

IL.	Mechanical 8	& Aerospace	PROJECT:	
	1	OPEN BUILDS: V-	SLOT LINEAR RAIL	4
	ITEM NO.		PART NUMBER	QTY.



# ENGINEERING

# PLED TEAM

### **UtahState** University DRAFTED BY: T.SHORTHILL

PART/ASSEM NAME:	V-SLOT_600

PART/ASSEM NUMBER:	-

	1
ASSEM NUMBER: -	APPROVED BY: C.WOOD

MATERIAL:	ALUMINUM
FINISH: BL	ACK ANODIZED

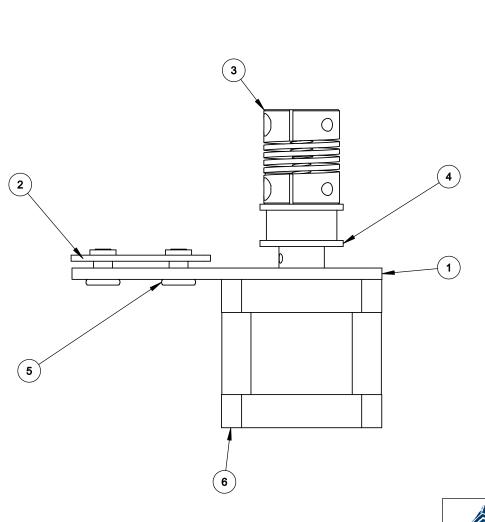
CHECKED BY:	Z.GARRA

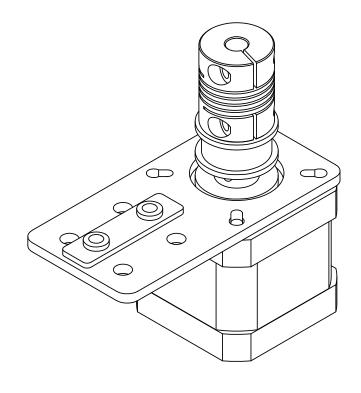
	DATE APPROVED: 4/26/2016
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SHEET SCALE: 1:3	SHEET NUMBER:	1 of 1
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DEFAULT DIMENSIONAL TOLERANCES:
LINEAR DIMENSIONS (inches): X±.5, X.X±.1, X.XX±.03, X.XXX±.05
ANGULAR DIMENSIONS (degrees): X±3, X.X±.5, X.XX±.1
MINIMUM SURFACE FINISH: 1000 microinches

UNLESS OTHERWISE NOTED
DRAWING ARE CREATED IN ACCORDANCE TO ASME Y14.5-2009





ITEM NO.	PART NUMBER	QTY.
1	MOD_NEMA_17_MOUNT_PLATE	1
2	Double Tee Nut	1
3	Flexible Coupling 5mm x 6mm	1
4	GT2 Timing Pulley 30 Tooth	1
5	M5 x 8	2
6	NEMA_17_MOTOR	1



## Mechanical & Aerospace ENGINEERING

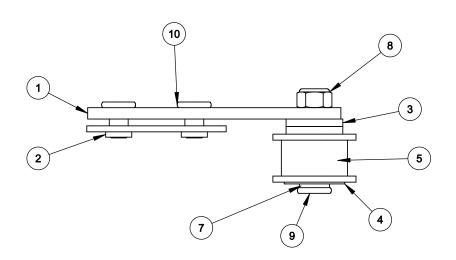
### PROJECT: PLED TEAM

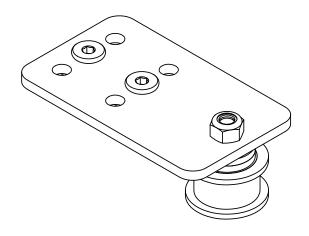
I HahState | Injugasity | DRAFTED BY: T SHORTHILL

**SPECIFICATIONS AND TOLERANCES** 

UNLESS OTHERWISE NOTED
DRAWING ARE CREATED IN ACCORDANCE TO ASME Y14.5-2009

Otalistate Offiversity	DRAFTED BT. 1.3HORT	IILL	
PART/ASSEM NAME: MOTOR MOUNT	CHECKED BY: Z.GARRA	ARD	
PART/ASSEM NUMBER: -	APPROVED BY: C.WOO	D	
MATERIAL: -	DATE APPROVED: 4/26/2016		
FINISH: -	SHEET SCALE: 1:2	SHEET NUMBER:	1 of 1





