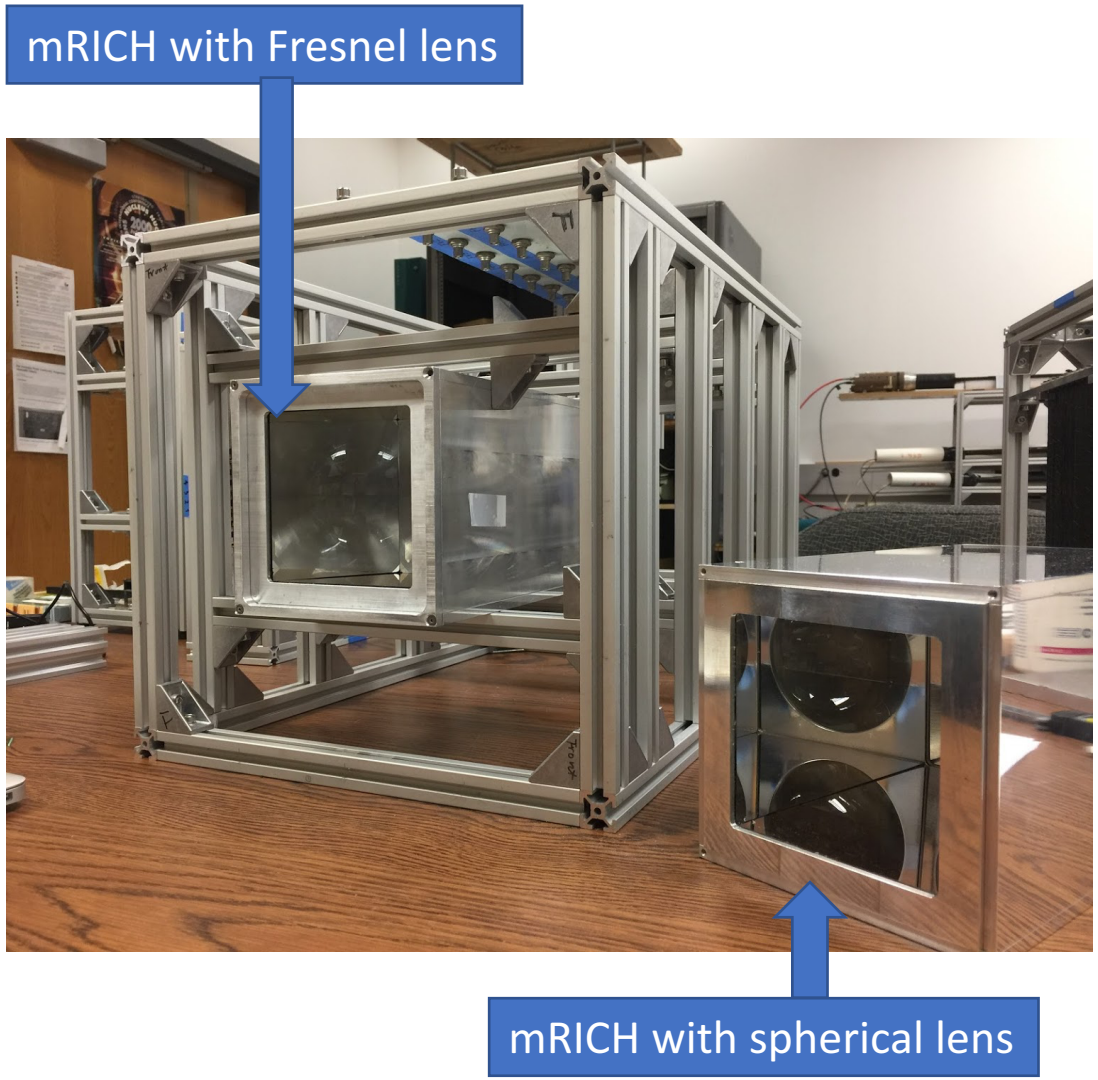
mRICH2 Mechanical Design

Xiaochun He, Xu Sun and William Roh

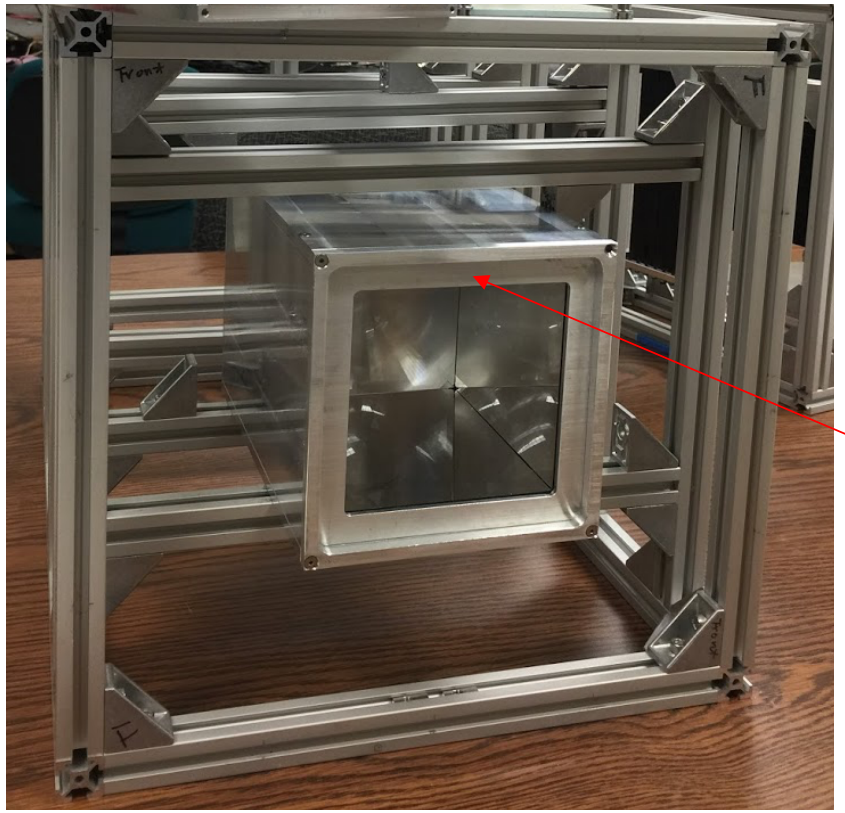
Prepared on 2/12/2018

General comments

- We constructed two mRICH holder boxes. One is for using Fresnel lens (f = 6”) and the other is using a spherical lens (f = 8”). The same readout electronics can be attached to the end of the holder box.
- The design drawings are appended at the end of this document.
- The following slides show the details of the holder box so that a proper readout electronics can be developed.

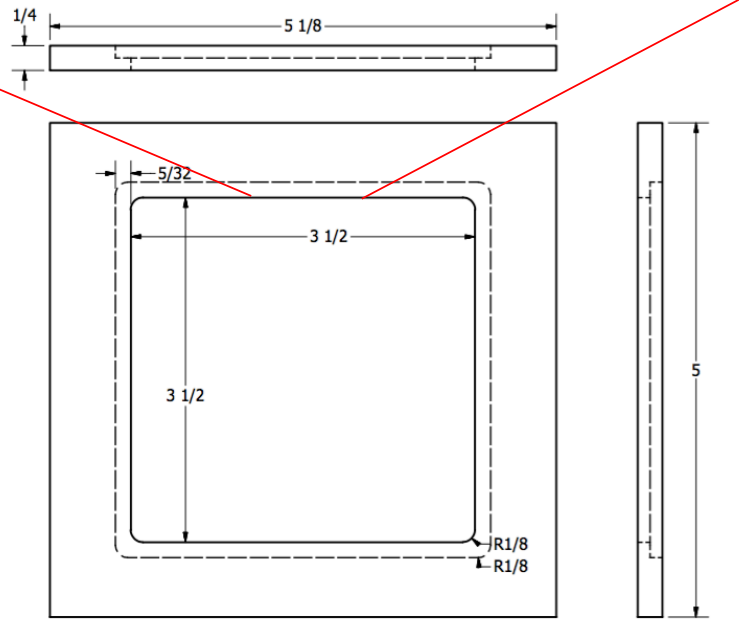


Holder box dimension (with Fresnel lens) - I



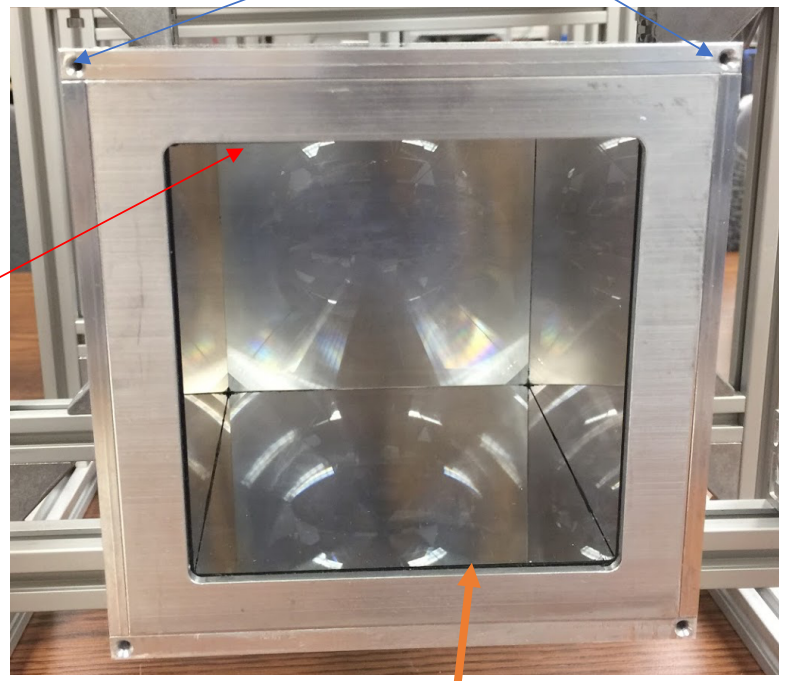
mRICH on a test stand viewed from back

All other dimensions can be found in the CAD drawings attached to the end of this document.



