

GLOSSARY of Printed Circuit Design and Manufacturing

No.	GLOSSARY	Meanings
1	C4	Controlled Collapsed Chip Connect. A type of flip-chip technology which is used in Intel's Pentium III™ and in Motorola's PowerPC 603™ and PowerPC 604™ RISC Microprocessors. Here is an Friday, February 07, 2003 introduction to the C4/CBGA interconnect technology by Kromann, Gerke and Huang of Motorola's Advanced Packaging Technology Division.
2	CAD	Computer Aided Design. A system where engineers create a design and see the proposed product in front of them on a graphics screen or in the form of a computer printout or plot. In electronics, the result would be a printed circuit layout.
3	CAD/CAM	Simply a concatenation of the two terms CAD and CAM .
4	CAE	Computer Assisted Engineering. In electronics work, CAE refers to schematic software packages.
5	CAF	Conductive Anodic Filamentation (or Conductive Anodic Filament growth) - An electrical short which occurs in PCBs when a conductive filament forms in the laminate dielectric material between two adjacent conductors under an electrical bias. CAF is a potentially dangerous source of electrical failure in the PCB. As PCB designs have increased in density, with hole-to-hole spacings reduced to 25 mils or less, CAF has become an everyday concern. [adapted from Erik J. Bergum, "CAF Resistance of NON- DICY FR-4," <i>PC FAB</i> , 9/2002]
6	CAM	Computer Aided Manufacturing. (See CAM files)
7	CAM files	CAM means Computer Aided Manufacturing. These are the data files used directly in the manufacture of printed wiring. The types of CAM files are 1) Gerber file, which controls a photoplotter, 2) NC Drill file, which controls an NC Drill machine and 3) fab and assembly drawings in soft form (pen-plotter files). CAM files represent the valuable final product of PCB design. They are handed off to the board house which further refines and manipulates CAM data in their processes, for example in step- and-repeat panelization. Some PCB design software companies refer to all plotter or printer files as CAM files , although some of the plots may be check plots which are not used in manufacture.
8	capture	<ol style="list-style-type: none"> 1. To draw (schematics) with CAE software in such a way that data, especially connectivity, can be extracted electronically. The extracted data would minimally be a netlist and preferably also a BOM . The more useful the data that is included in the schematic, the more useful will be the BOM and netlist extracted from it will be. 2. Extract data from a CAE schematic. E.g. " Capture a netlist." n. The process of creating a CAE drawing containing intelligent data. E.G. "Schematic capture."
9	card	another name for a printed circuit board.
10	card-edge connector	A connector which is fabricated as an integral portion of a printed circuit board along part of its edge. Often employed to enable a daughter or add-on card to be plugged directly into another much larger printed board, the motherboard or backplane. See finger .
11	capture	Extract information automatically through the use of software, as opposed to hand-entering of data into a computer file.
12	cathode	<ol style="list-style-type: none"> 1. In an electron tube the electrode through which a primary source of electrons enters the interelectrode space. 2. General name for any negative electrode. 3. When a semiconductor diode is biased in the forward direction, that terminal of the diode which is negative with respect to the other terminal. 4. In electrolytic plating, the workpiece being plated

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13	CBGA	Ceramic Ball Grid Array.
14	CEM-1	A NEMA grade of industrial laminate having a substrate of woven glass surfaces over a cellulose paper core and a resin binder of epoxy. It has good electrical and mechanical properties, somewhat surpassed by those of FR-4
15	check plots	Pen plots that are suitable for checking only. Pads are represented as circles and thick traces as rectangular outlines instead of filled-in artwork. This technique is used to enhance transparency of multiple layers.
16	chip	<ol style="list-style-type: none"> 1. An integrated circuit manufactured on a semiconductor substrate and then cut or etched away from the silicon wafer . (Also called a die .) A chip is not ready for use until packaged and provided with external connections. 2. Commonly used to mean a packaged semiconductor device.
17	chip-on-board	Abbreviated COB. In this technology integrated circuits , small portions of silicon wafers, are glued and wire-bonded directly to printed circuit boards instead of first being packaged. The electronics for many mass-produced toys are embedded by this system, which can be identified by the black glob of plastic sitting on the board. Underneath that glob (technical term: glob top), is a chip with fine wires bonded to both it and the landing pads on the board.
18	chip scale package	A chip package in which the total package size is no more than 20% greater than the size of the die within. Eg: Micro-BGA.
19	circuit design	The creation of the functional description and diagram (the schematic) of an electronic circuit. Done by an electrical engineer, this is NOT the same thing as "printed circuit design."
20	CIM	Computer Integrated Manufacturing. Used by an assembly house, this software inputs assembly data from a PCB CAM/CAD package, such as Gerber and BOM , as input and, using a pre-defined factory modeling system, outputs routing of components to machine programming points and assembly and inspection documentation. In higher end systems, CIM can integrate multiple factories with customers and suppliers.
21	clad	A copper object on a printed circuit board. Specifying certain text items for a board to be "in clad" means that the text should be made of copper, not silkscreen .
22	collector	<ol style="list-style-type: none"> 1. An electrode in a transistor that collects electrons or holes . 2. In certain electron tubes, an electrode to which electrons or ions flow after they have completed their function.
23	component	Any of the basic parts used in building electronic equipment, such as a resistor, capacitor, DIP or connector, etc.
24	component library	A representation of components as decals, stored in a computer data file which can be accessed by a PCB CAD program.
25	connection	One leg of a net . Also called a "pin pair" (PADS) and "from-to" (Protel).
26	connectivity	The intelligence inherent in PCB CAD software which maintains the correct connections between pins of components as defined by the schematic.
27	connector	A plug or receptacle which can be easily joined to or separated from its mate. Multiple-contact connectors join two or more conductors with others in one mechanical assembly.



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28	control code	A non-printing character which is input or output to cause some special action rather than to appear as part of the data. Control codes are generated by holding down the <Ctrl> key on your computer keyboard while pressing one of the letter keys (e.g. < CTRL-G> . Sometimes called "control characters."
29	coupon	See test coupon .
30	CSP	Chip Scale Package or Chip Scale Packaging.