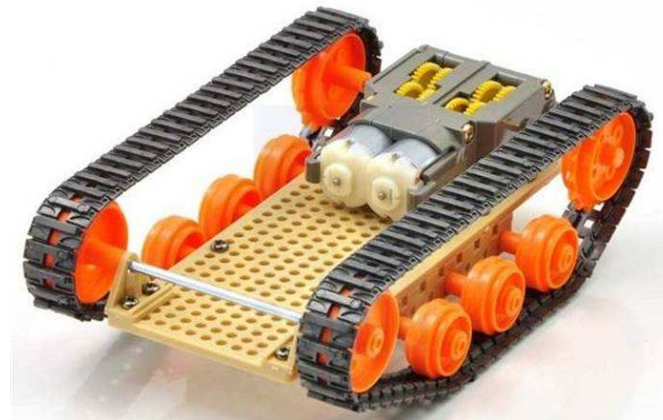
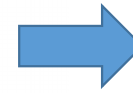
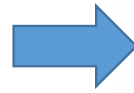
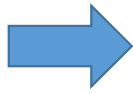
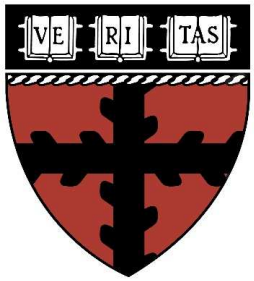


FPGA Radar Guidance

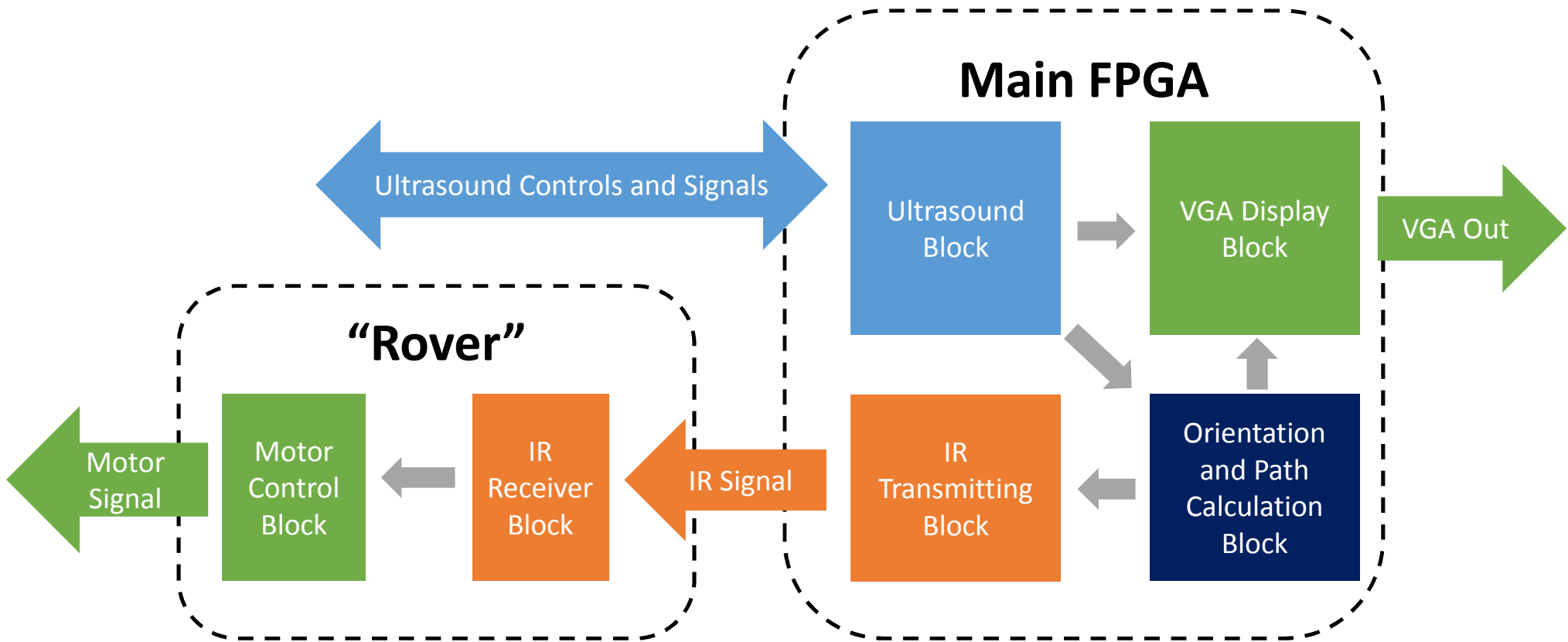
Brian Plancher – 6.111 Final Project – Fall 2015



