

Communication for Wireless Power Transfer

Project

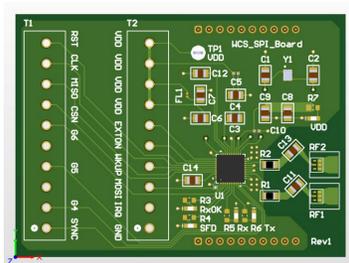
Wireless power transfer, used for the wireless charging of everything from phones to vehicles, requires communication between the two sides of the system to enhance efficiency. This project helps provide for this need by providing a communication platform for wireless power transfer systems.

Objectives:

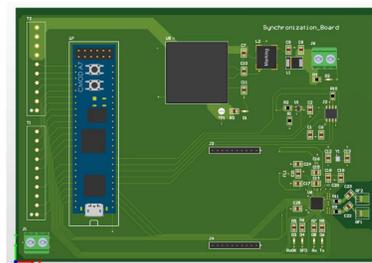
- Provide a communication platform for wireless power transfer (WPT) systems
- Provide a communication platform that maybe integrated into existing systems
- Transfer synchronization signals between the primary and secondary sides of a wireless power transfer system

Methods

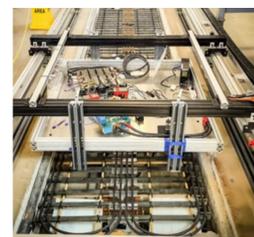
- System uses SPI as the communication protocol, implemented on an FPGA using the Verilog hardware description language
- Designed a “SPI Communication” PCB for initial testing and to allow for the transmission of multiple signals in the final system
- Designed a “Synchronization” PCB that allows for the creation, transmission, and reconstruction of a PWM signal to act as a synchronization signal for the secondary side of a wireless power transfer system



SPI Communication PCB

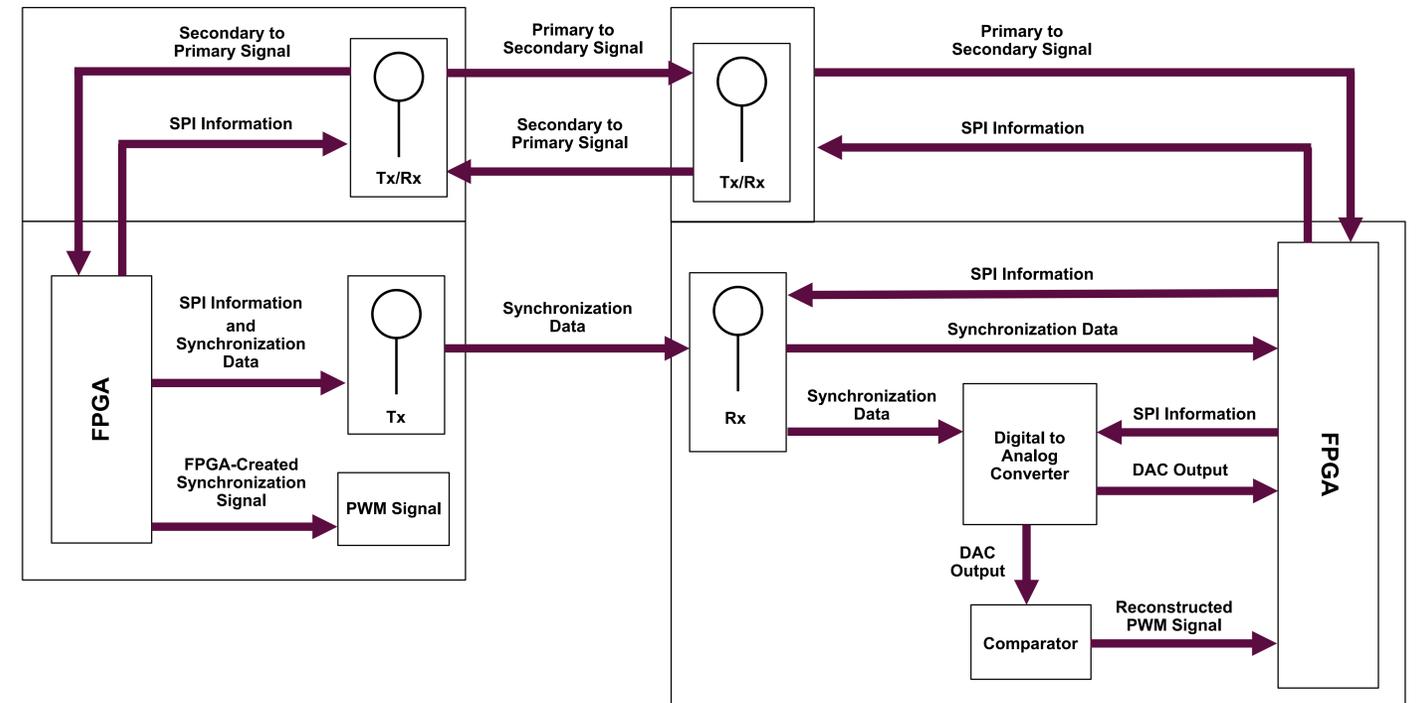


Synchronization PCB



Example of Existing WPT System

System Diagram



Conclusion

- System provides a platform for SPI communication
- System contains circuitry allowing for synchronization signals to be wirelessly transmitted
- Continued development of system will allow system to reach a point where it may be fully integrated into existing wireless power transfer systems, and allow for the transmission of voltage, current, phase, and fault data as well as synchronization signals
- From this project, I learned more about PCB design, Verilog, and interfacing between FPGAs and external components