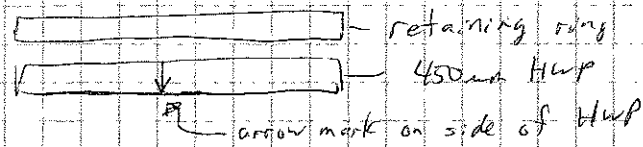


Jan. 21, 2009

John Vailancourt

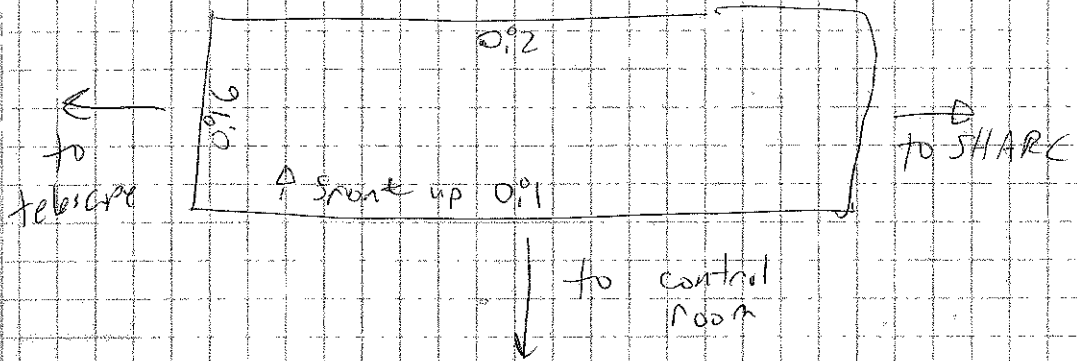
Haber 2

- installed newly AR coated 450nm HWP
- retaining ring screws were tightened, but not "gently"



- HWP rotation $50^\circ \rightarrow 120^\circ$
 ang. mom. vector ptr. towards SHARC-U

Box 3 level measurement



Testing data acquisition #1/SHARP single file
 file no. 045820

SHARC - II alignment

1. ~~SHARP HWP & Filter~~ 450

2. SHARP BOXES 1, 2, 3 installed

3. Exit apt. → centering locks good
 file = 045821

all gain HI
~~center~~ fit center = [16.62, 6.5]
 [16.9, 6.5]

entrance aperture U-D good
 file 45822 L-R 1/2 pix L

SHARP Box 4 in place HWP = 50

entrance aperture file = 45823
 H L-R 0, U-D 0 0.14 p L, 0.13 p U
 V 1/2 p R, 1/2 D 0.76 p L, 0.22 p D
 H-V alignment 1/2 p LR, 1/2 U-D; 0.62 LR, 0.35 UD

exit aperture file = 45824
 H 1/2 p R, 1 p U 0.68 L, 0.30 U
 V 1 p U 0.83 L, 0.24 U
 H-V alignment 1/2 p LR, 0 p U-D 0.15, 0.06 UD

H parallelism 1/4 LR, 1/2 U-D 0.27 LR, 0.02 UD
 V 1/4 LR, 1/4 U-D 0.04 LR, 0.23 UD

entr. ap want to move H to R on IRC by 1/4 - 1/2 px

entr. ap. H 0.34 L 0.19 U
 file 45825 V 0.64 L 0.63 U
 align 0.30 LR 0.16 UD

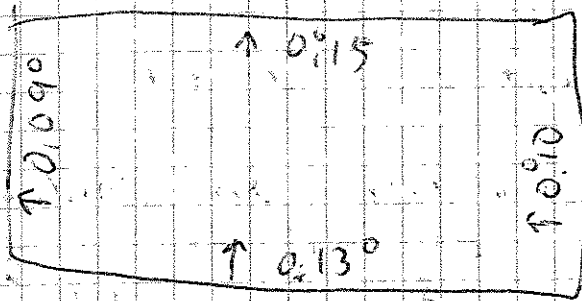
~~H parallel 0.17 LR 0.10 UD 0.06~~
~~0.10 LR~~

exit ap. H 0.77 L 0.32 U
 file = 45826 V 0.58 L 0.34 U
 mis align = 0.19 LR 0.02 UD

H parallel 0.22 LR 0.07 UD
 V 0.63 0.16

Box 4 level

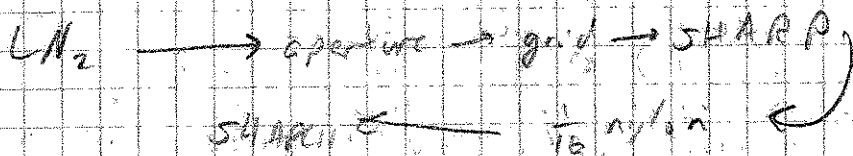
to telescope
←



to control rm.

Wire Grid Tests

single wire grid @ ext aperture



all gain HI

nylon taped to SHARP window

HWP

- 50
- 60
- 70
- 80

File

- 48-827
- 28
- 29

H (6.5)

- 246
- 264
- 167

V (6.25)

- 1.3
- 4.5
- 55

STOP test, observers have arrived

Jan. 22, 2009 Vaillancourt and Li

(81)

SHARP 950nm HWP calibration angle

- optical path w/ nylon + wire grid same as on previous page
- grid wires vertical, 60 sec files Below

HWP	File	H (0.5)	V (0.25)
50	45886	-218	318
8	- error during copy?	-188	-35
66			
50	45890	-133	
60	45891	-138	+35
70	92	-66	-58
80	⊗ const level?		
90	45893	-27	-103
100	45894	-42	Bad level? -87
110	cannot level		
120	45895	-79	
130	96	-111	-18
110	97	-24	-28
80	98	-71	-83
50	99	-137	-22
55	45900	-132	-22
45	901	-120	-27
40	902	-153	Bad level? -10

Jan. 24, J. Vaillancourt

HWP alignment tests

cold load / done → aperture → vert grid → SHARP → $\frac{1}{16}$ " nylon → SHARP-ET

use "SHARP standard" IRC script, 60 sec per HWP
HWP angle = $40^\circ \rightarrow 120^\circ$ 10° steps
file numbers 46135 - 46143

- ea. file has first ~30 sec of cold load on wand, followed by ~ " " warm load
warm load = MB looking @ telescope and dome

3/20/09

JV + MK

SPARC-II Alignment

Entrance aperture in place

1) Peak signal about $\frac{1}{2}$ pixel up
 about $\frac{1}{4}$ pixel to the right \leftarrow actually right in d9

Need to move down and to the right

File taken with 1) 46678

Remove entrance aperture, install exit aperture

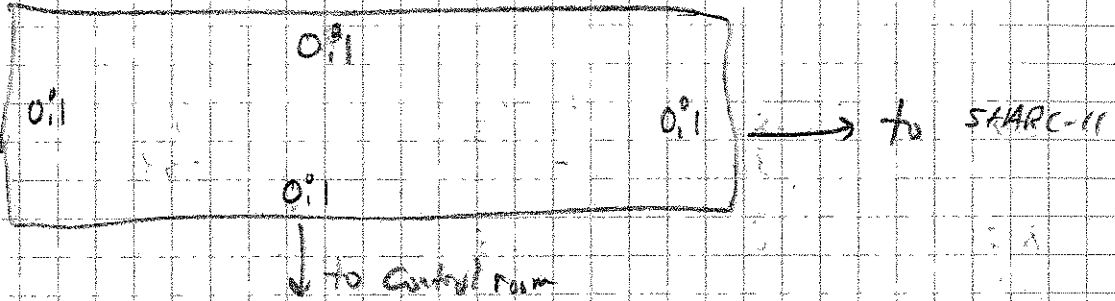
2) Peak signal about $\frac{1}{2}$ pixel up
 about $\frac{1}{3}$ pixel to the right \leftarrow agree in d9
 file no. 46679

mean ~~is~~ V-D good to within $\frac{1}{6}$ pixel

fragments on 46678: (16.32, 6.9) center
peak signal 0.33

46679: (16.45, 6.96)

in y_1 off from absolute position
by $\sim \frac{1}{2}$ pixel



SHARP alignment

1) ext aperture

File #
46680

H (right hand side): 1 pixel to rt
1/2 pixel up

V (left hand side): 1 pixel to rt
1/2 pixel up

2) entrance aperture

File #
46681

H: 3/4 pixel to rt
1/2 pixel up

V: 1 pixel to rt
1/3 pixel up

fit gauss on 46680 ~~5.544, 7.756~~
 H center = ~~5.544, 7.756~~ 5.353, 6.954
 V = 25.938, 7.002
 align 0.585, 0.05

fit gauss on 46681 H center = 5.684, 6.953
 V = 25.928, 7.000
 align -0.244, 0.05

parallel H = 0.17, 0
 V = 0, 0

For Alignment ~~data~~ data see p. 85

HWP alignment

SHAR II

T = 360 μ K

HWP

File no.

