Typhoon HIL600 with Fail-safe Modular Control Platform from EPFL

"Thanks to the easy-to-use interfaces of the control platform, the gating and measurement wires can be just swapped from the HIL emulator to the real-world application within minutes, providing a seamless transition to the physical setup with little or no further debug."

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Introduction

Advanced control algorithms such as Rapid Prototyping Systems (RPS) are gaining in popularity within academic sectors, due to their constantly improving performance, as well as the increasing need for reducing development time. Unfortunately, apart from being expensive, such systems are rather complex to comprehend, and sensitive to misuse, which makes them poorly suited as teaching applications.

As an alternative, EPFL introduces a fail-safe modular control platform thoroughly tested and verified with Typhoon HIL systems, tailored for the rapid prototyping of power electronic applications in academic environments.

Challenge

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Projects are a distinct type of practical work conducted in power electronics studies. Students are responsible for leading and managing individual assignments over several months. In such cases, topics are more various and advanced than the introductory lesson, and students must design and implement prototypes on their own. It is then crucial to provide them with a modular, versatile and robust control platform which they can easily start using. This control platform must undergo many tests of safety and precision.

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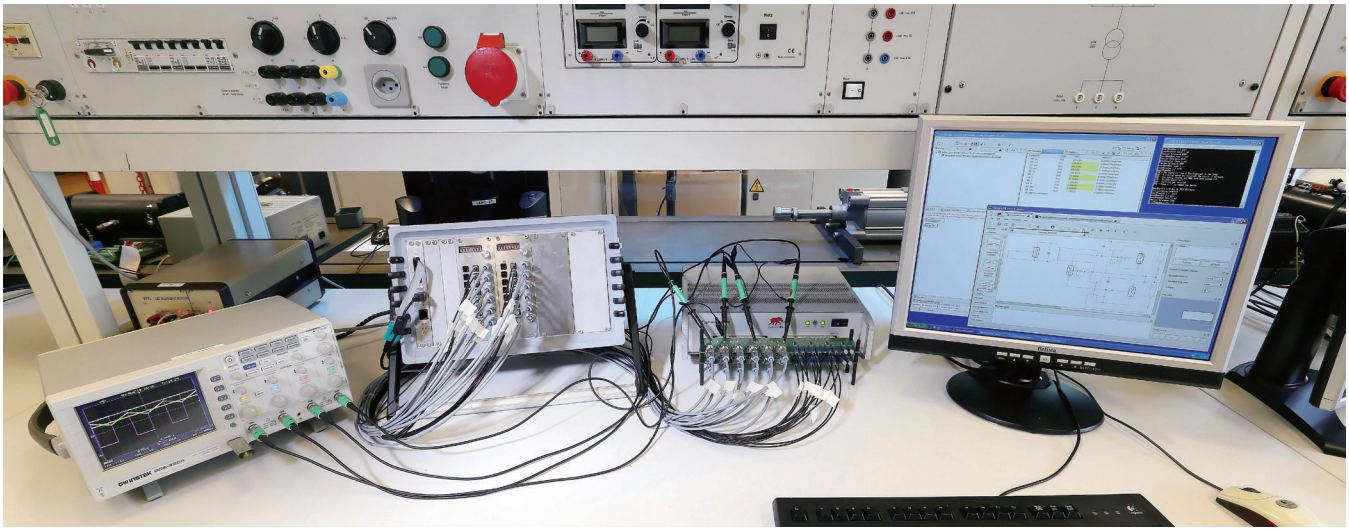


Solution

In order to create the ideal control platform for hands-on student projects and R&D, EPFL students designed and combined equipment accounting for a robust monolithic design, signal conditioning tailored for power electronics applications, and software-independent safety mechanisms.

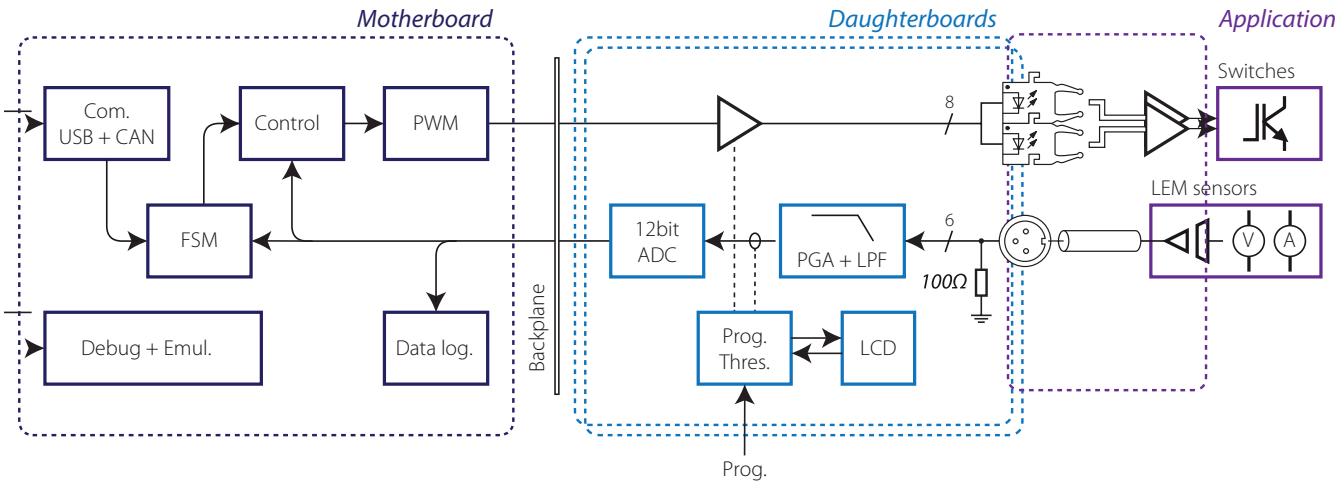
A Typhoon HIL600 was used in the many testing stages to guarantee for the platform's efficiency. The system is easy to use, comprising of merely a motherboard and 4 daughterboards, optical receivers and LEM sensors. Through careful development and HIL testing, the safety mechanisms have demonstrated their capability to provide the expected fail-safe behavior

Conclusion

The presented control platform clearly differs from previously existing approaches and combines at the same time the advantages of full-custom designs and rapid prototyping systems.

Perfectly suited for academic use

Very little necessary additional hardware and a very short implementation time is guaranteed without compromising safety. Besides, due to its industrial-grade design, the proposed solution is not limited to applications in the academic sector, but can be used in a broad range of environments, from R&D sectors to industrial appliances.



Main datapaths of the proposed control platform

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