

## BOARD CHARACTERISTICS

Copper Layer Count: 8      Board Thickness: 1.6180 mm  
 Board overall dimensions: 130.0000 mm x 170.0000 mm  
 Min track/spacing: 0.1000 mm / 0.1000 mm      Min hole diameter: 0.1500 mm  
 Copper Finish: ENIG      Impedance Control: Yes  
 Castellated pads: No      Plated Board Edge: No  
 Edge card connectors: No

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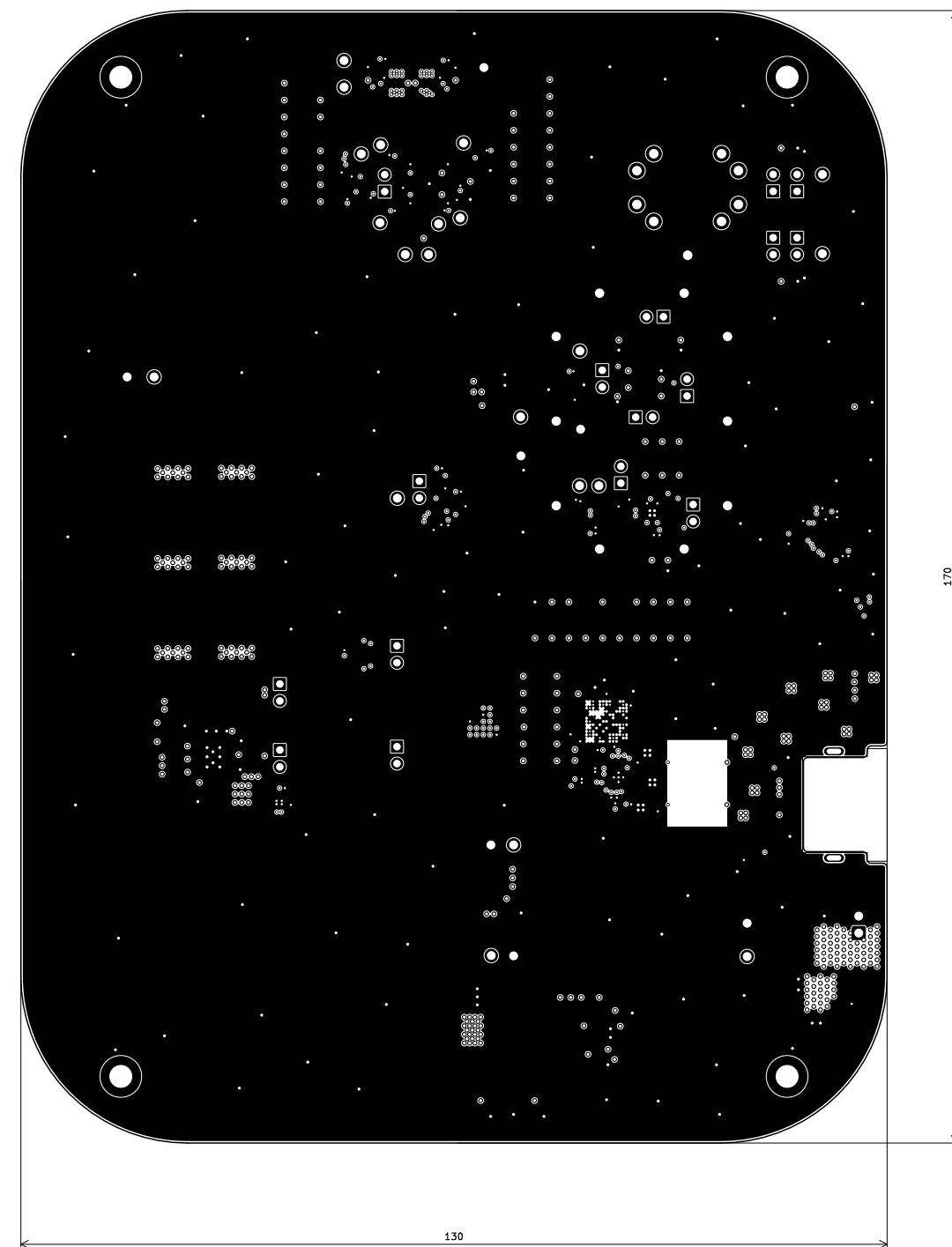
Layer Name	Type	Material	Thickness (mm)	Color	Epsilon R	Loss Tangent
F.Silkscreen	Top Silk Screen	Not specified	0 mm	White	1	0
F.Paste	Top Solder Paste		0 mm		1	0
F.Mask	Top Solder Mask	Not specified	0.01 mm	Black	3.3	0
F.Cu	copper		0.035 mm		1	0
Dielectric 1 (1/2)	prepreg	FR4-7628*1	0.218 mm	FR4 natural	4.4	0.02
Dielectric 1 (1/2)	prepreg	FR4-7628*1	0.203 mm	FR4 natural	4.4	0.02
PWR.Cu	copper		0.03 mm		1	0
Dielectric 2	core	FR4	0.075 mm	FR4 natural	4.6	0.02
signal1.Cu	copper		0.03 mm		1	0
Dielectric 3 (1/2)	prepreg	FR4-1080*1	0.069 mm	FR4 natural	3.91	0.02
Dielectric 3 (1/2)	prepreg	FR4-1080*1	0.069 mm	FR4 natural	3.91	0.02
signal2.Cu	copper		0.03 mm		1	0
Dielectric 4	core	FR4	0.075 mm	FR4 natural	4.6	0.02
signal3.Cu	copper		0.03 mm		1	0
Dielectric 5 (1/2)	prepreg	FR4-1080*1	0.069 mm	FR4 natural	3.91	0.02
Dielectric 5 (1/2)	prepreg	FR4-1080*1	0.069 mm	FR4 natural	3.91	0.02
signal4.Cu	copper		0.03 mm		1	0
Dielectric 6	core	FR4	0.075 mm	FR4 natural	4.6	0.02
GND.Cu	copper		0.035 mm		1	0
Dielectric 7 (1/2)	prepreg	FR4-7628*1	0.203 mm	FR4 natural	4.4	0.02
Dielectric 7 (1/2)	prepreg	FR4-7628*1	0.218 mm	FR4 natural	4.4	0.02
B.Cu	copper		0.035 mm		1	0
B.Mask	Bottom Solder Mask	Not specified	0.01 mm	Black	3.3	0
B.Paste	Bottom Solder Paste		0 mm		1	0
B.Silkscreen	Bottom Silk Screen	Not specified	0 mm	White	1	0