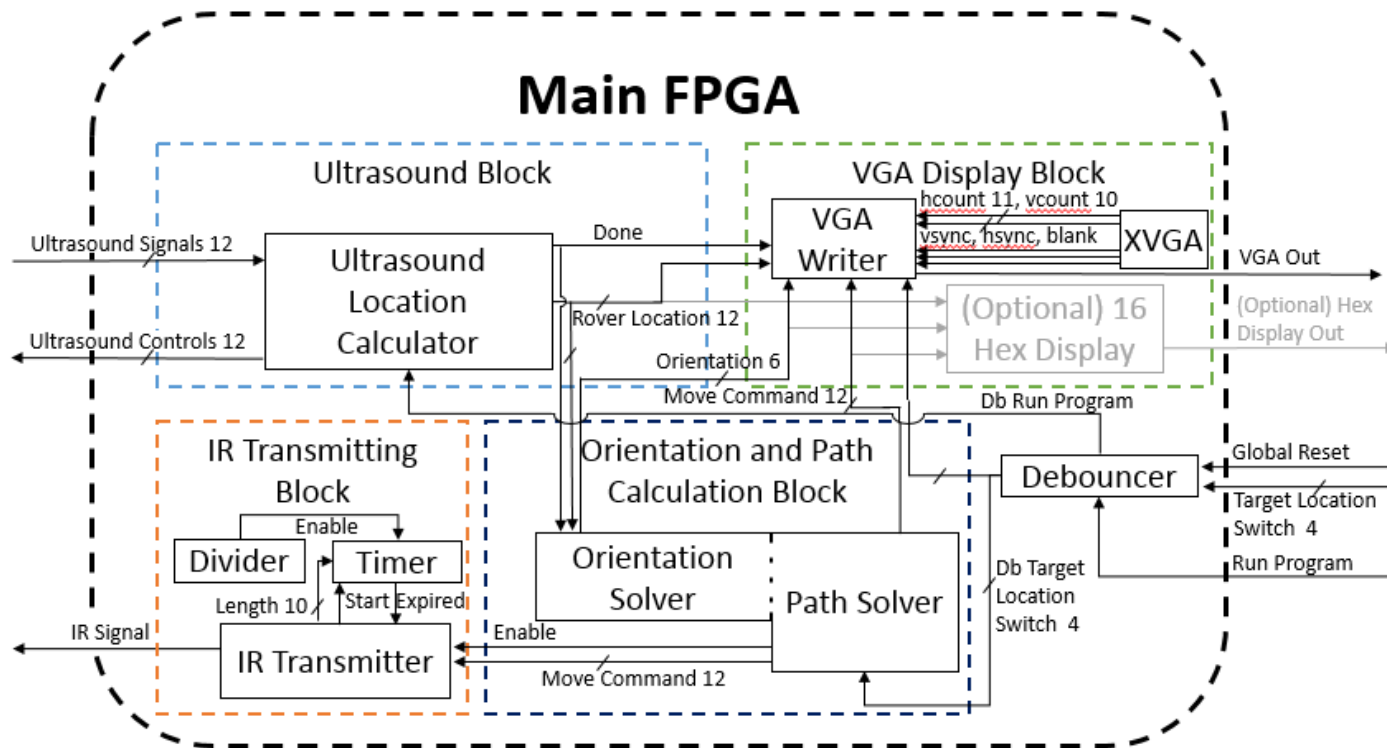
Motivation



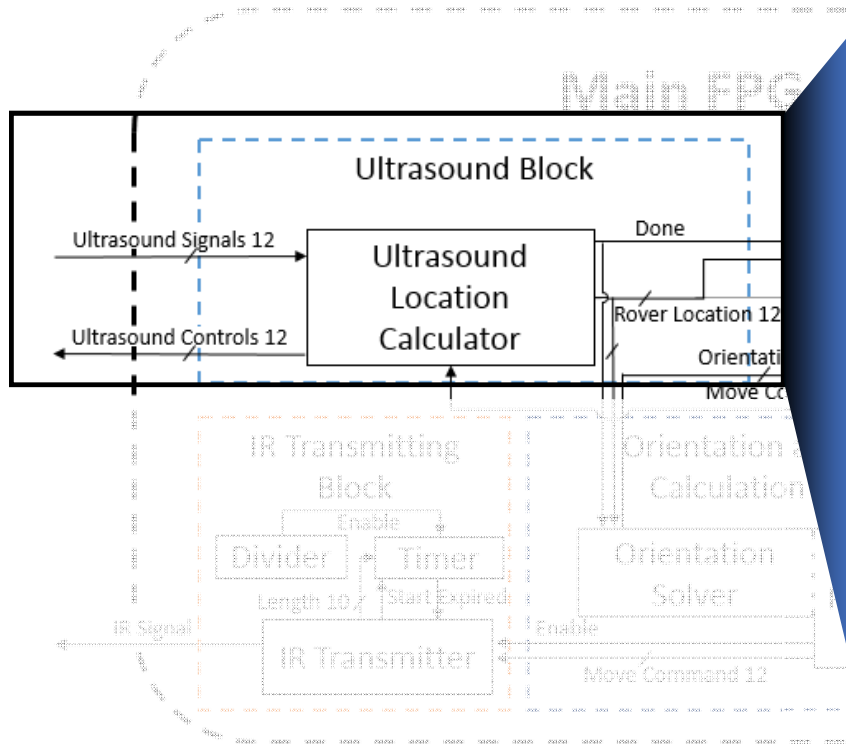
Overview



Main FGPA

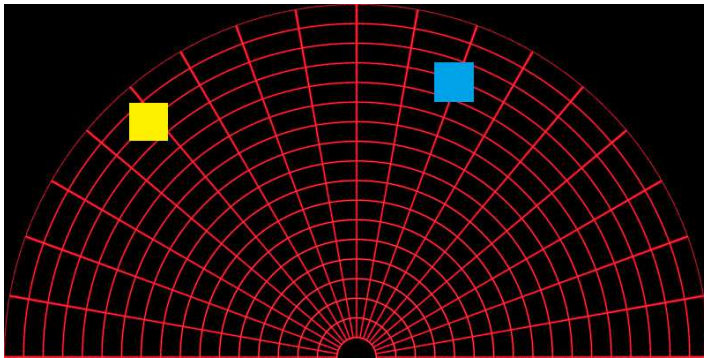


Main FGPA - Ultrasound Block

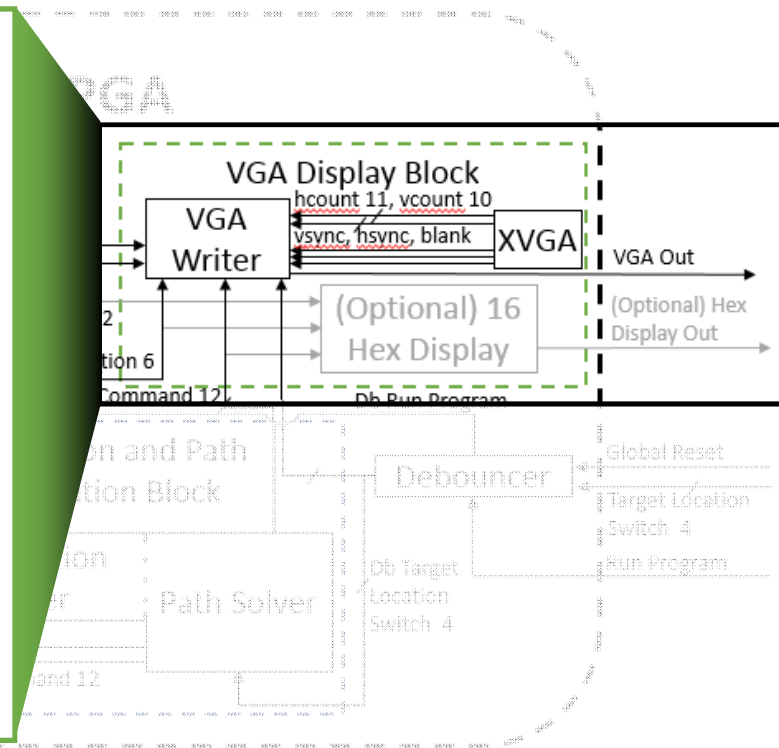


