ECEN 5813 PES Final Project Presentation

ZX Gesture Sensor

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Sparkfun ZX Gesture Sensor

VCC	5 V power supply
GND	Connect to ground
CL	I^2C clock
DA	I^2C data

Working of the Sensor

- It consists of 2 transmitter-receiver units mounted on the sensor chip.
- X axis values are determined by measuring the differential illumination of the transmitter-receiver pair. If object is directly above both the units, then X value will be 0
- Z axis values are determined by the direct illumination of both the receivers. Its values are measured accurately when the object is directly above the units.
- The ZX Sensor works by bouncing infrared (IR) beams of light from the two units on either side off of an object above the sensor. Combination of these values are used to compute the gestures internally (in MCU of the sensor) and writes to the output register.

Interfacing ZX Sensor through I2C

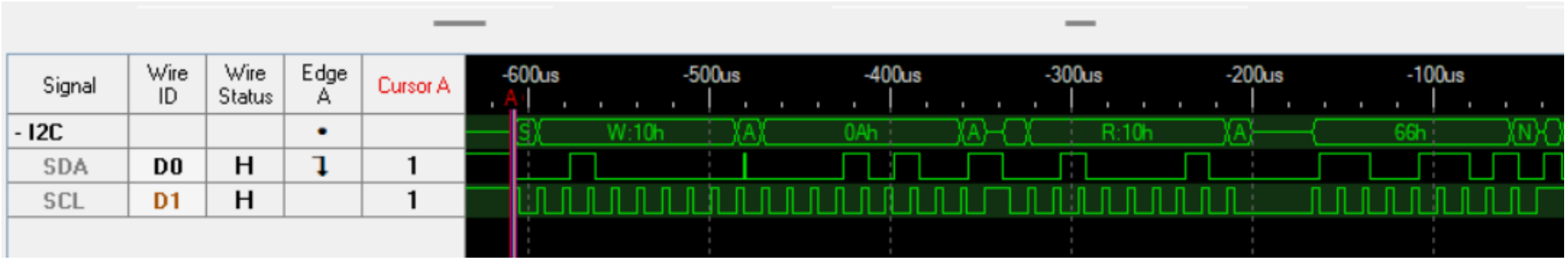
GestureSense XZ01 Sensor I2C Register Map

Version 1

Last update: 20140728

Address	Name	Description
0x00	STATUS	Sensor and Gesture Status
0x01	DRE	Data Ready Enable Bitmap
0x02	DRCFG	Data Ready Configuration
0x04	GESTURE	Last Detected Gesture
0x05	GSPEED	Last Detected Gesture Speed
0x06	DCM	Data Confidence Metric
0x08	XPOS	X Coordinate
0x0a	ZPOS	Z Coordinate
0x0c	LRNG	Left Emitter Ranging Data
0x0e	RRNG	Right Emitter Ranging Data
0xfe	REGVER	Register Map Version
0xff	MODEL	Sensor Model ID

Logic Analyzer Timing Diagram

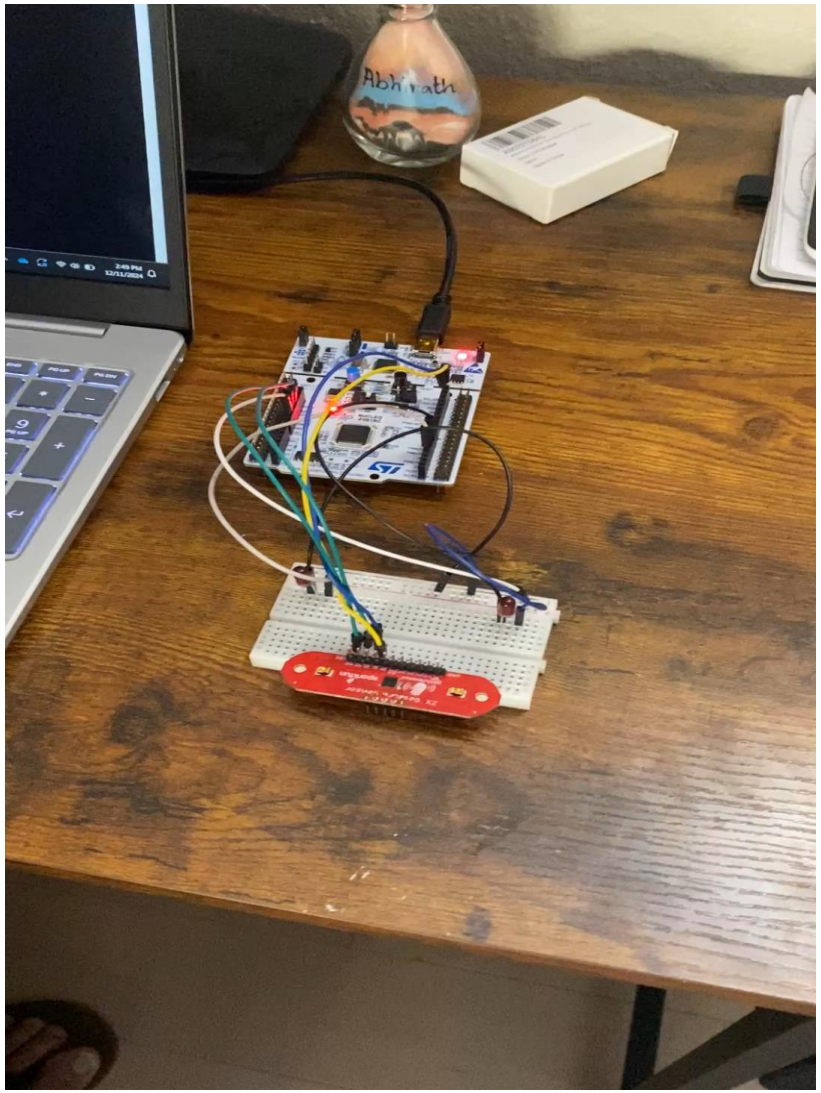


Capturing the Z Position (0x0A) register values from the Logic Analyzer. Here, 66h indicates a distance of 102 (as register output seen in terminal).

Gestures Supported

Gesture Register Values (0x04)	Gesture Indicated
0x01	Right Swipe
0x02	Left Swipe
0x03	Up Swipe
0x05	Hover
0x06	Hover-Left
0x07	Hover-Right
0x08	Hover-Up

Video Demonstration



Presentation Questions

- Feature scope changes from original proposal and the reason for the change.

No scope changes from original proposal

- What works or you feel confident in getting working in the revised proposal.

No scope changes from original proposal

- What did not work in the revised proposal or you had to tweak.

No scope changes from original proposal

Presentation Questions (Continued)

- What did you learn from the project.
  - *Interfacing the sensor through I2C*
  - *Understanding the datasheets to read the register values for outputs*
  - *Bit manipulation in those registers to check for gestures, position changes*
  - *Surrounding light plays a role in IR sensors detection*

- What could you have done differently.
  - *Could have also explored bit-banging for interfacing I2C*
  - *Could have added functionality to capture other gestures (hover-right, hover-up etc)*

Thank You