## ORDERING NOTES

PCB:	* Product Type: Industrial/Consumer electronics * Different Design: 1 * Delivery Format: Single PCB * PCB Thickness: 1.6 mm * PCB Colour: Black * Silkscreen: White * Material Type: FR4—Standard TG 135–140 * Surface Finish: ENIG * Gold Thickness: 2 U" * Outer Copper Weight: 1 oz * Inner Copper Weight: 1 oz * Specify Layer Sequence: No * Impedance Control: Yes * Layer Stackup: JLC081611-7628 * Via Covering: Epoxy Filled & Capped * Min Via Hole Size/Diameter: 0.15mm * Board Outline Tolerance: ±0.2mm(Regular) * Confirm Production File: Yes * Mark on PCB: 2D barcode (Serial Number) * Printing: Number Only * Prefix: * Unique Number: Keep * Starting Value: 0001 * 2D Barcode Position: Specify Position * Gold Fingers: No * Castellated Holes: No * Press-Fit Hole: No * Edge Plating: No	PCB Advanced Options: * 4-Wire Kelvin Test: Yes * Paper Between PCBs: No * Appearance Quality: IPC Class 2 Standard * Silkscreen Technology: Ink-Jet/Screen Printing Silkscreen * Package Box: With JLCPCB Logo
PCBA:	* PCBA Type: Standard * Assembly Side: Both Sides * Edge Rails/Fiducials: Added by JLCPCB * Confirm Parts Placement: Yes * Parts Selection: By Customer	
PCBA Advanced Options:	* Photo Confirmation: No * Conformal Coating: No * Packaging: Antistatic Bubble Film * Solder Paste: Sn96.5%, Ag3.0%, Cu0.5% * Add Paste for Unpopulated Pad Opening: No * Others: No * Board Cleaning: No * Bake Components: No * Depanel Boards & Edge Rail Before Delivery: No * Flying Probe Test: No * Nitrogen Reflow Soldering: No	



Item Number: BR-103907	Tolerances Specified per Decimal Place Unless Otherwise Specified	Linear: X. ±0.2	Angular: X. ±1
Description: Sonar Development Board		X.X ±0.1	X.X ±0.5
		X.XX ±0.05	X.XX ±0.1
Unpop. PCB: BR-103907-001 RevA	PCBA: BR-103907-002 RevA		
Size: USLetter	Date:	Scale: 1:1	
KiCad E.D.A. 9.0.5	Sheet:		Id: 1/6



