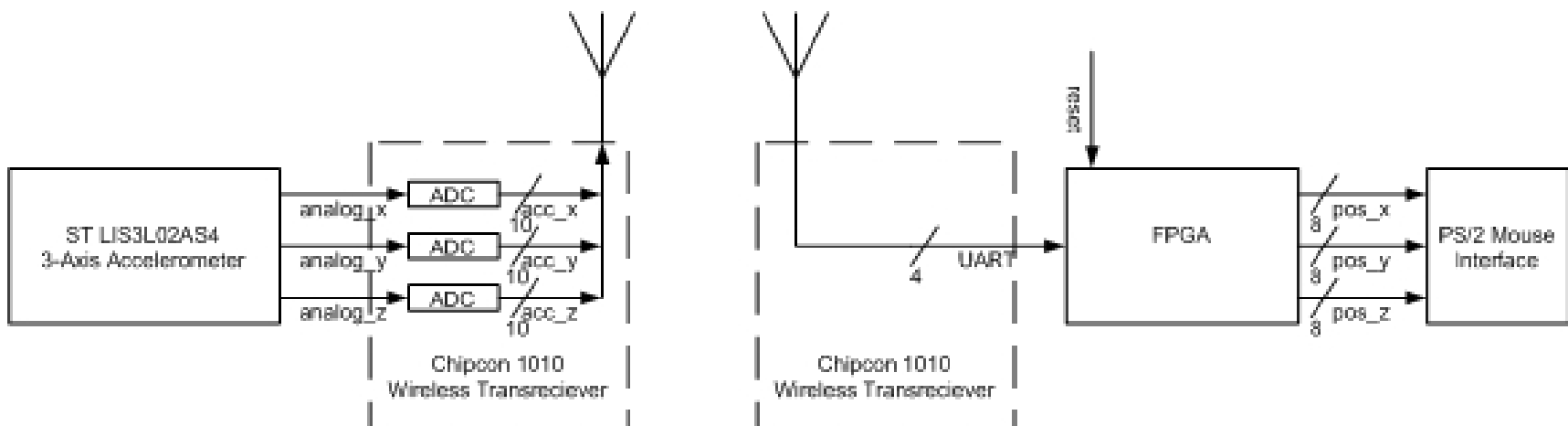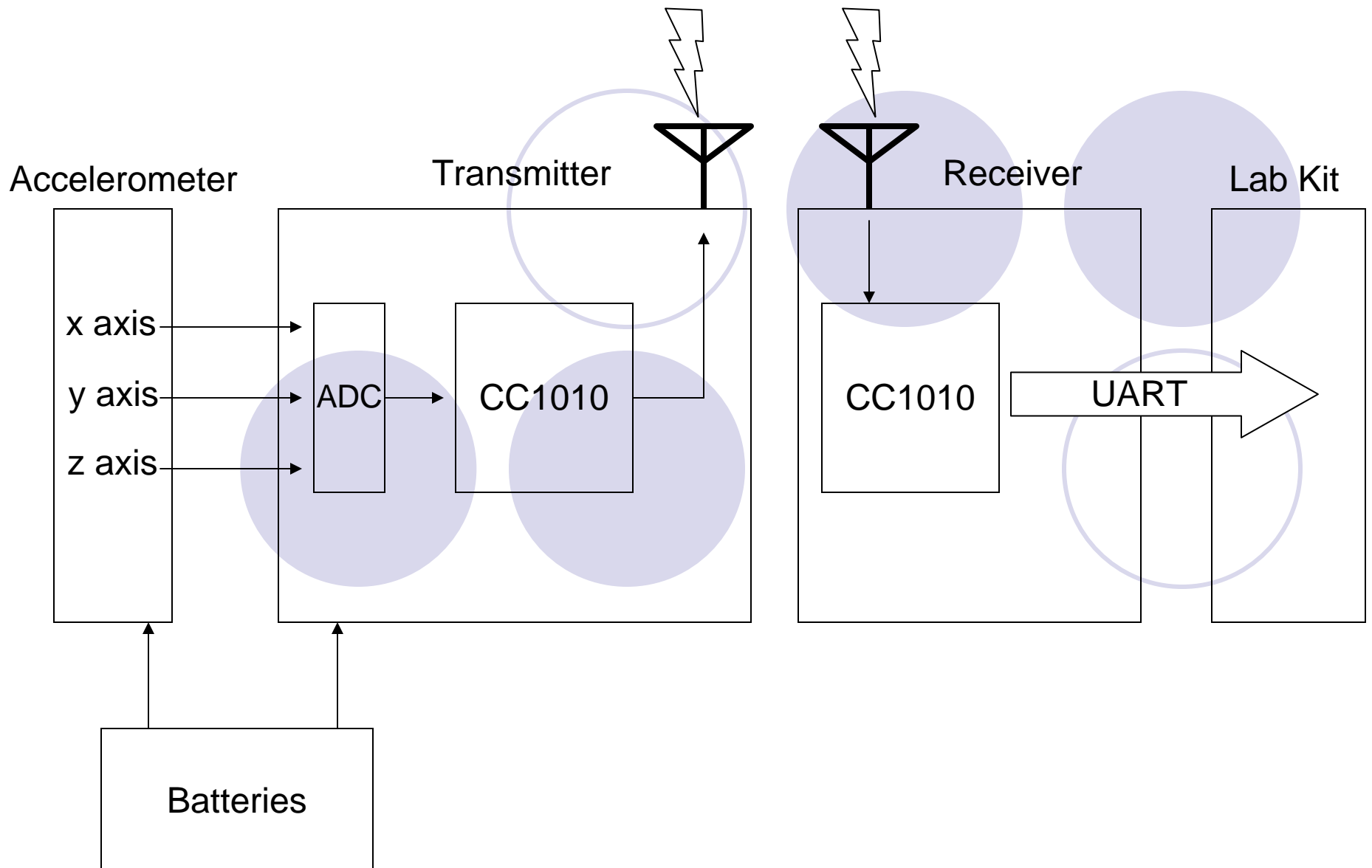# 3D Wireless Mouse

