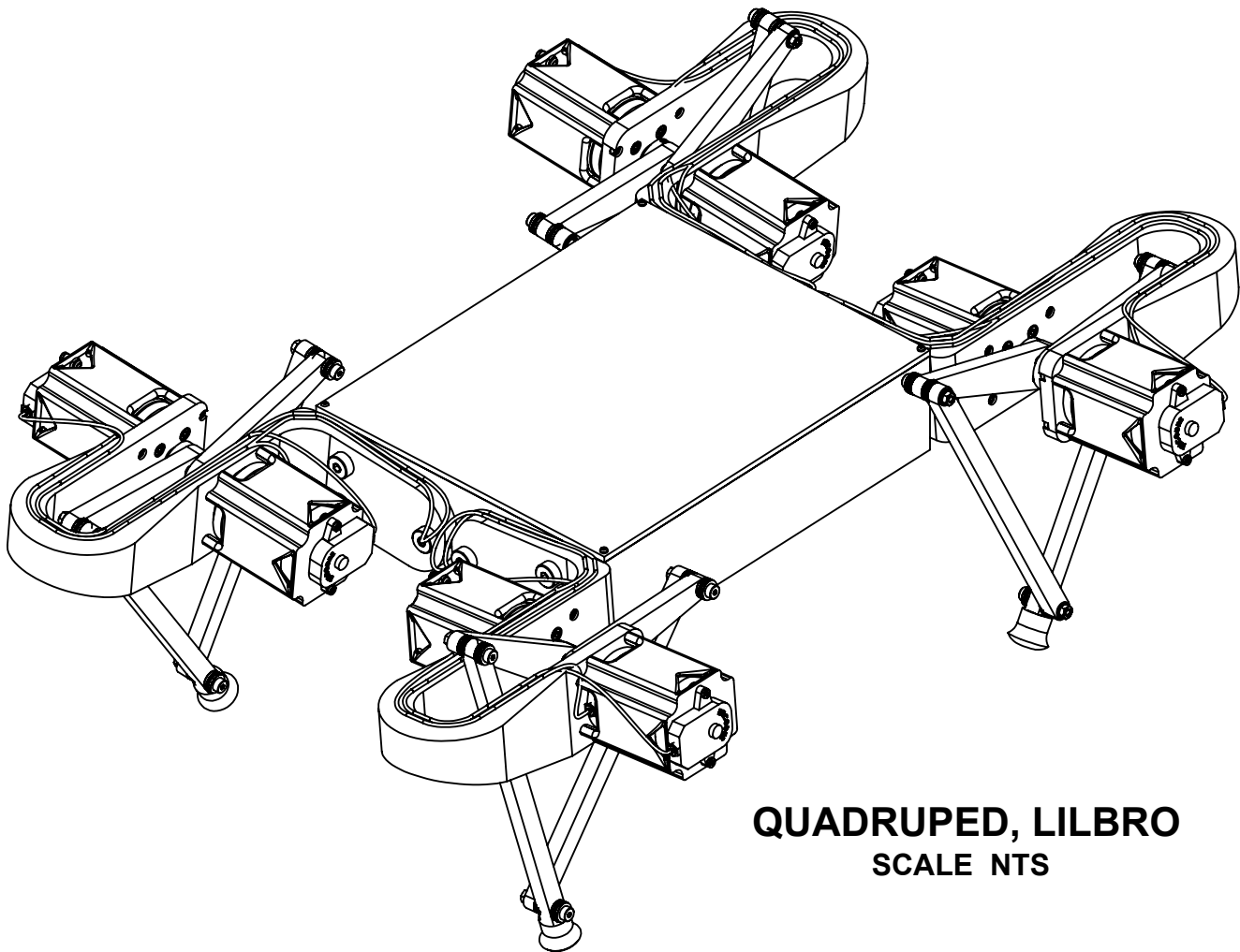


GENERAL NOTES:

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED

SUB-ASSEMBLY CHART			
SUB NO.	QTY	DET. SHT.	DESCRIPTION
301	2	3	ASSEMBLY, RIGHT LEG
302	2	4	ASSEMBLY, LEFT LEG
303	1	5	ASSEMBLY, BODY



QUADRUPEd, LILBRO  
SCALE NTS

36	1	536	CONTROLLER, PS3	PURHCASE	99004, NEWEGG
35	3	535	3D FILAMENT SPOOL	PURCHASE	AMAB011756-10, AMAZON
34	8	534	ALLOY STEEL SCREW	PURCHASE	95263A110, MCMASTER-CARR
33	4	533	STEEL SOCKET SCREW	PURCHASE	92290A056, MCMASTER-CARR
32	8	532	SS HEAD SCREW	PURCHASE	94500A222, MCMASTER-CARR
31	16	531	NUT, STEEL HEX	PURCHASE	90592A009, MCMASTER-CARR
30	4	530	BRAKE RESISTOR	PURCHASE	INCLUDED W/ ITEM NO. 28
29	4	529	BATTERY, DC	PURCHASE	HOBBY KING
28	4	528	DRIVER, MOTOR	PURCHASE	ODRIVE ROBOTICS
27	1	527	COMPUTER, RASPBERRY PI	PURCHASE	ADAFRUIT INDUSTRIES
26	8	526	STANDOFF, HEX	PURCHASE	98952A055, MCMASTER-CARR
25	48	525	FASTENER, HUB	PURCHASE	93840A126, MCMASTER-CARR
24	8	524	HUB, MOTOR	PURCHASE	2693, POLOLU
23	4	523	FOOT, SLIP-ON	PURCHASE	2517T71, MCMASTER-CARR
22	24	522	BEARING, SLEEVE	PURCHASE	6679K33, MCMASTER-CARR
21	24	521	BEARING, THRUST	PURCHASE	6655K51, MCMASTER-CARR
20	12	520	FASTENER, LEG-JOINT	PURCHASE	90278A375, MCMASTER-CARR
19	12	519	LOCKNUT, LEG-JOINT	PURCHASE	91270A310, MCMASTER-CARR
18	32	518	FASTENER, MOTOR HOUSING	PURCHASE	91292A114, MCMASTER-CARR
17	32	517	FASTENER, MOTOR	PURCHASE	93705A824, MCMASTER-CARR
16	28	516	HOLDER, CABLE	PURCHASE	7565K31, MCMASTER-CARR
15	16	515	FASTENER, ENCODER	PURCHASE	90666A104, MCMASTER-CARR
14	8	514	ENCODER, CPR	PURCHASE	CVI AMT102-V, ODRIVE
13	8	513	MOTOR, DC	PURCHASE	D5065-270KV, ODRIVE
12	4	512	FASTENER, COVER	PURCHASE	96817A274 MCMASTER-CARR
11	24	511	NUT, HEX	PURCHASE	96557A109 MCMASTER-CARR
10	12	510	WASHER, LOCK	PURCHASE	3573A16 MCMASTER-CARR
9	12	509	FASTENER, LEG MOUNT	PURCHASE	93897A542 MCMASTER-CARR
8	8	508	COVER, MOTOR	ABS	FABRICTAE
7	1	507	COVER	ABS	FABRICATE
6	1	506	BODY	ABS	FABRICATE
5	2	505	MOUNT, LEFT LEG	ABS	FABRICATE
4	2	504	MOUNT, RIGHT LEG	ABS	FABRICATE
3	4	503	LEG, PRIME	ABS	FABRICATE
2	4	502	LEG	ABS	FABRICATE
1	8	501	LEG, UPPER	ABS	FABRICATE
ITEM	QTY	PART NUMBER	DESCRIPTION	MATERIAL	VENDOR OR NOTES

UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS ARE IN MILLIMETERS  
TOLERANCES:  
Bores ± .5  
Radi ± .5  
Lengths ±1  
BEND ± .5  
MATERIAL:

