

EECS192 Lecture 6

Feb. 23, 2016

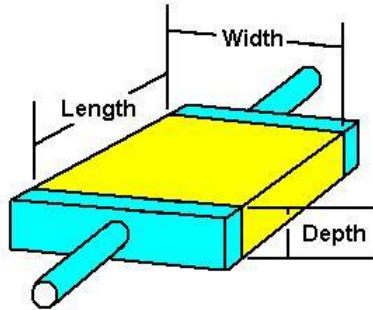
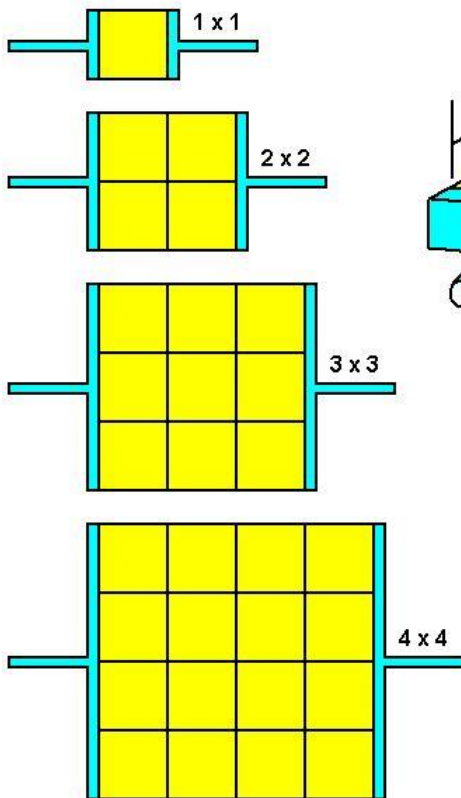
Notes:

1. Check off-
 - PCB design due (Gerbers) Tues 2/23 midnight
 - PCB workshop Tues 5 pm
 - Peer review here
 - Final rework due Thurs 2/25 midnight
2. 2/22 Quiz 3: switch mode power supply and regulator
3. CalDay Sat. April 16 @ UCB, Freescale Cup at UC Davis
4. 3/4/2016 : benchtop line tracking (line camera+servo)

Topics

- PCB tip ohms/quare
- Analog Interface
- Latchup gotcha
- Line sensor
- iPython notebook
(under Resources
on Piazza)

