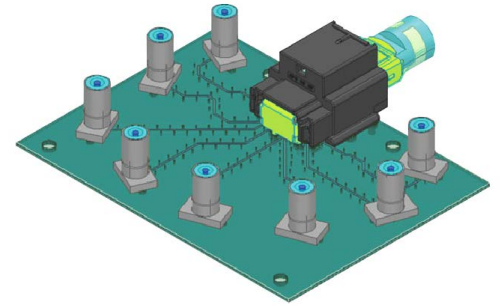# HIGH-SPEED DATA TRANSFER IN VEHICLES ❯ FROM MOLEX

Achieving the high-speed data transfer necessary to use sensor data in real time requires optimal signal integrity (SI) and electromagnetic compatibility (EMC).

INTRODUCTION

Continuous Testing During Product Development

Molex supports connected and smart vehicle solutions by optimizing SI/EMC in custom and off-the-shelf product offerings. Designs undergo continuous, rigorous testing during their modeling and simulation process. As a result, Molex achieves the best performance possible for their customers' final product.
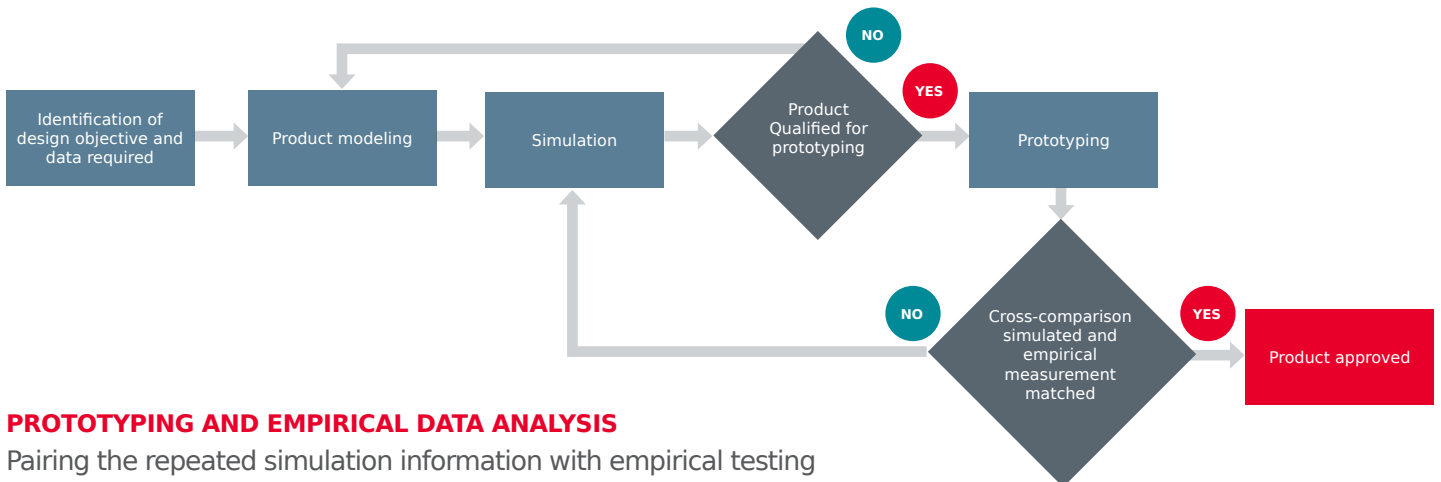
SI/EMC Optimization Cycle

Molex's base SI/EMC process consists of 4 phases: modeling, simulation, prototyping and cross-comparing simulated measurements with empirical data.

MODELING

When developing a model, Molex establishes the simulation objectives and fixed variables prior to simulating a product's performance. Molex considers the system's configuration and operating procedure to establish necessary test parameters such as model objectives, data requirements, and data-report formats.

SIMULATION

Molex then uses the model to simulate how the product would perform under given conditions. Two noteworthy tools that Molex engineers use for simulations are the Ansys High Frequency Structure Simulator (HFSS) and SI Wave.

Identification of design objective and data required → Product modeling → Simulation → Product Qualified for prototyping — NO → (back to Simulation) / YES → Prototyping → Cross-comparison simulated and empirical measurement matched — NO → (back to Simulation) / YES → Product approved

PROTOTYPING AND EMPIRICAL DATA ANALYSIS

Pairing the repeated simulation information with empirical testing data is what truly drives high-quality SI and EMC design analysis. To that end, Molex employs several hardware and software tools to gather as much empirical data as possible.

molex

HIGH-SPEED DATA TRANSFER IN VEHICLES › FROM MOLEX

Test Equipment

Hardware Test Equipment

Two proven technologies Molex deploys to accrue empirical data are the Vector Network Analyzer (VNA) test and the Time Domain Reflectometry (TDR) test.

VNA tests measure attributes such as attenuation, crosstalk, return loss and mode conversion. Characteristics including impedance, intrapair skew and propagation delay are measured with TDR testing. These tools accurately monitor important properties to provide solutions consistent with data specifications and customer requirements.

Software Test Equipment

Molex designed its own software solutions to collect and process data gathered from tests such as the VNA and TDR. The software helps interpret the collected data and extrapolate it into various mediums to help customers change, refine and confirm design elements that ultimately shape a top-performing product.
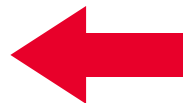
APPLICATIONS

Automotive

- Safety and Driver Assist
- Power Train
- Body Electronics
- Comfort and Infotainment
- Connected Mobility
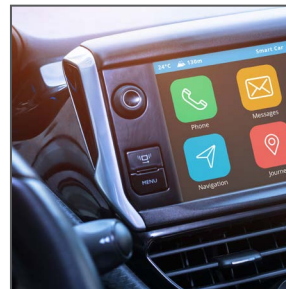
Automotive

THE MOLEX ADVANTAGE ›

With over 30 years of experience designing SI-optimized and EMC-performing products for the automotive industry, Molex continues to provide superior high-speed products and forward-thinking analysis for next-generation vehicle solutions. As a result, Molex has established itself as a high-quality, expert design and manufacturing partner for many major OEMs today.

molex

www.molex.com/capabilities/hsd-tiv.html