ITEM NO.	PART NUMBER	QTY.
1	Idler Pulley Plate	1
2	Double Tee Nut	1
3	Slot Washer 15 x 5 x 2	2
4	Ball Bearing 5 x 16 x 5	2
5	Smooth Idler Pulley Wheel	1
6	Nylon Spacer 0.125in	1
7	Precision Shim 8 x 5 x 1	1
8	Nylon Insert Lock Nut M5	1
9	M5 x 25	1
10	M5 x 8	2



## Mechanical & Aerospace **ENGINEERING**

# PLED TEAM

**PROJECT:** 

SHEET SCALE: 1:1

### **SPECIFICATIONS AND TOLERANCES**

UNLESS OTHERWISE NOTED
DRAWING ARE CREATED IN ACCORDANCE TO ASME Y14.5-2009

DEFAULT DIMENSIONAL TOLERANCES:
LINEAR DIMENSIONS [inches]: X±.5, X.X±.1, X.XX±.03, X.XXX±.05
ANGULAR DIMENSIONS] degrees]: X±3, X.X±.5, X.XX±.1
MINIMUM SURFACE FINISH: 1000 microinches

# UtahState University

# PART/ASSEM NAME: FREE IDLER PULLY

PART/ASSEM NUMBER:	-
MATERIAL	

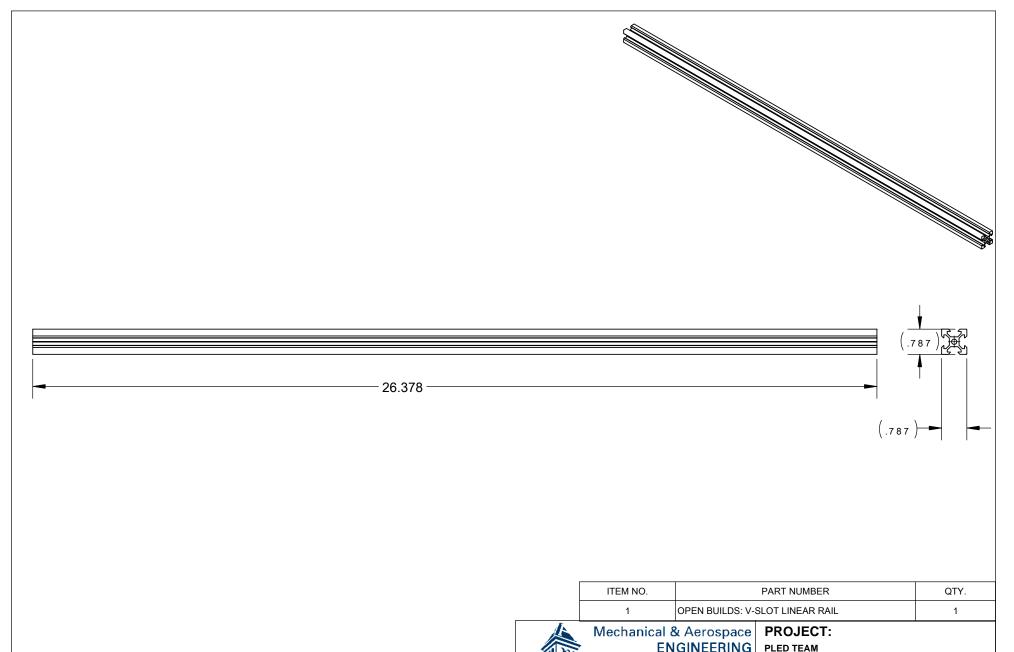
MATERIAL:	-
FINISH: -	

## DRAFTED BY: T.SHORTHILL

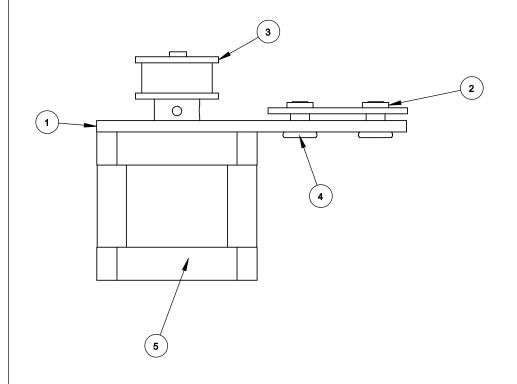
CHECKED BY: Z.GARRARD APPROVED BY: C.WOOD

