

# PCB DESIGN FOR REAL WORLD EMI CONTROL THE SPRINGER INTERNATIONAL SERIES IN EN

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**What is EMI in PCB design?** Electromagnetic interference, or EMI, refers to the unwanted and damaging effects of EMC, as well as electromagnetic interference from environmental sources. Too much EMI can result in a defective or damaged product. Any PCB designer should follow EMC design rules to minimize the amount and effects of EMI.

**How to solve EMI EMC problems in PCB?** Reducing EMI/EMC totally depends on how effectively PCB designers apply the ground plane in their design. You must be careful while splitting ground paths. Adoption of a large, unbroken ground reference plane, and connecting it to the ground plane with the ground vias will reduce interference.

**What is a PCB designer?** PCB design is the entire process of creating a Printed Circuit Board (PCB) through collaboration and integration between multiple disciplines and multiple domains which includes electrical, mechanical, software, system, test, and manufacturing. It's a team effort that requires constant bi-directional communication.

**Is PCB design useful?** In conclusion, learning PCB design offers numerous advantages from both commercial and employment aspects. It opens up exciting career opportunities, provides cost and time efficiency, ensures product quality and reliability, and equips individuals with industry-relevant skills.

**How to test a PCB for EMI?** One of the best techniques for testing a PCB for EMI is near-field EMI testing. This technique involves using a near-field probe, which is a small antenna that can detect the magnetic or electric fields emitted by the PCB.

**What is EMI design?** EMI design is critical for reducing electromagnetic field radiations. Electronic devices and traces emit certain levels of electromagnetic waves that can interfere with other electronic systems or circuits nearby.

**What techniques are employed to prevent EMI in PCB design?** If you have any bypass or decoupling capacitors in your PCB design, connecting them directly to the ground plane will help reduce EMI. Grounding these capacitors quickly ensures that return currents have a very short path to complete their loop.

**How do I troubleshoot EMI issues?**

**How to shield PCB from EMI?** A Faraday cage is typically a metallic enclosure on the board. It helps prevent EMI related interruption, especially in applications where there are multiple and complex PCBs or parts that also work as antennas.

**Is PCB design hard to learn?** On average, it takes 6 - 8 months to become a proficient PCB designer, but it can take much more time than that to master the skill. To master PCB design, you must have a deep understanding of electronics, and specifically of the foundation of PCB design - circuit design.

**Do computer engineers design PCBs?** Some computer engineers will spend their time designing and populating printed circuit boards (PCBs) or other hands-on hardware design.

**Does PCB designing require coding?** There is no real coding is required to make a PCB. When I say that, it does not mean PCB design is entirely GUI. Design constraints, PCB parameters, etc... would need to be entered, in a spreadsheet like form available within the PCB design software.

**Can I learn PCB design on my own?** You can make your own PCB's for single sided PCB's without any complex machinery with you. But the same is not possible for a double-sided PCB. The DIY PCB is made by printing the layout using a laser printer on a photo paper and then transferring that to PCB using Hot iron.

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**Do you need a degree for PCB design?** Many PCB designers do not necessarily have an advanced degree in any specific field. However, PCB designers most often have a degree or certification in an area that includes drafting, computer-aided design, electronic design, hands-on printed circuit board work, or other related areas.

**What is the future of PCB design?** While AI will never replace human expertise entirely, it is proving to be a valuable augmentation tool. As algorithms and our understanding of AI and PCB design deepen, collaboration between humans and machines will become more sophisticated, leading to more efficient and innovative PCB design solutions.

**How can I reduce my PCB EMI?**

**What is the difference between EMI and EMC in PCB?** What are EMI and EMC in a PCB? Electromagnetic compatibility (EMC) is the ability of an electronic system to operate within an electromagnetic environment satisfactorily without generating intolerable EMI (electromagnetic interference) in nearby devices/systems.

**What is EMI testing?** EMI/EMC testing indicates to engineers whether a device is compatible with its electromagnetic environment as well as whether it will produce electromagnetic interference (EMI) in real-world situations.

**What are the three elements of EMI?** There are three essential elements in EMI problem: source, coupling path and receiver, as illustrated in Fig. 2. A source (culprit) generates the emission, and a coupling path (transfer), transfers the emission energy to a receiver (victim) [1,6,10].