H (G.4)

V (G.24)

50
60
70
80
90
100
110
120
130
~~1450~~

46682
83
84
85
86
87
88
89
90
91

- 215
- 176
- 115
- 75
- 7
- 27
- 46
- 119
- 170
- 176

15
- 34
- 61
- 114
- 148
- 144
- 132
- 67
- 45
+ 6

SHAR 2

T = 360 μ K

From: Darren Dowell <odd@phobos.caltech.edu>
Subject: Re: SHARC/P alignment

Date: March 21, 2009 3:01:03 AM HST

To: Vaillancourt John <johnv@phobos.caltech.edu>

Cc: Giles Novak <g-novak@northwestern.edu>, Megan Krejny <krejny@astro.umn.edu>

A preliminary look at the SHARC2 alignment showed excellent parallelism, but an alignment that was off by half-a-pixel from the nominal (16.5, 6.5) array position. This is about the same SHARC2 misalignment magnitude we had in January.

My fit:

46678 -- entrance ap. -- -0.23 pix left, 0.43 pix up on IRC
46679 -- exit ap. -- -0.22 pix left, 0.23 pix up on IRC

A preliminary look at the SHARP alignment (w/o adjusting M4/M5) indicated excellent parallelism, but H-V misalignment by more than half-a-pixel.

My fit:

46680, H -- -- -1.15 pix left, 0.44 pix up on IRC] - exit aperture
46680, V -- -- -1.01 pix left, 0.49 pix up on IRC]
46681, H -- -- -0.82 pix left, 0.43 pix up on IRC] - entrance aperture
46681, V -- -- -1.17 pix left, 0.25 pix up on IRC]

Otherwise, no new opinions expressed.

Darren

May 22 2009

S. Lai, J. V. Harcourt, Tso-chung Chang

SHARC-II alignment
all gain L₂ no nylon in Beam
entrance aperture

~~Site~~ cold load → aperture → SHARC
Site no. 47963. Sits

exit aperture 47964 Sits

~~entrance aperture = [16.79, 6.560]~~

~~exit aperture = [16.67, 6.498]~~

file number 47965

~~exit aperture = center = [16.48, 6.61]~~

file number 47966

entrance aperture ~~center = [16.81, 6.50]~~
16.81

file number 47967

entrance aperture ~~center = [16.81, 6.50]~~

file number 47968

entrance aperture ~~center = [16.81, 6.50]~~

file number 47969

~~exit aperture = center = [16.81, 6.50]~~
~~entrance aperture~~

file # 47970

~~entrance aperture = center = [16.81, 6.50]~~

May 23, 2009

87

Tao-chung Ching, Shih-Ping Lai,
John Vainancov, Mimi Zou

● Entrance Aperture, File # 097971

center = 16.87, 6.52
File 47972, center =

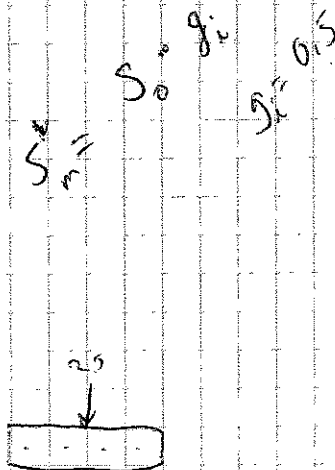
● Exit Aperture, File # 0479703, center = 16.822, 6.986

[Darren = ~~66~~ 626.260-5725
797-5791 c h]

● entrance aper. 047974 ← File #
center = 16.627, 6.687

● Entrance Aper: 047975 ← File #
center = 16.672, 6.691

● Exit Aperture: File # 047976
center = 16.6182, 6.631



SHARP Alignment:

● Exit Aperture: File # 47977
 H-center: 5.016, 6.691
 V-center: 26.153, 6.583

● Entrance Aper: File # 47978
 H-center: 5.190, 6.547
 V-center: 26.194, 6.500

● Entrance Aper: File #
 H-center:
 V-center:

File #	Entrance H-center	V-center	Exit H-center	V-center
47983 (ent)	6.487, 6.447		6.324, 6.608	26.032, 6.432
47984 (exit)	6.702, 6.441	26.001, 6.222	6.324, 6.608	26.032, 6.432
47985 (ent)	6.702, 6.441	26.001, 6.222		
47986 (ent)	6.944, 6.378			
47987 (exit)			6.094, 6.682	
47988 (exit)	5.853, 6.604			
47989 (ent)	6.102, 6.424			

old: 0.375 new: 0.309
 B6 0.056 -0.018
 F6 0.406 -0.012

May 24, 2009

John Vaillancourt, Mimi Zou

SHARP half wave plate calibration
450 micron HWP + filter

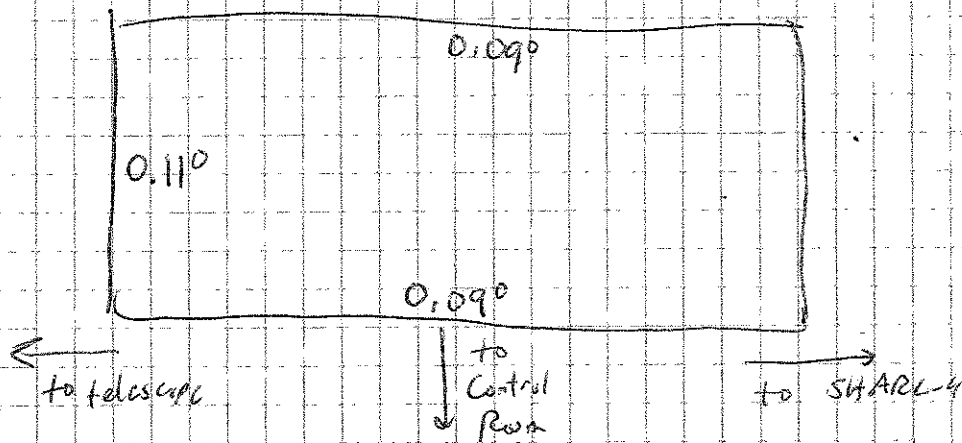
File #	Angle	H (5.5)	V (5.25)
47990	50	-186	0
91	60	-190	-22
92	70	-140	-61
93	80	-57	-84
94	90	-7	-123
95	100	-14	-107
96	110	-30	-93
97	120	-109	-54
98	130	-142	-18
99	140	-202	+4
48000	50	-174	-22

July 13, 2009

John Vallancourt

- SHARP Boxes 1-3 already installed w/ 450 nm HWP

Leveling Box 3



• net SHARC-II filter to 50% = 450 nm

• HWP is successfully moving thru IRC Chest

• Test of Data Acq. system: file = 048009
→ file is good

• SHARC-II alignment files

all 60 sec. files

- exit aperture

hot load, after leveling, file = 048010

cold load, " file = 048011

- entrance aperture

hot load, after leveling, file = 048012

~~048013~~

Bad files
Remove

forget to
exit aperture

- entrance aperture

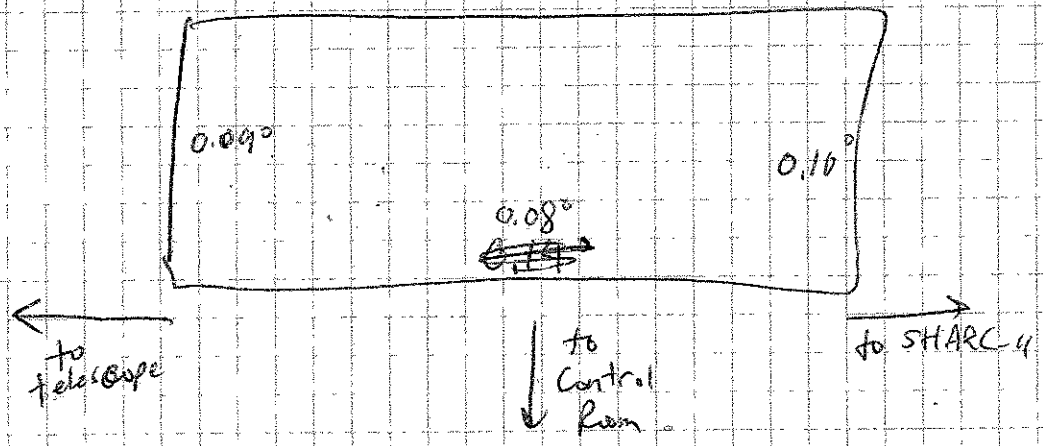
hot load, after leveling, file = 048014

cold load, " file = 048015

SHARC II alignment fits

ext aperture, Site 048011 center = [16.849, 6.458]
 FWHM = 1.013 pixels
 entr. " " 048015 center = [16.825, 6.483]
 FWHM = 1.011 pixels

Leveling Box 4



SHARP alignment

all 60 sec. Sites

- entrance aperture
 hot load, after leveling, Site = 048016
 cold " " = 048017
- exit aperture
 hot load, after leveling, Site = 048018
 cold " " = 048019

entrance Site
 H = [6.426, 6.663] 6.476 6.569
 V = [26.073, 6.146] 26.387 6.427

exit Site
 H = [5.987, 6.779] i 30 5.978 6.996
 V = [26.026, 6.495] R₂ 0.0026342 6.640

file 048020, exit aper, cold load.