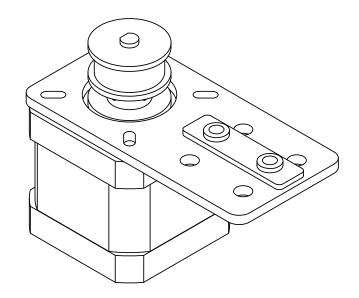
DATE APPROVED: 4/26/2016

SHEET NUMBER: 1 of 1



	ENGINEERING		
	<b>UtahState</b> University	DRAFTED BY: T.SHORTH	HILL
SPECIFICATIONS AND TOLERANCES	PART/ASSEM NAME: V-SLOT_670	CHECKED BY: Z.GARRA	ARD
UNLESS OTHERWISE NOTED DRAWING ARE CREATED IN ACCORDANCE TO ASME Y14.5-2009	PART/ASSEM NUMBER: -	APPROVED BY: C.WOO	D
DEFAULT DIMENSIONAL TOLERANCES: LINEAR DIMENSIONS [inches]: X±.5, X.X±.1, X.XX±.03, X.XXX±.005	MATERIAL: ALUMINUM	DATE APPROVED: 4/26/2	016
ANGULAR DIMENSIONS [degrees]: X±3, XX±5, XXX±1 MINIMUM SURFACE FINISH: 1000 microinches	FINISH: BLACK ANODIZED	SHEET SCALE: 1:8	SHEET NUMBER: 1 of 1

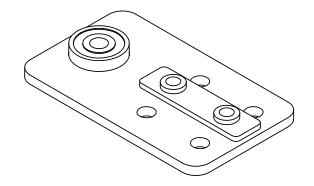


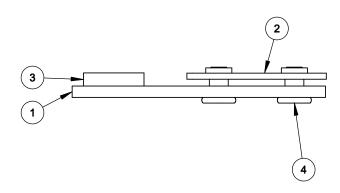


NOTE: M3 SOCKET HEAD CAP SCREWS REQUIRED FOR MOUNTING NEMA 17 MOTOR TO PLATE.

ITEM NO.	PART NUMBER	QTY.
1	Motor Mount Plate Nema 17	1
2	Double Tee Nut	1
3	GT2 Timing Pulley 30 Tooth	1
4	M5 x 8	2
5	NEMA_17_MOTOR	1

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	<u></u> Mec	hanical & Aeros	pace	PROJECT:		
		ENGINEER	RING	PLED TEAM		
	Ut	<b>ahState</b> Unive	rsity	DRAFTED BY: T.SHORT	HILL	
SPECIFICATIONS AND TOLERANCES	PART/ASSEM NAME:	MOTOR MOUNT 2		CHECKED BY: Z.GARR	ARD	
UNLESS OTHERWISE NOTED DRAWING ARE CREATED IN ACCORDANCE TO ASME Y14.5-2009	PART/ASSEM NUMBER	R: -		APPROVED BY: C.WOO	D	
DEFAULT DIMENSIONAL TOLERANCES: LINEAR DIMENSIONS [inches]: X±5, X.X±1, X.XX±.03, X.XXX±.005	MATERIAL: -			DATE APPROVED: 4/26/2	016	
ANGULAR DIMENSIONS (degrees): X±3, X.X±.5, X.XX±.1 MINIMUM SURFACE FINISH: 1000 microinches	FINISH: -			SHEET SCALE: 1:2	SHEET NUMBER:	1 of 1





SPECIFICATIONS AND TOLERANCES

UNLESS OTHERWISE NOTED

DRAWING ARE CREATED IN ACCORDANCE TO ASME Y14.5-2009

DEFAULT DIMENSIONAL TOLERANCES:
LINEAR DIMENSIONS [inches]: X±.5, X.X±.1, X.XX±.03, X.XXX±.005
ANGULAR DIMENSIONS] degrees]: X.3, X.X±.5, X.XX±.1
MINIMUM SURFACE FINISH: 1000 microinches

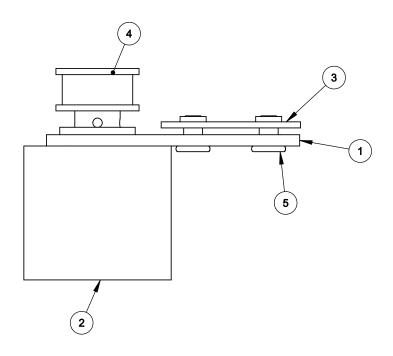
FINISH: -

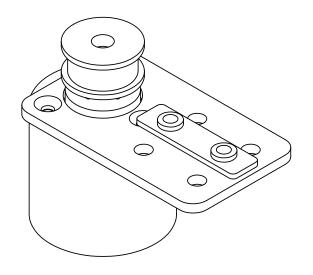
ITEM NO.	PART NUMBER	QTY.
1	BEARING_PLATE	1
2	Double Tee Nut	1
3	Ball Bearing 5 x 16 x 5	1
4	M5 x 8	2

