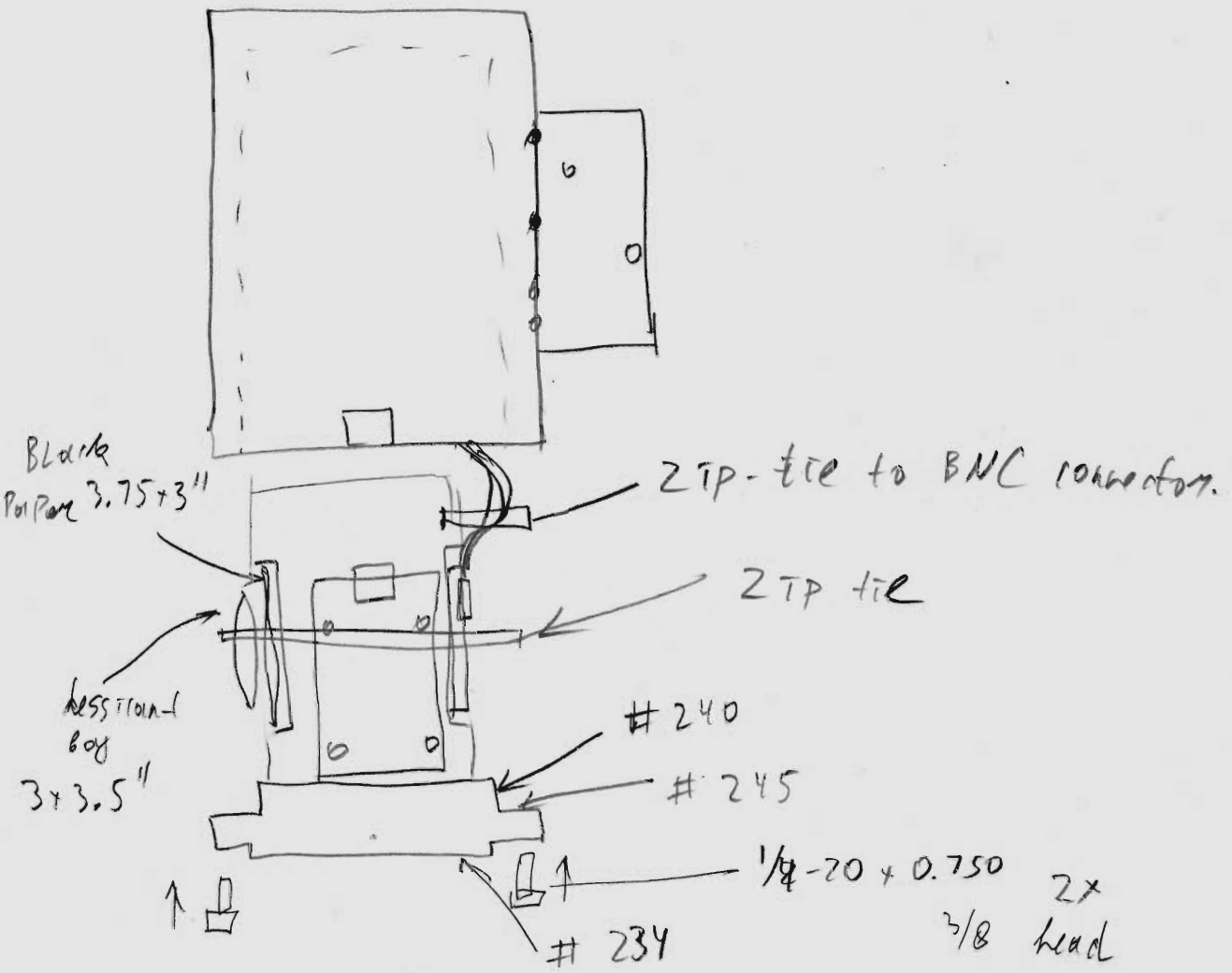
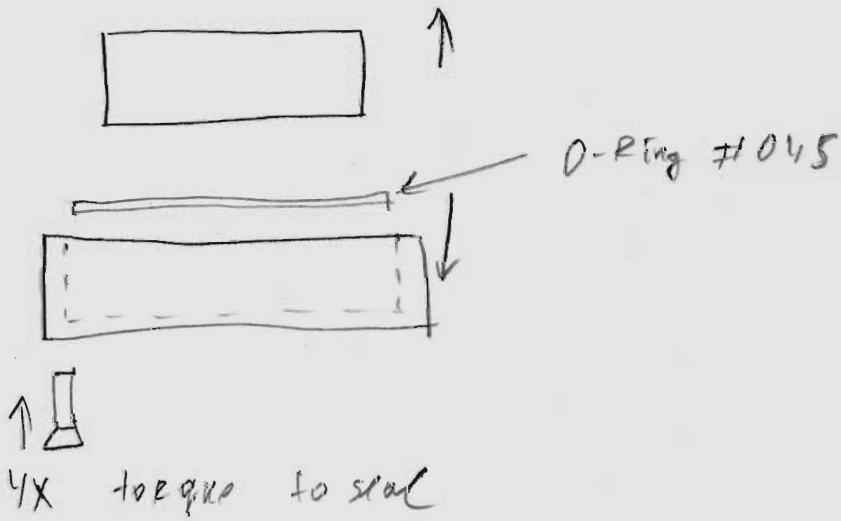
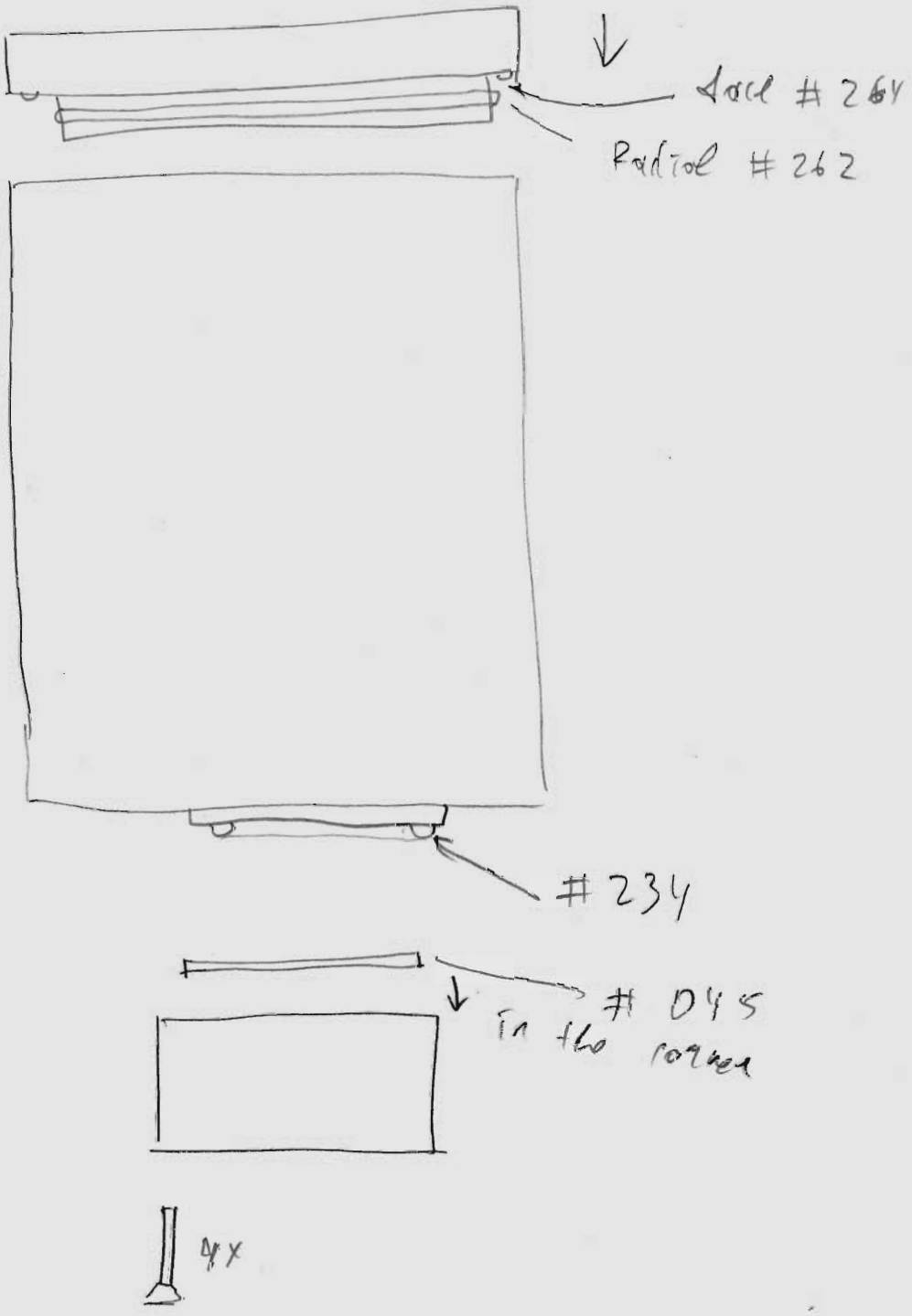
8/25/2011 Integration. H20 Fluorometer