- Relies on the HC-SR04 Ultrasonic Sensor and its specifications
 - TTL signals
 - Distance is a function of time
 - 30° Angle of View
 - Reports closest object distance

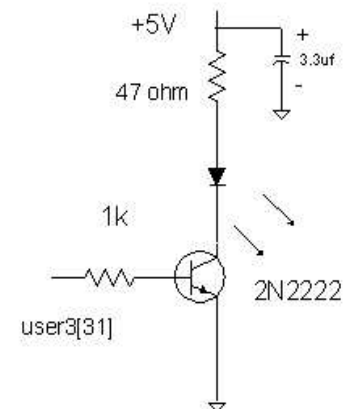
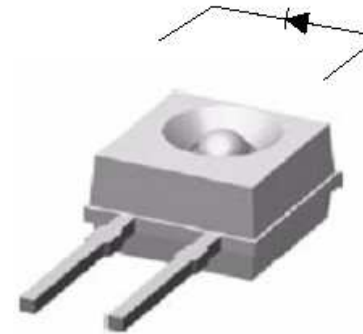
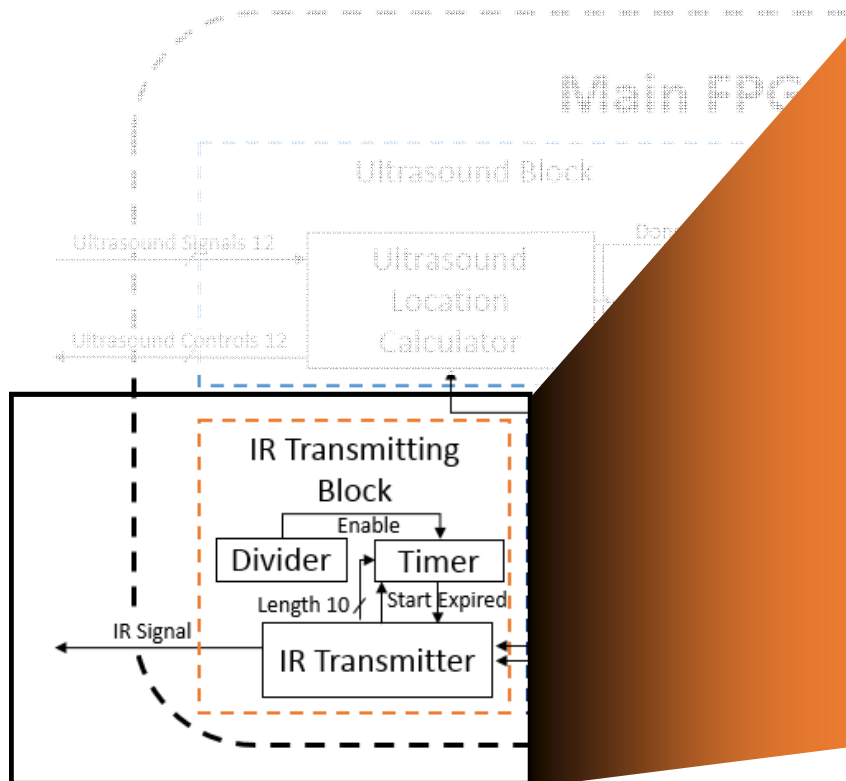
Main FGPA - VGA Display Block



- Display the position of the “Rover” and the target on a grid
- Show the orientation of the “Rover” after orientation is done

