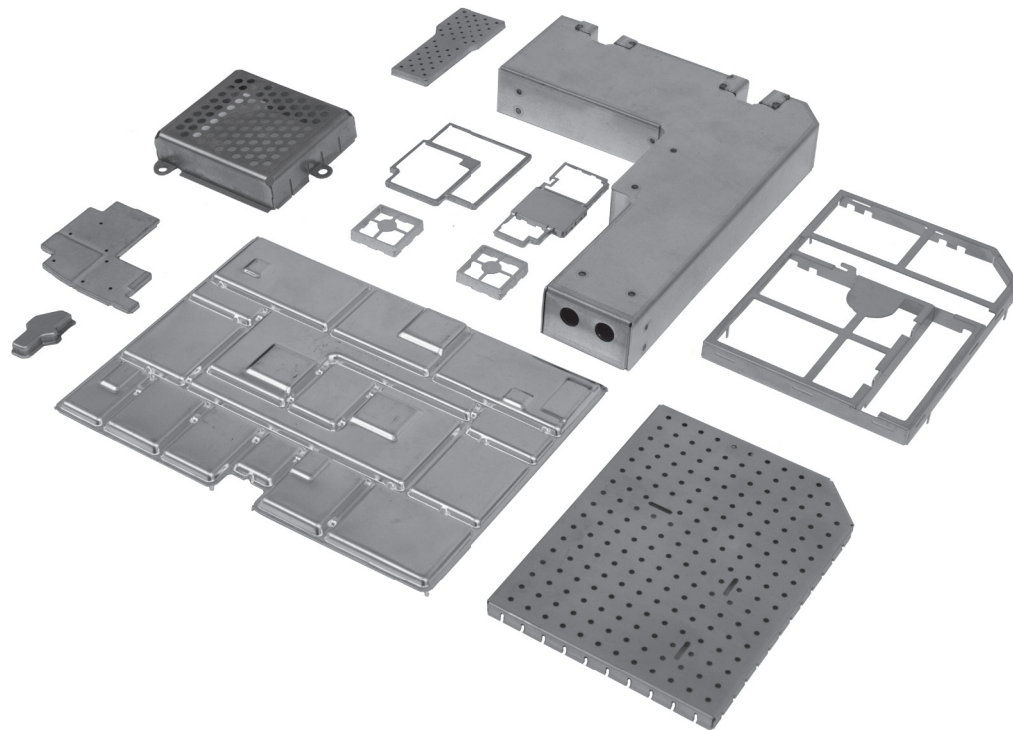


# BOARD LEVEL SHIELDS

Whether it's a one-piece shield, multi-compartmental shield or precision contact, each solution Laird delivers is designed to provide maximum performance within a minimum timeline. Laird produces metal electronic components for surface mount applications in a variety of industries. Laird expertise in a number of key areas ensures that the part provided not only performs, but also optimizes applications. After determining the right board level shield or contact design for an application, Laird experts use the latest systems to develop part designs in just hours.

Laird experienced engineers and technical specialists look beyond the component to the total application.

They work with you to engineer the ideal finished product at the best value.



# BOARD LEVEL SHIELDS

## STANDARD DESIGN SHIELDS

### STANDARD SURFACE MOUNT SHIELDS —

#### ONE-PIECE

#### Off the Shelf, On Spec and On Budget

Standard surface mount shields are available in both one-piece and two-piece designs. One-piece shields offer six sides of protection, with the sixth side being the board itself. One-piece designs offer economical shielding protection where access to covered components is not necessary. There are no tooling costs associated with either the one and/or two-piece standard design.