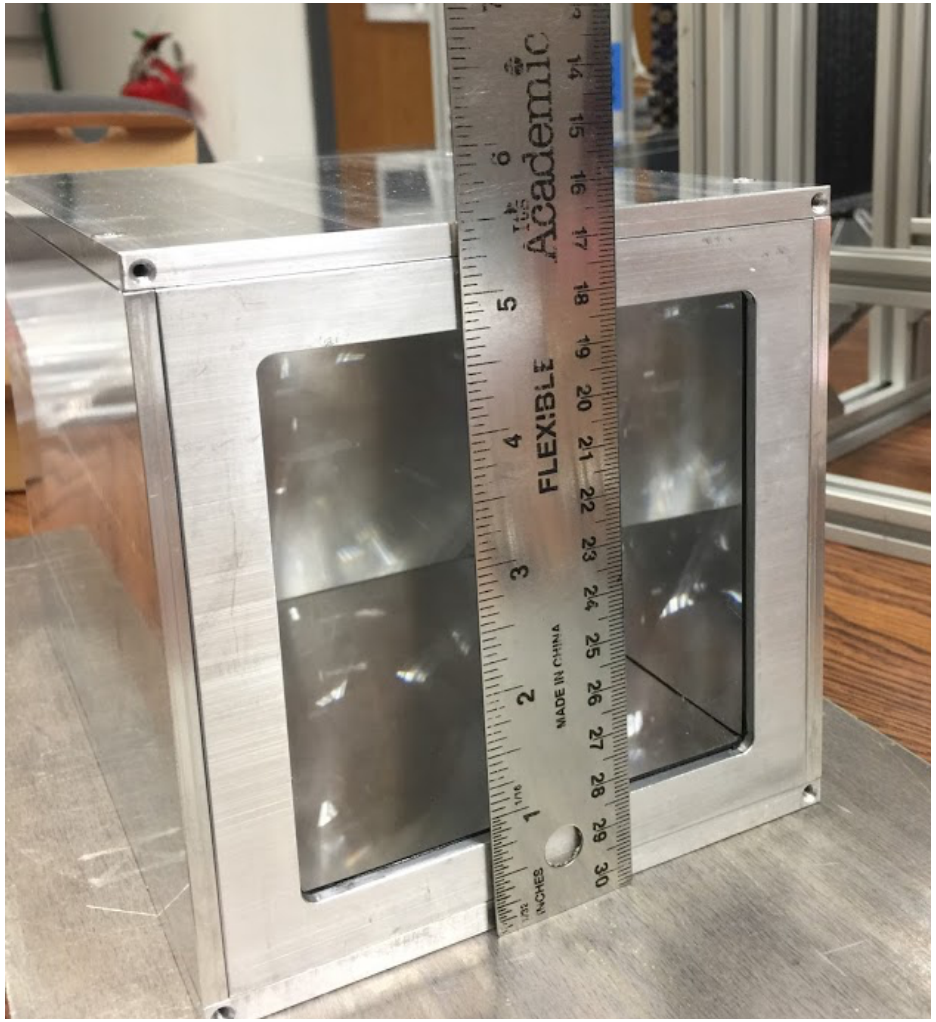
From design drawings (in inches)

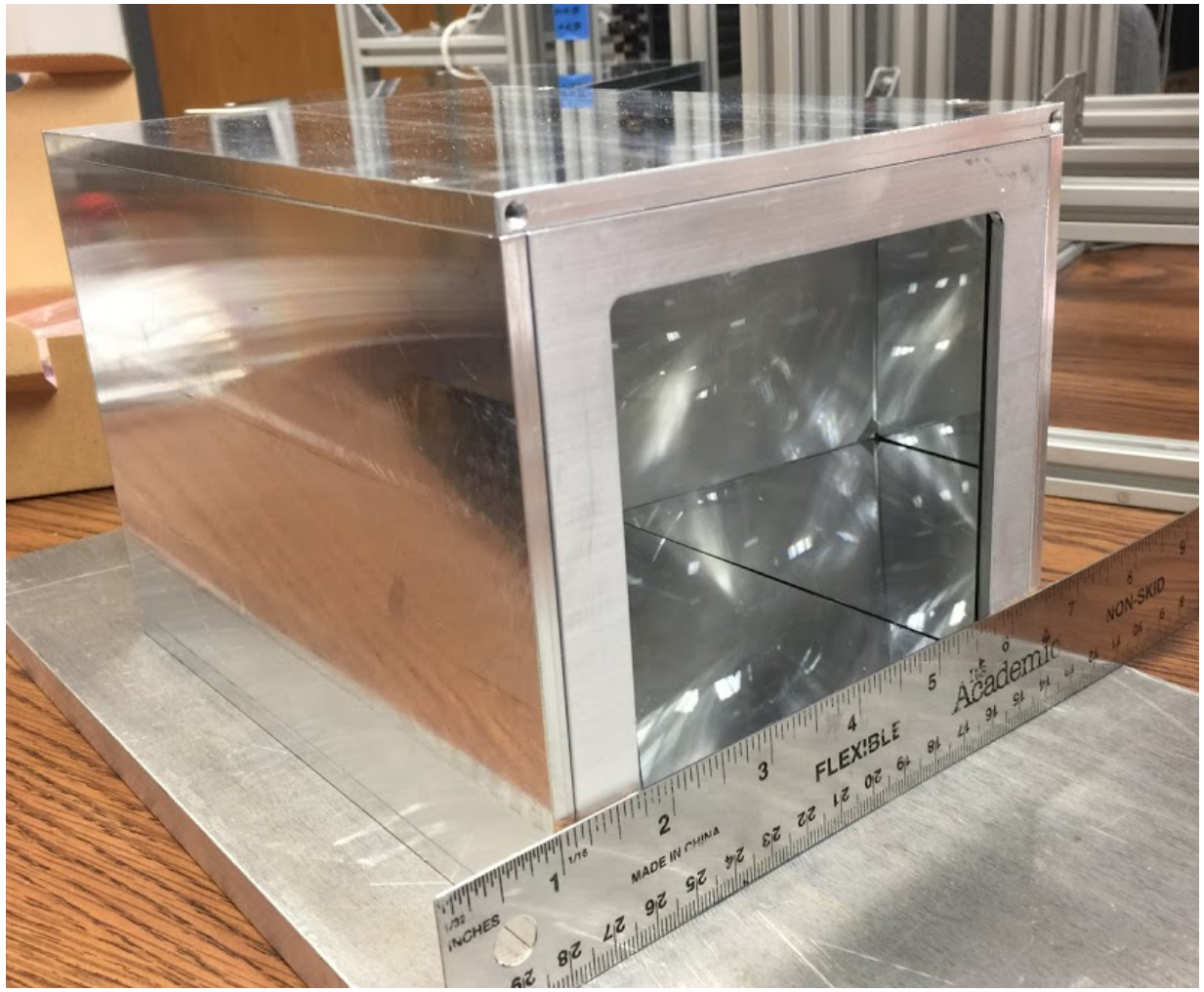
Electronics mounting screw holes



The holder box opening is at the focal plane of the Fresnel lens

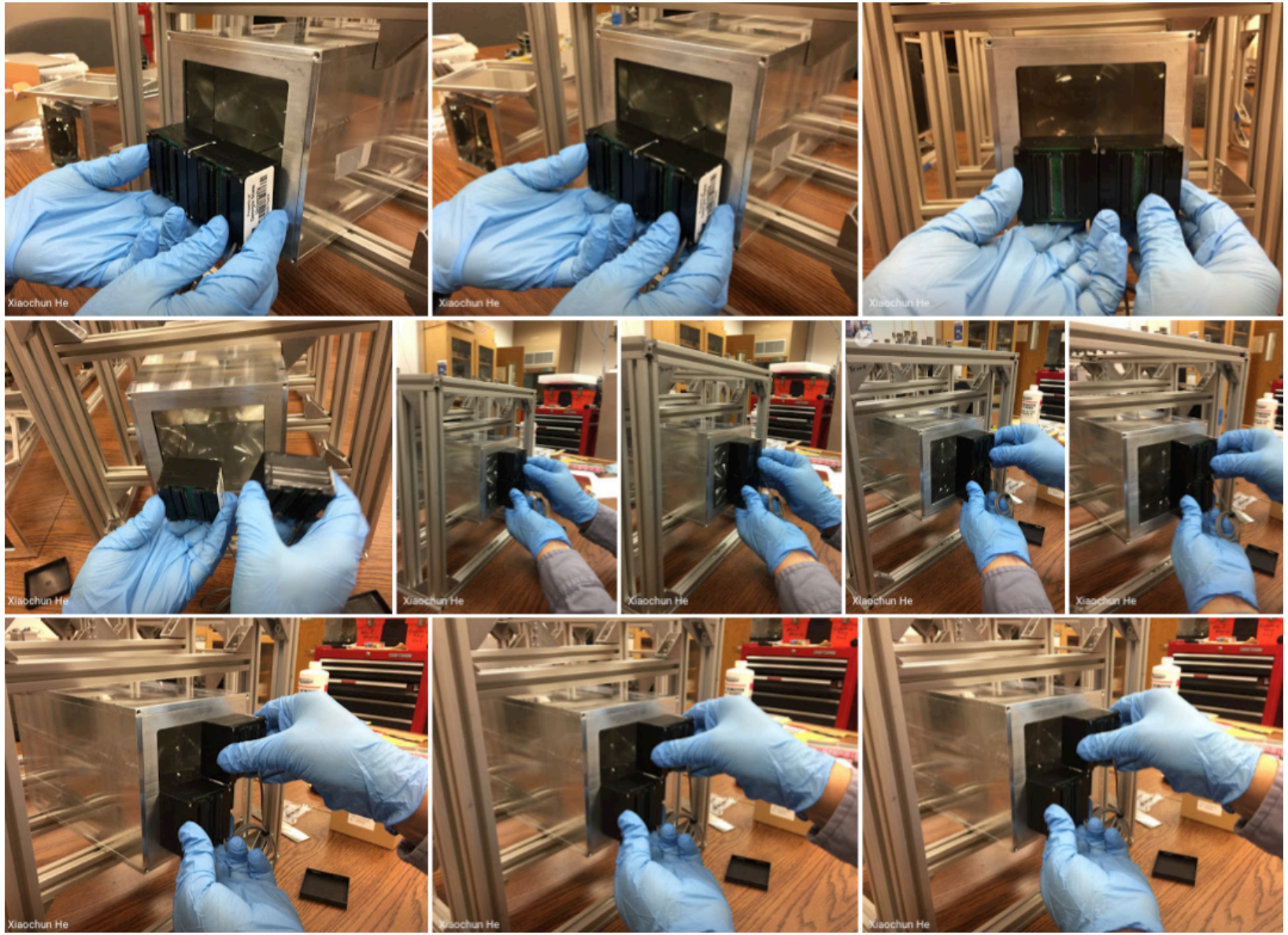
Holder box dimension (with Fresnel lens) - II



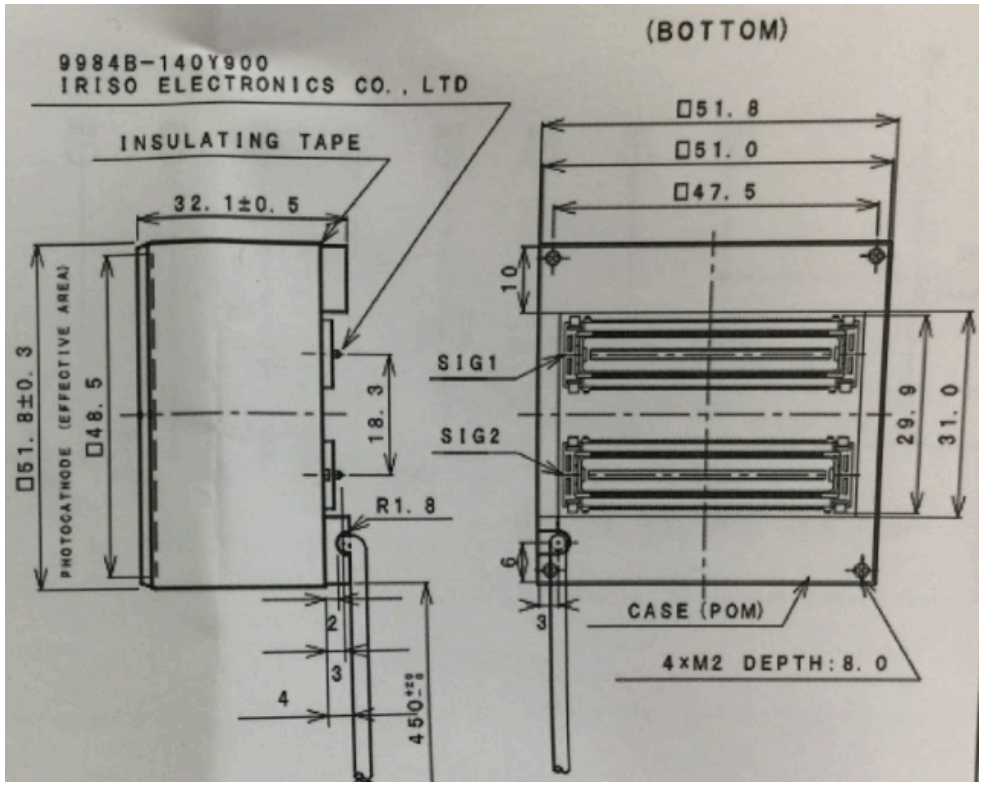


Attaching Four H13700 PMTs (Design Concept)