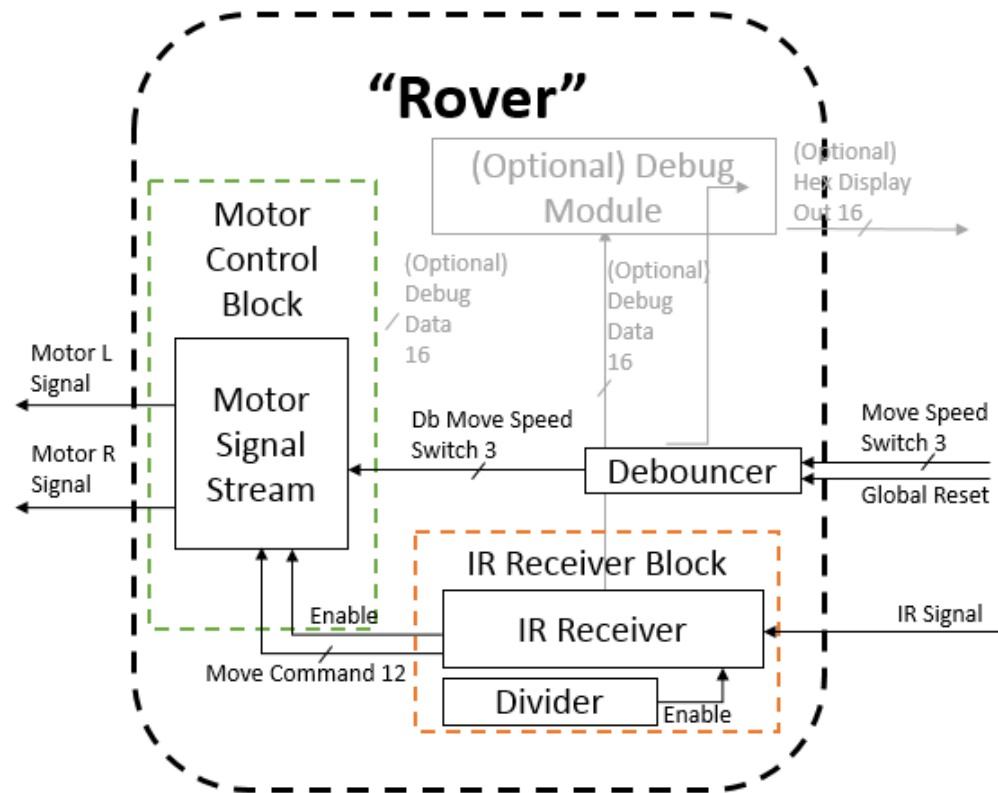


Main FGPA - IR Transmitting Block

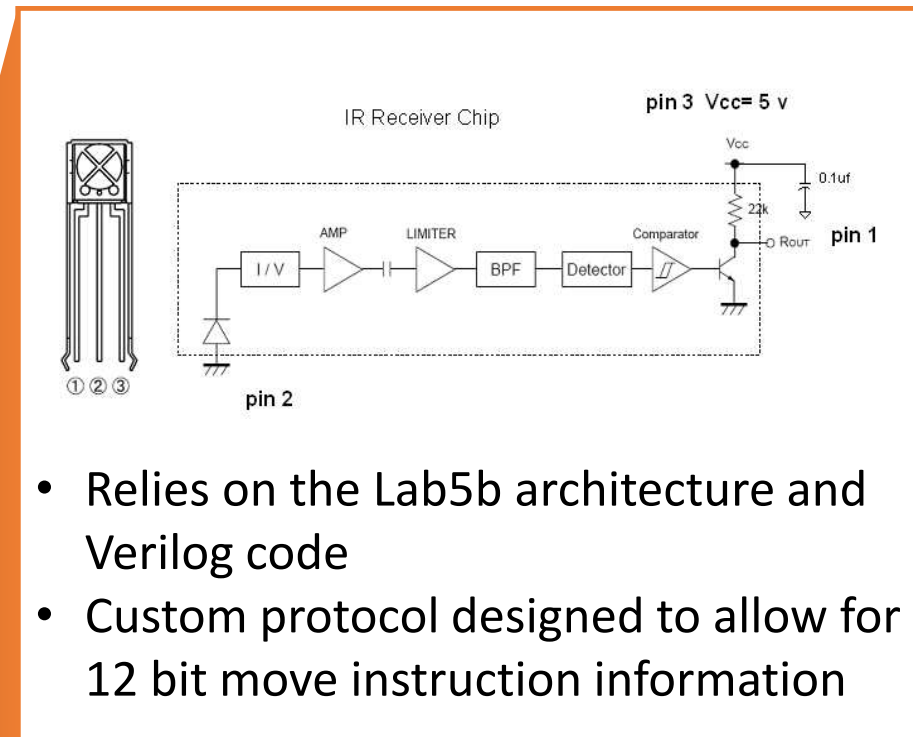
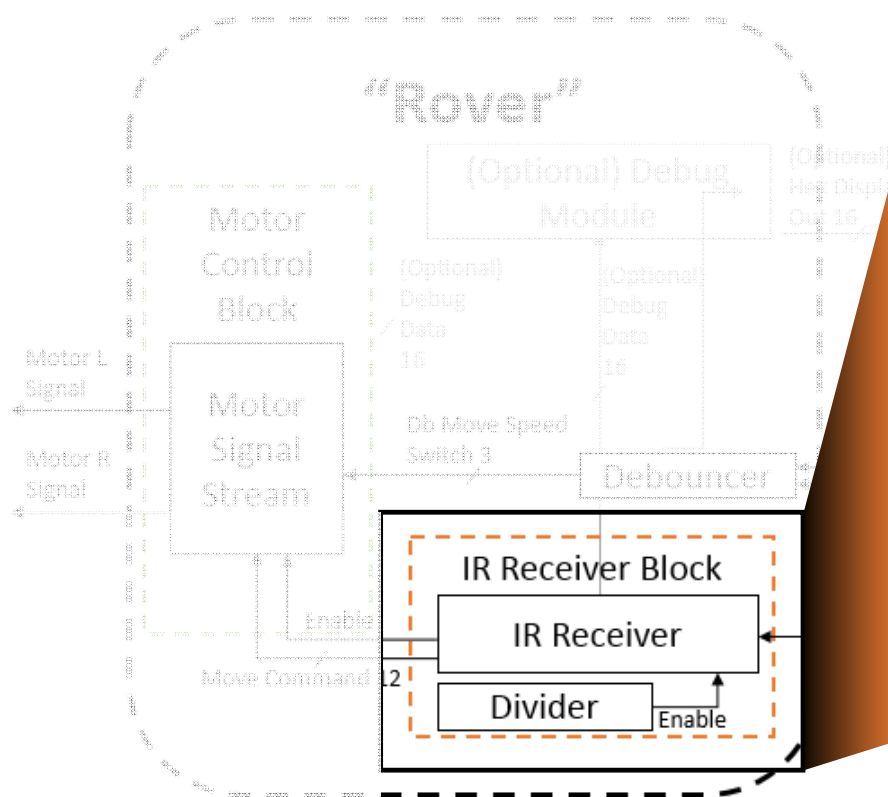


- Relies on the Lab5b architecture and Verilog code
- Custom protocol designed to allow for 12 bit move instruction information

“Rover”

