UTN FRBA – AÑO 2021

Sistemas de Representación

Proyecto Amplificador Clase D

Curso R1001

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INTRODUCCIÓN:

El proyecto se basará en armar un amplificador *Clase D*. Principalmente funciona con el integrado **IS31AP2111**, que es un amplificador de audio de interfaz I2S digital capaz de controlar un par de altavoces de **8 Ω a 20 W** cuando funciona con un suministro de 24 V.

Fuente: https://www.digikey.com/reference-designs/en/audio-amplifiers/2177

DIAGRAMAS ESQUEMÁTICOS

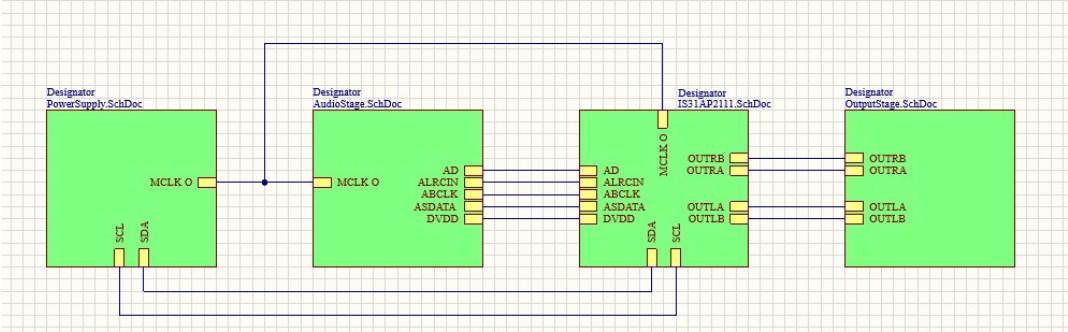

Figura 1: Top Level

