

HS-STAND DYNAMIC BALANCER



TABLE OF CONTENTS

TABLE OF CONTENTS	1
BEFORE GETTING STARTED	2
PARTS LIST	3
BUILD INFO	5
WARNING!	19
BALANCING OPERATION	20
BAND PASS FILTER	21
BAND PASS TABLE	22
SPECIFICATIONS	23

BEFORE GETTING STARTED

- 1) Confirm availability of critical parts, in particular the KING MITRE SAW STAND. But also ESP32 WROOM Board, laser, motor and controller, 24v power supply
- 2) At the time of this build (spring 2025) the HS-ACC licence was free, as it had been during the previous 4 yrs of development. This is subject to change. Typical HScope licenses are in the \$30 range. Contact Martin Loren if you think this may be a factor in your decision to proceed with build.
- 3) This is a serious project. Before embarking on it, reach me on HScope LOUNGE Telegram Group to discuss it.
- 4) Watch GADGETS#210 and GADGETS#211 on YouTUBE!

PARTS LIST

HS-STAND COMPONENTS:

KING MITRE SAW STAND

(5) rolls PETG

(8) MENDING PLATES

(16) 608ZZ BEARINGS

(8) 6202RS BEARINGS

(6) 5/8 THD ROD X 4.5in

(2) 5/8 THD COUPLER 3/4 HEX

(2) 1.25 X 1.25 PERFORATED ANGLE X 3ft

(8) 8mm x 2.210in HARDENED GUIDE ROD

(1) 5/16 THD ROD x 9in

(4) 3/8 THD ROD x 1ft

(1) 1/4 THD ROD x 1ft

(1) 3/8 THD ROD x 21in

(1) MOTOR CONTROLLER

(2) BANANA JACKS

(1) 120VAC ILLUMINATED SWITCH

(1) 120VAC POWER CORD

(1) 24V POWER SUPPLY

(1) 30mm X 1850mm DRIVE BELT

(2) 5/8 FLAT WASHERS

(2) 3/16 BS WASHERS

(4) 5/16 BS WASHER

(4) 5/16 x 2 + HEX NUTS

(8) 5/16 x 1.5 + HEX NUTS

(2) #10 x 2 ROUNDHEAD + HEX NUTS

(2) #10 x 1 COUNTERSUNK + HEX NUTS + FLAT WASHERS

(1) 1/4 x 1 + WINGNUT + FLAT WASHER

(10) 5/16 NYLOCK NUTS

(2) 3/8 HEX NUTS (3/8 drill thru one)

(1) 3/8 FLAT WASHER

(2) 5/16 CARRIAGE BOLTS + HEX NUTS + FLAT WASHERS

JB WELD PLASTIC BONDER

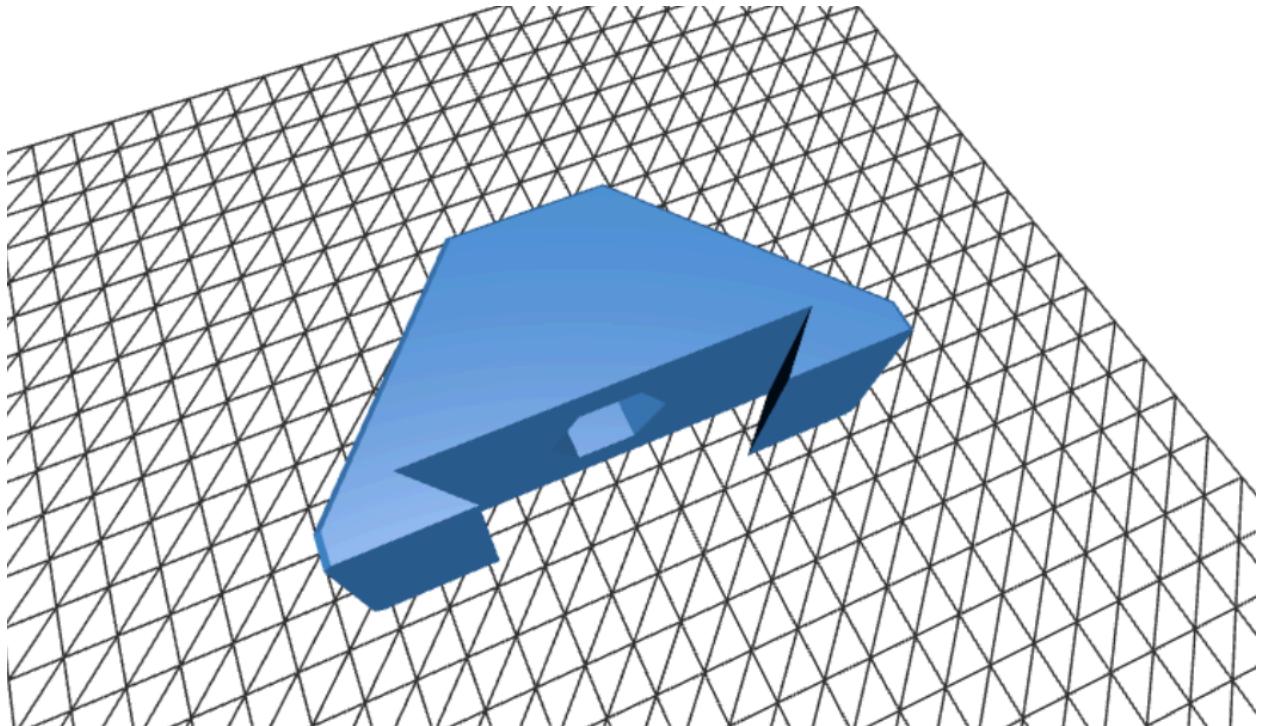
HS-ADXL COMPONENTS:

