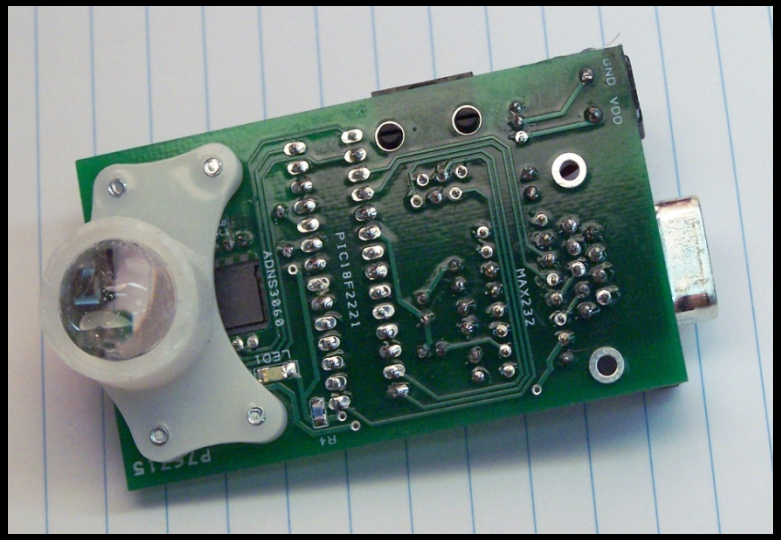
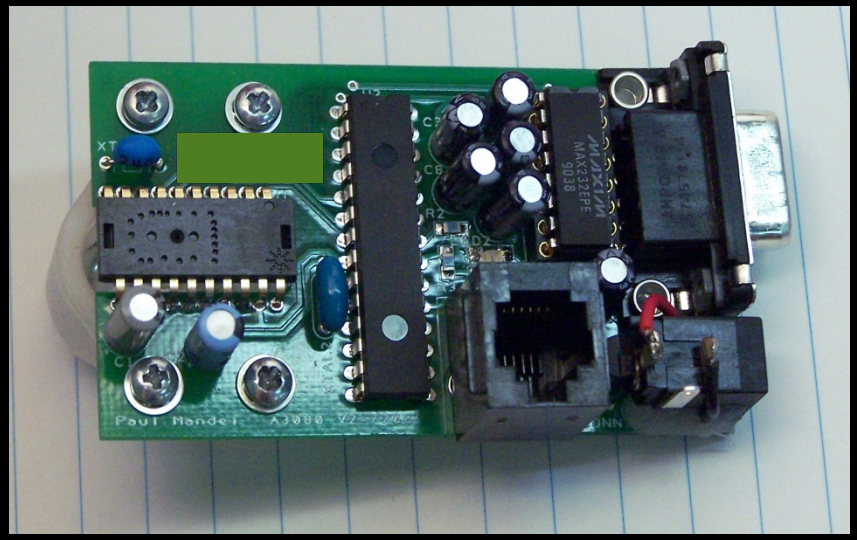


