

NF4 V1.0 Plans and Parts List Introduction

Copyright Dan Neubecker 3-20-05

The following document contains two kinds of parts lists, a component assembly list and complete construction drawings for the NeuFinder4.

1. **The Master Parts list:** This includes a listing, by type, of all the parts needed to construct an NF4, including both locally purchased parts and those you might have to get from Internet sources.
2. **The Component Specific Parts List:** This parts list does not include any new parts, but breaks down the parts in the master list into groups that can be associated with the basic components of the NF2. If you want to know where specific parts in the master parts list are used, this list will tell you.
3. **Component Assemblies:** The component assemblies are a reference that is used in conjunction with the plans. For example, the plans may call out for the “stabilizer bearing assembly”. The components assemblies list will tell you what that assembly of parts includes and in what order the individual parts are assembled, such as:

Stabilizer bearing assembly (assembly from right to left)

Hex Head Bolt: 5/16” x 2” x 18 thread

ABEC 5 (or 3) Sealed roller blade bearing

5-6 Flat washers: Grade 8 (or equivalent), 5/16” I.D., 11/16” max. O.D.

Rotator Stop: 3/4” hardwood stock

Flat washer: Grade 8 (or equivalent), 5/16” I.D., 11/16” max. O.D.

Hex Nut: 5/16” x 18 thread

4. **Construction Drawings:** When used in conjunction with these lists, the plans provide a complete description of the parts and components needed to construct and NF4 and how to make them.

NF4 v1 Master Parts List (3-25-05)

Copyright Daniel Neubecker 3/25/05 All Rights Reserved

Likely Internet Ordered Parts:

16 - ABEC 5 (3 or 7, ok as well) Sealed roller blade bearings: www.edsbearings.com

1 - AMW-25 Digital Fish Scale, see:

http://www.americanweigh.com/product_info.php?cPath=40&products_id=104&osCsid=67c5fca63d67ff78b57e5dd3659e7a

1 - 36" (+-1/8") x 1-1/2" x 1-1/2" extruded aluminum T-slot, #1515 with two (optional) end caps: from 80/20. See <http://8020.net/PostalLookup.asp> and look up local distributor and call for parts

1 - DeStaco SL-3 straight toggle clamp. See <http://www.mcfeelys.com/product.asp?ProductID=tc-5120>

1 - Polypropylene or UHMW plastic material piece: 3/4" x 2" x 6" minimum. See <http://thecuttingboardfactory.com/Merchant2/merchant.mvc> (see Specials section)

1 - Slick Tape: UHMW adhesive back tape, 3" x 36" x 1mm thick, #0165, see

http://www.thewoodworkerschoice.com/search_results.asp?customerid1=43040&customerid0=43040&customerid=43040&txtsearchParamTxt=slick+tape&txtsearchParamCat=ALL&txtsearchParamType=ALL&iLevel=1&txtsearchParamMan=ALL&txtsearchParamVen=ALL&txtFromSearch=fromSearch

2- Cam Clamps: 3" x 5/16" x 18 thread, with 5/16" x 1" x 1/8" thick neoprene washer

http://www.rockler.com/ecom7/product_details.cfm?&offerings_id=10602&objectgroup_id=451&catid=69&filter=cam%20clamp These come two to a package.

Knobs may be purchased online at MSC Industrial:

1 - Ball Knob: 1-1/4" dia, 5/16" x 18 thread, see: <http://www1.mscdirect.com/>, quick search for item 09300229 (not needed if you build Handle 1 or Handle 2 from the plans provided)

2 - 4-Arm Knobs-female, through-hole, 5/16" x 18 thread, 1-1/2" diameter (or equivalent) see:

<http://www1.mscdirect.com/>, quick search for item 64820046 for plastic knobs

Note: the Abec 3 or 5 bearings might be found locally at most sporting goods or department stores that sells roller blades or skate boards, such as Walmart, Target, MCSports, Dicks, etc.

Locally Purchased Parts Summary (Lowe's and True Value Hardware were my sources)

(All wood stock dimensions are actual, not nominal)

2 - Hardwood veneer Plywood Pieces: 3/4" x 8" x 32 (+-1/8")

1 - Hardwood veneer Plywood: 3/4" x 7" x 9"

2 - Hardwood leg pieces: 3/4" x 1" x 7-1/2"

4 - Hardwood leg pieces: 3/4" x 2-1/2" x 5-1/8"

1 - Hardwood rotator stop piece: 3/4" x 4" x 1-1/4"

1 - Hardwood rotator board piece: 3/4" x 4" x 12-1/4"

2 - Hardwood rotator board pieces: 3/4" x 4" x 2-3/4"

2 - Hardwood toggle stop block pieces: 3/4" x 1-1/2" x 2"

2 - Hardwood or hardwood plywood toggle board support pieces: 3/4" x 2-3/4" x 3-3/4"

1 - Hardwood shaft marking guide piece: 3/4" x 5" x 1-1/2"

Note: All hardwood pieces can be fashioned from one 1"x6"x48" (nominal) piece of stock

Note: All hardwood plywood pieces can be fashioned from one 3/4"x24"x48" (actual) piece

1 - Aluminum Flat Stock for rotator stop: 1/8" x 3/4" x 4" long

- 1 – Aluminum Flat Stock for tip bearing yoke: 1/8" x 3/4" x 5 3/8" long
- 1 – Aluminum Flat Stock for stabilizer bearing base: 1/8" x 3/4" x 2 3/4" long
- 1 – Aluminum Flat Stock for extended toggle scale marker: 1/8" x 3/4" x 13" long
- 1 – Aluminum Flat Stock for tip marking guide: 1/8" x 3/4" x 2" long

Note: All Aluminum pieces can be fashioned from one 1/8"x3/4"x36" piece

- 3- Hex Head Bolt: 5/16" x 2-1/2" x 18 thread
 - 1- Hex Head Bolts: 5/16" x 3" x 18 thread
 - 3- Hex Head Bolt: 5/16" x 2" x 18 thread
 - 1- Hex head bolt: 1" x 1/4" x 20 full thread
 - 4- Carriage Bolts with full length thread: 1/4" x 3" x 20 thread
 - 1- Carriage Bolt with full length thread: 1/4" x 4" x 20 thread
 - 1- Carriage Bolt with full length thread: 5/16" x 1" x 18 thread (only if using ball knob)
 - 2- Carriage Bolts with full length thread: 5/16" x 1-1/4" x 18 thread. You can use 1-1/2" length if 1-1/4" is not available, but you must have female, through-hole knobs to do so.
 - 2- Carriage Bolts with full length thread: 5/16" x 4" x 18 thread
 - 3- Carriage Bolts with full length thread: 5/16" x 3-1/2" x 18 thread
 - 1- Carriage Bolt with full length thread: 5/16" x 2-1/2" x 18 thread
 - 1- Eye Bolt: 2-1/2" x 3/16" x 24 thread, (threaded part need to be at least 1-1/2", eye dia. 3/16" max.)
 - 2 – hex nuts: 3/16"x24 thread for eyebolt
 - 14- Hex Nuts: 5/16" x 18 thread
 - 12- Hex nuts: 1/4" x 20 thread
 - 8- Locking hex Nuts (nylon insert): 5/16" x 18 thread
 - 2- Brad Point T-nuts: 1/2-3/4" depth, 5/16" x 18 thread (installed in reverse)
 - 1- Fender Washer: 1/4" x 1" to 1-1/4" dia.
 - 1- Fender Washer: 3/8" x 1" to 1-1/4" dia.
 - 2- Fender Washers: 5/16" x 1" to 1-1/4" dia.
 - 58- Flat Washers (Grade 8 or equivalent): 5/16" I.D., 11/16" max. O.D.
 - 16- Flat washers: 1/4"
 - 2- Flat Washers: 3/16" to fit eye bolt
 - 3 – split lock washers: 5/16"
 - 2 – Drywall Screws: 2-1/2" x #6
 - 8 – Drywall Screws: 3" x #8
 - 8 – Drywall Screws: 1-1/4" x #6
 - 2 – Zinc Pan Head Phillips Screws: 1" x #6
 - 8 – Zinc Flat Head Phillips Screws for hinges (may come in hinge package): 1/2" x #6
 - 2 – Zinc Flat Head Phillips Screws for aluminum extended toggle scale marker: 1/2" x #6
 - 2 – stainless steel hinges: 1-1/2" long x 3/4" wide
 - 2 - Knobs: 4-arm, female, through-hole: 5/16" x 18 thread x 1-1/2" max. dia. x 1" deep (unless purchased via internet above)
 - 1 – Ball knob, female: 5/16" x 18 threads x 1-1/4" dia. (unless purchased via internet above or if using Handle 1 or Handle 2 from the plans, in which case the ball knob is not needed)
 - 7- 7/8" Adjustable glide foot with 1/4"x 20 thread, with plastic threaded inserts (comes bundled in a package of 4 glide feet and 4 plastic inserts)
 - 2 – Colored cloth/plastic tape measures, 3/4" x 48" minimum (available at most fabric stores, like JoAnn's Fabrics)
 - 1 - Key Ring: 1/2" I.D., nickel plated (look for this at hardware store or place that makes keys)
 - 1 – Popsicle stick or tongue depressor, or equivalent, cut to shape for toggle scale marker
- Standard wood glue: i.e. Titebond II

Contact Cement

HANGLES (Choose which type you want before buying parts)

HANDLE: VERSION 1

- 2- Carriage Bolts with full length thread: 5/16" x 2-1/2" x 18 thread
- 1 – Hardwood handle piece: 1" x 2-1/2" x 7-1/2" actual
- 2- Flat Washers (Grade 8 or equivalent): 5/16" I.D., 11/16" max. O.D.
- 2- Hex Nuts: 5/16" x 18 thread

OR

HANDLE: VERSION 2 (Easier to Build)

- 2- Carriage Bolts with full length thread: 5/16" x 3" x 18 thread
- 2- Cap Nuts: 5/16" x 18 thread
- 2- Steel Sleeves: 1-1/2" x 1/2" o.d. (option: 1-1/2" x 1/2" pvc pipe, or 1-1/2" section of steel or graphite shaft)
- 4- Flat Washers (Grade 8 or equivalent): 5/16" I.D., 11/16" max. O.D.
- 1 – Hardwood handle piece: 3/4" x 1-1/4" x 6" actual

OR

HANDLE: VERSION 3 (purchased part)

- 1- Garage door handle, mounting holes reamed out to 5/16" diameter
 - 2- Carriage Bolts with full length thread: 5/16" x 3/4" x 18 thread
 - 2- Hex Nuts: 5/16" x 18 thread
 - 2- Flat Washers (Grade 8 or equivalent): 5/16" I.D., 11/16" max. O.D.
- Note:** If you use this handle option, the 1-1/4" ball knob and associated hardware will be needed.

Component Specific Parts List (3/23/05)

Copyright Daniel Neubecker 3/23/05 All Rights Reserved

Backer Board

- 2- pieces of 3/4" hardwood plywood glued and screwed together for a 1-1/2" width
- 8 – Drywall Screws: 1-1/4" x #6
- 1 – piece Slick Tape: UHMW adhesive back tape, 1-1/2"x 32"x 1mm thick
- 1- Fender Washer: 3/8" x 1" to 1-1/4" dia.
- 1- Fender Washers: 5/16" x 1" to 1-1/4" dia.
- 10- Flat Washers (Grade 8 or equivalent): 5/16" I.D., 11/16" max. O.D.
- 2- Hex Nuts: 5/16" x 18 thread
- 3 - ABEC 5 (3 or 7, ok as well) Sealed roller blade bearings
- 2- Cam Clamps: 3"x 5/16" x 18 thread, with 5/16"x 1"x 1/8" thick neoprene washers
- 1 - 36" (+-1/8") x 1-1/2" x 1-1/2" extruded aluminum T-slot, #1515 with two (optional) end caps
- 3- Carriage Bolts with full length thread: 5/16" x 3-1/2" x 18 thread
- 2- Carriage Bolts with full length thread: 5/16" x 1-1/4" x 18 thread. You can use 1-1/2" length if 1-1/4" is not available, but you must have female, through-hole knobs to do so.
- 2- Brad Point T-nuts: 1/2-3/4" depth, 5/16" x 18 thread (installed in reverse)
- 2 – Colored cloth/plastic tape measures, 3/4" x 48" minimum
- Standard wood glue: i.e. Titebond II
- Contact Cement

Rotator Board

- 1 – Hardwood rotator board piece: 3/4" x 4" x 12-1/4"
- 2 – Hardwood rotator board pieces: 3/4" x 4" x 2-3/4"
- 1 – Aluminum Flat Stock for rotator stop: 1/8" x 3/4" x 4" long
- 1 – Aluminum Flat Stock for stabilizer bearing base: 1/8" x 3/4" x 2 3/4" long
- 1- Carriage Bolt with full length thread: 1/4" x 4" x 20 thread
- 2- Carriage Bolts with full length thread: 5/16" x 4" x 18 thread
- 1- Carriage Bolt with full length thread: 5/16" x 2-1/2" x 18 thread
- 1- Fender Washer: 1/4" x 1" to 1-1/4" dia.
- 1- Fender Washer: 5/16" x 1" to 1-1/4" dia.
- 1- Flat washer: 1/4"
- 4- Flat washers (Grade 8 or equivalent): 5/16" I.D., 11/16" max. O.D.
- 3- Hex nuts: 5/16" x 18 thread
- 1- Hex nut: 1/4" x 20 thread
- 2 – Zinc Pan Head Phillips Screws: 1" x #6
- 3- Locking hex Nuts (nylon insert): 5/16" x 18 thread
- Standard wood glue: i.e. Titebond II
- Contact Cement