Layer Name	Type	Material	Thickness (mm)	Color	Epsilon R	Loss Tangent
F.Silkscreen	Top Silk Screen	Not specified	0 mm	White	1	0
F.Paste	Top Solder Paste		0 mm		1	0
F.Mask	Top Solder Mask	Not specified	0.01 mm	Black	3.3	0
F.Cu	copper		0.035 mm		1	0
Dielectric 1 (1/2)	prepreg	FR4-7628*1	0.218 mm	FR4 natural	4.4	0.02
Dielectric 1 (1/2)	prepreg	FR4-7628*1	0.203 mm	FR4 natural	4.4	0.02
PWR.Cu	copper		0.03 mm		1	0
Dielectric 2	core	FR4	0.075 mm	FR4 natural	4.6	0.02
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Dielectric 7 (1/2)	prepreg	FR4-7628*1	0.218 mm	FR4 natural	4.4	0.02
B.Cu	copper		0.035 mm		1	0
B.Mask	Bottom Solder Mask	Not specified	0.01 mm	Black	3.3	0
B.Paste	Bottom Solder Paste		0 mm		1	0
B.Silkscreen	Bottom Silk Screen	Not specified	0 mm	White	1	0

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PCBA:	* PCBA Type: Standard * Assembly Side: Both Sides * Edge Rails/Fiducials: Added by JLCPCB * Confirm Parts Placement: Yes * Parts Selection: By Customer	
PCBA Advanced Options:	* Photo Confirmation: No * Conformal Coating: No * Packaging: Antistatic Bubble Film * Solder Paste: Sn96.5%, Ag3.0%, Cu0.5% * Add Paste for Unpopulated Pad Opening: No * Others: No * Board Cleaning: No * Bake Components: No * Depanel Boards & Edge Rail Before Delivery: No * Flying Probe Test: No * Nitrogen Reflow Soldering: No	

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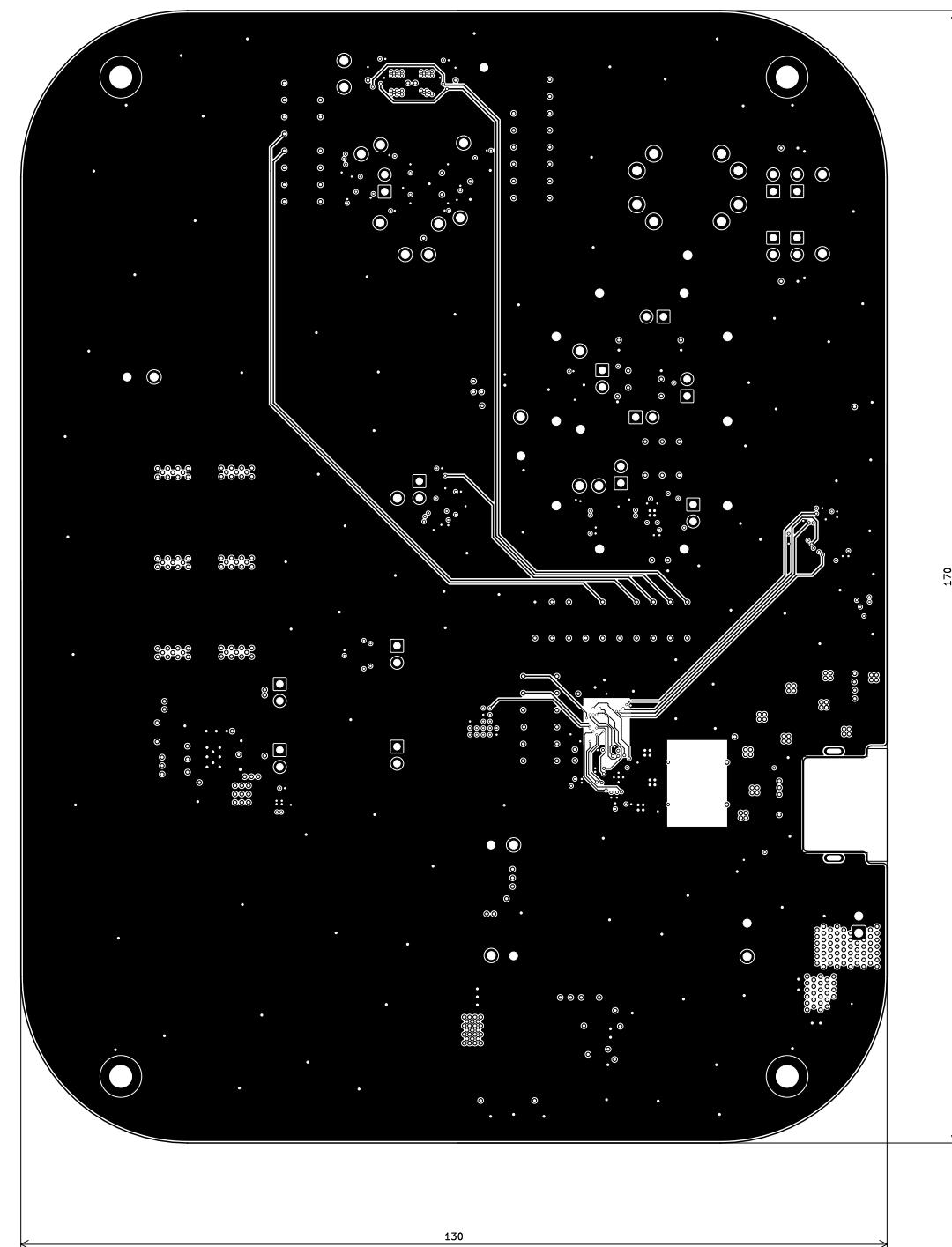
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		X.XX ±0.05	X.XX ±0.1
Unpop. PCB: BR-103907-001 RevA	PCBA: BR-103907-002 RevA		
Size: USLetter	Date:	Scale: 1:1	
KiCad E.D.A. 9.0.5	Sheet:		Id: 2/6