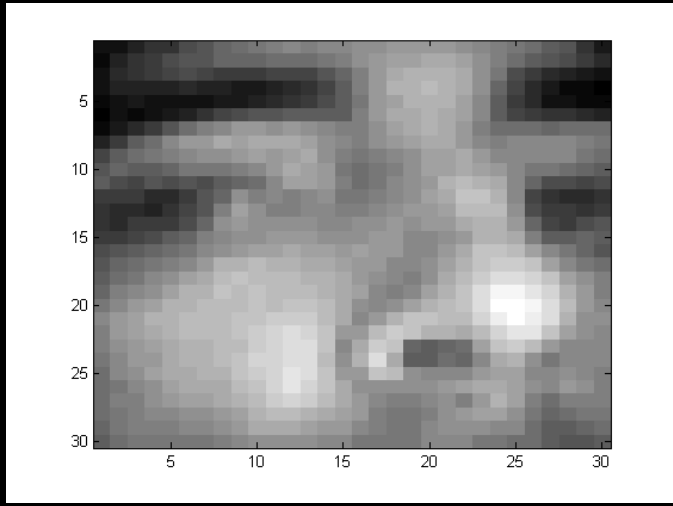


On the creation of an

OPTICAL SIDE-SLIP SENSOR

Paul Mandel
Summer 2008

First Light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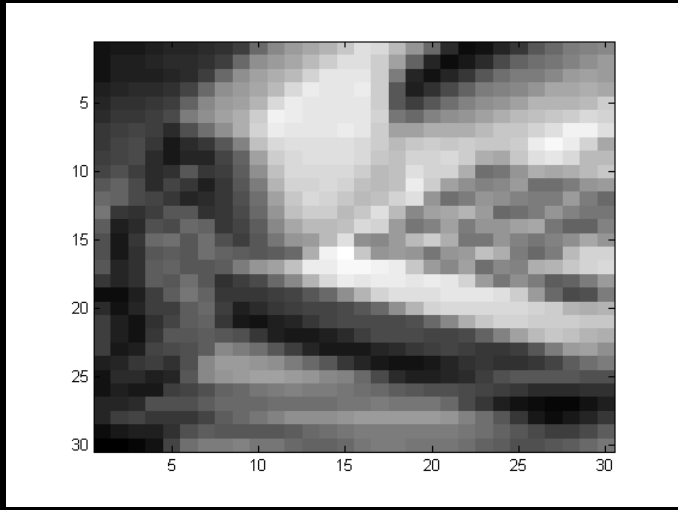
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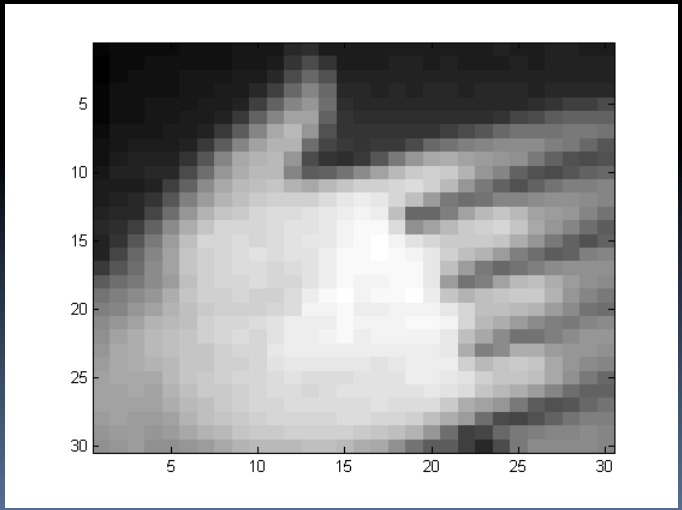