July 14, 2009

J.V.

SHARP alignment

• exit aperture, Saddle w/ H alignment
 Site 048021 [6.526, 6.732] H
 [26.573, 6.518] V
 • entr. aperture 048022 [~~6.525, 6.733~~] H
 [~~26.573, 6.518~~] V
 [6.898, 7.649] H
 [26.407, 6.136] V

• Saddle w/ H
 entr. aper f.6 048023 [6.501, 6.591] H
 [26.426, 6.159] V
 ext aper " 048024 [6.962, 6.738] H
 [26.163, 6.527] V

exit 048025 H [6.982, 6.580] V
 [26.569, 6.529] V
 entr. 048026 H [6.908, 6.479] V
 [26.428, 6.142] V

exit 048027 H [6.508, 6.835] V
 [26.628, 7.133] V
 entr. 048028 H [~~6.859, 7.649~~] V
 [~~26.425, 6.800~~] V

can't sit

entr. 048029 H [6.901, 6.600] V
 [26.454, 6.775] V

exit 48030 H [6.547, 6.823] V
 [26.616, 6.921] V
 entr. 48031 H [6.914, 6.692] V
 [26.432, 6.564] V

2009 Sept 14 2009 September Run Darren, Gile

Only Box 0 + Box 1 in place.

Box 1 level check = opt. axis: 0.05° low on telescope side
 $l = 0.05^\circ$ high on surface side
pap. = $\approx 0.03^\circ$ tilt (outside - const room dir)

Install Box 2.

Box 2 leveling is the same as Box 1 to within measurement error.

2009 Sept. 15

HWP tight at two locations 180° apart even when in lab.

air coat damaged, after removal of 450, similar problem to last time. The plate did not fall out easily. Thought it did fall out under its own weight.

is retainer rid. too small ~~or~~ or were screws over-tightened?

there is certainly not a lot of lateral motion in hwp

350 installed.

motion now much smoother. Is this because it warmed on my legs when I was holding it or due to hwp sha

Installed box 3 at $ZA = 90^\circ$
(timed in from Adelaide —
not ideal)

hooked up all but heaters
this really needs fixing

$17^\circ - 138^\circ$ clean motion

it's sticky again (getting colder)

96° mark is at 96.6°

see all of this NB

when \vec{J} points toward SHARC-II
the angle increases.

started up SHARC-II client/server, etc.

can move hup from IRC

doing a fake single hup in "track" mode

sharc2-048231.fts

Sharp password: NGC1333!

found hwp steps at 50 ... 117 etc.

learning new cold-load procedure

remember V on left on LRC

exit aperture

entrance ap

(V)

(H)

$\frac{1}{4} R$

$\frac{1}{4} L$

$\frac{3}{8} \uparrow$

$\frac{1}{2} \uparrow$

(V)

(H)

$\frac{1}{4} R$

$\frac{5}{8} L$

0

$\frac{3}{8} \uparrow$

parallelism error

subarray misalignment

0

$\frac{3}{8}$

$\frac{3}{8}$

$\frac{1}{8}$

$\frac{3}{4}$

L/R

$\frac{1}{4}$

\uparrow / down

after adjustment of F2 only

exit aperture

entrance ap.

(V)

(H)

(V)

(H)

$\frac{1}{2} L$

$\frac{1}{4} L$

$\frac{1}{2} L$

$\frac{1}{2} L$

$1 \uparrow$

$\frac{3}{8} \uparrow$

$\frac{5}{8} \uparrow$

$\frac{3}{8} \uparrow$

48233

48232

adjust again

exit

entrance

(V)

(H)

(V)

(H)

$\frac{1}{2}L$

$\frac{1}{4}L$

$\frac{3}{8}L$

$\frac{5}{8}L$

$\frac{5}{8}up$

$\frac{3}{8}up$

$\frac{3}{8}up$

$\frac{3}{8}up$

($\frac{3}{4}up?$)

48234

48235

parallelism errors

subaway misalignment

$\frac{1}{8}$

$\frac{3}{8}$

0

L/R

$\frac{1}{4}$

0

$\frac{1}{8}$

up/down

BY COMPUTER

exit

entrance

(V)

(H)

(V)

(H)

0.69 L

0.28 L

0.46 L

0.61 L

0.65 up

0.47 up

0.36 up

0.34 up

subarray mis alignment according to computer:

0.13 off left-right
0.10 off up-down
(V higher than H)

the two methods agree within 1/8 pixel
furthermore, we looked at the map that
the computer was fitting

Sept. 18, night of

→ After 3 nights of observing, hwp
is perfect ($\pm 0.3^\circ$ worst case,
usually much better). We've been
observing half nights. We're
heating at

+5°C 12 V
+2°C 15 V

a bit less than recommended values
in current cheatsheet

Begin Nov, '09 SHARP run

Jackie, Giles arrive to HP Oct. 31

Sunday Nov. 1

tested software :

~~test~~

"Za 35" to
start fake nodding
on a fixed sky pos'n
→ can read hwp angles

did on hwp cycle - moves were
good to 0.1 degrees.

installed box 4

alignment was perfect (next page)

Null is nominal

Alignment check

Nov, 1 '09

exit aperture
(remember V on left)

entrance aperture

LR: $\frac{1}{2}L$
up down: $\frac{5}{8}hi$

H: $\frac{1}{4}L$
 $\frac{1}{2}hi$

V: $\frac{1}{2}L$
 $\frac{3}{8}hi$

H: $\frac{5}{8}L$
 $\frac{1}{2}hi$

signal ~ 180 mV

parallelism errors

0 $\frac{3}{8}$ pix
 $\frac{1}{4}$ pix 0

subarray misalignment

LR dead on
up down ~~dead~~ dead

V-null test.

gnd on exit aperture wires vertical

90	-21 mV
80	-67
85	-40
90	-20 ←
95	-12
100	-12
105	-28 ←
110	-52
115	-82
80	-65

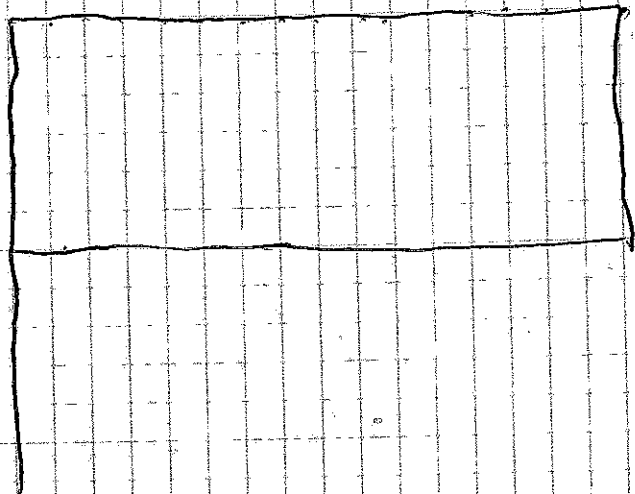
87.5 and 105 are about
equidistant from minimum

$$\frac{87.5 + 105}{2} \sim 96$$

$V_{null} = 96$

noise tests, Mimi + Giles, 9/6/09

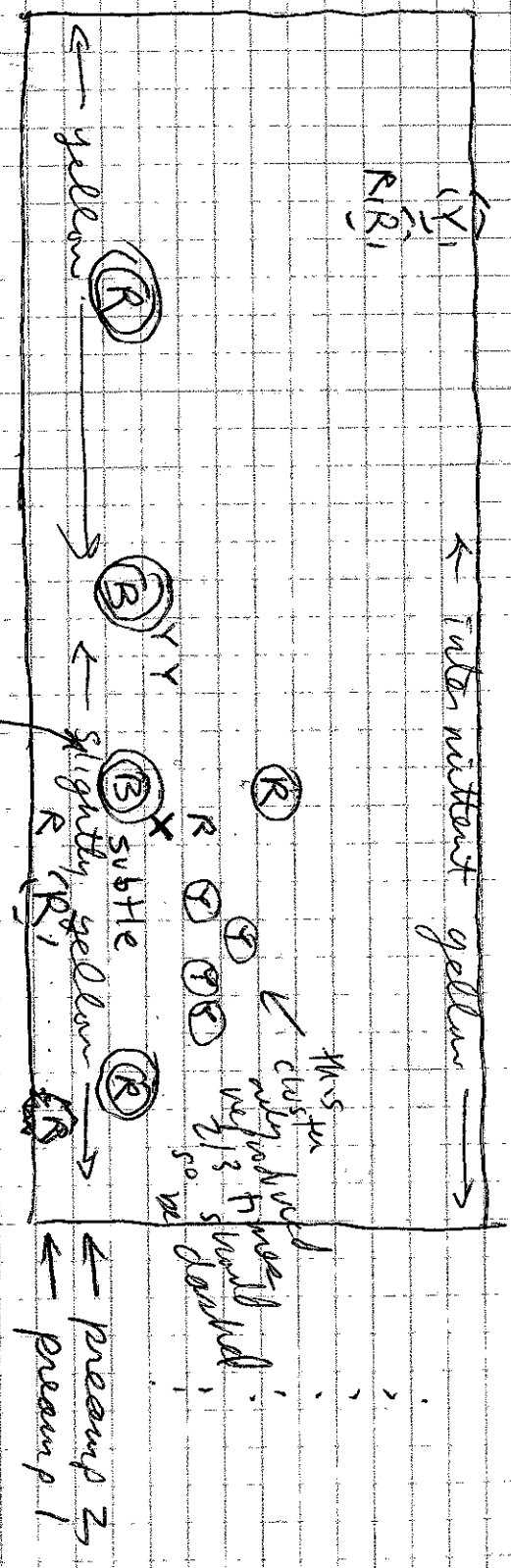
We had the row 3-4 problem
two nights ago. Pixel (3,10) was
the worst.