1 2 3 4 5 6 7 8



Layer Name	Type	Material	Thickness (mm)	Color	Epsilon R	Loss Tangent
F.Silkscreen	Top Silk Screen	Not specified	0 mm	White	1	0
F.Paste	Top Solder Paste		0 mm		1	0
F.Mask	Top Solder Mask	Not specified	0.01 mm	Black	3.3	0
F.Cu	copper		0.035 mm		1	0
Dielectric 1 (1/2)	prepreg	FR4-7628*1	0.218 mm	FR4 natural	4.4	0.02
Dielectric 1 (1/2)	prepreg	FR4-7628*1	0.203 mm	FR4 natural	4.4	0.02
PWR.Cu	copper		0.03 mm		1	0
Dielectric 2	core	FR4	0.075 mm	FR4 natural	4.6	0.02
signal1.Cu	copper		0.03 mm		1	0
Dielectric 3 (1/2)	prepreg	FR4-1080*1	0.069 mm	FR4 natural	3.91	0.02
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Dielectric 5 (1/2)	prepreg	FR4-1080*1	0.069 mm	FR4 natural	3.91	0.02
Dielectric 5 (1/2)	prepreg	FR4-1080*1	0.069 mm	FR4 natural	3.91	0.02
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GND.Cu	copper		0.035 mm		1	0
Dielectric 7 (1/2)	prepreg	FR4-7628*1	0.203 mm	FR4 natural	4.4	0.02
Dielectric 7 (1/2)	prepreg	FR4-7628*1	0.218 mm	FR4 natural	4.4	0.02
B.Cu	copper		0.035 mm		1	0
B.Mask	Bottom Solder Mask	Not specified	0.01 mm	Black	3.3	0
B.Paste	Bottom Solder Paste		0 mm		1	0
B.Silkscreen	Bottom Silk Screen	Not specified	0 mm	White	1	0

