



Busbar Power Solutions

Product Presentation



Power Solutions



Category Information

1. Power Connectors

Board, Cable, Busbar connectors



PwrBlade
PwrBlade(+)
HPCE BTB **NEW**
HPCE
HCI
PwrLoPro **NEW**
Airmax Power*
BarKlip **NEW**

2. Power Cable IO

Cable Assemblies



PwrBlade Cable
HPCE Cable **NEW**
PwrProfile
PwrProfile(+)
PwrTwinblade

3. Busbar

Laminated Busbars

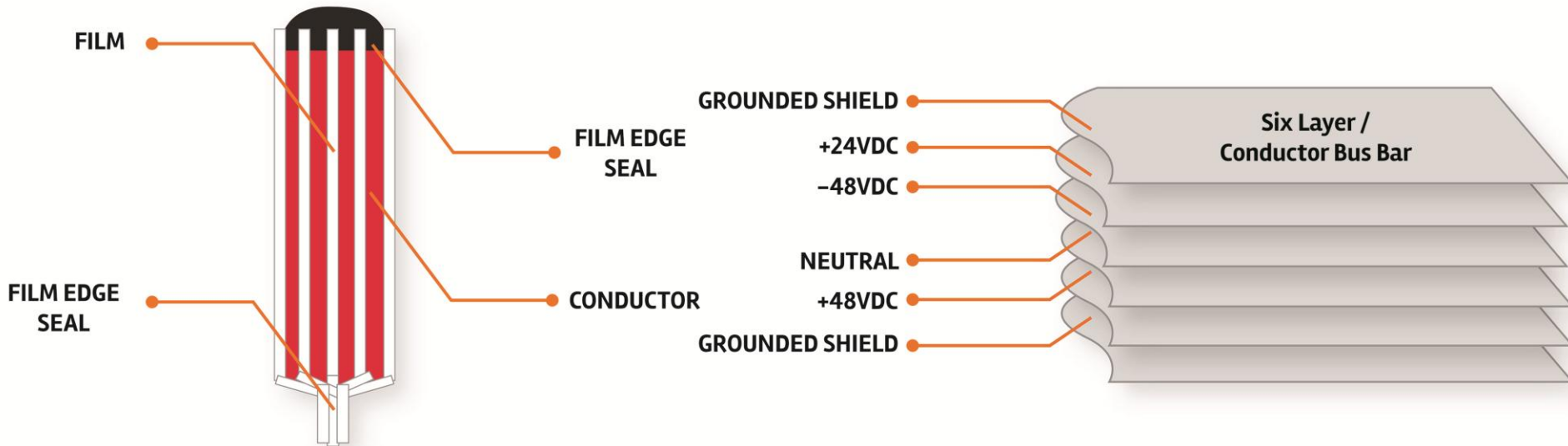


Customer-made

Product Overview – Bus Bar

To Distribute Electrical Power to Electronic Circuits

- A Laminated Bus Bar is an electrical conductor made of several layers of stamped and formed copper sheet. Each layer is individually insulated so the bar can distribute current, AC or DC, at different voltages. Layers can also be used to transmit signals.



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Bus Bar Value Proposition

Features and Benefits

| | |
|--|--|
| Space Saving | Complex three dimensional configurations. Pre-shaped 3D system; Multiple current carrying capacity in a single assembly; |
| Ease of Installation | Customized modular form for ease of handling and installation; Error-free wiring |
| Improved Thermal Characteristics | Better thermal characteristics (heat dissipation); Thin thickness allows better air flow in systems; |
| Improved Electrical Performances | Low inductance; High distributed capacitance; Designed to meet partial discharge requirements; |
| Long Term Reliability and Better Quality | Fully tested products; high reliability and repeatability performances; |
| A Cost Effective Solution | Integrated electronic components (breakers, fuses...); Reduces customer assembly time; Reduces number of components |