Shirley Li

Matt Tanwentang

Joseph Cheng

General Overview

- Wireless
- FPGA Calculations and Interfacing
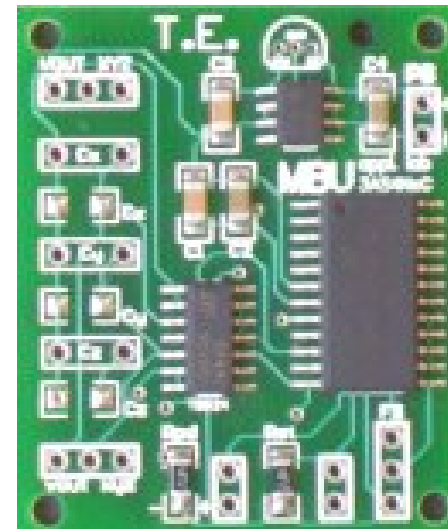- PS/2 Interface

Wireless Segment Block Diagram

Accelerometer
- x axis
- y axis
- z axis

Transmitter
- ADC
- CC1010

Receiver
- CC1010
- UART
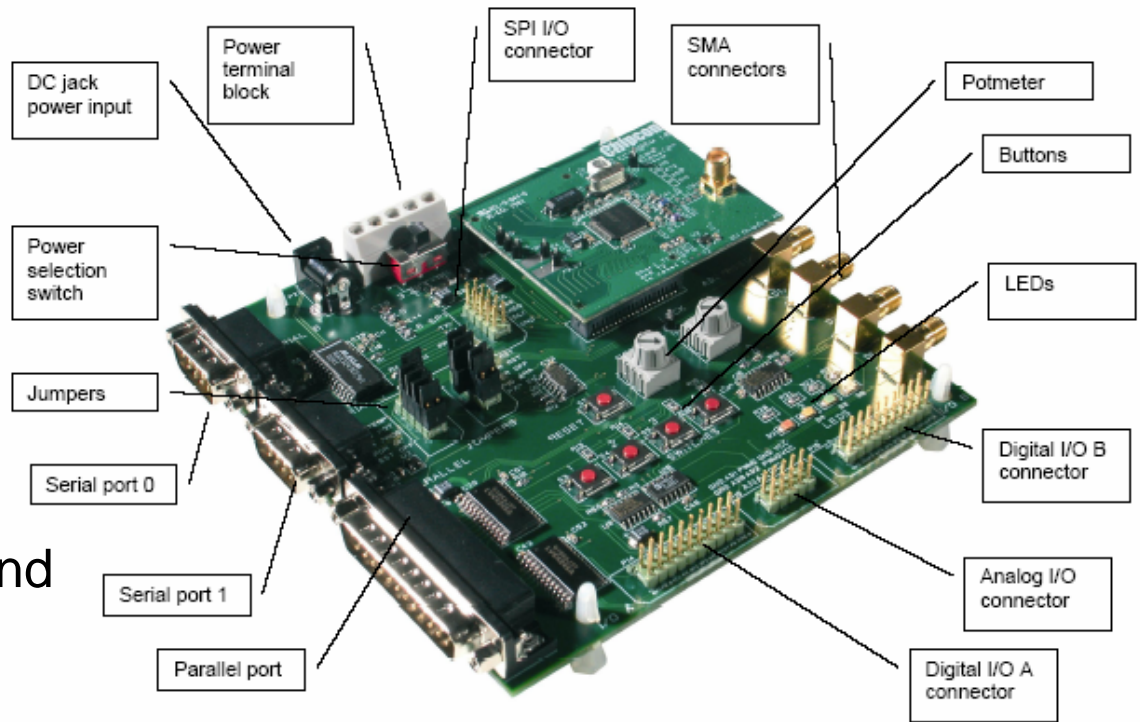
Lab Kit

Batteries

LIS30L02 Accelerometer

- 3-Axis acceleration readings

- Radiometric analog voltage output

- 2g/6g range

- Evaluation board