### TYPICAL PROPERTIES AND PERFORMANCE

ALL PART NUMBERS

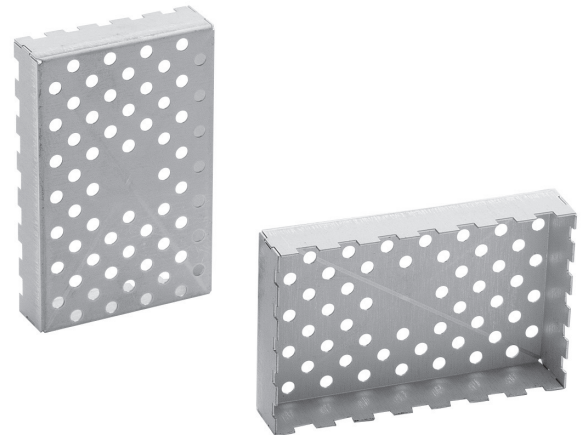
PROPERTY	TEST METHOD	RESULT
Co-planarity	LTWI-1119	< 0.10 mm
Solderability	ANSI/JSTD-002	>99%
Solderability	MIL-STD-202 Method 208	>99%
Surface mount solderability	ANSI/EIA 638	Passes
Appearance	LTIES-125	Passes
Adhesion	ASTM B-571	Passes
3 Axis mechanical shock	LTES-461	Passes

#### Features and Benefits:

- Available in both one-piece and two-piece designs
- One-piece designs offer economical shielding protection
- No tooling costs associated with one or two-piece standard designs

### STANDARD ONE-PIECE BOARD LEVEL SHIELDS

PART NUMBER	MAXIMUM OVERALL LENGTH in (mm)	MAXIMUM OVERALL WIDTH in (mm)	MAXIMUM OVERALL HEIGHT in (mm)	PARTS PER REEL
BMI-S-101	.538 (13,66)	.476 (12,10)	.100 (2,54)	1000
BMI-S-102	.650 (16,50)	.650 (16,50)	.142 (3,60)	700
BMI-S-103	1.032 (26,21)	1.032 (26,21)	.200 (5,08)	300
BMI-S-104	1.260 (32,00)	1.260 (32,00)	.236 (6,00)	225
BMI-S-105	1.500 (38,10)	1.000 (25,40)	.236 (6,00)	250
BMI-S-106	1.450 (36,83)	1.326 (33,68)	.200 (5,08)	300
BMI-S-107	1.747 (44,37)	1.747 (44,37)	.384 (9,75)	120
BMI-S-111	1.032 (26,21)	1.032 (26,21)	.079 (2,00)	625



# BOARD LEVEL SHIELDS

## STANDARD DESIGN SHIELDS

### STANDARD SURFACE MOUNT SHIELDS — TWO-PIECE

#### Reduce Board Damage From Inspection and Repairs

Two-piece board level shields offer users the flexibility to inspect or repair shielded components without having to risk board damage by removing the entire shield or incur any tooling costs. Covers snap on and off with ease, which makes repair of the component under the shield quicker and easier and reduces board re-work. Two-piece shields are available unassembled\*, and are designed to survive drop, shock and no-rattle tests.

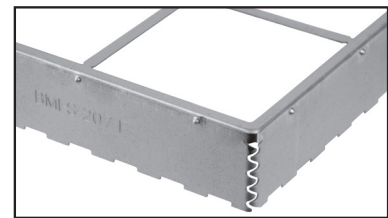
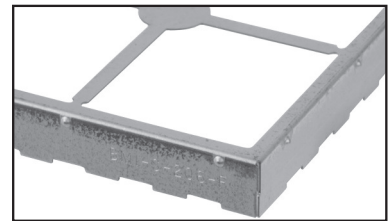
\*Pre-assembly is an option. Consult sales