Ohms/square

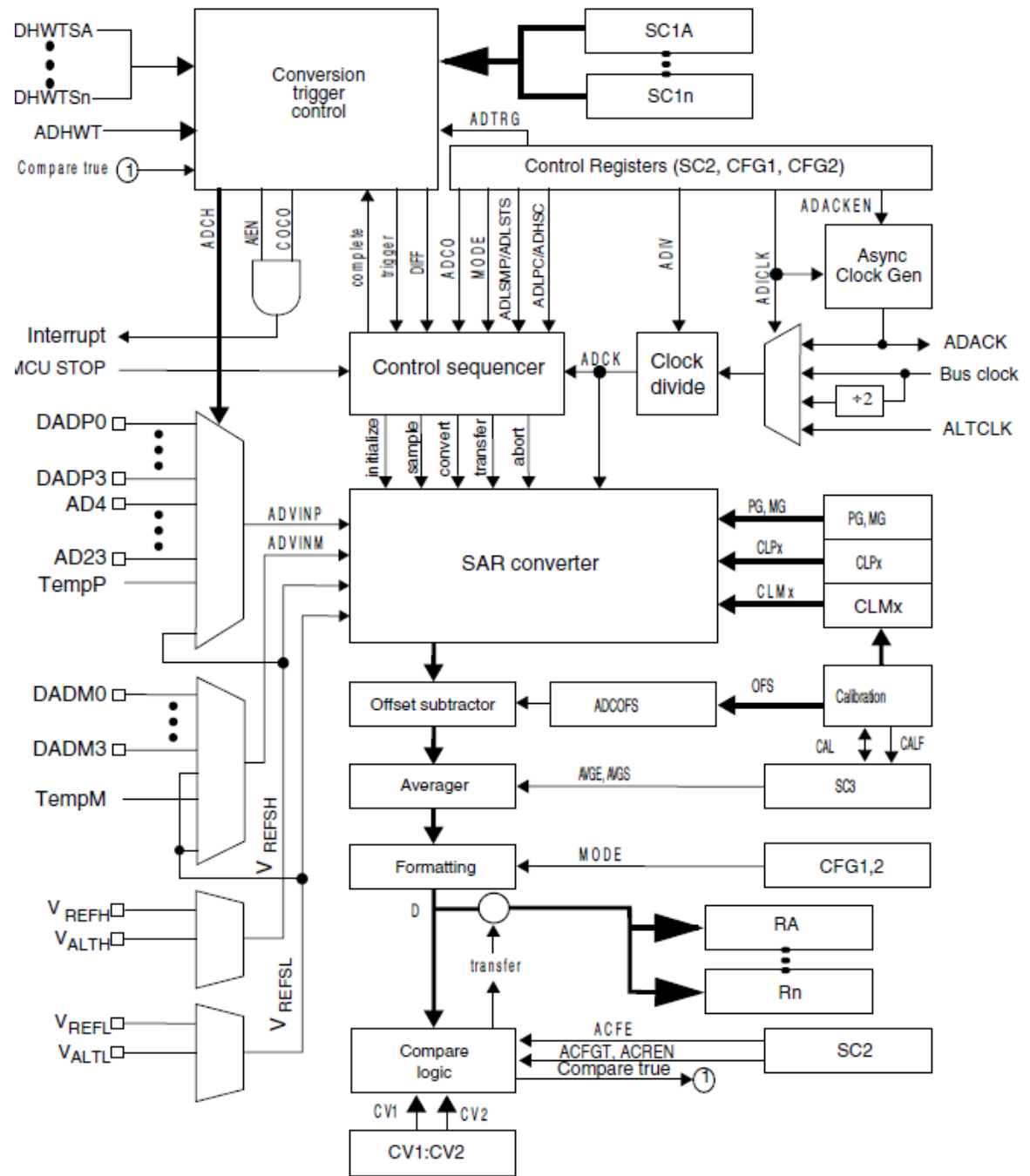


$$\text{Ohms} = \frac{\text{Resistivity} \times \text{Length}}{\text{Width} \times \text{Depth}}$$

For some given depth, resistance is directly in proportion to length and inversely proportional to width.

Therefore, we can rate the resistive material of constant depth in terms of ohms per square.

Cu Weight oz.	Thickness mm(mils)	mΩ/Square 25°C	mΩ/Square 100°C
1/2	.02 (0.7)	1.0	1.3
1	.04 (1.4)	0.5	0.65
2	.07 (2.8)	0.25	0.36
4	.13 (5.3)	0.13	0.18




Analog/Digital Overview

Figure 28-1. ADC block diagram

Analog Input

<https://developer.mbed.org/handbook/AnalogIn>

 **mbed - AnalogIn Class Reference** Import library

Public Member Functions

	AnalogIn (PinName pin) Create an AnalogIn , connected to the specified pin.
float	read () Read the input voltage, represented as a float in the range [0.0, 1.0].
unsigned short	read_u16 () Read the input voltage, represented as an unsigned short in the range [0x0, 0xFFFF].
	operator float () An operator shorthand for read()

