45802 SMT Receptacle Connector (Shown with and without a vacuum pick-up clip)

45830 SMT Plug Connector (Shown with and without a vacuum pick-up clip)
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1.0 **SCOPE**

This document is not intended to be the final process definition nor is it intended to constrain design. The document addresses the manufacturing techniques and end-usage considerations for Molex's High Density Mezzanine™ parallel board to board interconnect system. This system consists of various height surface mount receptacles and plugs that are combined to get particular board to board stack height interconnects. Various circuit sizes are also available. This document is a guideline for process development and customers with varying equipment, materials, and processes. Customers will need to develop individual processes to meet their needs. The customer is encouraged to contact Molex with any questions regarding the application of this product.

2.0 **PRODUCT DESCRIPTION**

2.1 **Product Names and Part Numbers**

**SMT Receptacle Connectors**
- Series: 45802-WXYZ

**SMT Plug Connectors**
- Series 45830-WXYZ

**Part Number WXYZ Coding:**
- W is Connector Height (0=8mm, 1=18mm, 2=10mm, 3=9mm)
- X is Lead designation (0=Leaded, 2=Lead Free),
- YZ is wafer count (each wafer has 13 ckt).

Example: 45830-2223 is a Plug with 10mm height, Lead Free and 23 wafers (299ckt).

Total Stack Height is determined by adding the Height for the Receptacle and Plug (8+10=18mm).

2.2 **Dimensions, Materials, Platings, and Markings**

(See applicable sales drawings for information)

3.0 **APPLICABLE DOCUMENTS AND SPECIFICATIONS**

- Product Specification: PS-45802-001
- Sales Drawing SD-45802-001 (Receptacle)
- Sales Drawing SD-45830-001 (Plug)
- PCB Footprint AS-45830-916 (Plug)
- PCB Footprint AS-45830-916 (Receptacle)
- Packaging PK-45802-001, PK-45802-002 (Receptacle)
- Packaging PK-45830-001, PK-45830-002 (Plug)
HIGH DENSITY MEZZANINE™
APPLICATION GUIDELINE

4.0 MATING AND UN-MATING OF CONNECTORS

4.1 Recommendations for Mating:
Connector mating occurs after both have been surface mounted to their respective circuit boards.

Each customer should evaluate how the boards are going to be handled and make the determination of which connector is mounted on which board. Since the terminal blades in the plug are exposed after removing the pick and place clip it would be best suited to the board that gets the least manual handling (i.e. the mainboard). The receptacle would then go onto the secondary board.

This system is designed with guide pins that will locate and guide the connectors into one another.

Place the main board on a solid surface with the connector up.

Remove the pick and place clip from both connectors by lifting the side clips over the ramp on one side and then peeling it off until the other side disengages. Take special care to not contact the blades on the plug. Quarantine suspect assemblies for bent terminal inspection. Connectors with bent terminals should not be used.

Place the secondary board over the main board oriented such that the 1st circuit indicators of both line up with each other (the connectors are polarized to discourage improper mating). Orient the receptacle so that the guide holes on each end are near the plug's guide pins. Apply a force normal to the secondary board directly behind the location of the connector until the connector is fully seated and the circuit boards are parallel to one another.

There is no latching mechanism in the connector system so assembled connectors must be handled with care. If shipped in the mated condition packaging tests should be conducted to verify there is no damage to the assembly.

MaxMate Longitudinal Zippering is 2.0 degrees
Max Mate Lateral Zippering is 2.0 degrees
4.2 Recommendations for Un-Mating:
A force normal to the board should be used. Unmating by hand requires pulling the boards apart slowly while gently rocking the parts back and forth laterally (as in figure 4). Zipporing boards apart is not recommended since it will bind the guide pins.

Max Unmate Longitudinal Zippering is 2.0 degrees
Max Unmate Lateral Zippering is 2.0 degrees

4.3 Multiple Connector System:
A customer may elect to place two systems on the same board. Refer to the applicable PCB Footprint drawing (A-45802-916 and AS45830-916) for orientation and positional tolerance requirements. Multiple connectors must have the longitudinal (pin to pin) direction of the connectors parallel (figure 5 and 7) and not perpendicular (figure 6).

All the connectors on a board, in this application, must be the same gender, must come from a single supplier and process. Furthermore, they must come from either the same package or from successive packages with the same manufacturing date.