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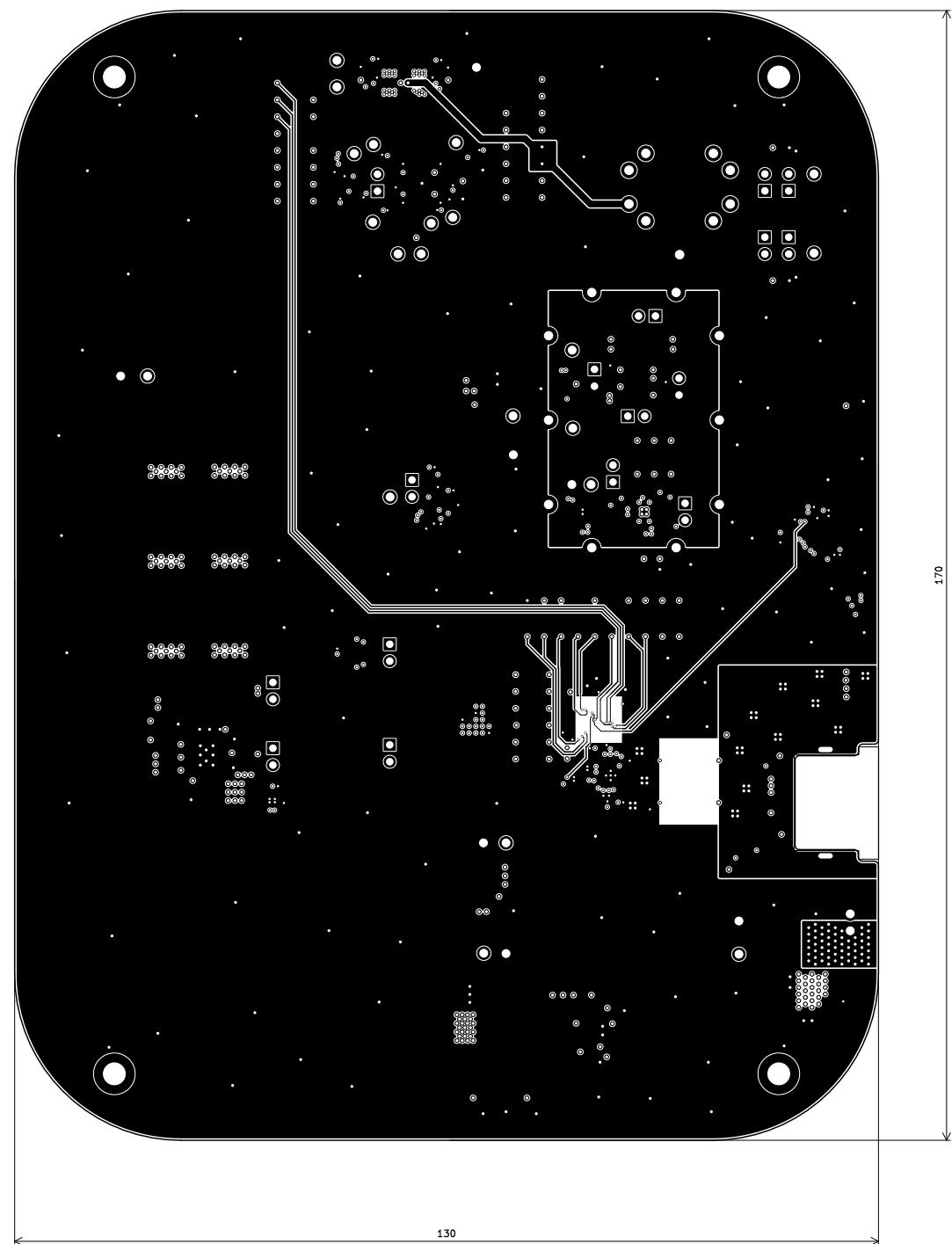
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Description: Sonar Development Board		X.X ±0.1	X.X ±0.5
		X.XX ±0.05	X.XX ±0.1
Unpop. PCB: BR-103907-001 RevA	PCBA: BR-103907-002 RevA		
Size: USLetter	Date:	Scale: 1:1	
KiCad E.D.A. 9.0.5	Sheet:		Id: 3/6



Layer Name	Type	Material	Thickness (mm)	Color	Epsilon R	Loss Tangent
F.Silkscreen	Top Silk Screen	Not specified	0 mm	White	1	0
F.Paste	Top Solder Paste		0 mm		1	0
F.Mask	Top Solder Mask	Not specified	0.01 mm	Black	3.3	0
F.Cu	copper		0.035 mm		1	0
Dielectric 1 (1/2)	prepreg	FR4-7628*1	0.218 mm	FR4 natural	4.4	0.02
Dielectric 1 (1/2)	prepreg	FR4-7628*1	0.203 mm	FR4 natural	4.4	0.02
PWR.Cu	copper		0.03 mm		1	0
Dielectric 2	core	FR4	0.075 mm	FR4 natural	4.6	0.02
signal1.Cu	copper		0.03 mm		1	0
Dielectric 3 (1/2)	prepreg	FR4-1080*1	0.069 mm	FR4 natural	3.91	0.02
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Dielectric 4	core	FR4	0.075 mm	FR4 natural	4.6	0.02
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signal4.Cu	copper		0.03 mm		1	0
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Dielectric 7 (1/2)	prepreg	FR4-7628*1	0.218 mm	FR4 natural	4.4	0.02
B.Cu	copper		0.035 mm		1	0
B.Mask	Bottom Solder Mask	Not specified	0.01 mm	Black	3.3	0
B.Paste	Bottom Solder Paste		0 mm		1	0
B.Silkscreen	Bottom Silk Screen	Not specified	0 mm	White	1	0

## ORDERING NOTES

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PCBA:	* PCBA Type: Standard * Assembly Side: Both Sides * Edge Rails/Fiducials: Added by JLCPCB * Confirm Parts Placement: Yes * Parts Selection: By Customer	PCBA Advanced Options: * Photo Confirmation: No * Conformal Coating: No * Packaging: Antistatic Bubble Film * Solder Paste: Sn96.5%, Ag3.0%, Cu0.5% * Add Paste for Unpopulated Pad Opening: No * Others: No * Board Cleaning: No * Bake Components: No * Depanel Boards & Edge Rail Before Delivery: No * Flying Probe Test: No * Nitrogen Reflow Soldering: No