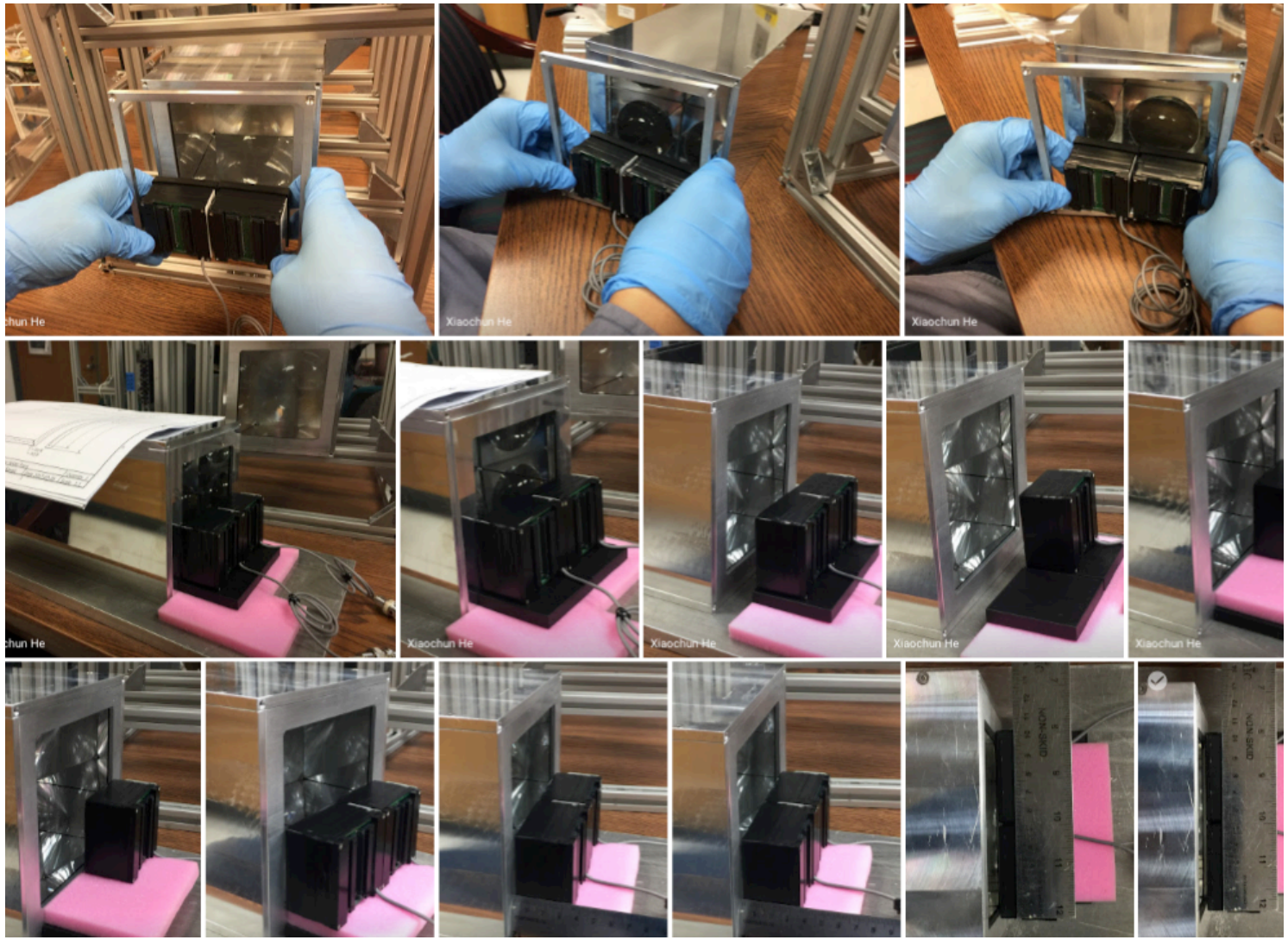
- Opening is completely covered by four PMT's with very little gap between them.
- Because of the focusing property of the lens, we expect that a complete ring image can be formed on the focal plane if the particle incident direction is not exceeding a threshold angle (to be determined from simulation!).
- This design feature was motivated from the first beam test, which will NOT limit the size of the readout electronics as long as one aligns the four PMT's to the opening of the mRICH holder box at the back.



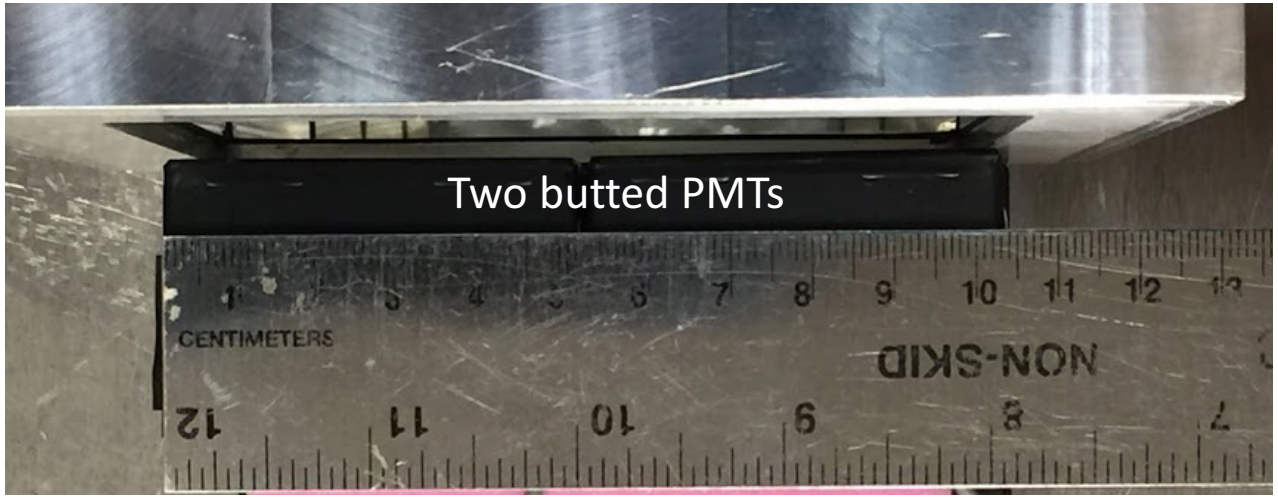
Attaching Four H13700 PMTs (Stacking PMT's)