Latchup phenomena

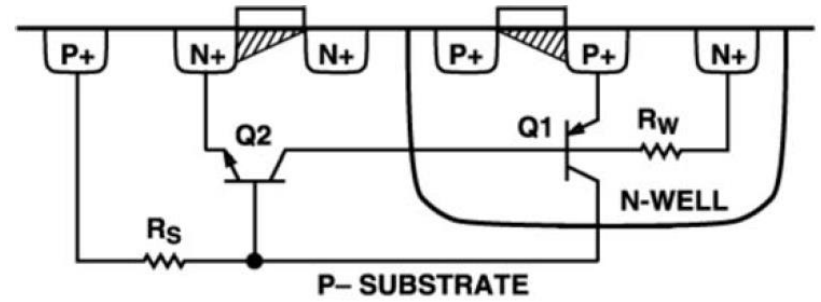
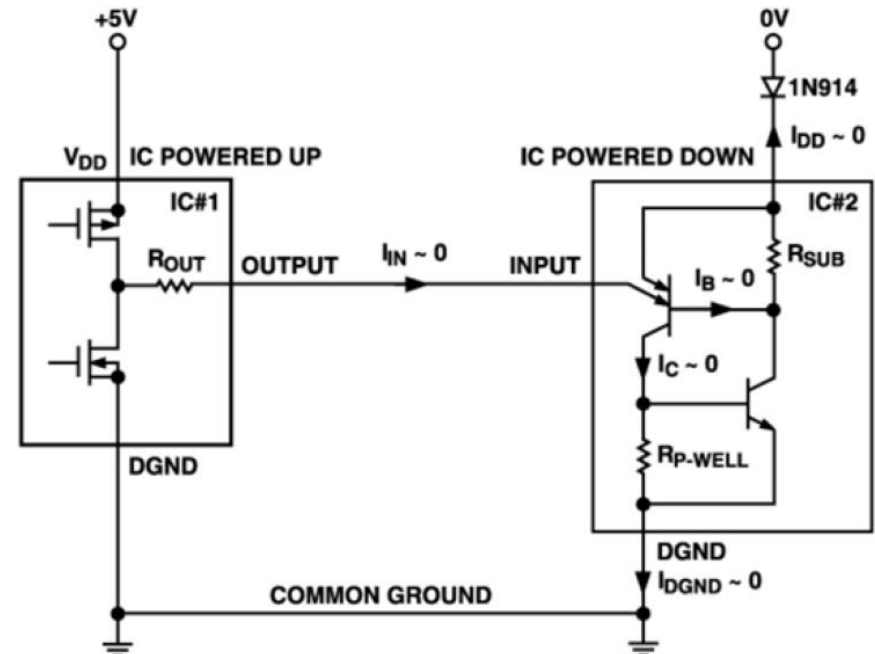
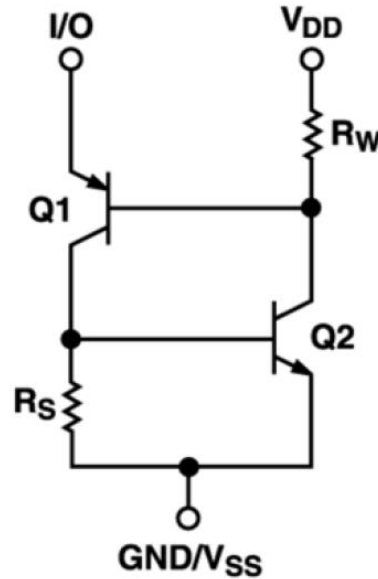
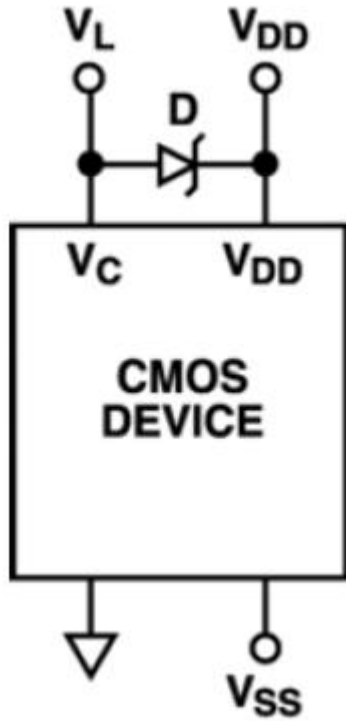