SHEET SCALE: 1:1

SHEET NUMBER: 1 of 1

		Mechanical & Aerospace ENGINEERING		
		<b>UtahState</b> University	DRAFTED BY: T.SHORTHILL	
	PART/ASSEM N	AME: BEARING MOUNT	CHECKED BY: Z.GARRARD	
	PART/ASSEM N	UMBER: -	APPROVED BY: C.WOOD	
	MATERIAL: -		DATE APPROVED: 4/26/2016	

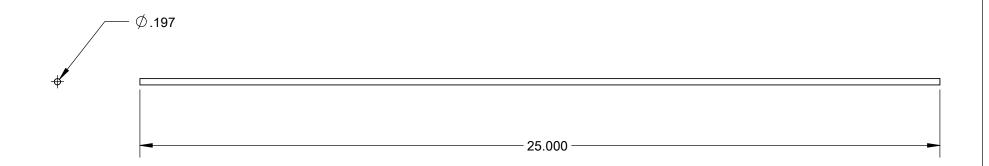




NOTE: 3M FLAT HEAD SCREWS ARE NEEDED TO MOUNT **ENCODER TO THE PLATE.** 

ITEM NO.	PART NUMBER	QT7.
1	Encoder_Plate	1
2	ENCODER	1
3	Double Tee Nut	1
4	PULLEY_6MM	1
5	M5 x 8	2

	Mechanical & Aerospace	PROJECT:	
	ENGINEERING	PLED TEAM	
	<b>UtahState</b> University	DRAFTED BY: T.SHORTHILL	
SPECIFICATIONS AND TOLERANCES	PART/ASSEM NAME: ENCODER MOUNT	CHECKED BY: Z.GARRARD	
UNLESS OTHERWISE NOTED DRAWING ARE CREATED IN ACCORDANCE TO ASME Y14.5-2009	PART/ASSEM NUMBER: -	APPROVED BY: C.WOOD	
DEFAULT DIMENSIONAL TOLERANCES: LINEAR DIMENSIONS (inches): X±.5, X.X±.1, X.XX±.03, X.XXX±.005	MATERIAL: -	DATE APPROVED: 4/26/2016	
ANGULAR DIMENSIONS [degrees]: X±3, XX±5, XXX±.1  MINIMUM SURFACE FINISH: 1000 microinches	FINISH: -	SHEET SCALE: 1:2 SHEET NUMBER: 1 of 1	



**NOTE: 5MM DIAMETER SHAFT** 

ITEM NO. PART NUMBER QTY. SHAFT\_5mm 1

Mechanical & Aerospace ENGINEERING
UtahState University
PART/ASSEM NAME: SHAFT_5mm
PART/ASSEM NUMBER: -

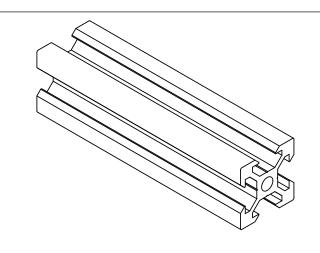
PROJECT: RING PLED TEAM

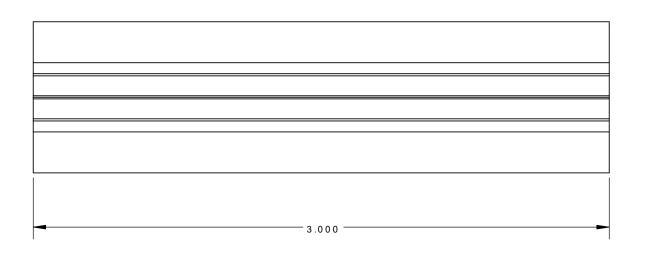
ersity DRAFTED BY: T.SHORTHILL

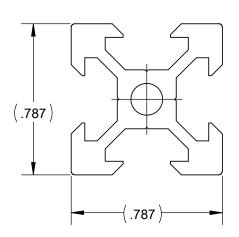
**SPECIFICATIONS AND TOLERANCES** 

UNLESS OTHERWISE NOTED
DRAWING ARE CREATED IN ACCORDANCE TO ASME Y14.5-2009

PART/ASSEM NAME: SHAFT_5mm	CHECKED BY: Z.GARRARD		
PART/ASSEM NUMBER: -	APPROVED BY: C.WOOD  DATE APPROVED: 4/26/2016		
MATERIAL: 316 STAINLESS (OR EQUIVALENT)			
FINISH: -	SHEET SCALE: 1:8	SHEET NUMBER: 1 of 1	