all we did was level and then
watch array. Diagram on next
page shows bad pixels

we only reproduced the row 3-4
problem one time in 3 tries

walking hap does not ~~have~~
induce any obvious electronic
noise.



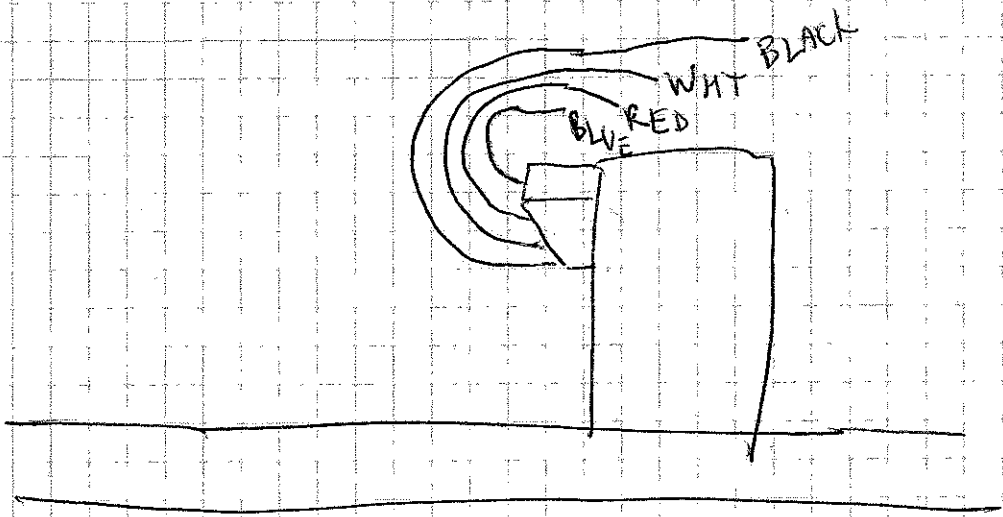
X = the worst fixed on one night - fine image

Colors don't mean much

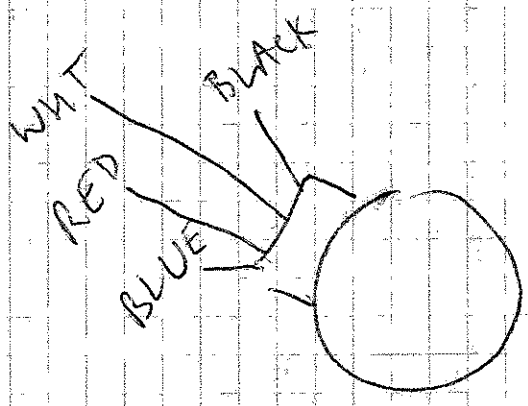
double circles are present at start

single circles are reproducible

dashed circle is semi-reproducible



TOP VIEW OF MOTOR
IN BOX 3 WITH
BOX 3 INSTALLED



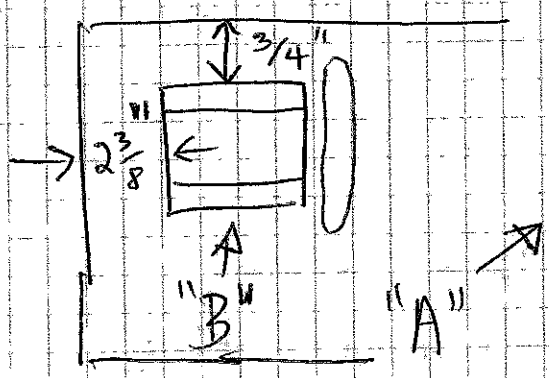
Rear View
of motor

4WP gear - mark @ 96°
→ toward shore = + direction

So these two tests are passed
(see p. 11 + 13 of this NB)

Feb. 1, 2010

measurements prior to Mimi's
rebuild of box 1:

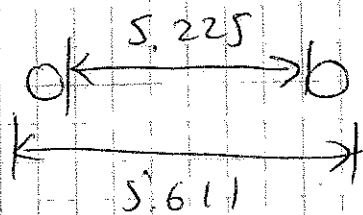


The $2\frac{3}{8}$ " dimension
is actually not
exact for the
"B" version -
it's more like

$$2\frac{23}{64}" \quad (= 2\frac{3}{8}" - \frac{1}{64}")$$

triangles are labeled "A" and "B"
and "N" (near) and "F" (far)

pin sep. A



pin dia .193

these are all consistent

pin sep. B



but pins .194
inconsistent by 2 mils

OK

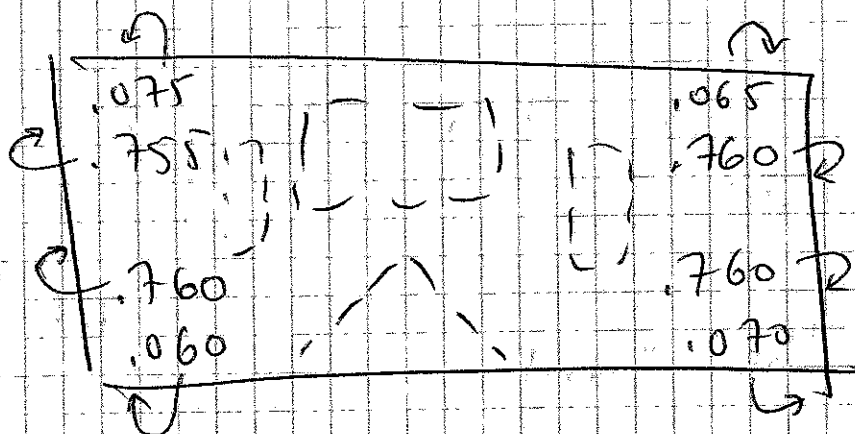
B has 10 mil shim on far side

A has 10 mil shim on far side

We redid A (took apart and put together) and the separation of the pins got 2-3 mils smaller

Box 1 bottom

viewing bottom
from below (105)



caliper measurements before
disassy of Box 1

Feb 9, 2010 ⇒ Mimi's

- drawings done; box 1 parts to shop
- due in 3 weeks (March 2)
- plenty of time to test and get to Hawaii by March 23, hopefully

March 15, 2010

Assembling
holders

Mimis

new grid

For the record

BL
means

top

~~BN~~

BN top

$$8 + 16 + 16$$

AL top

means

AF top

$$12 + 16$$

BR top

means

BF top

$$30 + 16$$

side B (see Feb. 1, 2010)

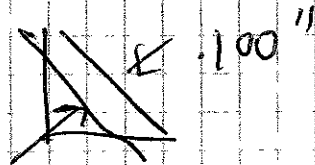
possible problems:

- is height a little off?
- micrometer snubels
- need spring so need spring hole
need a spring
- alum pins too deep
- how will we install shims?
- need to remove a little of base

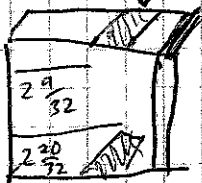
shop: ① take .080" off bases



② take .100" off "feet"
(just two)



remove .000"



③

(4) angles need holes for spring

(5) slot ~~.300~~ .305" for micrometer

height mismatch

.618 - .503 - .100

16 thousandths too high.

No big deal, but I wonder
if we made specs too
loose?