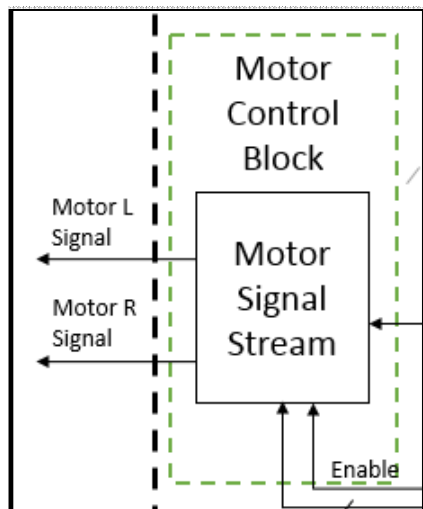


“Rover” - IR Receiver Block



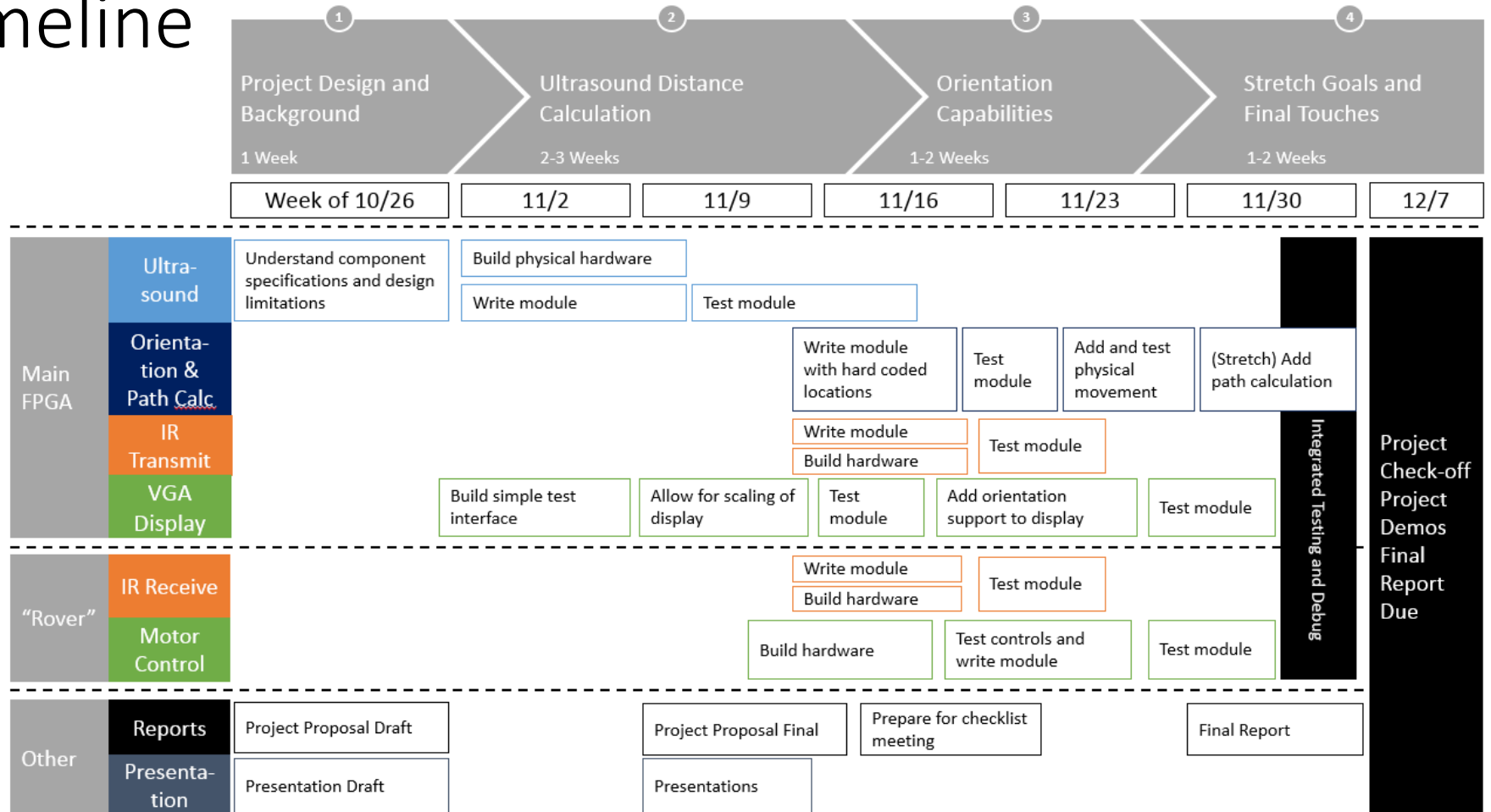
- Relies on the Lab5b architecture and Verilog code
- Custom protocol designed to allow for 12 bit move instruction information

“Rover” - Motor Control Block



- Uses Tamiya® Two-Motor Gearbox
 - Can drive each motor independently
 - Need to experimentally determine clock cycles to distance of fully loaded “Rover”

Timeline



Q&A