ITEM NO.	PART NUMBER	QTY.
1	OPEN BUILDS: V-SLOT LINEAR RAIL	4

SPECIFICATIONS AND TOLERANCES	PART/ASSEM NA

## Mechanical & Aerospace ENGINEERING

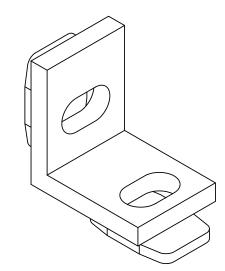
## PROJECT: PLED TEAM

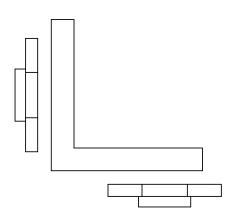
## **UtahState** University

## DRAFTED BY: T.SHORTHILL

UNLESS OTHERWISE NOTED
DRAWING ARE CREATED IN ACCORDANCE TO ASME Y14.5-2009

PART/ASSEM NAME: V-SLOT_LEGS	CHECKED BY: Z.GARRARD		
PART/ASSEM NUMBER: -	APPROVED BY: C.WOOD		
MATERIAL: ALUMINUM	DATE APPROVED: 4/26/2016		
FINISH: BLACK ANODIZED	SHEET SCALE: 2:1	SHEET NUMBER: 1 of 1	



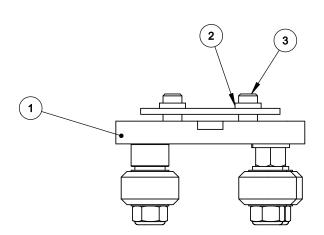


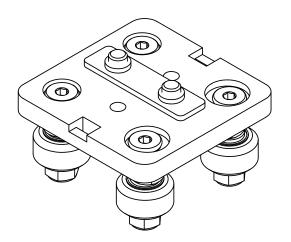
NOTE: THESE ARE ASSEMBLED WITH M5 SCREWS 8-10 mm LENGTH

ITEM NO.	PART NUMBER	QTY.
1	L Bracket Single	1
2	Tee Nut	2

	Mechanical & Aerospace ENGINEERING		
	<b>UtahState</b> University	DRAFTED BY: T.SHORTI	HILL
CES PART/ASSEM NAME: CORNER BRACKET		CHECKED BY: Z.GARRARD	
-2009	PART/ASSEM NUMBER: -	APPROVED BY: C.WOOD	
+.005	MATERIAL: -	DATE APPROVED: 4/26/2016	
±.005	FINISH: -	SHEET SCALE: 2:1	SHEET NUMBER: 1 of 1

	iviectiatiical & Aerospace	FROJECT.
	ENGINEERING	PLED TEAM
	<b>UtahState</b> University	DRAFTED BY: T.SHORTHILL
SPECIFICATIONS AND TOLERANCES	PART/ASSEM NAME: CORNER BRACKET	CHECKED BY: Z.GARRARD
UNLESS OTHERWISE NOTED DRAWING ARE CREATED IN ACCORDANCE TO ASME Y14.5-2009	PART/ASSEM NUMBER: -	APPROVED BY: C.WOOD
DEFAULT DIMENSIONAL TOLERANCES: LINEAR DIMENSIONS [inches]: X±5, X.X±1, X.XX±.03, X.XXX±.005	MATERIAL: -	DATE APPROVED: 4/26/2016
ANGULAR DIMENSIONS (degrees): X±3, X.X±.5, X.XX±.1  MINIMUM SURFACE FINISH: 1000 microinches	FINISH: -	SHEET SCALE: 2:1 SHEET NUMBER: 1 of 1





ITEM NO.	PART NUMBER	QTY.
1	MOD_MINI_V_GANTRY	1
2	Double Tee Nut	1
3	M5 x 10	2



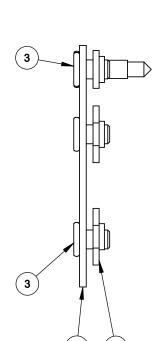
PROJECT:
DI ED TEAM

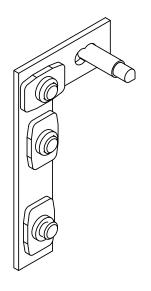
ItahState University DRAFTED BY: T.SHORTHILL

### **SPECIFICATIONS AND TOLERANCES**

UNLESS OTHERWISE NOTED
DRAWING ARE CREATED IN ACCORDANCE TO ASME Y14.5-2009

The Otalistate Offiversity	DIALIED DI. 1.0110KII	IILL
PART/ASSEM NAME: MOD_MINI_V_GANTRY_ASSEMBHECKED BY: Z.GARRARD		
PART/ASSEM NUMBER: -	APPROVED BY: C.WOO	D
MATERIAL: -	DATE APPROVED: 4/26/2	016
FINISH: -	SHEET SCALE: 1:1	SHEET NUMBER: 1 of 1