CC1010 RF Transceiver and Microcontroller

- 3 Channel 10 bit ADC

- UART Interface

- FLASH programmer

- C-compiler and Library
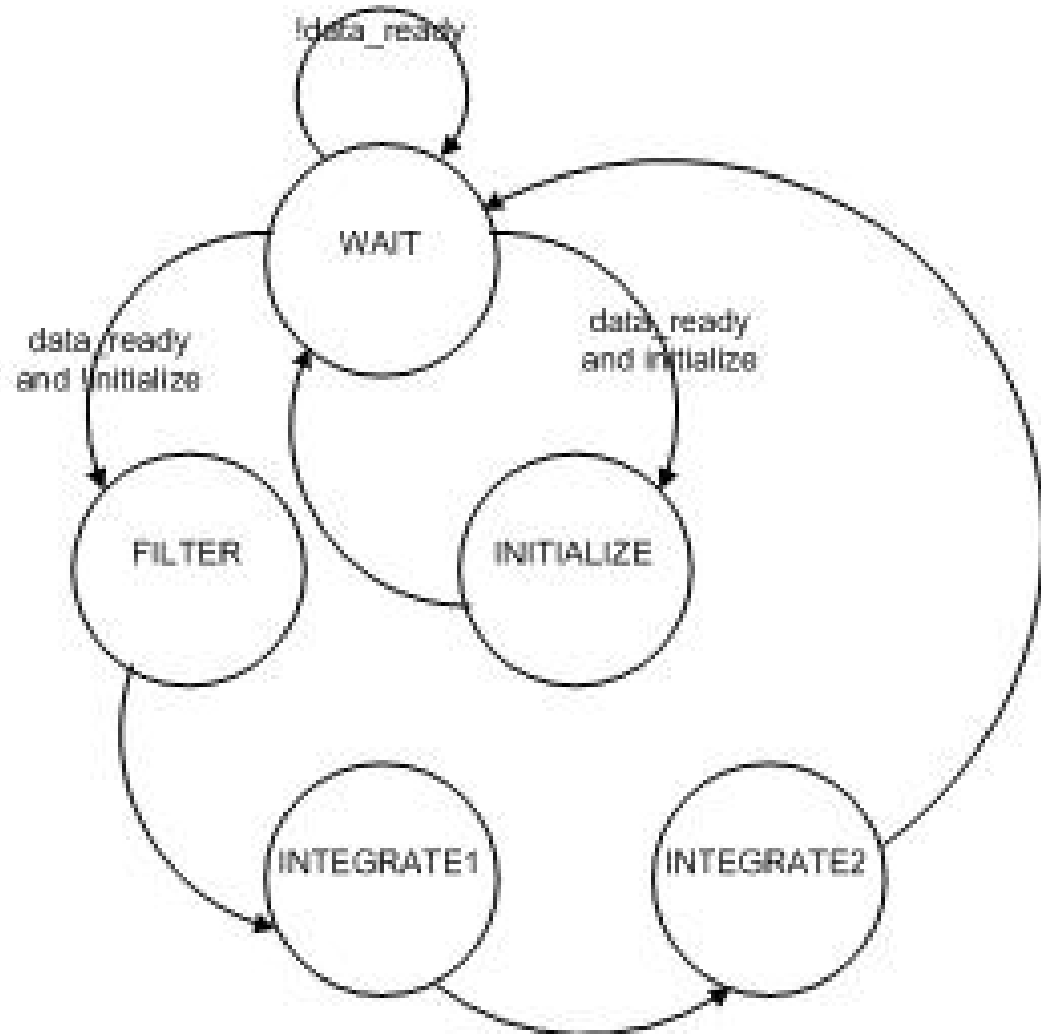
- 868 MHz frequency band
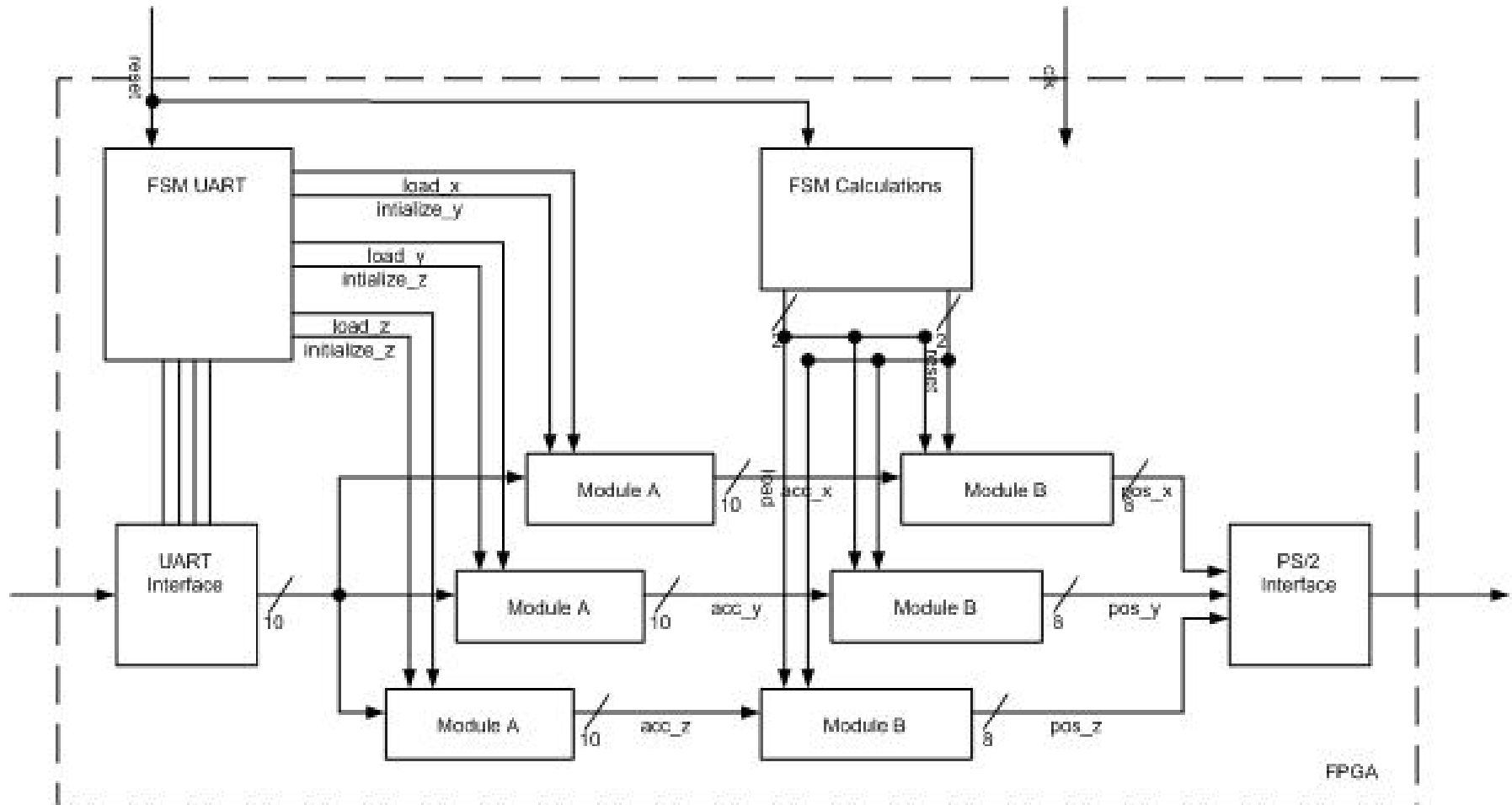
Testing the RF Segment