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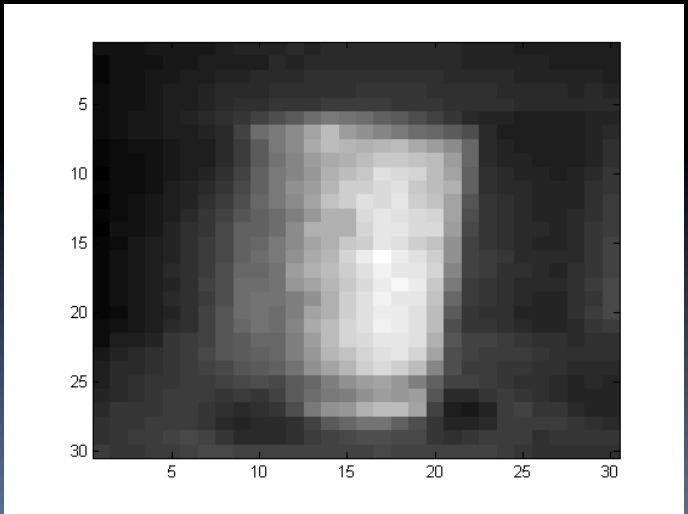
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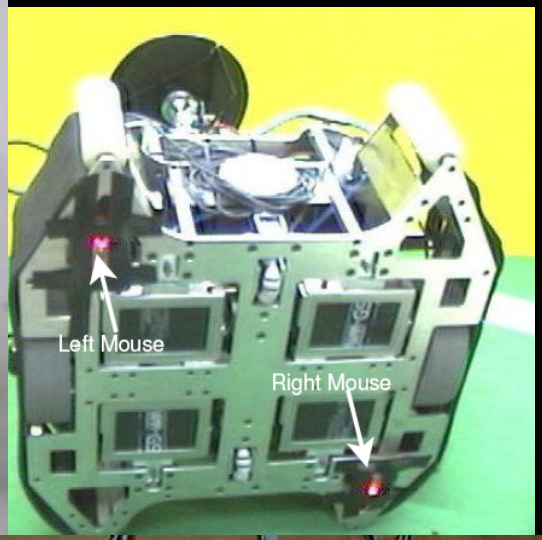
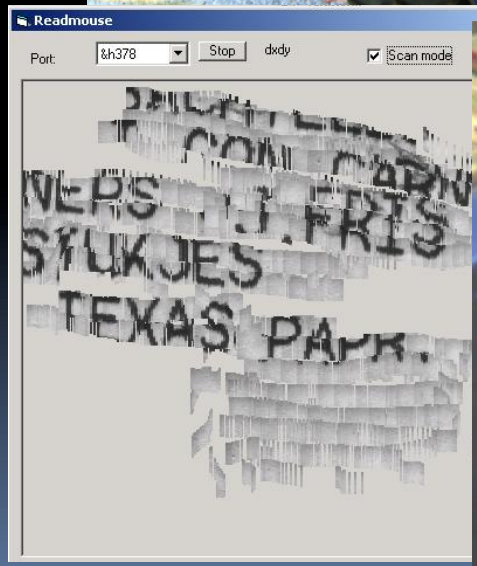
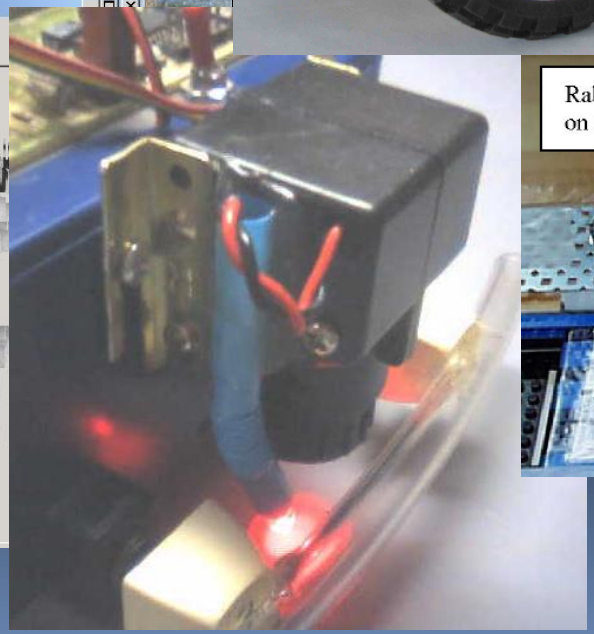
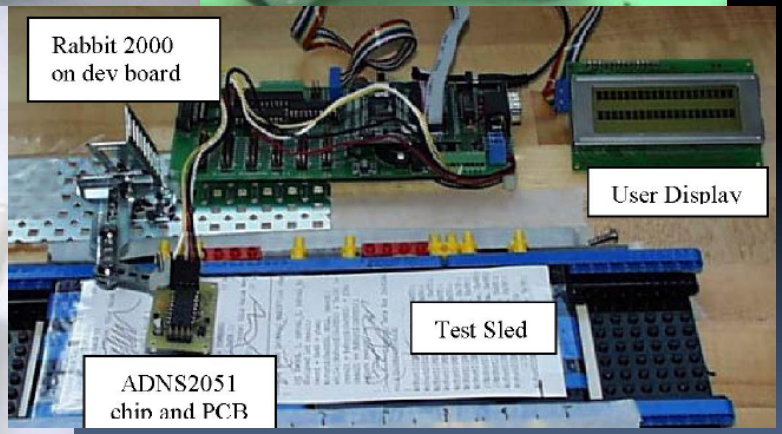
Prior Art