DRAWN  
CHECKED

NAME  
John  
Steven

DATE

TITLE:  
**QUADRUPEd, LILBRO**  
SIZE **B** DWG. NO. **LB18-101** REV  
SCALE: 1:1 WEIGHT: SHEET 1 OF 13

4

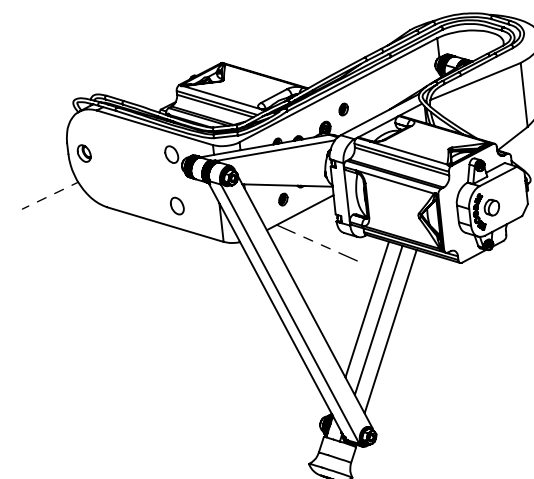
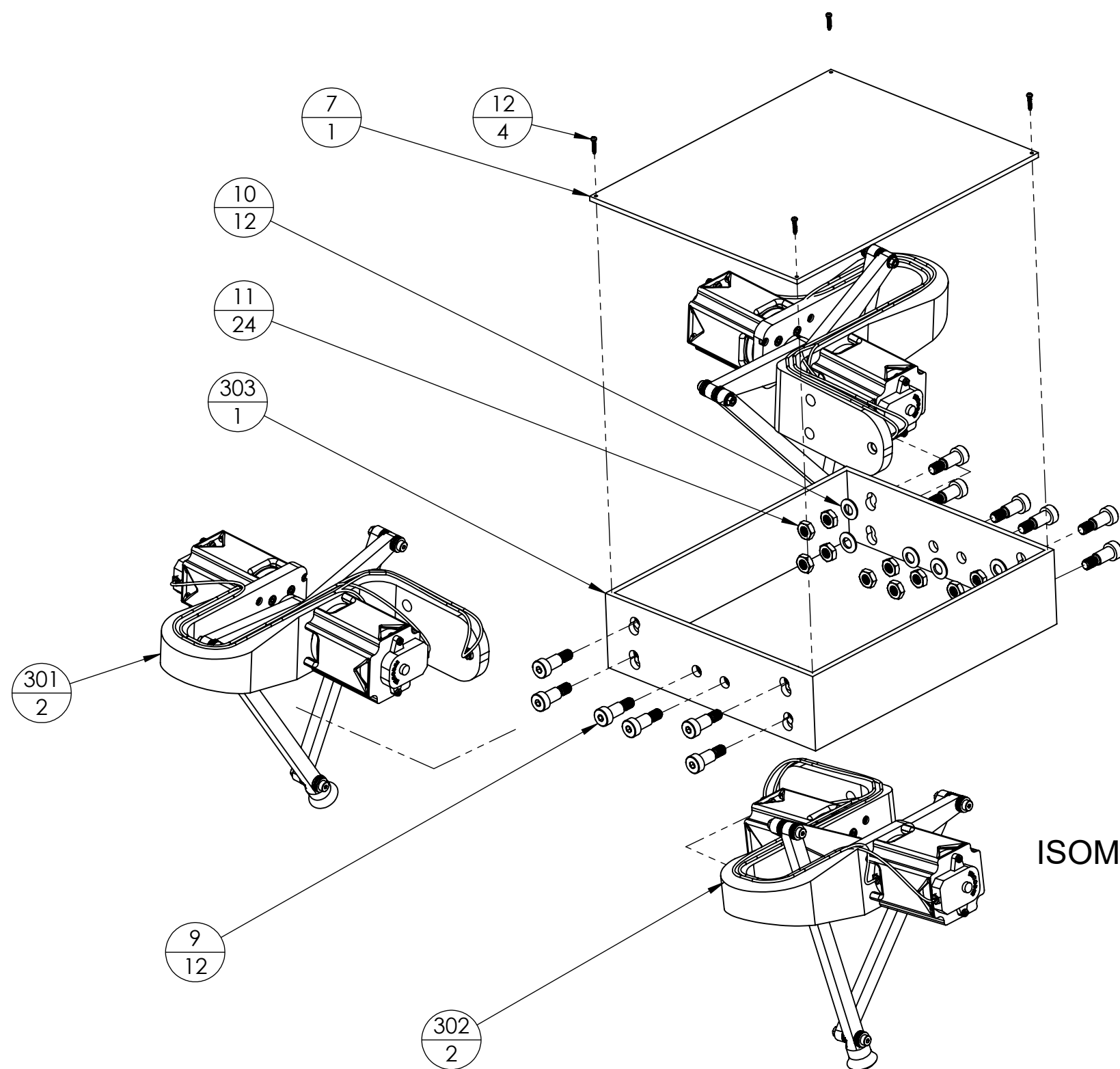
3

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ISOMETRIC VIEW FOR REFERENCE ONLY

SCALE NTS

UNLESS OTHERWISE SPECIFIED:		NAME	DATE	TITLE:	
DIMENSIONS ARE IN MILLIMETERS	DRAWN	John		QUADRUPED, LILBRO	
TOLERANCES:	CHECKED	Steven			
Bores $\pm .5$				SIZE	REV
Radii $\pm .5$				DWG. NO.	
Lengths $\pm 1$				<b>B</b>	LB18-101
BEND $\pm .5$				SCALE: 1:1	WEIGHT:
MATERIAL:				SHEET 2 OF 13	

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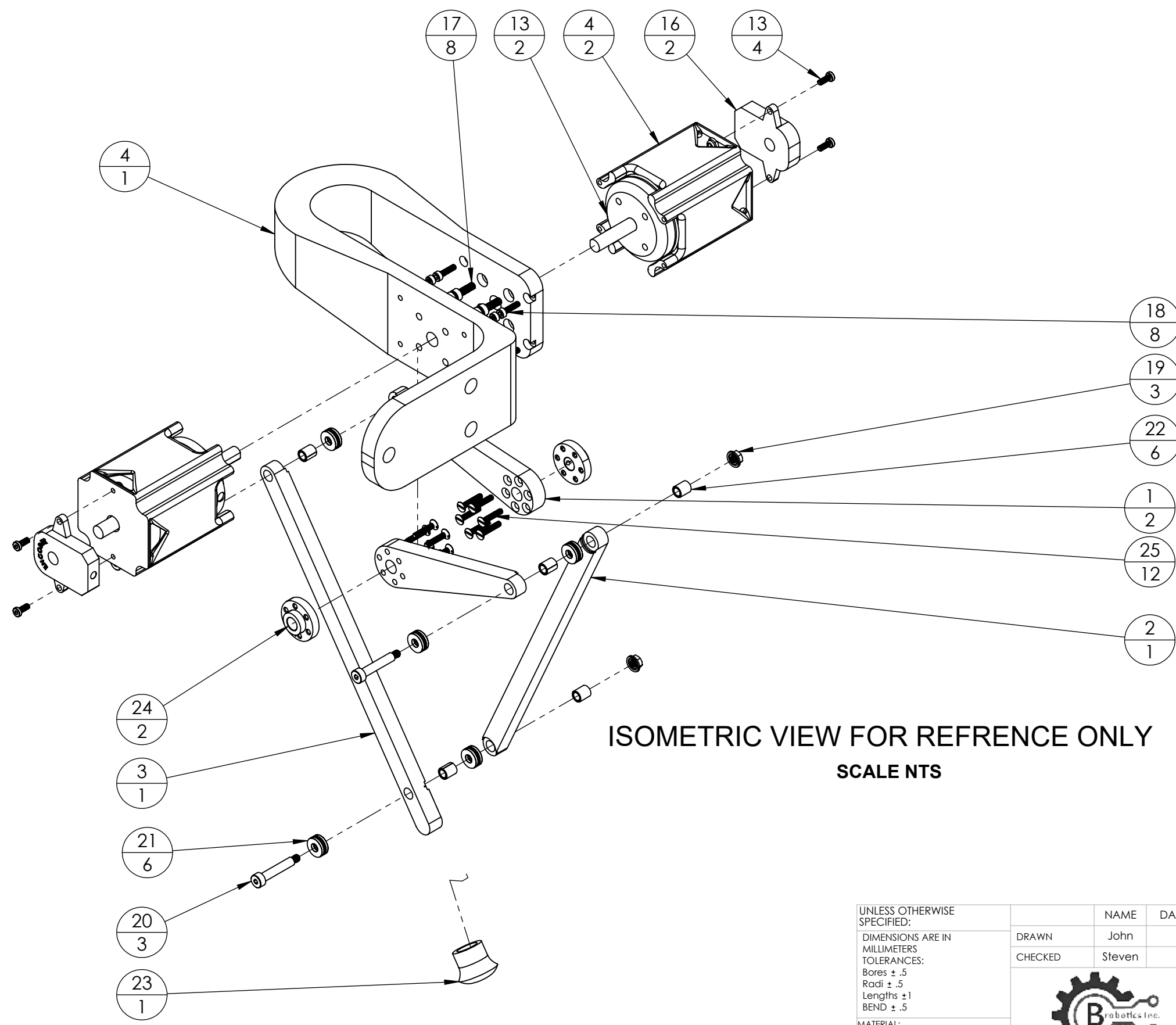
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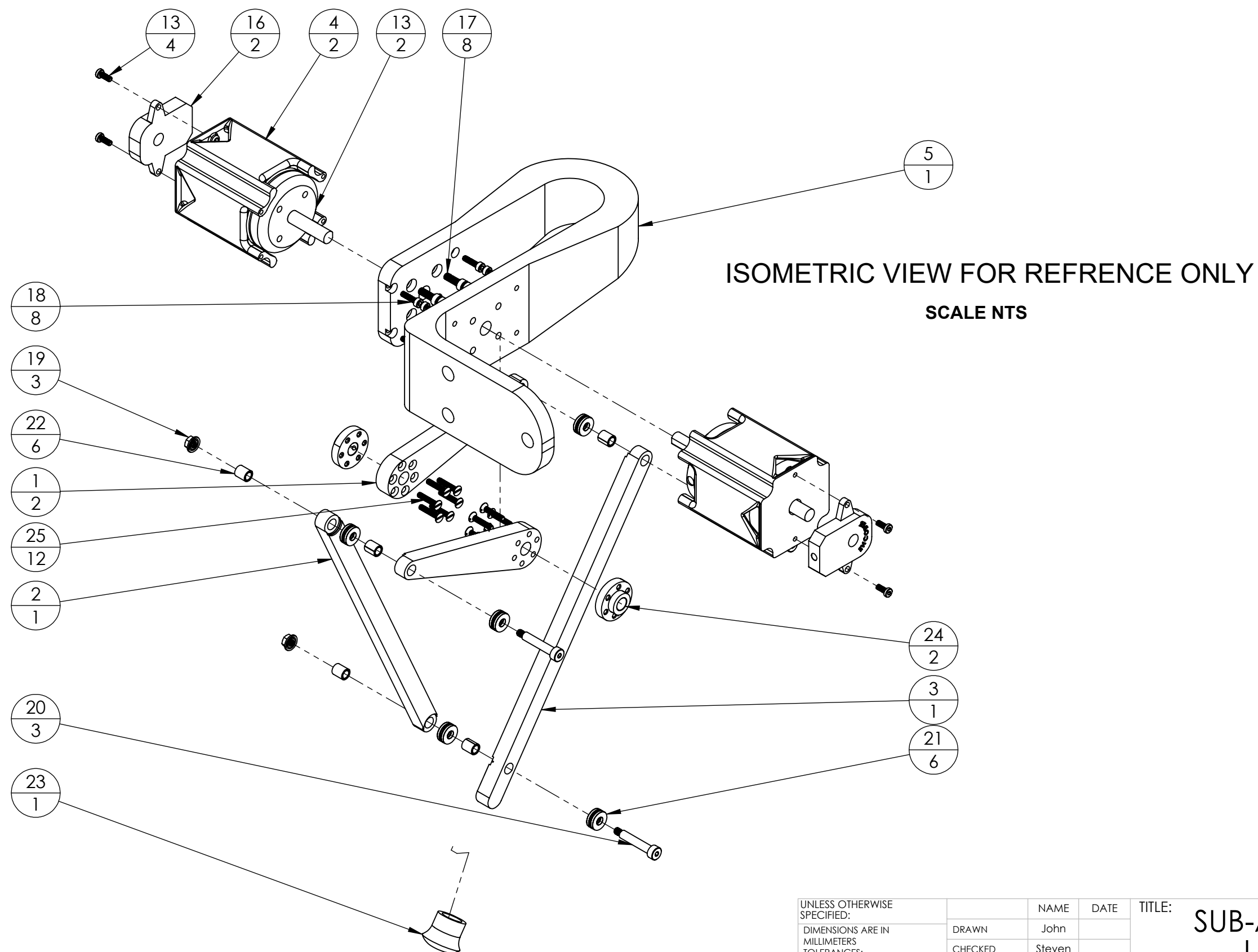
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS TOLERANCES: Bores ± .5 Radi ± .5 Lengths ± 1 BEND ± .5 MATERIAL:		NAME	DATE	TITLE: <b>SUB-ASSEMBLY, RIGHT LEG</b>	
	DRAWN	John			
	CHECKED	Steven		SIZE <b>B</b>	DWG. NO. <b>LB18-301</b>
		REV		SCALE: 1:1 WEIGHT:	
		SHEET 3 OF 13			


