

ELECTRONICS DESIGN

HIGH-SPEED DIGITAL



COMPONENT SELECTION



POWER ELECTRONICS



PCB LAYOUT



MOTOR DRIVES



DESIGN REVIEW



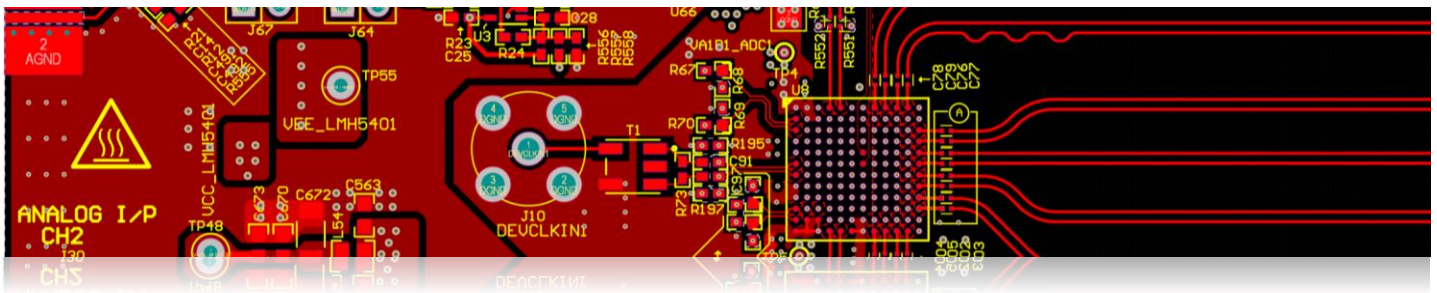
EMC/EMI



DESIGN VERIFICATION



HIGH-SPEED DIGITAL



When pushing clock rates and rising edge times of digital signals, a whole slew of challenges comes with it. At BuildEmber, we know how to design and apply the appropriate constraints to ensure the small details don't slip through the cracks.

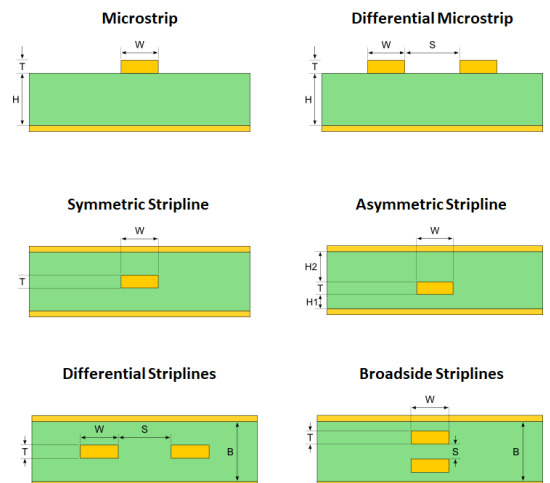
Signal Integrity

High-speed interconnects require proper definitions of transmission line structures for signal integrity. Properly defining geometries, impedance matching, designing a stackup, and verifying the stackup with a PCB manufacturer are all critical steps to ensure reliable designs. Ensuring a consistent transmission line structures are built prevent poor signal integrity due to impedance mismatch.

Length Matching

Timing is critical when high-speed buses clock data for read and write operations. Incorrect length matching between bits and bit groups can cause incorrect data to be transmitted.

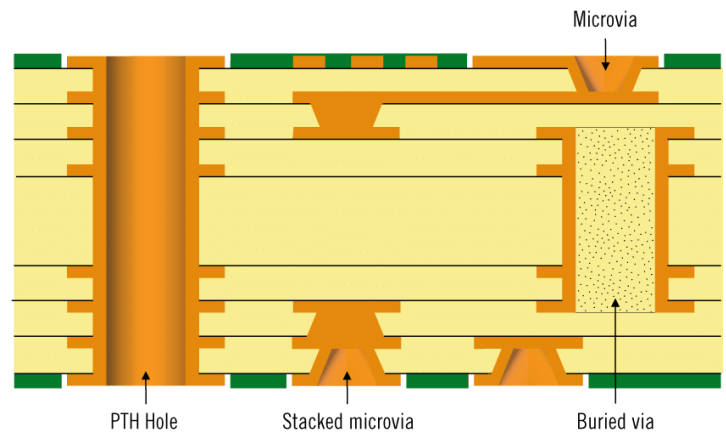
Whether you need length matching on differential pairs, or between byte groups in data buses, we've got you covered.



