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Patent Search

Invention Title	Optimized Multilayer PCB for IoT-Based Asset Tracking Device
Publication Number	48/2025
Publication Date	28/11/2025
Publication Type	INA
Application Number	202541108930
Application Filing Date	07/11/2025
Priority Number	
Priority Country	
Priority Date	
Field Of Invention	MECHANICAL ENGINEERING
Classification (IPC)	F24S 25/16, H01L 23/528, B22F 10/47, H02S 40/36, H01L 21/768

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Abstract:

The invention provides a compact, power-efficient Printed Circuit Board (PCB) design framework for Internet of Things (IoT)-enabled payment devices using Altium Designer. The PCB integrates Near Field Communication (NFC), microcontroller, and sensor modules within a four-layer high-density interconnect structure featuring controlled impedance routing and advanced grounding for electromagnetic compatibility. Through 3D simulation, thermal analysis, and design rule verification, the invention achieves optimal signal integrity, low latency, and stable power distribution. This design enhances transaction security, minimizes interference, and ensures manufacturability and scalability for compact payment systems. The invention thereby offers a reliable, cost-effective solution for modern IoT-based financial hardware and portable contactless payment applications.

Complete Specification

Description:FIELD OF THE INVENTION

[001] The present invention pertains generally to the field of electronic circuit design and development, and more particularly relates to a printed circuit board (PCB) architecture optimized for Internet of Things (IoT)-based asset tracking devices. The invention specifically concerns a multilayer, high-density PCB layout configured to integrate Global Navigation Satellite System (GNSS) and Long-Term Evolution (LTE) modules within a compact form factor, employing advanced design and simulation tools in Altium Designer to ensure optimal signal integrity, power efficiency, and electromagnetic compatibility. The invention further relates to improvements in PCB structural configuration, component placement, impedance-controlled routing, and thermal management, collectively enhancing the operational reliability, manufacturability, and scalability of IoT asset tracking systems deployed across logistics, transportation, and industrial monitoring applications.

BACKGROUND OF THE INVENTION

[002] The present invention arises from the growing demand for compact, power-efficient, and high-performance electronic systems utilized in Internet of Things (IoT) applications, particularly in the domain of asset tracking, logistics, and remote monitoring. Conventional printed circuit board (PCB) designs, when adapted for such IoT-based systems, often encounter substantial limitations in accommodating multiple communication modules such as Global Navigation Satellite System (GNSS) and Long-Term Evolution (LTE) within the confined dimensions of portable devices.

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