Toggle Board with stop blocks

- 1 – Hardwood veneer Plywood: 3/4" x 7" x 9"
- 2 – Hardwood toggle stop block pieces: 3/4" x 1-1/2" x 2"
- 2 – Hardwood or hardwood plywood toggle board support pieces: 3/4" x 2-3/4" x 3-3/4"
- 1 – Aluminum Flat Stock for extended toggle scale marker: 1/8" x 3/4" x 13" long
- 4- Carriage Bolts with full length thread: 1/4" x 3" x 20 thread
- 2 – stainless steel hinges: 1-1/2" long x 3/4" wide
- 8 – Zinc Flat Head Phillips Screws for hinges (probably will come in hinge package): 1/2" x #6

2 – Zinc Flat Head Phillips Screws for aluminum extended toggle scale marker: 1/2” x #6
10- Hex nuts: 1/4” x 20 thread
12- Flat washers: 1/4”
2- 7/8” Adjustable glide foot with 1/4”x 20 thread, with plastic threaded inserts (comes bundled in a package of 4 glide feet and 4 plastic inserts)
2 - Knobs: 4-arm, female, through-hole: 5/16” x 18 thread x 1-1/2” max. dia. x 1” deep (unless purchased via internet above)
1 – Popsicle stick or tongue depressor, or equivalent, cut to shape for toggle scale marker
Standard wood glue: i.e. Titebond II
Contact Cement

Legs

2 – Hardwood leg pieces: 3/4” x 1” x 7-1/2”
4 – Hardwood leg pieces: 3/4” x 2-1/2” x 5-1/8”
4- 7/8” Adjustable glide foot with 1/4”x 20 thread, with plastic threaded inserts (comes bundled in a package of 4 glide feet and 4 plastic inserts)
8 – Drywall Screws: 3” x #8
1- Eye Bolt: 2-1/2” x 3/16” x 24 thread, (threaded part need to be at least 1-1/2”, eye dia. 3/16” max.)
2 – hex nuts: 3/16”x24 thread for eyebolt
2- Flat Washers: 3/16” to fit eye bolt
1 – split lock washers: 5/16”
1 - Key Ring: 1/2” I.D., nickel plated
1 - AMW-25 Digital Fish Scale
Standard wood glue: i.e. Titebond II

Rotator Board Stop Block

1 – Hardwood rotator stop piece: 3/4” x 4” x 1-1/4”
2 – Drywall Screws: 2-1/2” x #6
1- Hex Head Bolt: 5/16” x 2” x 18 thread
1- ABEC 5 (or 3) Sealed roller blade bearing
6-7 Flat washers: Grade 8 (or equivalent), 5/16” I.D., 11/16” max. O.D.
1- Hex Nut: 5/16” x 18 thread
1- 7/8” Adjustable glide foot with 1/4”x 20 thread
1- Plastic threaded insert, 3/8” o.d., 1/4”x20 thread, (comes in package of 4 with the glide feet)
1- Hex nut: 1/4”x20 thread

Toggle Clamp

1 - DeStaco SL-3 straight toggle clamp
1-2- Flat washers: 1/4”
1- Hex head bolt: 1” x 1/4” x 20 full thread
1- Hex Head Bolts: 5/16” x 3” x 18 thread
4- Flat washers: Grade 8 (or equivalent), 5/16” I.D., 11/16” max. O.D.
1- Locking hex Nuts (nylon insert): 5/16” x 18 thread
1 – Aluminum Flat Stock for tip bearing yoke: 1/8” x 3/4” x 5 3/8” long

Handle 1

2- Carriage Bolts with full length thread: 5/16” x 2-1/2” x 18 thread
1 – Hardwood handle piece: 1” x 2-1/2” x 7-1/2” actual

- 2- Flat Washers (Grade 8 or equivalent): 5/16" I.D., 11/16" max. O.D.
- 2- Hex Nuts: 5/16" x 18 thread

Handle 2

- 2- Carriage Bolts with full length thread: 5/16" x 3" x 18 thread
- 2- Cap Nuts: 5/16" x 18 thread
- 2- Steel Sleeves: 1-1/2"x 1/2" o.d. (option: 1-1/2"x 1/2" pvc pipe, or 1-1/2" section of steel or graphite shaft)
- 4- Flat Washers (Grade 8 or equivalent): 5/16" I.D., 11/16" max. O.D.
- 1 – Hardwood handle piece: 3/4"x1-1/4"x6" actual

Handle 3

- 1- Garage door handle, mounting holes reamed out to 5/16" diameter
 - 2- Carriage Bolts with full length thread: 5/16" x 3/4" x 18 thread
 - 2- Hex Nuts: 5/16" x 18 thread
 - 2- Flat Washers (Grade 8 or equivalent): 5/16" I.D., 11/16" max. O.D.
- Note:** If you use this handle option, the 1-1/4" ball knob and associated hardware will be needed.

Rear Bearing Arm

- 1- Polypropylene or UHMW bearing arm: 3/4" x 1-1/2" x 2"
- 1- 3/4" hardwood stock shaft marking guide
- 1- Hex Head Bolt: 5/16" x 2-1/2" x 18 thread
- 1- Hex Head Bolt: 5/16" x 3" x 18 thread
- 4- ABEC 5 (or 3) Sealed roller blade bearings
- 14-15 Flat washers: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.
- 2- Hex Nuts: 5/16" x 18 thread
- 1- split lock washers: 5/16"
- 2- Locking hex Nuts (nylon insert): 5/16" x 18 thread

Middle Bearing Arm

- 1- Polypropylene or UHMW bearing arm: 3/4" x 1-7/8" x 2"
- 2- Hex Head Bolt: 5/16" x 2" x 18 thread
- 4- ABEC 5 (or 3) Sealed roller blade bearings
- 4- Flat washers: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.
- 2- Hex Nuts: 5/16" x 18 thread

Front Bearing Arm

- 1- Polypropylene or UHMW bearing arm: 3/4" x 1-1/2" x 2"
- 2- Hex Head Bolt: 5/16" x 2-1/2" x 18 thread
- 4- ABEC 5 (or 3) Sealed roller blade bearings
- 13-14 Flat washers: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.
- 2- Hex Nuts: 5/16" x 18 thread
- 1- split lock washers: 5/16"
- 2- Locking hex Nuts (nylon insert): 5/16" x 18 thread
- 1 – Aluminum Flat Stock for tip marking guide: 1/8" x 3/4" x 2" long

Component Assemblies (3/19/05)

Copyright Daniel Neubecker 3/19/05 All Rights Reserved

Adjustable foot assembly

7/8" Adjustable glide foot with 1/4"x 20 thread
Plastic threaded insert, 3/8" o.d., 1/4"x20 thread, (comes in package of 4 with the glide feet)
Leg: 3/4" hardwood stock
3- Carriage Bolts with full length thread: 5/16" x 3-1/2" x 18 thread

Adjustable scale anchor assembly

1/2" key ring attached to top of
AMW-25 digital
Split lock washer: 5/16", bent open, attached to eyebolt and scale base, and then pinched closed
Eye Bolt: 2-1/2" long x 3/16"x24 thread
Hex nut: 3/16"x24 thread
Flat Washer: 3/16"
3/4" hardwood stock leg
Flat Washer: 3/16"
Hex nut: 3/16"x24 thread

Bearing arm bolt assembly

Carriage Bolt with full length thread: 5/16" x 4" x 18 thread
Rotator Board: 2 – 3/4" Hardwood pieces glued together for a 1-1/2" width
1 or 2 Flat washers: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.*
Hex Nut: 5/16" x 18 thread, tightened down
Polypropylene or UHMW plastic Bearing Arm: 3/4" x 1-1/2" x 2"
Locking hex Nuts (nylon insert): 5/16" x 18 thread, kept loose so arm can freely rotate
*The number of washers varies in order to align all three bearing arms

Bearing bolt assembly (middle bearing arm)

Hex Head Bolt: 5/16" x 2" x 18 thread
ABEC 5 (or 3) Sealed roller blade bearing
Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.
Polypropylene or UHMW plastic material: 3/4" x 1-1/2" x 2"
Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.
ABEC 5 (or 3) Sealed roller blade bearing
Hex Nut: 5/16" x 18 thread

Bearing bolt assembly (rear counterbalance)

Hex Head Bolt: 5/16" x 2-1/2" x 18 thread
ABEC 5 (or 3) Sealed roller blade bearing
Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.
Polypropylene or UHMW plastic material: 3/4" x 1-1/2" x 2"
Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.
ABEC 5 (or 3) Sealed roller blade bearing
Approximately 5 Flat washers: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D. (as needed to apply bearing arm counterbalance)
Hex Nut: 5/16" x 18 thread
Locking Hex Nut: 5/16" x 18 thread

Bearing bolt assembly (front counterbalance)

Hex Head Bolt: 5/16" x 2-1/2" x 18 thread

ABEC 5 (or 3) Sealed roller blade bearing

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Polypropylene or UHMW plastic material: 3/4" x 1-1/2" x 2"

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

ABEC 5 (or 3) Sealed roller blade bearing

Approximately 8 Flat washers: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D. (as needed to apply bearing arm counterbalance)

Hex Nut: 5/16" x 18 thread

Locking Hex Nut: 5/16" x 18 thread

Handle-1 bolt assembly

Carriage Bolt with full length thread: 5/16" x 2-1/2" x 18 thread inserted into 36" (+1/8") x 1-1/2" x 1-1/2" extruded aluminum T-slot

U-shaped 1" hardwood handle

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Hex Nut: 5/16" x 18 thread into 3/4" dia., 1/2" deep counterbore

Handle-2 bolt assembly

Carriage Bolt with full length thread: 5/16" x 3" x 18 thread inserted into 36" (+1/8") x 1-1/2" x 1-1/2" extruded aluminum T-slot

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Hex Nut: 5/16" x 18 thread tightened down to t-slot

Steel Sleeve: 1-1/2" x 1/2" o.d. (option: 1-1/2" x 1/2" i.d. pvc pipe, or 1-1/2" section of steel or graphite shaft butt would probably work)

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

3/4" x 1-1/4" x 6" hardwood stock wood handle

Cap Nut: 5/16" x 18 thread tightened down against wood handle

Kerf bolt assembly

Carriage Bolt with full length thread: 1/4" x 4" x 20 thread

Rotor Board – 2- 3/4" pieces of hardwood stock

Fender Washer: 1/4" x 1" to 1-1/4" dia.

Flat washer: 1/4"

Hex nut: 1/4" x 20 thread

Marking guide bearing bolt assembly

Hex Head Bolt: 5/16" x 3" x 18 thread

ABEC 5 (or 3) Sealed roller blade bearing

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Polypropylene or UHMW bearing arm: 3/4" x 1 1/2" x 2"

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

ABEC 5 (or 3) Sealed roller blade bearing

1-3 Flat washers: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D. as needed to get to threads

Hex Nut: 5/16" x 18 thread

3/4" hardwood stock shaft marking guide

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Split Washer: 5/16"

Locking Hex Nut: 5/16" x 18 thread

Pivot bolt assembly

Carriage Bolt with full length thread: 5/16" x 3 1/2" x 18 thread

Fender Washer: 3/8" x 1" to 1-1/4" dia. (to fit over square shank of carriage bolt)

Backer board: 2- pieces of 3/4" hardwood plywood glued and screwed together for a 1-1/2" width

Fender Washer: 5/16" x 1" to 1-1/4" dia.

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Hex Nut: 5/16" x 18 thread tightened against backer board

ABEC 5 (or 3) Sealed roller blade bearing

4-6- Flat washers, grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.*

ABEC 5 (or 3) Sealed roller blade bearing

4-6- Flat washers, grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.*

ABEC 5 (or 3) Sealed roller blade bearing

Hex Nut: 5/16" x 18 thread tightened against bearing

* The amount of washers will vary but should meet an out to out bearing dimension of ~ 1-3/8"

Rotator stop adjustment assembly

7/8" Adjustable glide foot with 1/4"x 20 thread

Hex nut: 1/4"x20 thread

Plastic threaded insert, 3/8" o.d., 1/4"x20 thread, (comes in package of 4 with the glide feet)

Rotator Stop: 3/4" hardwood stock

Scale mount assembly

Carriage Bolt with full length thread: 5/16" x 2-1/2" x 18 thread

Rotator Board: 2 – 3/4" Hardwood pieces glued together for a 1-1/2" width

Fender Washer: 5/16" x 1" to 1-1/4" dia.

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Hex Nut: 5/16" x 18 thread

Key Ring: 1/2", nickel plated, connected through top post of AMW-25 digital scale

Locking hex Nut (nylon insert): 5/16" x 18 thread

Stabilizer bearing assembly (assembly from right to left)

Hex Head Bolt: 5/16" x 2" x 18 thread

ABEC 5 (or 3) Sealed roller blade bearing

5-6 Flat washers: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Rotator Stop: 3/4" hardwood stock

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Hex Nut: 5/16" x 18 thread

T-slot knob assembly (only needed if you use handle 3 option)

Carriage Bolt with full length thread: 5/16" x 1" x 18 thread, slid into the t-slot

36" (+-1/8") x 1-1/2" x 1-1/2" extruded aluminum T-slot

2 - Grade 8 (or equivalent) Flat washers: 5/16" I.D., 11/16" max. O.D.

Hex Nut: 5/16" x 18 thread

Round knob: female, with 5/16" x 18 thread x 1-1/4" dia.

Tip bearing bolt assembly (from toggle board side out)

Hex Head Bolt: 5/16" x 3" x 18 thread

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Tip Bearing Yoke: 1/8"x 3/4" aluminum stock

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Polypropylene or UHMW plastic bearing arm: 3/4" x 1 1/2" x 2"

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Tip Bearing Yoke: 1/8"x 3/4" aluminum stock

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Locking hex Nut (nylon insert): 5/16" x 18 thread

Tip stop bearing bolt assembly

Hex Head Bolt: 5/16" x 2 1/2" x 18 thread

ABEC 5 (or 3) Sealed roller blade bearing

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Polypropylene or UHMW bearing arm: 3/4" x 1 1/2" x 2"

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

ABEC 5 (or 3) Sealed roller blade bearing

2-3 Flat washers: Grade 8 (or equiv.), 5/16" I.D., 11/16" max. O.D. as needed to get to threads *

Hex Nut: 5/16" x 18 thread

Aluminum flat stock: 1/8"x3/4"x2" with 5/16" dia. hole

Flat washer: Grade 8 (or equivalent), 5/16" I.D., 11/16" max. O.D.