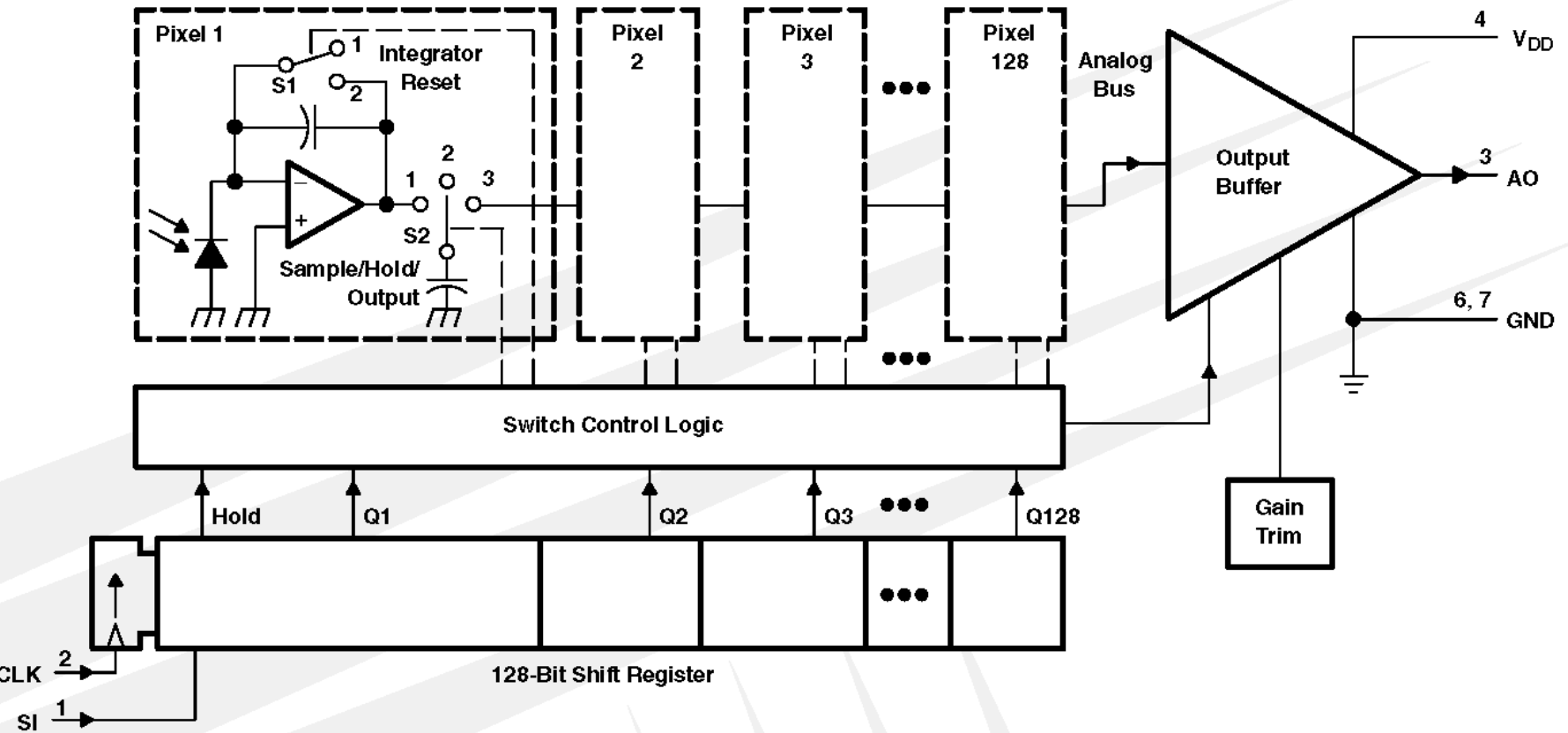
Figure 2. Cross-section of PMOS and NMOS devices, showing parasitic transistors Q1 and Q2.