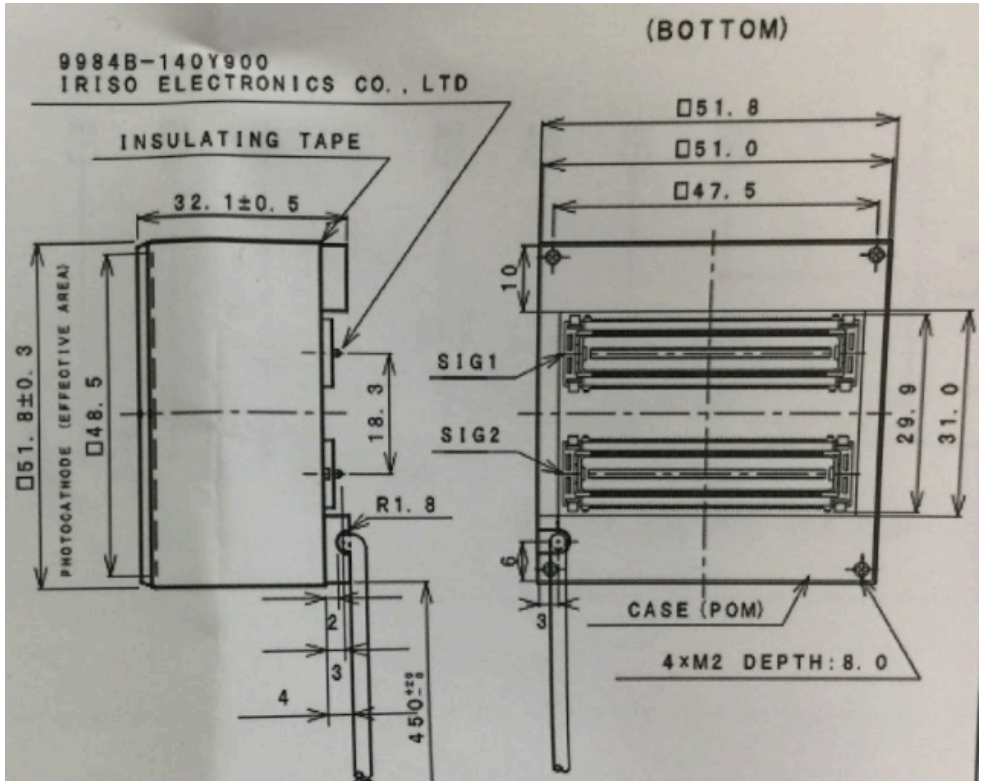


H13700 Dimension

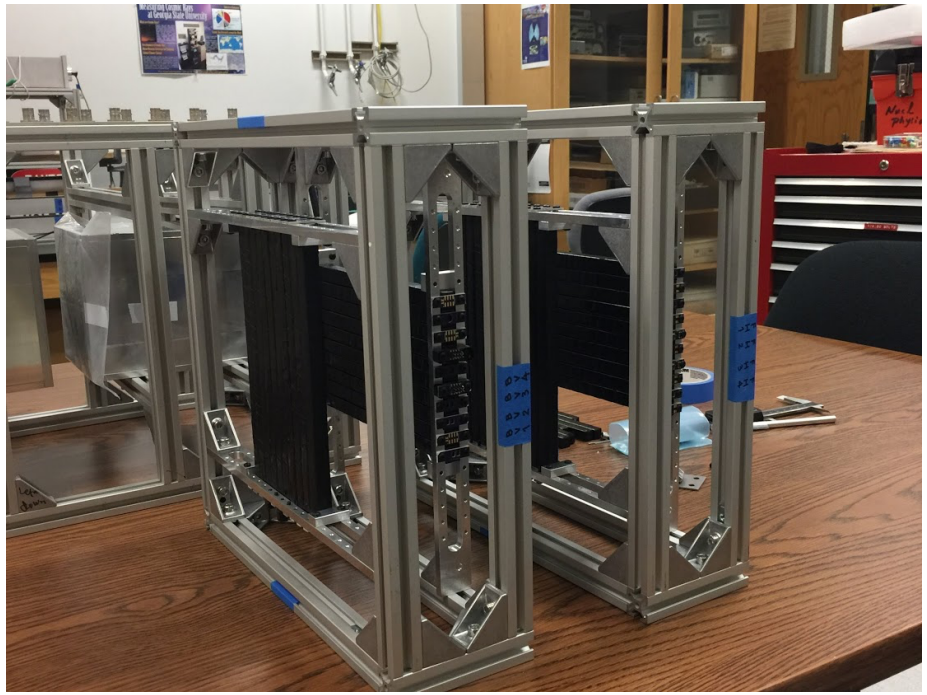


H13700 Dimension

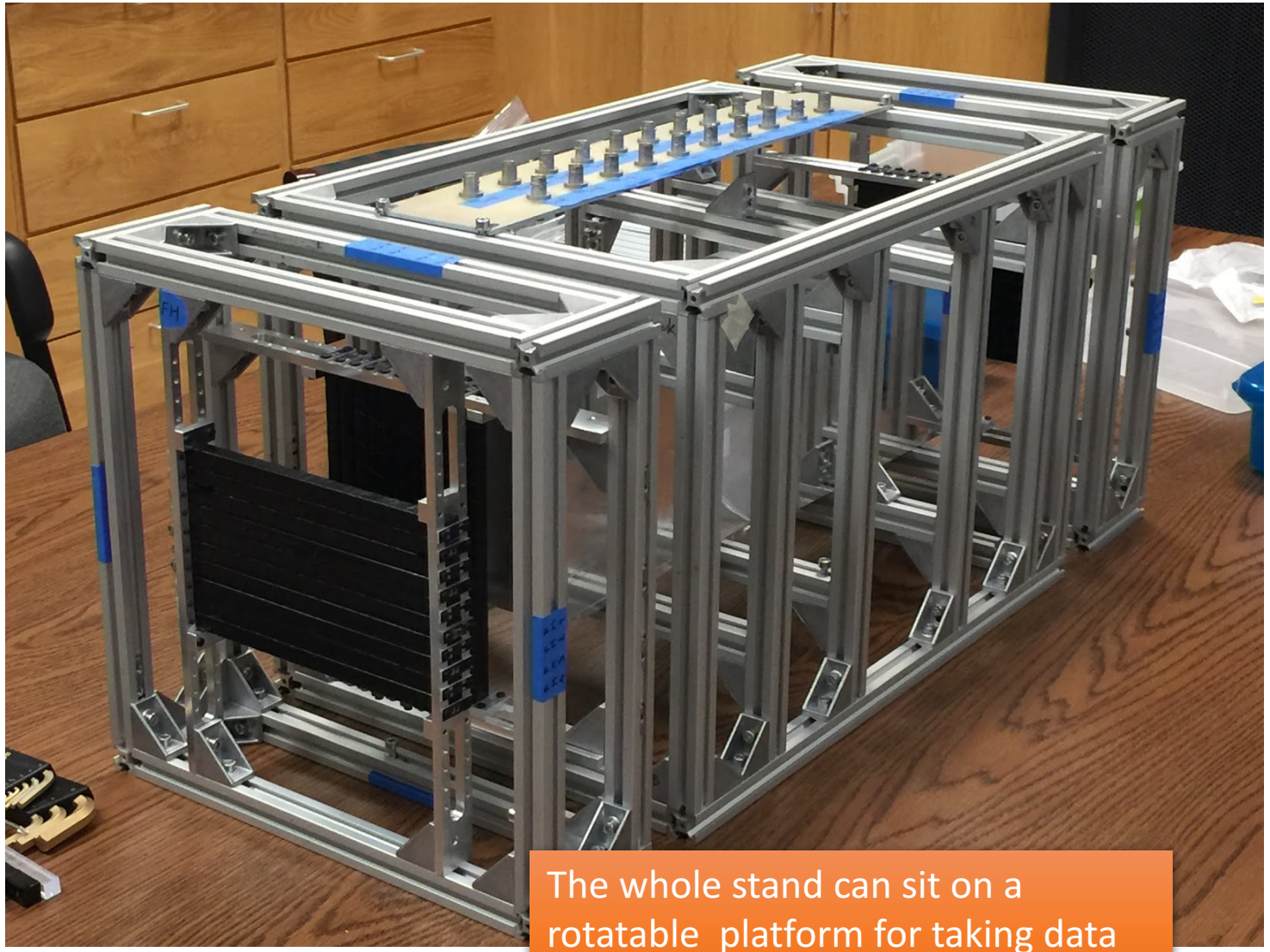




mRICH2 on the Test Stand with a Hodoscope Pair

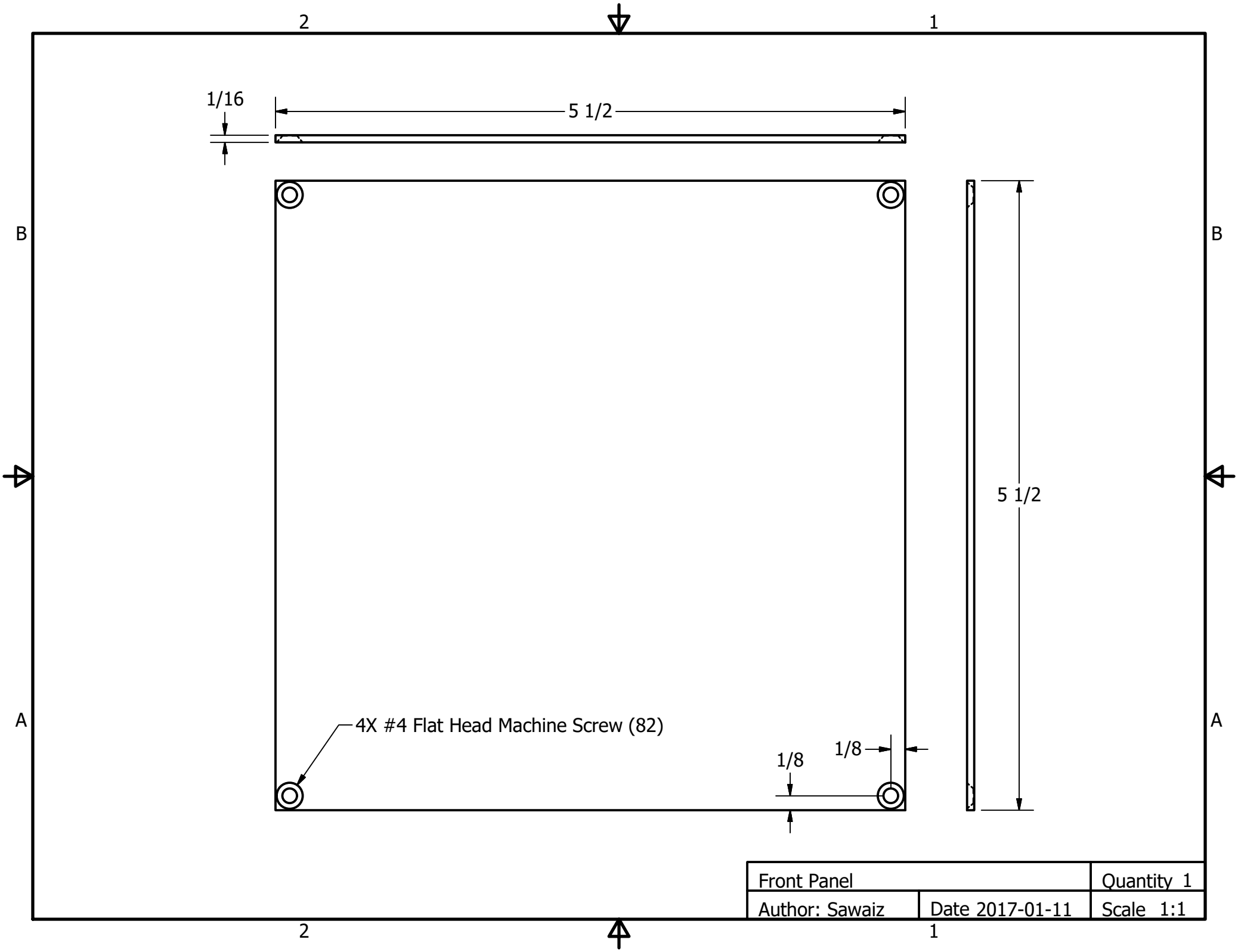


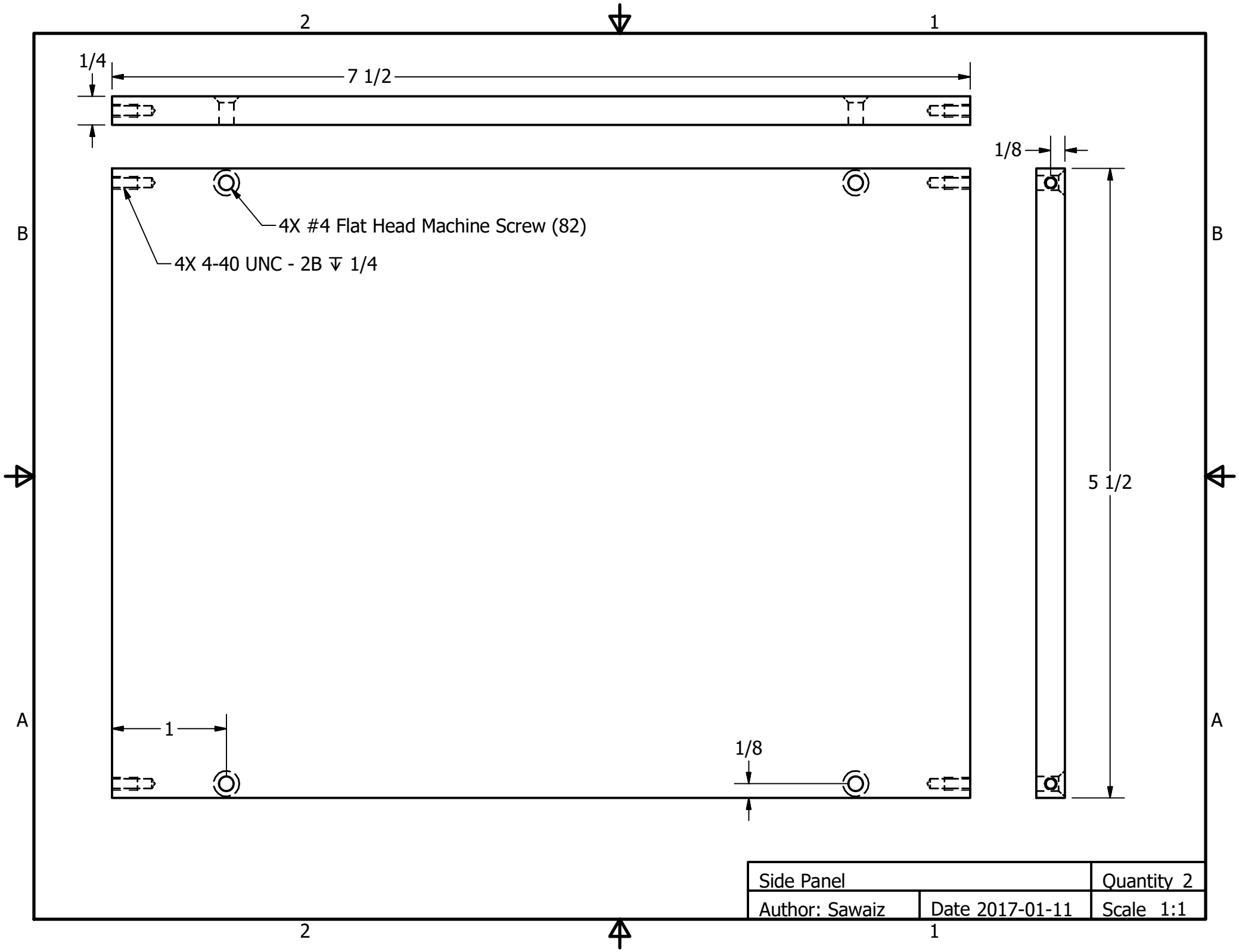
These X-Y hodoscopes will completely cover the active area of the mRICH and will be read out together with the hits in PMTs.

