

# Amulet Motion Controller Fabrication Document

A

## Layer Stack Legend

Material	Layer	Thickness	Dielectric	Type	Gerber
	F.Paste			Paste Mask	
	F.Silkscreen		Direct Printing	Legend	GBR
	F.Mask	0.02mm	Solder Resist	Solder Mask	GBR
Copper	L1 (Sig. PWR)	0.07mm (2oz)		Signal	GBR
Prepreg	L2 (GND)	0.18mm	FR4_7628	Dielectric	
Copper	L3 (Sig. PWR)	0.035mm (1oz)		Plane	GBR
Core		0.4mm	FR4	Dielectric	
Copper	L4 (Sig. PWR)	0.035mm (1oz)		Signal	GBR
Core		0.4mm	FR4	Dielectric	
Copper	L5 (GND)	0.035mm (1oz)		Signal	GBR
Prepreg	L6 (Sig. PWR)	0.07mm (2oz)	FR4_7628	Dielectric	
Copper	B.Mask	0.02mm	Solder Resist	Plane	GBR
	B.Silkscreen		Direct Printing	Solder Mask	GBR
	B.Paste			Legend	GBR
				Paste Mask	

Total thickness: 1.66mm

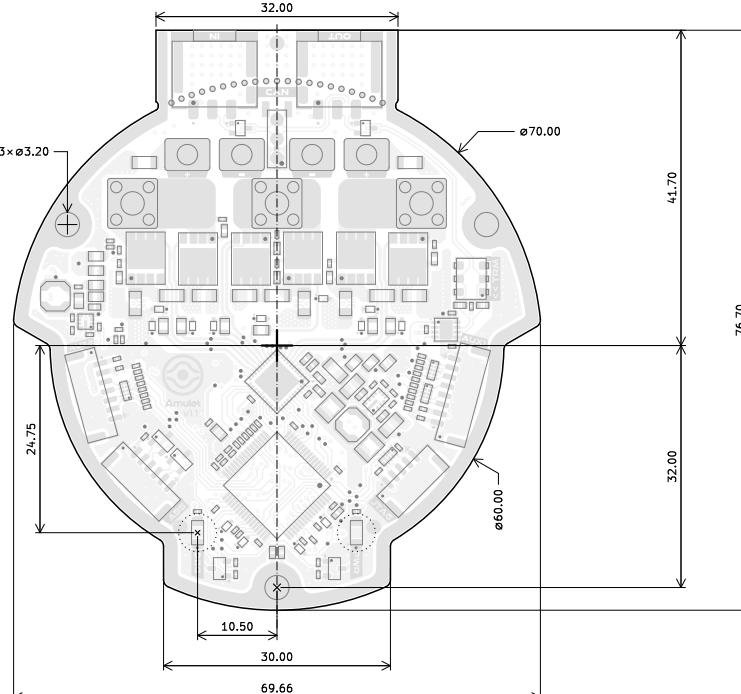
Note: external layer thicknesses are specified after plating

## FABRICATION NOTES (UNLESS OTHERWISE SPECIFIED)

- OUTLINE DEFINED IN SEPARATE GERBER FILE WITH "Edge\_Cuts.GBR" SUFFIX.  
DIMENSIONS OF CIRCUMSIZEZED RECTANGLE SHOWN ON THIS DWG FOR REF ONLY.
- SEE SEPARATE DRILL FILES WITH ".DRL" SUFFIX FOR HOLE LOCATIONS.  
SELECTED HOLE LOCATIONS SHOWN ON THIS DWG FOR REF ONLY.
- IMPEDANCE CONTROL REQUIRED.  
Microstrip 100-Ohm Differential (L1 ref. L2)  
0.2032mm width, 0.28mm spacing
- CONFIRM TRACE WIDTHS AND SPACINGS.
- DESIGN GEOMETRY MINIMUM FEATURE SIZES:  