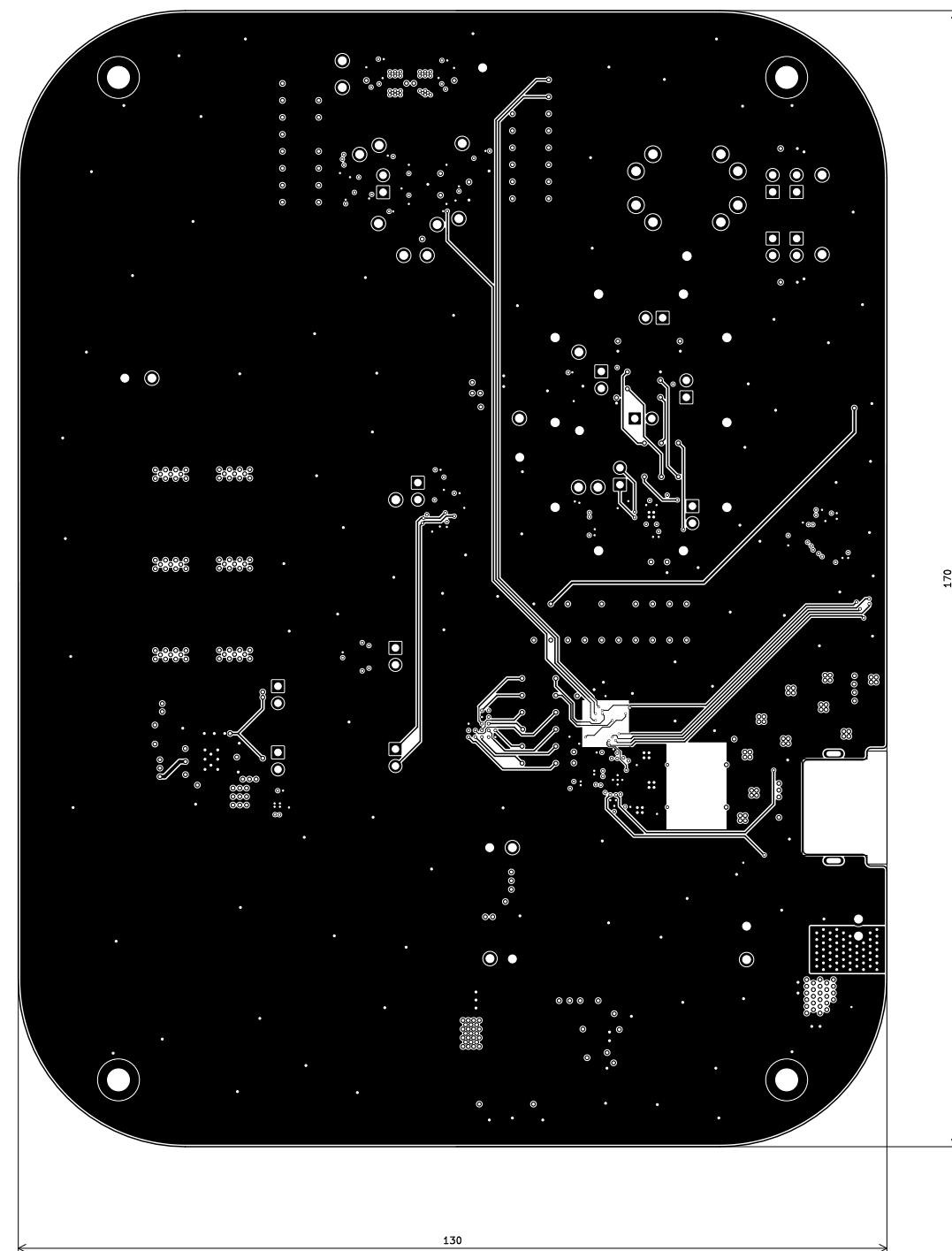
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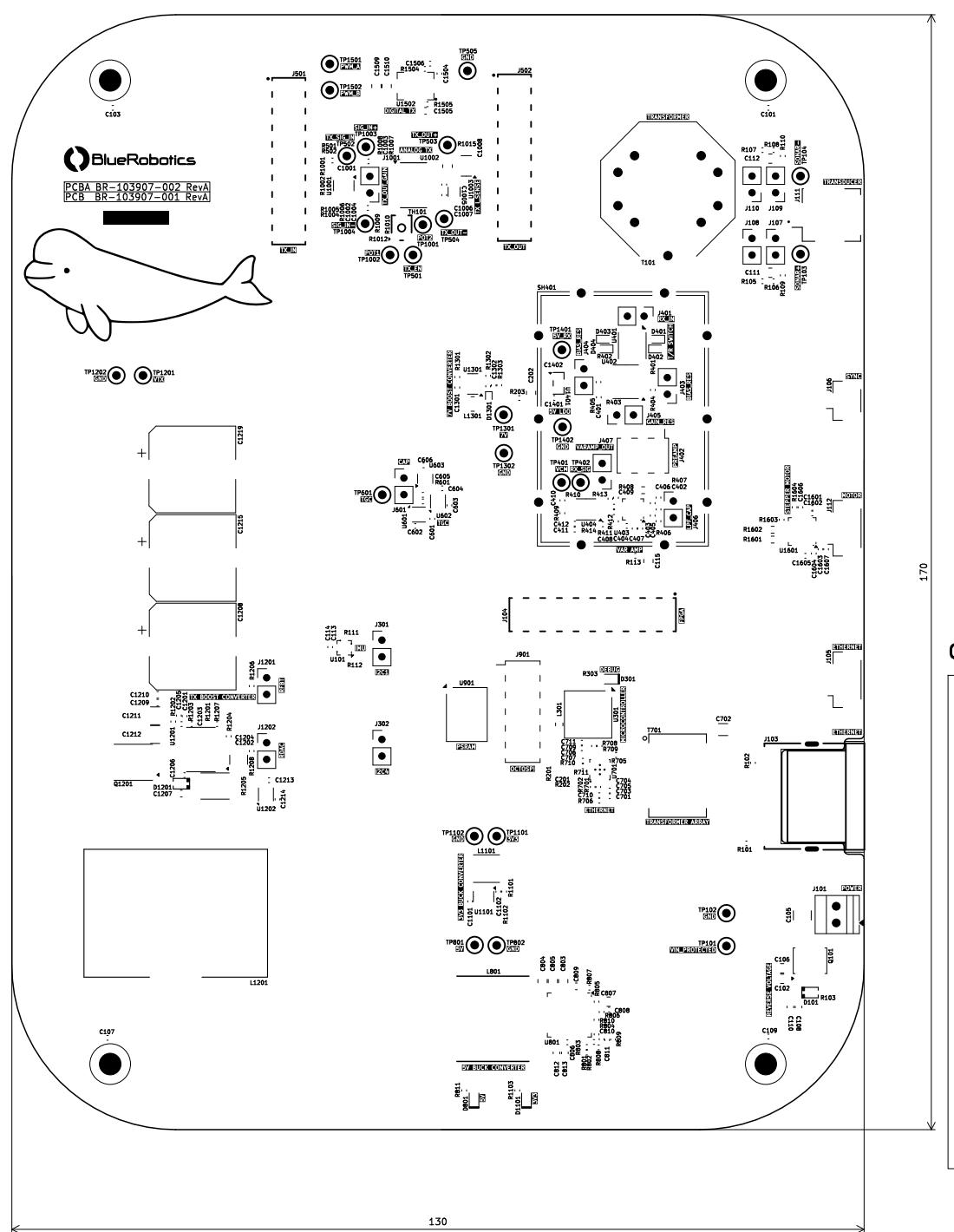
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 for applicable conditions