ITEM NO.	PART NUMBER	QTY.
1	ZINC PLATED STEEL 2.5 INCH L- BRACKET	1
2	Self Tapping Screw	1
3	M5 x 8	3
4	Tee Nut	3

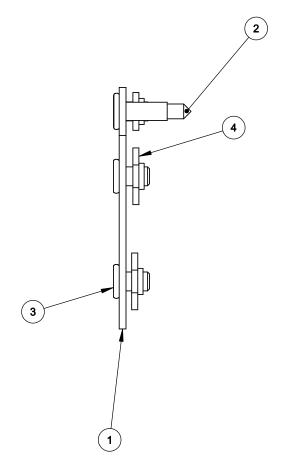


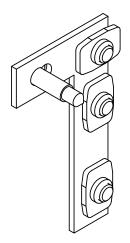
## Mechanical & Aerospace PROJECT: ENGINEERING PLED TEAM

**SPECIFICATIONS AND TOLERANCES** 

UNLESS OTHERWISE NOTED
DRAWING ARE CREATED IN ACCORDANCE TO ASME Y14.5-2009

UtahState University	DRAFTED BY: T.SHORTHILL	
PART/ASSEM NAME: L BRACKET ASSEMBLY	CHECKED BY: Z.GARRARD	
PART/ASSEM NUMBER: -	APPROVED BY: C.WOOD	
MATERIAL: -	DATE APPROVED: 4/26/2016	
FINISH: -	SHEET SCALE: 1:1 SHEET NUMBER: 1 of 1	





ITEM NO.	PART NUMBER	QTY.
1	ZINC PLATED STEEL 2.5 INCH L- BRACKET	1
2	Self Tapping Screw	1
3	M5 x 8	3
4	Tee Nut	3



Mechanical & Aerospace ENGINEERING PLED TEAM

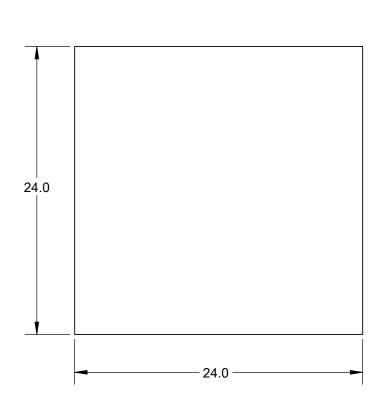
PROJECT:

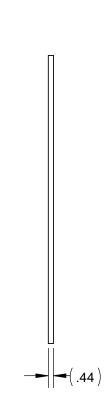
UtahState University DRAFTED BY: T.SHORTHILL

**SPECIFICATIONS AND TOLERANCES** 

UNLESS OTHERWISE NOTED
DRAWING ARE CREATED IN ACCORDANCE TO ASME Y14.5-2009

PART/ASSEM NAME: L BRACKET ASSEMBLY REVERSHECKED BY: Z.GARRARD		
PART/ASSEM NUMBER: -	SSEM NUMBER: - APPROVED BY: C.WOOD	
MATERIAL: -	DATE APPROVED: 4/26/2016	
FINISH: -	SHEET SCALE: 1:1	SHEET NUMBER: 1 of 1





