



## GLOSSARY OF TERMS AND DEFINITIONS

**Annealing** - Refers to a brass pin that has been softened by heat treatment which makes the pin easier to crimp, rivet (swage) or bend.

**Basket Plating** - An electroplating system where the parts are processed in a vibrating basket which ensures uniform plating thickness and avoids damage to delicate parts.

**Beryllium Copper Alloy 172** - (Per ASTM B194-92)  
Chemical Composition: 98.1 % Cu / 1.9% Be.

Beryllium Copper Alloy 172 is well suited to stamping and forming. Unlike other materials, which sacrifice formability to achieve favorable spring characteristics, beryllium copper is easily stamped and formed. Once formed into the desired contact shape, the part is then heat treated to obtain full spring properties.

**Brass Alloy 360 1/2 Hard** - (Per ASTM B16-85) Chemical Composition: 61.5% Cu / 35.4% Zn / 3.1% Pb. Classified as a free cutting material (excellent machinability) making it ideal for high speed turning. Other properties include excellent conductivity and solderability as well as good corrosion resistance. Brass is generally used in making receptacle shells and pins. It can be annealed (softened), but not hardened.

**Carrier** - An assembly consisting of an insulator with male pins onto which receptacles are loaded. This assembly is employed as a fixture during the soldering operation and is then removed leaving a P.C. board populated with individual receptacles. Female carriers that load male pins are also available for special applications.

**Clip** - See contact.

**Closed Entry** - Refers to female contacts where the front rim prevents the insertion of an oversize pin that would otherwise damage the contact.

**Compliancy** - Contact's ability to accept multiple insertions and extractions of a wide range of pin shapes and sizes while retaining its original configuration.

**Compliant Press Fit** - Method of mounting an interconnect component to a P.C. board where a drilled and slotted receptacle or pin is pressed into a plated-thru-hole without damaging the hole.

**Constant Usage Temperature (CUT)** - Constant Usage Temperature is a measure of the maximum temperature that a material may be exposed to for long periods of time, 1000 - 1500 hrs., before degradation of its' electrical and mechanical properties occurs.

**Contact** - Multi-finger spring insert of a receptacle which completes the electrical path between a male pin and a female receptacle. Also referred to as a clip.

**Contact Rating** - Current carrying capability of a contact measured in amperes with respect to temperature rise above ambient.

**Contact Resistance** - The electrical resistance at the point of connection determined by the contact geometry, area of

contact, plating and normal force.

**Electroplating** - The electrodeposition of a metal coating on a conductive object.

**End Stackable** - The ability for connectors to be mounted end to end while maintaining grid or spacing.

**FR-4 Epoxy** - Woven glass cloth epoxy laminate. HDT - 177°C / 350°F, CUT - 140°C / 284°F. Classified as a thermoset, the woven fibers of these materials enable them to withstand high temperatures without being damaged. Cut from large sheets of material, the insulator is then machined on a high speed drill/router, the same way as printed circuit boards are fabricated. Applications: Mill-Max uses FR-4 epoxy to quickly manufacture custom connectors. Configurations include standard and non-standard connector spacings (pin to pin and row to row), selected high density PGAs, low profile and surface mount sockets and headers, surface mount adapters and custom shaped connector bodies. Also used where thermal expansion of PCB is critical. See page 4 under "Insulator Body". FR-4 Epoxy is suitable for hand, wave, vapor phase and infra-red reflow soldering.

**Flash Plating** - A very thin plating, usually less than 10 micro inches, only enough metal to uniformly cover the surface of the base metal.

**Floating Contact** - In surface mount sockets, a receptacle designed to move up and down freely in an insulator to compensate for unevenly dispensed solder paste.

**Free Machining Alloy** - An alloy which is easy to machine, e.g. brass alloy 360.

**Fretting** - A form of corrosion caused by vibration.

**Gas Tight Connection** - An electrical connection of sufficient pressure to prevent the intrusion of a corrosive atmosphere into the contact area.

**Heat Deflection Temperature (HDT)** - An industry recognized test for comparing the short term effects of high temperature on plastics.

**Heat Treating** - The process of using specific heating and cooling cycles to alter the mechanical properties of an alloy. Generally, heat treating can harden or soften a metal depending on the material, the parameters used and the desired physical property.

**Hex Press Fit** - A method of press fitting either a pin or receptacle, using a hexagonal cross section, into a plated-thru-hole without causing damage to the hole and still maintaining a gas tight seal.