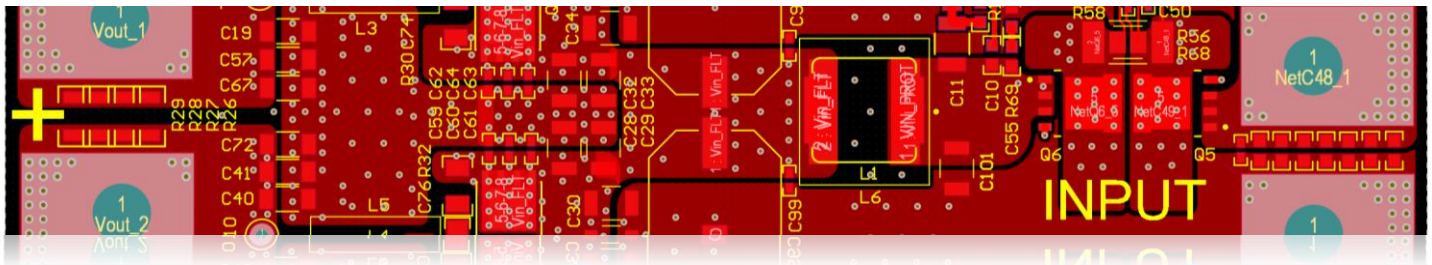
High-Density Interconnect Design

Modern PCB technology allows for extremely dense PCB layouts. Properly using technologies such as blind, buried, and microvias in a multi-lamination cycle PCBs result in high density layouts.

Although multi-lamination boards are more expensive, if small form factor is what you need, these PCB technologies can provide the size solutions you need.



POWER ELECTRONICS



DC/DC Converters



DC / DC

DC/DC converters are the heart of every power electronics system. If you're exploring new topologies whether isolated or non-isolated, proper care needs to be taken to ensure components are not electrically overstressed and control loops are properly compensated. We have experience with the following DC/DC converter concepts:

- Non-Isolated Converters (low-voltage and high-current point of load, load regulation, multi-phase converters)
- Isolated Converters (forward, full bridge, flyback, etc.)
- Loop Stability (Bode plot generation and loop gain tuning)

Our engineers have years of experience performing worst-case analysis for DC/DC converters and can guarantee your design works across wide operating temperatures, input voltage, load currents, component tolerances, and bias effects.

Fault Isolation, Power Distribution, and Redundancy

Some systems may require extra levels of robustness in their power delivery network. Part of this includes isolating faults so they don't propagate throughout the system as well as redundancy. If you have a system that requires redundant design due to uptime requirements, we can make that happen.

Motor Drives

BuildEmber has experience with PCB layout and design of brushless motor drivers as well as stepper motors. Our devices have been successfully implemented in oil and gas projects, handheld power tools, and various other machinery.

Our Approach

- ✓ DC/DC Converter Current Limits
- ✓ E-Fuses & Fuses
- ✓ Solid-State Circuit Breakers
- ✓ Redundant Fallback
- ✓ OR-ing FETs

ELECTROMAGNETIC COMPTABILITY / INTERFERENCE (EMC/EMI)



CONDUCTED EMISSIONS



CONDUCTED SUSCEPTIBILITY



ELECTROSTATIC DISCHARGE (ESD)