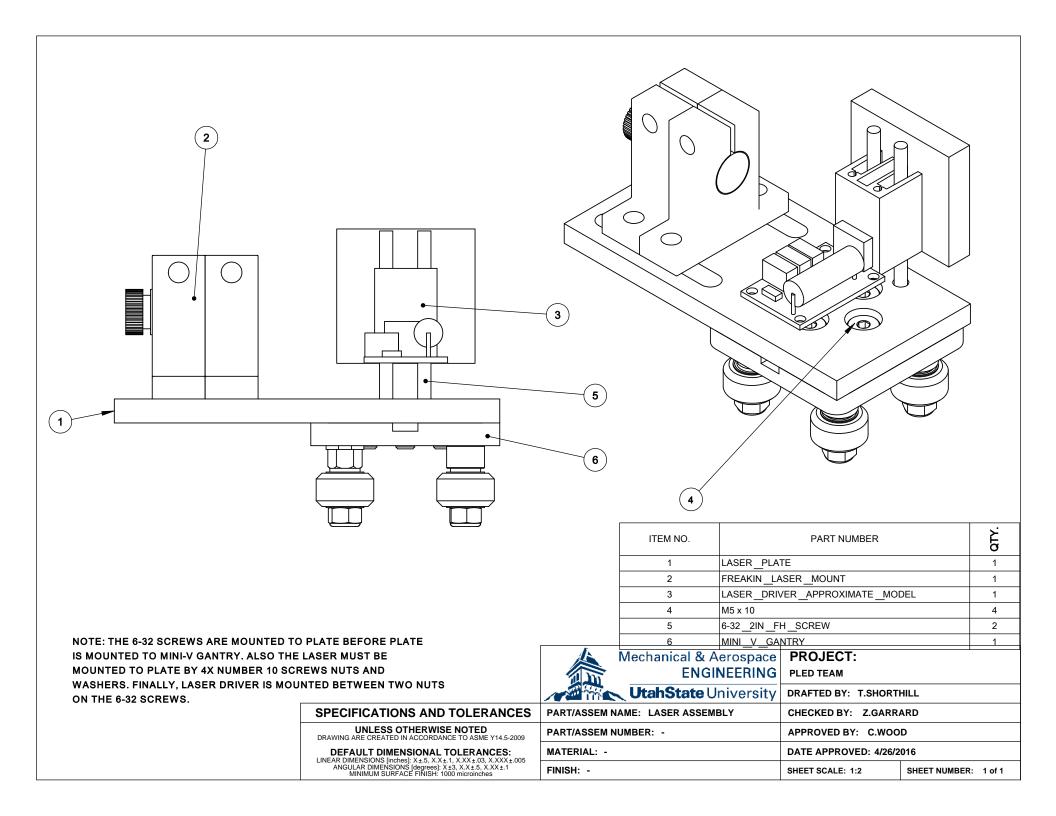
FINISH: BLK SPRAY PAINT

ITEM NO.	PART NUMBER	QTY.
1	BASE	1

SHEET SCALE: 1:8

SHEET NUMBER: 1 of 1

	Mechanical & Aerospace	PROJECT:
	ENGINEERING	PLED
	<b>UtahState</b> University	DRAFTED BY: T. SHORTHILL
SPECIFICATIONS AND TOLERANCES	PART/ASSEM NAME: BASE	CHECKED BY: Z. GARRARD
UNLESS OTHERWISE NOTED DRAWING ARE CREATED IN ACCORDANCE TO ASME Y14.5-2009	PART/ASSEM NUMBER: -	APPROVED BY: C. WOOD
DEFAULT DIMENSIONAL TOLERANCES: LINEAR DIMENSIONS (inches): X+.5, X,X+.1, X,XX+.03, X,XXX+.005	MATERIAL: OSB WOOD BOARD	DATE APPROVED: 4/26/2016



THIS SHEET INCLUDES THE TOTAL PARTS LIST. (PARTS ORDERED INCLUDE SUB-PARTS WHICH ARE ALSO INCLUDED IN THIS LIST. EXAMPLE: WE ORDERED A WHEEL BUT EACH WHEEL INCLUDED BEARINGS, SHIMS AND WASHERS.)

ITEM NO.	PART NUMBER	σ <b>⊢</b> ≻
1	V-SLOT_600	4
2	Motor Mount Plate Nema 17	1
3	Double Tee Nut	8
4	Flexible Coupling 5mm x 6mm	1
5	GT2 Timing Pulley 30 Tooth	3
6	MOD_NEMA_17_MOUNT_PLATE	1
7	NEMA_17_MOTOR	2
8	V-SLOT_670	1
9	PRINT_AREA	1
10	Idler Pulley Plate	1
11	Slot Washer 15 x 5 x 2	2
12	Ball Bearing 5 x 16 x 5	3
13	Smooth Idler Pulley Wheel	1
14	Nylon Spacer 0.125in	1
15	Precision Shim 8 x 5 x 1	25
16	Nylon Insert Lock Nut M5	13
17	M5 x 8	24
18	BEARING_PLATE	1
19	Encoder_Plate	2
20	ENCODER	2
21	PULLEY_6MM	2
22	M5 x 10	8
23	SHAFT_5mm	1
24	V-SLOT_LEGS	4
25	L Bracket Single	8
26	Tee Nut	28
27	M5 x 25	13
28	Delrin Mini V Wheel	12
29	Ball Bearing 5 x 10 x 4.2	24
30	Mini Eccentric Spacer 6mm	6
31	Aluminum Spacer 6mm	6
32	MOD_MINI_V_PLATE	2
33	ZINC PLATED STEEL 2.5 INCH L- BRACKET	4
34	Self Tapping Screw	4
35	BASE	1
36	LASER_PLATE	1
37	LASER_MOUNT	2
38	FREAKIN_LASER	1
39	LASER_DRIVER_APPROXIMATE_MODEL	1
40	6-32_2IN_FH_SCREW	2
41	Mini V Wheel Plate	1
42	M3 FLAT HEAD SCREWS (ENCODERS)	6
43	M3 SHC SCREW (MOTORS)	8
44	10-32 SCREWS (LASER MOUNT)	4
45	10-32 NUTS/ WASHERS	4
46	10-32 SELF TAPPING SCREWS 1 INCH LONG	4