### STANDARD TWO-PIECE BOARD LEVEL SHIELDS

PART NUMBER	OVERALL LENGTH in (mm)	OVERALL WIDTH in (mm)	OVERALL HEIGHT in (mm)	PARTS PER REEL
BMI-S-201-F	.538 (13,66)	.476 (12,10)	.100 (2,54)	1000
BMI-S-202-F	.650 (16,50)	.650 (16,50)	.142 (3,60)	700
BMI-S-203-F	1.032 (26,21)	1.032 (26,21)	.200 (5,08)	300
BMI-S-204-F	1.260 (32,00)	1.260 (32,00)	.236 (6,00)	225
BMI-S-205-F	1.500 (38,10)	1.000 (25,40)	.236 (6,00)	250
BMI-S-206-F	1.450 (36,83)	1.326 (33,68)	.200 (5,08)	300
BMI-S-207-F	1.747 (44,37)	1.747 (44,37)	.384 (9,75)	120
BMI-S-209-F	1.156 (29,36)	0.728 (18,50)	.275 (7,00)	400
BMI-S-210-F	1.732 (44,02)	1.201 (30,50)	.118 (3,00)	370
BMI-S-230-F	1.500 (38,10)	2.000 (50,80)	.200 (5,08)	250
BMI-S-230-F-R	1.500 (38,10)	2.000 (50,80)	.200 (5,08)	250
BMI-S-305	1.500 (38,10)	1.000 (25,40)	.236 (6,00)	250

#### Features and Benefits:

- Offers flexibility to inspect or repair shield components without risking board damage
- Covers snap on and off with ease



### DESIGN PARAMETERS – ALL PART NUMBERS

PICK-UP SPOT DIAMETER MATERIAL	MATERIAL	THICKNESS CARRIER TAPE	MATERIAL
6 mm or greater 0,20 mm	CRS Tin, Nickel Silver, 300 Series SS	0,20 mm	LTIMS-LCB
COVER TAPE	MATERIAL	REEL	DIAMETER
LTIMS-PSA	330 mm (101, 102, 103, 104, 201, 202, 203, 204) 381 mm (105, 106, 107, 205, 206, 207)	Plastic	EIA-481

# BOARD LEVEL SHIELDS

## EZ PEEL™

### PATENTED SHIELDS ARE SCORED TO ALLOW PEEL-OFF WHEN ACCESS IS NEEDED

These patented shields have a solid top, scored to allow peel-off when access to board level components within the shield is required.

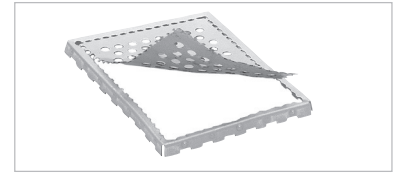
The peel-off feature prevents damage to the board and components by eliminating the need for labor intensive de-soldering, which can often result in increased scrap. Peeling off the cover is accomplished by using a small starter hole for simple removal. This hand operation requires minimal force using a hook scribe or tweezers.

After repair, replacement or adjustment of internal components, the shield can be resealed using a replacement cover. Laird offers two replacement cover options: a snap-in cover and a dish cover.

The snap-in cover utilizes a lance and hole design. The replacement cover snaps into place and locks into a lance feature on the frame of the original shield.

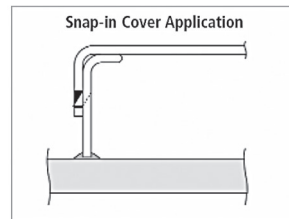
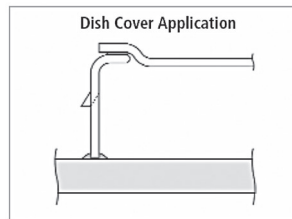
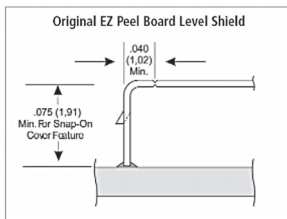
The other option is a dish cover that gets soldered into place on the board. The dish shape allows for self-location of the cover for soldering.

EZ Peel board level shields can be packaged in tape and reel formats for easy SMT installation using conventional pick-and-place equipment. The four standard sizes are also available without the EZ Peel (scored) feature.