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FCI Strength – Bus Bar

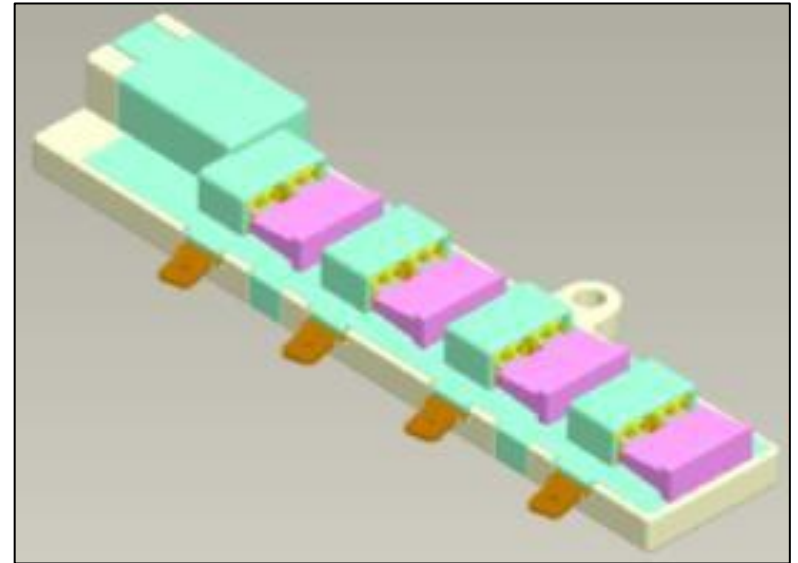
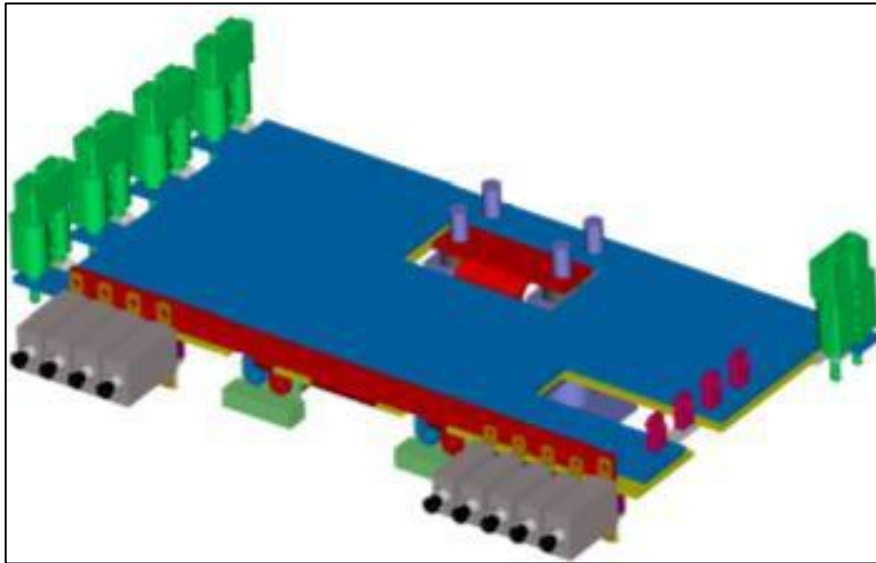
- FCI has almost 30 years of busbar design and manufacturing experience
- As a leading connector manufacturer and cable assembly provider, FCI can provide highly integrated power distribution solutions together with FCI power connectors & cables
- FCI has the entire Bus Bar development capability from design, simulation, testing, to manufacturing - all can be done in house
- Strong customer base includes all leading players in Datacom & Telecom

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FCI Bus Bar Design Capability

Create all drawings (2D & 3D) with ProE

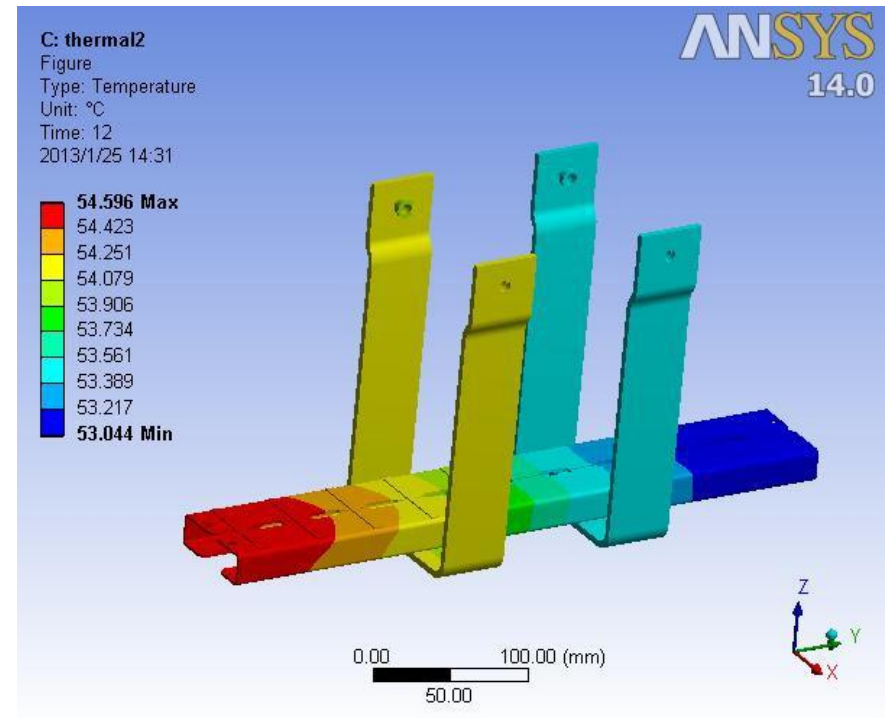
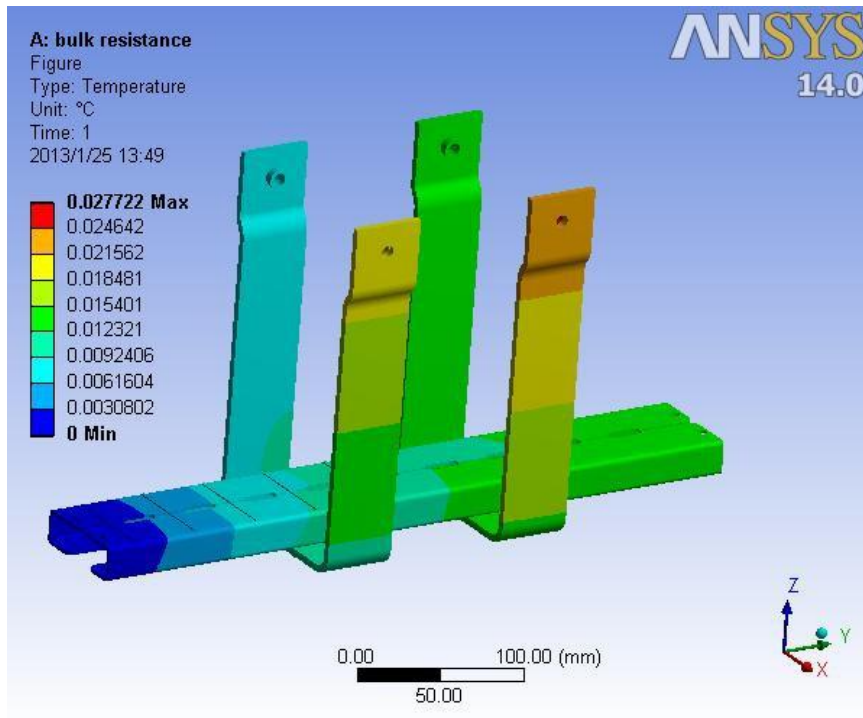