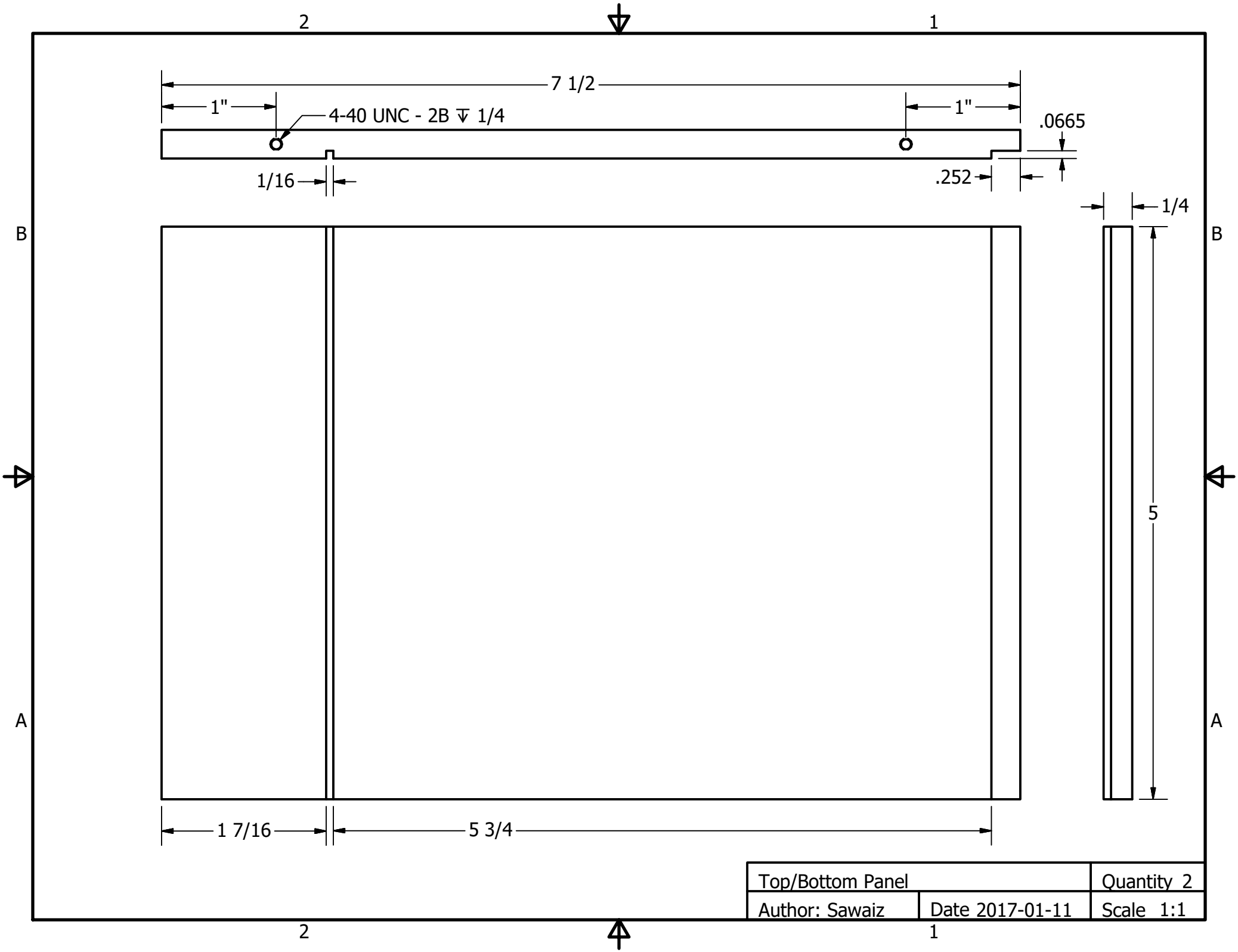


The whole stand can sit on a rotatable platform for taking data at different beam incident angles.

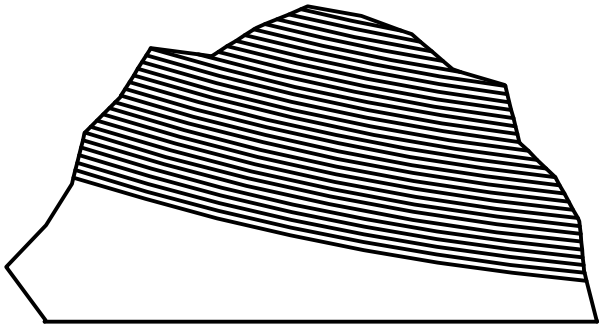
mRICH2 drawing (Fresnel lens)


2
1
B
A
1/16
5 1/2
5 1/2
4X #4 Flat Head Machine Screw (82)
1/8
1/8
Front Panel
Quantity 1
Author: Sawaiz
Date 2017-01-11
Scale 1:1

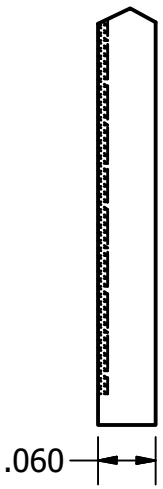

2
1
1/4
7 1/2
1/8
4X #4 Flat Head Machine Screw (82)
4X 4-40 UNC - 2B ↧ 1/4
5 1/2
1
1/8
B
A
Side Panel
Quantity 2
Author: Sawaiz
Date 2017-01-11
Scale 1:1



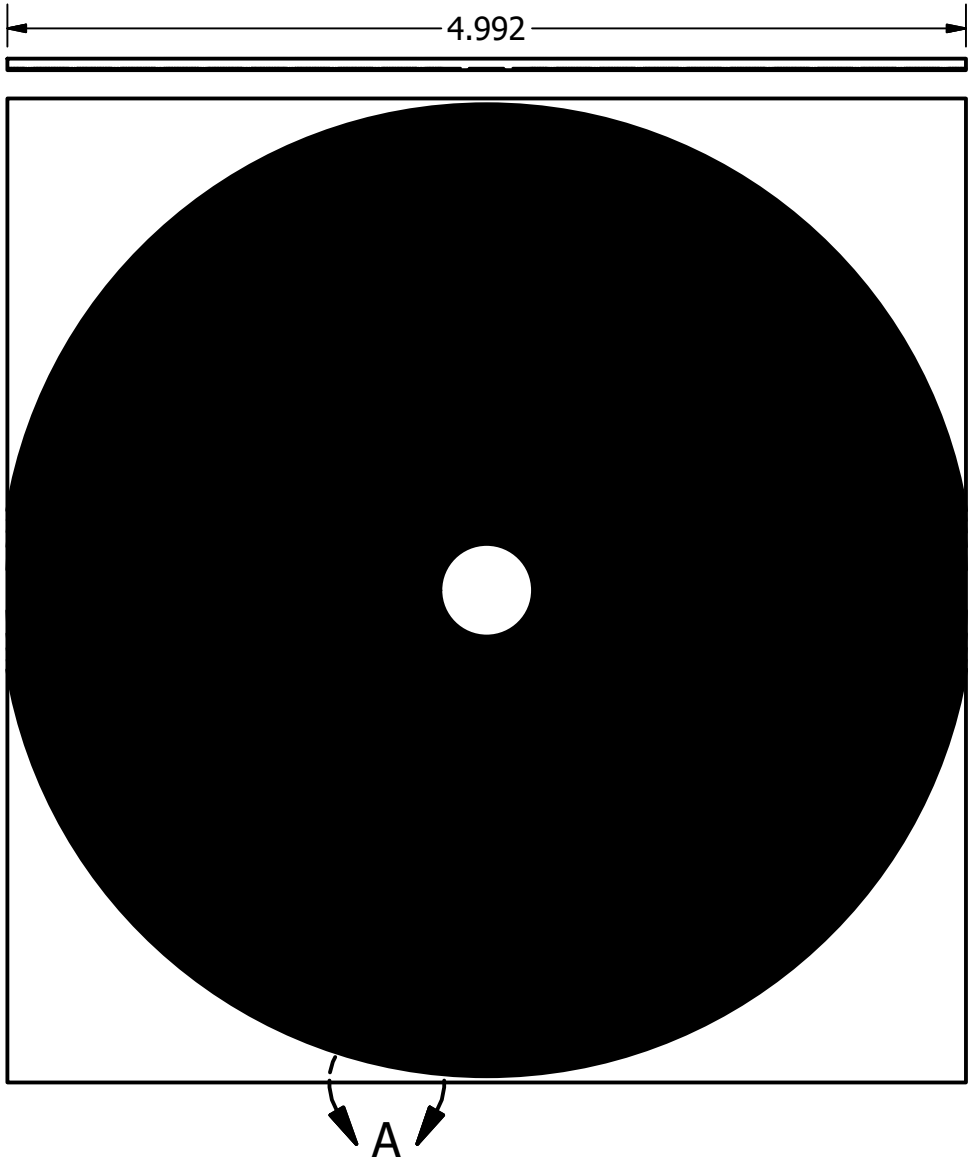
Top/Bottom Panel		Quantity 2
Author: Sawaiz	Date 2017-01-11	Scale 1:1