4

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1



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS TOLERANCES: Bores $\pm .5$ Radi $\pm .5$ Lengths $\pm 1$ BEND $\pm .5$ MATERIAL:		NAME	DATE	TITLE: SUB-ASSEMBLY, LEFT LEG		
	DRAWN	John				
	CHECKED	Steven				
				SIZE	DWG. NO.	REV
				B	LB18-302	
	SCALE: 1:1		WEIGHT:		SHEET 4 OF 13	

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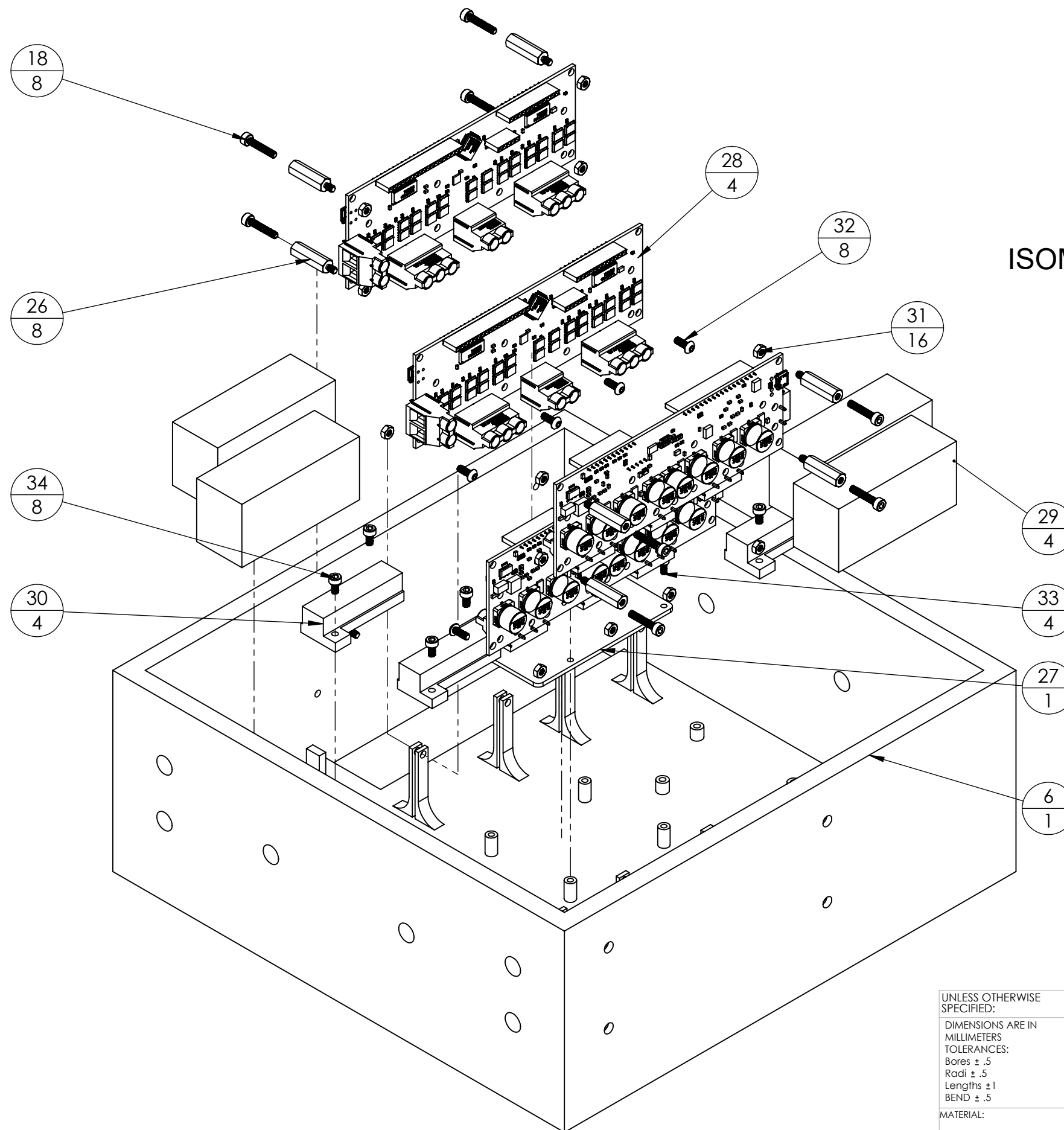
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ISOMETRIC VIEW FOR REFERENCE ONLY