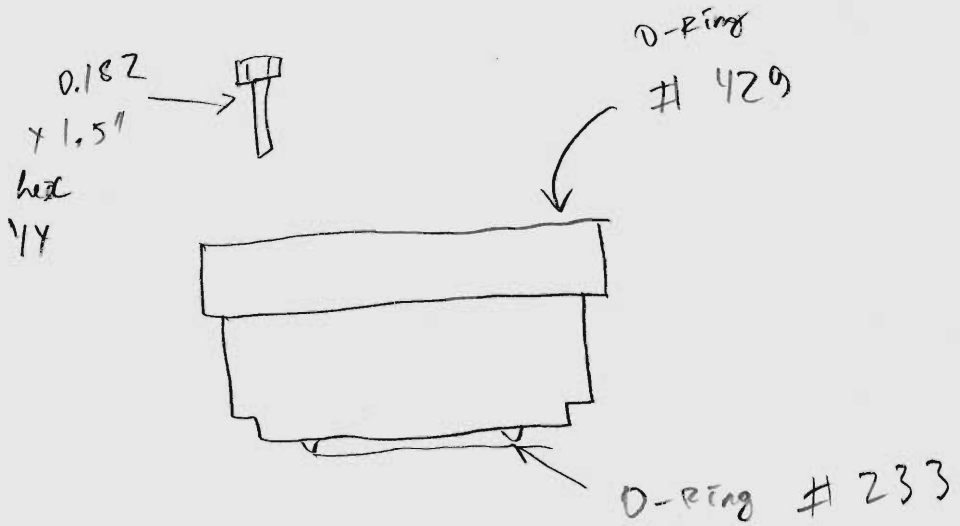


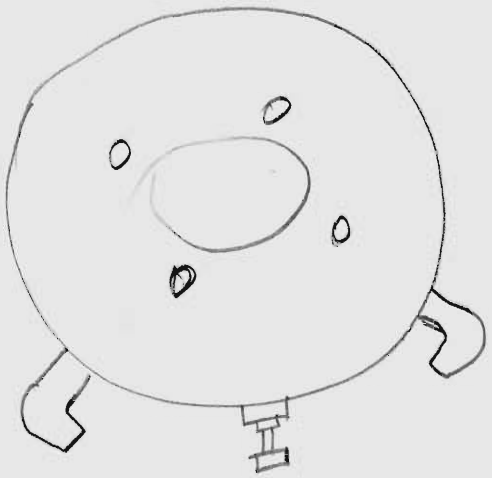
8/25/2011

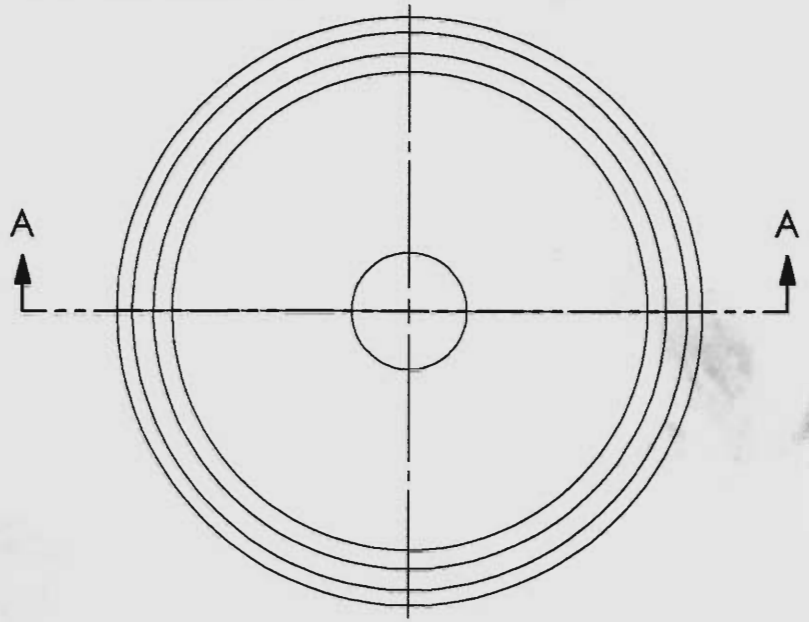


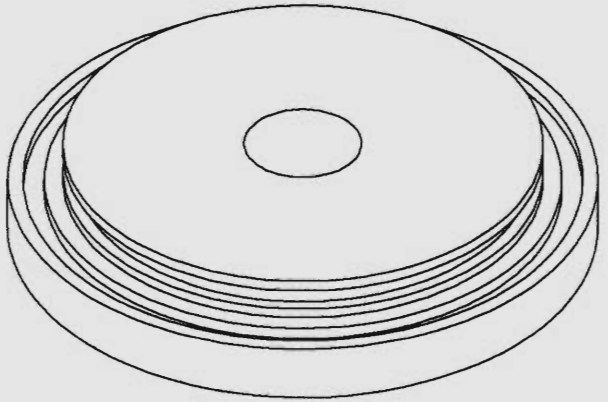
8/25/2011

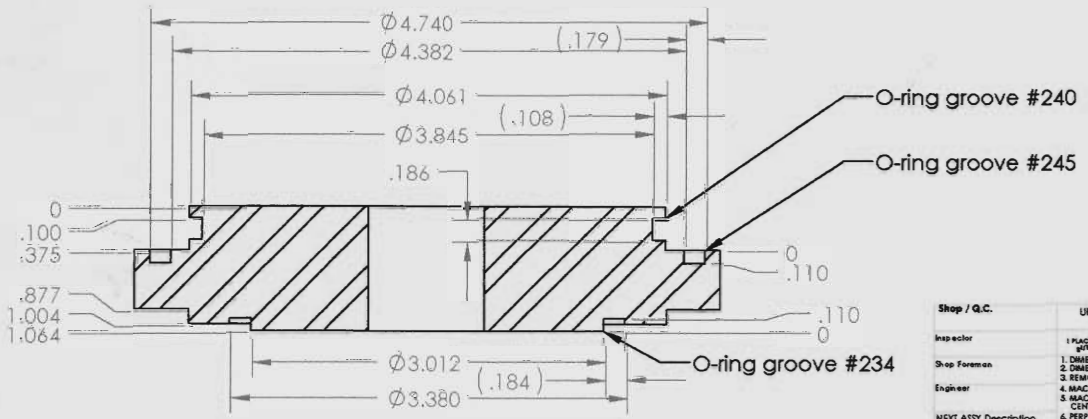
Window adaptor Infigmation











SECTION A-A

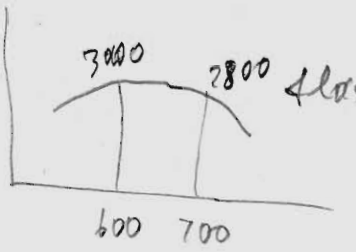
1- 234
1- 240
1- 245

Shop / Q.C.	UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:	INITIAL RELEASE rev 1	DATE 8/16/2011	Monterey Bay Aquarium Research Institute MBARI 7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1780
Inspector	1 PLACE DIM ±1/16 · 2 PLACE DIM ±.02 · 3 PLACE DIM ±.005 · ANGLES ±1°	DRAWN Klimov	xx	
Shop Foreman	1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING. 3. REMOVE BURRS AND SHARP EDGES .015 MAX.	ENGINEER Klimov	LAST UPDATE xx/xx/xxxx	
Engineer	4. MACHINED FILLET RADII .015/-.030. 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005	CHECKED		DRAWING NAME and FILE NAME 901027-301 - Fluorometer Housing Flange
NEXT ASSY Description	6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH, MAX .012 INCHES FOR SINGLE SURFACE.	PROJECT NO. 901027		SIZE B · DWG. NO. 901027-301 · REV. 1
Application	DO NOT SCALE DRAWING	PROJECT SES		SCALE 1:1 · SHEET 1 OF 1

1000 ms ;

8/18/2011

Initial: 25% filter 4x in each channel



flashlight Spectra

sensitivity of 590 channel is 10 – 20 times lower

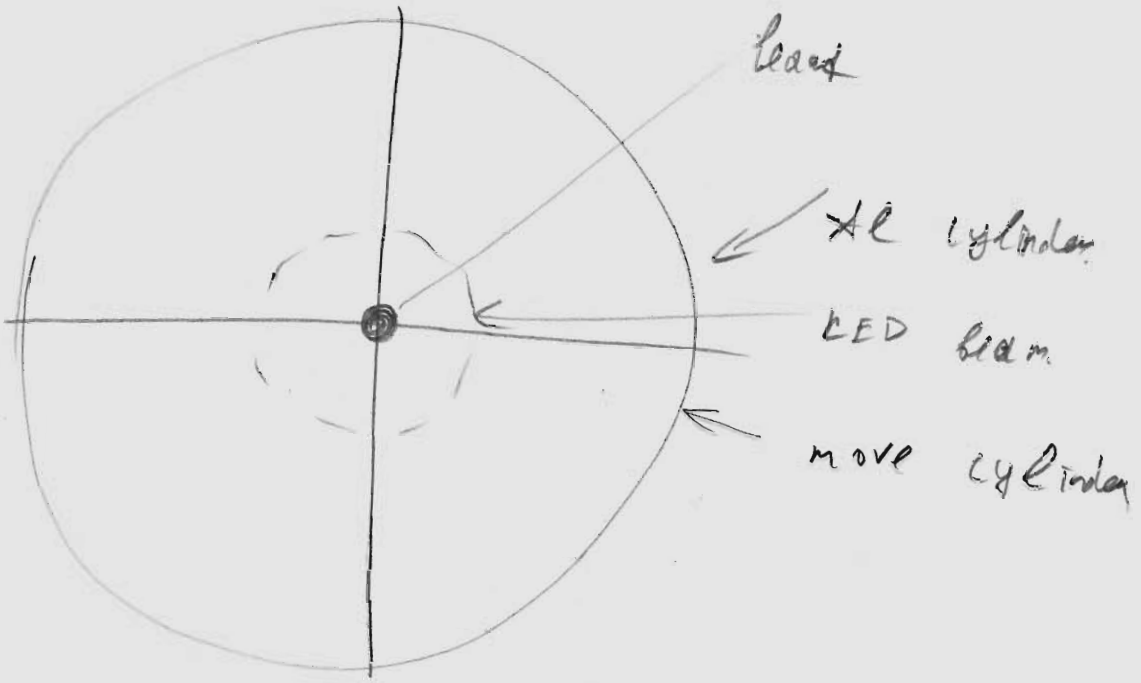
2 filters Removed. now $(0.25)^2 = 0.0625$

no lens (Removed was 85 mm)