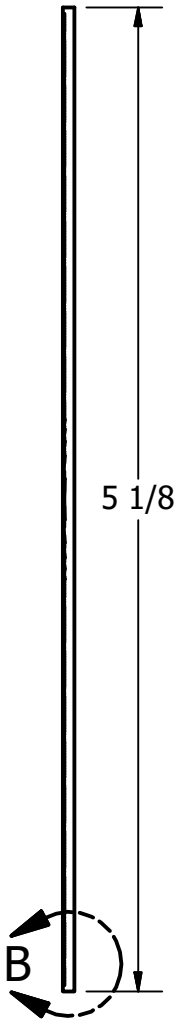


DETAIL A
SCALE 5 : 1

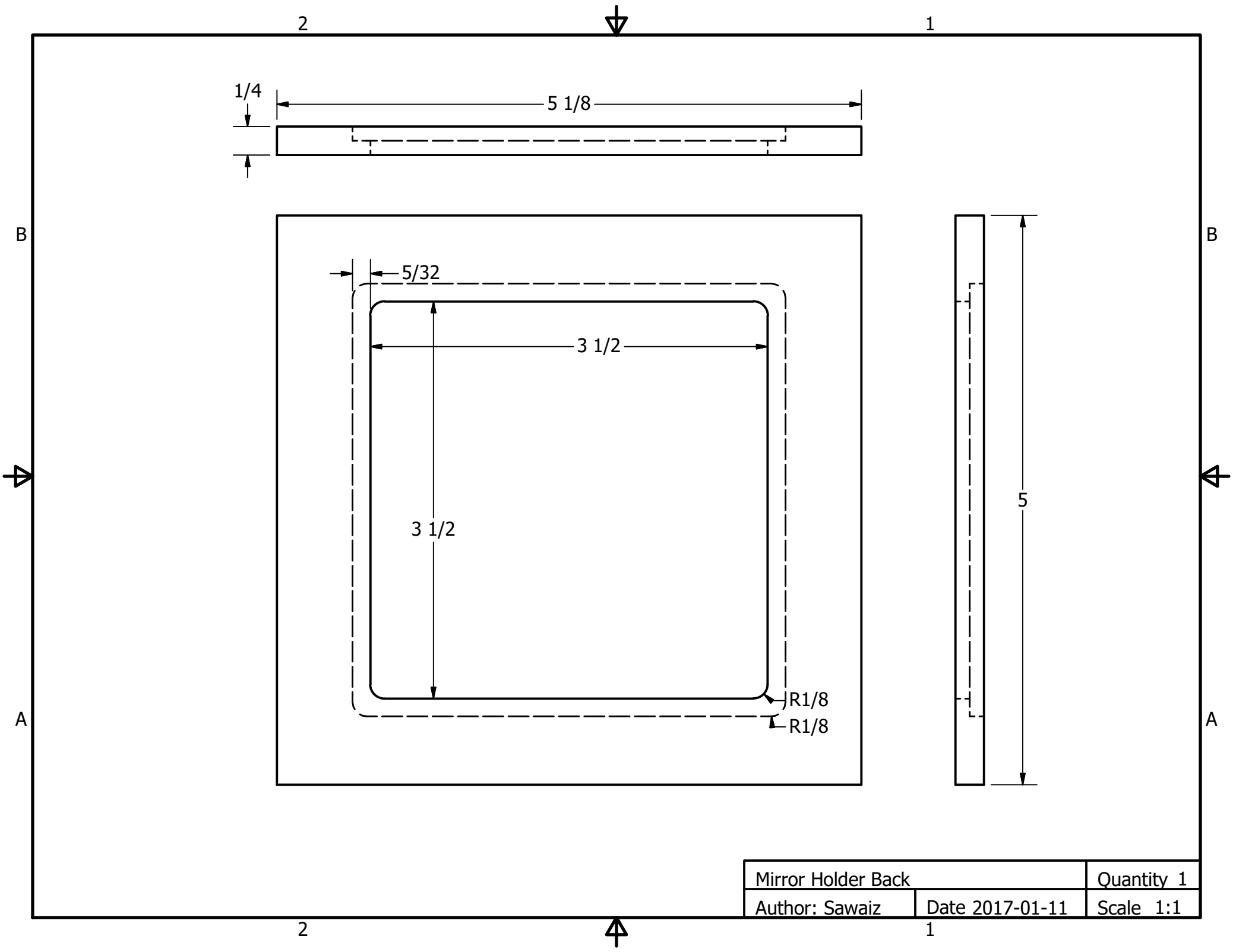


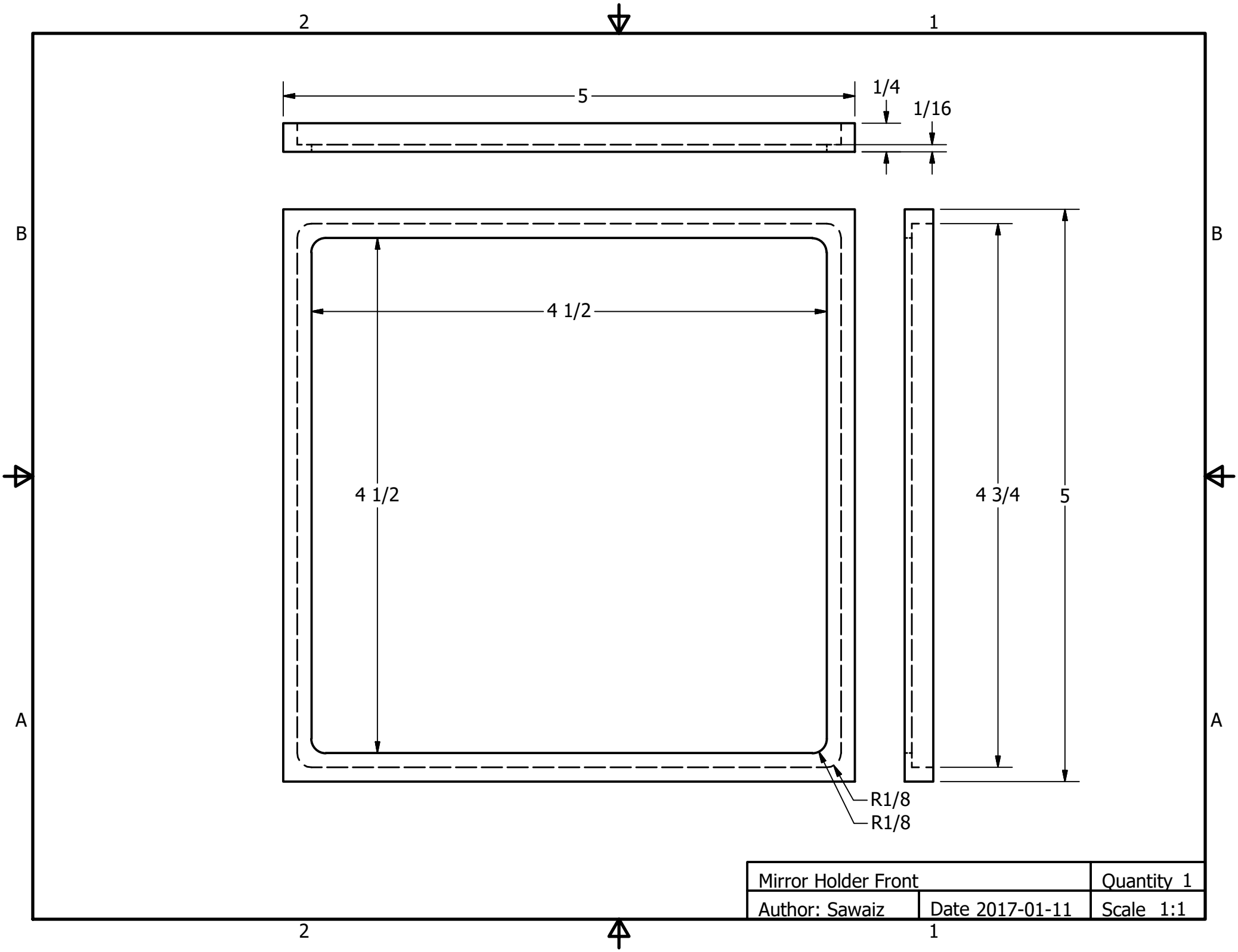
DETAIL B
SCALE 5 : 1



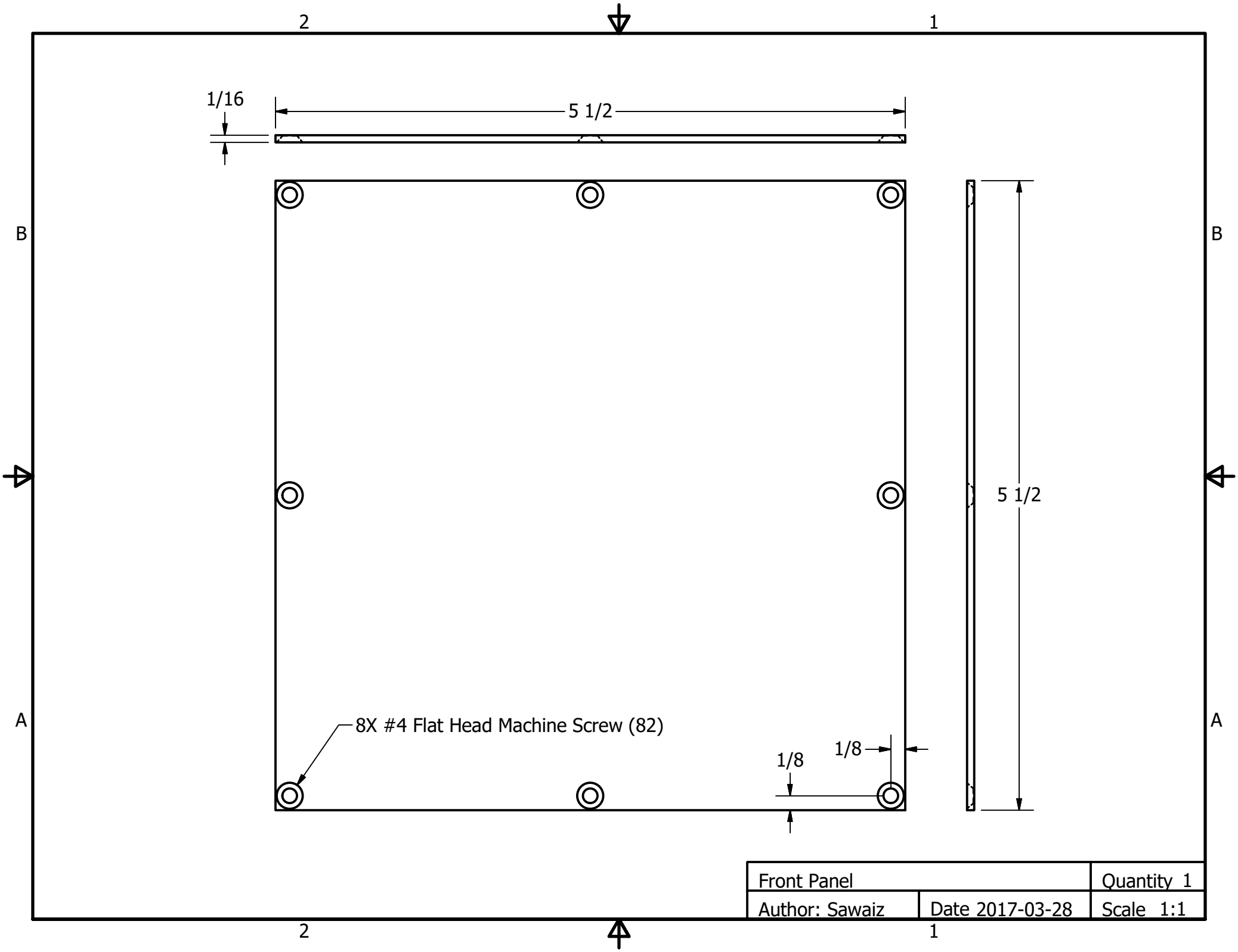


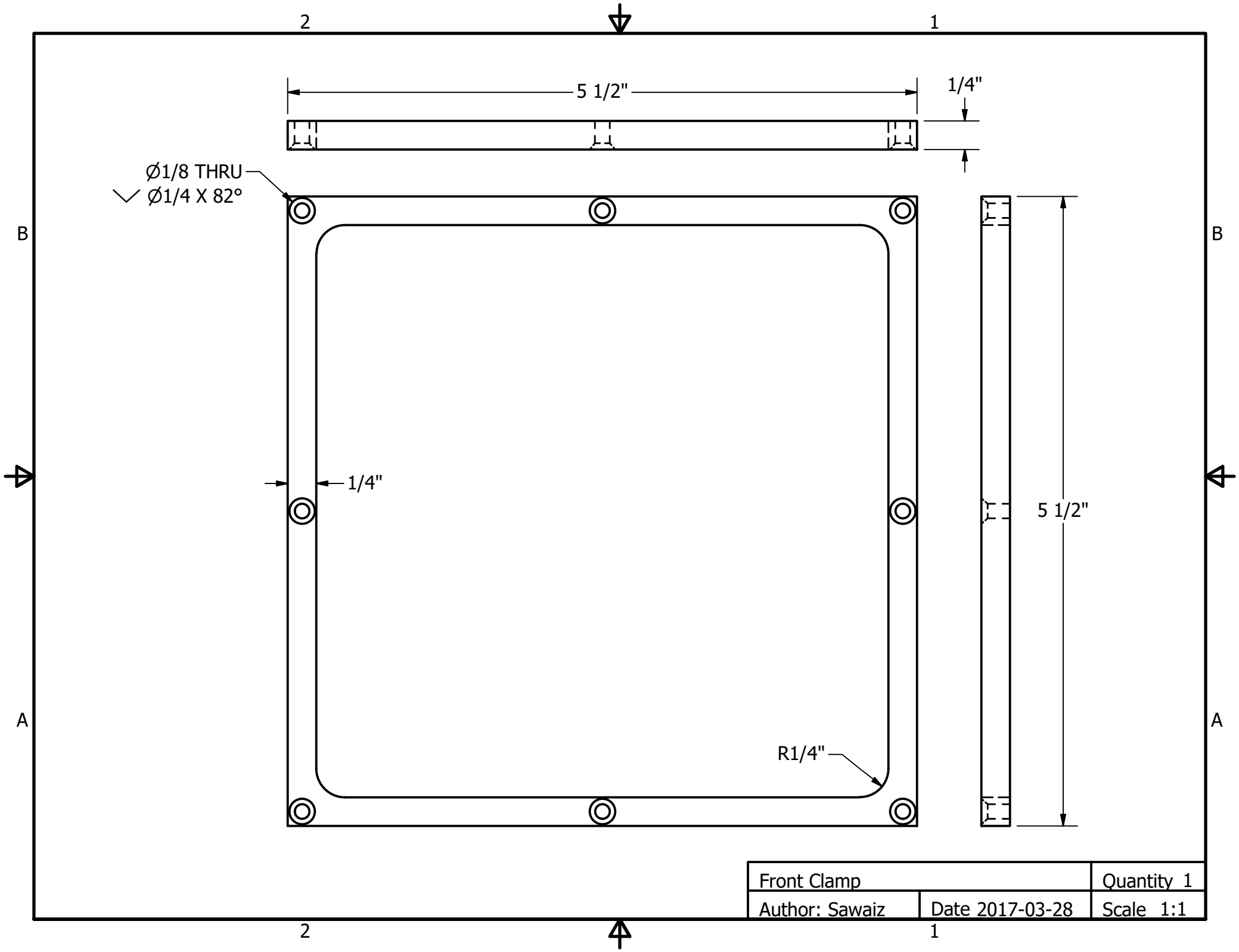
Fresnel Lens		Quantity 1
Author: Sawaiz	Date 2017-01-11	Scale 1:1