Split Washer: 5/16"

Locking Hex Nut: 5/16" x 18 thread

* The amount of washers will vary but should to meet the dimension from edge of UHMW to back of aluminum flat stock as shown on the Bearing Arm Assembly Plan

Toggle board knob assembly

Carriage Bolt with full length thread: 5/16" x 1-1/4" x 18 thread, slid into the t-slot

36" (+-1/8") x 1-1/2" x 1-1/2" extruded aluminum T-slot

Brad Point T-nut: 1/2-3/4" depth, 5/16" x 18 thread (installed in reverse)

Toggle Board: 3/4" hardwood plywood

4-arm, female, through-hole knobs: 5/16" x 18 thread x 1-1/2" max. dia. x 1" deep

Toggle bolt assembly

Carriage Bolt with full length thread: 1/4" x 3" x 20 thread

Toggle Board: 3 pieces of 3/4" wood for a 2-1/4" width

1-2 Flat washers: 1/4"*

Hex nut: 1/4" x 20 thread

DeStaco composite straight toggle clamp, SL-3

Flat washer: 1/4"

Hex nut: 1/4" x 20 thread

*The number of washers varies in order to align all three bearing arms

Toggle set screw assembly

7/8" Adjustable glide foot with 1/4"x 20 thread

Hex nut: 1/4"x20 thread

Plastic threaded insert, 3/8" o.d., 1/4"x20 thread, (comes in package of 4 with the glide feet)

Toggle stop block: 3/4" hardwood stock

T-slot lock-down assembly

Carriage Bolt with full length thread: 5/16" x 3-1/2" x 18 thread, slid into the t-slot

36" (+-1/8") x 1-1/2" x 1-1/2" extruded aluminum T-slot

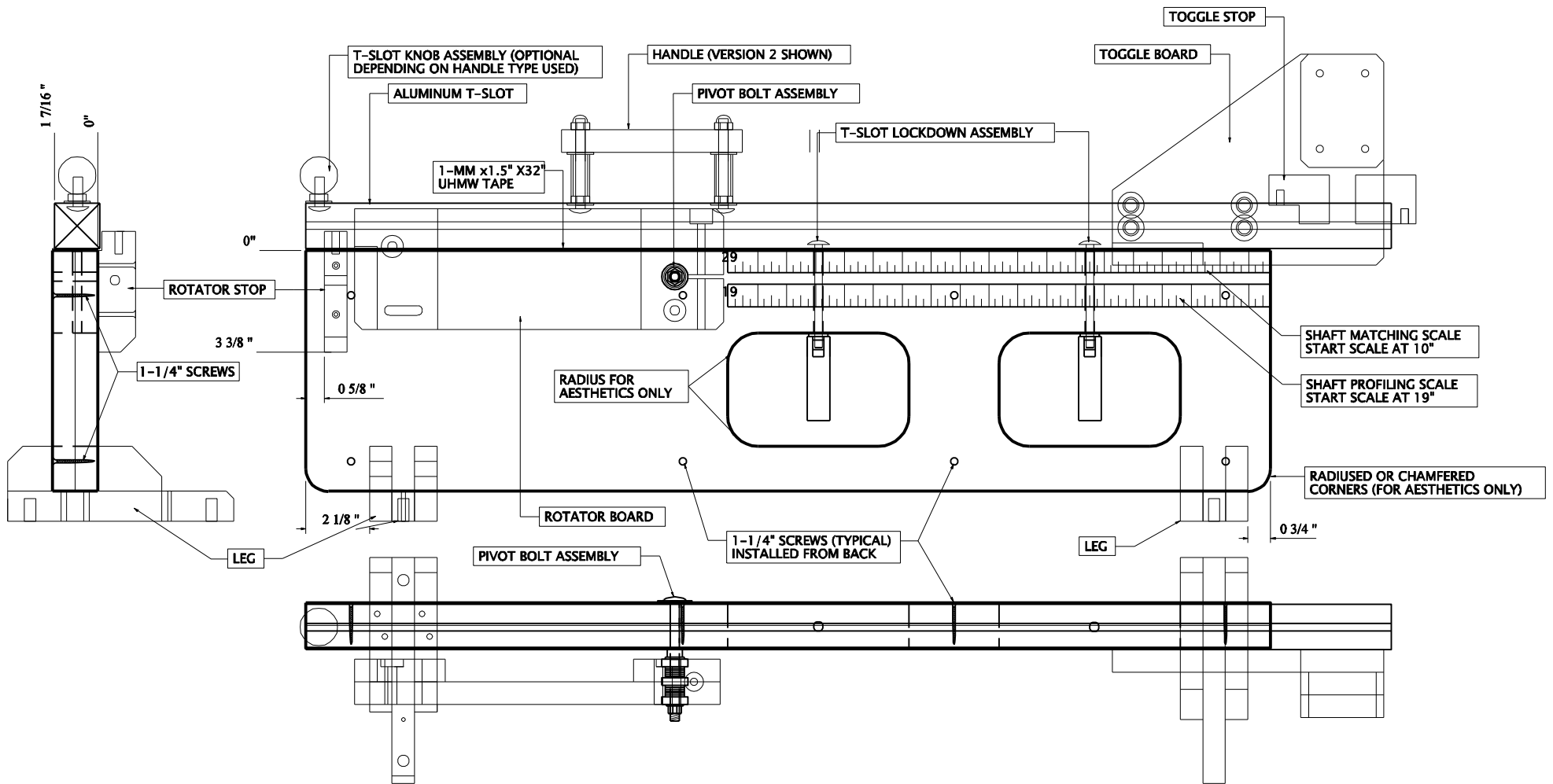
Slick Tape: UHMW adhesive back tape, 1-1/2"x 32"x 1mm thick

Backer board: 2- pieces of 3/4" hardwood plywood

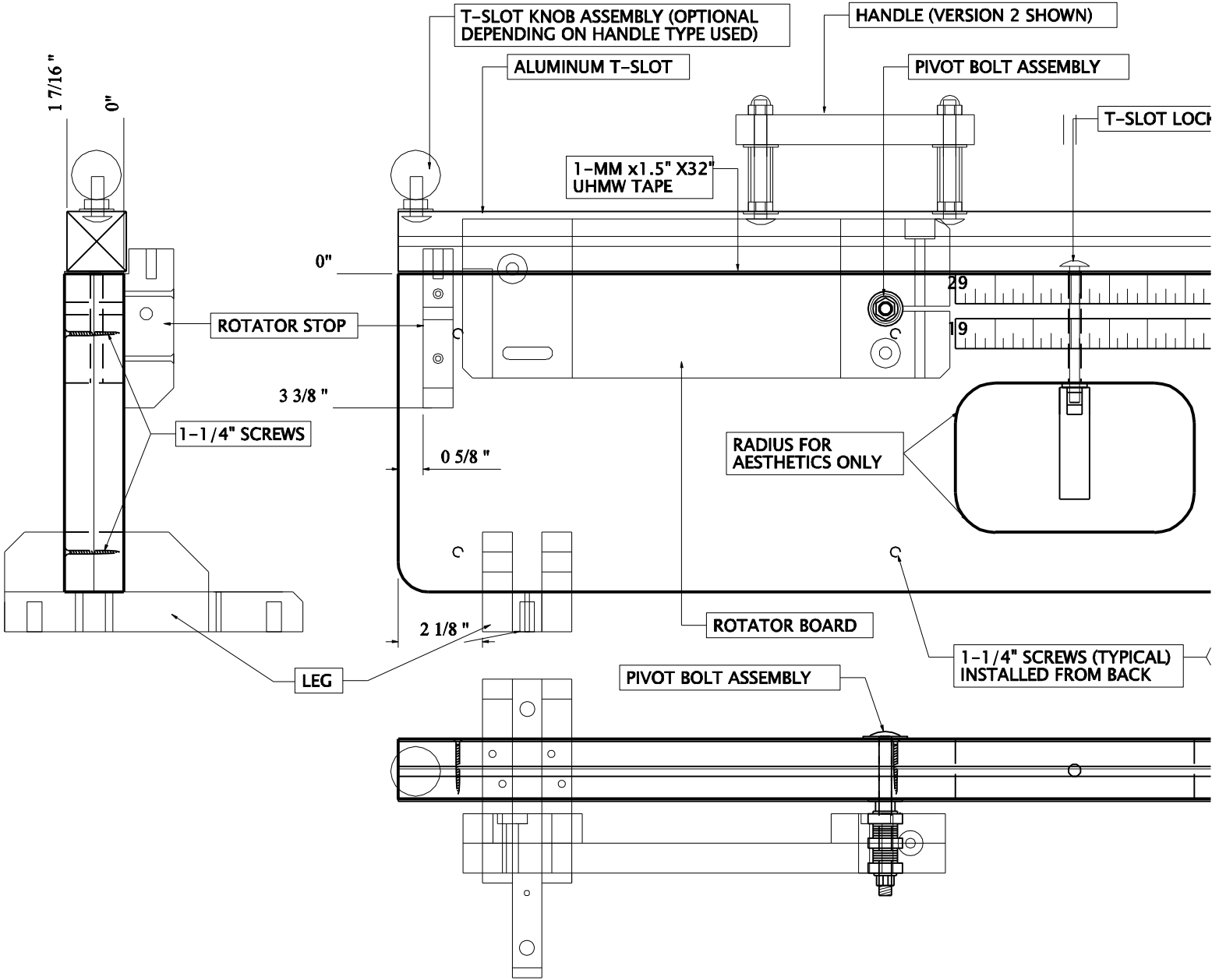
5/16"x 1"x 1/8" thick neoprene washer (comes with Cam Clamp below)