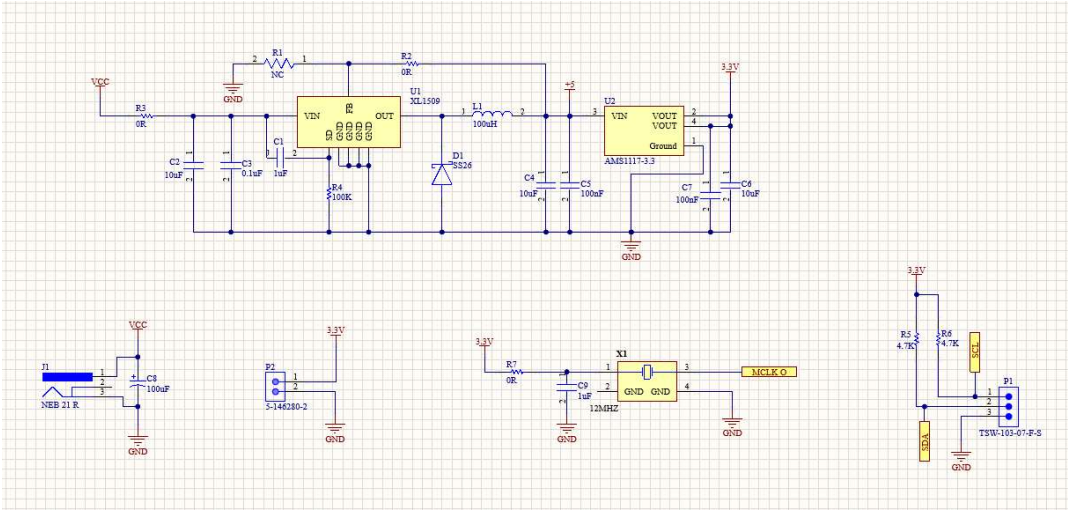

Figura 2: Power Supply

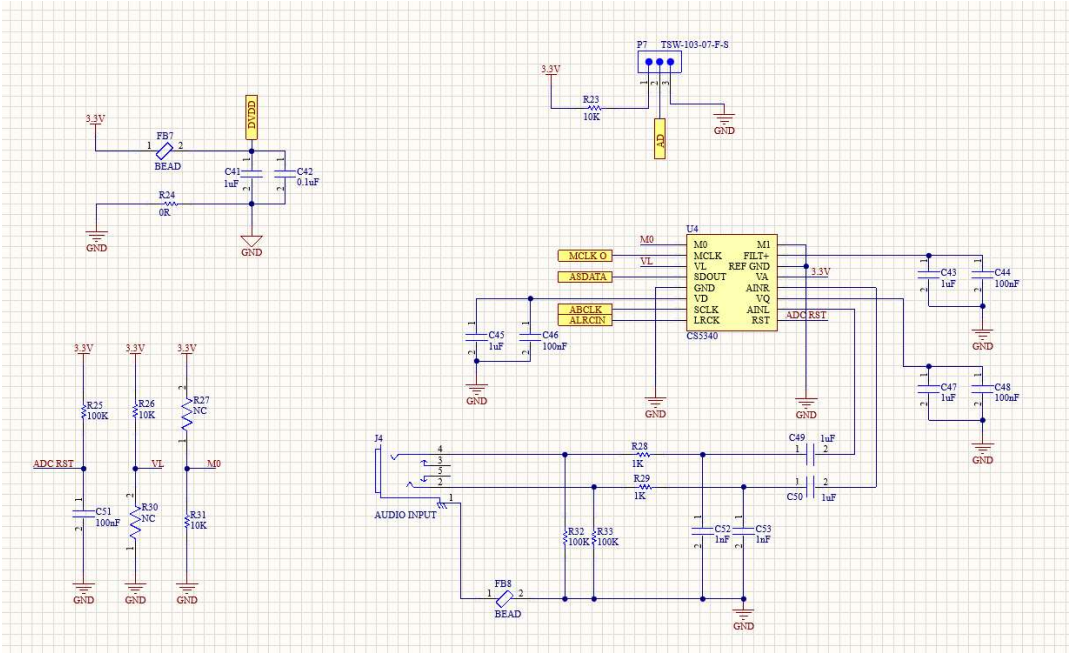

Figura 3: Etapa de audio

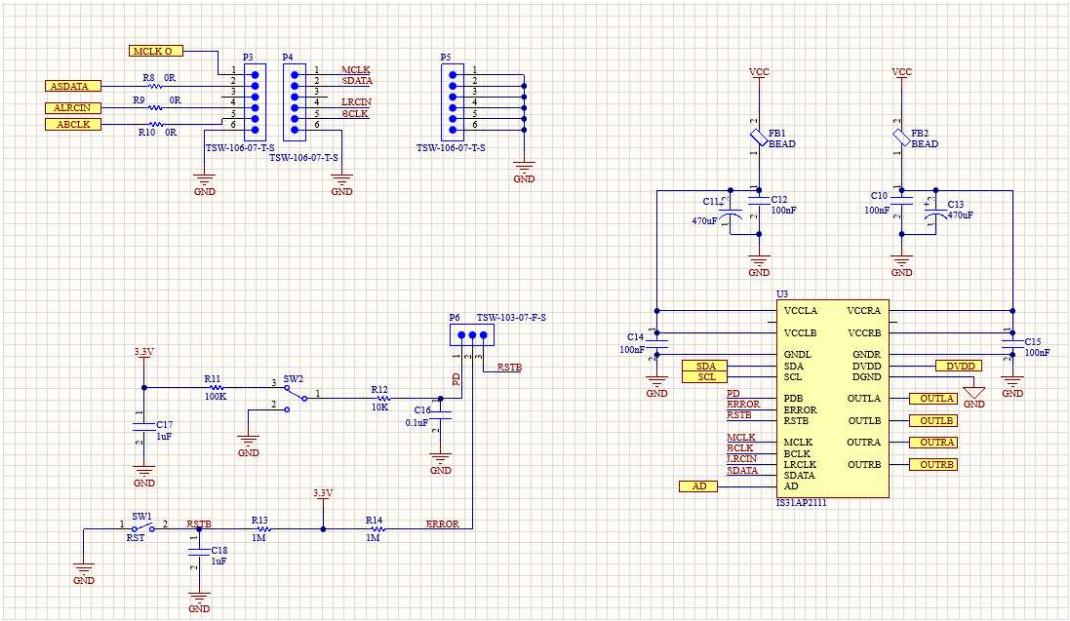

Figura 4: Esquemático IS31AP2111

