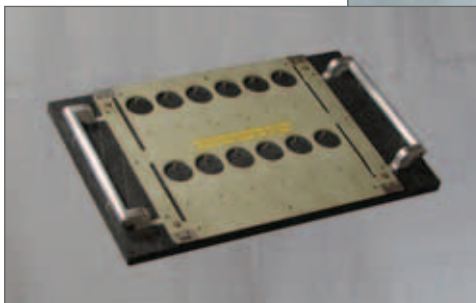
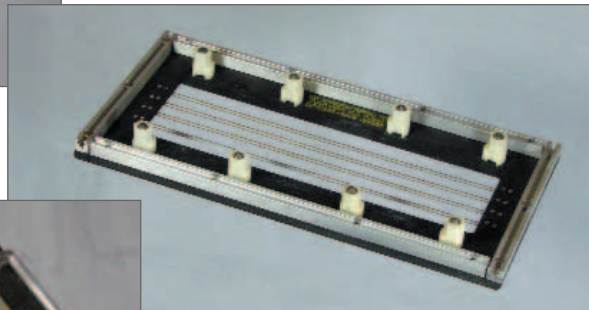
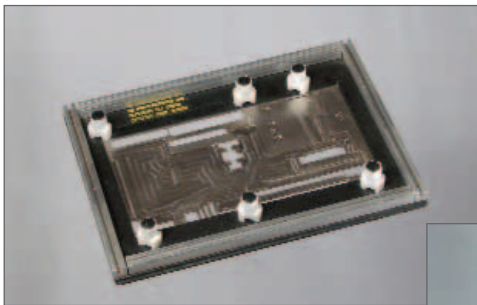




MB Manufacturing

Dedicated to the design and manufacture of fixtures to improve speed and quality in the assembly and production of printed circuit boards. Providing solutions that challenge the industry's accepted "rules of thumb" for more than 20 years.





Toss out long-accepted PCB manufacturing rules of thumb. Demand more and get more with fixturing solutions from MB Manufacturing.

A rotary fixture, such as the unit shown here, helps to optimize soldering quality during a testing process, so that solder wave angles can be perfected for actual manufacturing. Such innovative approaches have helped users of MB fixtures and achieve cost-saving exceptions to many PCB manufacturing rules of thumb, such as:

■ *“Wherever we can’t wave solder, we’ll selective solder; wherever we can’t selective solder, we’ll hand solder.”*

Fixtures can often solve problems that otherwise drive assembly into slower soldering processes with higher failure rates. Before going to slower processes, investigate the possibility of a fixture solution.

■ *“If we need to hand solder, we may as well hand solder a few items.”*

One good fixture can often eliminate all manual operations. Assemblers have purchased MB fixtures to help insert and solder as few as just one connector on a board; the payback in a process is very quick, and error is much reduced.

■ *“Our state-of-the-art selective solderer does the best possible job wherever our wave solderer can’t manage.”*

Be careful. Nozzles sometimes cannot get close enough to smt parts without hitting other parts, whereas wave soldering with an effective fixture can sometimes do a much better job, more reliably, and at a much faster rate.

■ *“I go by pin count; it’s simple.”*

Perhaps too simple. A well designed fixture holds boards precisely positioned for auto inserters as well as selective solders and wave solderers. Once fixturing enters the picture, the rules change. Consider the costs of masking and taping, tape removal and cleaning -- all of which might be eliminated.

■ *“My high-mix low-volume operation makes automation practically impossible.”*

Fixtures can permit standardized conveyor settings and can dramatically speed up changeovers with few or no adjustments, besides those already programmed.

Example shown: a fixturing technique that assists in-process design initially, and then can be simplified for implementation and roll out.

Rotary base permits adjustments for optimum wave angle on critical joints. Once angle is finalized, additional fixtures can be built without the rotary. Numbers at circumference show degree of rotation.

Debriding slots use pallet material to shorten lead lengths and break the wave to eliminate bridging.

Stiffeners also act as solder dams on the pallet. Titanium, aluminum or composite. Coatings assure that solder does not stick.