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FCI Bus Bar Design Capability

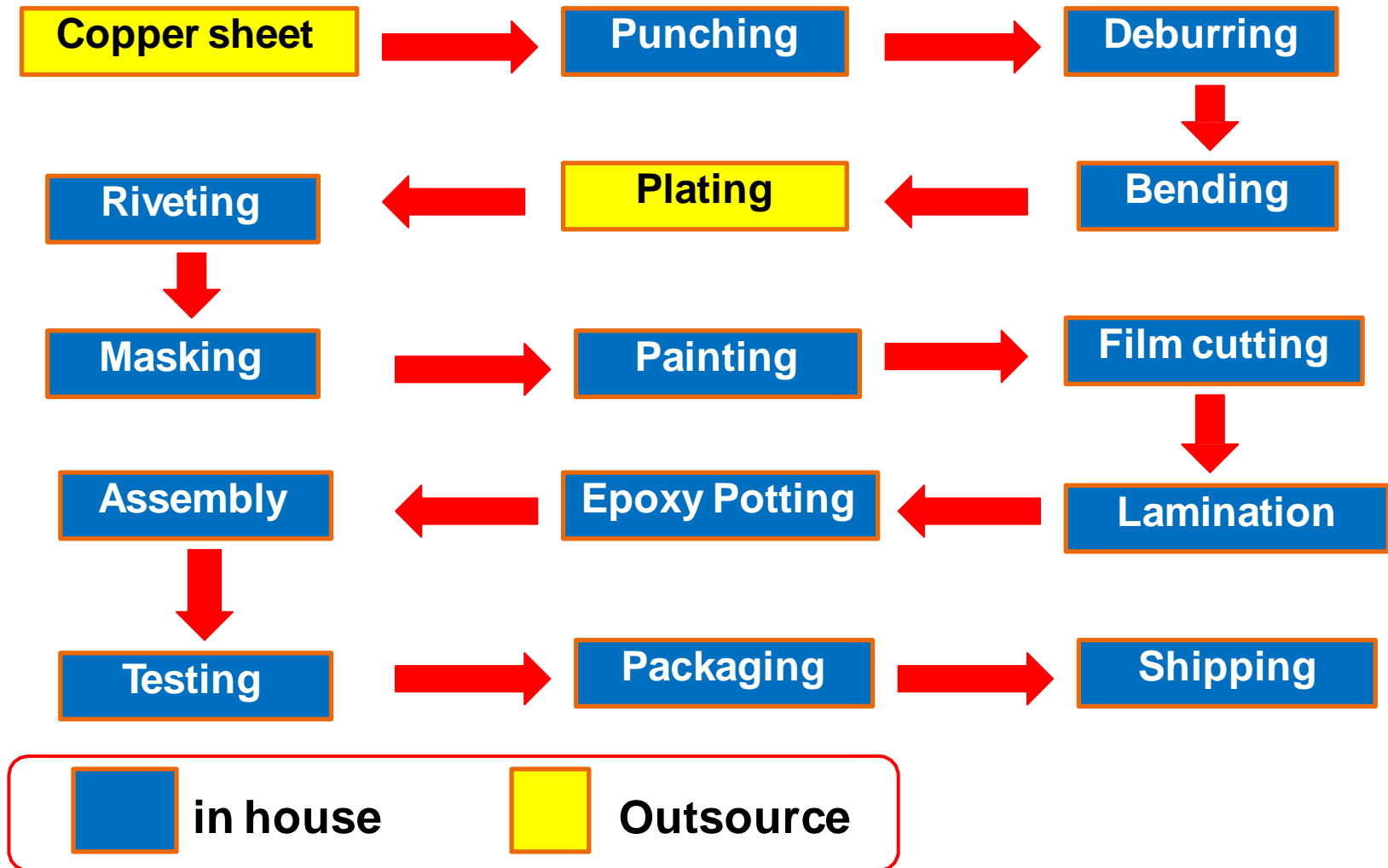
Use ANSYS software for voltage loss and T-rise simulation to minimize design risk and improve design efficiency.