12/16/2010

prepared revised drawings for shop

12/16/2010

(109)

planning for better way to hold
half-wave plates.

measurements on 350, 450, 800 nm.
 ↑ ↑
 uncoated peeling

350

$4.000 \pm .002$

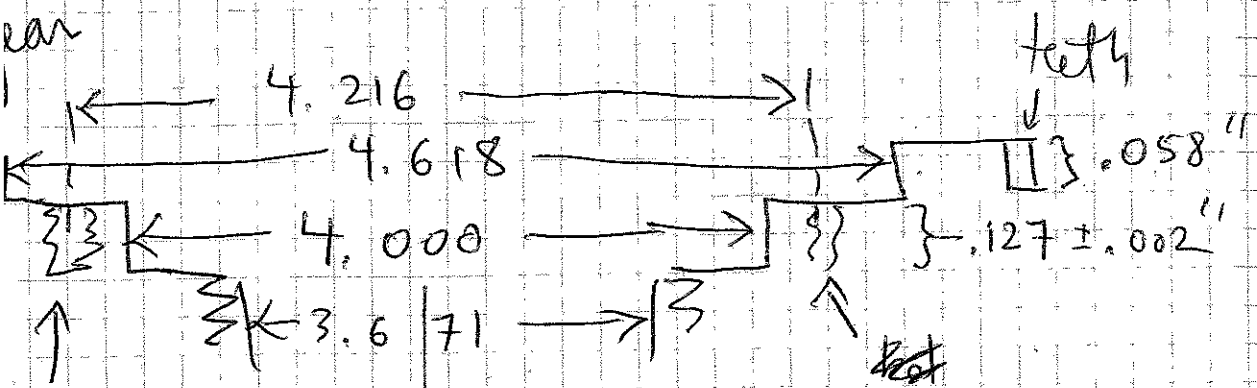
800

same

450

a few mils under, but
a/r coating hangs over edge.

could this have caused the
~~breakage~~ of peeling
(second failure of 450nm hwp
?)



notes
for
retainer

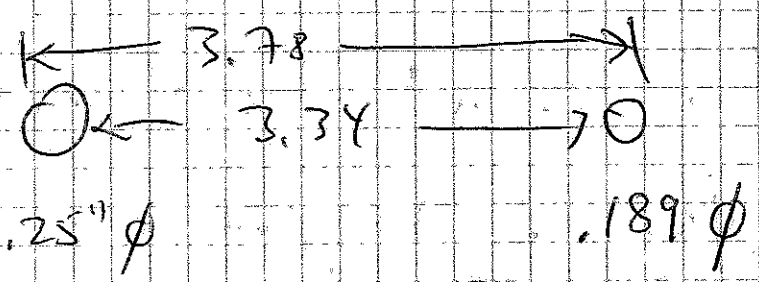
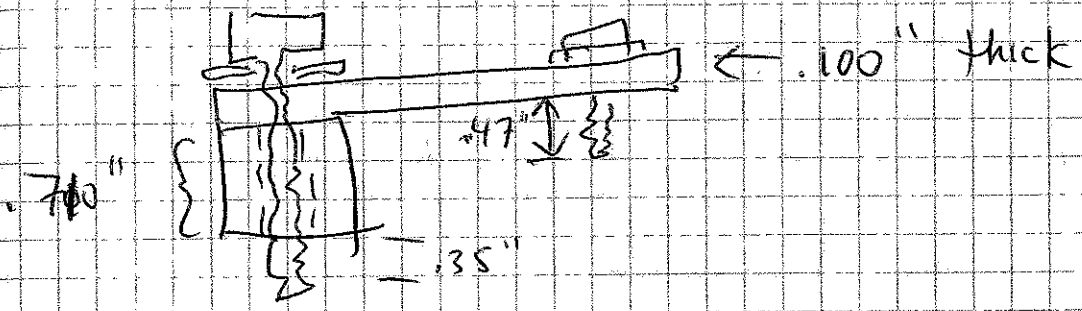
→ there are six
they look like
S-44 or
else metric (?)

is one in Hawaii
under? presumably,
but better check it!

To do in Hawaii: Measure clearance
beyond teeth so we can plan a
new retainer w/ springy washer
that can also accommodate the
800 μ m gap - remember it needs
air coating

Box 4 brackets :

near side :



far side :

- .710 \rightarrow .720
- .100 \rightarrow (.100 + .120) \leftarrow (2 pieces)
- ~~.100~~
- 3.78 \rightarrow 3.88
- 3.34 \leftarrow 3.44
- .35 \rightarrow .25
- .47 \rightarrow .53

bolts used for Mimi's new features:

4-40 x $5/8$ " (quantity = 4)

for "feet"

4-40 x $1/2$ " (quantity = 2)

for micrometers

★ Shop has finished the 5 mods.

grid-surfaces of triangles are pretty flat. There is some rocking, but only a few mils.

March 24, 2010

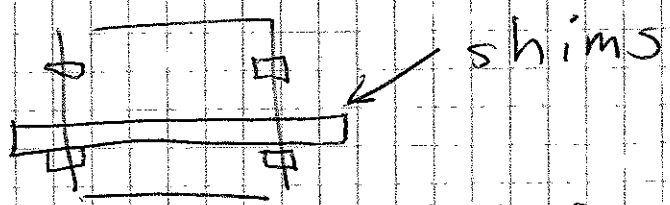
Mimi & Giles arrive at summit

First test of box 1 micrometer -
controlled grid adjusters

record thickness of 4 shims
under mirror in box 1. Note:
my memory is that these go
under bottom of mirror

- ① 5 mils
 - ② 4 mils
 - ③ 4 mils
 - ④ 28 mils
- } 41 mils of shim

we installed these shims like so:



See photo Mimi took in ~~Fall 2009~~
Spring 2009

Based on data recorded March 15
at Northwestern we went with
12 shims (.008" each) on near
side of B, and we set micrometer
on B to .177". ~~For~~ Nominal
level is ~~.192~~ .197"

Now for "A";

nominal level is 0.199"
we used 9 shims and
set micrometer to 0.209"

Leveling Box 1 MIMI'S NOTES

• height between boxes 0 & 1: 0.13 inches
(2005, 2007, on average)

• ~~near~~ (from POV of incident photon)

right jackscrew =	0.173	0.165	0.155	0.14
left jackscrew =	↑ 0.15	0.1	0.140	0.145
far jackscrew =	0.09	↓ 0.13	0.130	0.13
Adj. Attempts	1	2	3	4

RIGHT	0.135	0.135
LEFT	0.145	0.130
FAR	0.135	0.135
	5	4

SWITCH TO USING LEVEL



method used:
take ave.
of 2 level
readings

~~FAR~~

~~NEAR~~ RIGHT 0.02° too high

LEFT/RIGHT leveled to ±1/100th of degree

NEAR/FAR leveled to ±1/100th of degree

TIGHTEN NUTS



Both directions w/in 0.01°

Installed no hold-down bolt
on the "back" position.

None on ~~left~~ left or right

Installed box 2 8 mini hook
photos.

Installed box 3 8 mini hook
photos.

TO DO

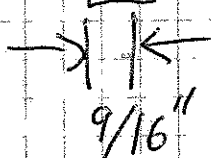
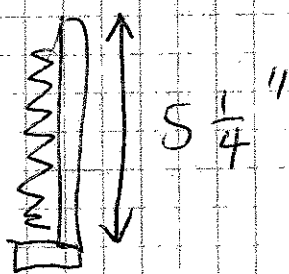
- order connectors for patch panel. Pat can help. Heiderheim might make the right size (or we could pay them)
- get those bolts, finally (for putting all boxes together)
- have paint sent to CSO so Darren can paint Box 1 and ground-holder bases
- get absorber for box 3 — can attach to 80-20
- Box 3 data:
 - You have at least 8 mm between hwp catchers and anything else (Xyrid, etc.)
 - you have only few mm between hwp retainer + hwp catcher

→ why not order all new mirrors.
 They really look terrible. Ask
 Hua-bai if he has any notes or
 old emails saved + start collecting
 my an

→ More Box 3 data

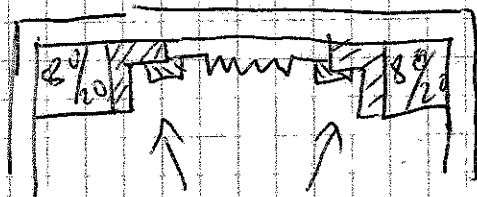
← hole

SIDE
VIEW



walls are $\frac{1}{4}$ " 80/20 15 1"

TOP
VIEW



ideas for
holding absorber

SHARC II ALIGNMENT TEST

03/25/10
Afternoon

• Entrance Aperture

$\frac{1}{4}$ pixel to the right

$\frac{3}{8}$ pixel high

W/ cell
load

• Exit Aperture

$\frac{1}{4}$ pixel to the right

$\frac{1}{4}$ pixel high

ADJUSTMENTS

• close side of M4 down $\frac{1}{2}$ turn

• new exit aperture

$\frac{1}{4}$ pixel to the left

$\frac{1}{4}$ pixel high

• close side $\frac{1}{4}$ turn up

$\frac{1}{2}$ pixel to the left

• close side $\frac{1}{2}$ turn up ~~other~~

1 pixel left

1 pixel high

• ~~close~~ s. loosened upper screws

1 pixel left

1 pixel high

FINDINGS)

moving top side down
→ moved signal down

moving close side down moves
us left (we think)

NOTE : using Darren
instructions as now posted
to alignment cheatsheet

refilled cold lead

* left-right : perfect
up-down : 1/4 pixel low

system tests :

take observing,

sharc2-050041.fits

angles within 0.1°

beamswitching five (CHOP A20 updates)

EXIT ALIGNMENT

03/26/10
Morning

(12)

- left column : 700
- right column : 560
- top row : } very close
- bottom row : }

SWITCH TO ENTRANCE

initial reading (sum)

- left column: 900
- right column: 550

w/ adjustments (sum)

→ ADJUSTING MS

- lowered close ^{to 2.80} side way too far
moved to the right

- top: 790
- bottom: 670
- left: 730
- right: 770

BACK TO EXIT

initial reading (sum)

- left : 520
- right : 640
- top : 580
- bottom : 580

made adjustments to → MS

- left : 590
- right : 670
- top : 700
- bottom : 560

lower close side move, tighten screws

- left : 580
- right : 610
- top : 520
- bottom : 670



try to move up.