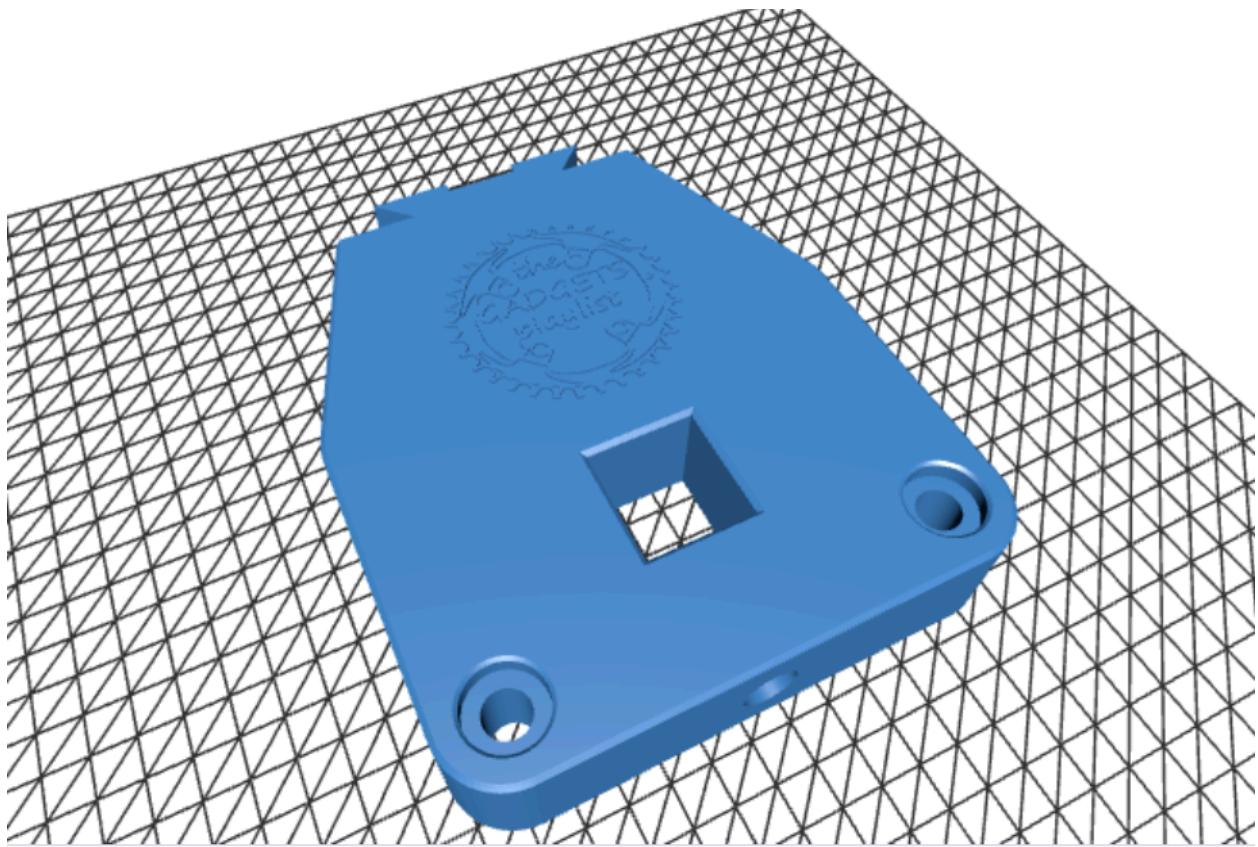
ANDROID TABLET/PHONE

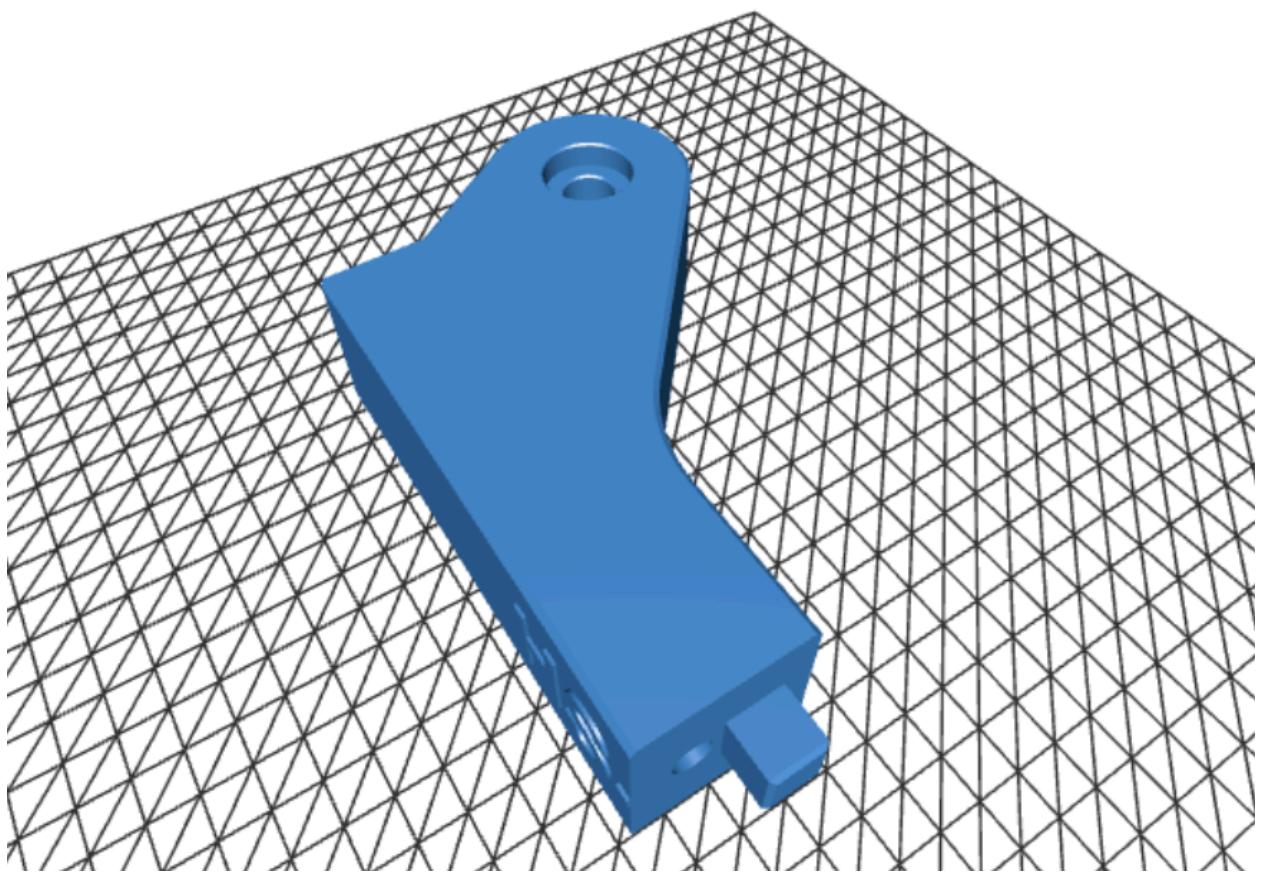
- (1) ESP32 WROOM 30pin BOARD
 - (2) ADXL345 ACCELEROMETERS
 - (1) 1m ETHERNET CABLE (thin, flexible type)
 - (1) 3m ETHERNET CABLE (thin, flexible type)
 - (1) MAINBOARD PCB
 - (2) ADXL/RJ45 PCB
 - (4) RJ45 JACKS
 - (1) GX12 3pin CONNECTORS
 - (1) E3ZC-BGNQ3-L LASER
 - (1) MP1584 DC-DC CONVERTER 5V
 - (4) MAGNETS 20mm x 10mm x 3mm
- E6000 ADHESIVE
DOUBLE ADHESIVE TAPE