- ADC outputs correct data

- Wireless kit can transmit data

- Wireless kit can receive data

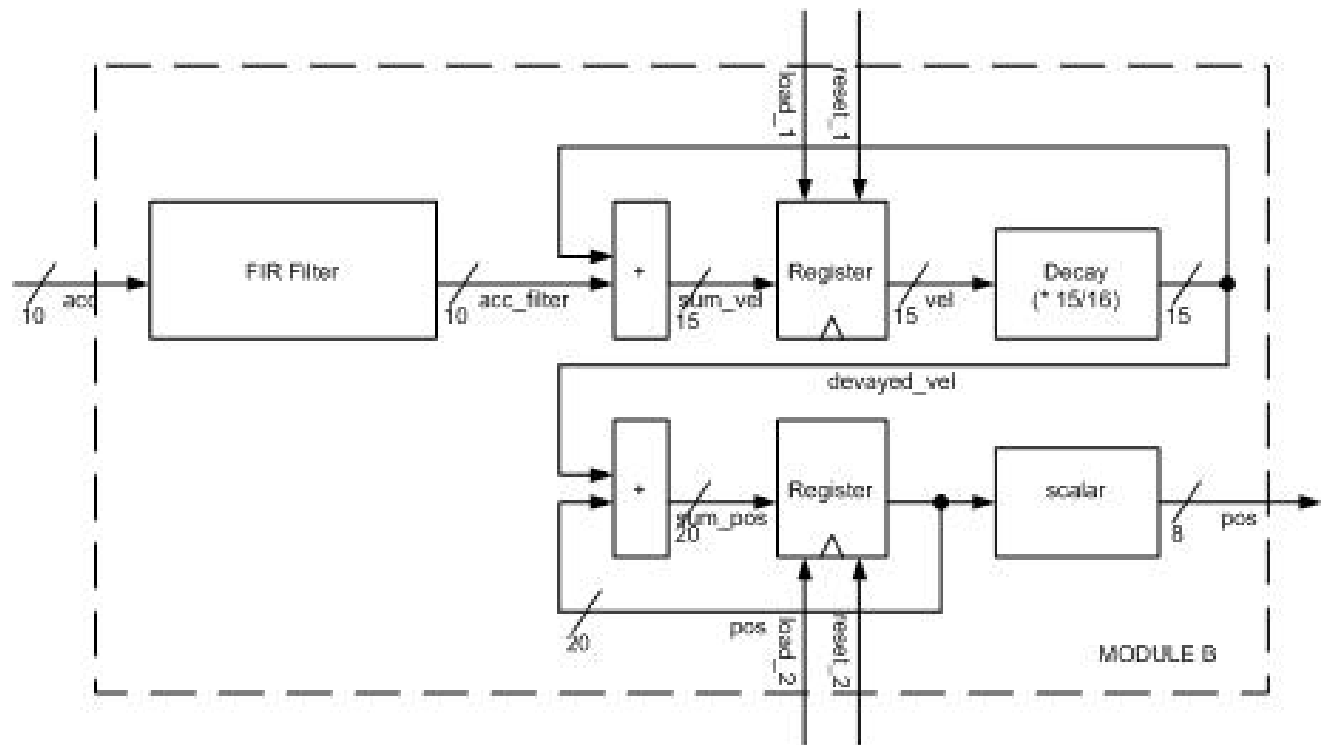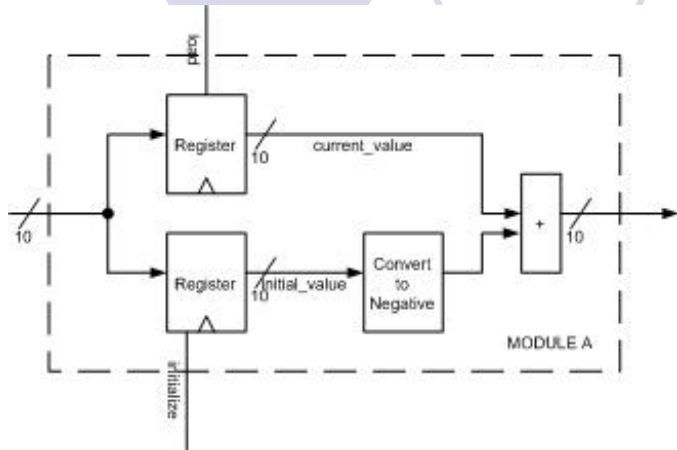- Wireless kit can interface with Labkit via UART

FPGA

- UART Interface

- Initialization

- Tilt rotation?