- left : 610
- right : 580
- top : 650
- bottom : 540

repeat... down.

- left : 600
- right : 570
- top : 440
- bottom : 740

repeat... up

- left : 630
- right : 570
- top : 630
- bottom : 570

TAKE ENTRANCE MEASUREMENT

- left : ~~760~~ 760
- right : 500
- top : 750
- bottom : ~~510~~ 510

after lunch

- left : 660 170
- right : 490
- top : 670 180
- bottom : 480

lowered close side...

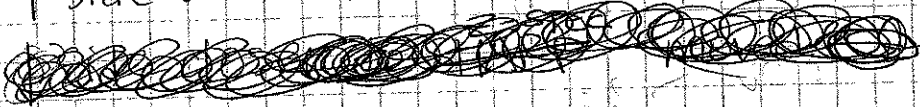
- left
- right
- top
- bottom

raising side ^{that's} away from STARP should lower the beam (Giles thanks)

seems to work nvm. wrong

- ~~- left~~
- ~~- right~~
- ~~- top~~
- ~~- bottom~~

↑ side closer to STARP ↓ beam



ADJ. NOTES

↓ side closer to Z SPEC → beam

- left 520
- right 580 > 60
- top 540 > 20
- bottom 560

moves right

BACK TO EXIT

- left 420 > 110
- right 530
- top 430 > 90
- bottom 520

moved close side down

- left 480
- right 450
- top 410
- down 520

move top edge up ward

left 490

right 440

top 510

down 420

move upper edge down

left 480 > 30

right 450

top 450 > 30

down 480

GOING BACK TO ENTRANCE APERTURE (MS)

initial reading

left 580 > 130

right 450

top 540 > 50

bottom 490

lowered side closer to z-spec (→)

left 530 > 20

right 550

top 580 > 80

bottom 500

tried to lower...

left 540 > 30

right 570

top 490 > 140

bottom 630

lower side closer to SHARP

left	580	> 30
right	550	
top	580	> 10
bottom	570	

SWITCH TO EXIT APERTURE ^{move} (CMF)

initial reading

left	440
right	490
top	
bottom	

repeat - display flakey

left	450	> 30
right	480	
top	420	> 80
bottom	500	

raised

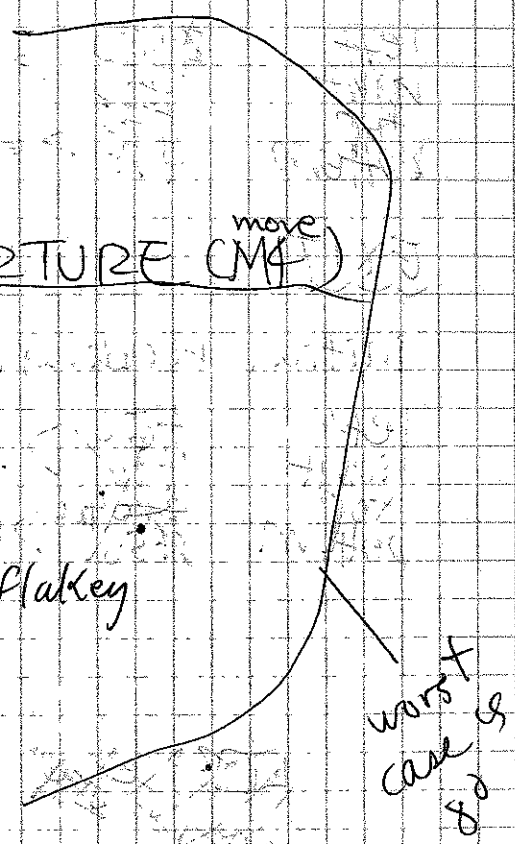
left	550 450	> 30
right	580 480	
top	480 470	> 20
bottom	450 450	

ENTRANCE

left	530	> 80
right	450	
top	550	> 120
bottom	430	

raise side closer to SHARP to more down

left	490	> 90
right	450	
top	510	> 30
bottom	480	



lower side closer to z-spec, to move right

left	520	> 40
right	480	> 40
top	530	> 60
bottom	470	> 60

EXIT

initial leading...

left	460	> 30
right	490	> 30
top	460	> 10
bottom	450	> 10

420	> 70
490	> 70
460	> 20
440	> 20

worst
case
is
70

~~RRR~~

Decided to accept this

move to SMART: exit ap.

goal (26, 25) and (5, 6) V

(5, 6) and (5, 6) for M

Which is V and which is H?

H:

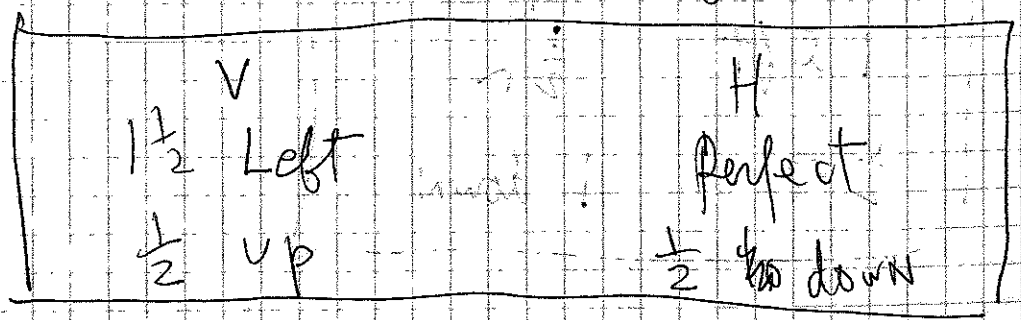
used hand to determine:

V beam is deflected to the right as it comes in so it bounces around the side of sharp to rest to the control room.

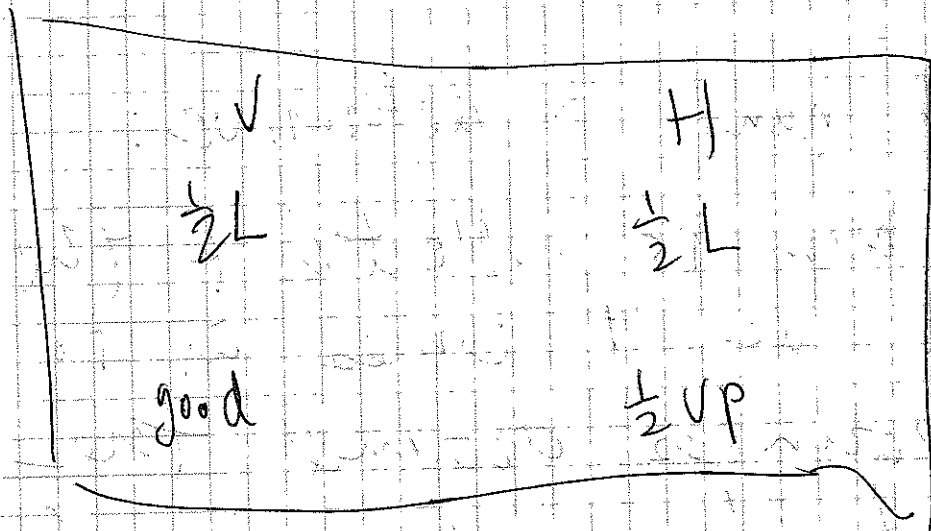
on I.R.C. display V is on the left

exit aperture:

~~1/2 left, 1/2 high~~



Entrance



Signal seems 50% bigger in "V".

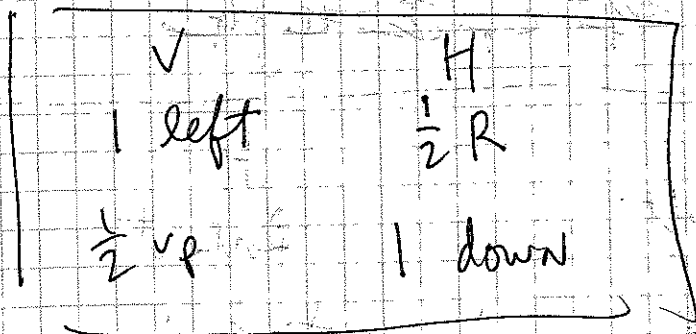
I don't remember this from before.