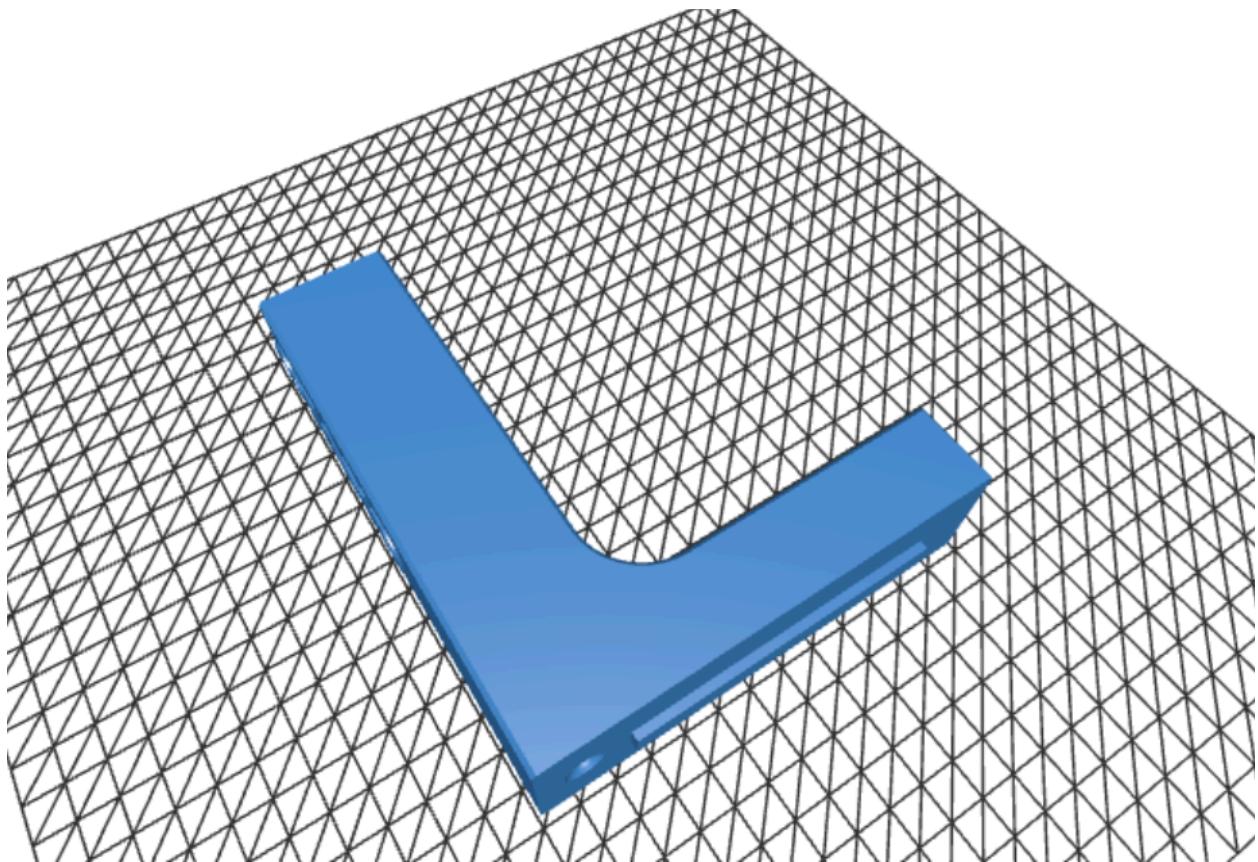
BUILD INFO

To achieve weight capacity, all load bearing components are 3D printed out of PETG and have 8 walls, 8 bottom layers, 8 top layers and 50% infill!









These parts are glued with JB WELD Plastic Bonder. Don't forget to insert flat washer!

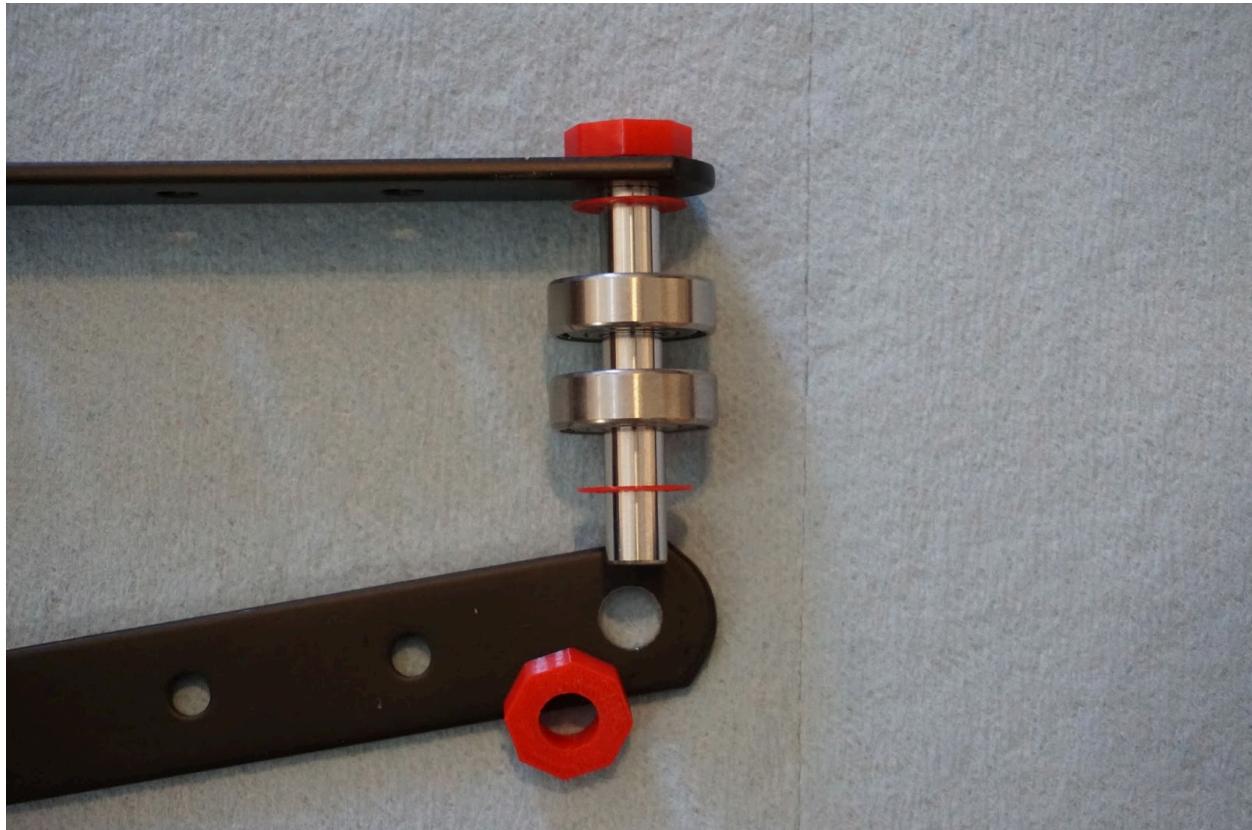


Drill metal mending plates 5/16" to fit 8mm hardened steel rods



Carefully clean holes for 608zz bearings. Steel pins should slip through without any binding prior to full assembly. Notice thin spacers between inner race and mending plate.