TRACE WIDTH	0.20 mm
TRACE TO TRACE	0.20 mm
MIN. HOLE (PTH)	0.25 mm
MIN. HOLE (NPTH)	0.70 mm
ANNUAL RING	0.15 mm
COPPER TO HOLE	0.254 mm
COPPER TO EDGE	0.25 mm
HOLE TO HOLE	0.254 mm

## Top Fabrication (Scale 1:1)



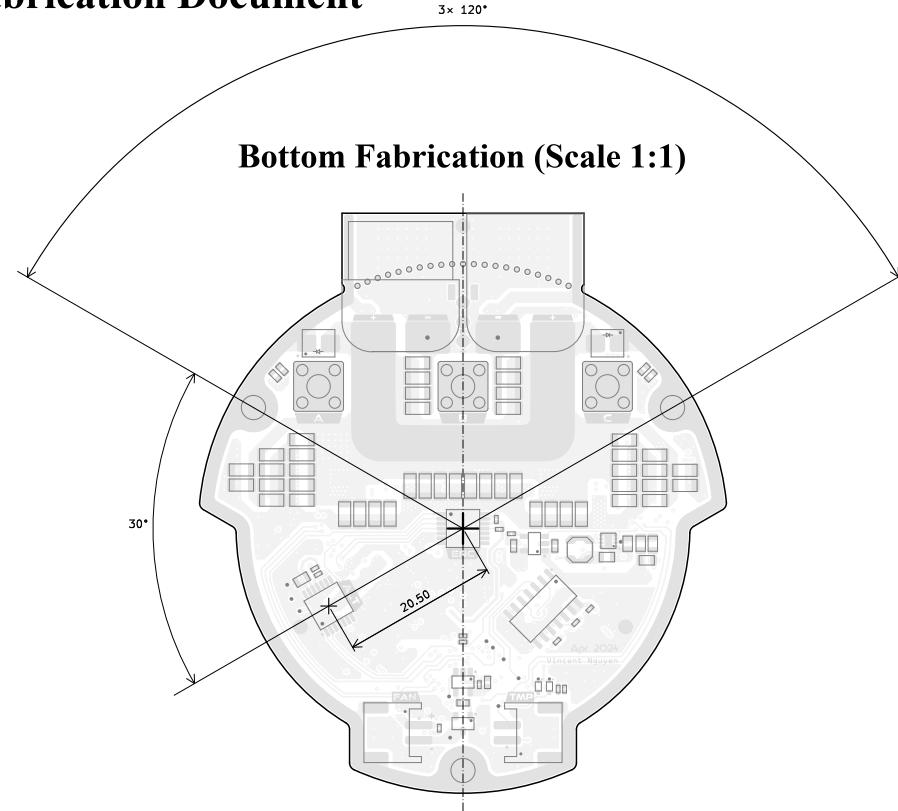
All dimensions are in millimeters unless otherwise specified.

C

D

	Comments:	Company: EPFL Xplore Research	Variant: CHECKED	Git Hash: 6cdc567
	Board Name: <b>Amulet Motion Controller</b>			Project Name: <b>Chienpanzé</b>
	Sheet Title: Top Fabrication (Scale 1:1)	File Name: amulet_controller.kicad_pcb	Designer: Vincent Nguyen	Date: 2024-04-13    Revision: 1.2
	Sheet Path:		Reviewer:	Size: <b>A4</b> Sheet: <b>1</b> of 11

# Amulet Motion Controller Fabrication Document



All dimensions are in millimeters unless otherwise specified.