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FCI Bus Bar Manufacturing Flow Chart



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FCI Manufacturing Capability: CNC Punching



CNC Turret Punch



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FCI Manufacturing Capability: CNC Punching



Automated De-Burring Machine

Before



After

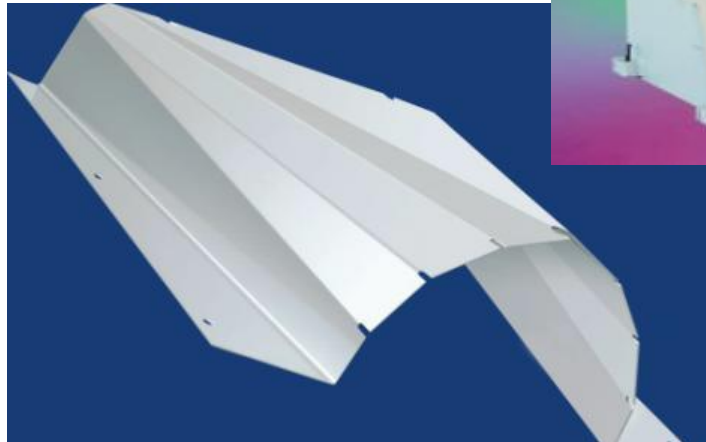


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FCI Manufacturing Capability: CNC Forming

CNC Bending Machine



FCI Manufacturing Capability: Riveting



Semi-automatic
Clinch Fastener
Inserter



PEM® Self-clinching and Broaching Fasteners

FCI Manufacturing Capability: Painting

Semi-Automated painting line:
Includes two steps (1, spraying; 2, roasting)



Spray chamber
(Powder is absorbed on the surface of conductor under electrostatic effect)



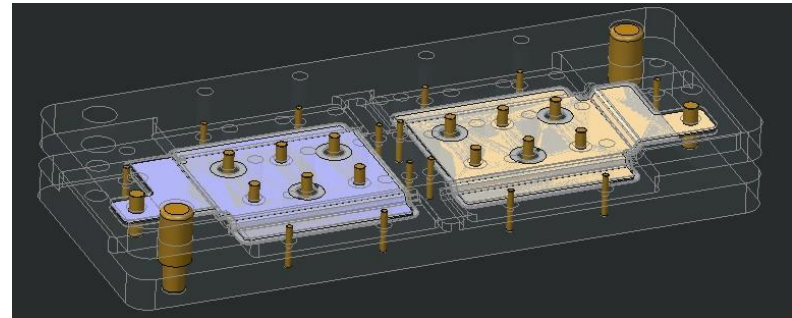
Oven
(Powder is solidified in high temperature)

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FCI Manufacturing Capability: Lamination

Lamination Presses & Tool Design



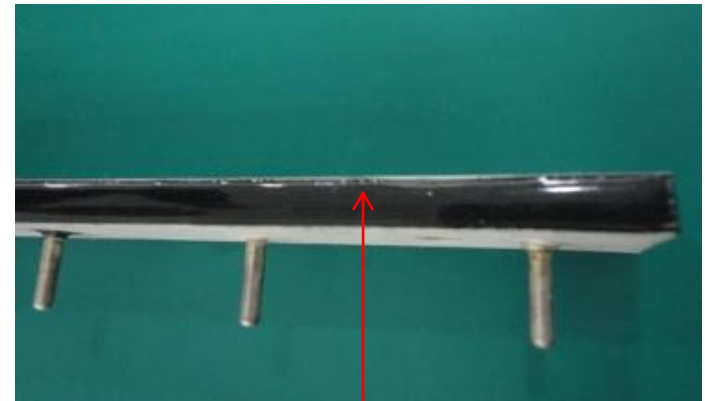
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FCI Manufacturing Capability: Epoxy Potting Compound