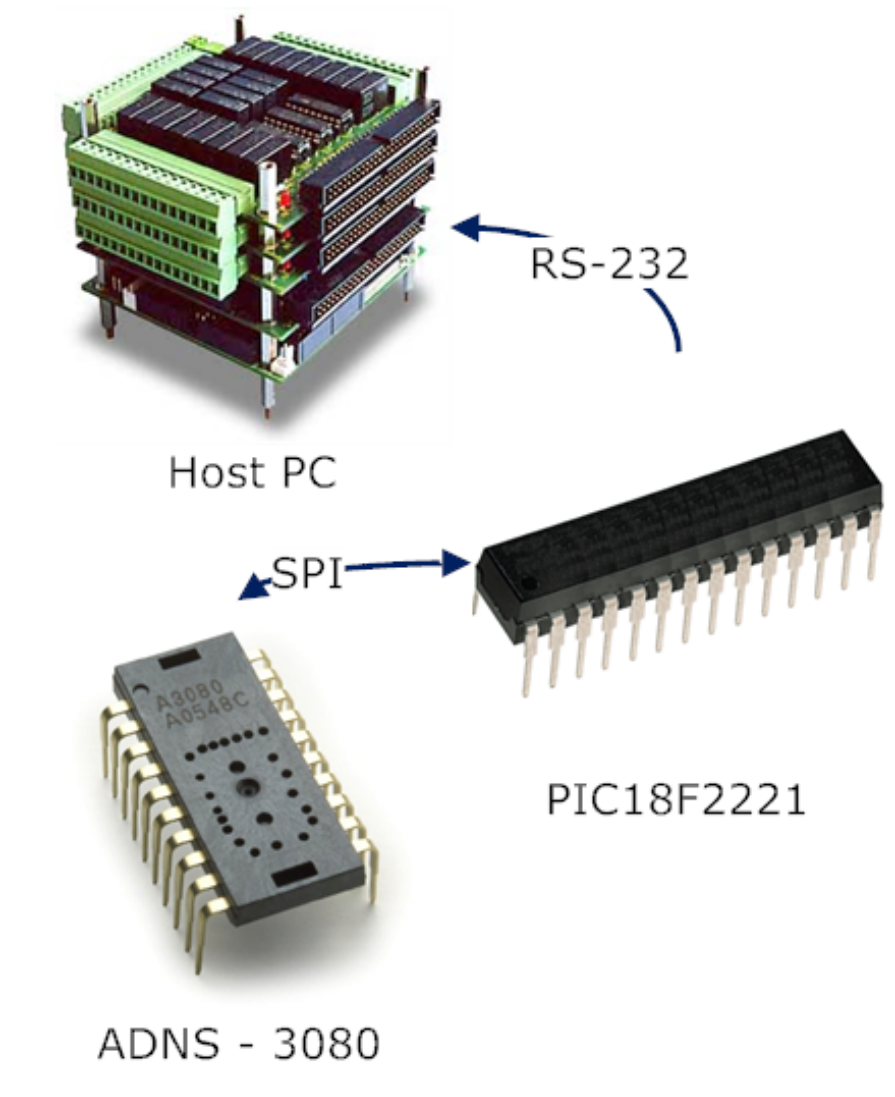

Left Mouse
Right Mouse


Readmouse
Port:
&h378
Stop
dxdy
Scan mode




Rabbit 2000
on dev board
User Display
Test Sled
ADNS2051
chip and PCB