- Filter

- Integration

- PS/2 Interface

FPGA: Block Diagram
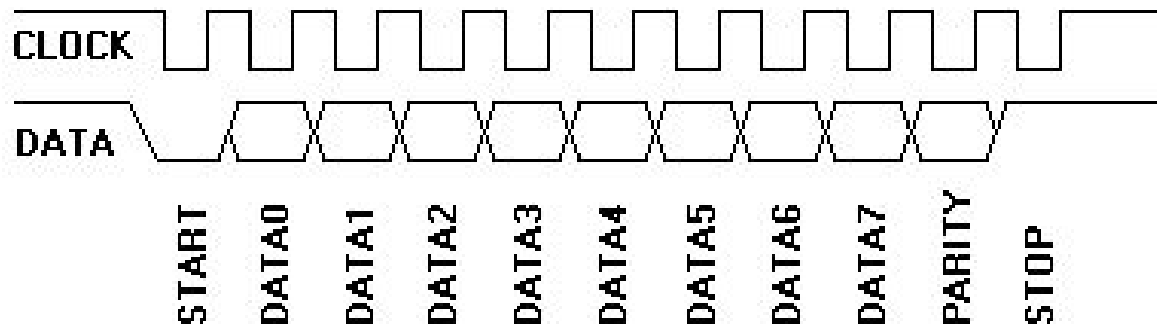
FPGA: Detail Block Diagram

PS/2 Mouse Interface

- Reads spatial data from accelerometer
- Translates data into mouse movement and click data
- Serializes mouse information into PS/2 format
- Reads and responds to host requests

PS/2 Mouse data packet

	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 1	Y overflow	X overflow	Y sign bit	X sign bit	Always 1	Middle Btn	Right Btn	Left Btn
Byte 2				X Movement				
Byte 3				Y Movement				

Device to Host Communication

Host to Device Communication
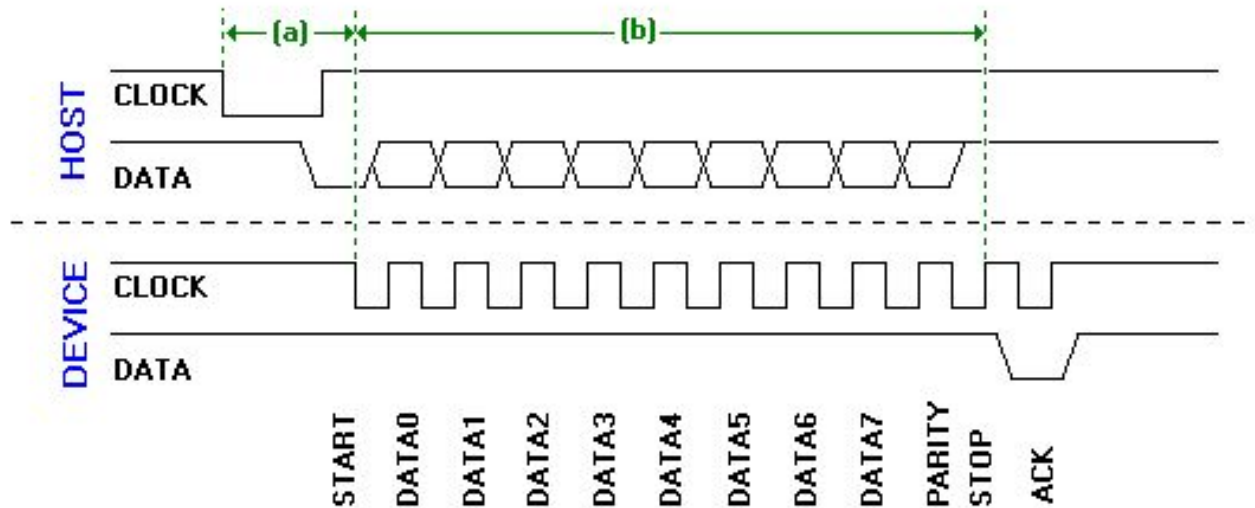
Overall PS/2 Interface Block Diagram

dx dy   z   buttons   pos_reset

Clock Generator   ctrl

reset   Interpreter   ctrl   FSM

                              mouse_out   response

                         Serializer   ctrl

                                          De-Serializer

         clock   data

Parallel-Serial Converter

Stop (1)