Hold-down clamps firmly secure boards in position.

Fixture hardware is attached with titanium screws and fastened with split locknuts; prevents hardware from loosening on the pallets.



Reversed milling directs better solder flow into the openings; 20-25 degree chamfers on the back of the pallet break the surface tension of the lead-free solder allowing it to hug the walls and get closer to components near opening edges.



■ *“We’ve thought about fixturing, but our time to market is too quick for such a custom design process.”*

Many of our customers consider us “partners.” When they get the data, they send it to us. Looking at the project together, we determine quickly how and where to optimize the process if we can. They know the potential. We know the techniques -- and how to meet deadlines.

■ *“Flexible circuits can’t take the heat of a wave, so we mask, tape, and use titanium fingers -- there’s just no getting around it.”*

Not true. Fixtures can provide support for flexible circuits, while also masking necessary areas without taping, removal and other manual operations, which are particularly high risk with such fragile end products.



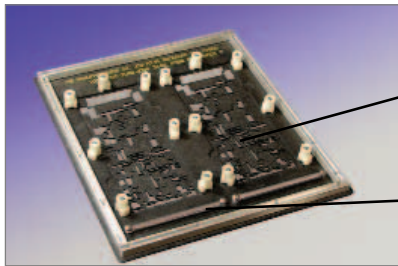
At MB, we design to maximum simplicity and ease of use. On the manufacturing floor, we find this works best.

We custom design selective- and wave-soldering fixtures to achieve optimum soldering on the board as determined by how the board is designed, the location and shape of openings, how the board is support-

ed, and other factors. Millouts for heavy ground-plane areas allow the board to reach temperature and solder properly.

We approach every fixture design with the goal of developing the sim-

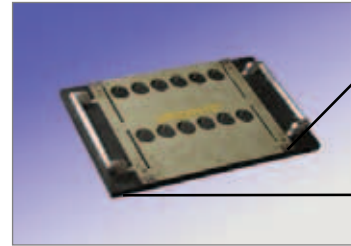
plest solution that serves the purpose. Features that add value must be (similarly) simple and elegant. Selected examples of our design approaches and custom solutions are shown here.



Thin wall areas protect SMT components.
Extension springs hold wires in place with tension.

Selective solder fixture.

Affixes through-hole components and large parts that must be masked on the bottom side on a fairly heavy printed circuit board. Thin wall areas protect SMT components as little as 0.020 in. from through-hole components. Millouts for heavy ground-plane areas allow the board to reach temperature and solder properly.

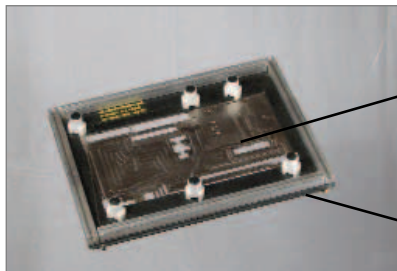


Titanium tabs reduce wear on conveyor edges for high-volume applications.

Installation and locating pins are placed on the loading fixture, rather than the surface fixture; future surface-mount fixtures can be economically built to the template.

Surface-mount fixture.

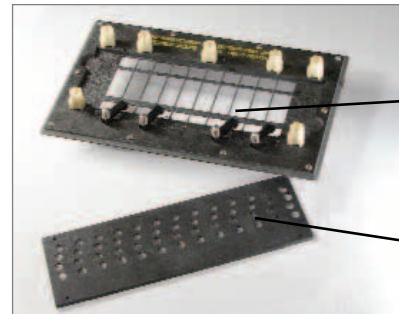
Holds a flex circuit in place for screen print, pick and place, and reflow. It locates, provides support for, and maintains flatness of the flex circuit throughout the process -- without having anything protrude above the surface.



Titanium base for maintaining thin walls over thousands of solder cycles.
Spring loaded clamps and stiffeners.

Selective solder fixture.

Combination of composite, which minimizes heat sinking, and titanium, to permit extremely thin walls between SMT parts and through-hole parts -- down to 0.01 in. clearance -- and still get effective solder.