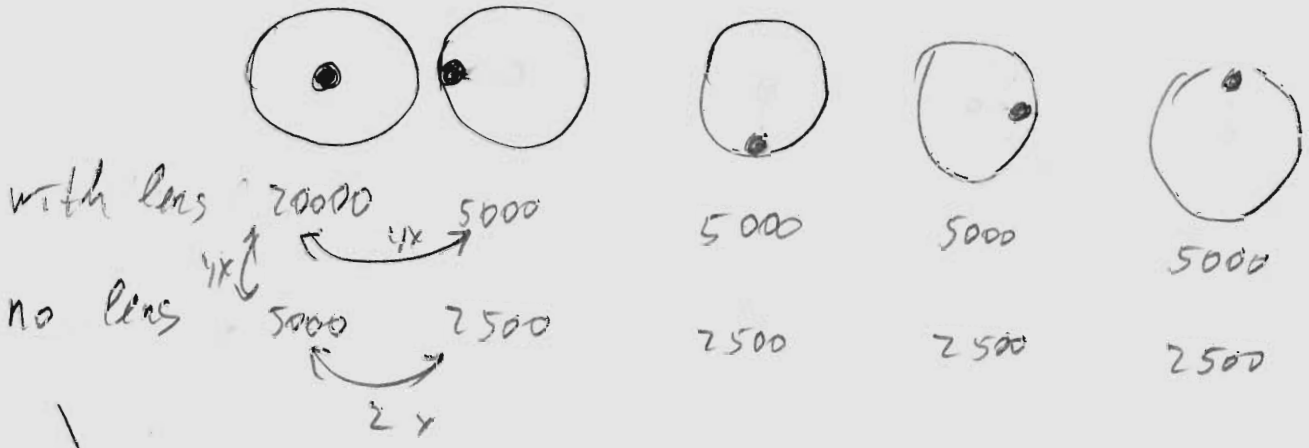
test	measure		bank			
flashlight	100		1000	25000	14000	
@ 3.25"	1000	177 247	1000	7	1	
green leave on @ 3.25"	1000	11013 442				
green - yellow leaf		15173 604				
		20200 594				
Yellow lettuce		18000 353				
		23000 353				
		20000 352				
lemon head, green section		16000 316				
		19000 318				
		26000 315				
		27000 321				
Yellow section		15500 978				
		16900 962				
		17700 964				
		17000 975				
glue stick on @ 3.25"	520	1980	5	0		
@ 3.25	184	425	1	1		

Final Setting

8/17/2011



dual sensitivity



Remove Lens, increase current

8/15/2011
100 ms ; counting with scope

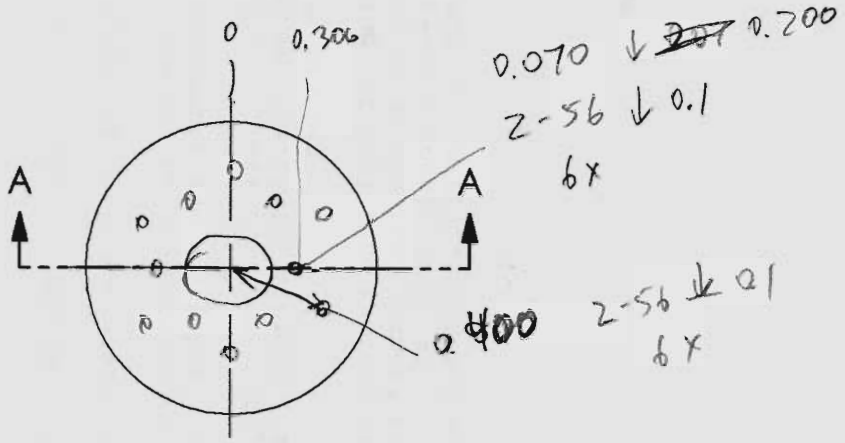
	P1 690nm	P2 590nm
100ms; noLED	102×64	32×64
100ms +LED	70×64	39×64

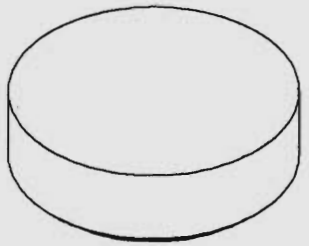
8/17/2011

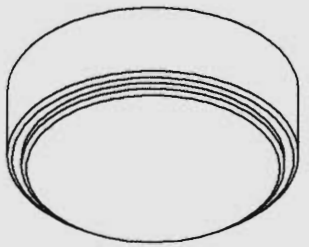
	measure			dark		
housing [illegible] 3.25", Al	1000	1500	128	1000	12	1
housing 3.25", PVC	1000	1380	123	1000	5	1
20" Al pipe	1000	1390	127	1000	3	0
3.25"; PVC	1000	66	19	1000	5	1
3.25" Al	1000	144	23	1000	26	4
3.25" Leave on Al	1000	5340 (↕ 374)	22	1000	27	2
3.25" Leave on Al	1000	21000	27	1000	8	1
3.25" on Al	1000	397 (↕ 524)	24	1000	7	0
3.25" on PVC	1000	168	21	1000	8	0
20' pipe	1000	199	35		8	0