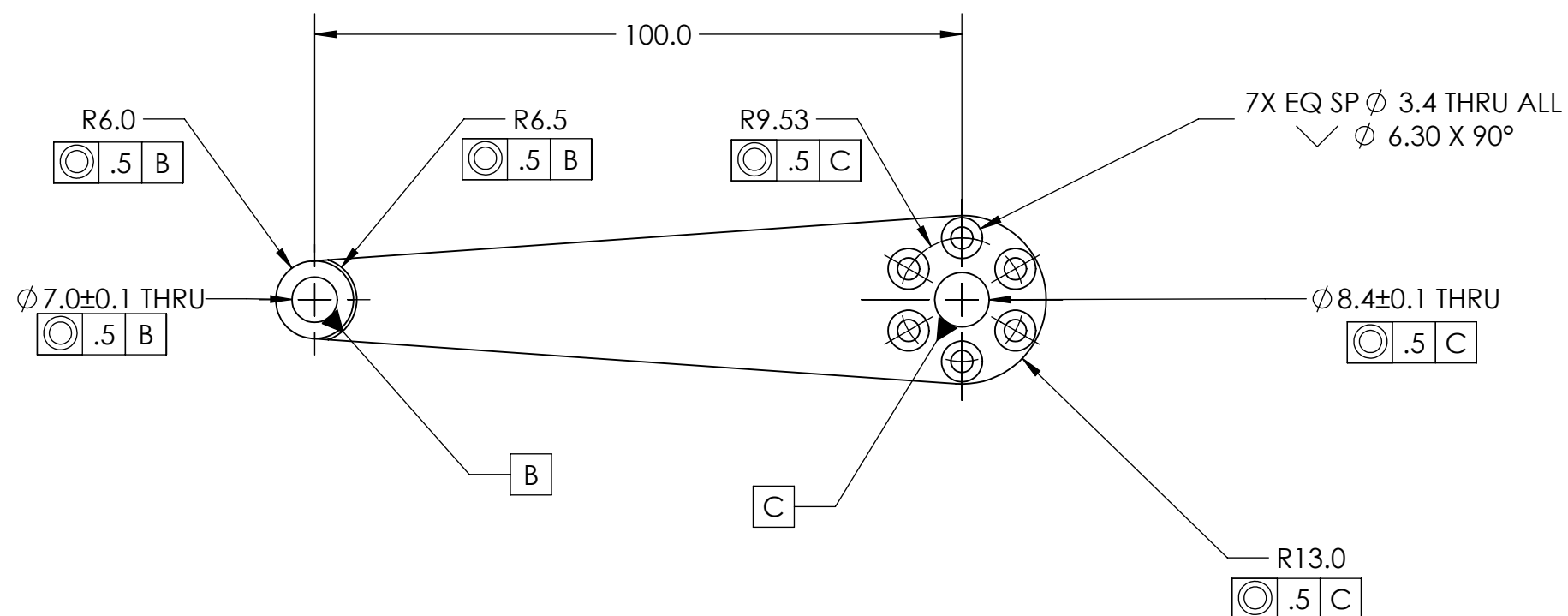
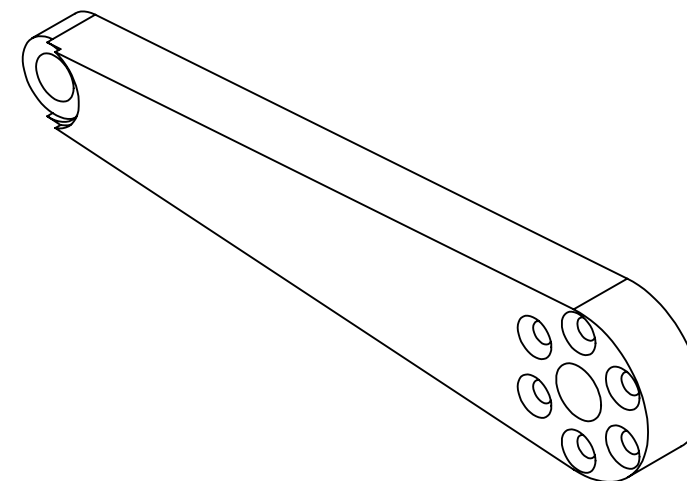
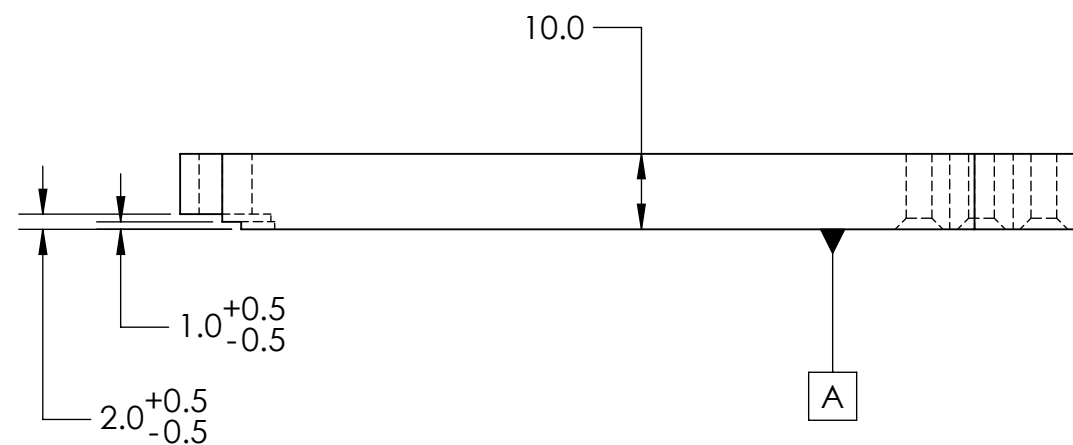
SCALE NTS


UNLESS OTHERWISE SPECIFIED:		NAME	DATE	TITLE: SUB-ASSEMBLY, BODY		
DIMENSIONS ARE IN MILLIMETERS TOLERANCES: Bores ± .5 Radi ± .5 Lengths ±1 BEND ± .5	DRAWN	John				
	CHECKED	Steven				
MATERIAL:  PLA				SIZE	DWG. NO.	REV
				B	LB18-303	
				SCALE: 1:5		WEIGHT:

3

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1



UNLESS OTHERWISE SPECIFIED:		NAME	DATE	TITLE:  <b>LEG, UPPER</b>		
DIMENSIONS ARE IN MILLIMETERS TOLERANCES: Bores $\pm .5$ Radi $\pm .5$ Lengths $\pm 1$ BEND $\pm .5$	DRAWN	John				
	CHECKED	Steven				
MATERIAL  PLA, 80% infill				SIZE	DWG. NO.	REV
				<b>A</b>	<b>LB18-501</b>	
				SCALE: 1:1	WEIGHT:	SHEET 6 OF 13

4

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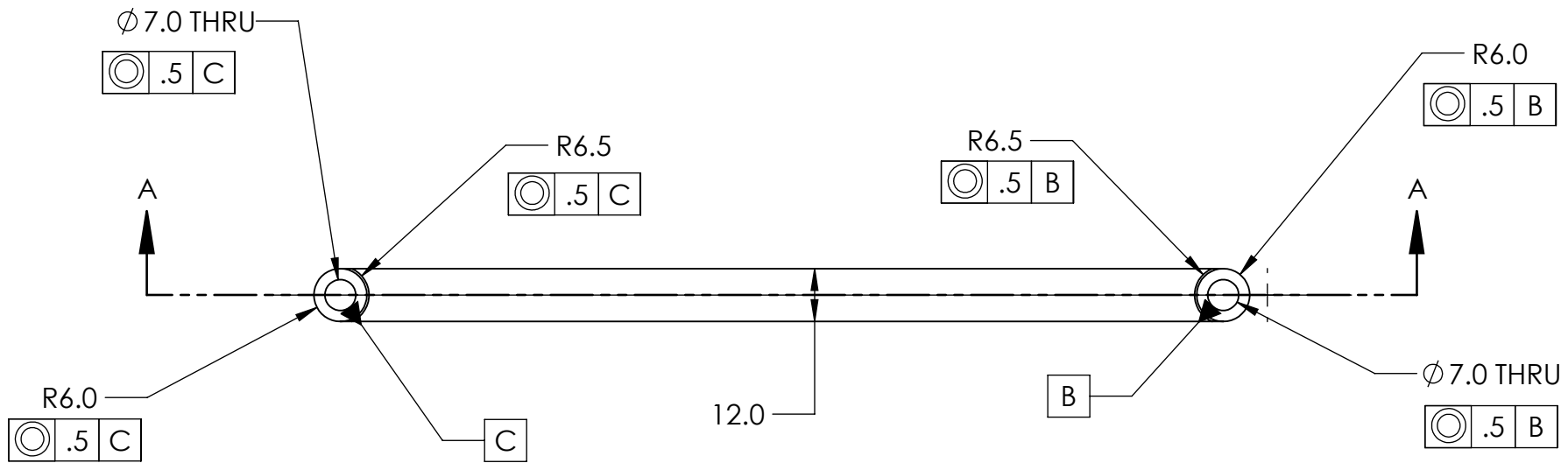
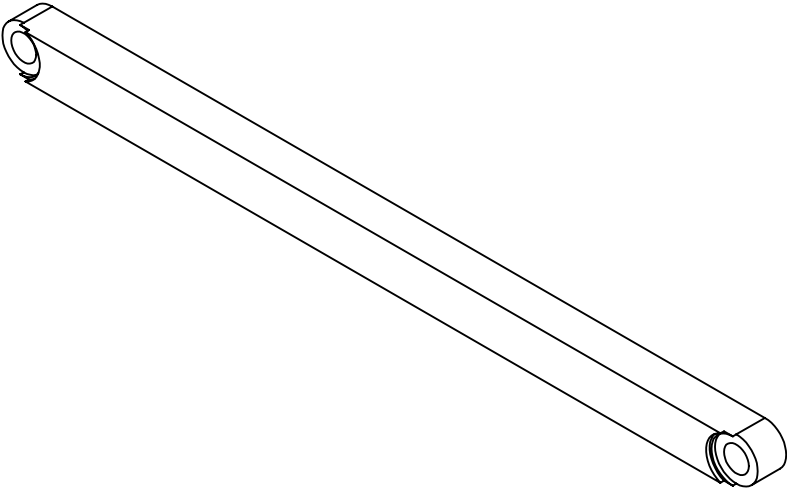
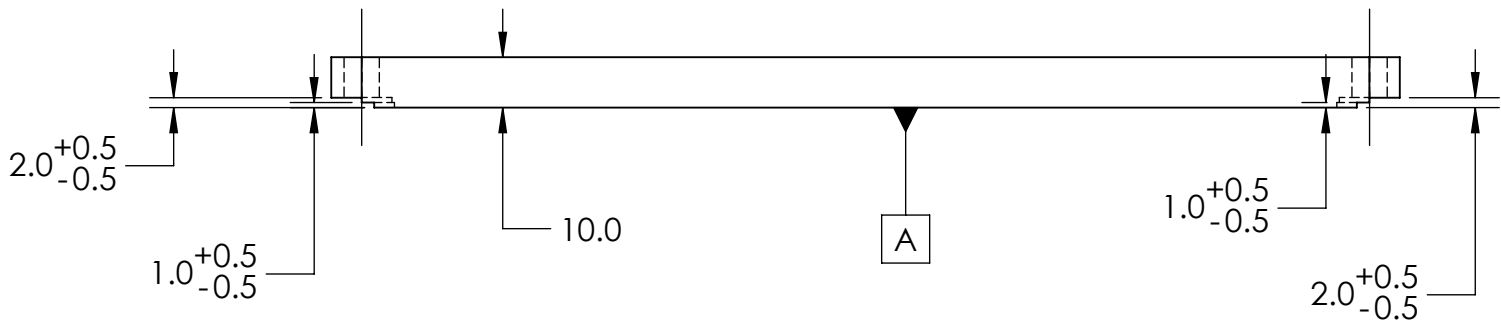
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SECTION A-A