They seemed better matched on the exit aperture

ADOPTING 4 step plan on p. 67

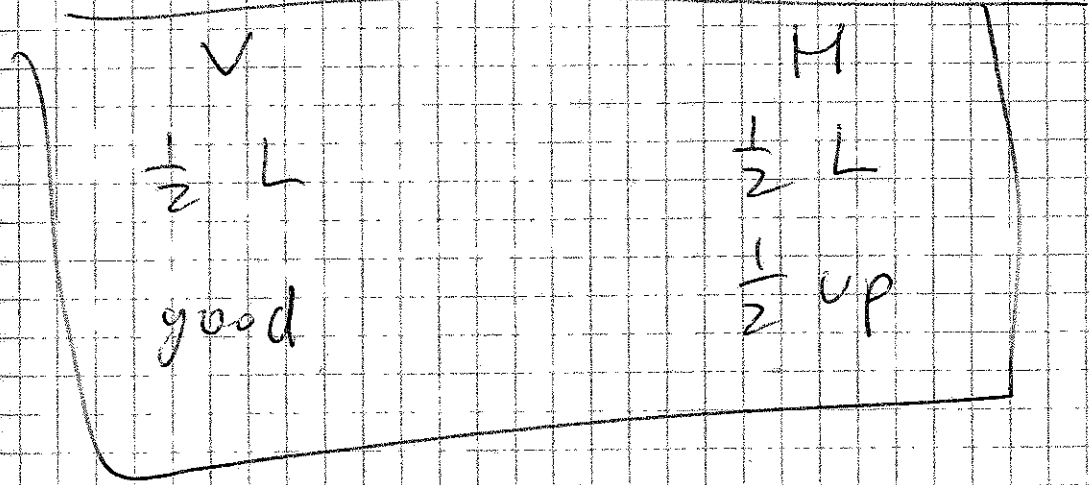
parallelism:

exit - entrance

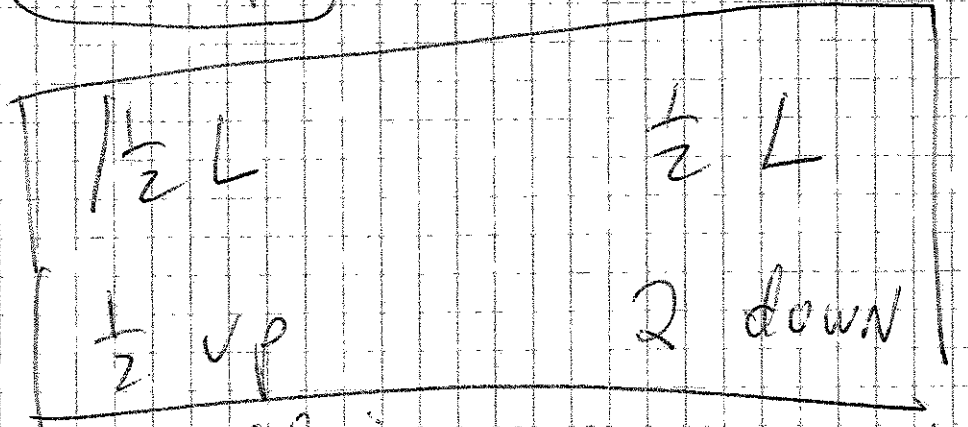


decide to move micrometer on H beam by 20 mils in + direction (increasing numbers) $0.209'' \rightarrow 0.226''$

entrance

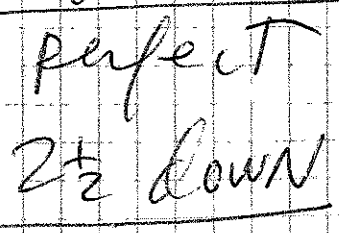
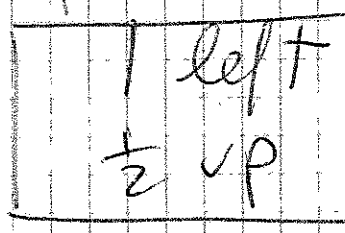


exit



parallelism

exit - entrance

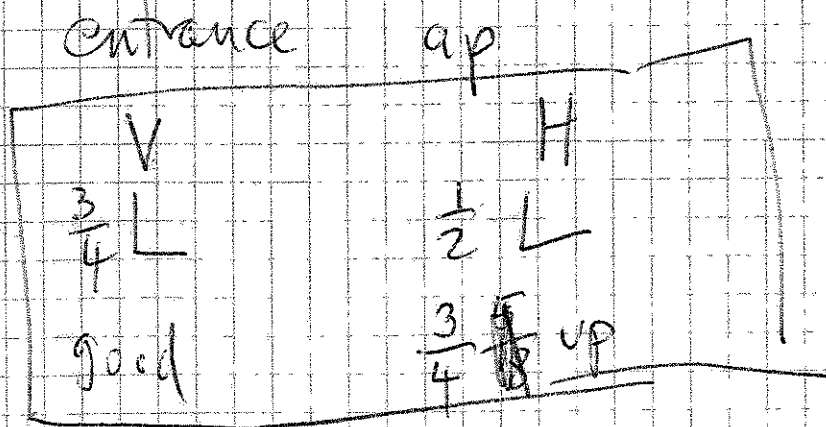
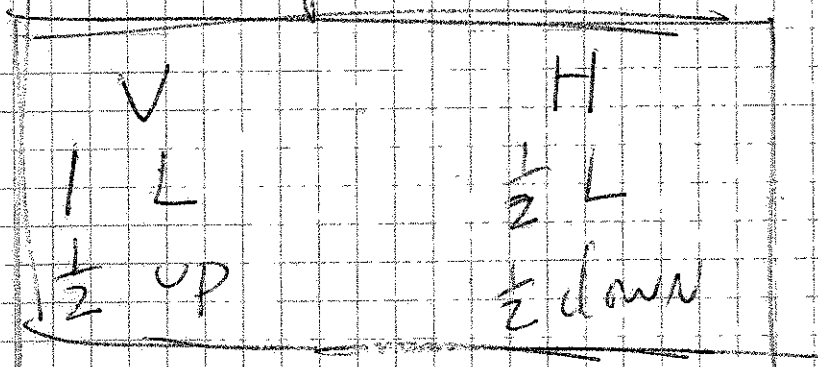


good working

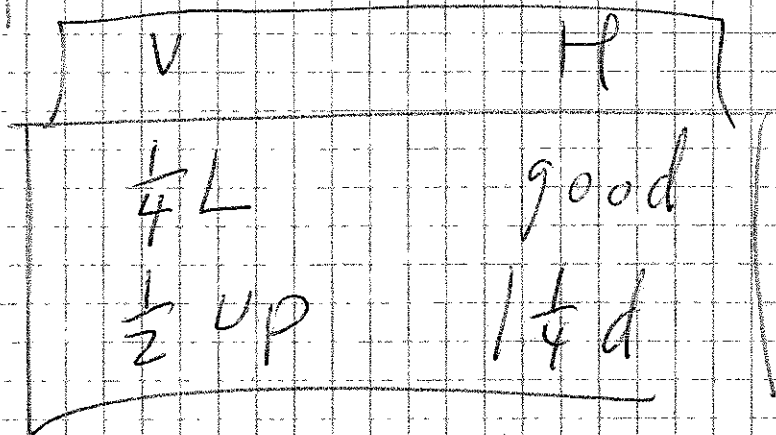
bigger micrometer #'s on H
mean parallelism (defined
as exit - entrance) ~~is~~
moves down

→ 1 pixel is about $\frac{1}{2}$ mils

move to 198 + remove 1 shim
exit ap

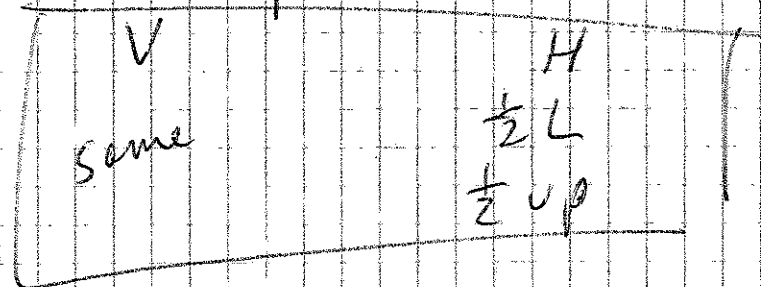


parallelism exit-ent

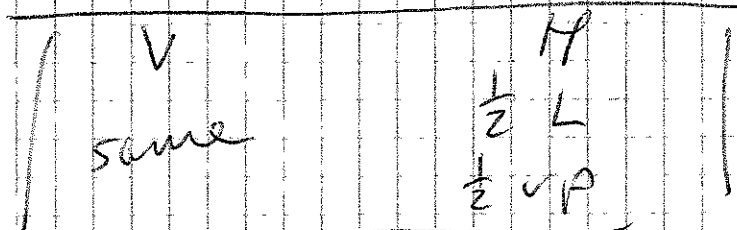


weird, we should have over-shot the original configuration. Move another 11 mils down to 187

