

What is the circuit board of an AI server



AI Overview

AI server PCBs are high-performance, multi-layer circuit boards designed to handle extreme data rates, power delivery, and thermal loads in AI servers. Overview AI server PCBs serve as the central backbone connecting GPUs, CPUs, memory, storage, and networking components in AI servers, enabling high-speed data processing and parallel computing for AI workloads. Unlike traditional server PCBs, AI server boards are engineered for ultra-high performance, supporting data rates exceeding 112 Gbps and power delivery of 300–700W per accelerator. Key Features Layer Complexity: AI server PCBs typically have 20–40+ layers, compared to 8–12 layers in conventional servers. Advanced designs may reach 68 layers for prototyping and 32 layers for mass production. Precision Manufacturing: Line widths and spacing are often ≤ 40 microns, with laser-drilled vias and high aspect ratios to ensure signal integrity. High-Density Interconnects (HDI): Supports dense routing between processors, accelerators, and memory, often using blind, buried, and any-layer vias. Thermal Management: AI PCBs integrate liquid cooling and heavy copper layers to dissipate kilowatt-level heat from GPUs and TPUs. Material Upgrades: Enhanced materials reduce signal loss and improve transmission speed, critical for high-bandwidth memory and NVSwitch interconnects. Architecture and Value AI server PCBs are divided into GPU board assemblies, CPU motherboard assemblies, and accessory modules such as power supplies and control boards. The GPU board assembly is the most valuable, containing GPU substrates, NVSwitch carriers, and OCP Accelerator Modules (OAMs) with 14–16 layers per substrate. For example, a DGX A100 server with eight GPUs requires eight substrates, each supporting advanced 2.5D/3D packaging. Cost Considerations AI server PCBs are significantly more expensive than traditional server boards. A single NVIDIA NVL72 PCB can cost \$170,000, reflecting the complexity, high-speed performance, and critical role in up...

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What is AI Server PCB?

Definition and Function of AI Server PCBs. An AI server PCB—specifically, a printed circuit board designed for use in artificial intelligence servers—stands as one of the core components of

AI Server Demand Drives Circuit Board Material Price Surge

AI servers are equipped with large quantities of high-performance semiconductors such as GPUs and high-bandwidth memory (HBM). For these components to exchange data rapidly, high

Panasonic Industry Announces an Investment of 7.5

Guangzhou Factory produces a wide range of products, from the MEGTRON6, an industry-pioneering Multi-layer Circuit Board Materials for

Nvidia's AI Scaling Hit by Circuit Board Snag

Nvidia's latest AI ambition has hit a hard stop. The Kyber AI rack, designed to house 144 GPUs in a single server cabinet, will not arrive until 2028—pushed back from 2027. The culprit is a

Atlantic International University

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AI Server PCB Hardware Breakdown

This article explains the internal PCB composition of an AI server by disassembling the server hardware, so readers can gain a clearer understanding of the PCB types and their relative

AI Server PCB

AI server PCBs are high-performance printed circuit boards specifically engineered for artificial intelligence servers.

AI Server PCB: Types, Design Guidelines & Key Features

An AI server PCB is a printed circuit board that is specially designed for AI servers. Compared to standard server PCB, it supports higher computing power, faster data transmission,

Iran war disrupts the circuit board supply chain, raises costs for tech ...

The conflict in the Middle East has disrupted supplies of crucial raw materials and pushed up prices of the printed circuit boards (PCB) used in almost all electronic devices, from smartphones

AI Server PCB: The Right Manufacturer for Data Centers

An AI server PCB is a specialized printed circuit board engineered to support the extreme demands of artificial intelligence workloads in enterprise and hyperscale data centers, connecting AI

AI Server PCB Hardware Breakdown Complete Guide: Core

Every time I disassemble an AI server, I'm always amazed by the densely packed circuit boards and components inside. These seemingly insignificant PCBs actually hold the soul of the

Hidden beneath AI chips, Chinese-made circuit boards raise national ...

With demand booming for printed circuit boards, the U.S. government is trying to boost domestic production to move away from reliance on China.

China's circuit-board makers push capex towards record to feed AI boom

China's printed circuit board (PCB) makers are embarking on a factory-building spree to feed demand fuelled by the global artificial intelligence boom, a rush that is expected to push their ...

Iran war disrupts the circuit board supply chain, raises

Multi-layer PCBs can cost around 1,394 yuan (\$204) per square metre, with higher-end models for AI servers costing around 13,475 yuan,

Deconstructing AI Servers: A Look Inside PCB Composition and Value

To truly grasp the intricate composition of an AI server, disassembling its hardware provides invaluable insight into its printed circuit board (PCB) architecture.

AI boom sparks Kingboard subsidiary's US\$1.5 billion stake sale to

AI server backlogs and supply chain strains push Kingboard to tap markets and expand circuit board output Riding on a buoyant stock market for artificial intelligence hardware components ...

Printed Circuit Board Market Size, Share Report, 2026

Printed Circuit Board Market Summary The global printed circuit board market size was valued at USD 82.7 billion in 2025 and is projected to grow from USD 87.8

NVIDIA and Doosan Expand Physical AI Across Robots, Reactors,

CCL — a copper foil bonded to an insulating substrate — is the foundational material for printed circuit boards used in NVIDIA's AI accelerators, networking gear, and server motherboards.

AI Server PCB Manufacturing Guide: HDI, High-Speed Design,

An AI server PCB is a high-performance circuit board built for GPU servers, AI accelerators, HPC systems, and data center computing systems. Compared with standard server

How to Design PCBs for Data Centers and AI Servers

Designing PCBs for AI servers and hyperscale data center platforms requires architectures that support extreme routing density, high-speed serializer/deserializer (SerDes)

Iran War Disrupts Circuit Board Supply Chain, Drives

Middle East conflict disrupts circuit board supply chains, raising PCB prices and tech manufacturing costs globally. Industry faces severe material

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What Is an AI Server? Architecture, Components & PCB Requirements

Understanding those differences is essential for anyone involved in designing, manufacturing, or procuring the printed circuit boards that make AI servers function. This article breaks down AI server

Nvidia's next-gen AI rack system delayed to 2028 on ...

The Kyber NVL144 has been pushed to 2028 due to difficulties in manufacturing a key circuit board: SemiAnalysis. The reported delay adds to concerns that Nvidia's breakneck annual

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