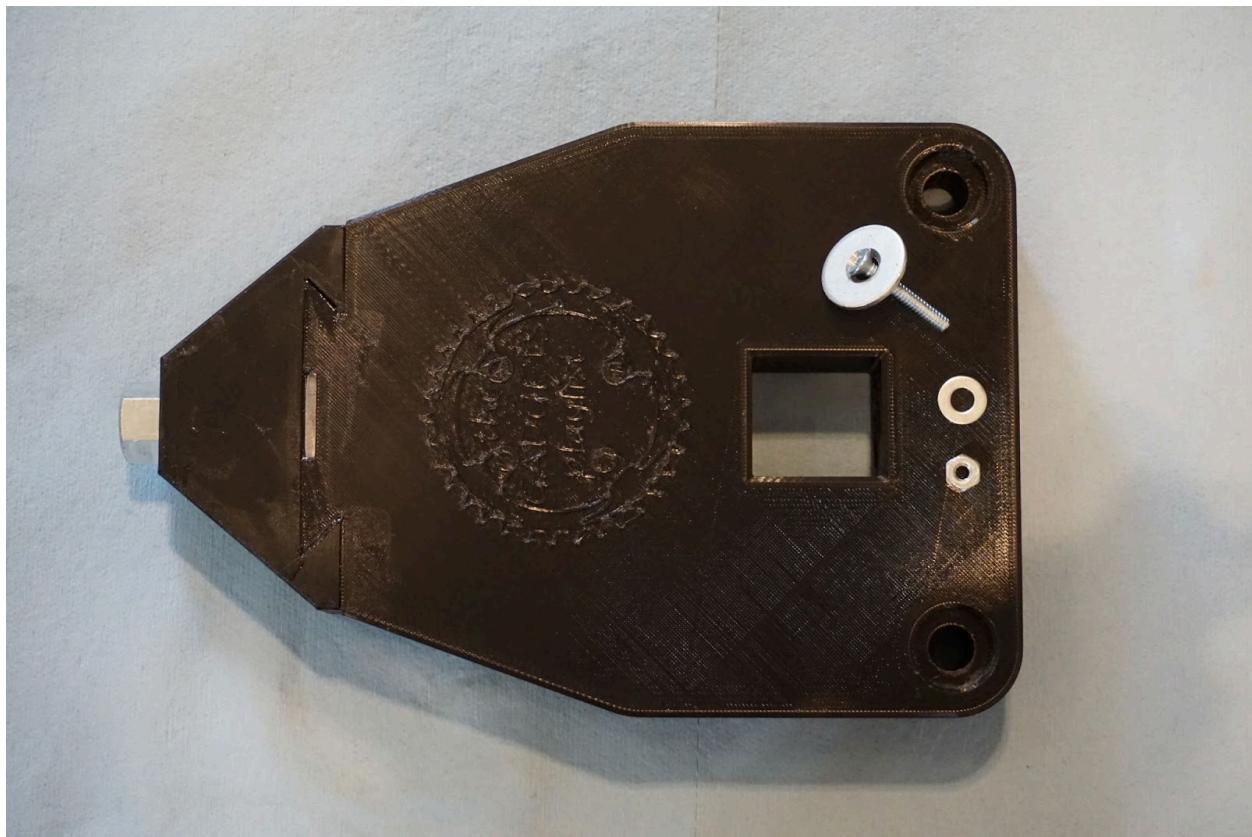
Run 5/16" drill in red end retainers. Assembled dry, no adhesives.



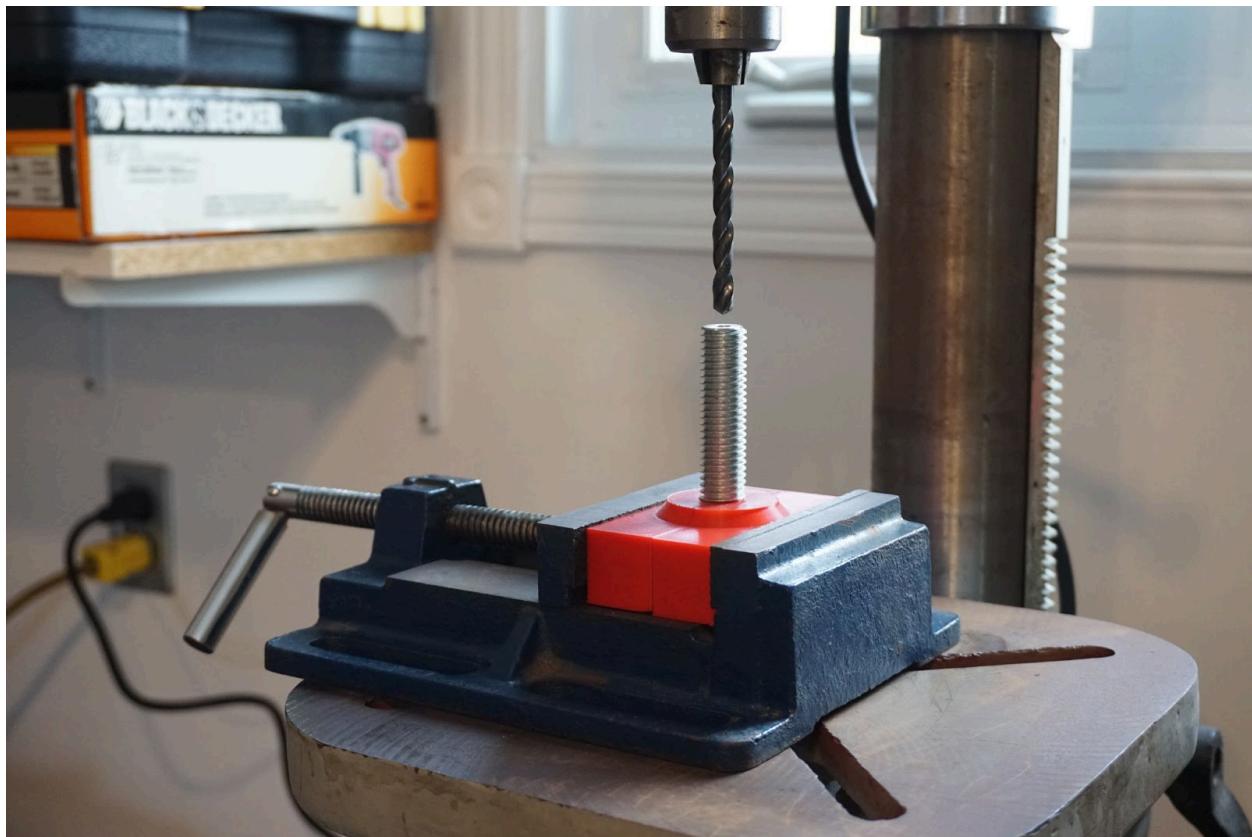
Squeeze red retainers with clamp to eliminate any end play.



