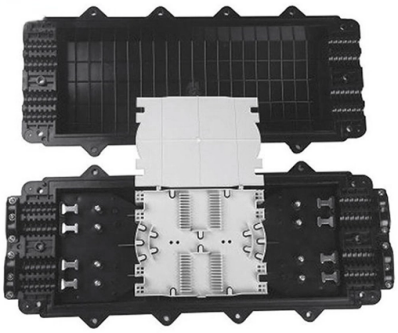
DANI ALONSO OPTICAL CONNECTIVITY

AI Server Hardware Section



Overview

AI Server PCB Hardware Breakdown From a functional perspective, PCB value in an AI server can be grouped into three parts: the GPU board assembly, Powering.

Key Takeaways

AI servers are composed of specialized hardware sections including GPU accelerator cards, CPU motherboards, storage and control boards, power modules, and high-performance interconnects, all optimized for AI workloads.Core Hardware Sections

Modern AI servers, such as NVIDIA DGX A100/H100 systems, are typically divided into five main hardware sections:

• Front Fan Module: Houses multiple fans (e.g., eight in an 8U server) to manage airflow and cooling for high-density components .

• Drives and Front Control Board: Contains storage drives and a control board responsible for system management and external device signaling. For example, the DGX A100 includes eight 3.84 TB drives, totaling 30 TB of internal storage .

• GPU Board Assembly (GPU Board Tray): The defining section of AI servers, containing GPU accelerator cards, module boards, and NVSwitch units. GPUs like NVIDIA H100 or AMD MI300X are mounted on multi-layer PCBs with HBM memory stacks, power management ICs, and thermal interface materials. SXM-form-factor GPUs require a baseboard for power, NVLink routing, and PCIe connectivity .

• CPU Motherboard Assembly (CPU Motherboard Tray): Hosts the system CPUs (e.g., AMD EPYC or Intel Xeon), system memory, network adapters, and PCIe switches. CPUs handle system management and workloads unsuitable for massive parallelization, while GPUs perform the bulk of AI computations .

• Power Modules: Include multiple power supply units to support high-performance GPUs and other components. Each GPU accelerator card (OAM) corresponds to a dedicated power and PCB configuration, often requiring 14–20 PCB layers with Ultra Low Loss materials for high-end systems .
PCB and Semiconductor Considerations

AI server PCBs are among the most complex in the industry. Key points include:

• GPU Accelerator Cards: Multi-layer PCBs with GPU dies, HBM stacks, and power ICs. SXM GPUs mount to a baseboard for connectivity and power distribution .

• Unit Baseboard (UBB): Hosts the entire GPU platform, often a 26-layer PCB with Ultra Low Loss CCL, critical for NVSwitch and GPU interconnects .

• Semiconductors: Chips account for over 95% of an AI server rack's content value, including AI accelerators, CPUs, DPUs, FPGAs, and networking chips. These components provide the compute, memory, and interconnect bandwidth required for AI training and inference .
Summary

AI servers are purpose-built for massive parallelization and high-throughput tensor operations, with hardware sections optimized for cooling, power delivery, and interconnect performance. The GPU assembly, CPU motherboard, storage/control boards, and power modules are tightly integrated, with PCB design and semiconductor selection playing a critical role in overall system efficiency and AI workload performance .

Article Content

AI Server PCB Hardware Breakdown

From a functional perspective, PCB value in an AI server can be grouped into three parts: the GPU board assembly,

Powering AI: The Semiconductor Ecosystem at the Foundation of

Breaking down the AI hardware stack: Chips in an AI data server As the following section will illustrate, breaking down AI server rack

A Jargon-Free Guide on How AI Server Architecture Works

While traditional servers rely mostly on CPUs, AI servers lean heavily on graphics processing units (GPUs) and

Artificial Intelligence (AI) Servers – Intel

AI servers are strategically architected from AI hardware components to support AI workloads from edge to cloud. Critical elements

Knowledgebase

Looking for a dedicated server to deploy your AI models? Bacloud offers dedicated GPU servers tailored to

A Jargon-Free Guide on How AI Server Architecture Works

AI server architecture combines specialized processors, high-speed connections, and

AI Hardware Requirements: A Comprehensive Guide

This guide covers AI hardware requirements in detail, including CPUs, CPU, TPUs and

AI Servers in 2025: What Hardware is Needed to Run LLMs and

Discover essential hardware for AI servers in 2025, focusing on requirements for LLMs and neural networks. Learn

AI Infrastructure Server Solutions For Enterprise | Supermicro

Supermicro''s Enterprise AI solutions offer exceptional performance for AI servers, edge AI servers, and AI GPU servers. Empower

Building the AI Server

Powering Advanced Workloads with AI Servers Artificial intelligence (AI) is being adopted

AI Servers | Artificial Intelligence Infrastructure Solutions

Explore Lenovo AI servers to help businesses accelerate and scale AI solutions efficiently while managing and protecting all data.