Epoxy Potting Line... The mixing and application of epoxy potting compounds is a labour intensive process requiring skill and expertise



Epoxy Area

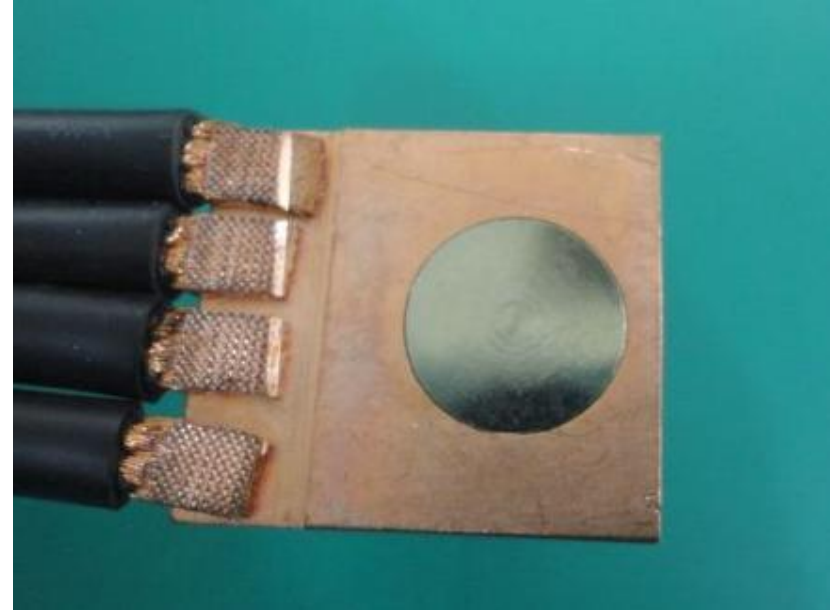
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FCI Manufacturing Capability: Ultrasonic Welding



Ultrasonic Welding Machine



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FCI Testing Capability: Dimensional Verification



CMM (UK):
Dimension Measuring



Microscope Meter (Nikon):
Dimension Measuring



X-ray (Fischer):
Plating Thickness Measuring



Microscope Meter (Nikon):
Dimension Measuring

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FCI Testing Capability: Electrical Tests



Hi-pot Tester (Extech):
Insulation Resistance & Voltage Proof
Test



Micro-ohm Meter (Hope tech):
Resistance Test



Milliohm Meter (Agilent):
LLCR Test



PD Tester (Dielec):
Partial Discharge Test



Precision LCR Meter (HP):
Capacitance Measuring



Power Supply (Agilent):
Current Rating (T-rise) & Contact
Resistance Test

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FCI Testing Capability: Climatic Tests



Thermal Shock Chamber (Asli):
Thermal Shock Test



Humidity Chamber (Asli):
Thermal Cycling Test



Oven (Asli):
High Temperature Life Test



Salt Spray Chamber (Asli):
Saly Spray Test



Steam Aging Chamber (Asli):
Steam Aging Test



MFG Chamber (Yamasaki):
Mixed Flowing Gas Corrosion
Test

Why use Laminated Bus Bars?

In electronics, laminated bus bars are used for two main reasons

- To replace cable
 - ... In the case of a cable replacement...
 - Because laminated bus bar conductors are made of wide, thin copper sheet, they dissipate heat more efficiently than circular cables. This critical geometric characteristic is what allows bus bar conductors to carry more current than cables for a given cross section.
 - Laminated bus bars can also be formed to fit in small areas and around corners where cables can not.
 - A laminated bus bar is neater, more elegant and easier to install than a cumbersome “daisy chain” harness.

Why use Laminated Bus Bars?