Countersink 3/16 BS flat washer to recess screw head.



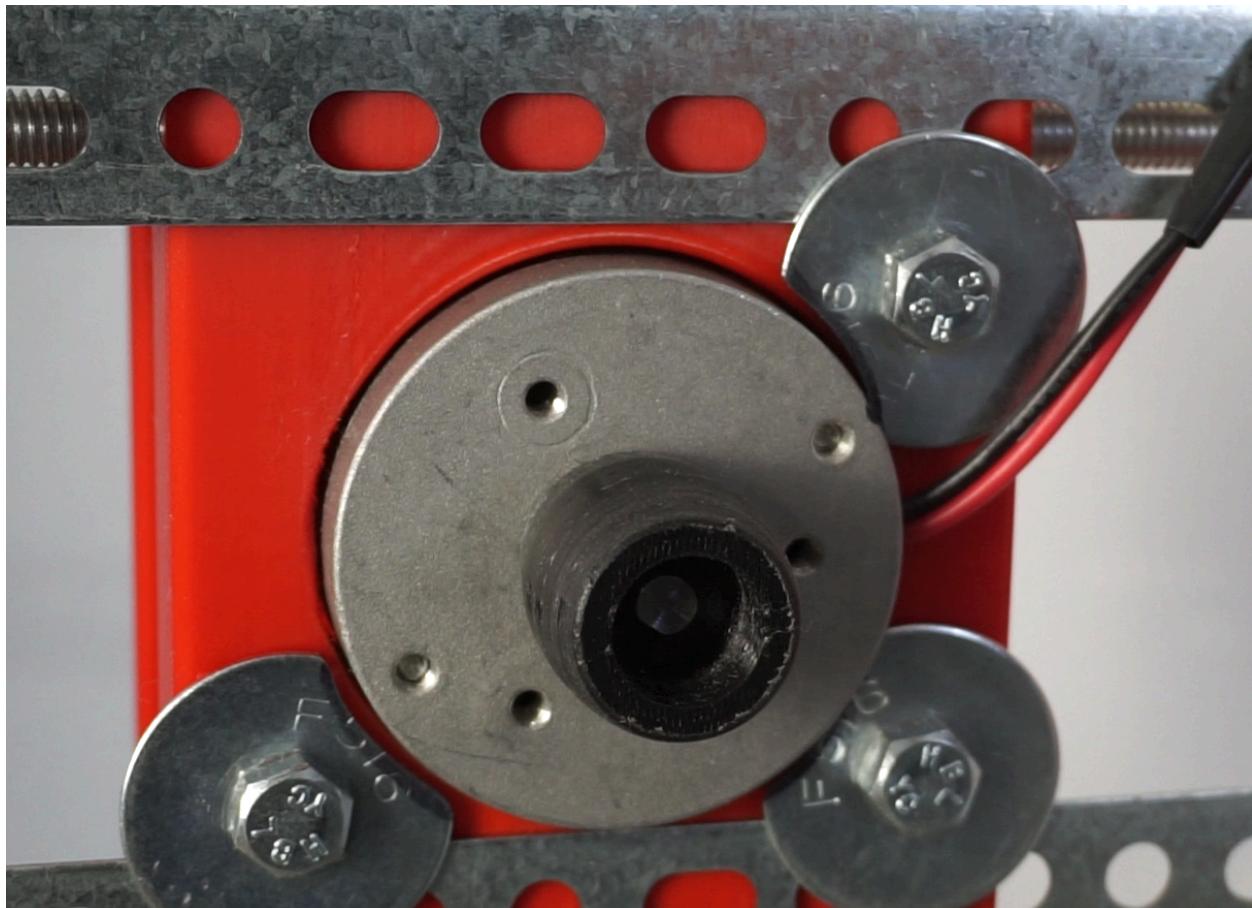
Reduce parasitic weight by drilling 9/32" through $\frac{5}{8}$ " threaded rods.