Protection circuit

TSL 1401 line sensor

Functional Block Diagram



TSL 1401 line sensor

PARAMETER MEASUREMENT INFORMATION

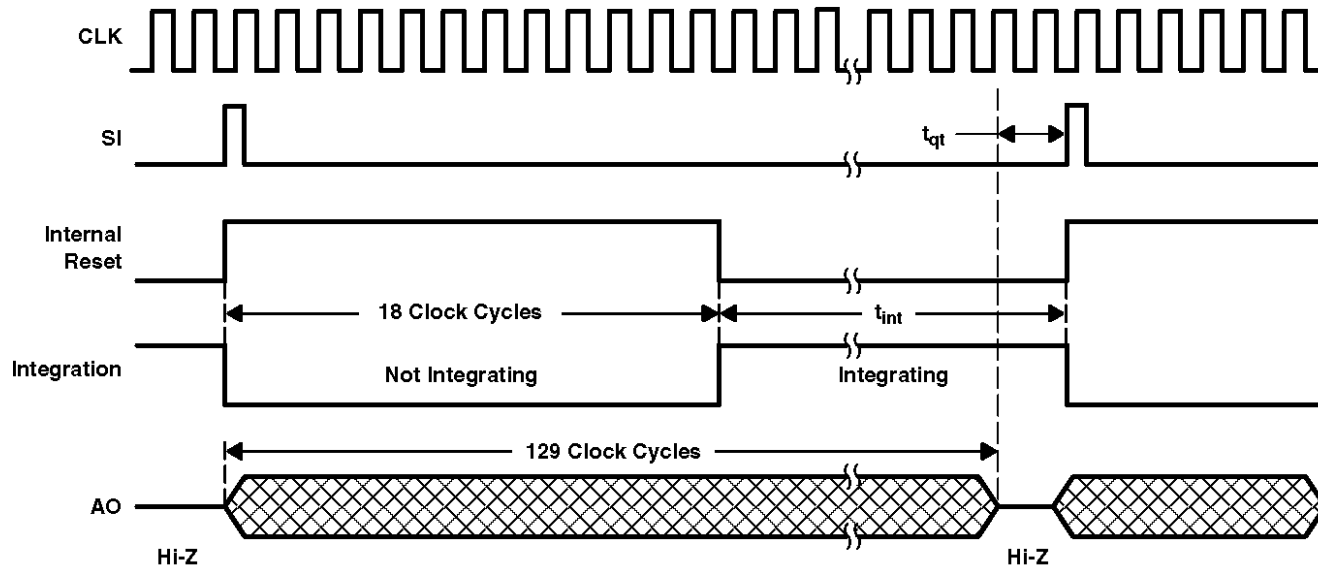


Figure 1. Timing Waveforms

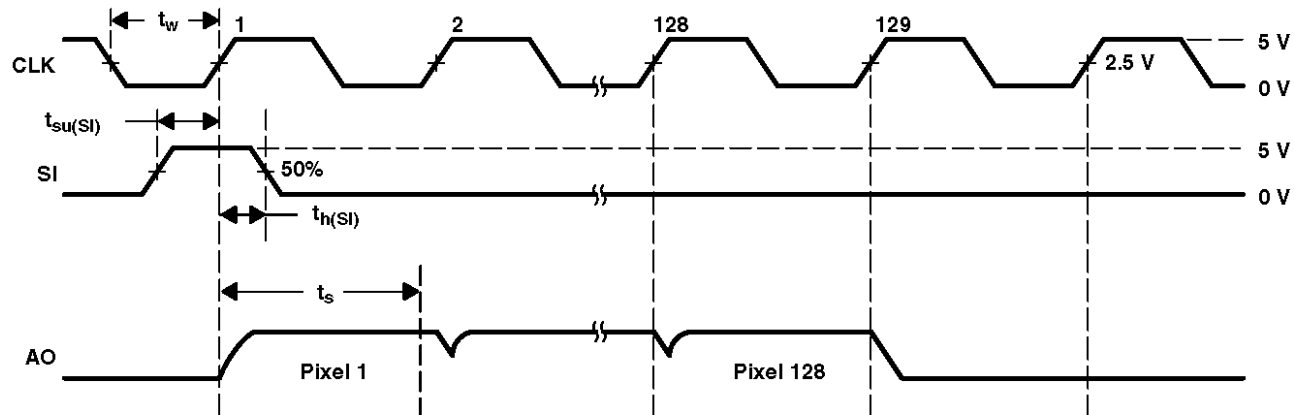