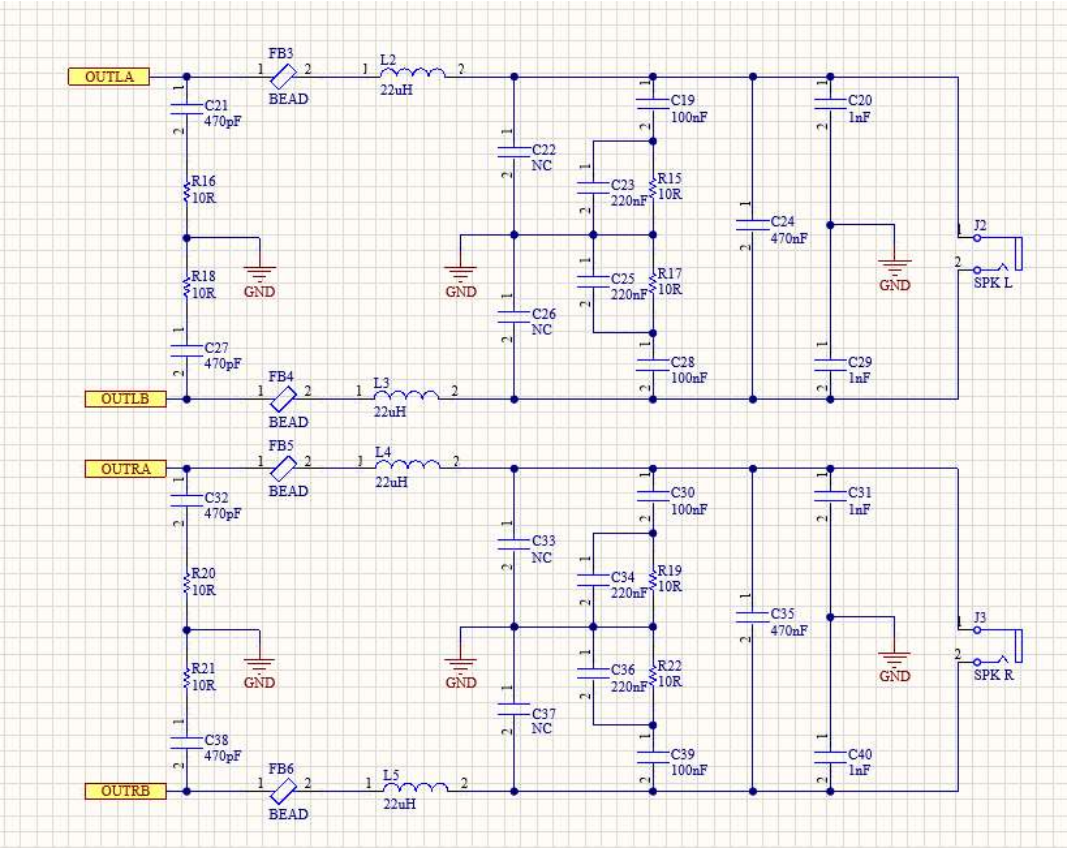

Figura 5: Etapa de salidas

DIAGRAMAS PCB

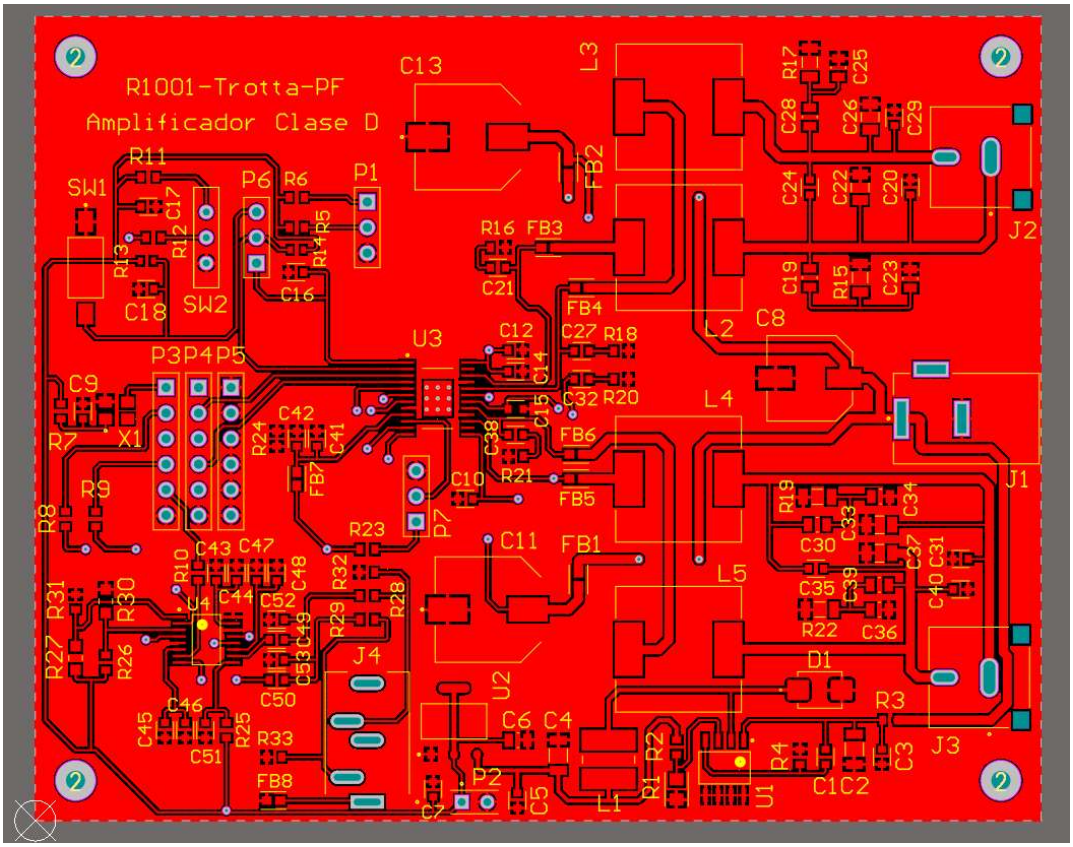

Figura 6: Top Layer

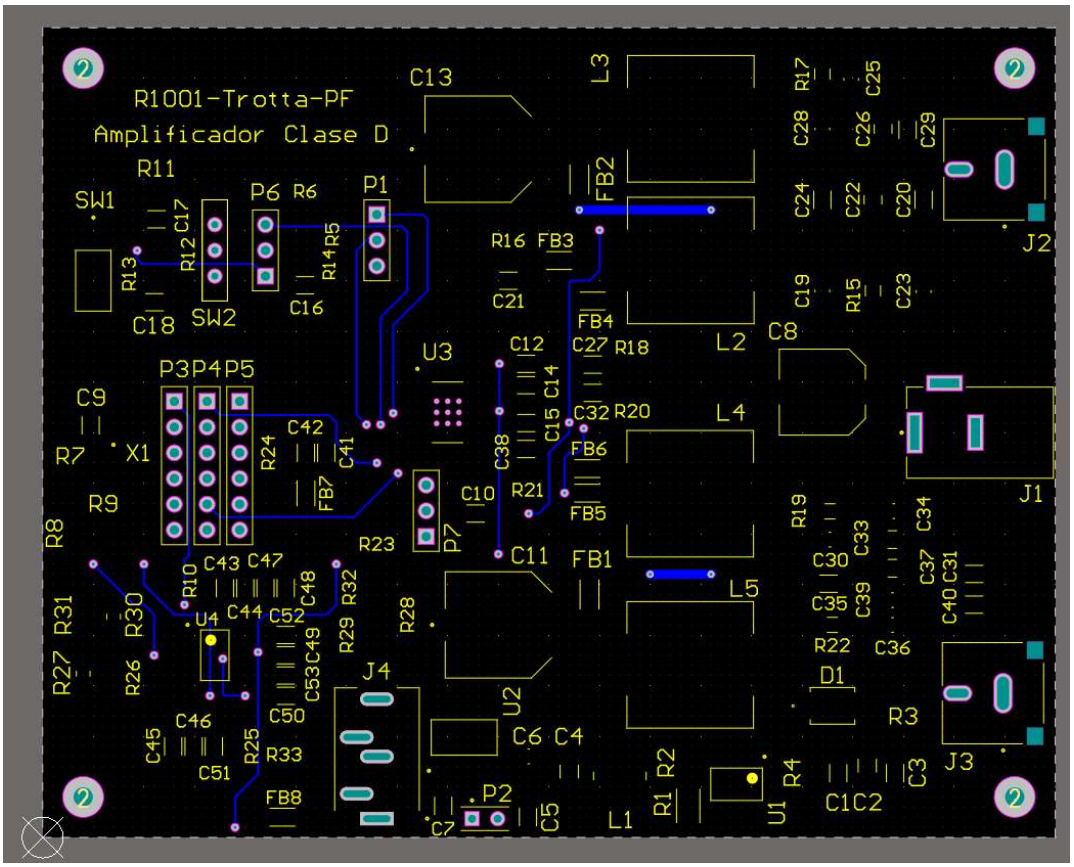