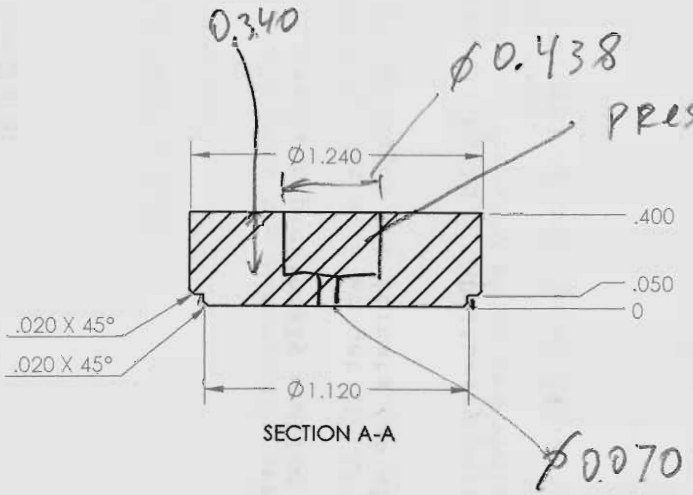
Painted parts ↓

Painted + lens







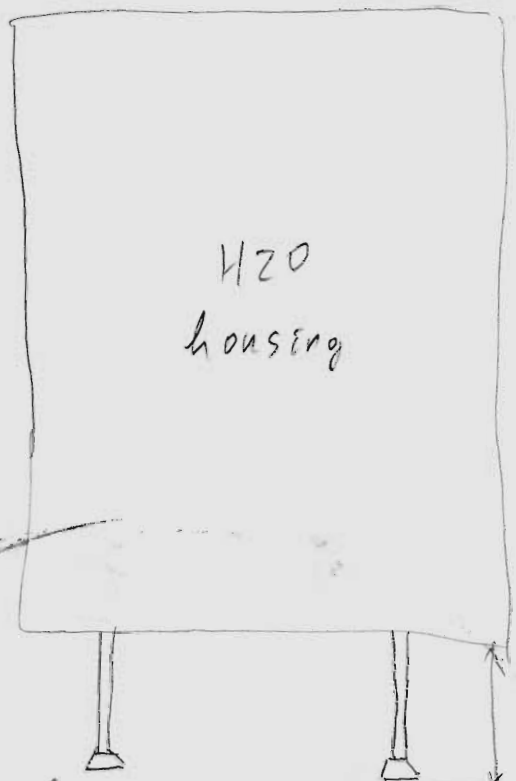


SECTION A-A

Material: UHMW

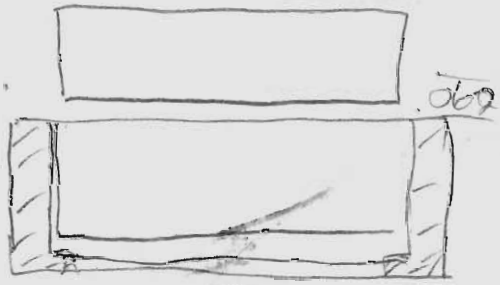
Shop / Q.C.	UNLESS OTHERWISE SPECIFIED TOLERANCES ARE:	INITIAL RELEASE rev 1	DATE 5/16/2011	Monterey Bay Aquarium Research Institute MBARI 7700 Sandholdt RD. Moss Landing, CA 95039 PH: (831) 775-1700
Inspector	1 PLACE DIM ±1/16 · 2 PLACE DIM ±.02 · 3 PLACE DIM ±.005 · ANGLES ±1°	DRAWN Klimov	XX	
Shop Foreman	1. DIMENSIONS ARE IN INCHES 2. DIMENSION LIMITS HELD AFTER PLATING. 3. REMOVE BURRS AND SHARP EDGES .015 MAX.	ENGINEER Klimov	LAST UPDATE xx/xx/xxxx	
Engineer	4. MACHINED FILLET RADII .015/-.000. 5. MACHINED DIAMETERS ON A COMMON CENTERLINE CONCENTRIC WITHIN .005	CHECKED		DRAWING NAME and FILE NAME 901027-102 - Diffuser-Side
NEXT ASSY Description	6. PERPENDICULARITY & PARALLELISM OF MACHINED SURFACES .002 PER INCH, MAX .012 INCHES FOR SINGLE SURFACE.	PROJECT NO. 902710		SIZE B · DWG. NO. 901027-102 · REV. 1
Application	DO NOT SCALE DRAWING	PROJECT SES		SCALE 2:1 · SHEET 1 OF 1

4/19/2011 SES



1.562
1.560
1.562
1.553

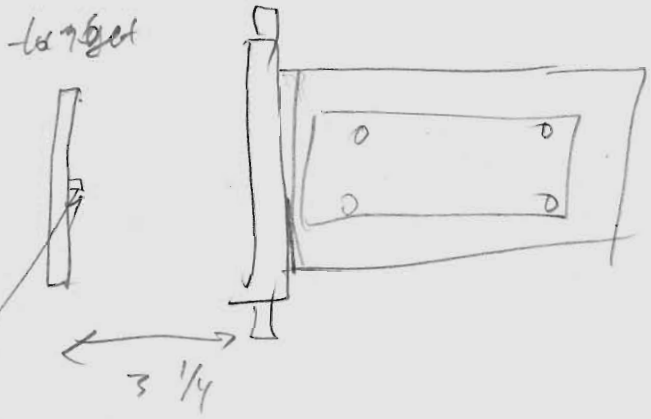
Bottomed out

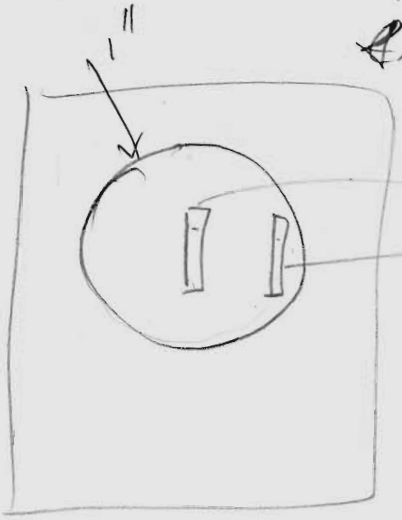


..607

3/31/2011

Al Block





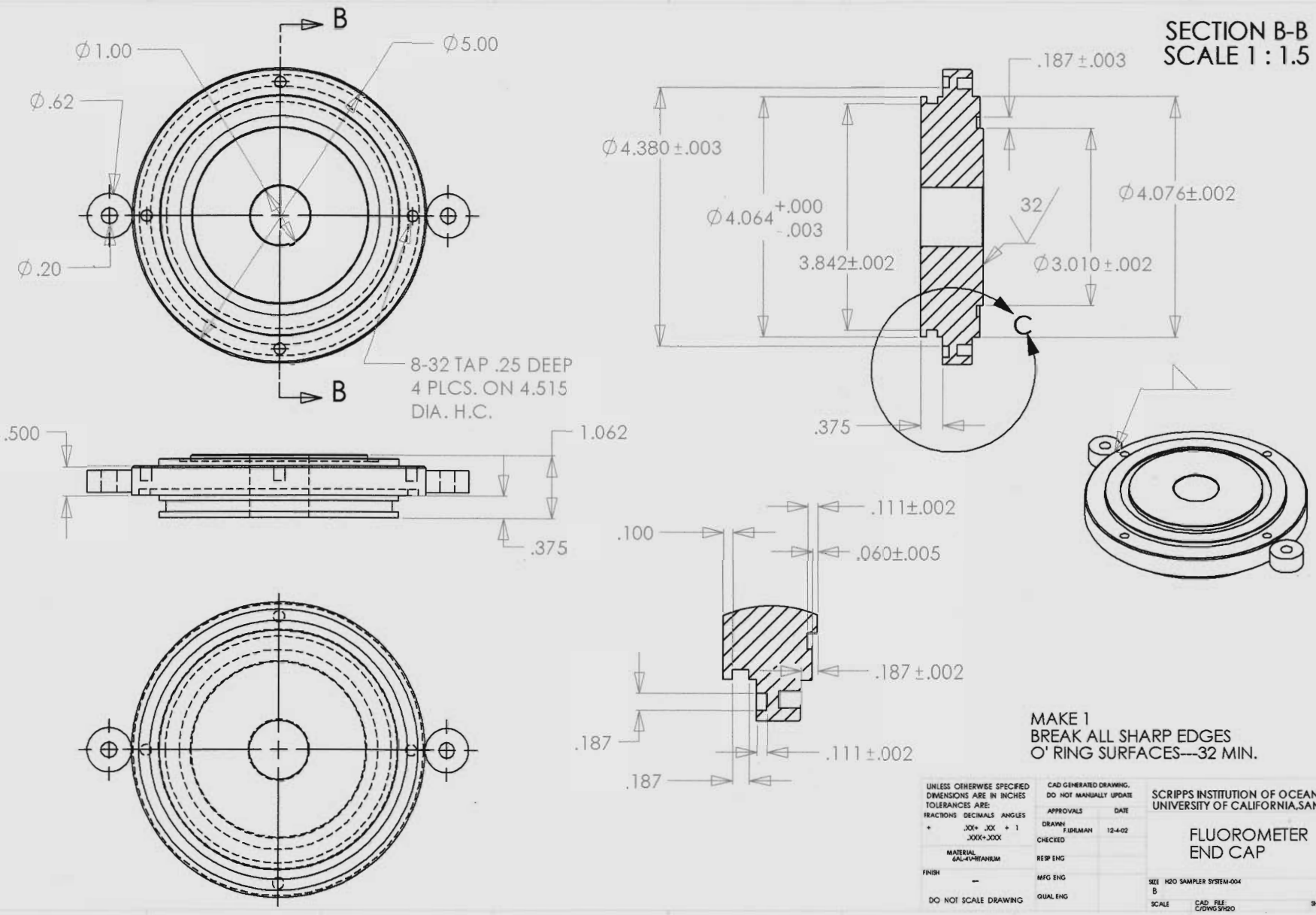
Fluorescent paper 1/8 × 1/4 fabric

central position

peak position

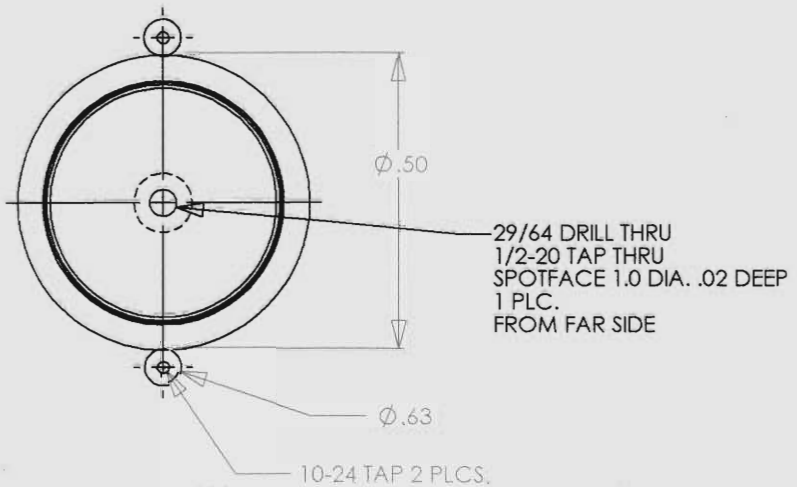
1sec. accumulation

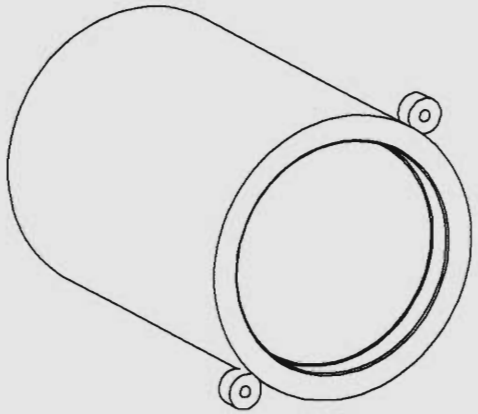
	counts				
	signal, no fluor	central	Peak 1	Peak 2	
125mm lens	42,000	78100	72100	71800	83
original (80mm)	46900	104000	86K	82K	65
no lens	52.7K	62.8K	58.2	59.5	64