RADIATED EMISSIONS



RADIATED SUSCEPTIBILITY



LIGHTNING INDUCED



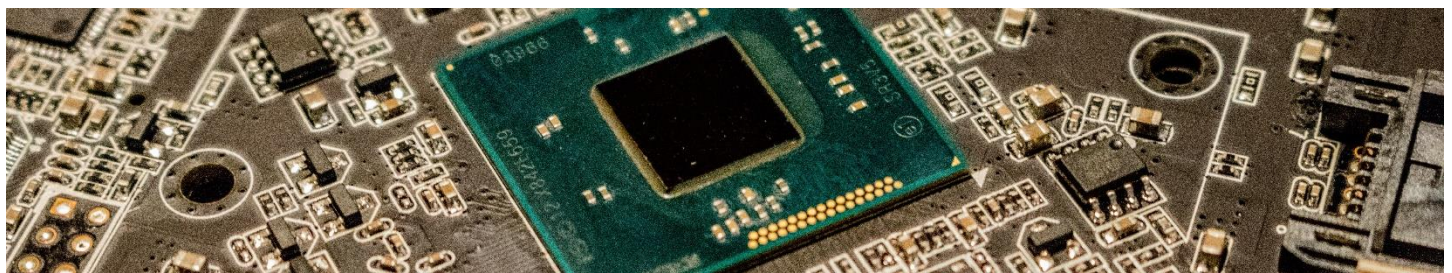
Electromagnetic Compatibility (EMC) is an often-overlooked aspect of product design. Proactively addressing EMI culprits at different levels early in the project will ensure a successful project.

Poor management of EMI can often lead to problems and malfunction of hardware when system components are integrated together.

We Check For

- ✓ Unintended Radiators
- ✓ DC/DC Input Filters & Power Factor
- ✓ Performance To Interference
- ✓ Differential & Common-Mode Noise
- ✓ Proper Shielding and Grounding

COMPONENT SELECTION



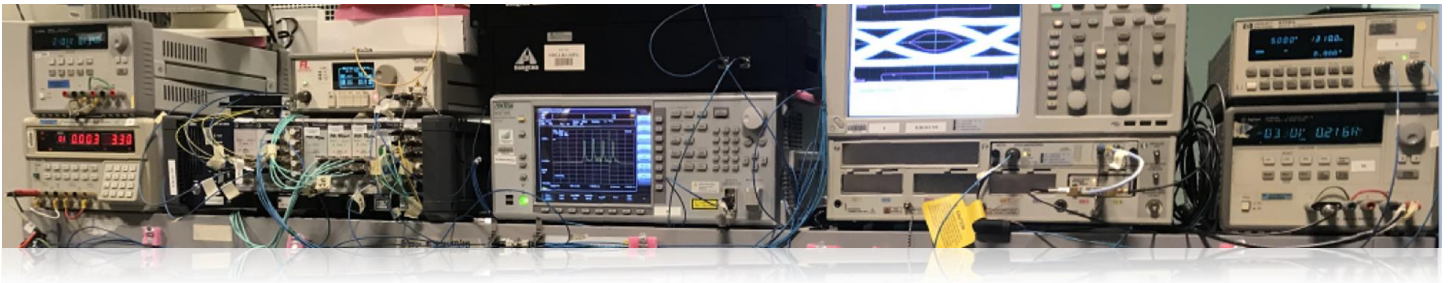
There are many components to choose from when incorporating them into your design. At BuildEmber, we consider a multitude of characteristics about a component to ensure it's the right fit for your design.

We take the approach of determining design constraints to properly choose components. Whether it's cost, reliability, accuracy, etc., these types of questions are ultimately the driving factors for component selection.

We Consider

- ✓ Operating Temperature
- ✓ Bias Effects on Components
- ✓ Material Directives Requirements
- ✓ Component Deratings
- ✓ Parameter Drift
- ✓ Cost

DESIGN VERIFICATION



What's Included

- ✓ Specification Verification
- ✓ Requirements Verification Matrix (RVM)
- ✓ Oscilloscope Waveforms
- ✓ Design Verification Report
- ✓ Address Known Shortcomings

To verify your product is working as designed, we utilize on-the-bench testing to verify performance and functional design.

Let us take your product and run it through the ringer. Whether you have a product that you suspect has issues, or there are unknowns, we will find them and make you aware. We know how to properly test your hardware and find any potential issues.

CONTACT US



Schedule a time to discuss your project needs. Our experienced team members are ready to discuss your project.

Email



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