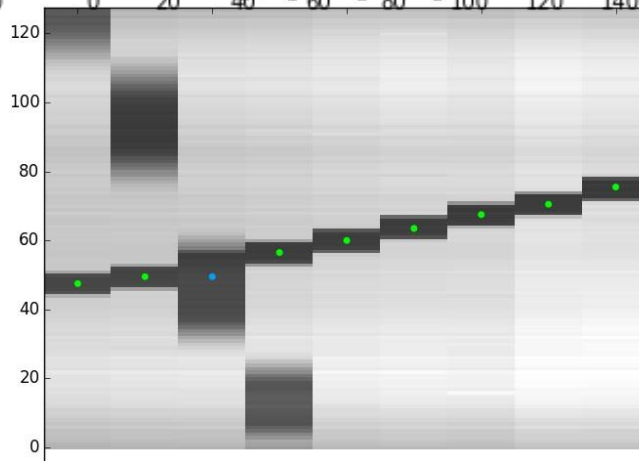
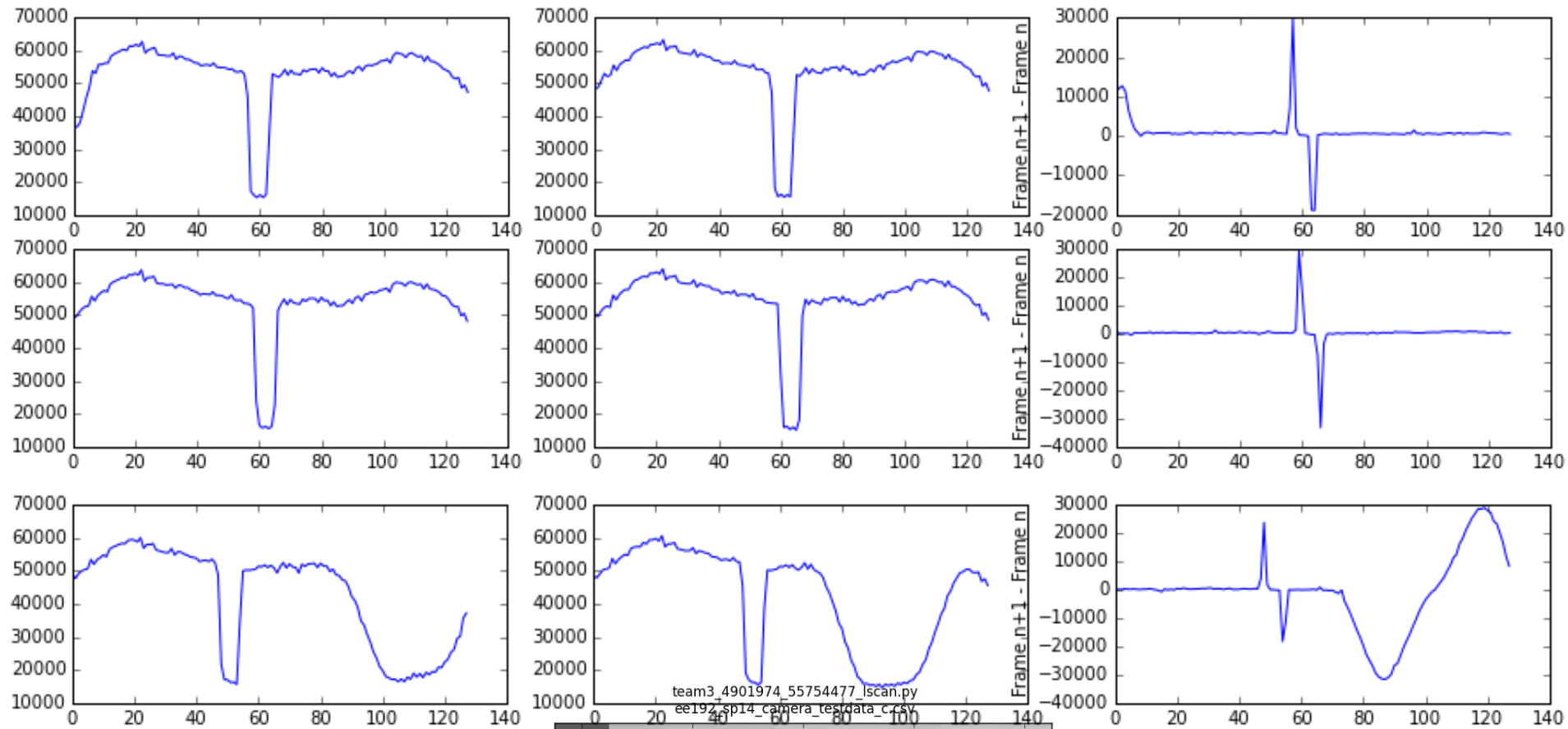
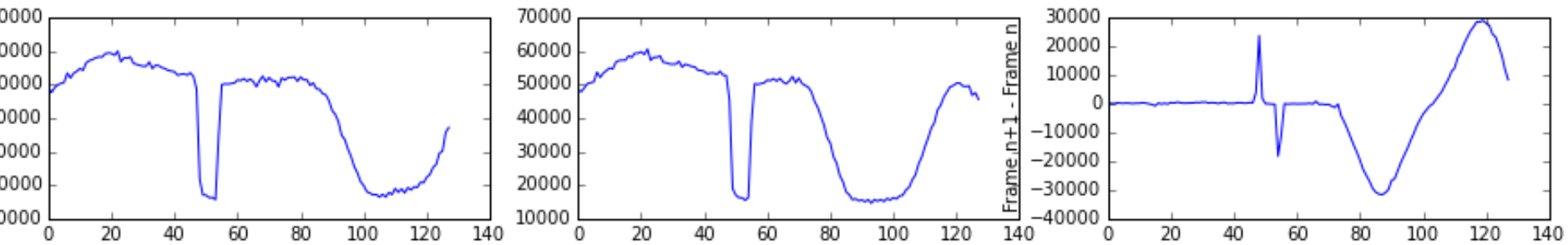


Figure 2. Operational Waveforms

TSL 1401 line sensor



TSL 1401 line sensor



team3_4901974_55754477_lscan.py
ee192_sp14_camera_testdata_c.csv