Figura 7: Bottom Layer

RENDER PCB

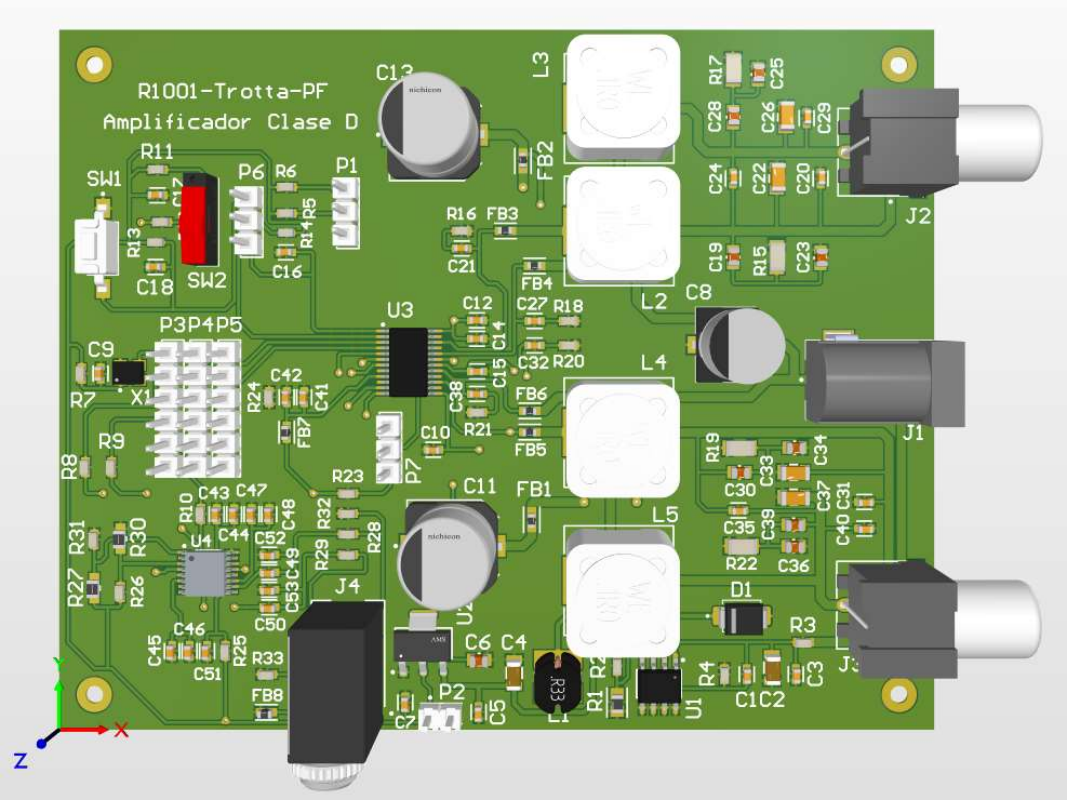

Figura 8: Vista superior

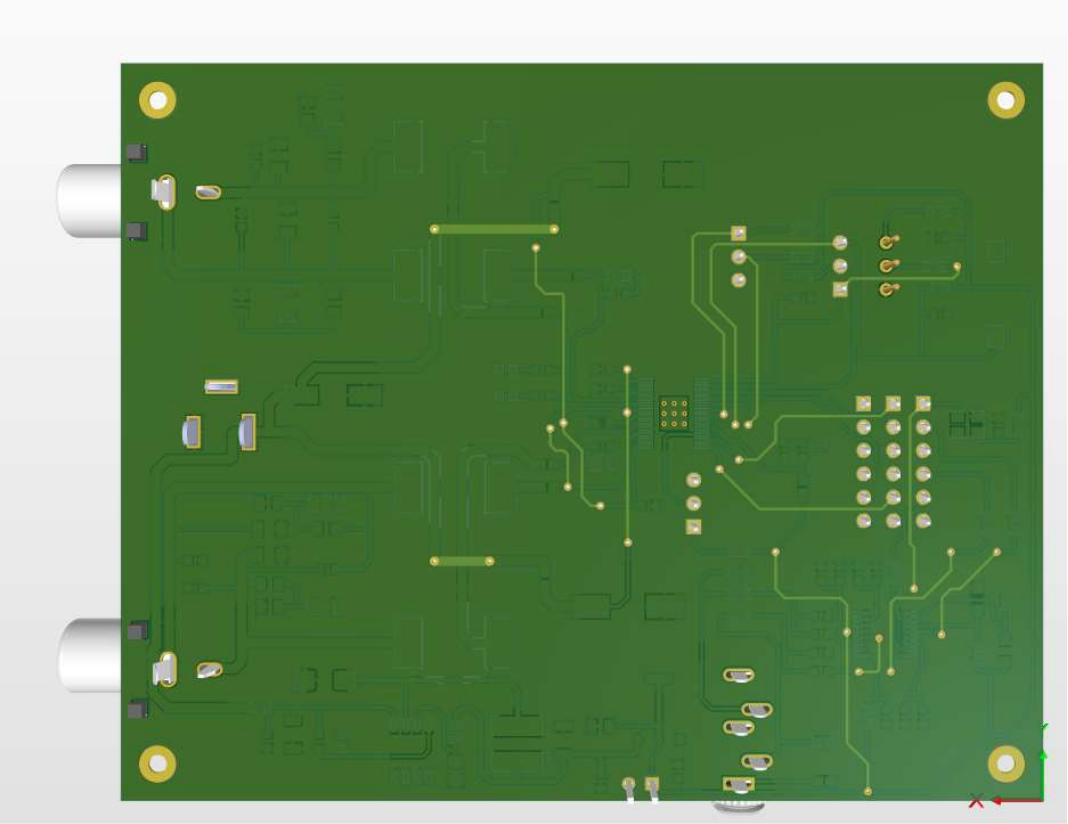

Figura 9: Vista inferior

BOM (Bill of Materials)