### THIS SHEET SHOWS ALL THE PARTS WITHIN EACH ITEM OR SUB-ASSEMBLY

ITEM NO.	PART NAME	QTY	
	1 V-SLOT_600		4
	2 MOTOR_MOUNT		1
	MOD_NEMA_17_MOUNT_PLATE		1
	Double Tee Nut		1
	Flexible Coupling 5mm x 6mm		1
	GT2 Timing Pulley 30 Tooth		1
	M5 x 8		2
	NEMA_17_MOTOR		1
	3 V-SLOT_670		1
	4 PRINT_AREA		1
	5 FREE_IDLER_PULLEY		1
	Idler Pulley Plate		1
	Double Tee Nut		1
	Slot Washer 15 x 5 x 2		2
	Ball Bearing 5 x 16 x 5		2
	Smooth Idler Pulley Wheel		1
	Nylon Spacer 0.125in		1
	Precision Shim 8 x 5 x 1		1
	Nylon Insert Lock Nut M5		1
	M5 x 25		1
	M5 x 8		2
	6 MOTOR_MOUNT_2		1
	Motor Mount Plate Nema 17		1
	Double Tee Nut		1
	GT2 Timing Pulley 30 Tooth		1
	M5 x 8		2
	NEMA_17_MOTOR		1
	7 BEARING_MOUNT		1
	BEARING_PLATE		1
	Double Tee Nut		1
	Ball Bearing 5 x 16 x 5		1
	M5 x 8		2
	8 ENCODER_MOUNT		2
	Encoder_Plate		1
	ENCODER		1
	Double Tee Nut		1
	PULLEY_6MM		1
	M5 x 8		2
	9 SHAFT_5mm		1
	10 GT2 Timing Pulley 30 Tooth		1
	11 V-SLOT_LEGS		4
-	12 CORNER_BRACKETS		8
	L Bracket Single		1
	Tee Nut		2
-	13 MOD_MINI_V_GANTRY_ASSEMBLY		2
	MOD_MINI_V_GANTRY		1
	M5 x 25		4
	Delrin Mini V Wheel		2
	Delrin Mini V Wheel		1
	Ball Bearing 5 x 10 x 4.2		2
	Precision Shim 8 x 5 x 1		2

Nylon Insert Lock Nut M5	1
Aluminum Spacer 6mm	1
Delrin Mini V Wheel	2
Delrin Mini V Wheel	1
Ball Bearing 5 x 10 x 4.2	2
Precision Shim 8 x 5 x 1	2
Nylon Insert Lock Nut M5	1
Mini Eccentric Spacer 6mm	1
MOD_MINI_V_PLATE	1
Double Tee Nut	1
M5 x 10	2
14 L_BRACKET_ASSEMBLY	2
ZINC PLATED STEEL 2.5 INCH L- BRACKET	1
Self Tapping Screw	1
Tee Nut	3
M5 x 8	3
15 L_BRACKET_ASSEMBLY_REVERSE	2
ZINC PLATED STEEL 2.5 INCH L- BRACKET	1
Self Tapping Screw	1
Tee Nut	3
M5 x 8	3
16 BASE	1
17 LASER_ASSEMBLY	1
LASER_PLATE	1
FREAKIN_LASER_MOUNT	1
LASER_MOUNT	2
FREAKIN_LASER	1
LASER_DRIVER_APPROXIMATE_MODEL	1
6-32_2IN_FH_SCREW	2
MINI_V_GANTRY	1
M5 x 25	4
Mini V Wheel Plate	1
Delrin Mini V Wheel	2 1
Delrin Mini V Wheel	
Ball Bearing 5 x 10 x 4.2 Precision Shim 8 x 5 x 1	2
	2
Nylon Insert Lock Nut M5 Aluminum Spacer 6mm	1 1
Delrin Mini V Wheel	2
Delrin Mini V Wheel  Delrin Mini V Wheel	1
Ball Bearing 5 x 10 x 4.2	2
Precision Shim 8 x 5 x 1	2
Nylon Insert Lock Nut M5	1
Mini Eccentric Spacer 6mm	1
M5 x 10	4
MI2 V TO	7