Item Number: BR-103907	Tolerances Specified per Decimal Place Unless Otherwise Specified	Linear: X. ±0.2	Angular: X. ±1
Description: Sonar Development Board		X.X ±0.1	X.X ±0.5
		X.XX ±0.05	X.XX ±0.1
Unpop. PCB: BR-103907-001 RevA	PCBA: BR-103907-002 RevA		
Size: USLetter	Date:	Scale: 1:1	
KiCad E.D.A. 9.0.5	Sheet:		Id: 5/6



Layer Name	Type	Material	Thickness (mm)	Color	Epsilon R	Loss Tangent
F.Silkscreen	Top Silk Screen	Not specified	0 mm	White	1	0
F.Paste	Top Solder Paste		0 mm		1	0
F.Mask	Top Solder Mask	Not specified	0.01 mm	Black	3.3	0
F.Cu	copper		0.035 mm		1	0
Dielectric 1 (1/2)	prepreg	FR4-7628*1	0.218 mm	FR4 natural	4.4	0.02
Dielectric 1 (1/2)	prepreg	FR4-7628*1	0.203 mm	FR4 natural	4.4	0.02
PWR.Cu	copper		0.03 mm		1	0
Dielectric 2	core	FR4	0.075 mm	FR4 natural	4.6	0.02
signal1.Cu	copper		0.03 mm		1	0
Dielectric 3 (1/2)	prepreg	FR4-1080*1	0.069 mm	FR4 natural	3.91	0.02
Dielectric 3 (1/2)	prepreg	FR4-1080*1	0.069 mm	FR4 natural	3.91	0.02
signal2.Cu	copper		0.03 mm		1	0
Dielectric 4	core	FR4	0.075 mm	FR4 natural	4.6	0.02
signal3.Cu	copper		0.03 mm		1	0
Dielectric 5 (1/2)	prepreg	FR4-1080*1	0.069 mm	FR4 natural	3.91	0.02
Dielectric 5 (1/2)	prepreg	FR4-1080*1	0.069 mm	FR4 natural	3.91	0.02
signal4.Cu	copper		0.03 mm		1	0
Dielectric 6	core	FR4	0.075 mm	FR4 natural	4.6	0.02
GND.Cu	copper		0.035 mm		1	0
Dielectric 7 (1/2)	prepreg	FR4-7628*1	0.203 mm	FR4 natural	4.4	0.02
Dielectric 7 (1/2)	prepreg	FR4-7628*1	0.218 mm	FR4 natural	4.4	0.02
B.Cu	copper		0.035 mm		1	0
B.Mask	Bottom Solder Mask	Not specified	0.01 mm	Black	3.3	0
B.Paste	Bottom Solder Paste		0 mm		1	0
B.Silkscreen	Bottom Silk Screen	Not specified	0 mm	White	1	0