Cam Clamp: 3"x 5/16" x 18 thread

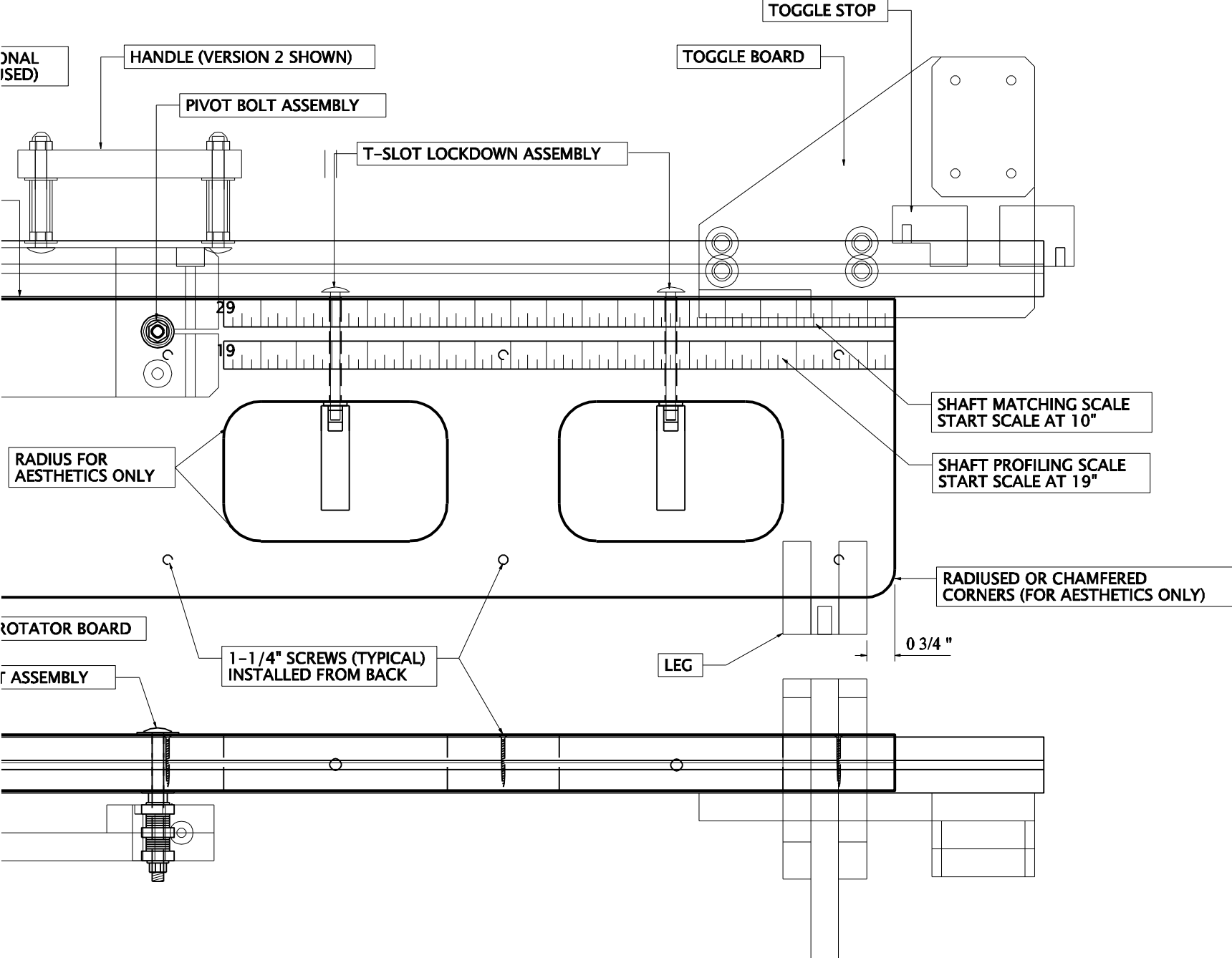
BACKER BOARD ASSEMBLY PLAN



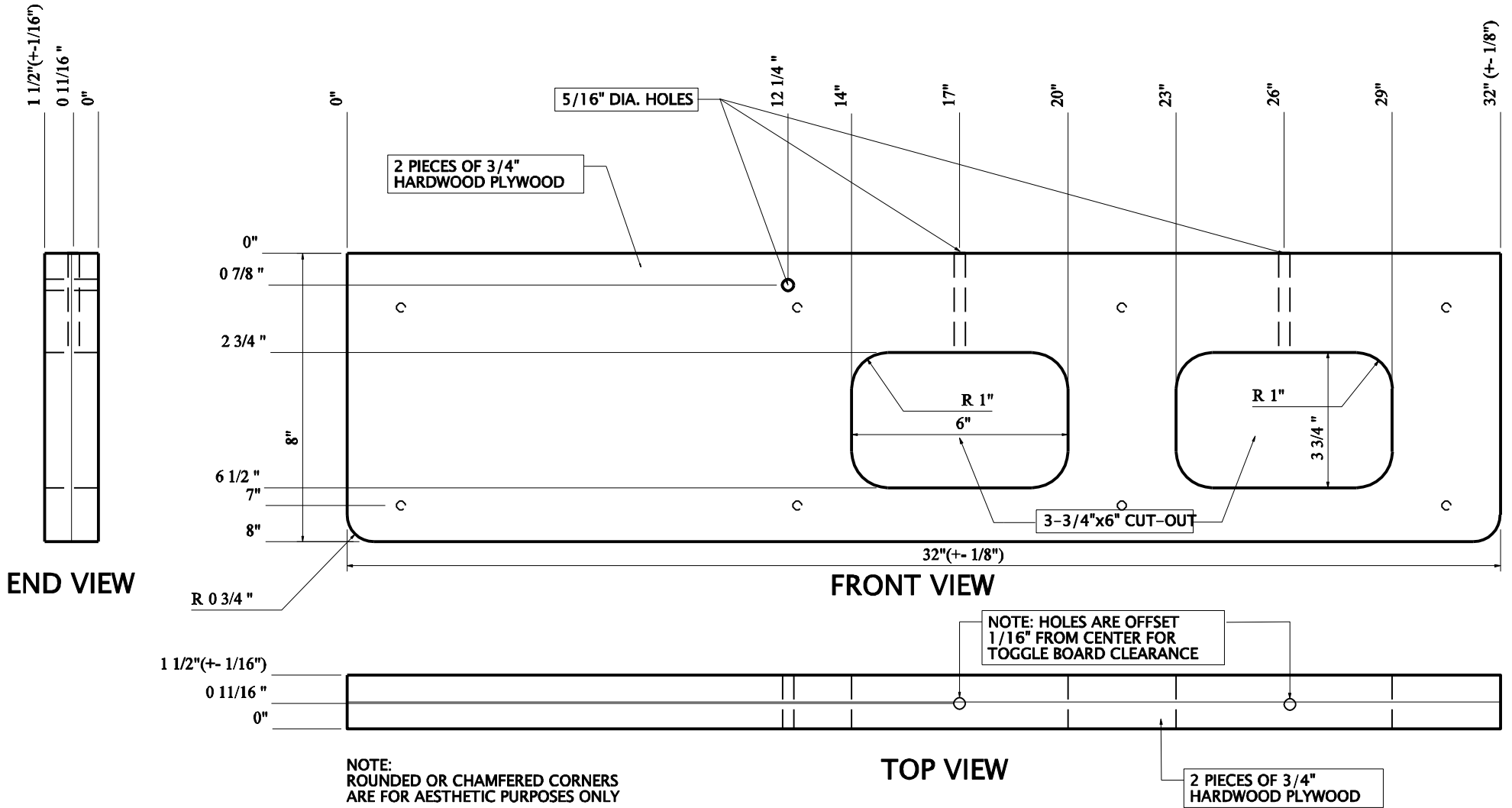
BACKER BOARD ASSEMBLY PLAN



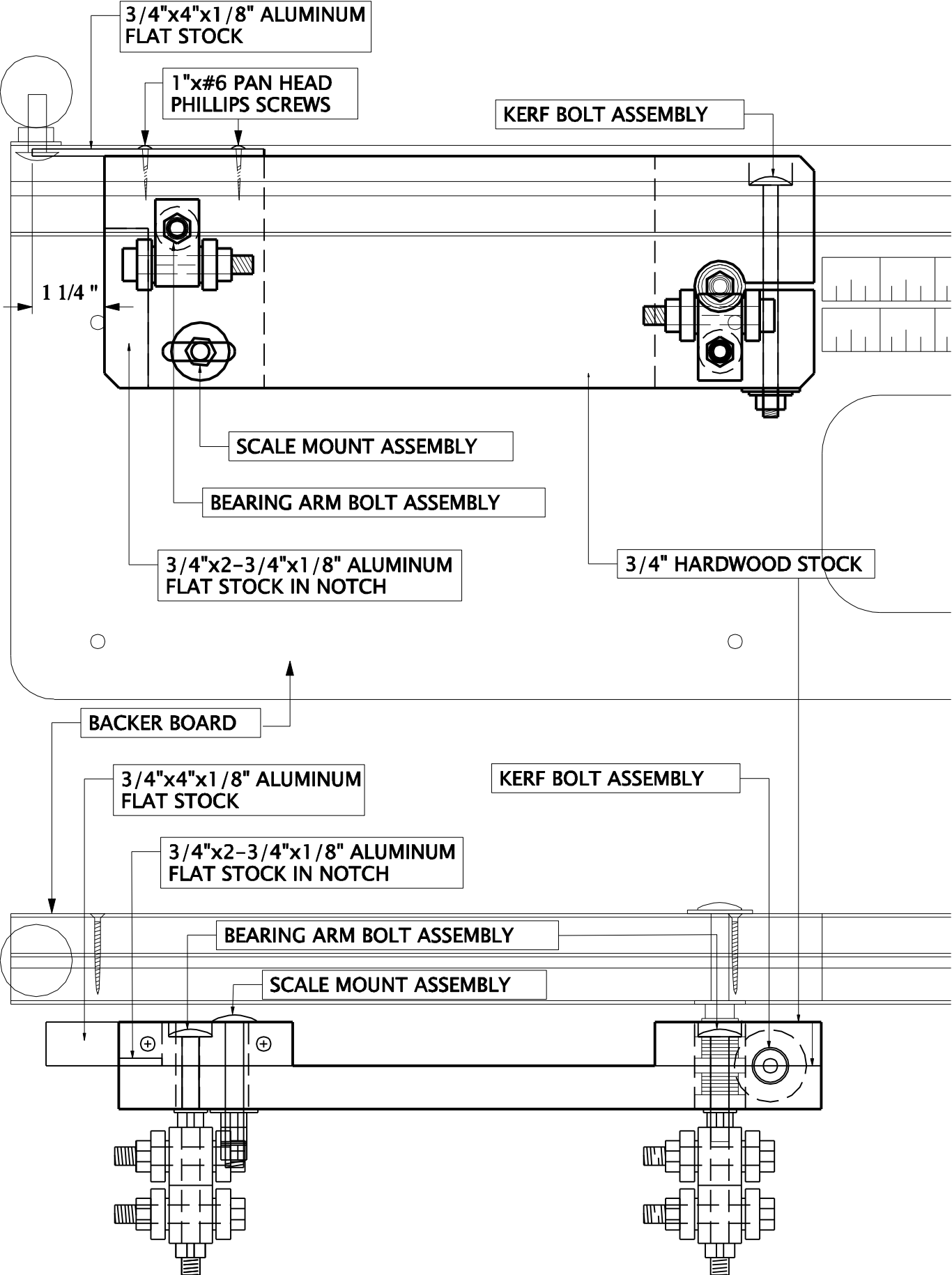
BACKER BOARD ASSEMBLY PLAN



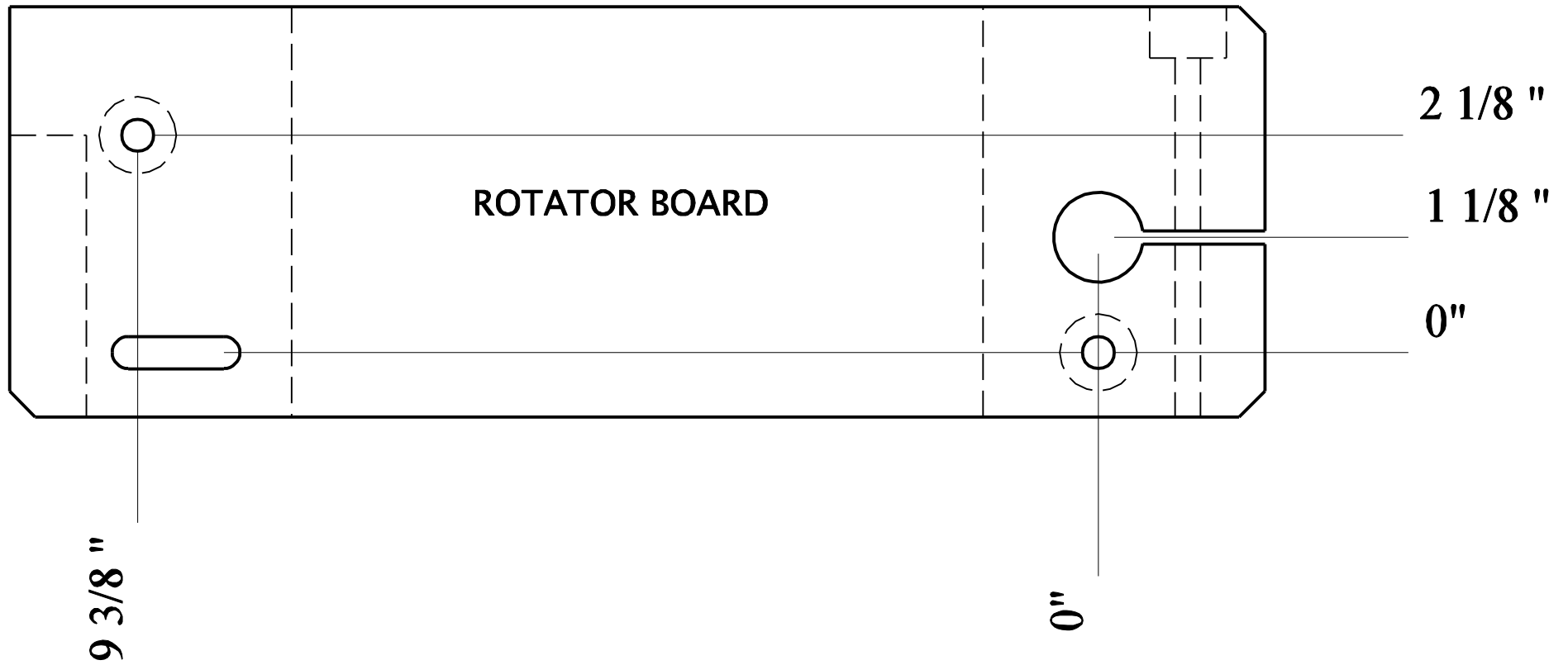
BACKER BOARD DIMENSION PLAN



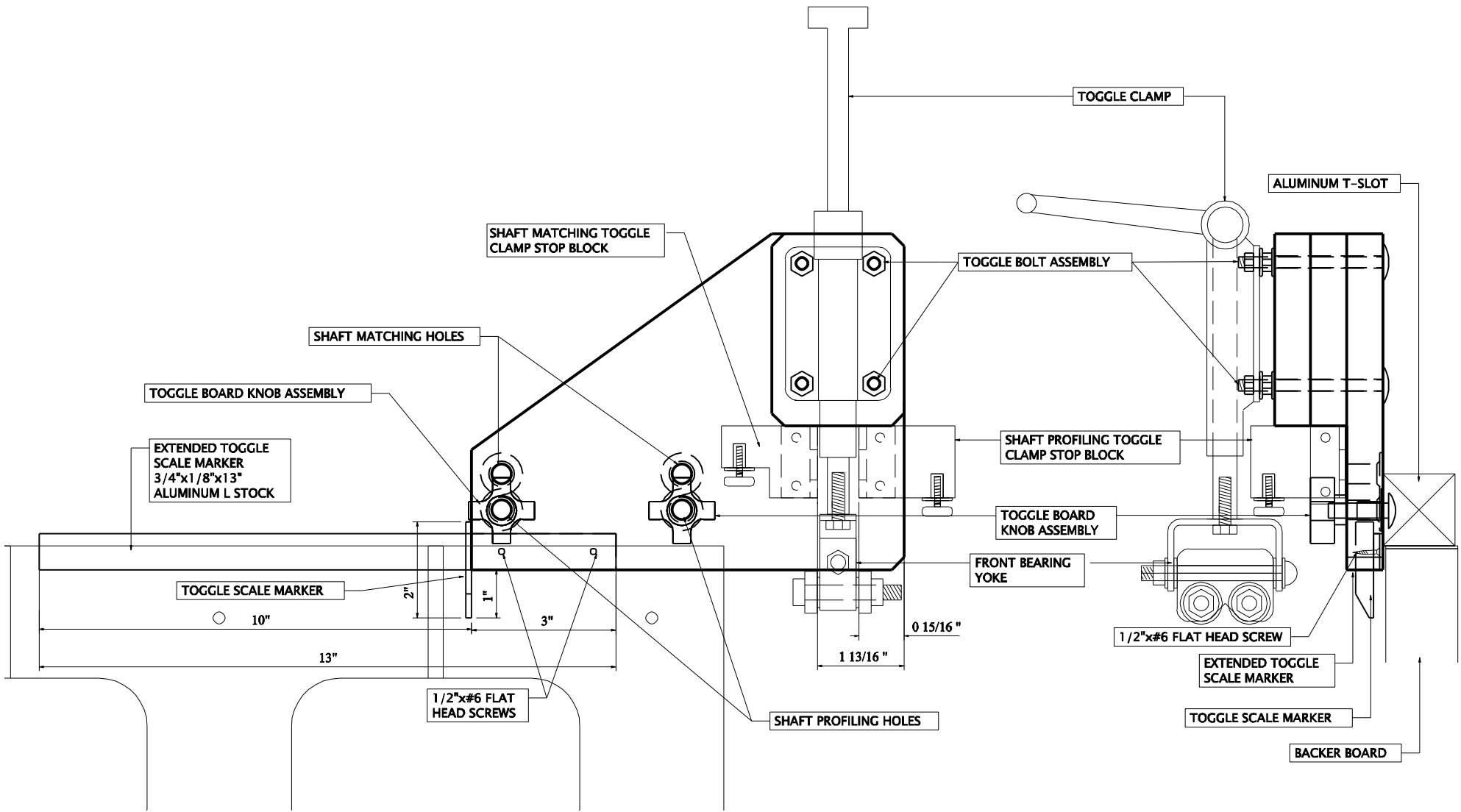
ROTATOR BOARD ASSEMBLY PLAN