UNLESS OTHERWISE SPECIFIED:		NAME		DATE		TITLE:  LEG							
DIMENSIONS ARE IN MILLIMETERS		DRAWN		John									
TOLERANCES:		CHECKED		Steven		SIZE <b>A</b>							
Bores ± .5										DWG. NO.		REV	
Radii ± .5													
Lengths ± 1													
BEND ± .5						LB18-502							
MATERIAL													
PLA, 80% infill													
DO NOT SCALE DRAWING						SCALE: 2:3		WEIGHT:		SHEET 7 OF 13			

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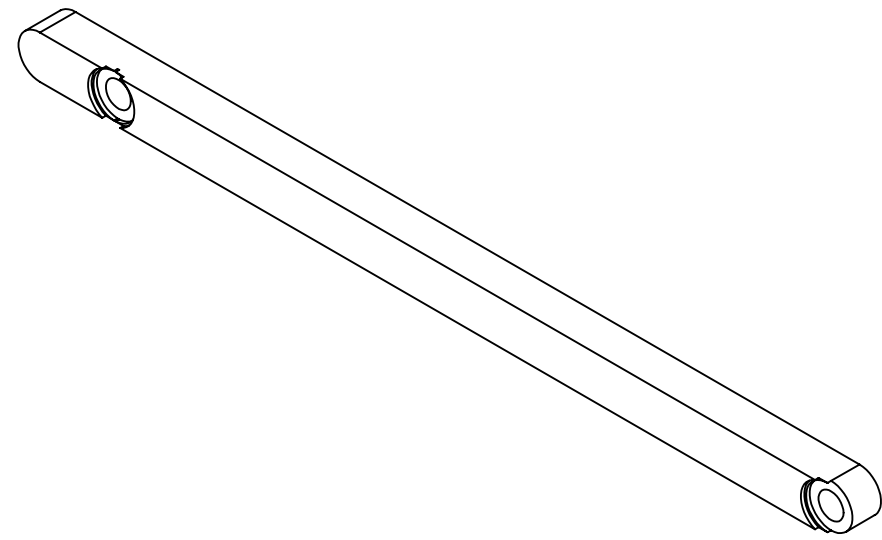
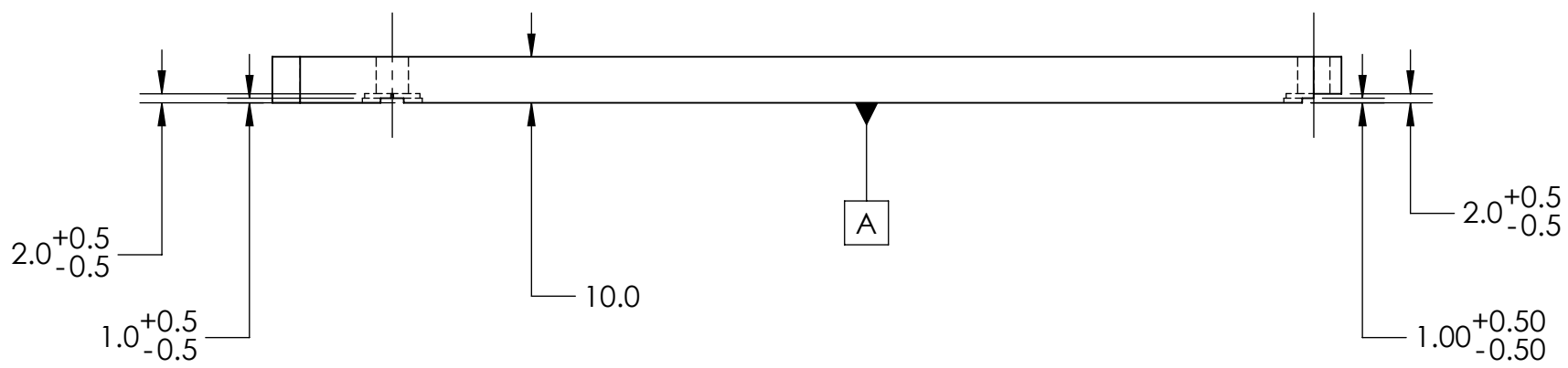
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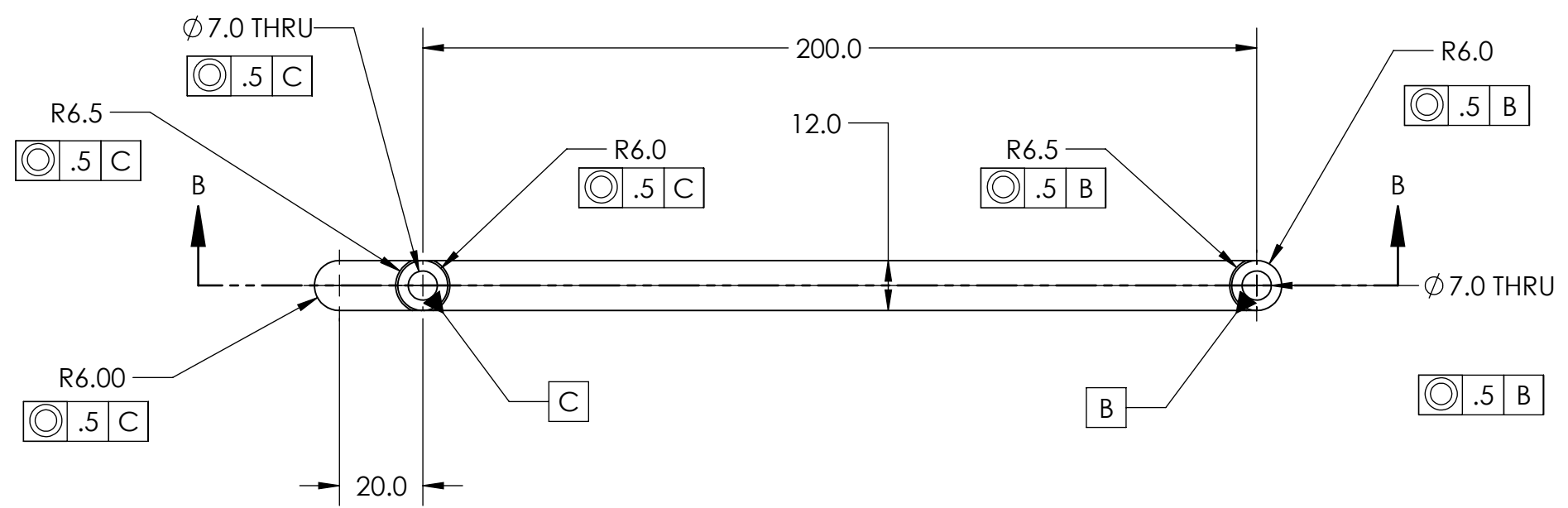
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SECTION B-B

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS TOLERANCES: Bores $\pm .5$ Radi $\pm .5$ Lengths $\pm 1$ BEND $\pm .5$ MATERIAL PLA, 80% infill DO NOT SCALE DRAWING		NAME	DATE	TITLE:  <b>LEG, PRIME</b>		
	DRAWN	John				
	CHECKED	Steven		SIZE	DWG. NO.	REV
			<b>A</b>	<b>LB18-503</b>		
		SCALE: 2:3		WEIGHT:	SHEET 8 OF 13	