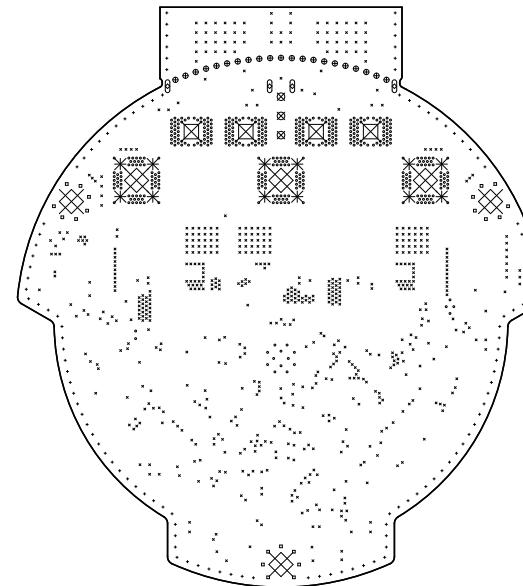
	Comments:	Company: EPFL Xplore Research	Variant: CHECKED	Git Hash: 6cdc567
	Board Name: <b>Amulet Motion Controller</b>			Project Name: <b>Chienpanzé</b>
	Sheet Title: Bottom Fabrication (Scale 1:1)	File Name: amulet_controller.kicad_pcb	Designer: Vincent Nguyen	Date: 2024-04-13    Revision: 1.2
	Sheet Path:		Reviewer:	Size: <b>A4</b> Sheet: <b>2</b> of 11

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Symbol	Count	Hole Size	Plated
•	674	0.25mm	Plated
•	438	0.25mm	Plated
•	120	0.30mm	Plated
▫	21	0.50mm	Plated
◊	4 (slot)	0.60mm	Plated
☒	3	1.00mm	Plated
✳	12	1.50mm	Plated
☒	4	2.70mm	Plated
☒	6	3.20mm	Plated
●	21	0.70mm	Unplated

**Drill Drawing Top View (Scale 1:1)**



B

C

D

A

B

C

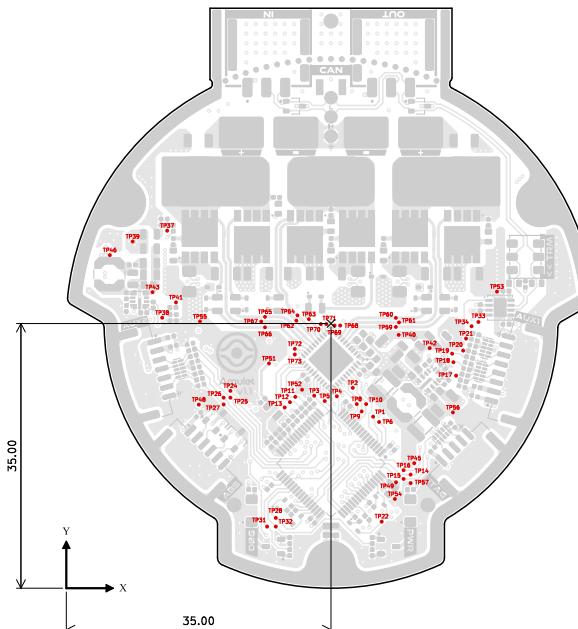
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	Comments:	Company: EPFL Xplore Research 	Variant: CHECKED	Git Hash: 6cdc567
	Board Name: <b>Amulet Motion Controller</b>			Project Name: <b>Chienpanzé</b>
	Sheet Title: Drill Drawing Top View (Scale 1:1)	File Name: amulet_controller.kicad_pcb	Designer: Vincent Nguyen	Date: 2024-04-13    Revision: 1.2
	Sheet Path:		Reviewer:	Size: <b>A4</b> Sheet: <b>3</b> of <b>11</b>

