The George Washington University

School of Engineering and Applied Science

Department of Electrical and Computer Engineering

A Novel 100 Watt High Intensity Focused Ultrasound Driving System

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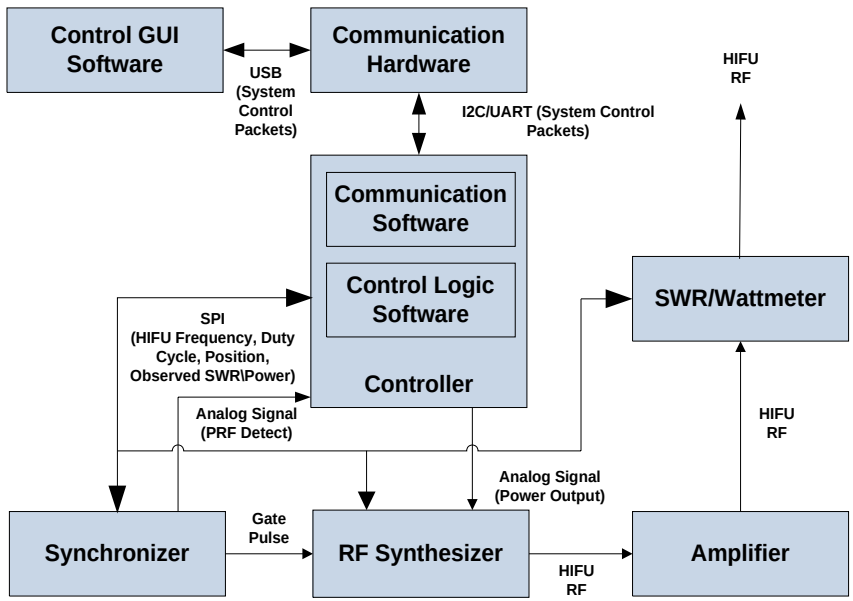
Background and Objective

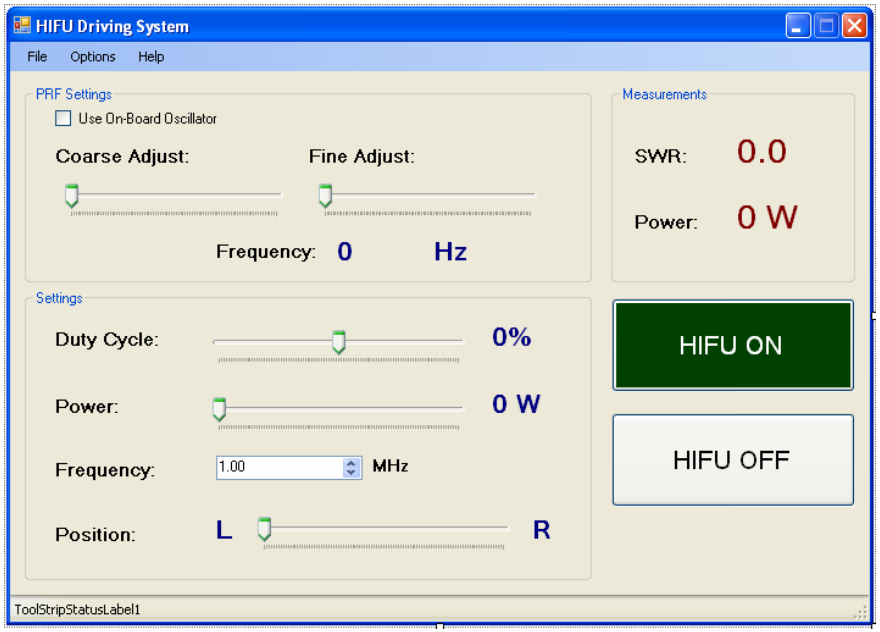
- High Intensity Focused Ultrasound (HIFU) is used in conjunction with ultrasonic B-Mode imaging
- The HIFU interferes with the B-Mode imager and “whites-out” the imaging window
- The interference can be controlled by pulsing the HIFU at the frame rate of the ultrasonic B-Mode imager.
- **Objective: Create a low-cost, inexpensive, portable 100 W HIFU power source that allows the HIFU to be pulsed at the frame rate of the B-Mode imager to control the interference window.**