Comment	Description	Designator	Footprint	LibRef	Quantity
1uF	CAP CER 10000PF 50V X	C1, C9, C17, C18, C41, C	FP-CC0603-DA-MFG	CMP-2100-03600-2	10
10uF	CAP CER 0.1UF 50V X7R	C2, C4	FP-CC1206-1_25-MFG	CMP-03422-000842-1	2
0.1uF	CAP CER 10000PF 50V X	C3, C16, C42	FP-CC0603-DA-MFG	CMP-2100-03600-2	3
100nF	CAP CER 10000PF 50V X	C5, C7, C10, C12, C14, C	FP-CC0603-DA-MFG	CMP-2100-03600-2	10
10uF	CAP CER 0.1UF 50V X7R	C6	FP-CC0805-0_85-MFG	CMP-2100-03606-3	1
100uF	Aluminum Electrolytic	C8	NIC-UCL1V101MNL1GS	CMP-2000-07344-1	1
470uF	CAP ALUM 470UF 20% (	C11, C13	FP-UUX0J471MNL1GS-(	CMP-12462-000017-1	2
100nF	CAP CER 0.22UF 50V X7	C19, C28, C30, C39	FP-CC0805-0_85-MFG	CMP-03422-000996-1	4
1nF	CAP CER 10000PF 50V X	C20, C29, C31, C40, C52	FP-CC0603-DA-MFG	CMP-2100-03600-2	6
470pF	CAP CER 10000PF 50V X	C21, C27, C32, C38	FP-CC0603-DA-MFG	CMP-2100-03600-2	4
NC	Cap Ceramic 1nF 2kV X	C22, C26, C33, C37	FP-CL31-IPC_C	CMP-13271-000934-1	4
220nF	CAP CER 0.22UF 50V X7	C23, C25, C34, C36	FP-CC0805-0_85-MFG	CMP-03422-000996-1	4
470nF	CAP CER 10000PF 50V X	C24, C35	FP-CC0603-DA-MFG	CMP-2100-03600-2	2
SS26	SCHOTTKY BARRIER RECTIFIER 2.0 AMPERES 60 VOLTS	D1	SMB	SS26_Trotta	1
BEAD	Chip Ferrite Bead, 060	FB1, FB2	FP-BLM18-0_15-t0_8-IF	CMP-0686-00557-7	2
BEAD	Chip Ferrite Bead, 060	FB3, FB4, FB5, FB6, FB7	FP-BLM18-0_15-t0_8-IF	CMP-0686-00503-3	6
NEB 21 R	Jack Socket, Body 14.5	J1	LUMB-NEB21R_V	CMP-2000-06841-1	1
SPK L	Female RCJ Jack, 2 Pos	J2	CUI-RCJ-041_V	CMP-1692-00002-1	1
SPK R	Female RCJ Jack, 2 Pos	J3	CUI-RCJ-041_V	CMP-1692-00002-1	1
AUDIO INPUT	CONN JACK STEREO 3.5	J4	FP-35RAPC4BV4-MFG	CMP-47983-000001-1	1
100uH	SMD Power Inductor W	L1	WE-PD2-M	CMP-0227-00441-1	1
22uH	SMD-Shielded Power I	L2, L3, L4, L5	WE-PD-XXL	CMP-0227-00178-1	4
TSW-103-07-F-S	0.025" SQ Post Header	P1, P6, P7	SMTC-TSW-103-07-X-S	CMP-1024-00331-1	3
5-146280-2	Male Header, Pitch 2.5	P2	TECO-5-146280-2_V	CMP-2000-07492-1	1
TSW-106-07-T-S	0.025" SQ Post Header	P3, P4, P5	SMTC-TSW-106-07-X-S	CMP-1024-00384-1	3
NC	Res Thick Film 0805 11	R1	FP-RC2012-IPC_A	CMP-13261-003410-1	1
0R	Chip Resistor, 100 Ohn	R2, R3, R7, R8, R9, R10,	RESC1608X55X25ML10T	CMP-2000-05021-1	7
100K	Chip Resistor, 100 Ohn	R4, R11, R25, R32, R33	RESC1608X55X25ML10T	CMP-2000-05021-1	5
4.7K	Chip Resistor, 4.7 KOh	R5, R6	RESC1608X55X25ML10T	CMP-2000-05024-1	2
10K	Chip Resistor, 100 Ohn	R12, R23, R26, R31	RESC1608X55X25ML10T	CMP-2000-05021-1	4
1M	General Purpose Chip	R13, R14	RESC1608X55X25LL10T	CMP-2000-06953-1	2
10R		R15, R17, R19, R22	RESC3116X65X40NL10T	CMP-2003-03943-1	4
10R	Chip Resistor, 100 Ohn	R16, R18, R20, R21	RESC1608X55X25ML10T	CMP-2000-05021-1	4
NC	Thick Film Chip Resist	R27, R30	FP-CR0805-MFG	CMP-07231-001707-1	2
1K	Chip Resistor, 0 Ohm,	R28, R29	RESC1608X55X25ML10T	CMP-2100-03667-1	2
RST	FSMSM Push Button Sv	SW1	TECO-FSMSM-2_V	CMP-2000-07511-1	1
450301014042	WS-SLTV 10mm*2.5mr	SW2	450301014042	CMP-1466-00001-1	1
XL1509	2A 150KHz 40V Buck DC	U1	SOIC8	XL1509_Trotta	1
AMS1117-3.3	LDO Voltage Regulator	U2	FP-AMS1117-IPC_C	CMP-209535-000001-1	1
IS31AP2111	2x20W STEREO/1x40W	U3	ETSSOP-24	IS31AP2111_Trotta	1
CS5340	101dB, 192kHz, Multi-B	U4	TSSOP-16L	CS5340_Trotta	1
12MHZ	Ultra Miniature Ceram	X1	ABRACON_ABM8G_V	CMP-2000-05039-1	1

