MILL-MAX MFG. CORP.

190 PINE HOLLOW ROAD
PO BOX 300
OYSTER BAY, NY 11771-0300
PHONE: (516) 922-6000 FAX: (516) 922-9253
www.mill-max.com

RECEPTACLE CARRIERS PROMOTE EFFICIENT ASSEMBLY

A receptacle carrier is a convenient way to pick-up and place individual sockets (receptacles) as a group. It is essentially an assembly fixture having an array of protruding pins onto which individual receptacles are pushed. The receptacles are held in place by their internal spring contacts. The carrier assembly is placed into a corresponding group of holes on the circuit board, and the carrier holds the receptacles in position during the wave or reflow soldering cycle. The carrier is then removed after soldering, leaving behind a group of receptacles to be used as a socket for a leaded component.

Many formats of carrier are available to match the footprint of the device being socketed: DIP, SIP, PGA, DC-DC converter, custom etc.

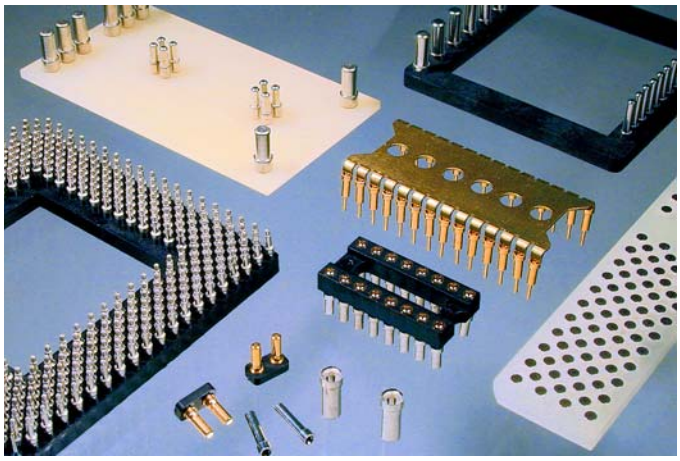
Carriers can be categorized as three types:

1. Re-usable carriers having a molded plastic or machined epoxy frame with durable metal carrier pins. The carrier pins are machined from brass and nickel plated. The nickel plating is passivated (oxidized) to make it "non-stick" to solder. All standard component footprints are available, and this type of construction is readily adapted for custom footprints.
2. Disposable metal carriers are one-piece stamped brass or aluminum lead frames used for DIP and SIP I.C. footprints.
3. Disposable plastic carriers are one-piece injection molded frames with integral plastic posts to hold the receptacles.

Cost savings are available when Type 1 carriers are returned to the factory for reloading.

The benefits of using receptacle carriers:

- Receptacle carriers are more convenient than placing individual sockets on a circuit board by hand with a pair of tweezers. At the other extreme, they do not require the expense of building a fully automatic assembly machine with a programmable X-Y table.
- Using a receptacle carrier eliminates the insulator of a traditional socket. For high-speed circuitry, this results in a shorter electrical path (lower inductance) and reduced propagation delay (no socket dielectric).
- Elimination of the insulator also provides lower socket profile. This is important for hand held devices such as mobile phones and PDAs, where space is at a premium and sockets are required for components that cannot go through reflow, i.e. speakers and microphones.
- Receptacle carriers are also ideal for socketing DC-DC converters. One carrier can place the two different sizes of receptacle required by the power and control pins, while the receptacles themselves add very little to the height of the converter.
- Carriers are used primarily for wave soldering receptacles into plated thru holes. The added weight of the carrier "holds-down" the components as the circuit board passes over the solder wave.



- Receptacle carriers are also used for surface mount assembly; the technique is called intrusive reflow. The carrier assembly is placed into plated thru holes on the circuit board, and solder paste adjacent to the holes is then reflowed before the carrier is removed.

Anatomy of a receptacle

Receptacles are discrete sockets used for plugging leaded components into printed circuit boards. They are made by press-fitting a stamped beryllium copper spring contact into a precision-machined housing. Pre-tooled are 35 sizes of contacts (3, 4 or 6 finger) to accept pins ranging in diameter from .012" to .102" as well as square and rectangular component leads. Heat-treated beryllium copper is the best choice of spring material to assure contact reliability. The receptacle's two-piece construction provides the advantage of selective plating when a gold-plated contact is installed in a tin-plated housing.

By Roger Sutcliffe, Mill-Max Mfg. Corp., Oyster Bay, NY