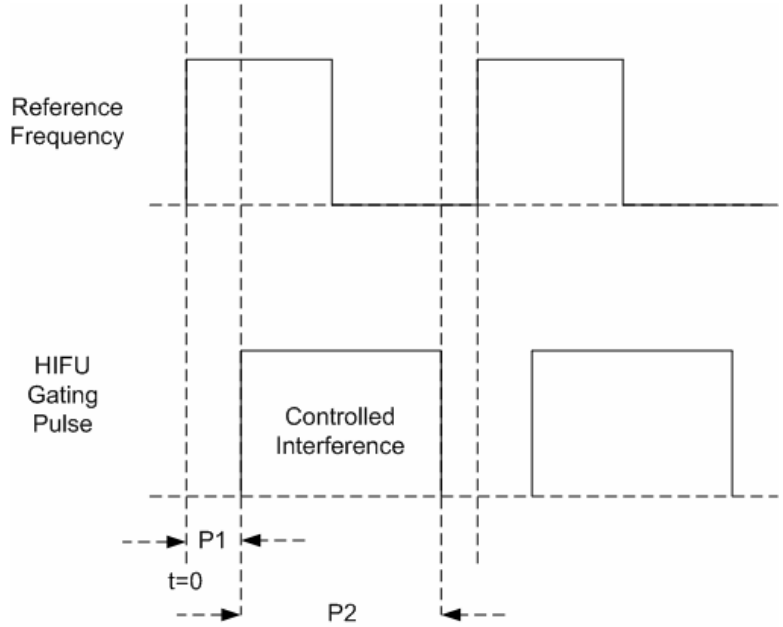
System Specification

• Supply Voltage:	120 V AC from wall outlet
• HIFU Driving Frequencies:	1 MHz – 5 MHz
• Supported Frame Rates:	10 Hz – 100Hz
• Gating Pulse Duration Accuracy:	Better than ± 1 ms at 10 Hz. Better than ± 125 us at 100 Hz.
• Gating Contrast Ratio:	Better than 80 dB
• RF Output Connector:	BNC Male
• Control GUI:	Windows Application or LabVIEW VI
• IO Interface:	Full-Speed USB 2.0
• Test Points:	Internal Watt meter with ± 1 W accuracy Internal SWR Meter
• Temperature Compatibility:	0°C - 70°C

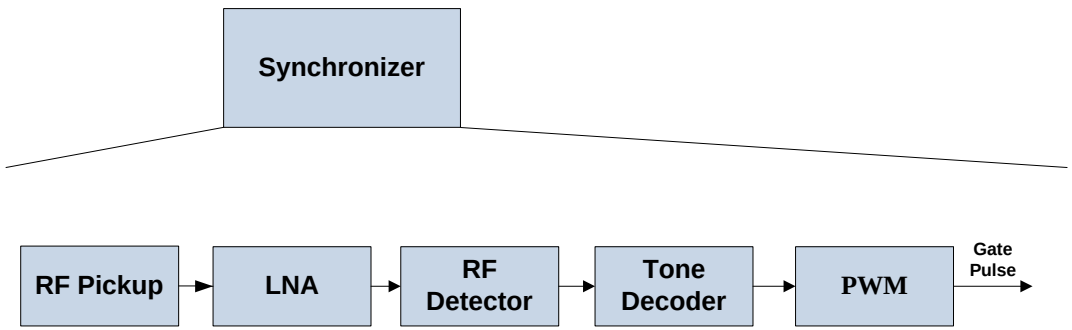
System Design



PC GUI



Pulse Modulation Method



Receive Chain for Synchronization