### Features and Benefits:

- Easy removal of scored cover area
- Only requires 1.5 lbs force for cover removal
- Simple replacement technique for cover
- Use on surface mount or through-hole applications
- Shield retains all physical properties after PCMCIA/JEIDA testing for shock, bending, torque, drop and vibration
- CRS 1008/1010 (tin plated) for solderability



## RIGID CORNER

The rigid corner board-level shield incorporates a corner design that optimizes component rigidity for increased part and printed circuit board (PCB) firmness. As PCB designers are increasingly using thinner substrates, a rigid frame reinforces the assembly, thereby improving overall ruggedness and performance. The shield has improved solder joint reliability and resistance to solder joint fracture, especially in drop testing performance with thin PCBs. Several standard Laird EMI style parts including single-piece, two-piece, and multi-compartmental board-level shields use this new rigid corner design, along with availability in custom sizes as well.

The rigid corner shield is stronger and more robust than traditional formed shields, which results in coplanarity improvement of the solder castellations. The shield can tolerate more deflection (i.e., more handling) without plastic deformation. Elimination of drawn flange reduces the space needed on the PCB for shielding trace width by potentially ~0.3 mm, allowing for the shield to be more closely placed on the PCB. Elimination of draft allows for more undershield space and improved component clearance.

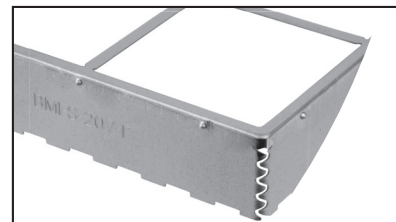
The partially drawn corner is located near the top portion the shield, resulting in improved torsional rigidity with no drawn lip and no draft. For parts over 2 mm, the corner is both drawn and formed with an interlocking multi-radius corner, which provides superior EMI shielding effectiveness. The interlocking corner can be meshed and closed in during the forming and drawing process for additional improved rigidity for parts taller than 2 mm. For parts under 2 mm, the entire corner is drawn without an interlocking corner.

### FEATURES

- Corner openings are reduced, improving shielding performance
- Partially drawn corner located near the top portion of the corner combined with 90° straight forming of wall sections for improved torsional rigidity.
- U.S. Patent No. 7,488,902

### MARKETS

- Computing
- Telecommunications
- Data Transfer and Information Technology
- Automotive
- Consumer Electronics
- Aerospace / Defense
- Medical
- Portability
- Industrial & Instrumentation
- Public Utilities



# BOARD LEVEL SHIELDS

## RECOVR™

The proprietary and patented ReCovr™ product line incorporates the functionality of a two-piece shield without the need for a separate frame and cover. The shield is specially designed with a locking mechanism that allows for easy removal of the shield cover when access to board-level components is required. The locking mechanism makes repair of components under the shield quick and easy by eliminating the need for removing the entire shield and reducing board re-work. The removable top shield also integrates Laird patented rigid corner board-level shield technology, which incorporates a new corner design that optimizes component rigidity for increased part and printed circuit board (PCB) firmness.

### FEATURES

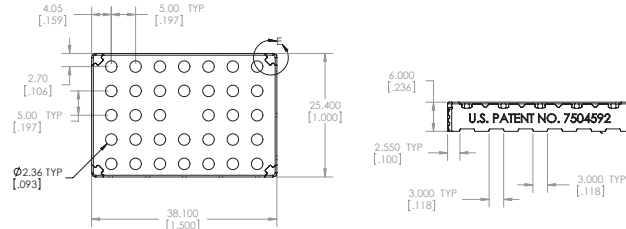
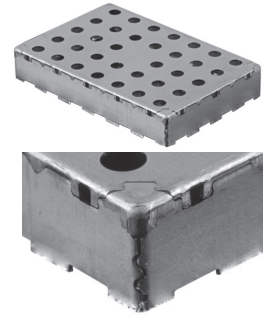
- Single-piece board-level shield with a removable top cover
- Eave-less side walls when the cover is removed
- SMT or through-hole pin configurations available
- U.S. Patent No. 7504592
- Other characteristics typical to one-piece shields: vent hole patterns, castellations, trace clearance notches, etc.