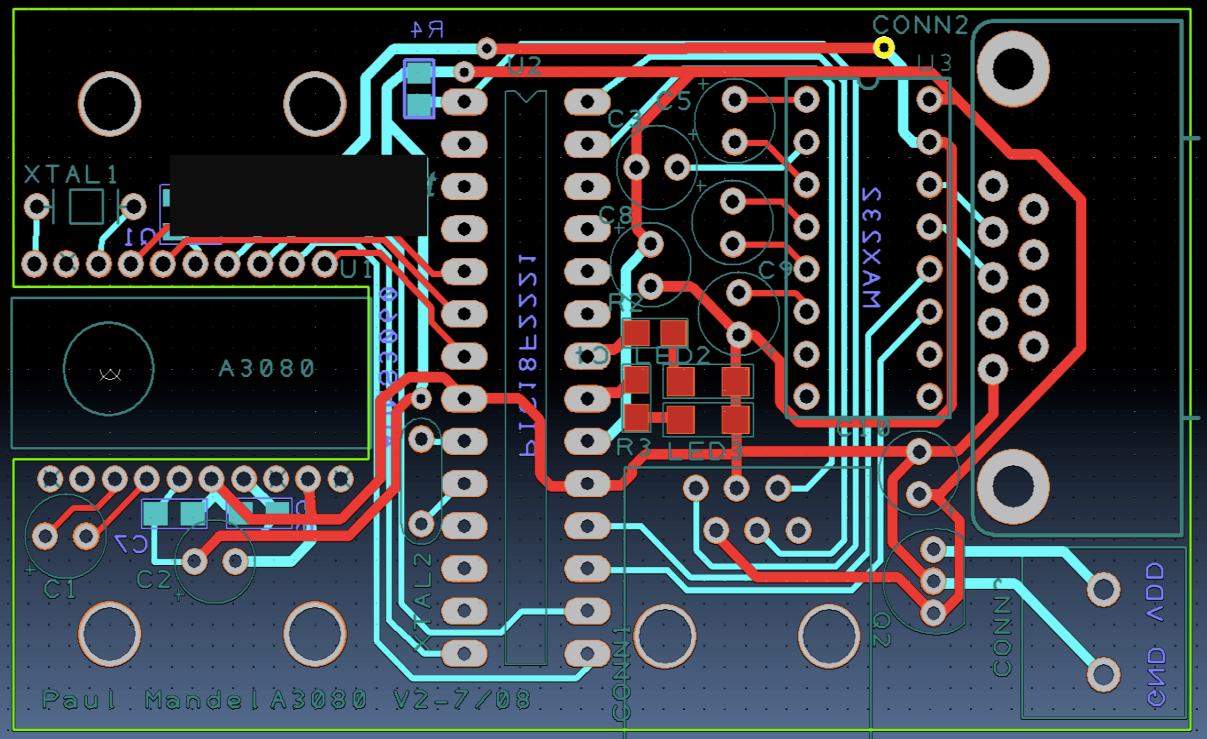
System Outline



Electronics

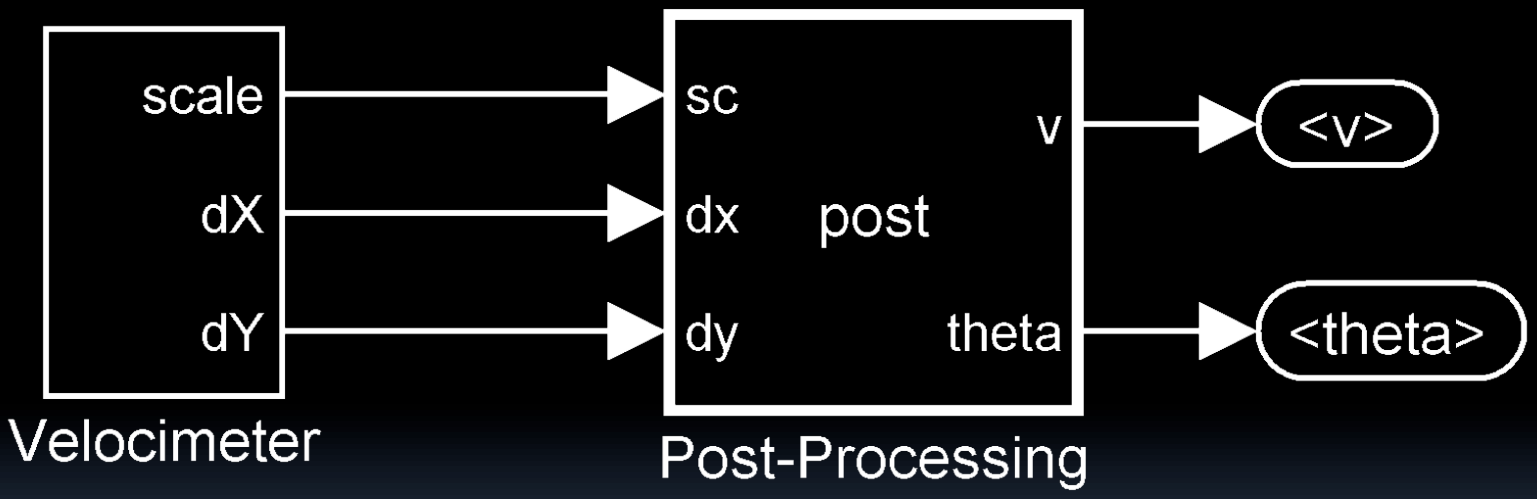
Specs	Min	Typ	Max	Units
V_{in}	3.3	5	30	V
I_q		27		mA
Data Rate	1	15	2000	Hz