4

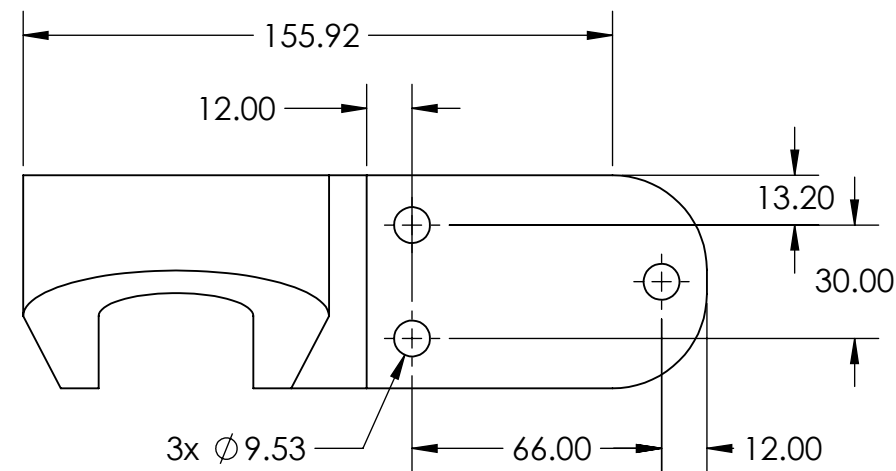
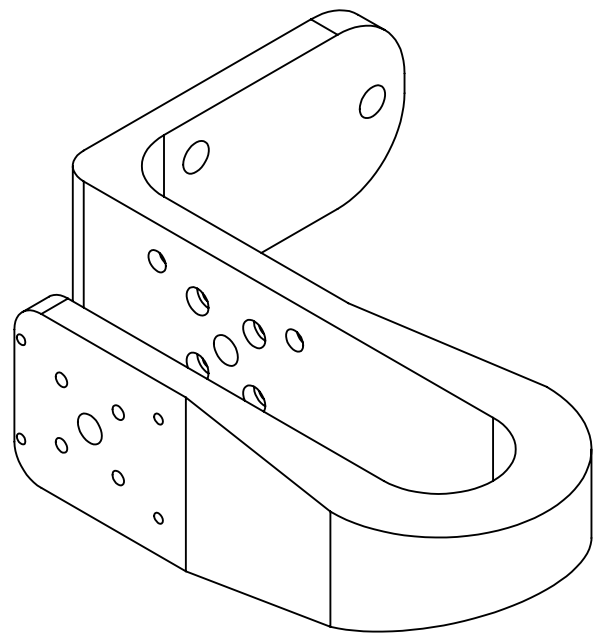
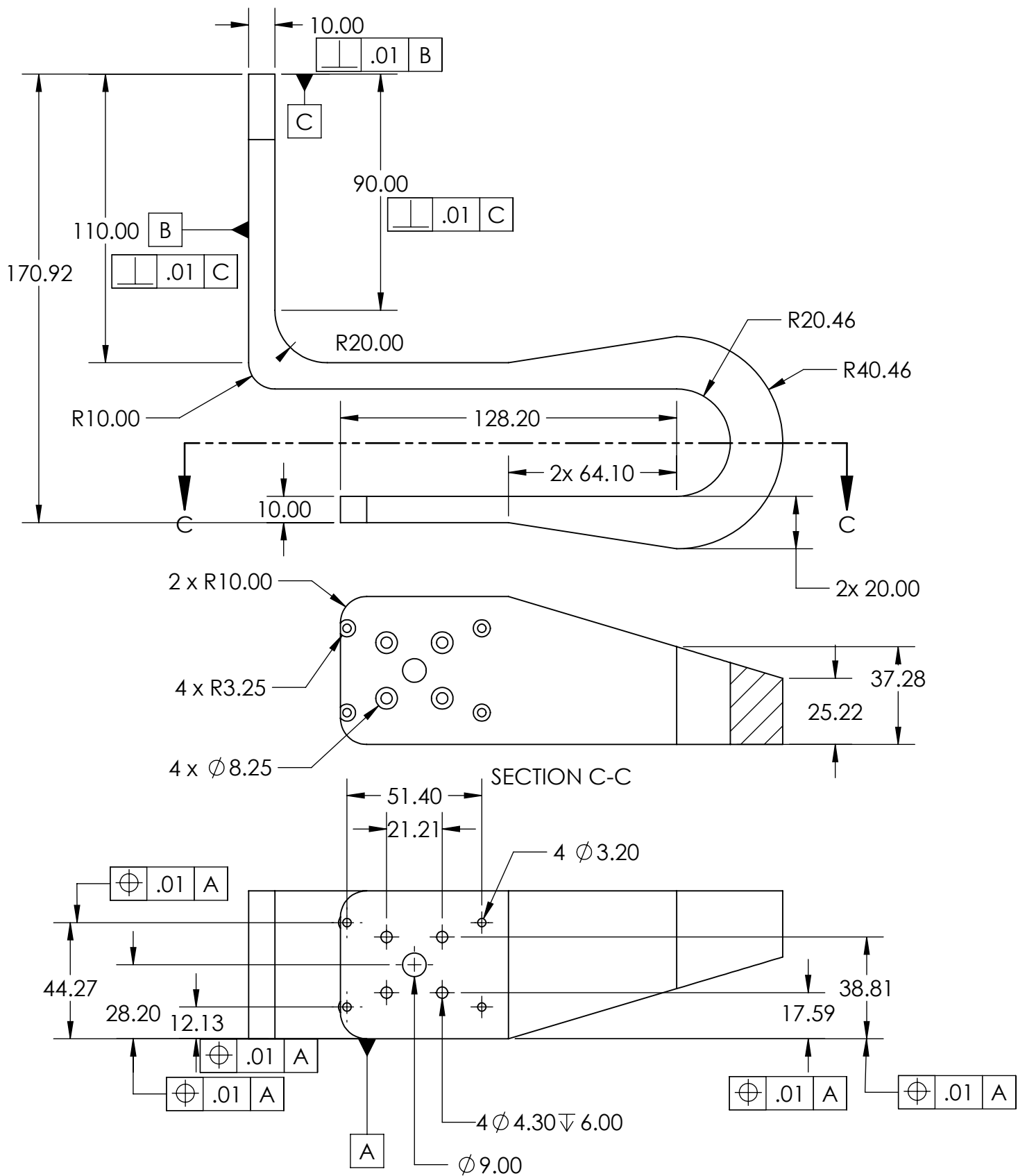
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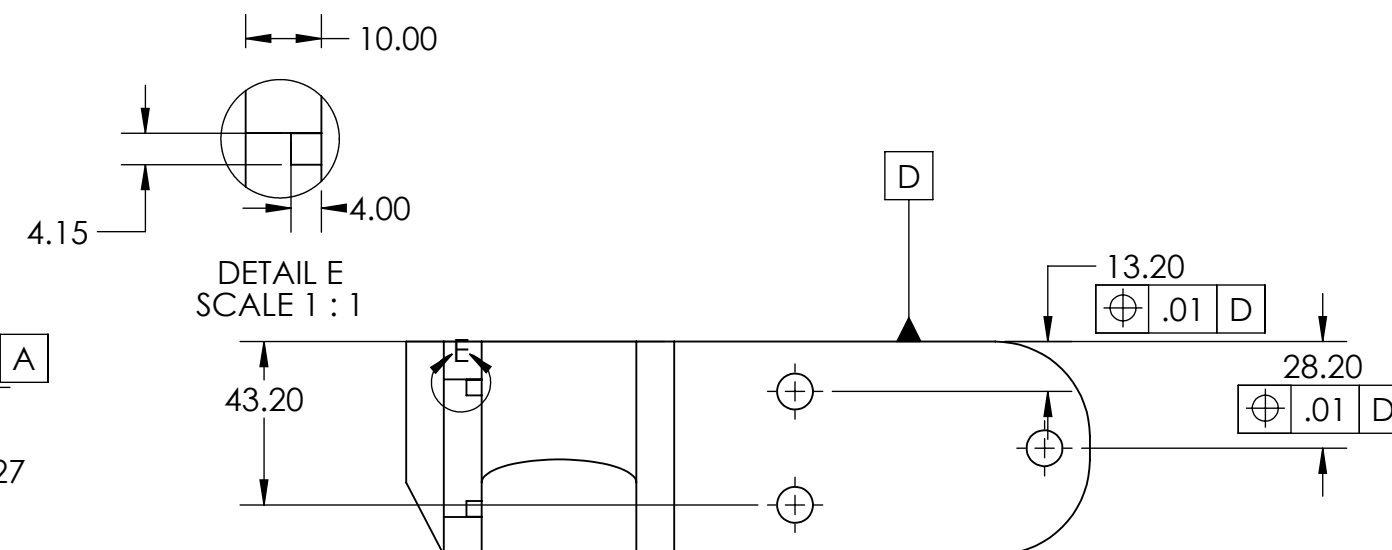
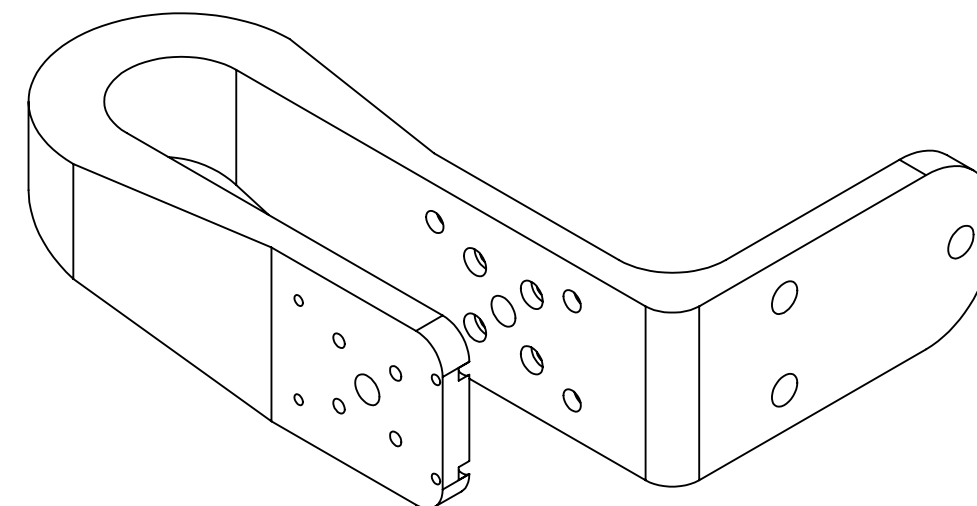
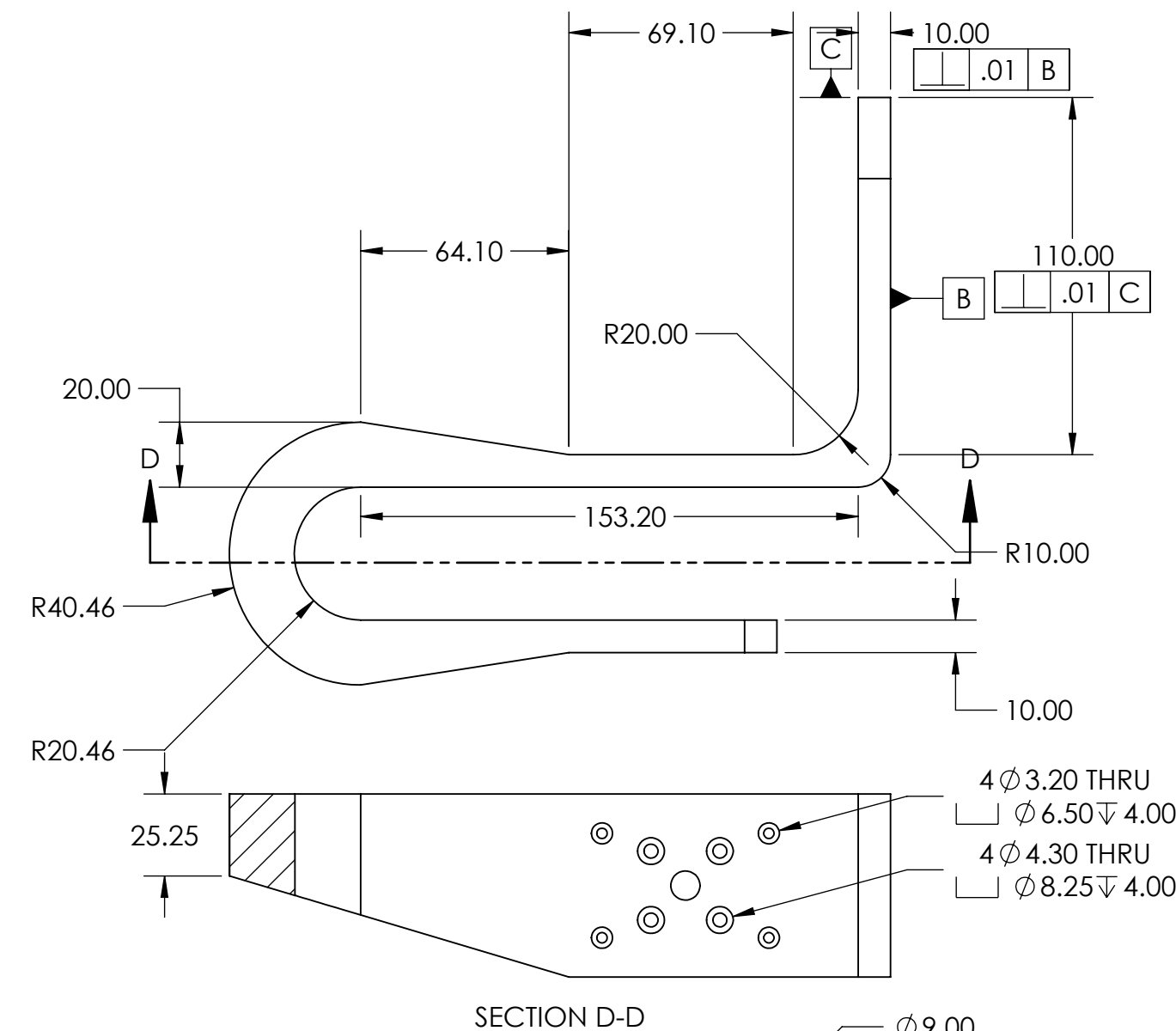