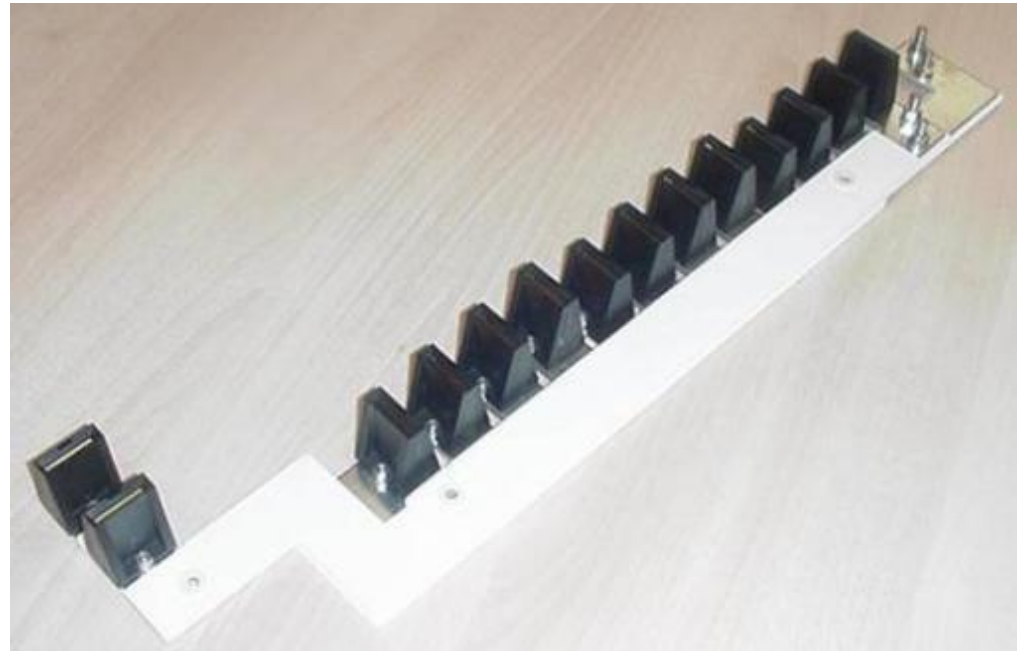
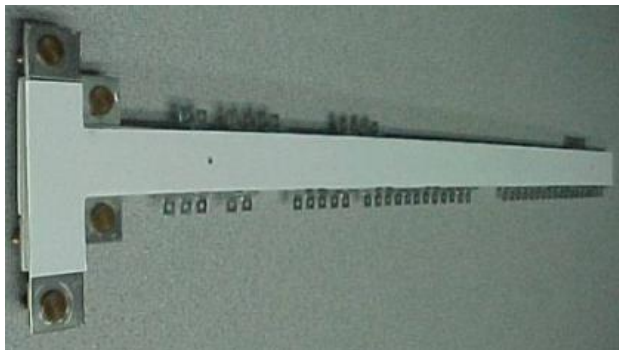
In electronics, laminated bus bars are used for two main reasons

- To replace traces and/or reduce power of layers on a backplane/PCB/motherboard
 - ... In the case of a backplane/PCB/motherboard...
 - A bus bar fastened or soldered to a PCB acts as a solder trace, albeit a trace capable of carrying much more current than that of a normal trace.
 - The distribution of high current on a backplane ($>100A$) is costly because of the additional and usually thick copper layers required. A bus bar mounted to the backplane replaces costly power layers.

Exmaples of Laminated Bus Bars Advantages

Cable Replacement

- Photos of laminated bus bars designed to distribute current from the power supply shelf to the other shelves and/or to multiple points along the backplane...
Eliminating large, bulky cables

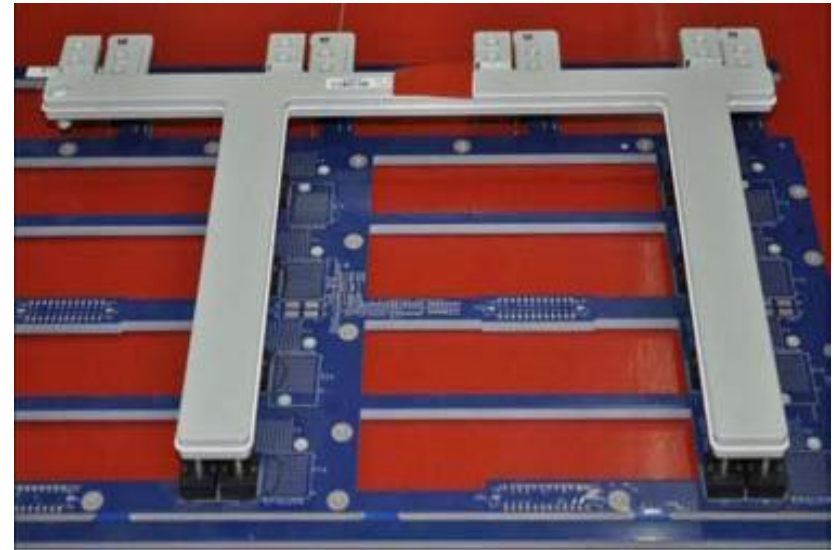
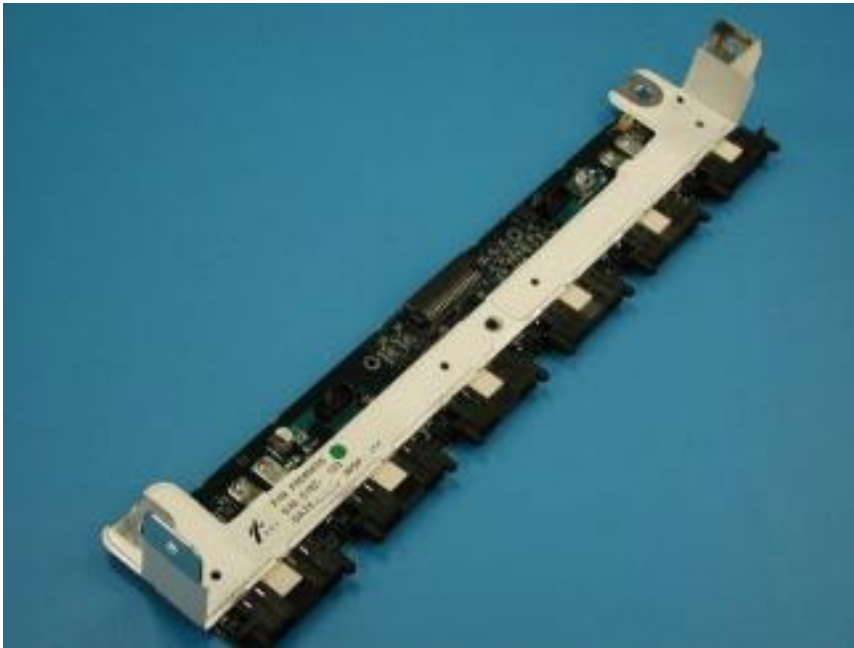