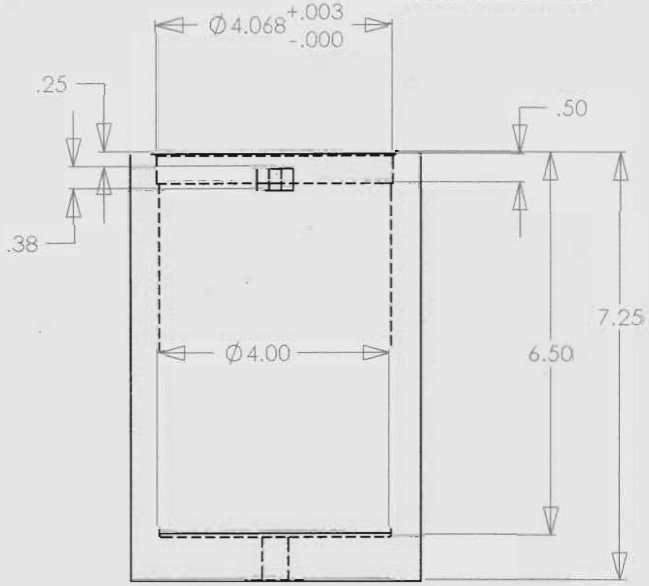


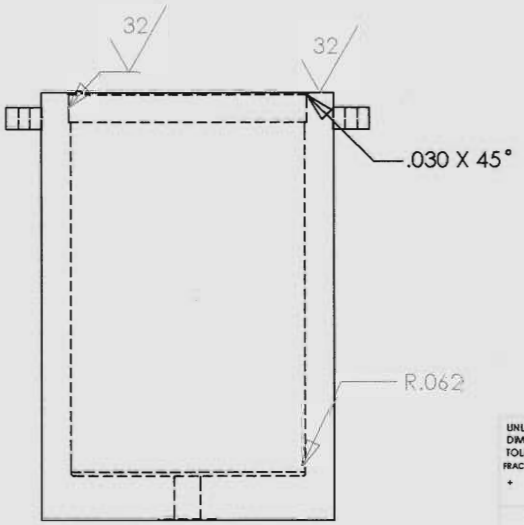
MAKE 1
BREAK ALL SHARP EDGES
O' RING SURFACES---32 MIN.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX± .XX ± 1 .XXX±.XXX	CAD GENERATED DRAWING. DO NOT MANUALLY UPDATE	SCRIPPS INSTITUTION OF OCEANOGRAPHY UNIVERSITY OF CALIFORNIA,SAN DIEGO
MATERIAL 6AL-4V-TITANIUM	APPROVALS / DRAWN F.UHLMAN 12-4-02 / CHECKED / RESP ENG	FLUOROMETER END CAP
FINISH –	MFG ENG	SIZE B H2O SAMPLER SYSTEM-004 REV.
DO NOT SCALE DRAWING	QUAL ENG	SCALE CAD FILE: C/DWG SH2O SHEET 1 OF 1









MAKE 1

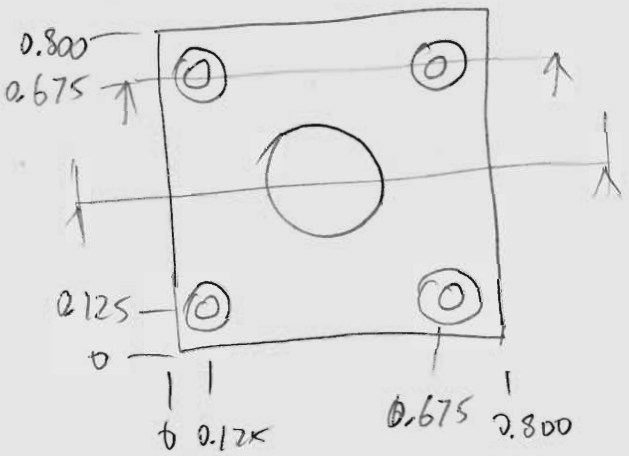
BREAK ALL SHARP EDGES

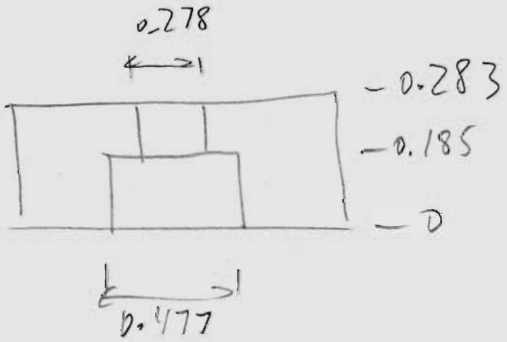
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES + XX+ .XX + 1 .XXX+.XXX	CAD GENERATED DRAWING. DO NOT MANUALLY UPDATE	SCRIPPS INSTITUTION OF OCEANOGRAPHY UNIVERSITY OF CALIFORNIA,SAN DIEGO
MATERIAL 6AL-4V TITANIUM	APPROVALS DATE DRAWN F.UHLMAN 12-05-02 CHECKED RESP ENG	FLUOROMETER CASE
FINISH —	MFG ENG	SIZE B DWG. NO. H2O FLUOROMETER-006 REV.
DO NOT SCALE DRAWING	QUAL ENG	SCALE CAD FILE: C/FILES/DWGS/H2O SHEET 1 OF 1

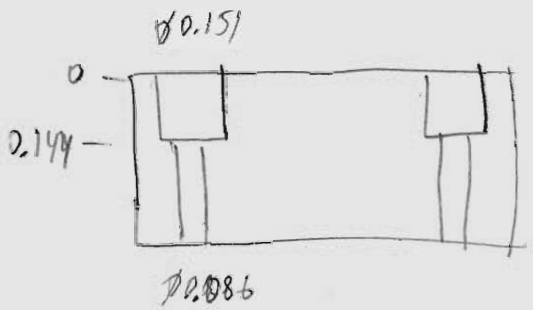
Do not Turn on Lights

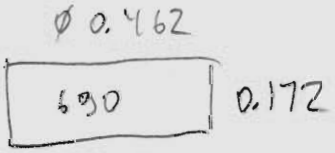
Knock First

filter holder
for PI channel









4/7/2011 - 1

408-261-2022 [redacted]

Roberta

Kate → moved to Boston

1

Sandra - Replacement for Kate → called back 4/11/2011

x 110

Adam x 7747

PMT Room light → with no power OK

in applied

photocathod loss

full sunlight - no damage to photocathod

7155 - no protection circuit

surge, damaged

7122 - has protection - with 2 mA

PMT < 1 μA - recommendations

↕ 100 μA - limiting lifetime.

< 1 nW (1000 A/W) > 1 nW - risk of damaging

100 nW - dam

H10682-110 - best replacement

100 μA max / $30 \cdot 10^7 \frac{A}{W}$ → 3.3 nW

4/7/2011 -2

H5783-20 at 0.8 V:

$3.9 \cdot 10^4 \frac{A}{W}$; 100 μA max → 2.5 nW max.

10nm Band; Sunlight: 1 KW/m²

$1000 \frac{W}{m^2} \rightarrow 100 \frac{mW}{cm^2}$

Ø 8mm → 0.5 cm²

$0.100 \frac{W}{cm^2} \cdot 0.5 cm^2 \cdot \frac{10nm}{1000nm} = 5 \cdot 10^{-4} W = 500{,}000 nW$

Room light: $500 \mu W/cm^2 \cdot 0.5 cm^2 \cdot \frac{10 nm}{1000 nm} = 2.5 \mu W$

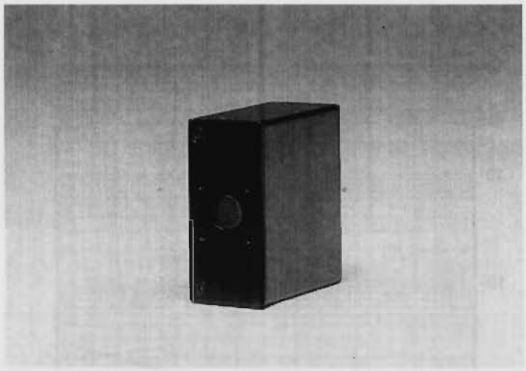
2500 nW

60 - 2007

80 - 2002

Metal package PMT

Photon Counting Head H7155 Series



The H7155 series are compact photon counting head devices consisting of a metal package photomultiplier tube along with a high-speed photon counting circuit and a high-voltage power supply circuit. The high voltage supply for photomultiplier tube and the discriminator level are preset to optimum values, allowing photon counting measurement by just connecting a +5 V supply.
The H7155-20 has an internal prescaler of division by 4. This prescaler improves the count linearity 4-fold compared to the H7155.

908-231-0960 applications support
left message.