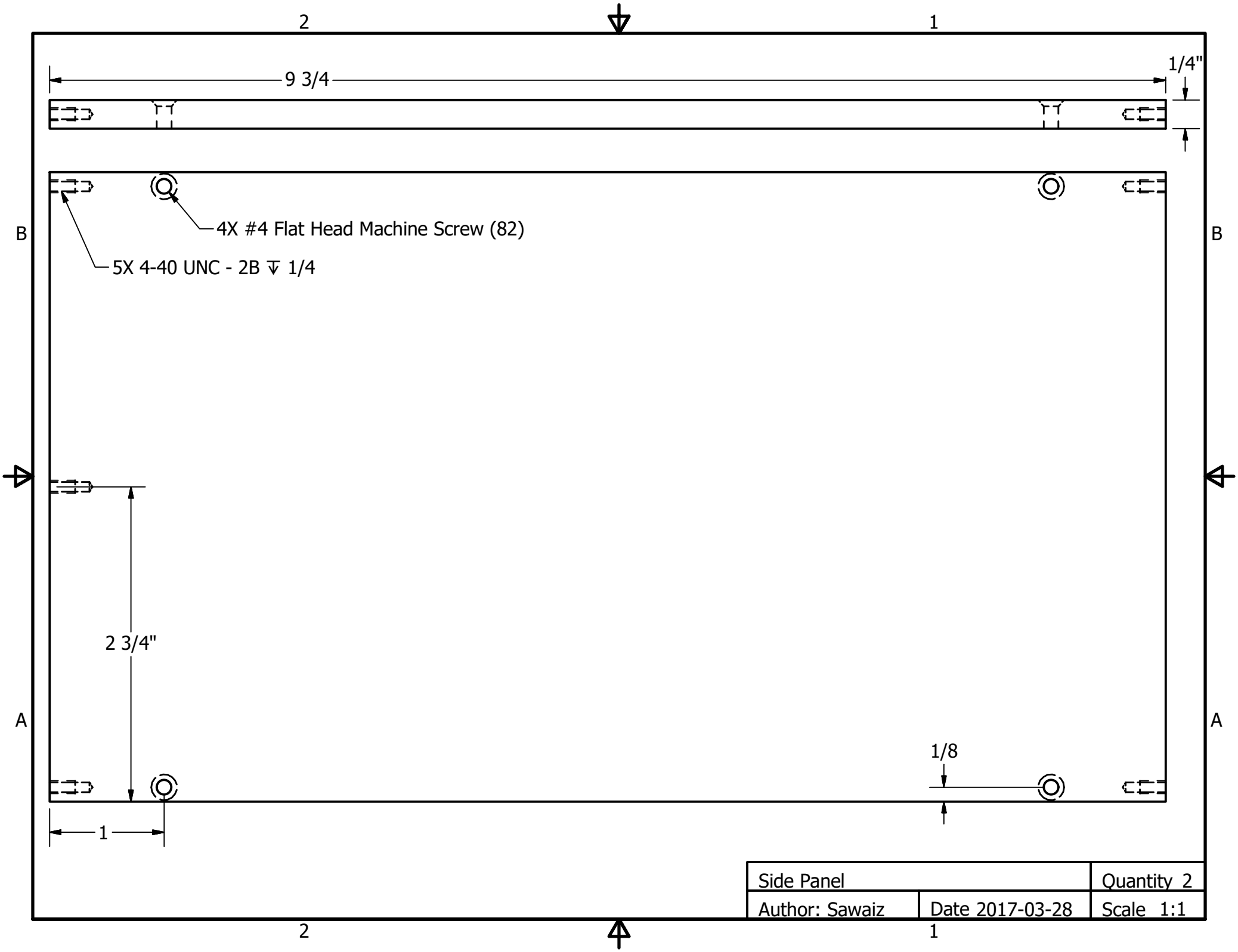

2
1
B
A
1/4
5 1/8
5/32
3 1/2
3 1/2
R1/8
R1/8
5
Mirror Holder Back
Quantity 1
Author: Sawaiz
Date 2017-01-11
Scale 1:1

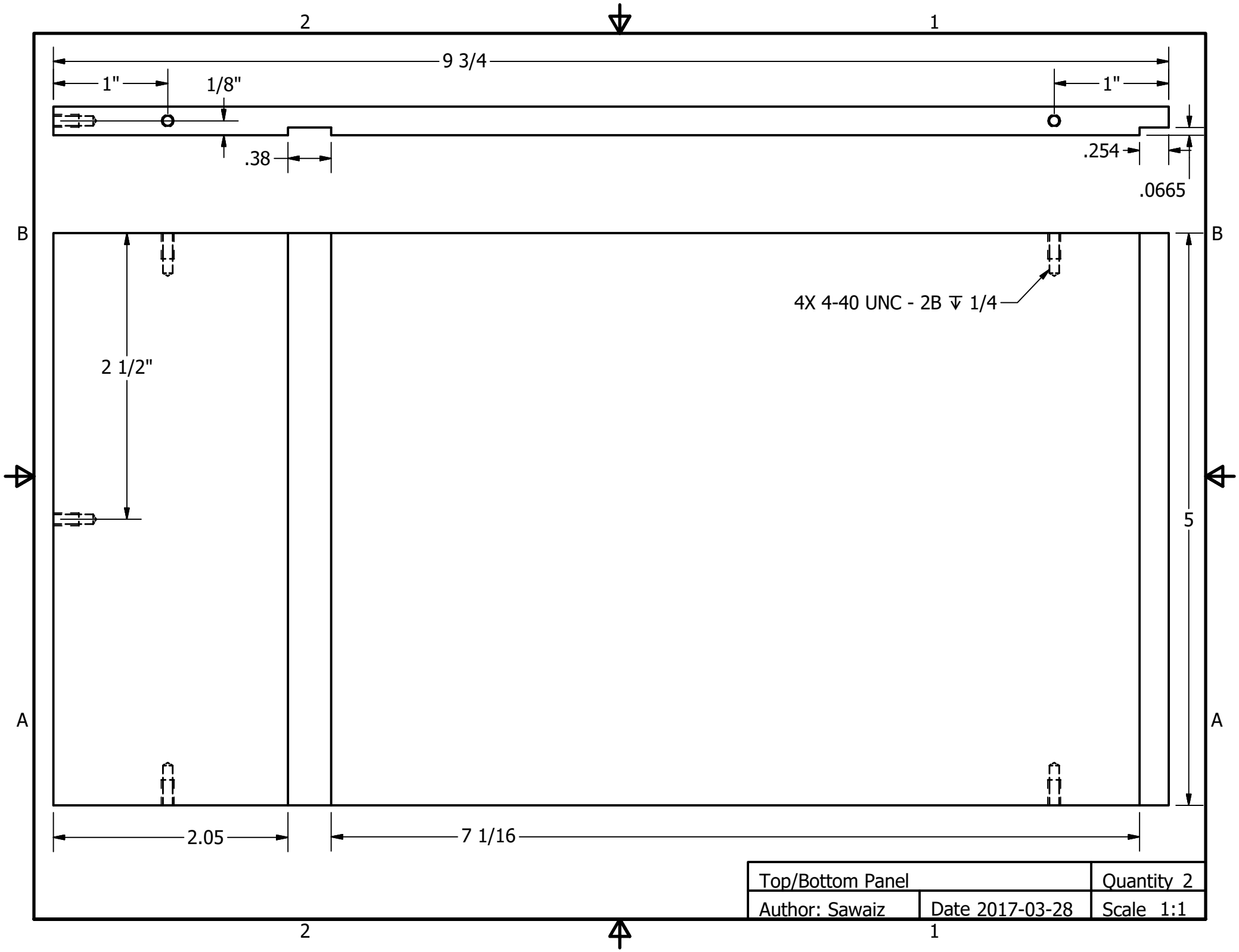

2
1
B
A
5
1/4
1/16
4 1/2
4 1/2
4 3/4
5
R1/8
R1/8
Mirror Holder Front
Quantity 1
Author: Sawaiz
Date 2017-01-11
Scale 1:1