Recommended
Not Recommended
Use with Caution

Figure 3
Figure 4
Figure 5
Figure 6
Figure 7
5.0 SOLDERING PROCESS RECOMMENDATIONS

5.1 45802 SMT RECEPTACLE CONNECTOR

5.1.1 PCB Layout
See the Footprint Drawing AS-45802-916 for an illustration of the recommended PCB layout. Contact Molex if further assistance is required.

The connector should be placed on a copper defined pad of 1.0x0.8mm oval shape (Ref. AS-45802-916 for exact detail) either coated with an organic protective coating or HASL.

Solder mask must be registered correctly to within 0.075mm of the pad edge.

Recommended clearance allowed for reworking of this component is 3mm all the way around the part, however, for sensitive components this should be increased to 5mm. Instructions from the repair equipment manufacturer should be followed where necessary. Sensitive components can be either electrically sensitive or mechanically sensitive such as micro BGA componets.

Vias should not be placed on pads.

A solder dam should be created using solder mask when a land goes to a via which is close to the pad, this will avoid wicking of the solder from the pad into the via.

Legends around the perimeter of the connector are recommended to aid in hand placement situations.

5.1.2 Solder Paste Stencil Layout
See the Footprint Drawing AS-45802-916 for an illustration of the recommended PCB layout. Contact Molex if further assistance is required.

For ease of use a no-clean paste is recommended but the connector is capable of being used with either WS or Rosin based pastes.

The stencil thickness should be not less than 0.1mm with a preferred thickness of 0.125mm, where a thinner stencil is used the apertures may have to be enlarged slightly to facilitate sufficient paste to ensure a good joint. Aperture size in the stencil should be 100% of the pad size.
5.1.3 Placement
Verify that your pick and place equipment’s Z axis can accommodate the height of the product and the travel depth required to clear the trays. Reference the applicable Sales and Packaging Drawing for dimensions.

The connector will be supplied in anti-static thermoformed plastic trays. Each tray will have a first circuit indicator corresponding to the first circuit indicator on the connector. The inner edges of the tray should be used as the set up datums for fixing the trays location. JEDEC or Tape and Reels methods will only be available on an as needed basis and upon request from the customer.

For ease of pick-up the connector has a removable pick-up cap/clip fitted for vacuum pick-up and automated SMT machine placement. Care should be taken when removing this cap after placement to avoid product damage especially on the Plug which has exposed terminal blades when the cap is removed.

Connectors should be placed with enough pressure to ensure that the leads touch down on the copper pads (this would normally be either 250 to 300 grams or where placement pressure is not adjustable a negative placement height).

Placement should be within a tolerance band of 0.2mm and placement equipment meeting this accuracy should be used.

5.1.4 Solder Reflow
The PCB containing the connector should be reflowed in compliance with the manufacturer’s data sheet for the paste used.

It is recommended that the soak time be long enough to allow temperature equalization of the whole area under the connector and the time above liquidus be long enough for total reflow.

Correct reflow should be confirmed by placing 2 thermocouples underneath the connector, one in an outer position and one in the middle (drilling through the PCB may have to be undertaken to accomplish this). This will need to be done on both the plug and receptacle since differences in their general construction may effect the amount of time required to reach reflow temperatures.

This component is suitable for processing through the temperatures used in lead free processes but should not be subjected to temperatures in excess of 260 deg. C.

In the event of dual pass reflow where the connector will be inverted a 1.5mm diameter clearance hole is provided at each end of the connector for applying a...
positive retention feature (i.e. fixing nail). The customer should determine if this is needed since his unique variables may combine to require or not require the use of a fixing nail. The Molex PCB layout provides a 1.25mm diameter hole in the PCB for this purpose. Molex can supply separately part 45987 fixing nail if desired.

The connector may be cleaned using a suitable cleaning agent to remove any residue or contaminants but care should be taken to ensure that it is completely dry before electrical testing.

Below is a sample Tin-Lead reflow profile.

![Tin-Lead Reflow Profile](image-url)
Below is a sample of a Lead Free reflow profile using Senju No-Clean Lead Free Paste M705- GRN360-K1MK-VS:

5.1.5 Inspection (Post Process)
The connector may be examined visually for damage and cleanliness.

The solder joints can be inspected using x-ray equipment or other established conventional methods.