**What is the effect of EMI on PCB?** This EMI is also known as radio-frequency interference or RFI and it affects the performance of a PCB, sometimes even disrupting its function. The printed circuit boards feature several components that are connected using interconnects. These interconnects would act as an antenna at high frequencies.

**What is the purpose of EMI?** EMI Shielding in electronic devices and equipment is the use of manufacturing techniques and materials to protect signals from being disrupted by external electromagnetic signals as well as preventing generated signals from interfering with surrounding components.

**How can we protect circuit from EMI?** There are three different methods to help reduce or eliminate EMI: filtering, grounding, and shielding. A direct way to get rid of unwanted signals is through filtering them out, and in this instance, passive filters work well, and they're used in most new equipment to minimise EMI.

**What are the different methods of PCB designing?** Altium Designer, Autodesk EAGLE, KiCad EDA, OrCAD are some commercially available software used for PCB design. The output of this design is usually in the form of a PCB schematic Gerber file. Gerber file encodes information including copper tracking layers, drill drawing, component notation, and other parameters.

**How can we protect wires from EMI?** The primary way to combat EMI in cables is through the use of shielding. The shield surrounds the inner signal- or power-carrying conductors. The shield can act on EMI in two ways. First, it can reflect the energy.

**What is the difference between EMI and EMC?** EMC is how well a device blocks EMI. More specifically, EMC—electromagnetic compatibility—measures how well electrical devices can function while being hit with EMI (released energy from another electrical device). While EMI is the problem, EMC sees how well that problem can be handled.

**What does an EMI board do?** EMI filter designs protect sensitive equipment from being damaged by high levels of electrical noise. Almost all electronics contain an EMI filter. It may be embedded into a printed circuit board or used as a separate, standalone device.

**What is an EMI?** Electromagnetic interference (EMI) is unwanted noise or interference in an electrical path or circuit caused by an outside source. It is also known as radio frequency interference.

**How to avoid EMI and EMC?**

**What is EMI EMC requirements?** Key Takeaways. To overcome EMI, devices need to have electromagnetic compatibility (EMC). EMC standards specify the acceptable limit of EMI in any electrical or electronic system. EMC standards ensure that a device's operation does not disturb the other system and the system does not receive the disturbance from other system.

devices adjacent to it.

**What are the two types of EMC?** As discussed in the previous article, there are two types of EMC tests: emission (EMI) and immunity (EMS). EMI (Electromagnetic Interference) tests measure the magnetic waves emitted by the device, and EMS (Electromagnetic Susceptibility) tests are performed to test emission handling immunity of the device.

**Why is EMI EMC important?** The EMI and EMC testing processes are essential when bringing a new product to market. Many manufacturers regard these tests as a long-term investment due to the multiple advantages: Boosts reliability: EMC testing shows that a product is compliant with established requirements and regulations.

**What is the difference between EMI and EMC in PCB?** What are EMI and EMC in a PCB? Electromagnetic compatibility (EMC) is the ability of an electronic system to operate within an electromagnetic environment satisfactorily without generating intolerable EMI (electromagnetic interference) in nearby devices/systems.

**How to protect PCB from EMI?** PCB Design Tips Ensure you have a sufficiently grounded plane that touches every single component as a foundation. Meanwhile, plan effective trace paths so they don't radiate EMI. To do so, don't bend traces more than 45 degrees at one point—opt for gradual turns instead.

**How does EMI work electronics?** Electromagnetic interference (EMI) is a phenomenon that occurs when the operation of an electronic device is disturbed by an electromagnetic (EM) field and typically occurs when the device is close to an EM field, which disrupts the radio frequency spectrum.

**Can humans cause electromagnetic interference?** Some natural sources that affect electronic devices through producing EMFs are lightning, solar storms, and solar flares. Human-made EMI can come from high-power radio, electrical sources, and even everyday devices like cellphones; it can also come from malfunctioning or improperly designed consumer devices.

**What is EMI with example?** For example, if you borrow Rs. 10,000 at an annual interest rate of 6% for 3 years (36 months), the monthly EMI would be  $EMI = 10,000$

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$$* (0.06/12) * (1 + 0.06/12)^{36} / ((1 + 0.06/12)^{36} - 1) = \text{Rs. } 303.87.$$

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**Do magnets cause electromagnetic interference?** DC and AC magnetic fields create electromagnetic interference (EMI) that can degrade the performance of electron microscopes and e-beam lithography tools. Although AC and DC magnetic fields are related, each impacts equipment differently.