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Examples of Laminated Bus Bars Advantages

Power Layer Replacement

- Photos of laminated bus bars designed to distribute current along the backplane



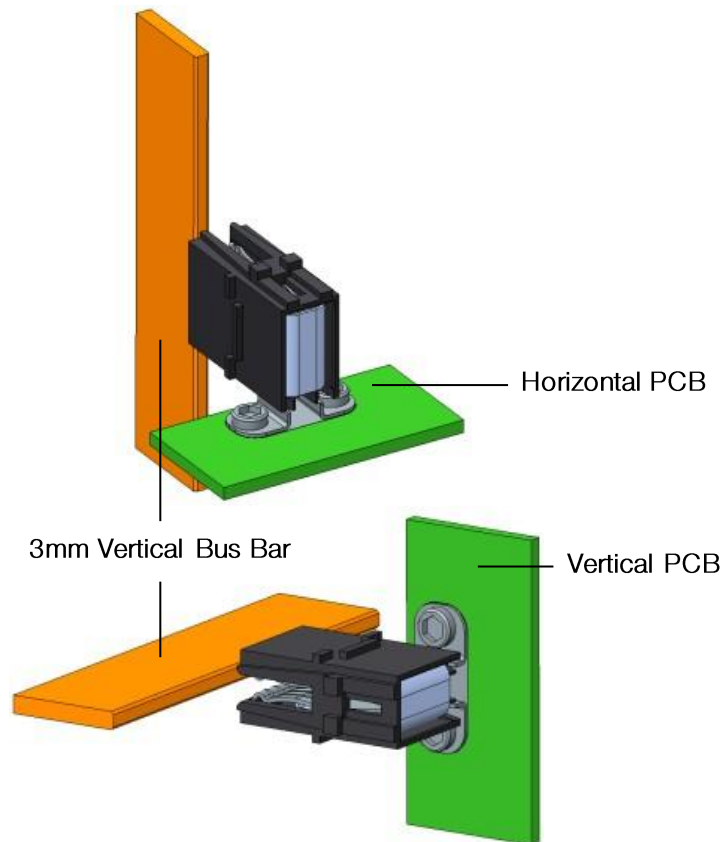
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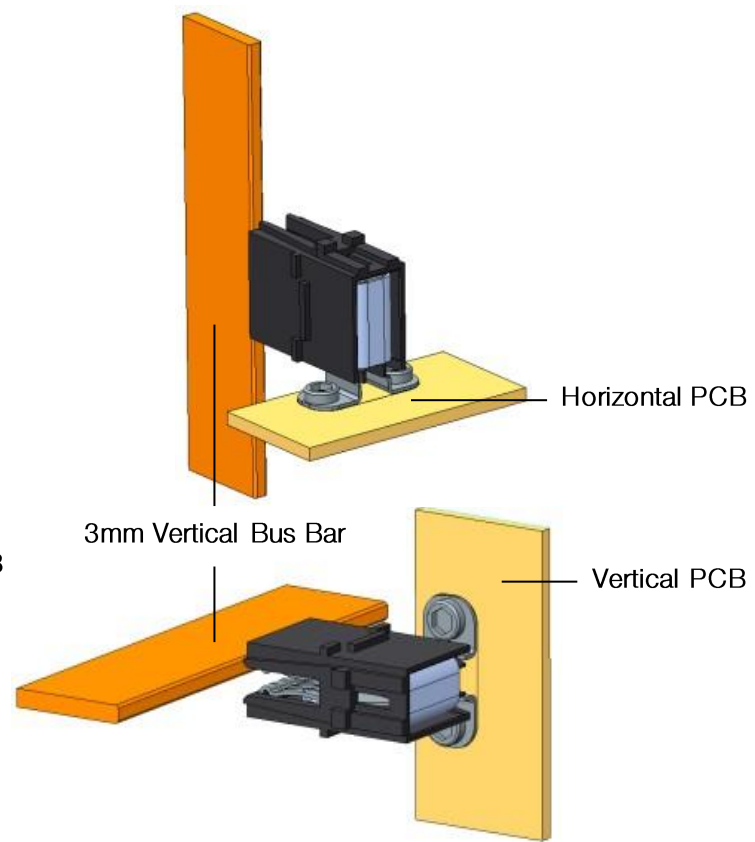
BarKlip Application