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Ref.	Net	X	Y
TP1	MOTOR_ENABLE	40.5766	22.6861
TP2	MOTOR_HIZ	37.8754	26.4999
TP3	MOTOR_FAULT	32.7804	25.4599
TP4	DRV_SCLK	35.7704	25.3799
TP5	DRV_MISO	34.1704	24.7499
TP6	DRV_MOSI	41.3617	21.9806
TP8	PWM_PHASEA	38.4004	24.3499
TP9	PWM_PHASEB	39.0504	23.3749
TP10	PWM_PHASEC	39.6504	24.3499
TP11	SOA	30.2754	25.2999
TP12	SOB	29.5754	24.5999
TP13	SOC	28.8754	23.8999
TP14	SWDIO	45.5254	15.0249
TP15	SWCLK	44.6004	14.4499
TP16	NRST	44.6004	15.5999
TP17	AUX1_A	51.5477	28.1109
TP18	AUX1_B	51.1875	29.8875
TP19	AUX1_C	51.0189	31.0189
TP20	AUX1_D	52.4750	31.4250
TP21	AUX1_E	52.8566	33.0161
TP22	AUX1_I2C_PULLUP	41.7004	8.7999
TP24	AUX2_A	21.7004	26.0999
TP25	AUX2_B	21.7004	25.1999
TP26	AUX2_C	20.8004	25.1999
TP27	AUX2_D	20.8004	24.2999
TP28	AUX2_I2C_PULLUP	27.7004	9.2999
TP31	LED_DBG	26.5504	8.1499
TP32	LED_PWR	27.7004	8.1499
TP33	FDCAN_RX	54.5004	35.2044
TP34	FDCAN_TX	53.5904	34.6399
TP37	SENSE_TEMP_FET	13.3400	47.2800
TP38	SENSE_VBAT	12.6749	35.7749
TP39	+VBAT	8.7754	45.8499
TP40	+VBAT	43.9504	33.4999
TP41	+VBAT	14.5004	37.7999
TP42	F_VIN_12V	48.0504	31.7499
TP43	F_VIN_5V	11.4004	39.1499
TP45	+12V	46.0104	16.5299
TP46	+5V	5.7504	44.0499
TP48	+3V3	17.5204	24.2799
TP49	+3V3	43.6004	13.9999
TP51	+A3V3	26.8004	29.7249
TP52	GND	31.1750	26.2500
TP53	GND	56.9504	39.2249
TP54	GND	43.4504	11.7999
TP55	GND	17.6754	35.2749
TP56	GND	51.1232	23.2471
TP57	GND	45.5254	13.8999
TP59	GHA	43.5804	34.5499
TP60	GLA	43.5804	35.7499
TP61	SHA	44.0004	35.1499
TP62	GHB	30.4189	35.3799
TP63	GLB	32.0704	35.5799
TP64	SHB	30.5675	36.0799
TP65	GHC	26.2704	35.8835
TP66	GLC	26.2704	34.4999
TP67	SHC	25.7704	35.2749
TP68	SA_P	36.2167	34.7396
TP69	SA_N	35.4667	34.7396
TP70	SB_P	33.6511	34.9263
TP71	SB_N	34.4011	34.9263
TP72	SC_P	30.2139	31.6529
TP73	SC_N	30.2139	30.9029

Top Test Points (Scale 1:1)



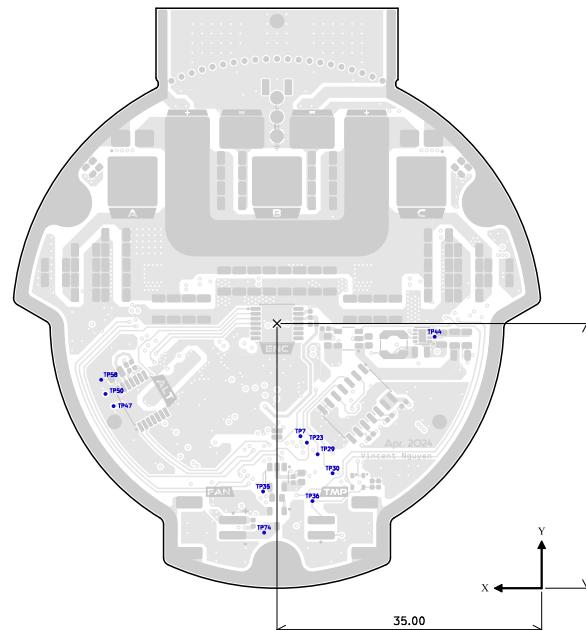
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	Comments:	Company: EPFL Xplore Research		Variant: CHECKED	Git Hash: 6cdc567
	Board Name:	<b>Amulet Motion Controller</b>		Project Name: <b>Chienpanzé</b>	
	Sheet Title:	File Name:	Designer:	Date:	Revision:
	Top Test Points (Scale 1:1)	amulet_controller.kicad_pcb	Vincent Nguyen	2024-04-13	1.2
	Sheet Path:	Reviewer:		Size:	Sheet:
		<b>A4</b>		<b>4</b>	of <b>11</b>

