any time prior to or during the joining process.

**Digital Circuit** **21.0380**  
An electrical circuit that provides two (binary) or three distinct relationships (states) between its input and output.

**Digitizing (CAD)** **25.0381**  
The converting of feature locations on a flat plane to its digital representation in X-Y coordinates.

**Dilution Ratio** **76.1221**  
The maximum number of unit volumes of hydrocarbons that can be added per unit volume of active solvent in order to cause the first trace of gelation to occur when the concentration of nitrocellulose in the solution is 8 g (grams) per 100 ml (millilitres).

**Dimensional Stability** **21.1381**  
A measure of the dimensional change of material that is caused by factors such as temperature changes, humidity changes, chemical treatment (aging), and stress exposure.

**Dimensioned Hole** **22.0382**  
A hole in a printed board whose location is determined by physical dimensions or coordinate values that do not necessarily coincide with the stated grid.

**Dimorphism** **40.0383**  
The existence of a substance in two different crystalline forms.

**Dip Soldering** **75.1382**  
The making of soldered terminations simultaneously by bringing the solder side of a printed board with through-hole mounted components into contact with the surface of a static pool of molten solder. (See also "Drag Soldering".)

**Diphase Cleaning** **76.0384**  
Cleaning by means of solutions that contain a solvent layer and an aqueous layer.

**Dipole (Electronic)** **21.0385**  
An assemblage of atoms or subatomic particles, separated by a finite distance, that have equal electric charges of opposite sign.

**Dipole Moment** **21.1383**  
Molecules in which the atoms, their electrons, and their nuclei, that are so arranged that one part of the molecule has a positive electrical charge while the other part is negatively charged.

**Direct Cleaning** **76.0386**  
See "Cathodic Cleaning".

**Direct Current (DC)** **21.1796**  
A current produced by a voltage source that does not vary with time and is normally provided by power supplies, transformers or batteries to power electronic circuits.

**Direct Current Cleaning** **76.0387**  
See "Cathodic Cleaning".

**Direct Dimensioning** **22.0388**  
The maximum variation between two features that is controlled by the tolerance on the dimension between the features.

**Discrepant Material** **92.0389**  
Material that does not conform to specification.

**Discrete Component** **30.0392**  
A separate part of a printed board assembly that performs a circuit function, e.g. a resistor, a capacitor, a transistor, etc.

**Discrete Wiring** **64.1693**  
A conductive pattern established by techniques other than printing, plating, and/or etching, that provides point-to-point connections in a predetermined arrangement on a common base.

**Discrete Wiring Board** **64.0390**  
A base material upon which discrete wiring techniques are used to obtain electrical interconnections.

**Discrete Wiring Board Assembly** **64.0391**  
An assembly that uses a discrete wiring board for component mounting and interconnecting purposes.

**Dispersant (Organosol)** **41.0393**  
A liquid chemical compound that has a solvating or peptizing action on a resin so as to aid in dispersing and spreading it.

**Disperse Phase (Suspension)** **41.0394**  
The particles of solid material dispersed in a liquid medium.

**Dispersing Agent** **41.0395**  
A surface-active agent added to a suspending medium to promote uniform separation of extremely-fine solid particles.

**Disposition (Defects)** **91.1694**  
The determination of how defects should be treated. Dispositions include, but are not limited to, rework, use as is, scrap or repair.

**Dissipation Factor** **21.0396**  
The ratio of loss current to charging current. The dissipation factor or loss tangent,  $\tan\delta$ , is given by  $\epsilon''/\epsilon'$ , where  $\epsilon'$  and  $\epsilon''$  are the real and imaginary parts of the permittivity (see permittivity). The loss tangent is a parameter used to express the tendency of insulators or dielectrics to absorb some of the energy in an ac signal.

**Dissolution of Metallization** **36.1741**  
The process of dissolving metal, usually by introduction of chemicals. (See also "Leaching, Metallization".)

**Dissolution of Termination Metallization (Leaching)** **75.1695**  
See "Leaching, Metallization".

**Distance to Neutral Point (DNP)** **35.1696**  
The linear separation of a joint from the neutral point on a chip. This dimension controls the strain on the joint imposed by expansion mismatch between chip and substrate.

**Distributed Numerical Control (DNC)** **25.0398**  
A network that links computer programs or computer-aided systems to numerically-controlled machine tools.

**Disturbed Solder Connection** **97.1384**  
A solder connection that is characterized by the appearance that there was motion between the metals being joined when the solder was solidifying.

**Don't Care Area** 22.0399  
See "Exclusion Area".

**Doping** 35.0400  
The addition of an impurity to alter the conductivity of a semiconductor die.

**Double-Sided Assembly** 80.0401  
A packaging and interconnecting structure with components mounted on both the primary and secondary sides. (See also "Single-Sided Assembly".)

**Double-Sided Printed Board** 60.0402  
A printed board with a conductive pattern on both of its sides.

**Double-Sided Flexible Printed Wiring Board** 62.1697  
See "Flexible Double-Sided Printed Board".

**Double-Sided Printed Wiring Board** 60.1698  
See "Double-Sided Printed Board".

**Doubled-Treated Foil (DTF)** 45.1700  
Application of a chemical adhesion promoter treatment is placed on both surfaces of the copper (matte and drum sides).

**Download, Computer** 11.1385  
The transfer of computer programs or data from a computer to a lower-level computer. Software that applies human-like reasoning to solve a problem by the use of rules and heuristics.

**Download, Tester** 92.0403  
The ability of a test analyser to provide failure analysis and data logging information to a host computer.

**Drafting Image** 26.0404  
An image that is part of a master drawing or layout.

**Drag Soldering** 75.1386  
The making of soldered terminations by moving the solder side of a supported printed board with through-hole mounted components through the surface of a static pool of molten solder. (See also "Dip Soldering".)

**Drain Wire** 37.0405  
An uninsulated wire that is used for the electrical termination of a shield or ground plane.

**Drawbridged Component** 73.0406  
See "Tombstoned Component".

**Drilling** 51.1703  
A process for making holes using a drill bit or laser.

**Drill Bit** 51.1702  
A rod with spiral flutes (grooves) and an obtuse angled point with sharpened cutting edges used to make holes by rotary action.

**Drill Body Length** 51.0407  
The distance from the drill point to the intersection of the drill diameter and shoulder angle.

**Drill Diameter** 51.0408  
The actual size of the drill body.

**Drill Point Concentricity** 51.0409  
The total variation of the location of the chisel point of a rotated drill shank.

**Dross** 75.0410  
Oxide and other contaminants that form on the surface of molten solder.

**Drying (Solder Paste)** 75.1708  
Ambient or heating process to evaporate volatile components from solder paste which may or may not result in melting of rosin/resin.

**Dry Film Resist** 52.1705  
A composite material where a photosensitive emulsion that is sensitive to portions of the light spectrum and is either carried by or sandwiched between polymer release films and is used to expose imagery on printed boards.

**Dry Glass (Clad Laminate)** 41.1706  
A general reference to the appearance of a laminate where the reinforcement is highly visible, due to low/lost resin content or poor wetting/encapsulation of the resin to the reinforcement, although the resin coverage is acceptable.

**Dual Fixture** 92.0411  
A test fixture with two separate bed-of-nails units.

**Dual-Inline Package (DIP)** 31.1387  
A basically-rectangular component package that has a row of leads extending from each of the longer side of its body that are formed at right angles to a plane that is parallel to the base of its body.