What is an AI server?

Defining AI servers AI servers are specialized computing systems that host and execute AI workloads. They provide the hardware

AI Server PCB Hardware Breakdown

GPU board assembly (GPU Board Tray): The rear area houses the critical components of

AI Servers: Hardware, Workloads, and Deployment Options

Discover what an AI server is, how it differs from traditional servers, when should use one, and what to expect from AI

What is AI hardware?

AI hardware refers to specialized components designed for AI systems or adapted from HPC to manage

Hardware for artificial intelligence

Scope For the purposes of this article, AI hardware refers to computing components and systems specifically designed or optimized

Knowledgebase

Looking for a dedicated server to deploy your AI models? Bacloud offers dedicated GPU servers tailored to

A Jargon-Free Guide on How AI Server Architecture Works

AI server architecture combines specialized processors, high-speed connections, and

AI Hardware Requirements: A Comprehensive Guide

This guide covers AI hardware requirements in detail, including CPUs, CPU, TPUs and

AI Servers in 2025: What Hardware is Needed to Run LLMs and

Discover essential hardware for AI servers in 2025, focusing on requirements for LLMs and neural networks. Learn

AI Infrastructure Server Solutions For Enterprise | Supermicro

Supermicro''s Enterprise AI solutions offer exceptional performance for AI servers, edge AI servers, and AI GPU servers. Empower

Building the AI Server

Powering Advanced Workloads with AI Servers Artificial intelligence (AI) is being adopted

AI Server PCB Hardware Breakdown

From a functional perspective, PCB value in an AI server can be grouped into three parts: the GPU board assembly,

Powering AI: The Semiconductor Ecosystem at the Foundation of

Breaking down the AI hardware stack: Chips in an AI data server As the following section will illustrate, breaking down AI server rack

A Jargon-Free Guide on How AI Server Architecture Works

While traditional servers rely mostly on CPUs, AI servers lean heavily on graphics processing units (GPUs) and

Artificial Intelligence (AI) Servers – Intel

AI servers are strategically architected from AI hardware components to support AI workloads from edge to cloud. Critical elements

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

Understand AI server architecture from a hardware engineer''s perspective—key components, PCB design challenges, manufacturing

What is an AI server?

An AI server executes workloads by coordinating compute, memory, storage, and high-speed data movement in a specialized

Deconstructing AI Servers: A Look Inside PCB Composition and Value

What Are the Key Hardware Sections of an AI Server PCB Architecture? To truly grasp the intricate composition of an

AI Server PCB Hardware Breakdown Complete Guide: Core

Ultimately, the hardware architecture of an AI server is like a sophisticated ecosystem, where each component has its

What is an AI Server? AI Server Architecture Explained

In this quick guide, we''ll walk you through everything you need to know before deploying your first AI server

AI Server Hardware Components and Requirements | Lenovo US

This article provides an in-depth exploration of the hardware components required for AI servers, focusing

AI Server PCB Hardware Breakdown

From a functional perspective, PCB value in an AI server can be grouped into three parts: the GPU board assembly,

Powering AI: The Semiconductor Ecosystem at the Foundation of

Breaking down the AI hardware stack: Chips in an AI data server As the following section will illustrate, breaking down AI server rack

A Jargon-Free Guide on How AI Server Architecture Works

While traditional servers rely mostly on CPUs, AI servers lean heavily on graphics processing units (GPUs) and

Artificial Intelligence (AI) Servers – Intel

AI servers are strategically architected from AI hardware components to support AI workloads from edge to cloud. Critical elements

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

Understand AI server architecture from a hardware engineer''s perspective—key components, PCB design challenges, manufacturing

What is an AI server?

An AI server executes workloads by coordinating compute, memory, storage, and high-speed data movement in a specialized

Deconstructing AI Servers: A Look Inside PCB Composition and Value

What Are the Key Hardware Sections of an AI Server PCB Architecture? To truly grasp the intricate composition of an

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

Contact Us

Continue your research online:

Website: https://danialonso.es
Technical inquiry: https://danialonso.es/contact.html

This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.