Electrical Specifications



PCB layout

Software - Basic



Black Box model of the software

Software - Advanced

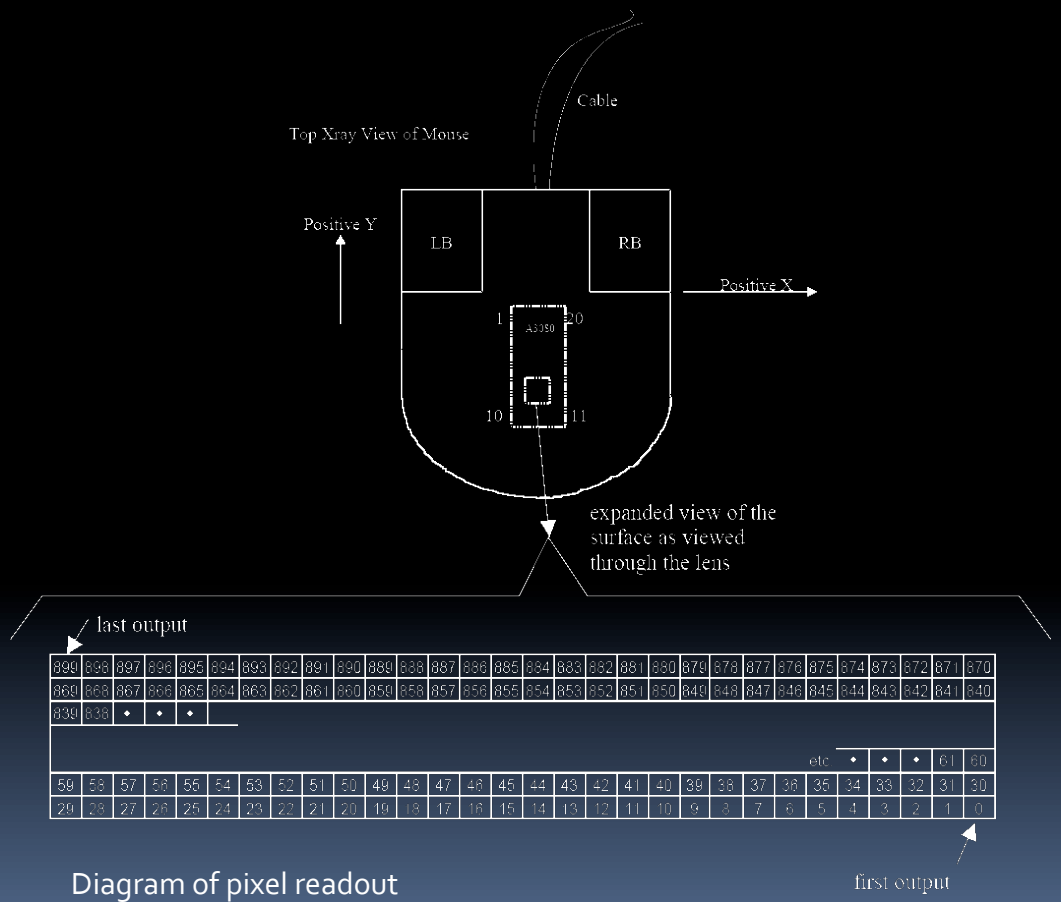
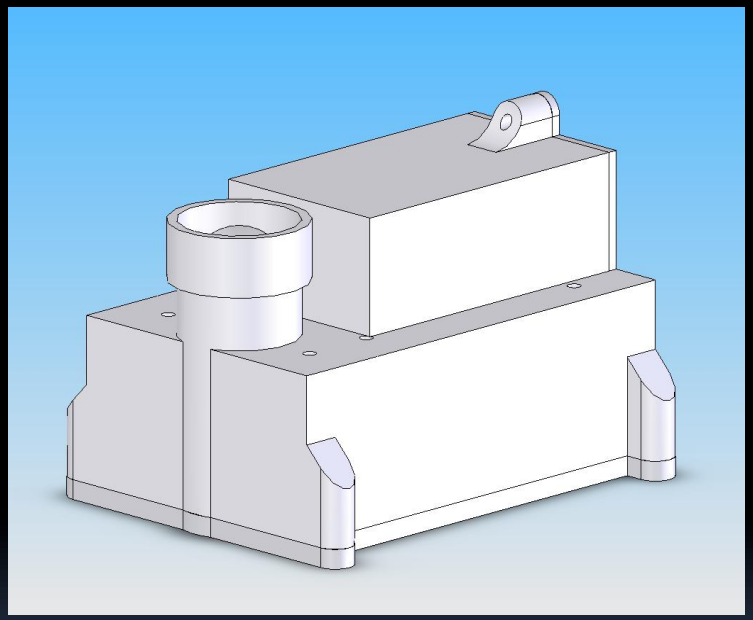