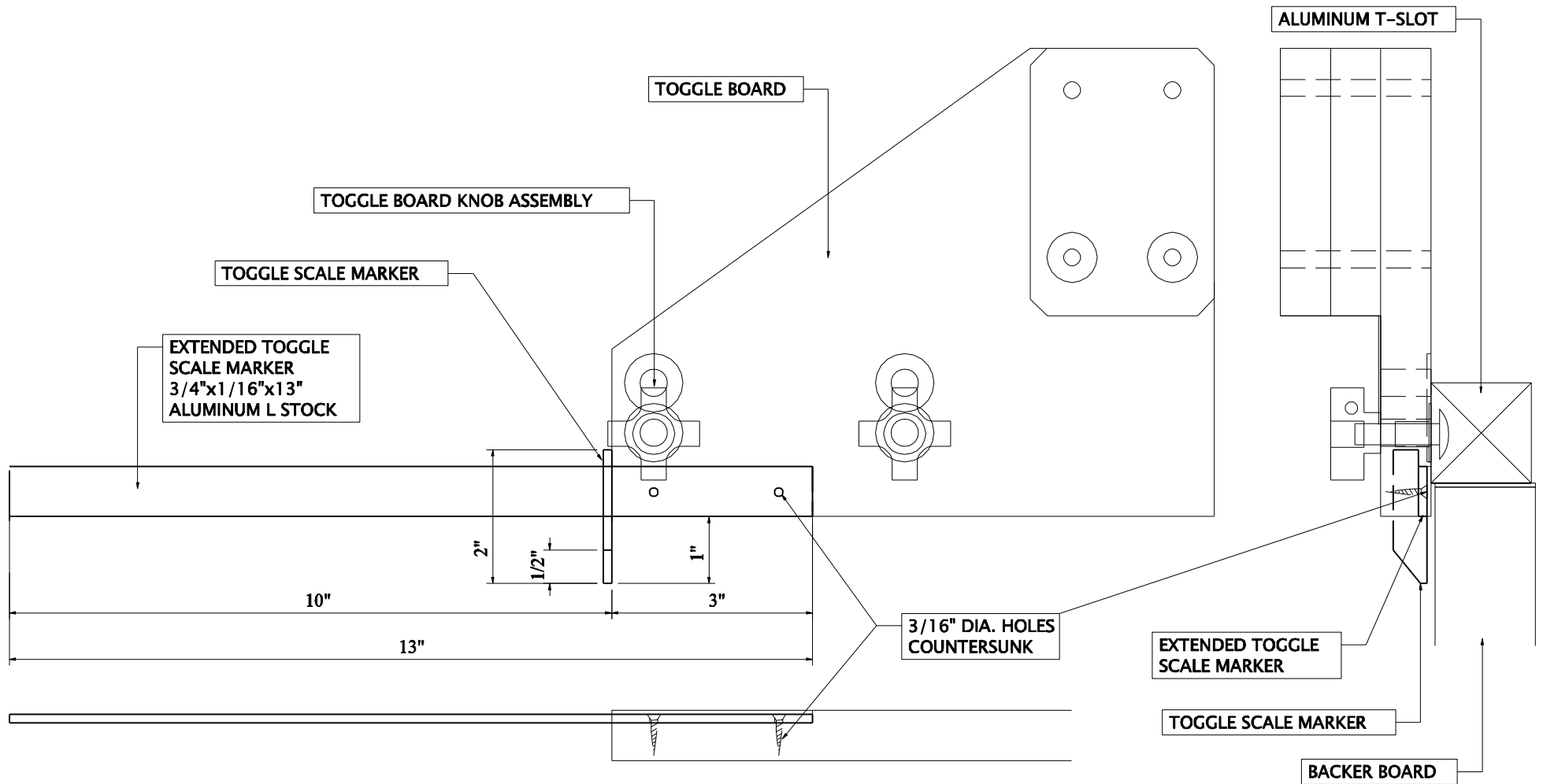
CALIBRATION CRITICAL DIMENSION PLAN



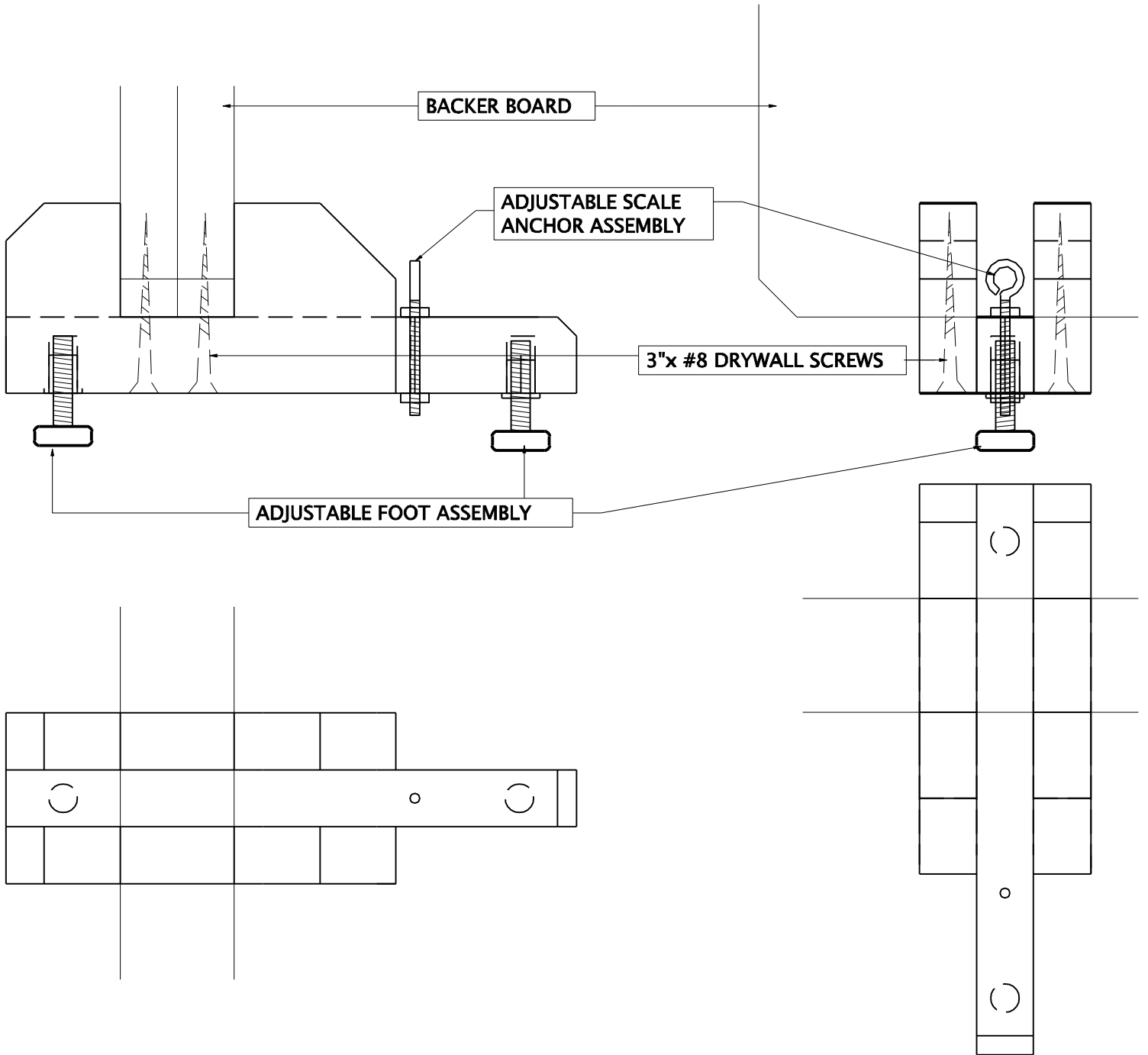
TOGGLE BOARD ASSEMBLY PLAN



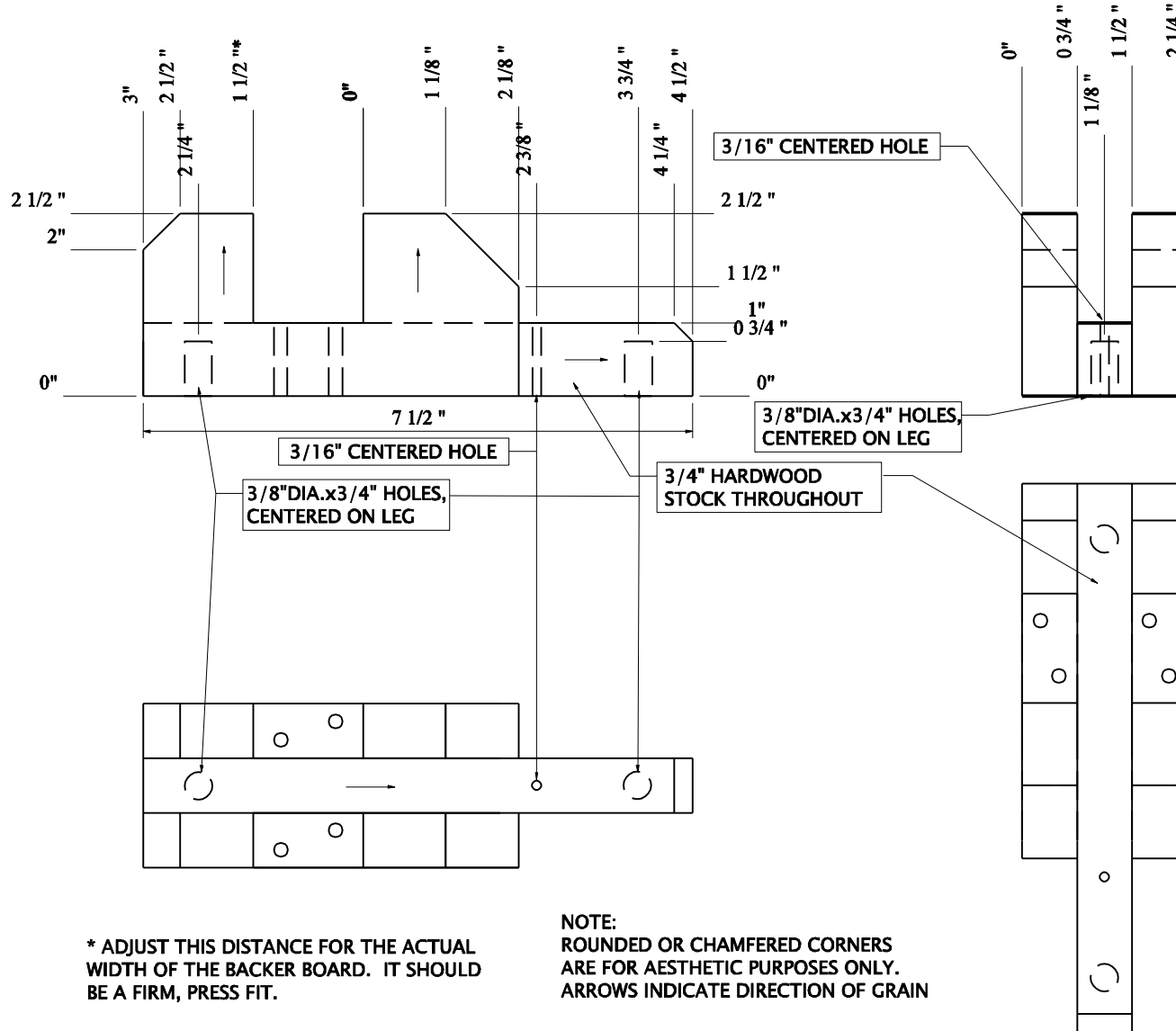
TOGGLE SCALE MARKER PLANS



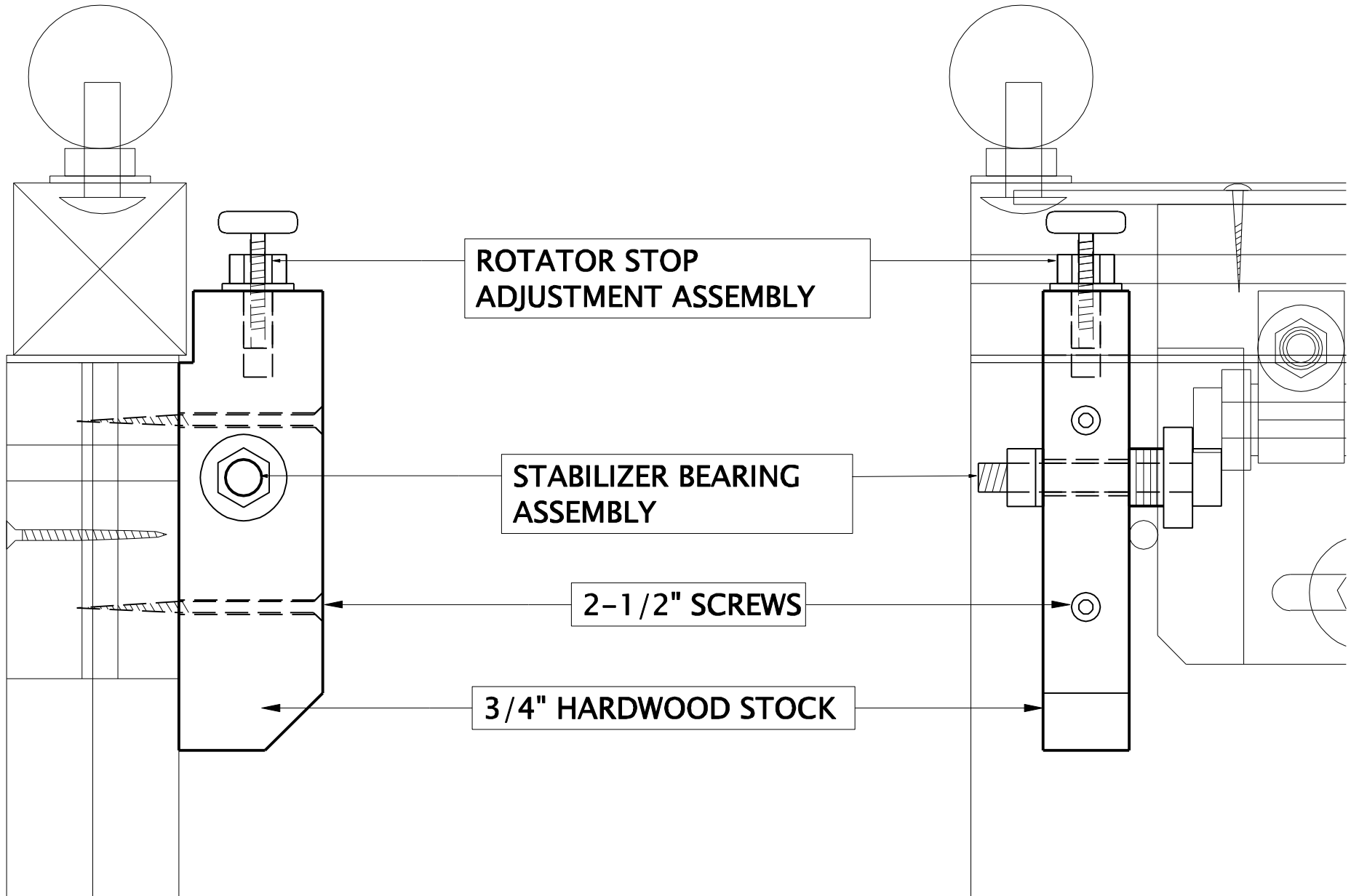
LEG ASSEMBLY PLAN



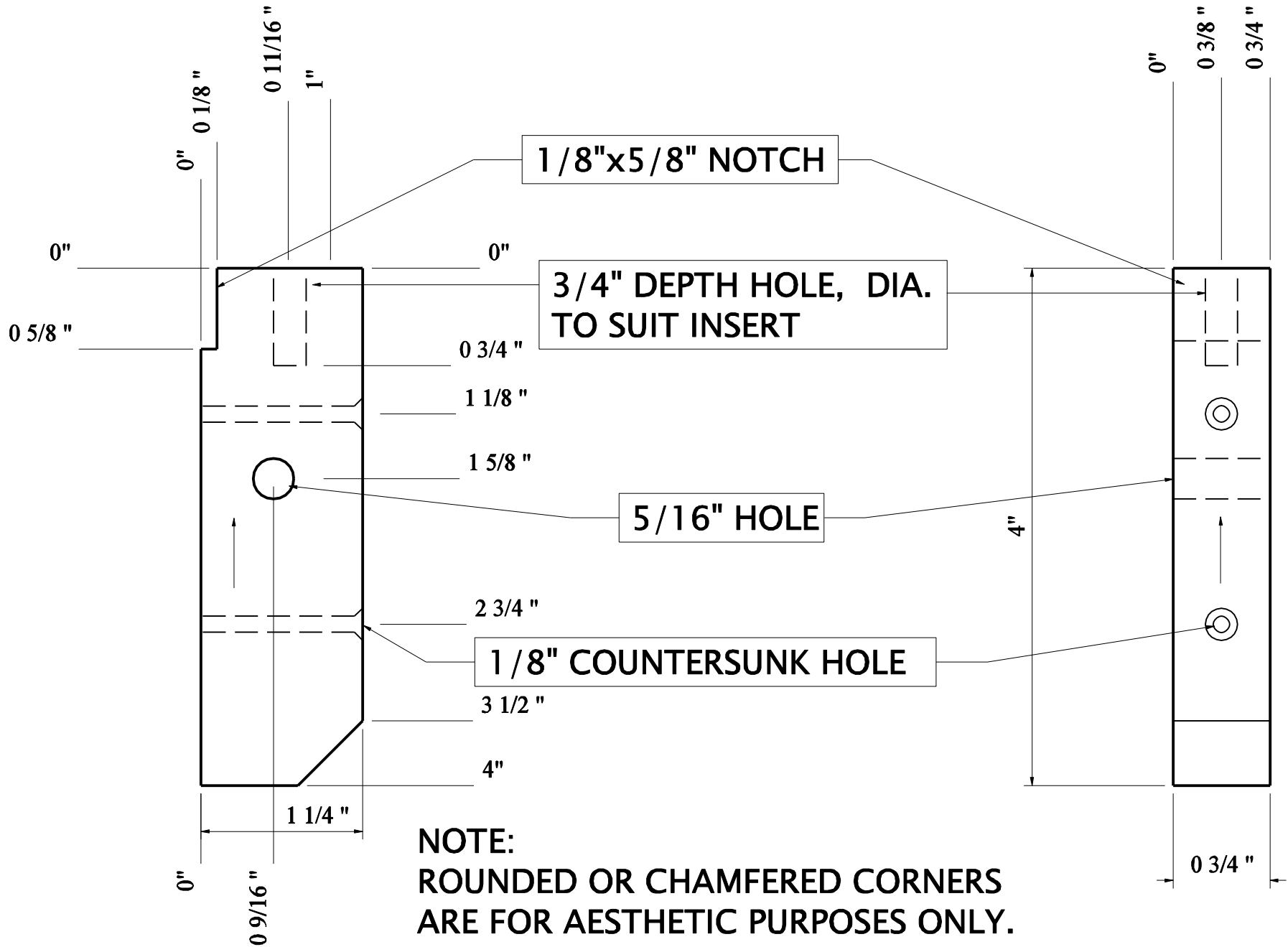
LEG DIMENSION PLAN



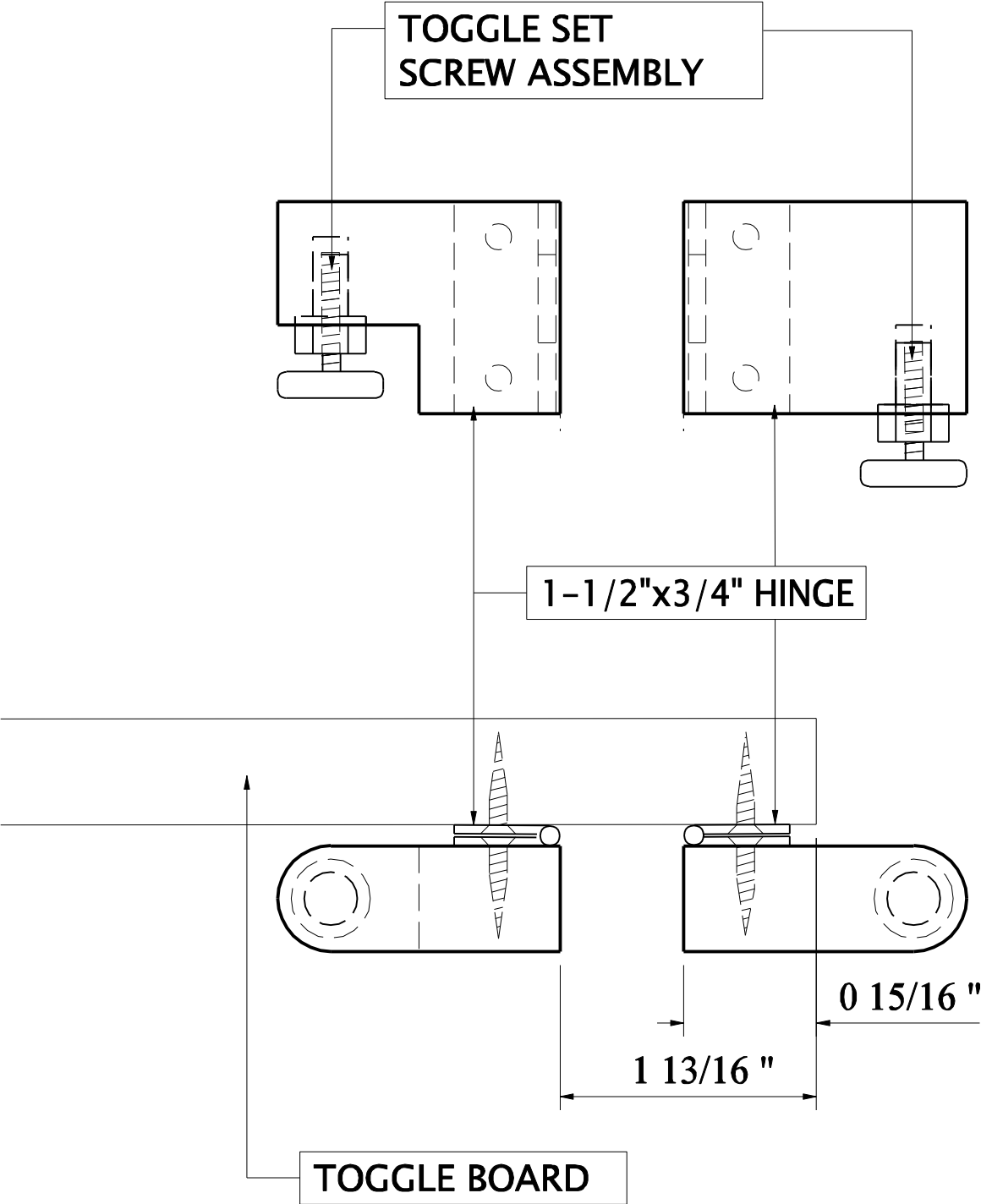
ROTATOR STOP ASSEMBLY PLAN