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Ref.	Net	X	Y
TP7	DRV_CS	31.9004	20.0999
TP23	POS_SENSOR_CS	31.0504	19.2499
TP29	RS422_RX	29.6284	17.7083
TP30	RS422_DE	27.6504	15.1999
TP35	FAN_CTRL	36.8394	12.7906
TP36	SENSE_TEMP_MOT	30.3132	11.5244
TP44	F_VIN_3V3	14.1504	33.2499
TP47	+5V	56.6093	24.0781
TP50	+3V3	57.6804	25.6899
TP58	GND	58.2504	27.5649
TP74	FAN_SW	36.7004	7.3499

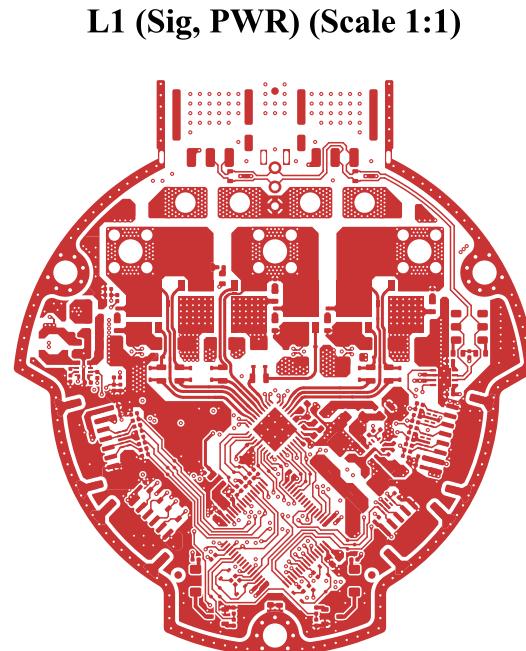
## Bottom Test Points (Scale 1:1)



All dimensions are in millimeters unless otherwise specified.

	Comments:	Company: EPFL Xplore Research 	Variant: CHECKED	Git Hash: 6cdc567
	Board Name: <b>Amulet Motion Controller</b>			Project Name: <b>Chienpanzé</b>
	Sheet Title: Bottom Test Points (Scale 1:1)	File Name: amulet_controller.kicad_pcb	Designer: Vincent Nguyen	Date: 2024-04-13    Revision: 1.2
	Sheet Path:		Reviewer:	Size: <b>A4</b> Sheet: <b>5</b> of <b>11</b>

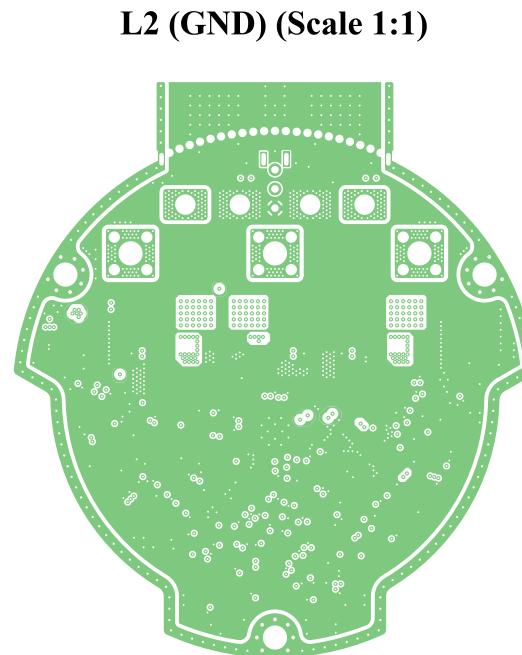
# Amulet Motion Controller Fabrication Document



