

Article Overview

Anti-tracking in backplane connectors is achieved through compliant pin designs and mechanical guidance modules that ensure proper alignment and prevent mis-insertion.

Anti-Tracking Mechanisms

In high-speed backplane systems, anti-tracking refers to design features that prevent misalignment or unintended electrical contact when inserting a daughter card into a backplane. This is critical for maintaining signal integrity and avoiding damage to pins or traces. Common anti-tracking strategies include:

- o **Compliant Pins:** These pins are slightly flexible and designed to accommodate minor misalignments during insertion. They maintain reliable electrical contact while reducing stress on the PCB and connector. Compliant pins are available in various diameters (e.g., 0.36mm, 0.39mm, 0.46mm) and are used in systems like Molex Impact and Impel backplane connectors to optimize mechanical and electrical performance .
- o **Mechanical Guidance Modules:** These modules provide physical alignment before the pins engage. They can be pin-style or blade-style, with tolerances typically in the range of $\pm 2.9\text{mm}$ to $\pm 3.5\text{mm}$ depending on orientation and slot pitch. Guidance modules are often made from zinc alloy with ESD protection and are designed to fit specific slot pitches (e.g., 17mm or 20mm) to ensure proper mating .
- o **Keying and Slot Design:** Connectors may include keying angles or notches that prevent incorrect insertion orientation, further reducing the risk of tracking or misalignment. These features are often specified in the product drawings and vary with backplane thickness and module type .

Electrical Considerations

Anti-tracking features also support signal integrity by minimizing cross-talk and maintaining consistent impedance across differential pairs. Proper pad stack design, removal of non-functional pads, and careful routing of traces are essential to prevent unintended electrical paths that could result from misalignment . High-speed backplane systems, such as those supporting 25-40 Gbps data rates, rely on these design strategies to maintain performance across multiple differential pairs per inch .

Practical Implementation

When designing or selecting a backplane connector with anti-tracking features:

- o Choose compliant pins appropriate for the PCB hole size and signal requirements.
- o Incorporate mechanical guidance modules to align the daughter card before pin engagement.
- o Use keying and slot design to prevent incorrect insertion.

o Follow recommended pad stack and routing guidelines to maintain signal integrity.

These combined mechanical and electrical strategies ensure reliable, high-speed operation while protecting the backplane and daughter cards from damage due to misalignment or tracking issues .

A backplane or backplane system is a group of electrical connectors in parallel with each other, so that each pin of each connector is

Backplane connectors are the key to PCBs becoming a more complex system. Backplane connectors, or sometimes

Dive into the ultimate guide to Backplane PCBs! Learn how these essential components

Here, we have enlisted top 10 Backplane Connector manufacturers; Harting: Harting's connector has worldwide

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About Backplane Connectors Backplane connectors are used in high-reliability applications such as computer buses and often

Industrial Backplane Connector Solutions The Amphenol industrial backplane connector range is one of the broadest and includes

ISA passive backplane showing connectors and parallel signal traces on back side. Only components are connectors, capacitors,



**Icelandic
anti-tracking**

backplane

connector

The Impact backplane connector system is designed for traditional backplane and/or midplane architectures to meet the growing

A backplane PCB contains slots or connectors to interface with these modules, allowing for the transfer of power,

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