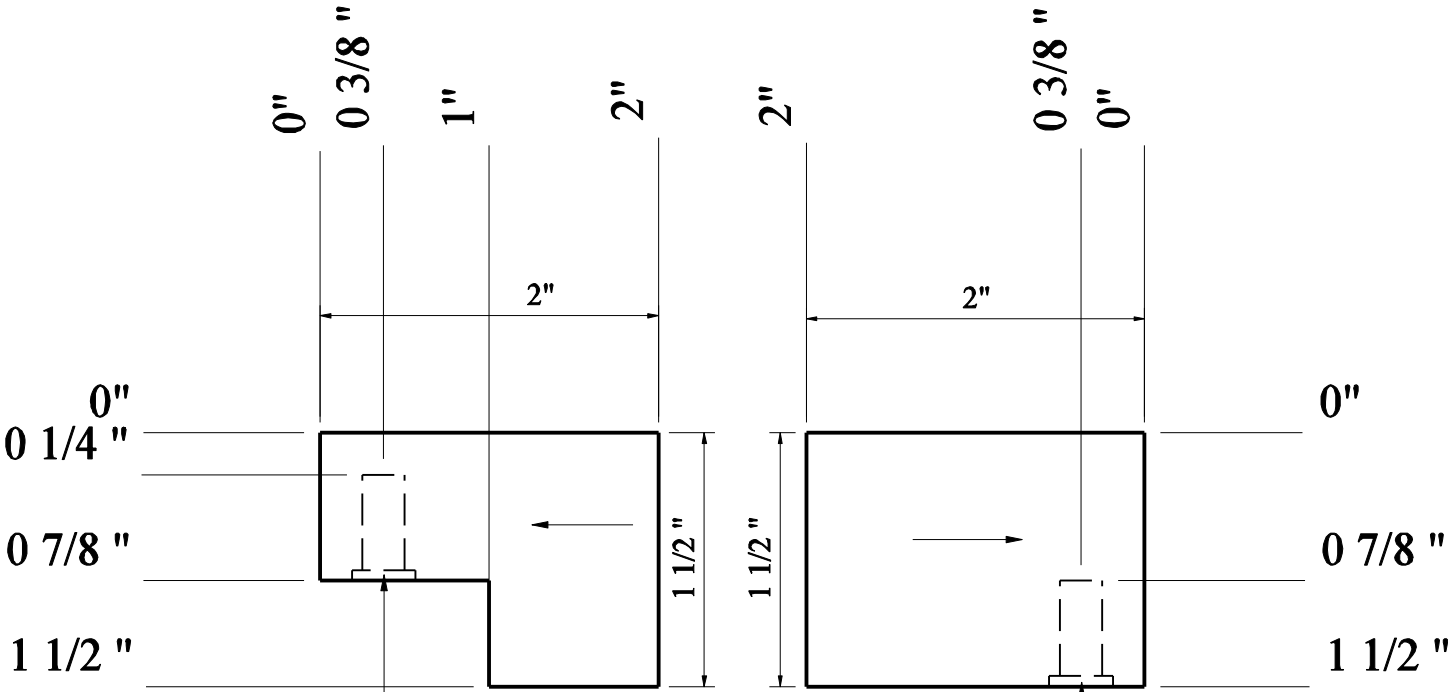
ROTATOR STOP DIMENSION PLAN



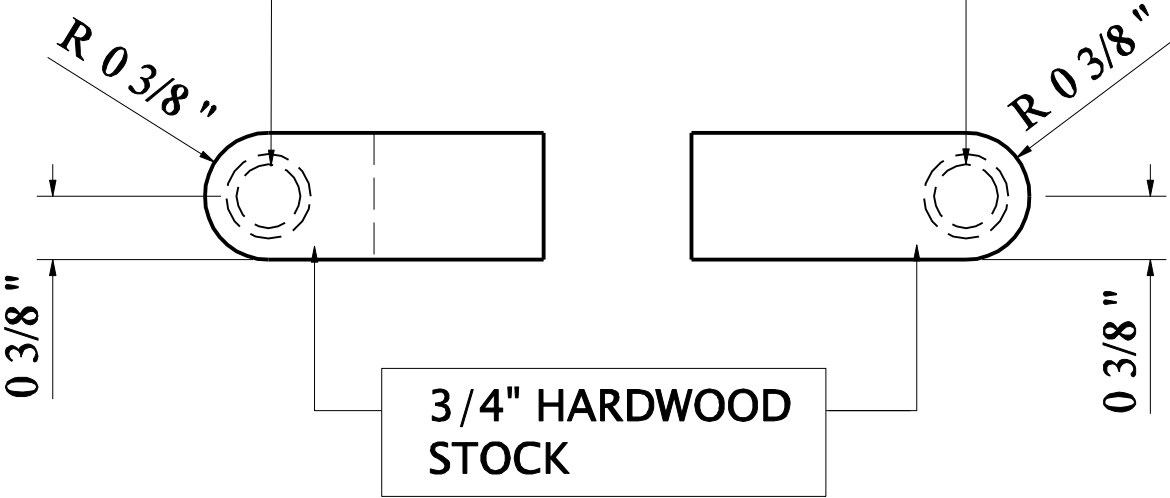
TOGGLE STOP BLOCK ASSEMBLY PLAN



TOGGLE STOP BLOCK DIMENSION PLAN



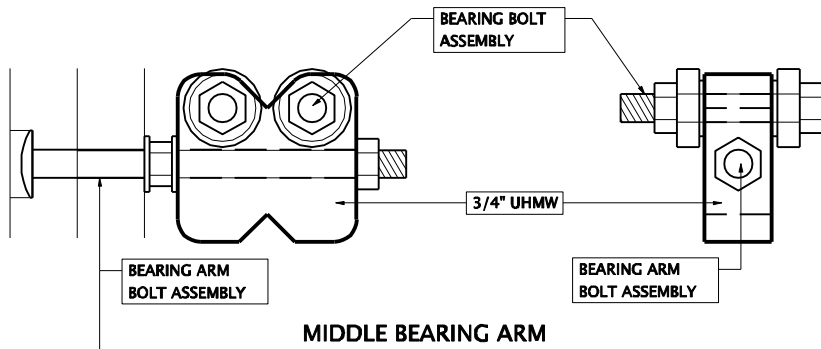
3/8" DIA.x5/8" HOLE WITH
1/2"x1/16" COUNTERBORE



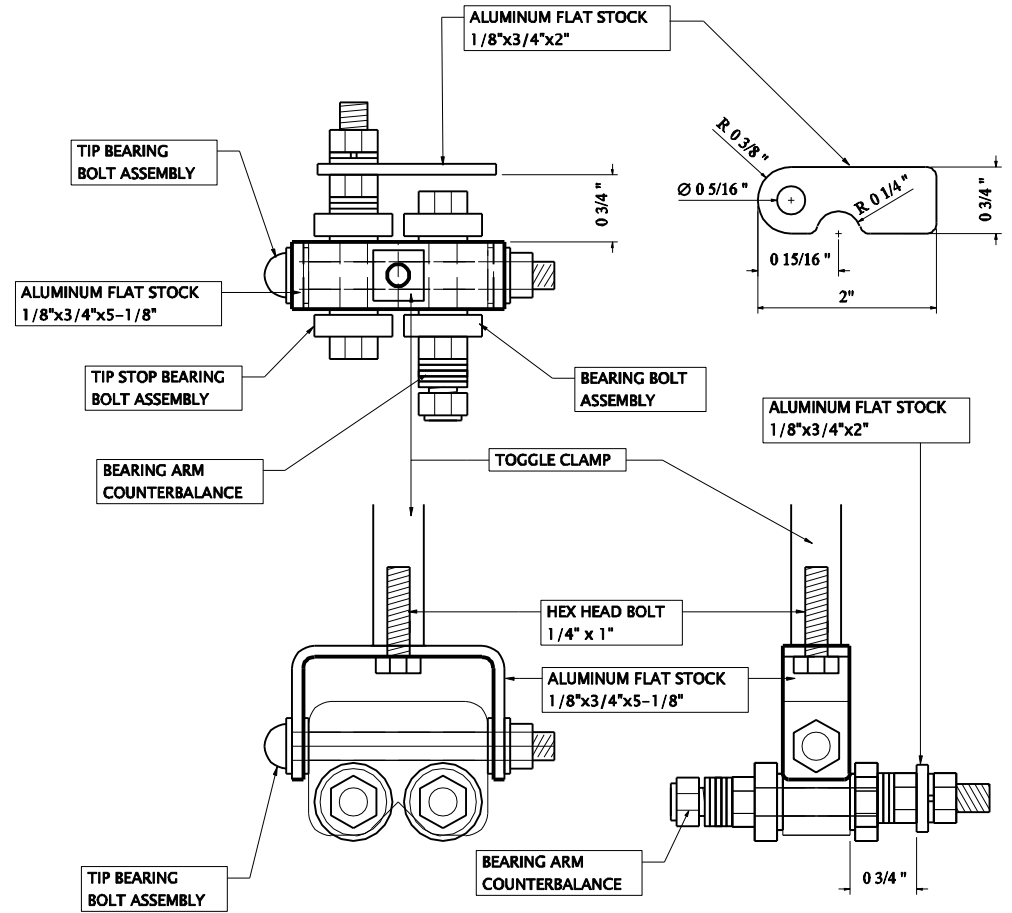
3/4" HARDWOOD
STOCK

NOTE: ARROWS INDICATE DIRECTION OF GRAIN

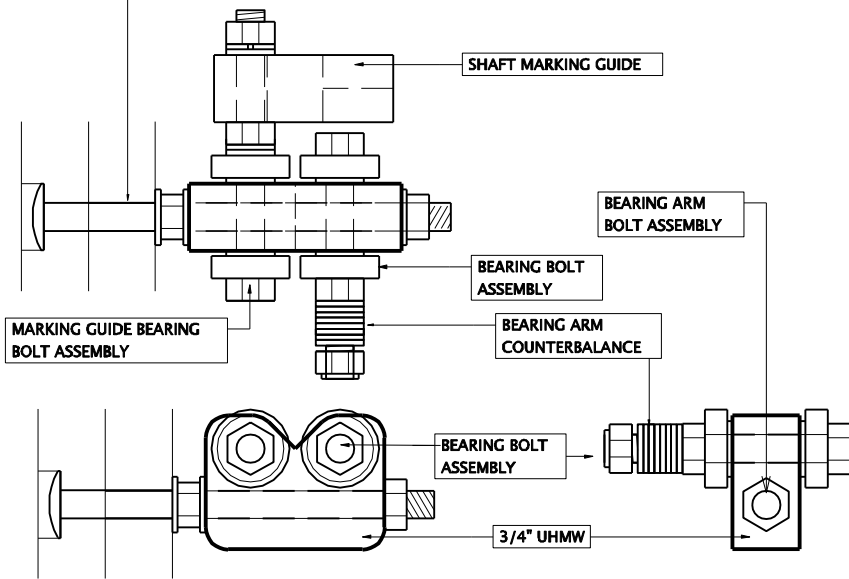