**L1 (Sig, PWR) (Scale 1:1)**

	Comments:	Company: EPFL Xplore Research 	Variant: CHECKED	Git Hash: 6cdc567
	Board Name: <b>Amulet Motion Controller</b>	Project Name: <b>Chienpanzé</b>		
	Sheet Title: L1 (Sig, PWR) (Scale 1:1)	File Name: amulet_controller.kicad_pcb	Designer: Vincent Nguyen	Date: 2024-04-13      Revision: 1.2
	Sheet Path:		Reviewer:	Size: <b>A4</b> Sheet: <b>6 of 11</b>

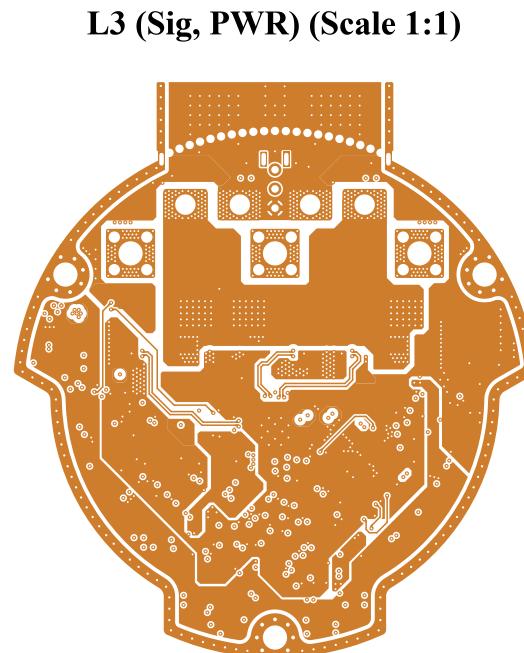
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**L2 (GND) (Scale 1:1)**

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	Board Name: <b>Amulet Motion Controller</b>	Project Name: <b>Chienpanzé</b>		
	Sheet Title: L2 (GND) (Scale 1:1)	File Name: amulet_controller.kicad_pcb	Designer: Vincent Nguyen	Date: 2024-04-13      Revision: 1.2
	Sheet Path:		Reviewer:	Size: <b>A4</b> Sheet: <b>7</b> of <b>11</b>

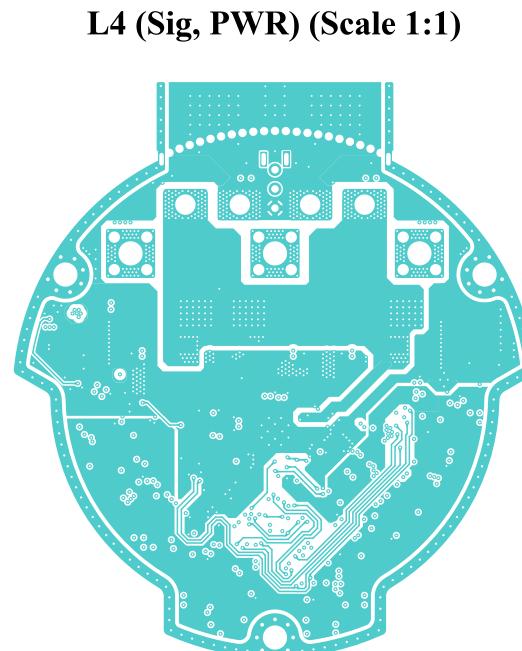
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L3 (Sig, PWR) (Scale 1:1)

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	Board Name: <b>Amulet Motion Controller</b>	Project Name: <b>Chienpanzé</b>		
	Sheet Title: L3 (Sig, PWR) (Scale 1:1)	File Name: amulet_controller.kicad_pcb	Designer: Vincent Nguyen	Date: 2024-04-13      Revision: 1.2
	Sheet Path:		Reviewer:	Size: <b>A4</b> Sheet: <b>8</b> of <b>11</b>