### BENEFITS

- Eliminates need for replacement covers
- Offered as an assembled product only: tape and reel, tray pack, or layer pack
- Excellent for periodic testing or rework applications.
- Limited footprint configurations (L-shapes, etc)
- Available in select Laird standard board-level sizes or custom configurations

### MARKETS OR APPLICATIONS

- Computing
- Telecommunications / Datacom
- Automotive
- Consumer Electronics
- SMART Metering
- Aerospace / Defense
- Medical
- Industrial & Instrumentation



## REMOVL™

The ReMovl feature incorporates the ReCovr attachment mechanism applied to the pickup bridge of a BLS frame to allow for easy, tool less detachment of the bridge after the frame is soldered to the PCB. Ease of detachment along with reliable and consistent separation force will allow for automated detachment.

### FEATURES

- Detachment is permanent – cannot be replaced like ReCovr
- Min Height: 2.0 mm (.080") Lower heights required Product Development Review
- Top Flange Width: 1.8 mm (.071")
- Flatness: Part Size Dependent, but typical to other Frame BLS parts
- Configurations Min 4 legs/branches required (see BLS Style options)
- Limitations: Must be folded or rigid corner type BLS. (No fully drawn parts.)
- Pull Force (Typ) 0.5 – 1.0 lbs

### MARKETS

- Ideal for customer manufacturing processes where post reflow detachment of the pickup bridge is required or desired. Applications that often require the bridge to be detached include:
  - Inspection
  - Rework
  - TIM Assembly into cover
  - Cover with contact fingers to chip, etc.
  - Noise / Vibration concerns of bridge to cover

**Note:** Due to delicate nature of the attachment of the pickup bridge, there will be some risk to the bridge separating during pick and place operations depending on customer manufacturing processes. Pick and place head depth tolerance (z axis) -.020"



# BOARD LEVEL SHIELDS

## INTRODUCTION

The complexities of today's electronics pose several design challenges. Resolving EMI needs to be balanced with space, weight and production restraints. When designing a custom shielding solution, beginning in the earliest stages of the application design allows effective elimination of EMI while meeting all specifications.

Laird board level shielding experts work through all phases of development. From design, rapid prototyping and pre-production through production and automated packaging, Laird has the experience to help speed a product to market and stay within budget.

To increase manufacturing throughput and reduce costs, Laird has developed a proprietary in-line production process that includes part formation, wash, assembly, inspection and automated packaging.

By integrating quality processes, board level shield quality and performance is ensured from design stage through final packaging. One process is the automated co-planarity inspection system. Laird replicates the customer application by measuring shields in the same plane as the printed circuit board. This is accomplished without "securing" or "touching" shields, which could throw off measurement and/or deform parts. Laird measures shields immediately prior to placement into carrier tape at speeds that match automation packing. Shield base materials include our exclusive Shield-Lite™, CRS 1008/1010, beryllium copper alloys, nickel-silver alloys, copper-based alloys and spring steels. All shields are fully solderable.

## ONE-PIECE SHIELD DESIGN LOW COST/EXCELLENT EFFECTIVENESS

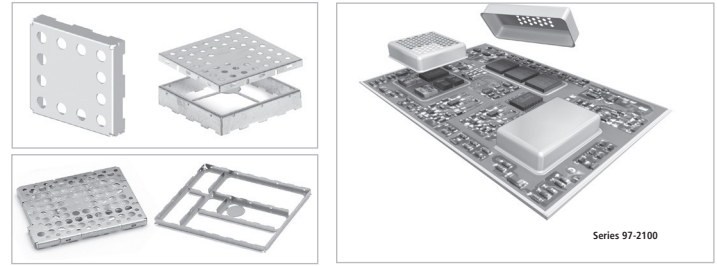
Custom surface mount shields are available in both one-piece and two-piece designs. One-piece shields provide six sides of protection, with the sixth side being the board itself. One-piece designs offer economical shielding alternatives where access to covered components for repair is not necessary.