BEARING ARM ASSEMBLY PLAN



MIDDLE BEARING ARM

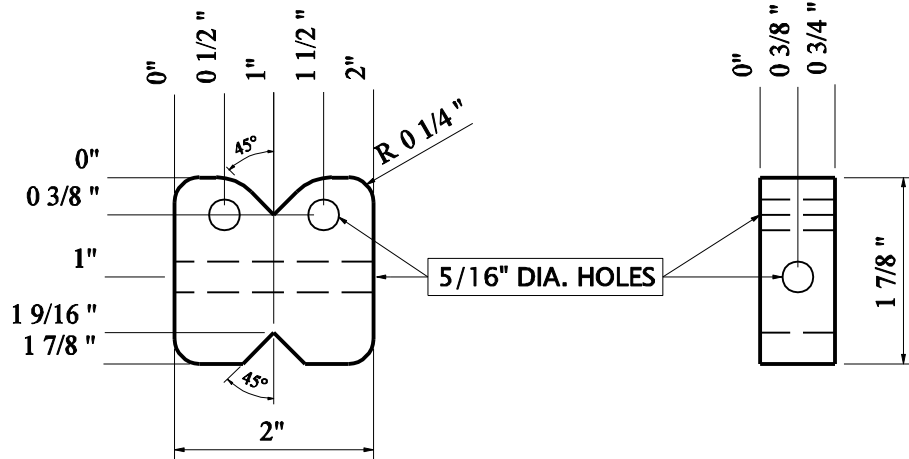


TIP BEARING YOKE



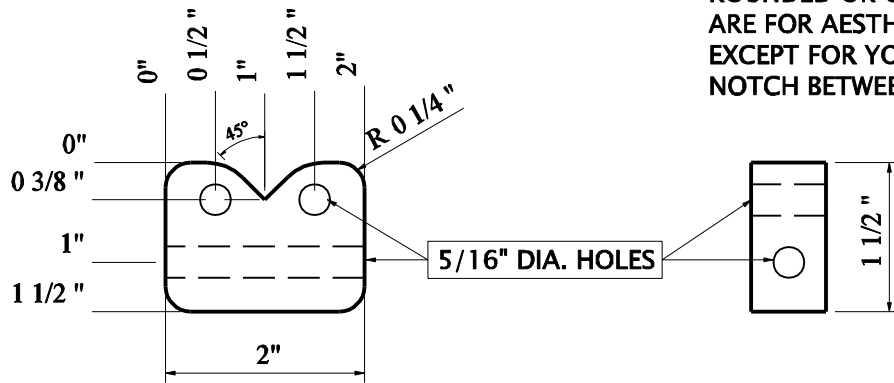
REAR BEARING ARM

BEARING ARM DIMENSION PLAN

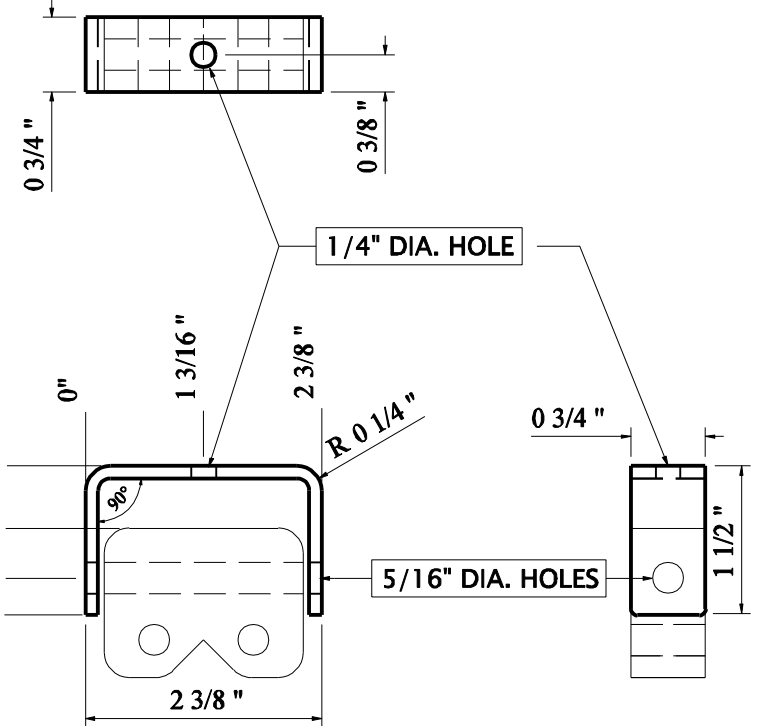


MIDDLE BEARING ARM

NOTE:
 ROUNDED OR CHAMFERED CORNERS
 ARE FOR AESTHETIC PURPOSES ONLY
 EXCEPT FOR YOKE BENDS AND INTO
 NOTCH BETWEEN BEARING HOLES