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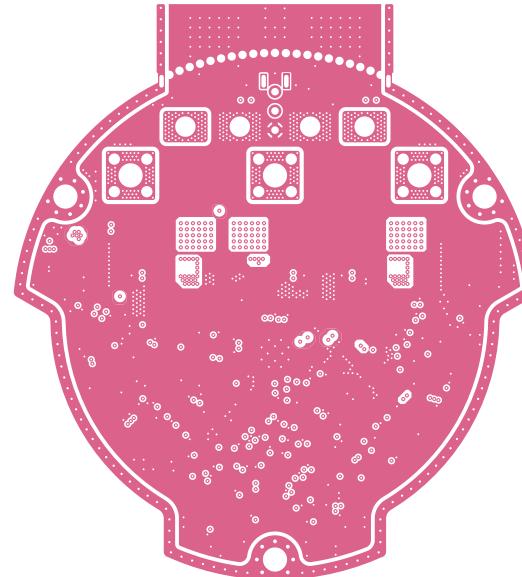


**L4 (Sig, PWR) (Scale 1:1)**

	Comments:	Company: EPFL Xplore Research 	Variant: CHECKED	Git Hash: 6cdc567
	Board Name: <b>Amulet Motion Controller</b>	Project Name: <b>Chienpanzé</b>		
	Sheet Title: L4 (Sig, PWR) (Scale 1:1)	File Name: amulet_controller.kicad_pcb	Designer: Vincent Nguyen	Date: 2024-04-13      Revision: 1.2
	Sheet Path:		Reviewer:	Size: <b>A4</b> Sheet: <b>9</b> of 11

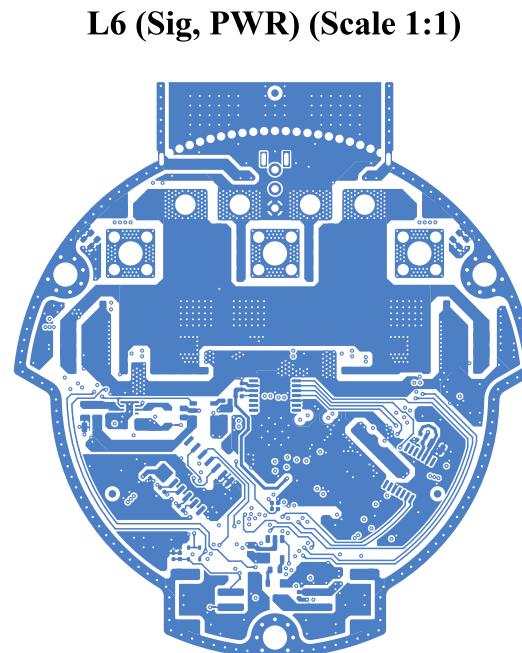
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L5 (GND) (Scale 1:1)



	Comments:	Company: EPFL Xplore Research 	Variant: CHECKED	Git Hash: 6cdc567
	Board Name: <b>Amulet Motion Controller</b>	Project Name: <b>Chienpanzé</b>		
	Sheet Title: L5 (GND) (Scale 1:1)	File Name: amulet_controller.kicad_pcb	Designer: Vincent Nguyen	Date: 2024-04-13      Revision: 1.2
	Sheet Path:		Reviewer:	Size: <b>A4</b> Sheet: <b>10</b> of <b>11</b>

# Amulet Motion Controller Fabrication Document



**L6 (Sig, PWR) (Scale 1:1)**

	Comments:	Company: EPFL Xplore Research	Variant: CHECKED	Git Hash: 6cdc567
	Board Name: <b>Amulet Motion Controller</b>	Project Name: <b>Chienpanzé</b>		
	Sheet Title: L6 (Sig, PWR) (Scale 1:1)	File Name: amulet_controller.kicad_pcb	Designer: Vincent Nguyen	Date: 2024-04-13      Revision: 1.2
	Sheet Path:		Reviewer:	Size: <b>A4</b> Sheet: <b>11</b> of <b>11</b>