UNLESS OTHERWISE SPECIFIED:		NAME	DATE	TITLE:			
DIMENSIONS ARE IN MILLIMETERS		DRAWN	John	Mount, Right Leg			
TOLERANCES:		CHECKED	Steven				
Bores ± .5							
Radi ± .5							
Lengths ±1							
BEND ± .5							
MATERIAL		SIZE				DWG. NO.	REV
PLA, 80% infill		B				LB18-504	
DO NOT SCALE DRAWING		SCALE: 1:2		WEIGHT:		SHEET 9 OF 13	

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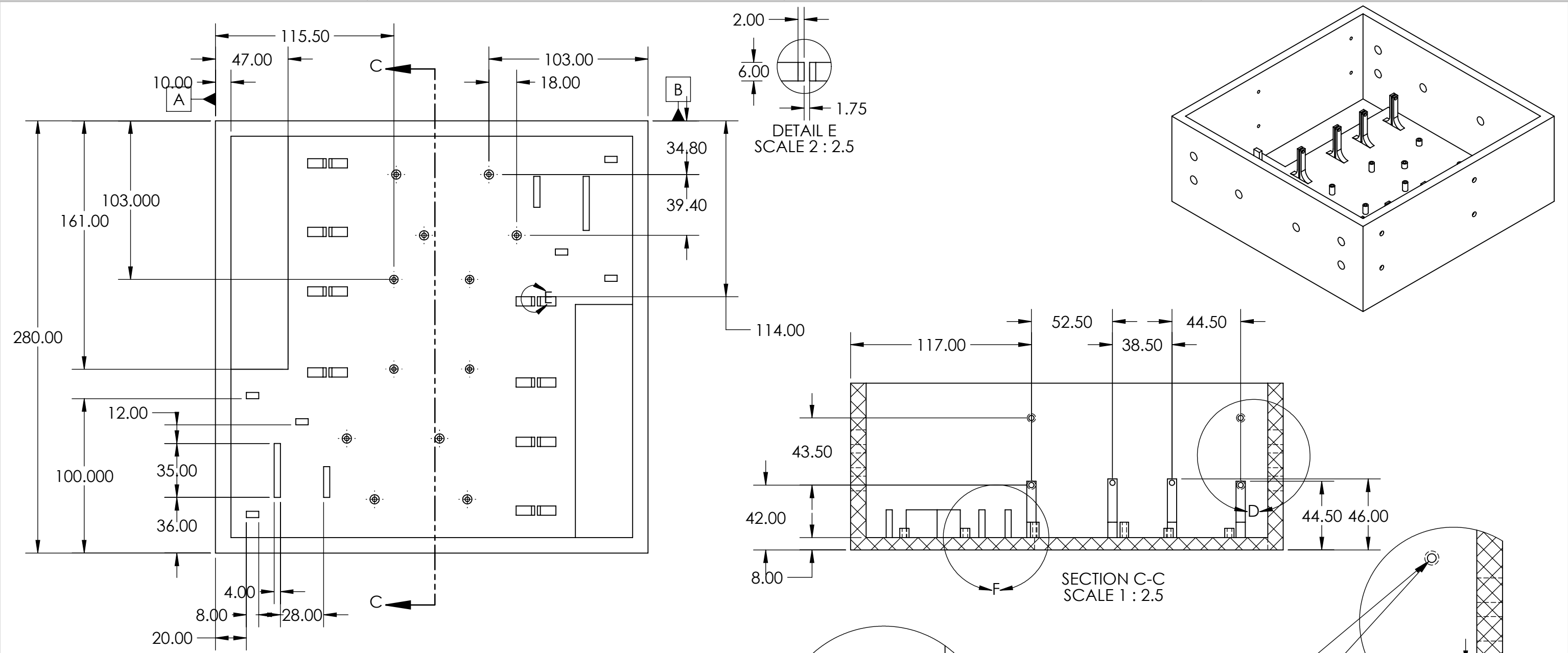


UNLESS OTHERWISE SPECIFIED:		NAME	DATE	TITLE:  Mount, Left Leg		
DIMENSIONS ARE IN MILLIMETERS		DRAWN	John			
TOLERANCES: Bores ± .5 Radi ± .5 Lengths ±1 BEND ± .5		CHECKED	Steven			
MATERIAL  PLA, 80% infill				SIZE <b>B</b>	DWG. NO. <b>LB18-505</b>	REV
DO NOT SCALE DRAWING				SCALE: 1:2	WEIGHT:	SHEET 10 OF 13

4 3 2 1

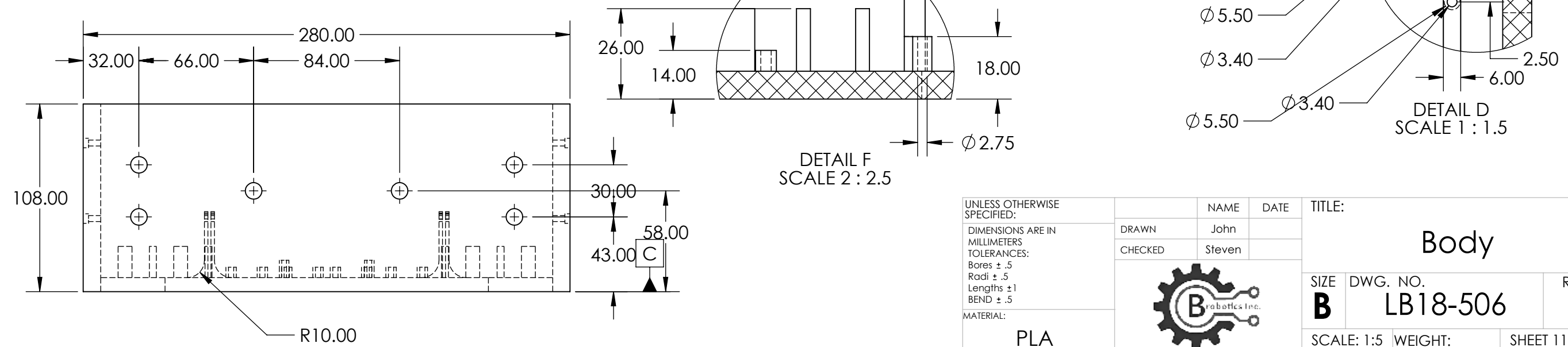
B


B



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A



UNLESS OTHERWISE SPECIFIED:  DIMENSIONS ARE IN MILLIMETERS TOLERANCES: Bores ± .5 Radi ± .5 Lengths ±1 BEND ± .5		NAME	DATE	TITLE:  Body		
	DRAWN	John				
	MATERIAL:  PLA	CHECKED	Steven		SIZE <b>B</b>	DWG. NO. LB18-506
				SCALE: 1:5		
				WEIGHT:		SHEET 11 OF 13