Webbing holds the board rigid and flat.
Hold-down plate that is placed on top of the connectors.

Selective solder fixture.

A fixture used to very accurately locate (height- and width-wise) the row of connectors on a circuit board or panel. A hold-down plate that is placed on top of the connectors and board that provides pressure downward on the row of connectors to 0.003 in. tolerance.

Benefits of Fixturing	Auto insertion	Wave soldering	Selective soldering	Screen printing	Pick and place	Reflow soldering
1) Hold boards precisely in position	■	■	■	■	■	■
2) Hold components onto boards		■	■			■
3) Precisely locate parts in X, Y, and Z axes		■	■			■
4) Direct solder flow into difficult areas		■	■			
5) Eliminate manual masking, taping, cleanup		■	■			
6) Eliminate board flexing and warping	■	■	■	■	■	■
7) Prevent bridging and solder flooding		■	■			
8) Automate assembly for odd-shape boards	■	■	■	■	■	■
9) Increase process speed	■	■	■	■	■	■
10) Improve reliability and eliminate rework	■	■	■	■	■	■
11) Process PCBs with components near edges	■	■	■	■	■	■
12) Locate boards accurately without tooling holes		■	■	■	■	■



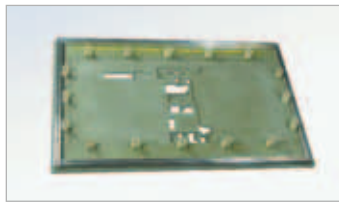
Your PCB assembly obstacle may not be such a problem. In fact, it could be an opportunity.

Especially if your competitors are having difficulty, too!

Come to MB.

MB Manufacturing designs and develops adjustable and custom fixtures for wave and selective soldering, auto-insertion, pick and place, and other electronics production operations.

Our wave solder fixtures enable wave solderers to perform complex jobs typically done using slower selective soldering processes.



Selective solder fixture for a large board in a lead-free process.

Conversely, our selective solder fixtures enable faster, surer soldering to tighter than typical tolerances, and a drastic drop in costly rework.

In these instances and others, a custom fixture from MB Manufacturing can extend the capabili-

ty of the machine involved well beyond its originally intended purpose. An MB fixturing solution can help you bid and win, where many might believe you can't even compete.

Tougher jobs done better.

Use of ever shrinking components on increasingly dense printed circuit boards -- dunked into the higher temperature processes associated with RoHS (lead free) soldering -- all this causes continuing challenges and problems in printed circuit board assembly and production.

Such problems can 1) reduce the speed of a process from "profit" to "loss," or 2) cause an unacceptable level of rework and waste, or 3) prevent use of the equipment for the manufacturing task altogether.

On the bright side, the pcb manufacturing obstacle that you and your competitors are facing may actually be an opportunity that's come your way -- if you team up with MB Manufacturing.

Where manufacturing challenges meet surprising design solutions.

Often, it's a specific manufacturing problem (see examples at right) that brings our fixture design group into the picture.

A short time later, the customer finds it surprising that their custom MB fixture goes far beyond solving the problem at hand, to improving the efficiency and productivity of the process altogether.

Such excellent results *don't just happen*, unless one addresses the matter from start to finish with the process knowledge and equipment experience that you find at MB Manufacturing.

We have 20+ years of experience in the business and literally thousands of manufacturing problems and tooling challenges behind us. We know PCB assembly equipment and processes, and how to design and build fixtures to improve them.

Call us.

Other MB Manufacturing Products:

- **Insert-All:** Adjustable tooling for automatic insertion equipment permits setups and changeovers in a few minutes.
- **PCB cleaning equipment:** Stainless-steel frame baskets allow you to run small PCBs through aqueous cleaners; carts for transporting PCB-filled baskets, more.
- **Adjustable Wave Solder Fixtures:** Hold any PCB on all four sides; mask gold fingers, etc.
- **Full Process Carriers:** Hold the PCB in place throughout the manufacturing process, from screen-printing through placement, reflow and cleaning.