## TWO-PIECE SHIELD DESIGN QUICK, EASY REPAIR AND INSPECTION OF COVERED COMPONENTS

Two-piece board level shields offer users the flexibility to inspect or repair shielded components without having to risk board damage by removing the entire shield. Covers snap on and off with ease, making repairs quicker and easier, and reducing board re-work. Two-piece shields are available pre-assembled or unassembled. Large locking dimples snap into slots on covers to provide mechanical retention force. Smaller grounding dimples provide electrical grounding for proper shielding and to prevent rattle. Two-piece shields survive drop, shock and no-rattle tests. Here are critical test results:

- Able to withstand acceleration of 4g from 10 Hz to 2000 Hz for three hours in each of three planes as per SAE J1455
- Pass EN 50 155 for railway electrical equipment including vibration test of 30g from 5 Hz to 200 Hz in 3 directions and a shock test with 500 m/s for 11/ms
- Pass standard telecommunications drop tests [6 faces, dropped 1 meter onto concrete floor]

Notice: The data set forth in all text, tables, charts, graphs and figures herein are based on samples tested and are not guaranteed for all samples or applications. Such data are intended as guides and do not reflect product specification for any specific part. Material properties are for reference only. Product testing by purchaser is recommended to confirm. Laird assumes no liability for product failure unless specifically stated in writing.



## MULTI-COMPARTMENTAL SHIELD DESIGN SHIELD MULTIPLE CIRCUIT GROUPS SAVE PCB SPACE AND PRODUCTION TIME

Multi-compartmental shields feature internal dividing walls of one material thickness and meet all on-board shield requirements for FCC, VDE, CISPR and CE. These shields are available in two-piece designs, either assembled or unassembled. Our unassembled versions allow for automatic optical inspection prior to cover placement. As in all our shielding offerings, Laird proprietary process for 100% automatic optical inspection verifies co-planarity including inner walls.

## DRAWN BOARD LEVEL SHIELDS SEAMLESS CORNERS ADDRESS HIGH-FREQUENCY LEAKAGE

As microprocessor speeds continue to increase, so does the potential for EMI leakage through the smallest apertures in board level shields. Laird drawn board level shields are designed to provide additional near-field and far-field circuit isolation (attenuation) at higher frequencies by eliminating the apertures found in the corners of traditional board level solutions. Drawn board level shields utilize small ground trace sizes, thereby preserving space on the circuit board.

- Solid corner designs when additional circuit isolation (attenuation) is required at higher frequencies
- Available in custom heights up to .250" (6,4 mm) with length and width dimensions from .300" (7,6 mm) to 2.0" (50,8 mm)
- Tape and reel packaging provides an economical and automated SMT attachment method
- Available in cold rolled steel, brass, stainless steel and nickel silver
- Molded Compartment Shields and Form-In-Place elastomers can be combined with drawn board level shields to achieve shielding of multiple components with a single part
- Available with an EZ Peel scored cover feature; allows for easy top section removal for component repair and re-sealing
- Ventilation holes as needed for solder outgassing.
- Online shielding effectiveness calculator

## SURFACE MOUNT SHIELDS MATERIAL VARIATIONS

RAW MATERIAL*	THICKNESS in (mm)	COMMENTS
Cold Rolled Steel 1008/1010	0.005 to 0.090 (0,127 to 2,286)	Pre-plated Tin
Nickel-silver alloys	0.004 to 0.016 (0,102 to 0,406)	No plating required for SMT solderability
Phosphor Bronze alloys	0.004 to 0.020 (0,100 to 0,510)	Pre-tempered & Preplated

\*Other materials may be available, please consult sales.

Note: Co-planarity dependant on design