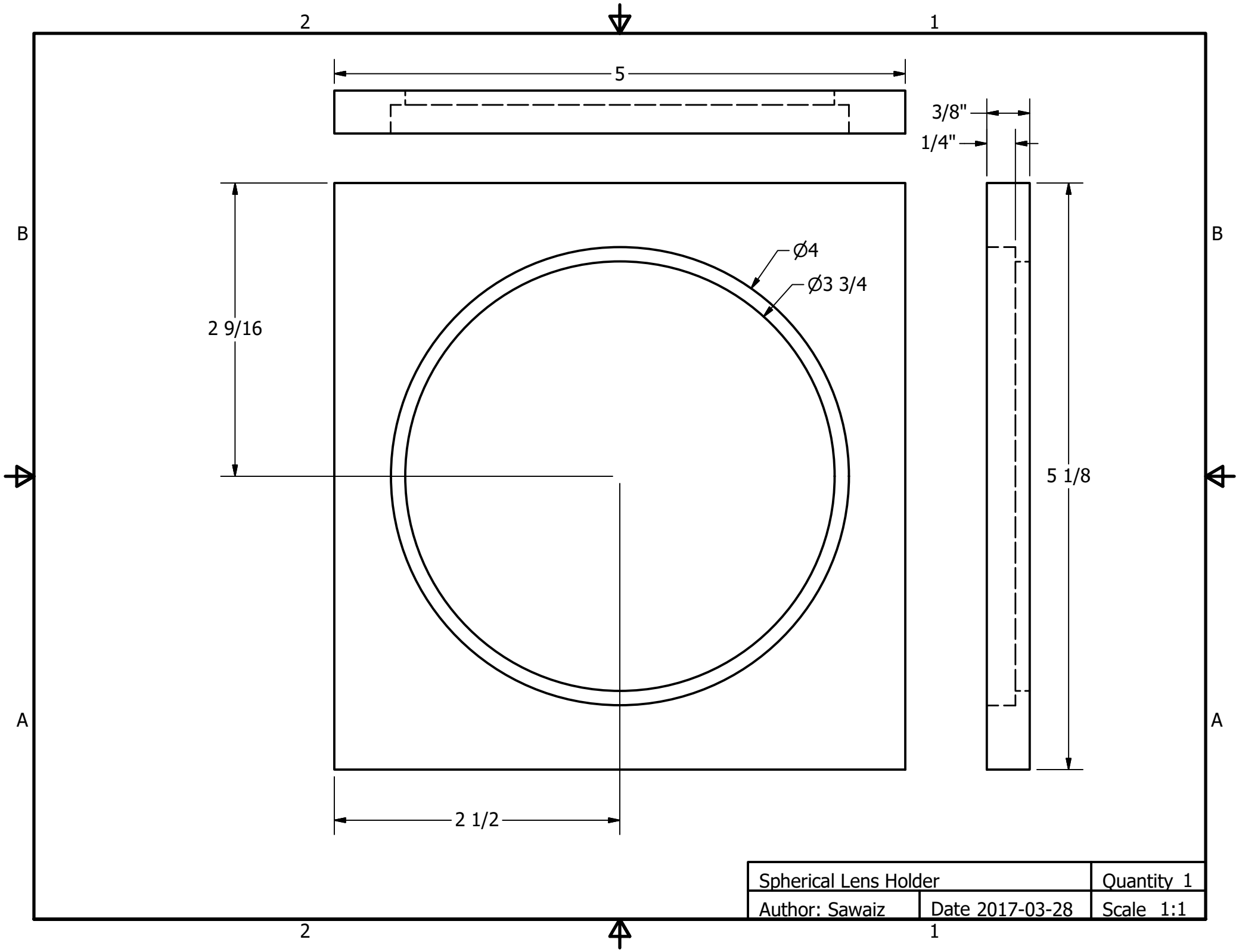
mRICH2 drawing (spherical lens)

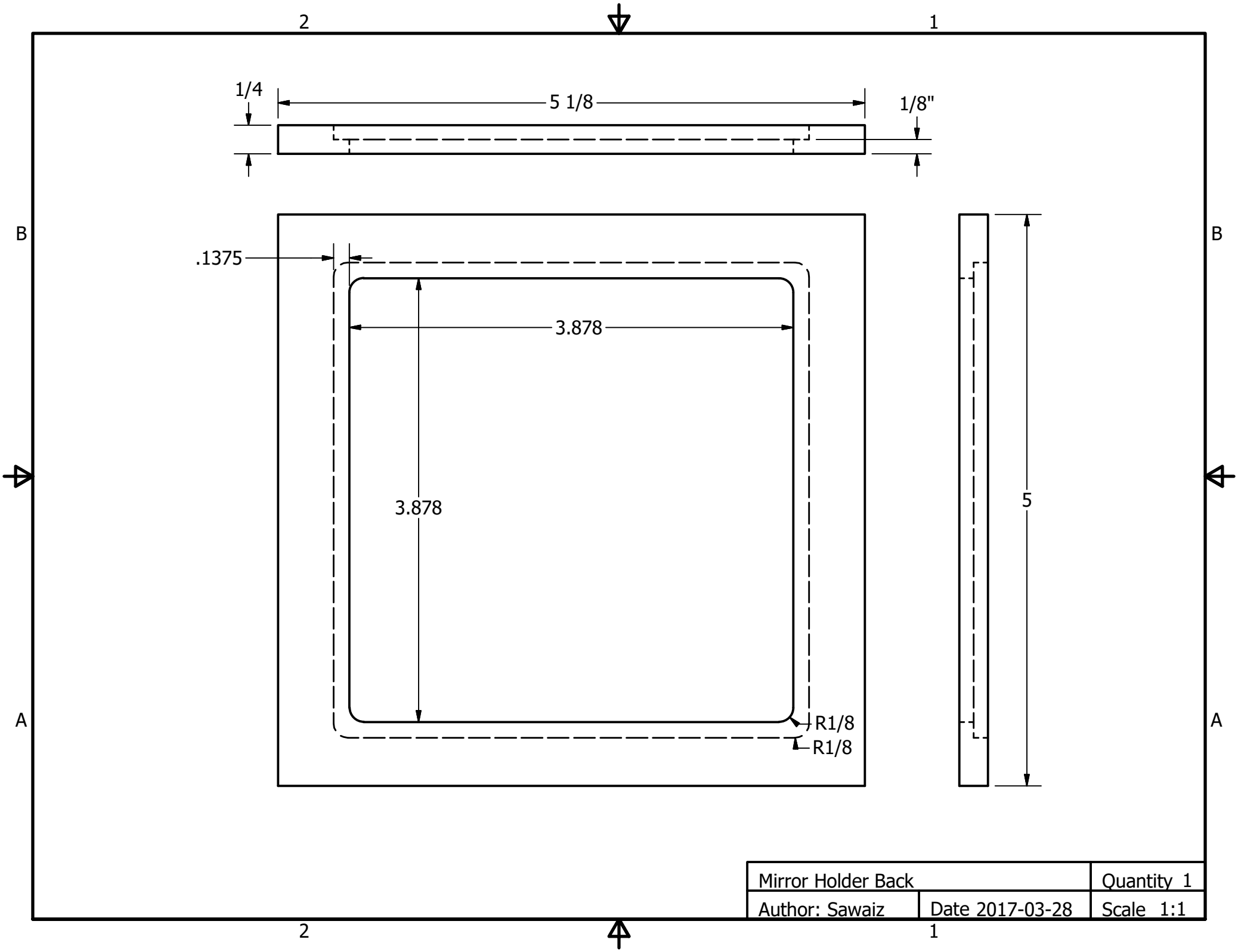

2
1
B
A
1/16
5 1/2
5 1/2
8X #4 Flat Head Machine Screw (82)
1/8
1/8
Front Panel
Quantity 1
Author: Sawaiz
Date 2017-03-28
Scale 1:1

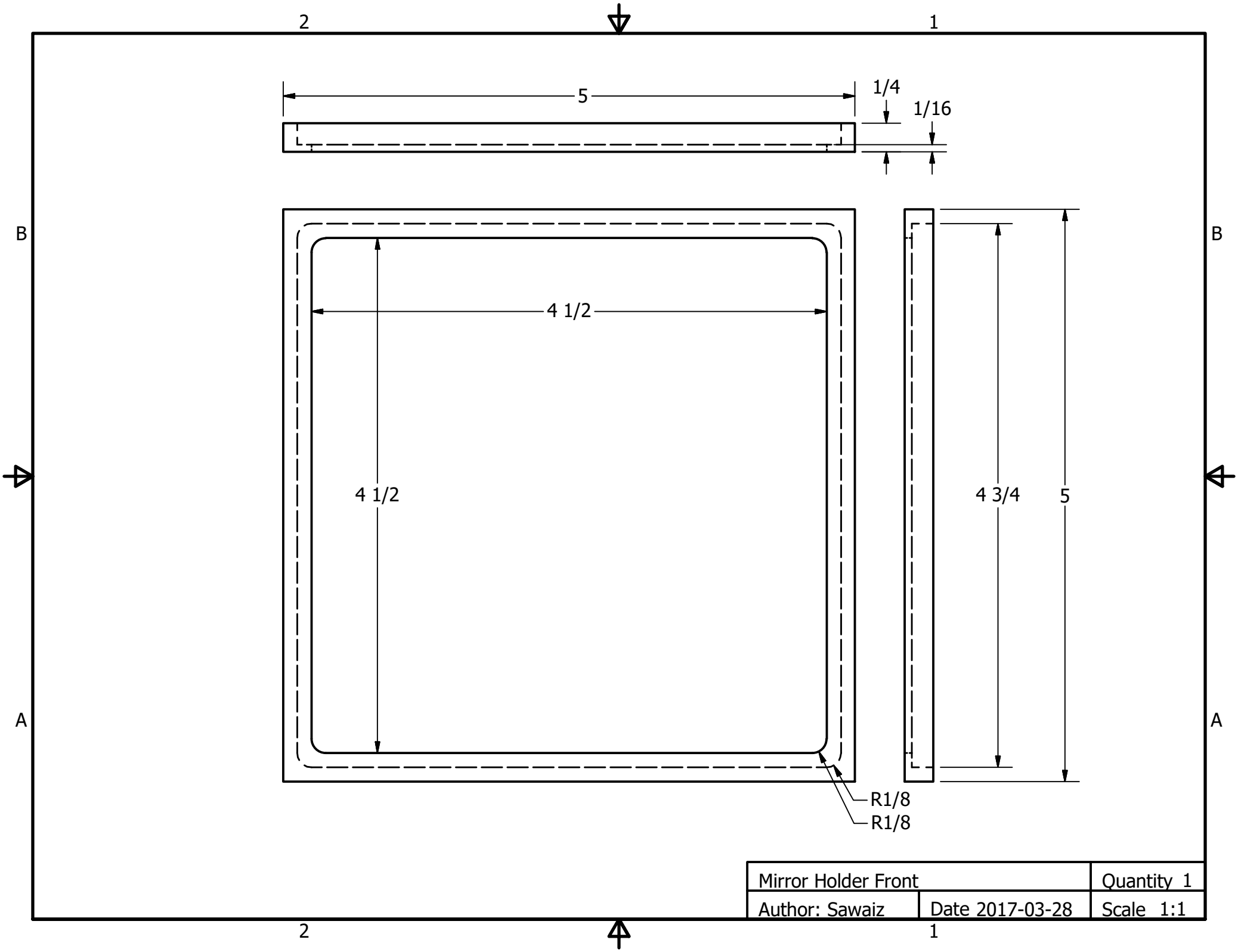

2
1
5 1/2"
1/4"
Ø1/8 THRU
Ø1/4 X 82°
B
A
1/4"
5 1/2"
R1/4"
Front Clamp
Quantity 1
Author: Sawaiz
Date 2017-03-28
Scale 1:1


2
1
9 3/4
1/4"
4X #4 Flat Head Machine Screw (82)
5X 4-40 UNC - 2B ↧ 1/4
B
A
2 3/4"
1/8
1
Side Panel
Quantity 2
Author: Sawaiz
Date 2017-03-28
Scale 1:1


2
1
9 3/4
1"
1/8"
1"
.38
.254
.0665
B
B
4X 4-40 UNC - 2B ↧ 1/4
2 1/2"
5
A
A
2.05
7 1/16
Top/Bottom Panel
Quantity 2
Author: Sawaiz
Date 2017-03-28
Scale 1:1
2
1


2
1
5
3/8"
1/4"
B
A
2 9/16
Ø4
Ø3 3/4
5 1/8
2 1/2
Spherical Lens Holder
Quantity 1
Author: Sawaiz
Date 2017-03-28
Scale 1:1


2
1
1/4
5 1/8
1/8"
B
.1375
3.878
3.878
5
R1/8
R1/8
A
Mirror Holder Back
Quantity 1
Author: Sawaiz
Date 2017-03-28
Scale 1:1


2
1
B
A
5
1/4
1/16
4 1/2
4 1/2
4 3/4
5
R1/8
R1/8
Mirror Holder Front
Quantity 1
Author: Sawaiz
Date 2017-03-28
Scale 1:1