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⌀ 0.5 B C

⌀ 0.5 B C

⌀ 0.5 B C

UNLESS OTHERWISE SPECIFIED:		NAME	DATE	TITLE:  COVER, MOTOR		
DIMENSIONS ARE IN MILLIMETERS	DRAWN	John				
TOLERANCES:	CHECKED	Steven		SIZE <b>B</b>	DWG. NO. LB18-508	REV
Bores ± .5				SCALE: 2:3	WEIGHT:	SHEET 12 OF 13
Radii ± .5						
Lengths ± 1						
BEND ± .5						
MATERIAL:						
PLA						

4

3

2

1

ASSEMBLY INSTRUCTIONS:

- 1) LOCATE ALL PARTS PER BILL OF MATERIALS ON SHEET #1
- 2) ASSEMBLE SUB-ASSEMBLY 301 (2X)

2.1) INSERT A THRUST BEARING(522 6X) INTO EACH OF THE 7MM BORES ON THE LEGS(501, 502, 503)

2.2) FASTEN THE FOUR SECTIONS OF LEGS TOGETHER BY PLACING THE LEG-JOINT FASTENER(520 3X) FIRST THROUGH A THRUST BEARING(521 6X), THEN A LEG SECTION, ANOTHER THRUST BEARING, AND THEN THE OTHER LEG SECTION. USE LEG-JOINT LOCKNUT(519 3X) TO KEEP FASTENERS IN PLACE. (TIGHTEN TO 0.8 IN\*LB)

2.3) PLACE SLIP-ON FOOT(523) ONTO LOWER SECTION OF PRIME LEG(503), USE A DESIRED EPOXY TO KEEP IN PLACE.

2.4) CONNECT A MOTOR HUB(524) TO EACH UPPER LEG(501) USING HUB FASTENERS(525 12X) (TIGHTEN TO A SNUG FIT ONLY USING A FLATHEAD SCREWDRIVER)

2.5) PLACE ROTOR OF DC MOTORS(513 2X) THROUGH THE CENTER BORE OF THE RIGHT LEG MOUNT(504) AND INTO THE MOTOR HUBS. FASTEN MOTORS TO MOUNT USING MOTOR FASTENERS(517 8X) TIGHTEN TO A SNUG FIT USING A 3MM ALLEN WRENCH.

2.6) TIGHTEN SET SCREWS ON MOTOR HUBS USING A 1.5MM ALLEN WRENCH.

2.7) PLACE MOTOR HOUSING(504) OVER EACH DC MOTOR, AND FASTEN IN PLACE USING MOTOR HOUSING FASTENERS(518 8X). (TIGHTEN TO A SNUG FIT USING A 2.5MM ALLEN WRENCH)

2.8) FASTEN AN ENCODER(517) TO EACH MOTOR HOUSING USING ENCODER FASTENER(513 4X) (TIGHTEN TO A SNUG FIT USING A 2MM ALLEN WRENCH)

2.9) PLACE CABLE HOLDERS(516 7X) ALONG THE UPPER SURFACE OF THE MOUNT, AND SECURE CABLES FROM ENCODERS AND MOTORS. (RUN CABLES TOWARDS L-JOINT ON MOUNT)
- 3) ASSEMBLE SUB-ASSEMBLY 302 (2X)

3.1) INSERT A THRUST BEARING(522 6X) INTO EACH OF THE 7MM BORES ON THE LEGS(501, 502, 503)

3.2) FASTEN THE FOUR SECTIONS OF LEGS TOGETHER BY PLACING THE LEG-JOINT FASTENER(520 3X) FIRST THROUGH A THRUST BEARING(521 6X), THEN A LEG SECTION, ANOTHER THRUST BEARING, AND THEN THE OTHER LEG SECTION. USE LEG-JOINT LOCKNUT(519 3X) TO KEEP FASTENERS IN PLACE. (TIGHTEN TO 0.8 IN\*LB)

3.3) PLACE SLIP-ON FOOT(523) ONTO LOWER SECTION OF PRIME LEG(503), USE A DESIRED EPOXY TO KEEP IN PLACE.

3.4) CONNECT A MOTOR HUB(524) TO EACH UPPER LEG(501) USING HUB FASTENERS(525 12X) (TIGHTEN TO A SNUG FIT ONLY USING A FLATHEAD SCREWDRIVER)

3.5) PLACE ROTOR OF DC MOTORS(513 2X) THROUGH THE CENTER BORE OF THE LEFT LEG MOUNT(505) AND INTO THE MOTOR HUBS. FASTEN MOTORS TO MOUNT USING MOTOR FASTENERS(517 8X) TIGHTEN TO A SNUG FIT USING A 3MM ALLEN WRENCH.

3.6) TIGHTEN SET SCREWS ON MOTOR HUBS USING A 1.5MM ALLEN WRENCH.

3.7) PLACE MOTOR HOUSING(504) OVER EACH DC MOTOR, AND FASTEN IN PLACE USING MOTOR HOUSING FASTENERS(518 8X). (TIGHTEN TO A SNUG FIT USING A 2.5MM ALLEN WRENCH)

3.8) FASTEN AN ENCODER(517) TO EACH MOTOR HOUSING USING ENCODER FASTENER(513 4X) (TIGHTEN TO A SNUG FIT USING A 2MM ALLEN WRENCH)

3.9) PLACE CABLE HOLDERS(516 7X) ALONG THE UPPER SURFACE OF THE MOUNT, AND SECURE CABLES FROM ENCODERS AND MOTORS. (RUN CABLES TOWARDS L-JOINT ON MOUNT)
- 4) ASSEMBLE SUB-ASSEMBLY 303

4.1) SECURE RASPBERRY PI (527) WITH STEEL SOCKET SCREWS (533)X4 FOR CENTER MOUNTING HOLES ON BODY WITH ALON KEY .


4.2) SECURE TWO MOTOR DRIVERS (528) BY PLACING A HEX STANDOFF (526)X8 BETWEEN THE WALL AND THE DRIVERS, USING THE CORNER MOUNTING HOLES OF THE DRIVERS, USING A HEX NUT (531)X8 FOR THE STANDOFF. USE A SOCKET SCREW (518)X8 TO SECURE THE STANDOFF AGAINST THE WALL, PLACING THE SCREW THROUGH THE COUNTER-BORED HOLES. USE AN ALON KEY TO SECURE THE SCREWS.

4.3) SECURE REMAINING TWO MOTOR DRIVERS INFRONT OF SECURED DRIVERS, USING THE MOUNTING BRACKETS EXTRUDING FROM THE BODY, WITH STAINLESS STEEL HEAD SCREWS (532)X8 USING AN ALON KEY, AND A HEX NUT (531)X8 TO SECURE IT.

4.4) SECURE BRAKE RESISTORS (530)X4 ON BODY THROUGH MOUNTING HOLES USING ALLOY STEEL SCREWS (534)X8 USING ALON KEY.

4.5) SECURE BATTERIES, BY HAND, IN BODY SLOTS, BETWEEN SECURING EXTRUSIONS

4.6) CONNECT EACH MOTOR DRIVER TO A BATTERY, A BRAKING RESISTOR, TWO MOTORS, TWO ENCODERS, AND THE RASPBERRY PI.
- 5) SECURE EACH LEG ASSEMBLY TO THE BODY(506) USING LEG MOUNT FASTENERS(509 12X), LOCK WASHERS(509 12X), AND HEX NUTS(511 24X). (TIGHTEN FASTENERS USING A 4.5MM ALLEN WRENCH, TO NO MORE THAN 8 IN\*LB. PLACE TWO HEX NUTS ON EACH FASTENER)
- 6) RUN CABLES FROM EACH LEG ASSEMBLY INTO THE BODY, THEN TO COMPONENTS, SECURING THROUGH CABLE HOLDERS.

UNLESS OTHERWISE SPECIFIED:  DIMENSIONS ARE IN MILLIMETERS TOLERANCES: Bores ± .5 Radi ± .5 Lengths ±1 BEND ± .5  MATERIAL:		NAME	DATE	TITLE: <b>ASSEMBLY INSTRUCTIONS</b>		
	DRAWN	John				
	CHECKED	Steven				
				SIZE <b>B</b>	DWG. NO. <b>LB18-101</b>	REV
				SCALE: 1:1	WEIGHT:	SHEET 13 OF 13