X7671

Product Variations

Type No.	Spectral Response	Prescaler
H7155	300 nm to 650 nm	No
H7155-20		Yes

Specifications

Parameter		H7155	H7155-20	Unit
Input Voltage		+4.5 to +5.5		V
Max. Input Voltage		+6		V
Max. Input Current		50	70	mA
Effective Area		φ8		mm
Peak Sensitivity Wavelength		420		nm
Count Sensitivity	300 nm	1.2×10^5	1.2×10^5 *2	$s^{-1} \cdot pW^{-1}$
	400 nm	2.7×10^5	2.7×10^5 *2	
	500 nm	2.2×10^5	2.2×10^5 *2	
	600 nm	2.1×10^4	2.1×10^4 *2	
Count Linearity *1		1.5×10^6	10×10^6 *2	s^{-1}
Dark Count *3	Typ.	100	100 *2	s^{-1}
	Max.	500	500 *2	
Pulse-pair Resolution		70	10	ns
Output Pulse Width		30	Depends on count rate.	ns
Output Pulse Height *4	Typ.	3.6	2.2	V
	Min.	3.0	2.0	
Recommended Load Resistance		50		Ω
Signal Output Logic		Positive logic		—
Operating Ambient Temperature		+5 to +40		°C
Storage Temperature		-20 to +50		°C
Weight		75		g

*1: Random pulse, at 10 % count loss
*2: Output count will be decreased to 1/4 after the prescaler.
*3: After 30 minute storage in darkness
*4: With input voltage +5 V, Load resistance 50 Ω and Coaxial cable RG-174/U (450 mm)

14·10⁶ Hz

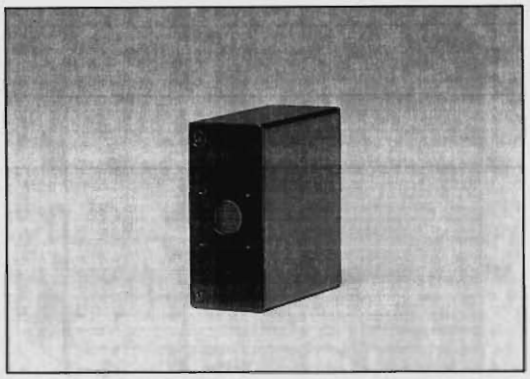
1mW @ 500: $220 \cdot 10^6$ counts/sec

$1.5 \cdot 10^6$ counts/sec: Linear
$14 \cdot 10^6$: overlapping
$220 \cdot 10^6$: damaging 1mW

Photon Counting Head

H7155 Series

HAMAMATSU



The H7155 series are compact photon counting head devices consisting of a metal package photomultiplier tube along with a high-speed photon counting circuit and a high-voltage power supply circuit. The high voltage supply for photomultiplier tube and the discriminator level are preset to optimum values, allowing photon counting measurement by just connecting a +5 V supply.
The H7155-20/H7155-21 has an internal prescaler of division by 4. This prescaler improves the count linearity compared to the H7155/H7155-01.

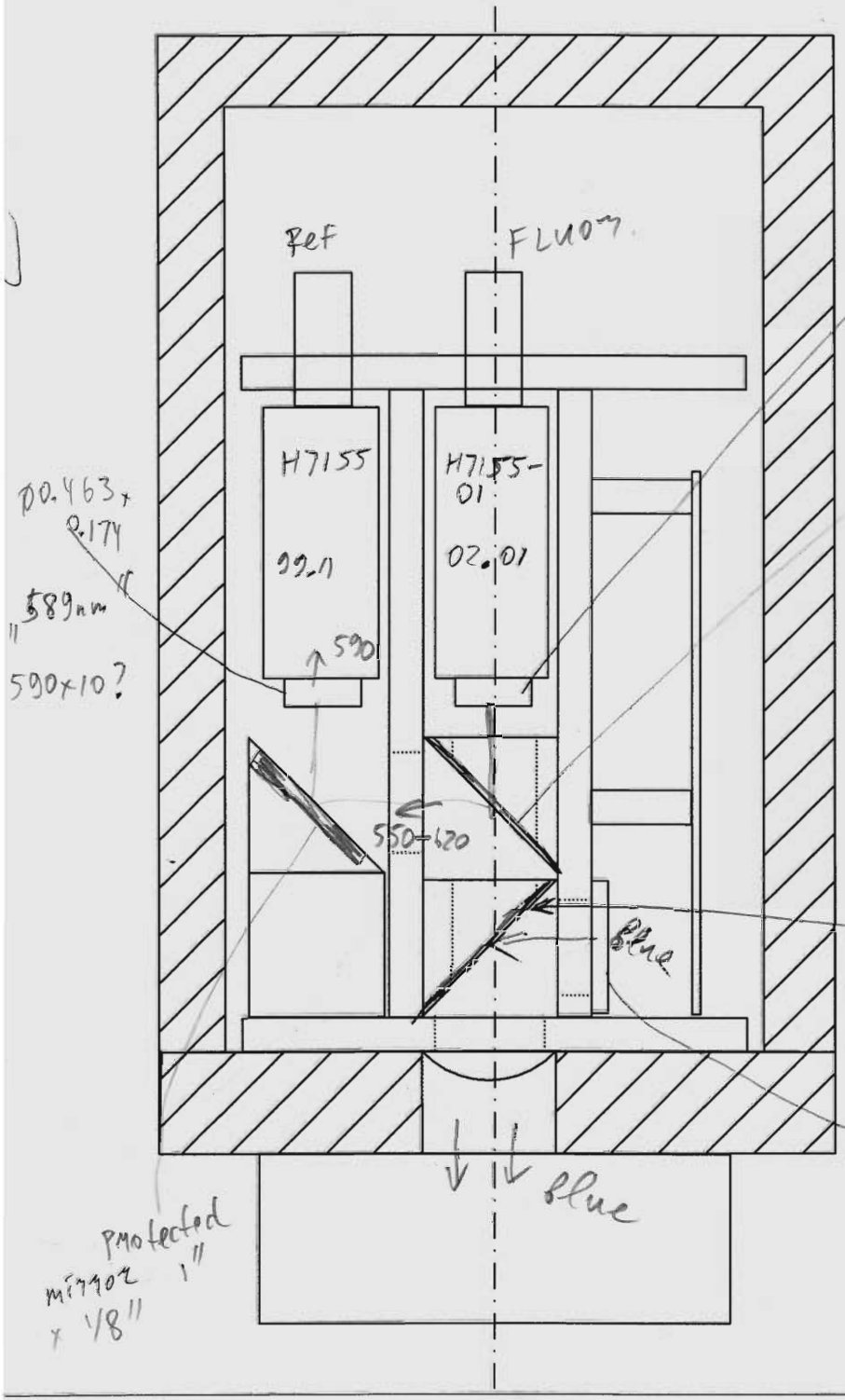
Product Variations

Type No.	Spectral Response	Prescaler
H7155	300 nm to 650 nm	no
H7155-01	300 nm to 850 nm	
H7155-20	300 nm to 650 nm	yes
H7155-21	300 nm to 850 nm	

Specifications

Parameter			H7155	H7155-20	H7155-01	H7155-21	Unit
Input Voltage			+4.5 to +5.5				V
Max. Input Voltage			+6				V
Max. Input Current			50	70	50	70	mA
Effective Area			ϕ8				mm
Peak Sensitivity Wavelength			420		400		nm
Count Sensitivity	Typ.	300 nm	1.2×10^5	1.2×10^5 *2	1.2×10^5	1.2×10^5 *2	$s^{-1} \cdot pW^{-1}$
		400 nm	2.7×10^5	2.7×10^5 *2	2.7×10^5	2.7×10^5 *2	
		500 nm	2.2×10^5	2.2×10^5 *2	2.0×10^5	2.0×10^5 *2	
		600 nm	2.1×10^4	2.1×10^4 *2	1.4×10^5	1.4×10^5 *2	
		700 nm	—	—	6.7×10^4	6.7×10^4 *2	
Count Linearity *1			1.5×10^6	10×10^6 *2	1.5×10^6	10×10^6 *2	s^{-1}
Dark Count *3		Typ.	50	50 *2	600	600 *2	s^{-1}
		Max.	100	100 *2	1000	1000 *2	
Pulse-pair Resolution			70	10	70	10	ns
Output Pulse Width			30	Depends on count rate	30	Depends on count rate	ns
Output Pulse Height *4		Min.	3.0	2.0	3.0	2.0	V
		Typ.	3.6	2.2	3.6	2.2	
Recommended Load Resistance			50				Ω
Signal Output Logic			Positive logic				—
Operating Ambient Temperature *5			+5 to +40				°C
Storage Temperature *5			-20 to +50				°C
Weight			75				g

*1: Random pulse, at 10 % count loss
*2: Output count will be decreased to 1/4 after the prescaler.
*3: After 30 minutes storage in darkness
*4: With input voltage +5 V, Load resistance 50 Ω and Coaxial cable RG-174/U (450 mm)
*5: No condensation

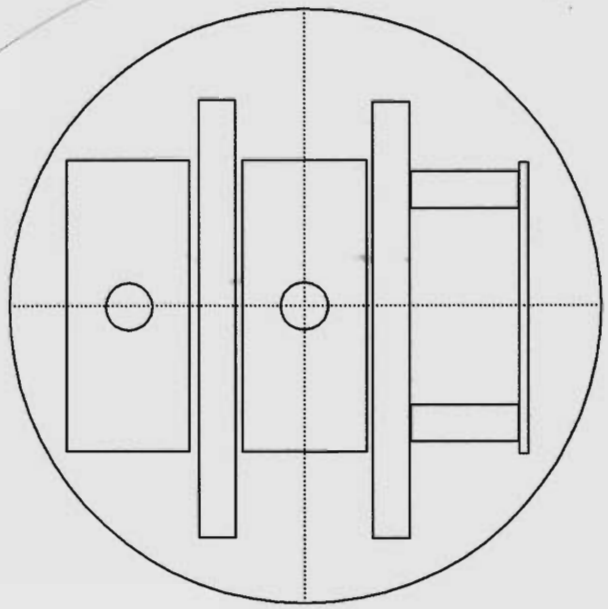


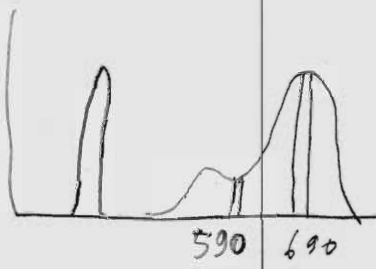
Tornado | Pulse | Storm | Tides | Rob & Patty | Rob | H20