PILLAR BOLT
THRU HOLE
#20

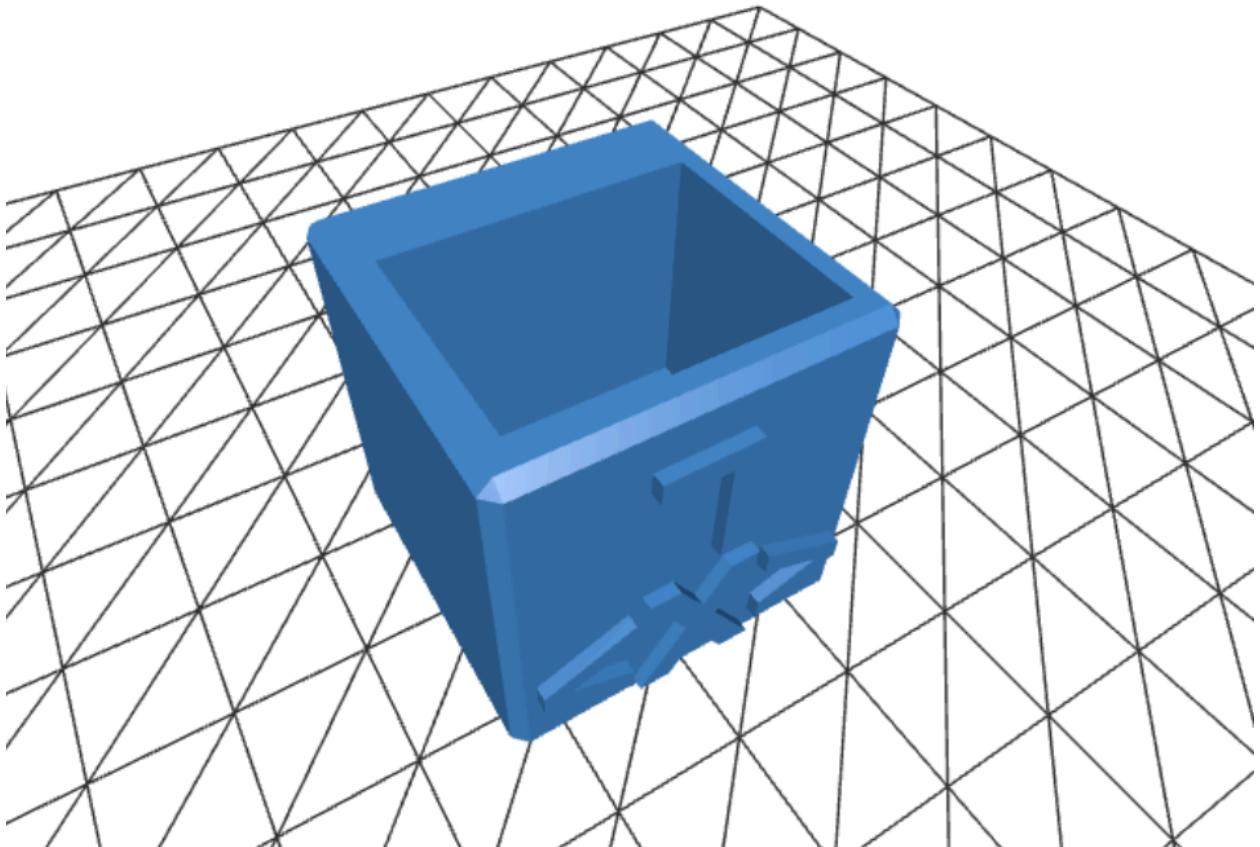
TIP! ... these can be kept finger tight to allow easy belt tension adjustment



Drill nut $\frac{3}{8}$ " as it acts a bearing support for threaded rod. Then retain nut with JB WELD Plastic Bonder.



ADXL345/RJ45 boxes were modified following release of video to allow stacking of 4 magnets for additional holding power. Magnets are secured with JB WELD Plastic Bonder. Circuit cavity is filled with E6000 adhesive and topped off with JB WELD Plastic Bonder.



The polarity for HS-STAND use which factors in the 180° phase shift characteristics of soft bearing balancers is:

RIGHT = RJ45 TAB DOWN

LEFT = RJ45 TAB UP

WARNING!

DYNAMIC BALANCING HAS INHERENT RISKS. BELT AND ROTATING COMPONENTS WITHOUT GUARDS. TRIAL WEIGHTS WITH POTENTIAL TO FLY OFF.

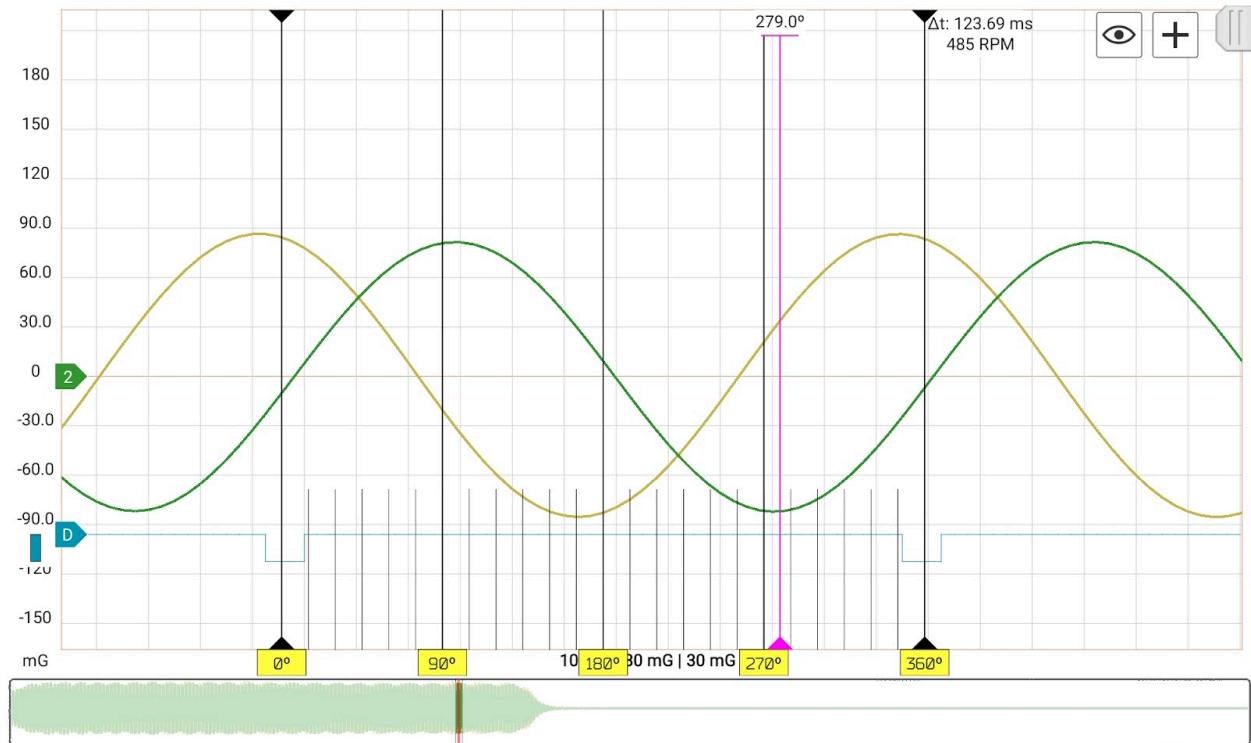
THERE IS A NEED TO APPRECIATE THE POWER OF THE CENTRIFUGAL FORCES AT PLAY!