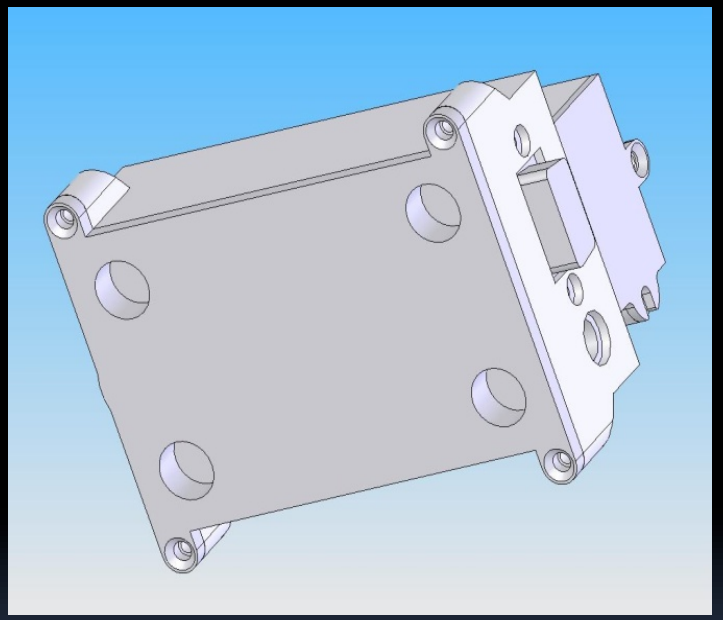
Diagram of pixel readout

Address	Register
0x00	Product_ID
0x01	Revision_ID
0x02	Motion
0x03	Delta_X
0x04	Delta_Y
0x05	SQUAL
0x06	Pixel_Sum
0x07	Maximum_Pixel
0x08	Reserved
0x09	Reserved
0x0a	Configuration_bits
0x0b	Extended_Config
0x0c	Data_Out_Lower
0x0d	Data_Out_Upper
0x0e	Shutter_Lower
0x0f	Shutter_Upper
0x10	Frame_Period_Lower
0x11	Frame_Period_Upper
0x12	Motion_Clear
0x13	Frame_Capture
0x14	SROM_Enable
0x15	Reserved
0x16	Reserved
0x17	Reserved
0x18	Reserved
0x19	Frame_Period_Max_Bound Lower
0x1a	Frame_Period_Max_Bound_Upper
0x1b	Frame_Period_Min_Bound_Lower
0x1c	Frame_Period_Min_Bound_Upper
0x1d	Shutter_Max_Bound_Lower
0x1e	Shutter_Max_Bound_Upper
0x1f	SROM_ID
0x20-0x3c	Reserved
0x3d	Observation
0x3e	Reserved
0x3f	Inverse Product ID
0x40	Pixel_Burst
0x50	Motion_Burst
0x60	SROM_Load

