



## Board Level Shield Design Guide

As technology improves and develops the need for high quality board level shielding grows exponentially with it. As an industry leader in board level shielding, Orbel offers not just insight and development aid, but a wide variety of standardized and tailored shielding options to provide any component with the right shield to ensure it performs as needed.

This guide highlights the benefits of early investment in shielding, the various product features of board shields that Orbel provides, and how to procure them.

Thank you,  
The Orbel Team



# Designing Board Shields

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Planning ahead for shielding is the best, most cost effective way to ensure not only that the component is properly shielded, but also that adequate space is provided to accommodate the shield. When designing the shield a few base points that are important to consider are:

- Interference concerns
- Solderability
- Flatness/Coplanarity
- Cross-talk
- Mounting Methods

## Design Considerations

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Now that the basics of the shield have been weighed, it is important to focus on the details in its design:

- One or Two Piece Construction
  - Will the components need to be accessed later? If so a Two Piece frame and cover construction would be the desired approach.
- Shield Walls
  - Standard shield corners may have small gaps where minimal EMI can pass through, Louvered corners break up the aperture.
  - Other available corner types are tight and welded corners.
- Cavities
  - Are there multiple components in close proximity that need shielding? A multi-cavity shield can be developed to ensure those components are all covered by one shield.
- Mounting
  - Does the trace have through-holes or will the shield be surface mounted?
  - Orbel's standard pins require a 0.050" diameter through-hole.
  - A trace width of 3-4 times the thickness of the shield's material thickness is recommended.

# More Design Considerations

- Shield types
  - Fold down style or welded fence frames.
- Ventilation Holes
  - Does the shielded component need air flow for ventilation?
  - Standard Hole Diameter: 0.062"
- Pick and Place
  - Pick bars are a standard feature for pick and place machinery
  - Be aware, if Automatic Optical Inspection (AOI) tools are used the horizontal bar may interfere with its line of sight.

## Standard Materials

There are two main base materials that are commonly used for board level shields: tin plated cold rolled steel and nickel silver. Orbel recommends:

### Tin-Plated Cold Rolled Steel 1010

- 0.008 x 12" 1/2 Hard
- 0.010 x 12" 1/2 Hard
- 0.012 x 12" 1/2 Hard
- 0.015 x 12" 1/2 Hard

### Nickel Silver 770 CDA

- 0.008 x 12" 1/2 Hard
- 0.010 x 12" 1/2 Hard
- 0.012 x 12" 1/2 Hard
- 0.015 x 12" 1/2 Hard

Each material has its own benefits and drawbacks, which are important to consider when developing a shield.

Tin-Plated Steel is a more cost effective solution, but does not hold up as well in corrosive environments, and requires surface plating to become solderable. Steel is best for shielding at lower frequency ranges.

Nickel Silver is inherently solderable, non-magnetic and corrosion resistant. Nickel silver is the best solution when shielding is required in the mid kHz to GHz range.



# Shielding Families

These are Orbel's standard shield families, which outline construction styles that easily lend themselves to modified shield sizes:



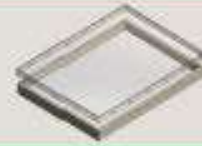
EZ-Shield Guardian Surface-Mount  
One piece surface-mount with alignment pins.

EZ-Shield Guardian Through-Hole  
One piece through-hole with mounting pins.



Snap-Shield Bullzeye  
Two piece surface-mount shield with castellated edges.

Snap-Shield Lazerloc Surface-Mount  
Two piece surface-mount shield with alignment pins.



Snap-Shield Lazerloc Through-Hole  
Two piece through-hole shield with mounting pins.

Snap-Shield Micro  
The lowest profile two piece surface-mount shield assembly in the industry.



Snap-Shield Kontour Pro  
Two piece shield configuration with multi-plane cover.

Snap-Shield Groove-Loc  
A two-piece shield design that utilizes a continuous groove feature in the shield cover.



Vault Shield  
Two piece through-hole shield ideal for extreme shock and vibration applications.

Multicav  
Compartmentalized shield that combines multiple shields into one.