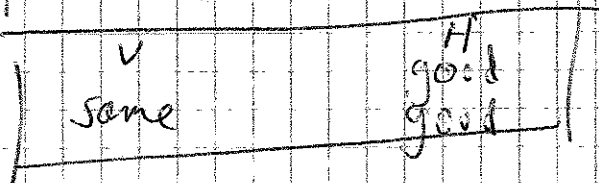
exit ap



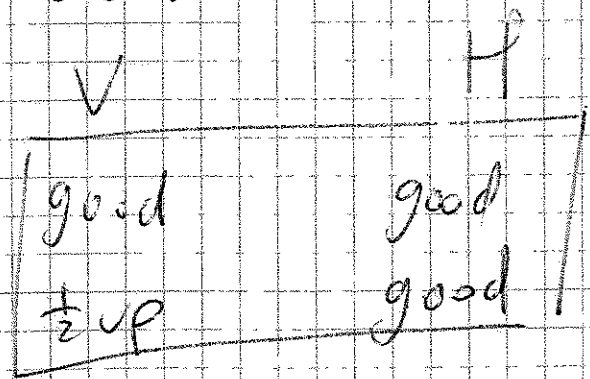
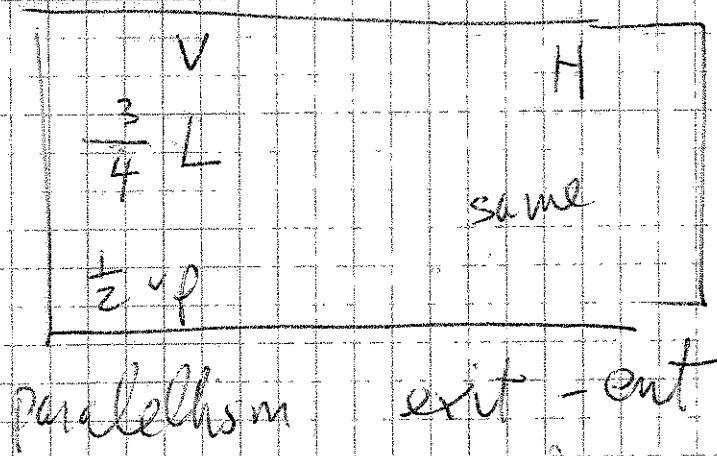
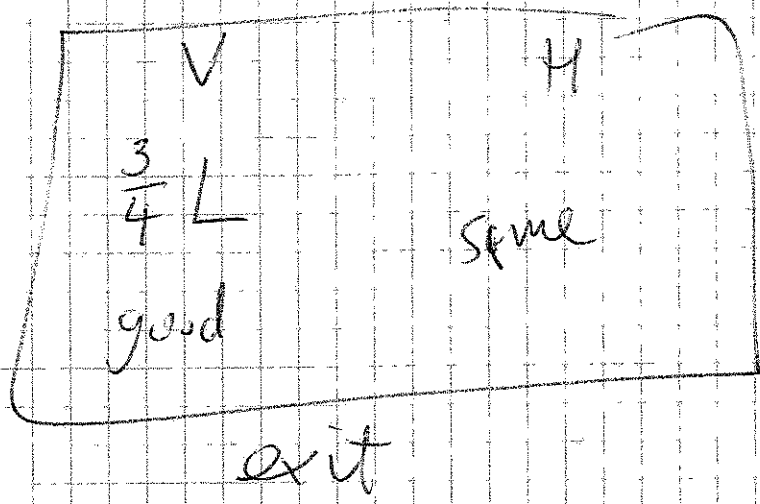
entrance ap



parallelism

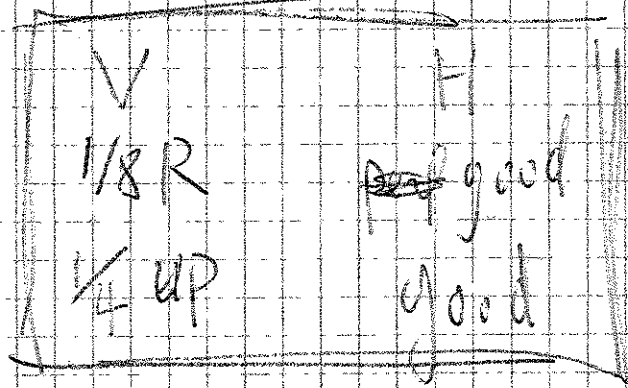
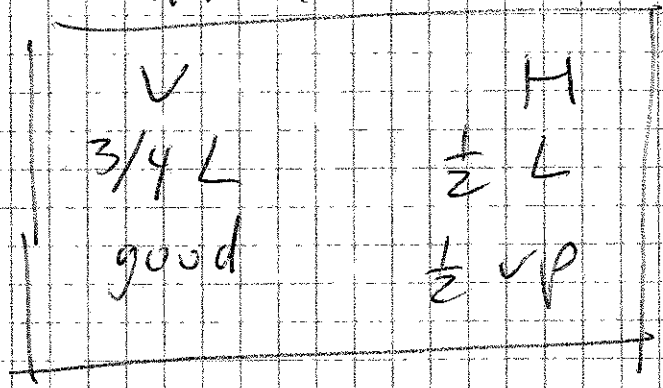


removed 2 more shims from V side
entrance



Move to step B

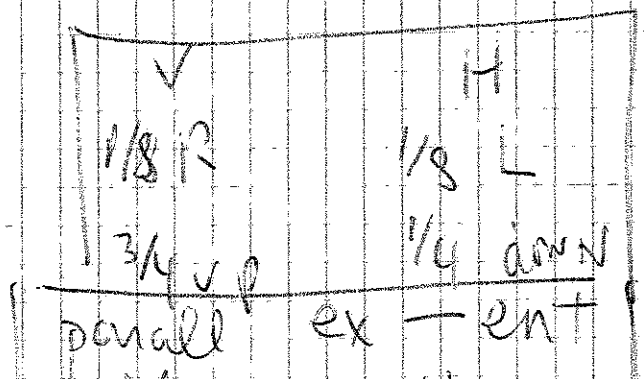
entrance



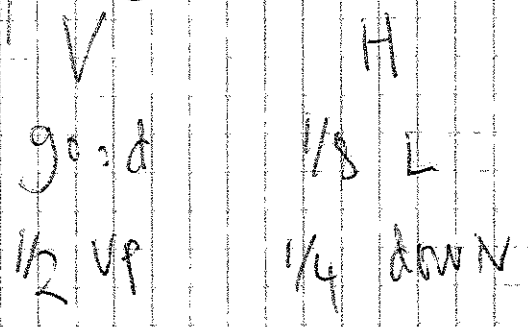
V 20% brighter

exit "START

STEP C "



panel ex - ent



~~S A~~

decrease by 6 mils

go .177 → .171

exit

~~z~~

~~exit~~ ~~exit~~

~~exit~~

exit

v

R $\frac{1}{4}$

up 1

v

R $\frac{1}{8}$

up $\frac{1}{4}$

entrance

is

parallels in
R $\frac{1}{8}$
up $\frac{3}{4}$

we should have moved
down to be consistent w/
what we learned w/ the
other. But he should overall
not be different same

,171 → ,183

Entrance

$\frac{1}{8} R$
up $\frac{1}{8}$

Exit

$\frac{1}{8} R$
up $\frac{1}{4}$

Parallelism

good
up $\frac{1}{8}$

Step D



exit

V
1/8 R
~~1/4~~ 1/4 UP

H
1/8 L
~~1/4~~ 1/4 down

entrance

V
1/8 R
1/4 UP

H
good
1/8 down

avg
V
1/8 R
1/4 UP

H
good
1/8 down

← OK

Goal: mov V 3/8 down

Loosen V-grid

Pushed V-grid into box (to align wires) while tightening again.

Final meas:

ENTRANCE

V
1/8 R
1/8 down

H
1/8 L
1/4 down

EXIT

1/8 R
good

1/8 L
1/4 down

WIRE
V H
1/8 R 1/8 L
1/6 d 1/4 d

Big grey box

box 2

power supplies

box 2 top cover

box 3 top cover

box 3 side panels

grades

level

Spare 15x15

~~for~~ surge protector

shims saved off allen wrench
for alignment

screws to connect boxes

brackets M4/B4

weld-down bolts

nylon + mesh

box 4 side panel

* cork

grey box 2 - box 4

black box 2 - box 3

black box 1 - misc (+ laser)

wooden 1 - misc

grey box 1 - misc