Data Byte

XOR ← /8

Parity

Start (0)

11-bit packet (reversed)

/11

clk

ld

Bit-Shifter

/11

Bit 0

Error

Serialized Data

Serialized Data

Reg 0 → Reg 0 → ..... → Reg 10

11-bit packet

Serial-Paraller Converter

/ 8-bit request [9:2]
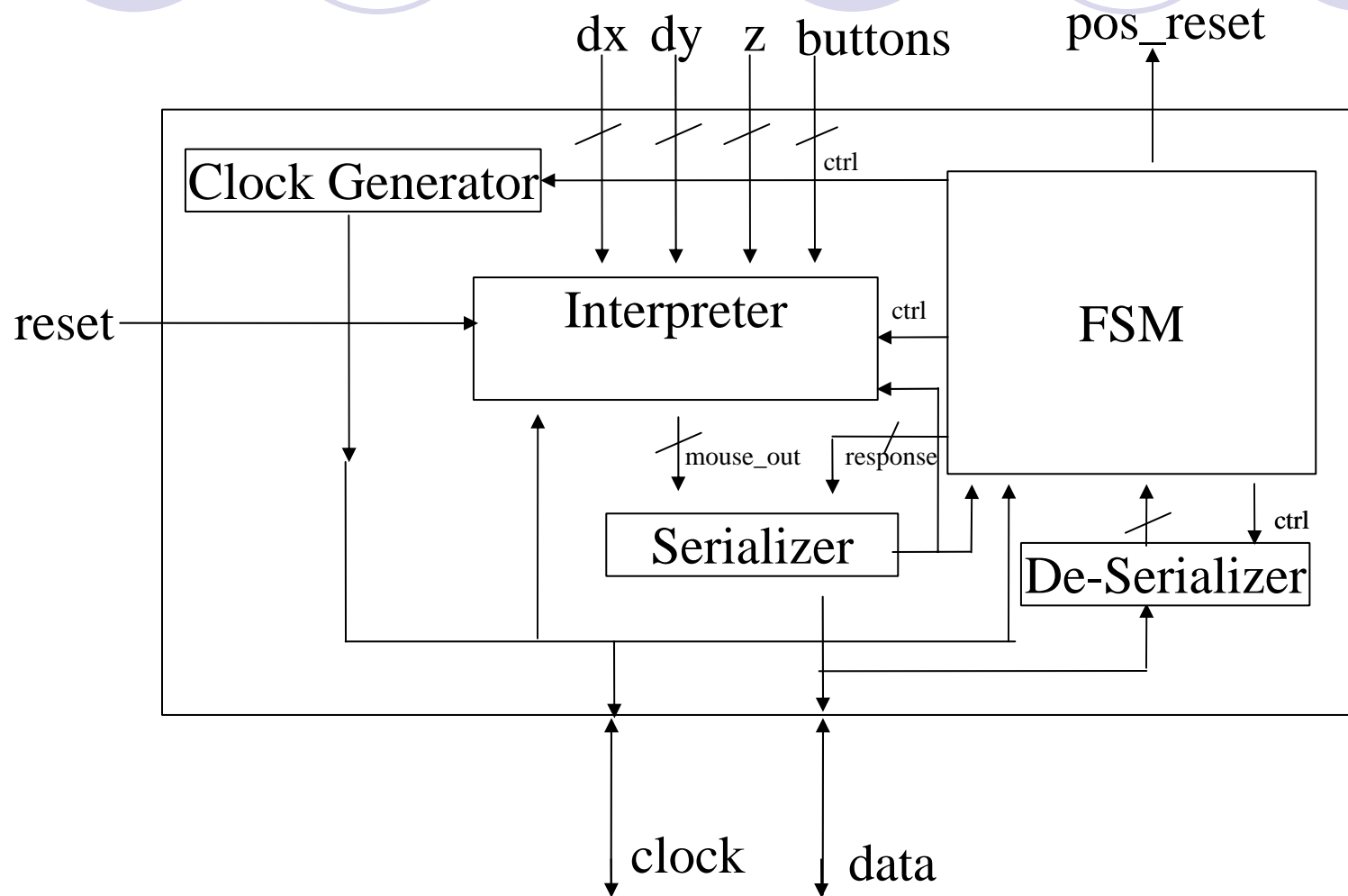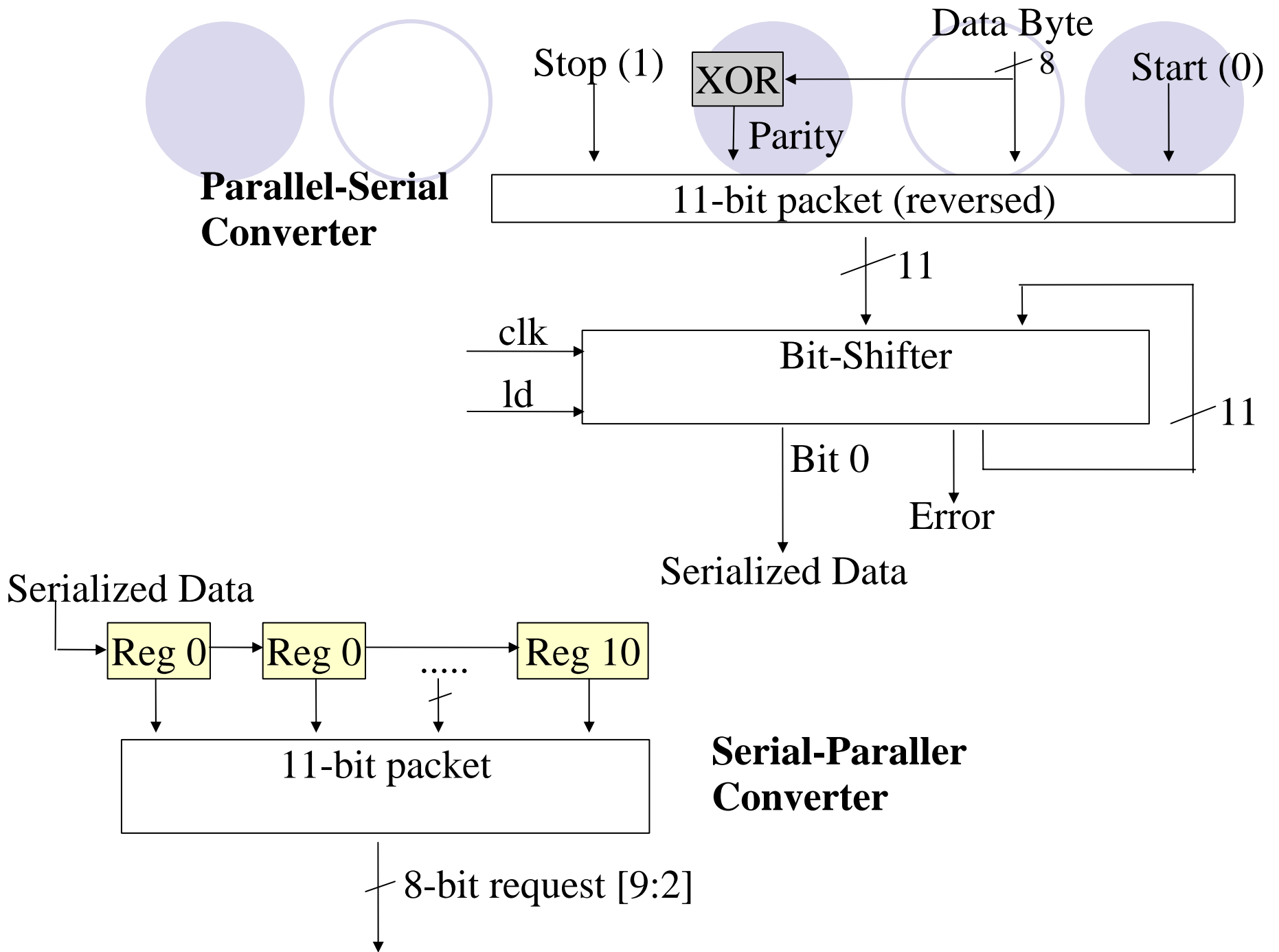
Timeline

- Mon, Apr 25: Wireless communication
- Fri, Apr 29: FPGA calculation, PS/2 interface
- Wed, May 6: Complete Integration
- Fri, May 8: Tilt translation?