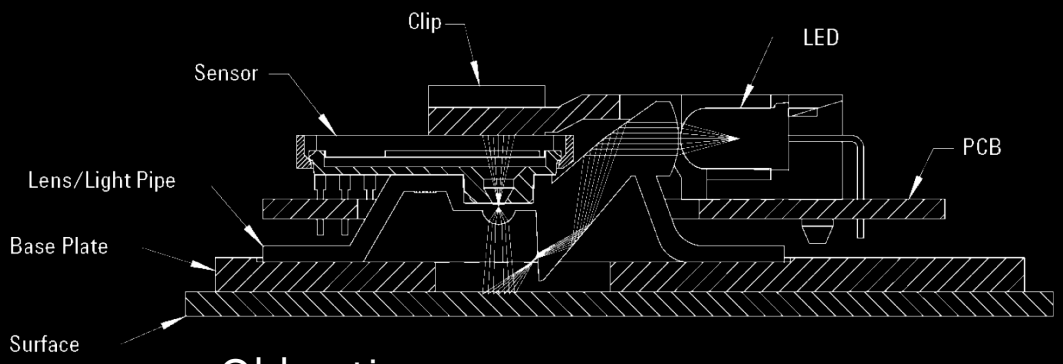
Registers of the ADNS-3080

Hardware - Case





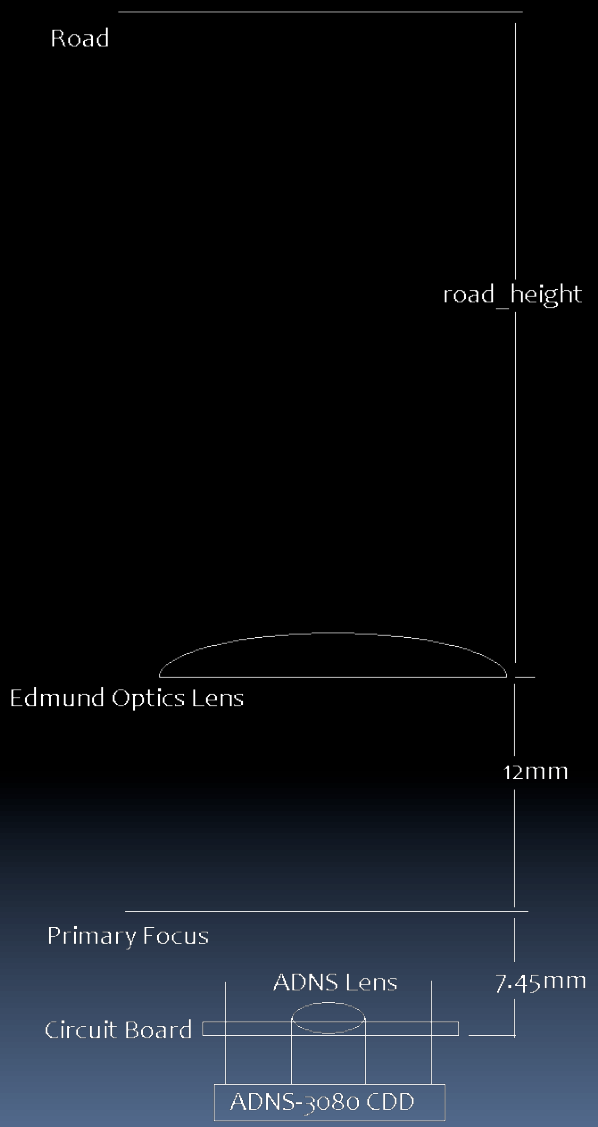
Hardware - Optics



Old optics

$$1ct@rd = \frac{h_{road}}{1.2cm} 1ct@pf$$

Magnification of new optics



New optics