## **ORDERING NOTES**

<p>PCB:</p> <ul style="list-style-type: none"> <li>* Product Type: Industrial/Consumer electronics</li> <li>* Different Design: 1</li> <li>* Delivery Format: Single PCB</li> <li>* PCB Thickness: 1.6 mm</li> <li>* PCB Colour: Black</li> <li>* Silkscreen: White</li> <li>* Material Type: FR4—Standard TG 135–140</li> <li>* Surface Finish: ENIG</li> <li>* Gold Thickness: 2 <math>\mu</math>m</li> <li>* Outer Copper Weight: 1 oz</li> <li>* Inner Copper Weight: 1 oz</li> <li>* Specify Layer Sequence: No</li> <li>* Impedance Control: Yes</li> <li>* Layer Stackup: JLC081611-7628</li> <li>* Via Covering: Epoxy Filled &amp; Capped</li> <li>* Min Via Hole Size/Diameter: 0.15mm</li> <li>* Board Outline Tolerance: <math>\pm 0.2\text{mm}</math>(Regular)</li> <li>* Confirm Production File: Yes</li> <li>* Mark on PCB: 2D barcode (Serial Number)           <ul style="list-style-type: none"> <li>* Printing: Number Only</li> <li>* Prefix:</li> <li>* Unique Number: Keep</li> <li>* Starting Value: 0001</li> <li>* 2D Barcode Position: Specify Position</li> </ul> </li> <li>* Gold Fingers: No</li> <li>* Castellated Holes: No</li> <li>* Press-Fit Hole: No</li> <li>* Edge Plating: No</li> </ul>	<p>PCB Advanced Options:</p> <ul style="list-style-type: none"> <li>* 4-Wire Kelvin Test: Yes</li> <li>* Paper Between PCBs: No</li> <li>* Appearance Quality: IPC Class 2 Standard</li> <li>* Silkscreen Technology: Ink-Jet/Screen Printing Silkscreen</li> <li>* Package Box: With JLCPCB Logo</li> </ul> <p>PCBA:</p> <ul style="list-style-type: none"> <li>* PCBA Type: Standard</li> <li>* Assembly Side: Both Sides</li> <li>* Edge Rails/Fiducials: Added by JLCPCB</li> <li>* Confirm Parts Placement: Yes</li> <li>* Parts Selection: By Customer</li> </ul> <p>PCBA Advanced Options:</p> <ul style="list-style-type: none"> <li>* Photo Confirmation: No</li> <li>* Conformal Coating: No</li> <li>* Packaging: Antistatic Bubble Film</li> <li>* Solder Paste: Sn96.5%, Ag3.0%, Cu0.5%</li> <li>* Add Paste for Unpopulated Pad Opening: No</li> <li>* Others: No</li> <li>* Board Cleaning: No</li> <li>* Bake Components: No</li> <li>* Depanel Boards &amp; Edge Rail Before Delivery: No</li> <li>* Flying Probe Test: No</li> <li>* Nitrogen Reflow Soldering: No</li> </ul>
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## BOARD CHARACTERISTICS

Copper Layer Count: 8 Board Thickness: 1.6180 mm  
Board overall dimensions: 130.0000 mm x 170.0000 mm  
Min track/spacing: 0.1000 mm / 0.1000 mm Min hole diameter: 0.1500 mm  
Copper Finish: ENIG Impedance Control: Yes  
Castellated pads: No Plated Board Edge: No  
Edge card connectors: No

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<b>Description:</b> Sonar Development Board		X. ±0.2 X.X ±0.1 XXX ±0.05	X. ±1 X.X ±0.5 XXX ±0.1
Populated PCB: BR-103907-001 RevA		PCBA: BR-103907-002 RevA	
Size: USLetter	Date:	Scale: 1:1	
iCad E.D.A. 9.0.5	Sheet:	Id: 6/6	