600 nm ; 690 x 10

dichroic Reflects < 620nm, trans > 620nm; 1" Round, < 550nm

550-620nm





D0.463 x 0.174

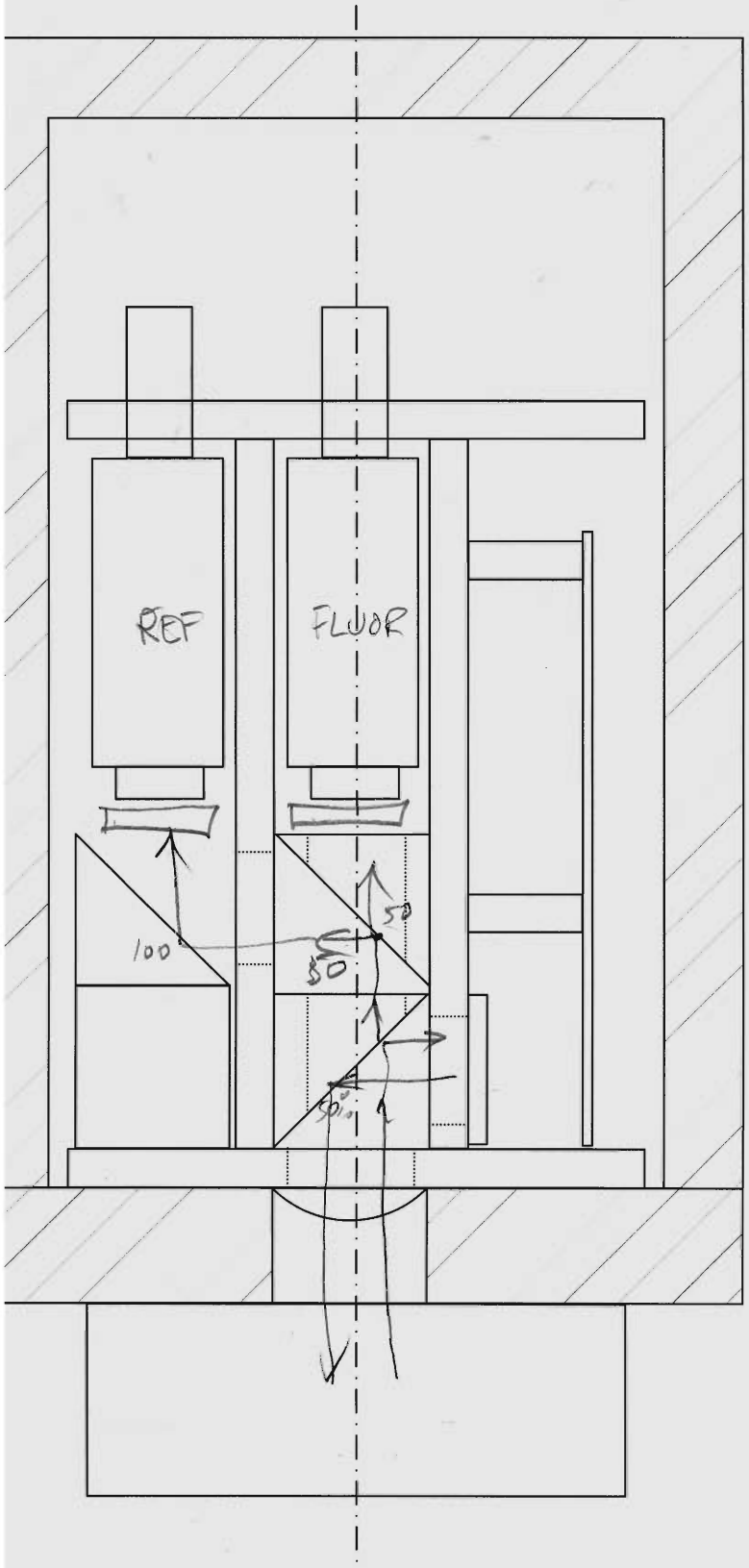
589nm

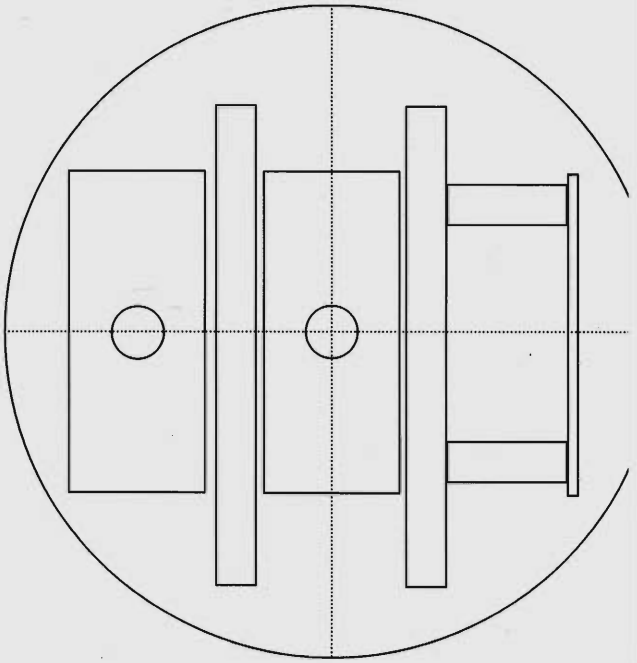
590x10?