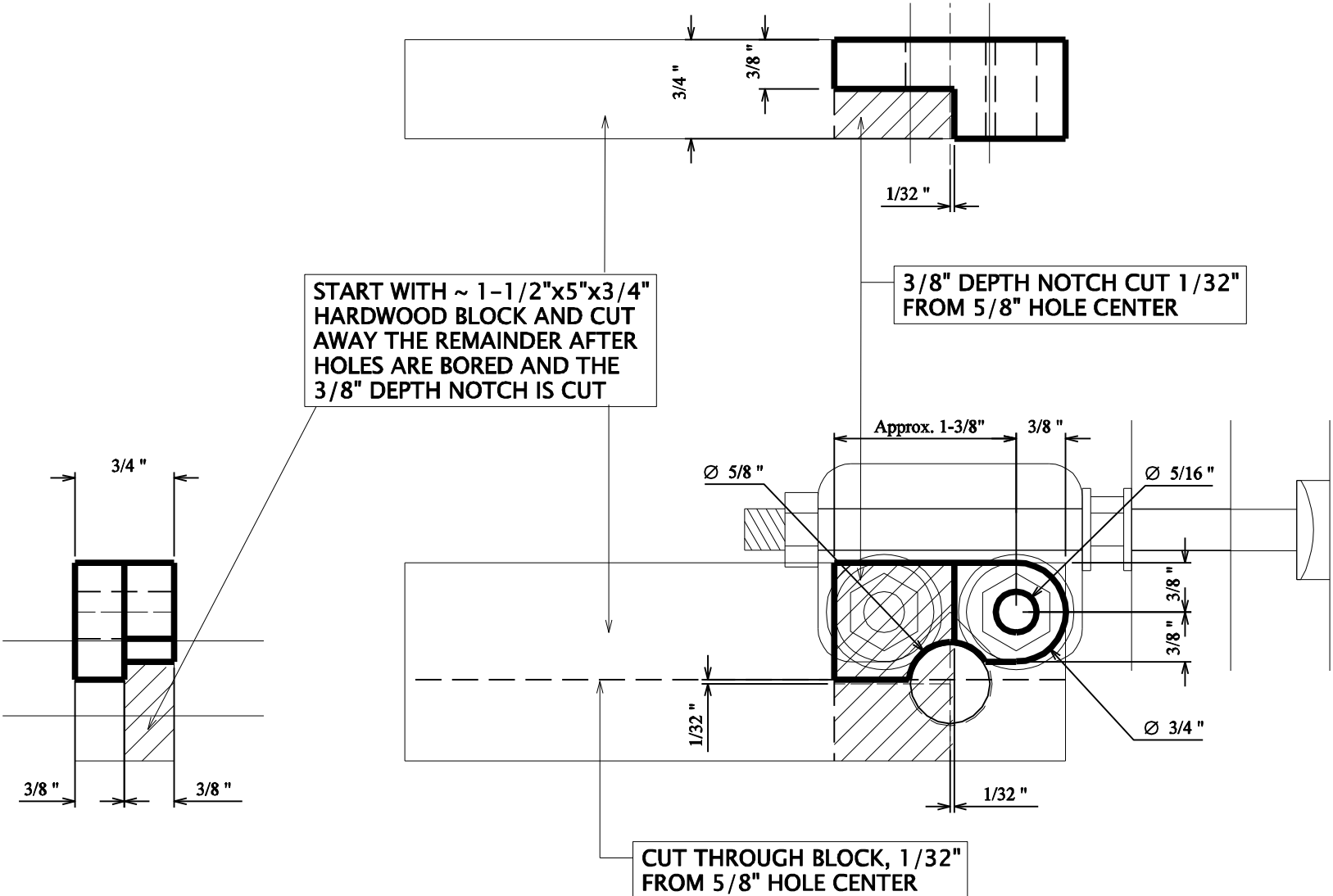


TIP/REAR BEARING ARM

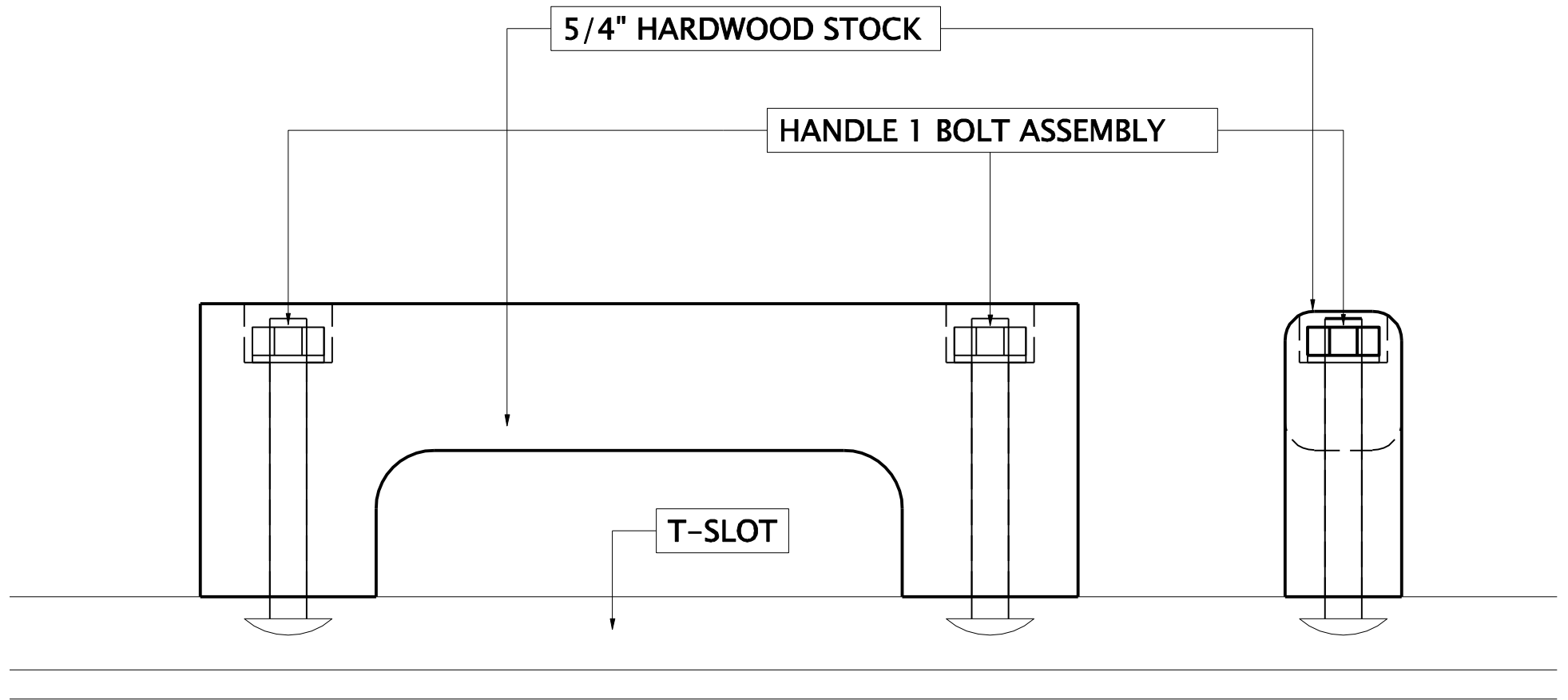


TIP BEARING YOKE

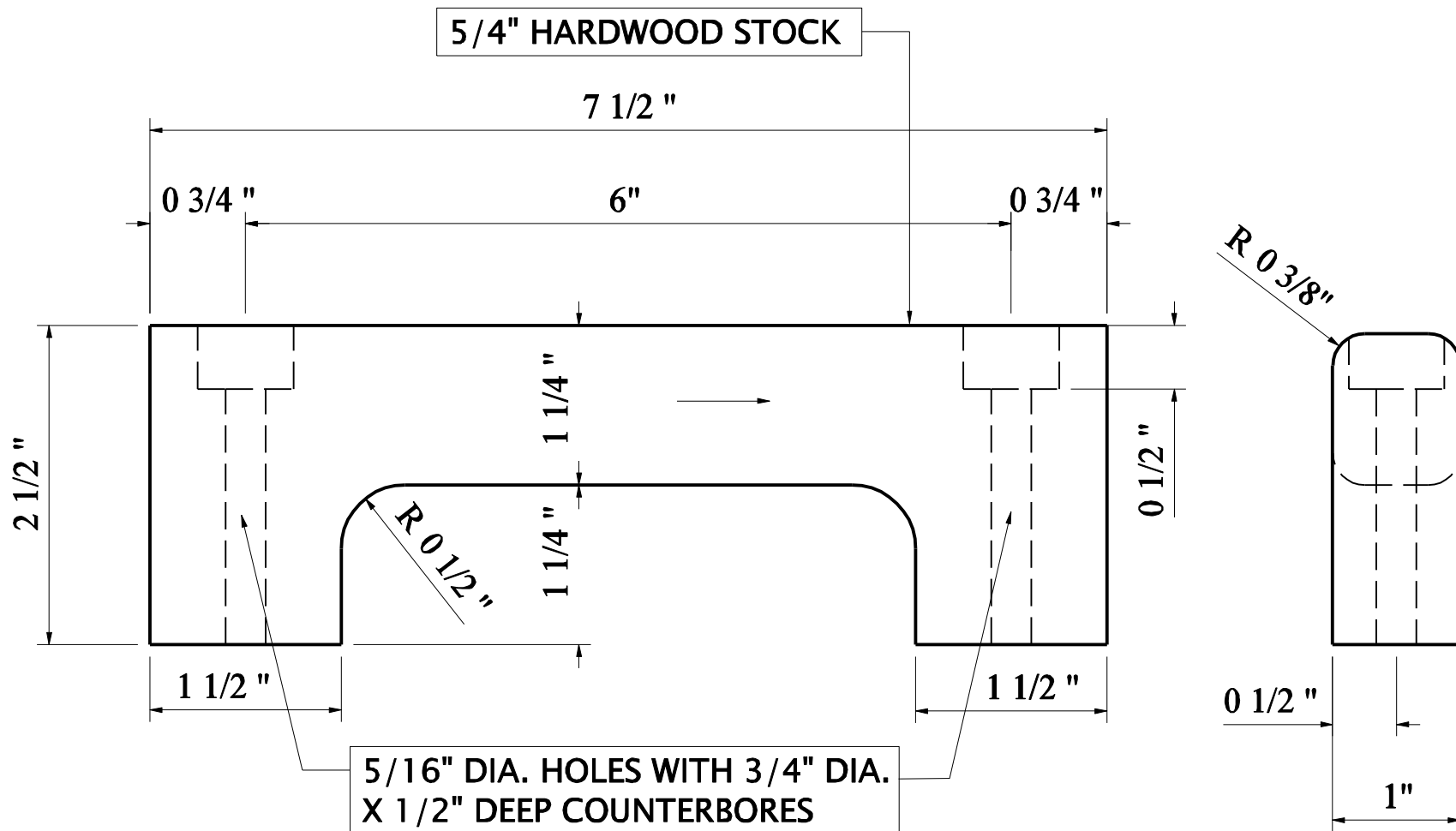
SHAFT MARKING GUIDE ASSEMBLY PLAN



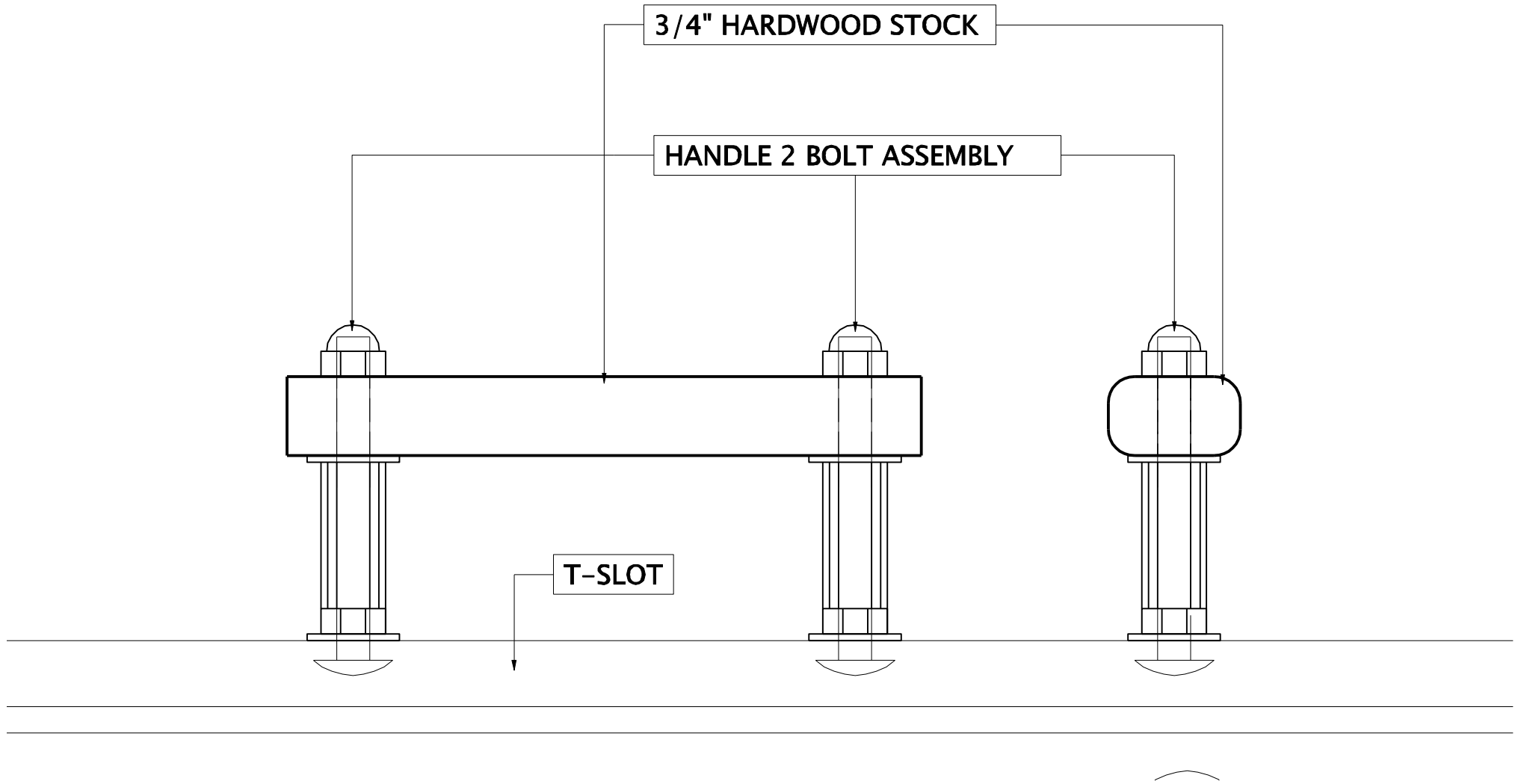
HANDLE 1 ASSEMBLY PLAN



HANDLE 1 DIMENSION PLAN



HANDLE 2 ASSEMBLY PLAN



HANDLE 2 DIMENSION PLAN