**How is a PCB designed?** The design and manufacturing of a circuit board is a step-by-step process: schematic creation and simulation, setting up PCB design grids and DRCs, component placement, PCB routing, power planes, and finally assembling the BOM and building the board.

**How can you handle EMI EMC issues in high-speed PCB design?**

**How to reduce EMI in circuit?**

**World TV Day 2023: EGTA Member Q&A**

**What is World TV Day?**

World TV Day is an annual celebration held on November 21 to recognize and celebrate the transformative power of television in our lives. It was first established by the United Nations General Assembly in 1996.

**Why is it celebrated on November 21?**

November 21 marks the date in 1996 when the first World Television Forum was held in Geneva, Switzerland.

**What is the role of EGTA on World TV Day?**

The European Group of Television Advertising (EGTA) plays a vital role in promoting and supporting World TV Day. As an industry association representing commercial broadcasters, EGTA advocates for the recognition of television as a valuable platform for information, entertainment, and advertising.

**How does EGTA celebrate World TV Day?**

EGTA encourages its members to participate in various initiatives to mark World TV Day, including organizing events, sharing case studies, and promoting the importance of television in society.

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## **What is the future of television?**

Television continues to evolve with the advent of new technologies and changing consumer preferences. EGTA believes that television will remain a central part of our lives, providing unique and engaging experiences that connect, inform, and entertain audiences around the world.

## **The Anunnaki Chronicles: A Zecharia Sitchin Reader**

Zecharia Sitchin's controversial theory of ancient aliens, known as the Anunnaki Chronicles, has captivated readers with its bold claims. Here are some frequently asked questions and answers about this popular book:

### **1. Who were the Anunnaki?**

According to Sitchin, the Anunnaki were an advanced extraterrestrial race from the planet Nibiru. They traveled to Earth 450,000 years ago in search of gold and established settlements in Mesopotamia.

### **2. What is the basis of Sitchin's theory?**

Sitchin based his theory on ancient Sumerian texts, which he interpreted as literal accounts of interactions between humans and the Anunnaki. He also drew connections between ancient myths and archaeological findings to support his claims.

### **3. Did the Anunnaki create humans?**

Sitchin argued that the Anunnaki genetically engineered humans as a hybrid race to serve as their workforce in gold mining. He believed that our DNA contains evidence of our extraterrestrial origins.

### **4. What happened to the Anunnaki?**

According to Sitchin, the Anunnaki left Earth around 6,000 years ago due to a catastrophic event that destroyed their home planet. However, he suggested that they may have returned to Earth at some point in the future.

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### **5. Is there any scientific evidence to support Sitchin's theory?**

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Sitchin's theory has been widely disputed by scientists. There is no conclusive evidence to support his claims about extraterrestrial beings, genetic engineering, or the origins of humans. Despite its lack of scientific credibility, the Anunnaki Chronicles remains a popular and influential work in the realm of ancient alien theories.

## **The Responsible Company**

### **What does it mean to be a responsible company?**

A responsible company is one that goes beyond profit maximization and embraces a triple bottom line approach that considers the interests of people, planet, and profit. It operates ethically, respects its stakeholders, and contributes positively to society and the environment.

### **How does a company demonstrate social responsibility?**

Social responsibility can be demonstrated through various initiatives such as:

- Supporting local communities through donations and volunteerism
- Ensuring fair labor practices and promoting employee well-being
- Implementing sustainable and environmentally friendly operations
- Engaging in philanthropic activities that address social issues

### **What are the benefits of being a responsible company?**

Embracing social responsibility can bring numerous benefits to a company, including:

- Enhanced reputation and brand loyalty
- Improved employee morale and productivity
- Reduced environmental footprint and operating costs
- Increased customer loyalty and sales
- Positive impact on society and the well-being of employees and stakeholders



## How can companies measure the impact of their social responsibility initiatives?

Measuring the impact of social responsibility initiatives is crucial to assess their effectiveness. Companies can use metrics such as:

- Number of community outreach programs and beneficiaries
- Reduction in carbon emissions and energy consumption
- Employee satisfaction and turnover rates
- Customer feedback and reviews
- Social media engagement and positive mentions

## What is the future of corporate social responsibility?

The integration of social responsibility into business practices is becoming increasingly important. Consumers, employees, and investors are demanding that companies demonstrate a commitment to sustainability, ethics, and social good. As a result, the responsible company model is expected to become the norm in the future.

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