KEEP ONLOOKERS AWAY. KEEP YOURSELF SAFE!

IT IS YOU THAT ACCEPTS AND MITIGATES THESE RISKS.

BALANCING OPERATION

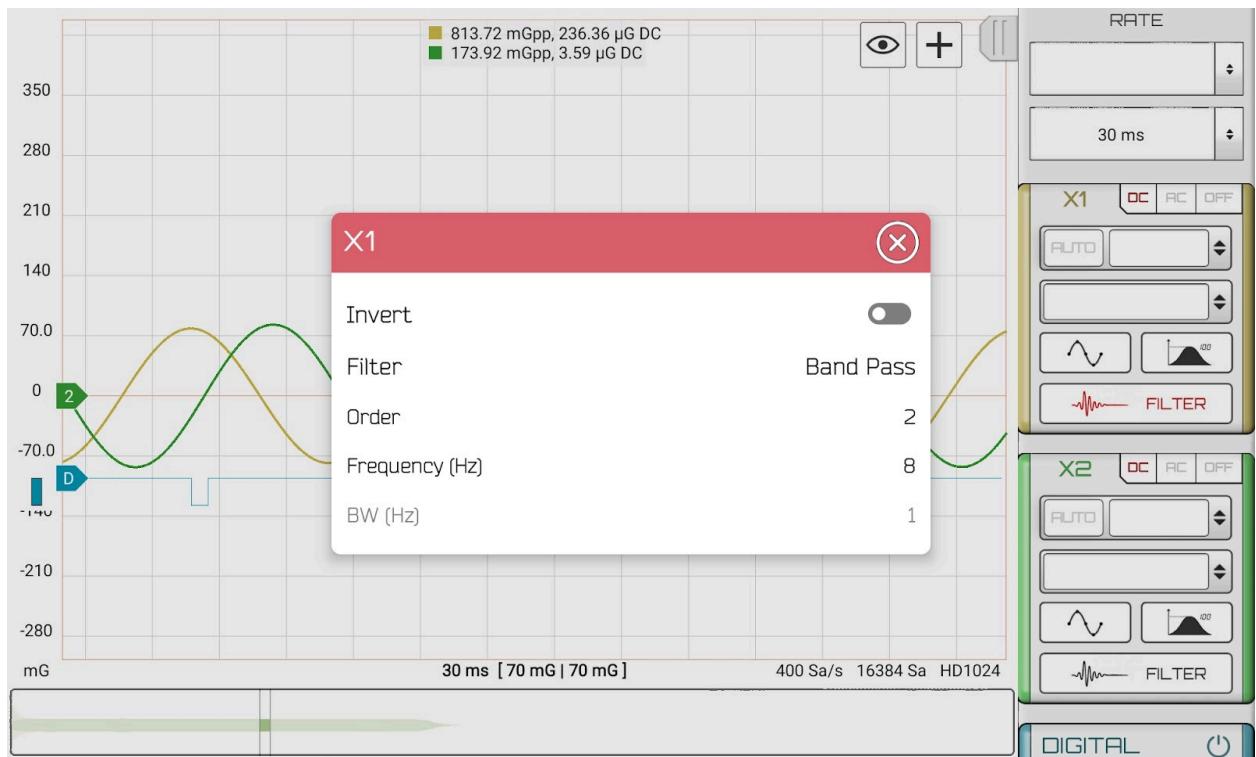
HS-STAND is oscilloscope based balancing based on the HS-ADXL project.



THE 360° OVERLAY IS ANCHORED TO THE NOTCHES PRODUCED BY THE LASER REFERENCE. A TROUGH INDICATES LIGHT AND A CREST INDICATES HEAVY. ALL DEMONSTRATED IN YouTUBE GADGETS#211

BAND PASS FILTER

Smooth sine waveforms are critical. They are achieved with the use of HScope BAND PASS FILTER



Frequency parameter = RPM/60

BW (Hz) parameter = Frequency x 10%

BAND PASS TABLE

RPM	FREQUENCY	BW
300	5	1
400	7	1
500	8	1
600	10	1
700	12	1
800	13	1
900	15	2
1000	17	2
1100	18	2
1200	20	2
1300	22	2
1400	23	2
1500	25	3
1600	27	3
1700	28	3
1800	30	3

SPECIFICATIONS

WEIGHT CAPACITY	100 Kg
WEIGHT PER STAND	50 Kg
SPAN	32 INCHES
SWING MAXIMUM	36 INCHES
SWING OVER DRIVE	22 INCHES