The final testing would probably be using electrical test equipment for both in circuit and application testing. However care should be taken that the design of this equipment does not cause damage to the housing or the terminals.
5.1.6 Rework and Repair

It is recommended that a commercially available hot air rework station be used for the repair of this product, many of these repair stations are readily available and the selected manufacturer is a matter of individual customer choice.

It is very important that the correct nozzle be used for this operation. Some of the connectors are taller, larger, and therefore have more mass in comparison to other SMT devices and these attributes need to be considered in nozzle selection.

Before commencing with the repair a rework clip, similar to the original removable pick-up cap should be fitted onto the connector to allow vacuum pick-up.

Removal can then be accomplished either by using a temperature ramp of 3 degrees C per second from 25 to 150 degrees C and then through liquidus or by baking the whole PCB in an oven at 100 degrees C for up to 30 minutes and then taking through liquidus. The time in soak and above liquidus should be sufficient to allow the solder to reflow underneath the connector and avoid damaging pads.

Soak time and temperature is dependent on the type of solder used and should conform to the paste manufacturer’s guidelines.

Once the full reflow has been achieved the connector should be removed using a vacuum pick-up taking care to not have motion parallel to the board if done by hand.

This removed connector should now be discarded as it cannot be reused.

Before replacing the connector the residual solder on the pads should be removed using either a vacuum scavenging system or by hand using a skilled operator. It is recommended that the pads be pasted again using a 0.125mm thick stencil. Where this is not possible a highly skilled operator can deposit sufficient solder on the pads but this method requires highly skilled experienced operators and is not recommended. Using this method the pads must be fluxed before reflow.

The fresh connector can then be replaced either using the silkscreen outline on the PCB for placement or by using the repair tool where the repair tool has a split image prism vision system allowing the operator to see the leads superimposed on the pads.
Once the connector has been placed on the PCB it should be refloowed using the reflow profile developed for the rework process. When determining this profile initially correct reflow should be confirmed by placing 2 thermocouples underneath the connector, one in an outer position and one in the middle (drilling through the PCB may have to be undertaken to accomplish this). This will need to be done on both the plug and receptacle since differences in their general construction may effect the amount of time required to reach reflow temperatures.

The rework clip should now be removed and the assembly retested as applicable.

5.2 45830 SMT PLUG CONNECTOR

5.2.1 PCB Layout
See the Footprint Drawing AS-45830-916 for an illustration of the recommended PCB layout. Contact Molex if further assistance is required.

The connector should be placed on a copper defined pad of 1.0x0.8mm oval shape (Ref. AS-45830-916 for exact detail) either coated with an organic protective coating or HASL.

Solder mask must be registered correctly to within 0.075mm of the pad edge.

Recommended clearance allowed for reworking of this component is 3mm all the way around the part, however, for sensitive component this should be increased to 5mm. Instructions from the repair equipment manufacturer should be followed where necessary. Sensitive components can be either electrically sensitive or mechanically sensitive such as micro BGA components.

Vias should not be placed on pads.

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5.2.3 Placement
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The connector will be supplied in anti-static thermoformed plastic trays. Each tray will have a first circuit indicator corresponding to the first circuit indicator on the connector. The inner edges of the tray should be used as the set up datums for fixing the trays location. JEDEC or Tape and Reels methods will only be available on an as needed basis and upon request from the customer.

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Below is a sample of a Lead Free reflow profile using Senju No-Clean Lead Free Paste M705-GRN360-K1MK-VS:

![Reflow Profile Graph]

### 5.2.5 Inspection (Post Process)

The connector may be examined visually for damage and cleanliness.

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The final testing would probably be using electrical test equipment for both in circuit and application testing. However care should be taken that the design of this equipment does not cause damage to the housing or the terminals. Design of this equipment does not cause damage to the housing or the terminals.
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The rework clip should now be removed and the assembly retested as applicable.

6.0 Electrical Recommendations

6.1 Power Considerations:
   Current: Signal Contact: 2 Amp
   Voltage: 250 VAC

6.2 High Speed Signal Transmission
   Characteristic Impedence: 100+/−1-% ohms – Diff. , 50+/−1-% ohms-SE tested at 100ps RT (10-90%) .
   Crosstalk: 5% of signal swing tested at SE tested at 100ps RT (10-90%) with all lines switching and with one victim bit.

Differential Insertion Loss (-3db): 12.5 GHz-16mm and 10.0GHz-36mm for mated connectors only (not including launches).