dichroic Reflects < 510nm, trans > 510nm. 1" Round, ~1mm 1st surface

SWP 500 or bandpass 1" diameter, thick DY80/30

3/7/2013 Print out of dx4 drw





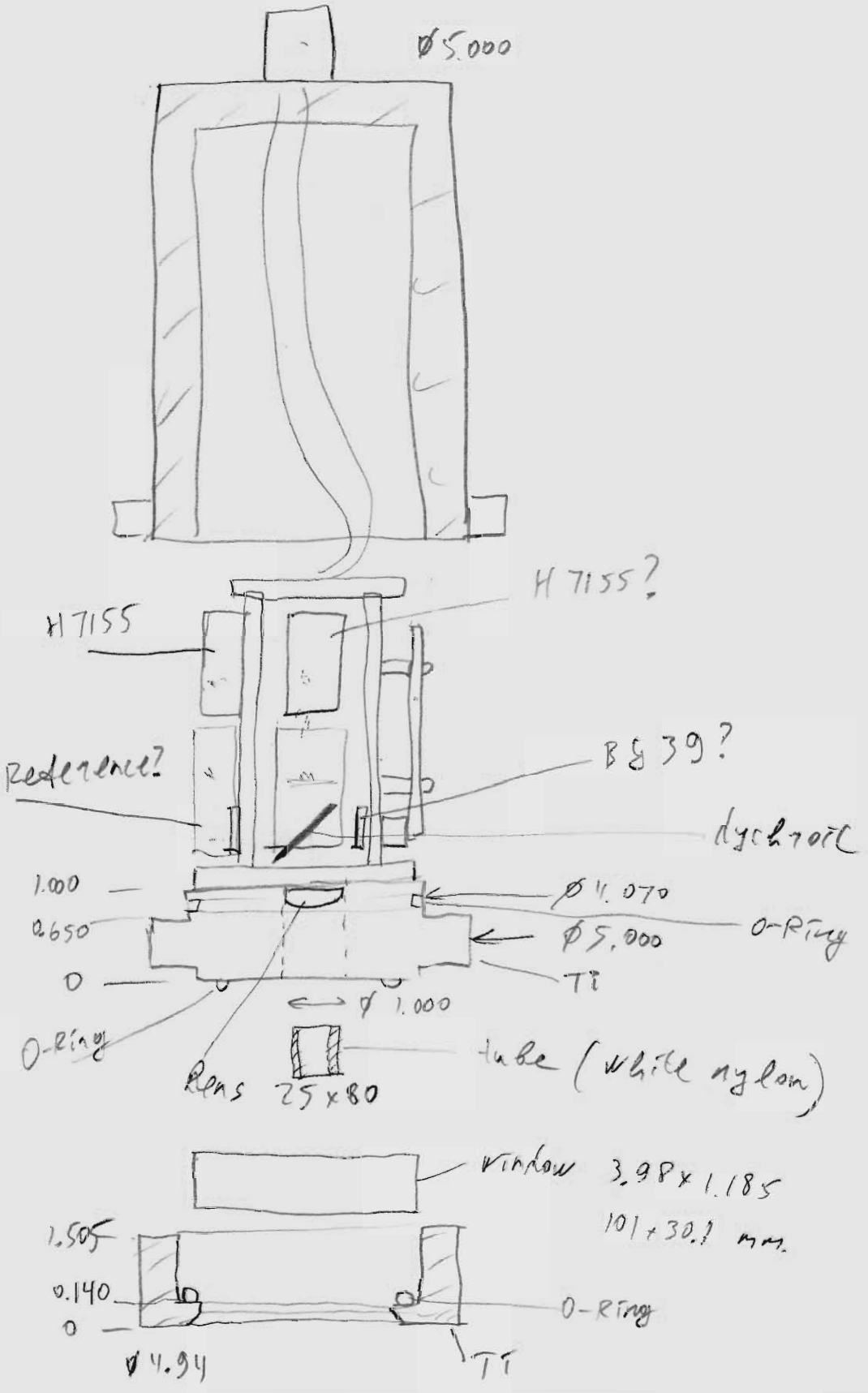
2/8/2011

901027

Sedimentation event sensor

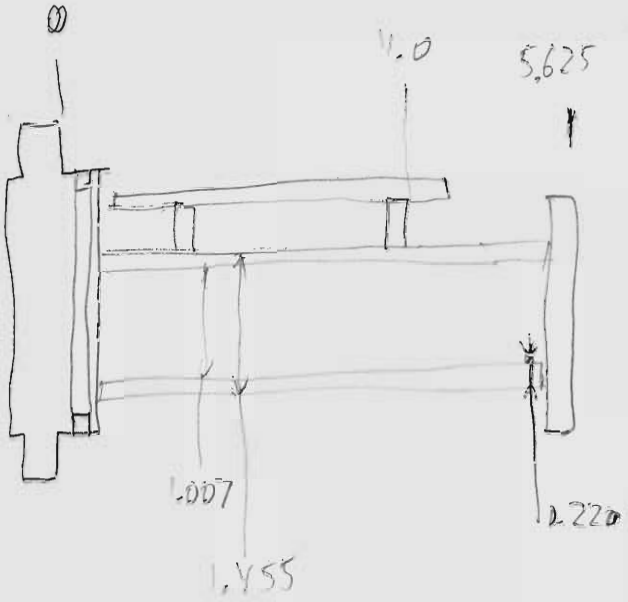
H2O fluorometer

Disassembly notes



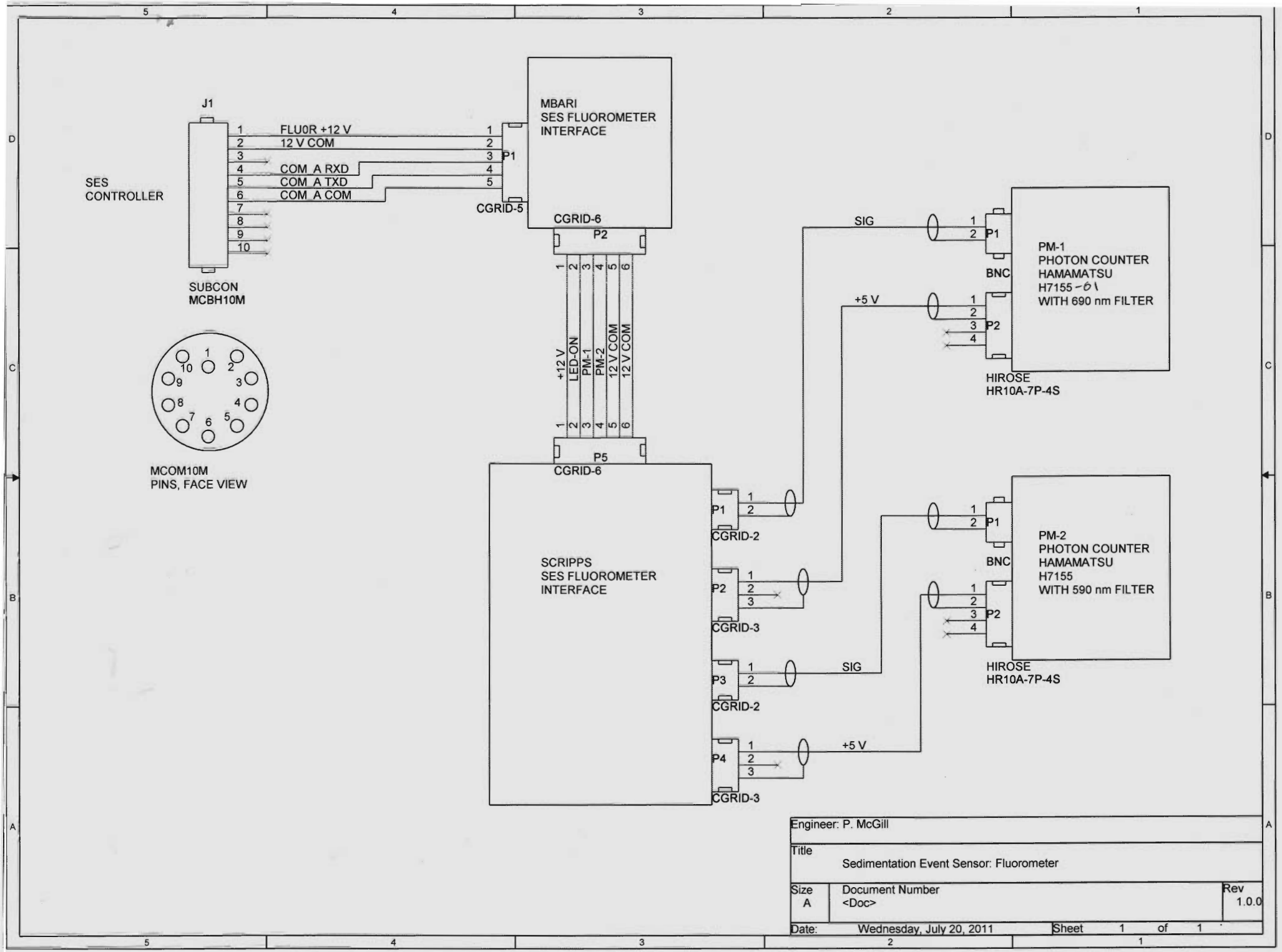
Initial disassembly

3/2013

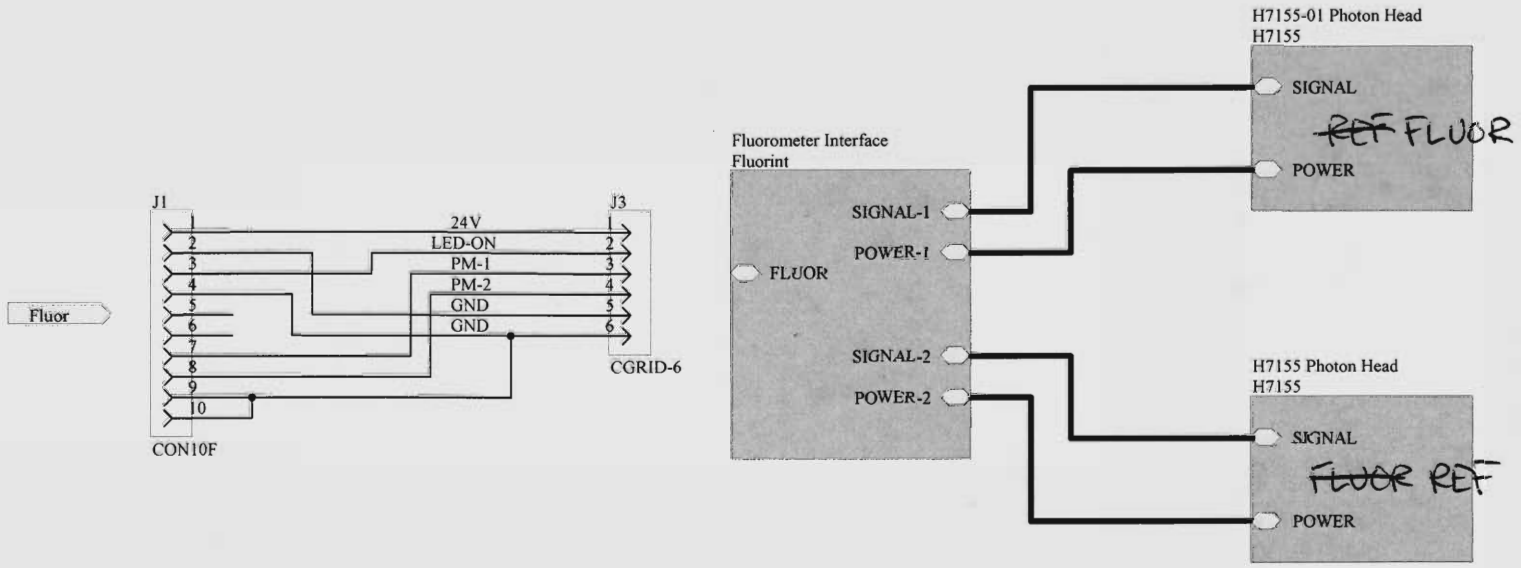



Bottom.


0
0.500
0.500
0
0
0.350



Engineer: P. McGill		
Title: Sedimentation Event Sensor: Fluorometer		
Size: A	Document Number: <Doc>	Rev: 1.0.0
Date: Wednesday, July 20, 2011	Sheet 1 of 1	



Title	Fluorometer		
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File:	C:\Documents and Settings\..\Fluorometer.SchDoc	Drawn By:	