**High Speed Turning** - See "Precision Machined".

**Injection Molding** - A method of molding plastics by first heating granular plastic to its molten state and injecting it into the mold cavity where the plastic solidifies and is then ejected from the cavity.

**Insertion Force** - The force required to insert a male lead into a female socket.



**Knurl** - A vertical serration machined around the diameter of an interconnect pin providing a retention feature for press-fitting in a P.C. board or insulator and also prevents rotation of the pin.

**LCP (Liquid Crystal Polymer)** - 30 % glass filled copolymer, rated UL94 V-O. HDT - 243°C / 470°F, CUT - 240°C / 465°F. Classified as a thermoplastic, LCP is a hard, rigid material which exhibits outstanding strength at high temperatures and exceptional strength and toughness in thin walls. Applications: LCP is used as an insulator material for tight grid (.050", 2mm) connectors and extremely high temperature requirements.

**Machined** - See "Precision Machined".

**Migration** - For a brass part plated with tin or gold, the migration of zinc from brass to the surface of the plating. This becomes zinc oxide and renders the part unsolderable. Zinc migration is prevented by using a copper or nickel underplate as a barrier.

**Nylon 46** - 45 % glass filled nylon, rated UL94 V-O. HDT - 285°C / 545°F, CUT - 149°C / 300°F. Nylons, or polyamides, are classified as thermoplastics. Nylon 46 offers superior heat resistance, good electrical properties and excellent toughness in thin walls, which are desirable characteristics for connector insulators. Its superior strength in thin walls enables the press fitting of pins in close proximity to each other without cracking or warping the material, making it ideal for molding 2mm and .050" grid insulators. Nylon 46 is suitable for high temperature applications including vapor phase, infra-red reflow and wave soldering operations.

**PCB** - Printed Circuit Board.

**PCT (Polycyclohexane Terephthalate)** - 30 % glass filled polyester, rated UL94 V-O. HDT - 243°C/470°F, CUT - 130°C/266°F. PCT, a thermoplastic polyester is rated for higher temperatures. PCT is a Standard material on DIP and SIP insulators for higher temperature operations. All PGA and surface mount products are molded from PCT and are suitable for infra-red, vapor phase and wave soldering.

**Phosphor Bronze Alloy 544** - (Per ASTM B139-90) Chemical Composition: 88% Cu / 4% Sn / 4% Zn / 4% Pb. Phosphor Bronze 544 is classified as a free cutting material which lends itself well to high speed turning. Phosphor bronze is used for selected terminals and receptacle shells where extra strength is needed. Along with excellent solderability, phosphor bronze is readily platable. Other characteristics include good conductivity and almost no corrosion related to stress. It cannot be hardened.

**Plating** - A process in which metals (e.g. gold, tin-lead, nickel, silver) are electrically deposited onto a base metal in very thin and precise thicknesses.

**Plated Thru Hole** - A hole in a printed circuit board which has metallic walls connected to conductors on the surface or inside the board, to which the component lead is inserted

and soldered.

**Precision Machined** - Manufacturing process whereby a rapidly turning solid metal rod is cut to precise tolerances.

**Receptacle** - Female contact consisting of an outer shell and inner spring contact (clip) designed for multiple mating/unmating cycles with a male pin or component lead.

**Screw Machined** - See "Precision Machined".

**Secondary Machining** - A process in which holes, slots, flats, squares or other special features may be machined onto a pin or receptacle after the basic shape of the part has been turned on a high speed lathe.

**Shrink DIP Package** - An IC which has a pin spacing of .070" on centers.

**Standoff** - A protrusion at the bottom of the connector used to raise it off the P.C. board to aid in solder fillet formation, board inspection, flux removal and cleaning.

**Swage Mount** - A type of mounting commonly used with solder terminals and printed circuit pins where one end of the terminal is flared out (riveted) securing it to the PCB.

**Thermal Coefficient of Expansion(TCE)** - Expansion of material caused by an increase in temperature.

**Thermoset** - Type of plastic which is heat cured into a permanent shape, and due to chemical reaction, cannot be remelted.

**Thermoplastics** - Type of plastic which is molded under heat and pressure and can be remelted and reused many times.

**Top Plate** - Final surface plating over base metal and underplating.

**Underplate** - Plating between the base metal and the top plating.

**Withdrawal Force** - The force required to remove a lead from a contact.

**Wrapost (Terminal or Receptacle)** - The length of square cross section of certain pins and receptacles which is used for making electrical connections via wire wrapping. Wire wrapping is a process in which wire is wrapped around the post to form a gas-tight connection without soldering.