- R/A Connector with Screw Mount

PCB to Bus Bar Application



Bus Bar to Bus Bar Application

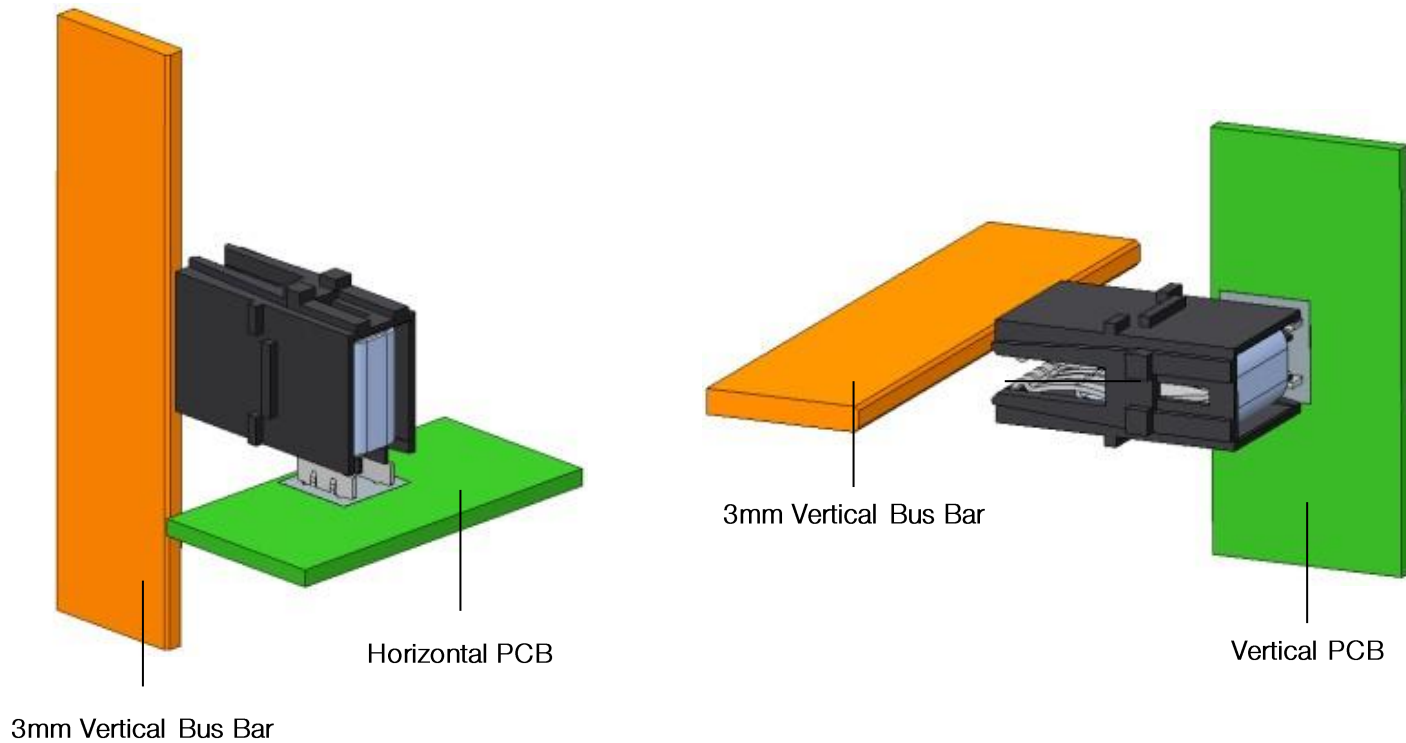


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BarKlip Application

- R/A Connector with Solder Tab

PCB to Bus Bar Application



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Bar Klip Spec

- R/A Connector Application
 - Bus-Bar material thickness: $3.0 \pm .1$ mm. (also available in 2.5mm, 2.0mm)
 - Misalignment allowance between two bus bar: ± 1.0 mm included twist and flatness
 - Blind mate, hot plug and hot swap application
 - Available for solder tab on PCB and screw mount on PCB and busbar
- Electrical Performance:
 - Current rating: 150A max.
 - Contact resistance: $0.2\mu\text{m}$ maximum
 - Voltage: -48VDC
- Environment:
 - Operating temperature: -40°C to 125°C
 - RoHS compliance
 - Halogen free
- Plating Spec:
 - $3\mu\text{m}$ min. Tin over $1.25\mu\text{m}$ min Nickel
 - Surface roughness in contact area: $1.6\mu\text{m}$ maximum



THANK YOU