GABINETE

Enlace de Onshape:

https://cad.onshape.com/documents/6b79bef4354ca2f29462f34f/w/9596fabb91709b6f19e3798f/e/ffadfb4ba8fe3b8889f0c616?renderMode=0&uiState=61a1ae8b19636722a38f3fe6

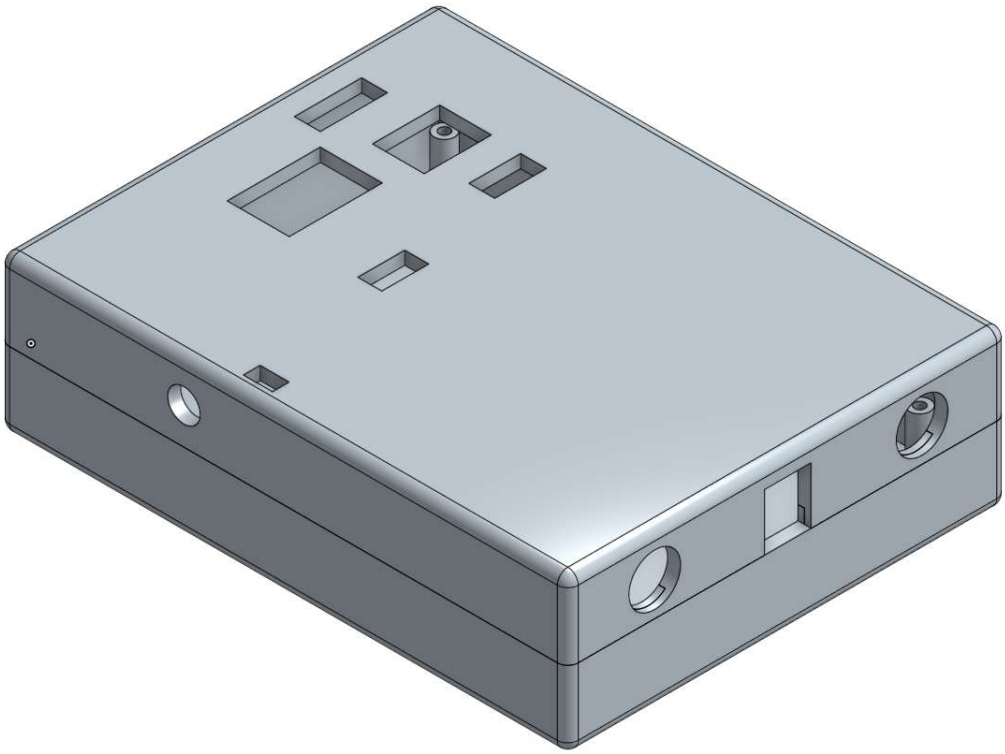

Figura 10: Vista Isométrica

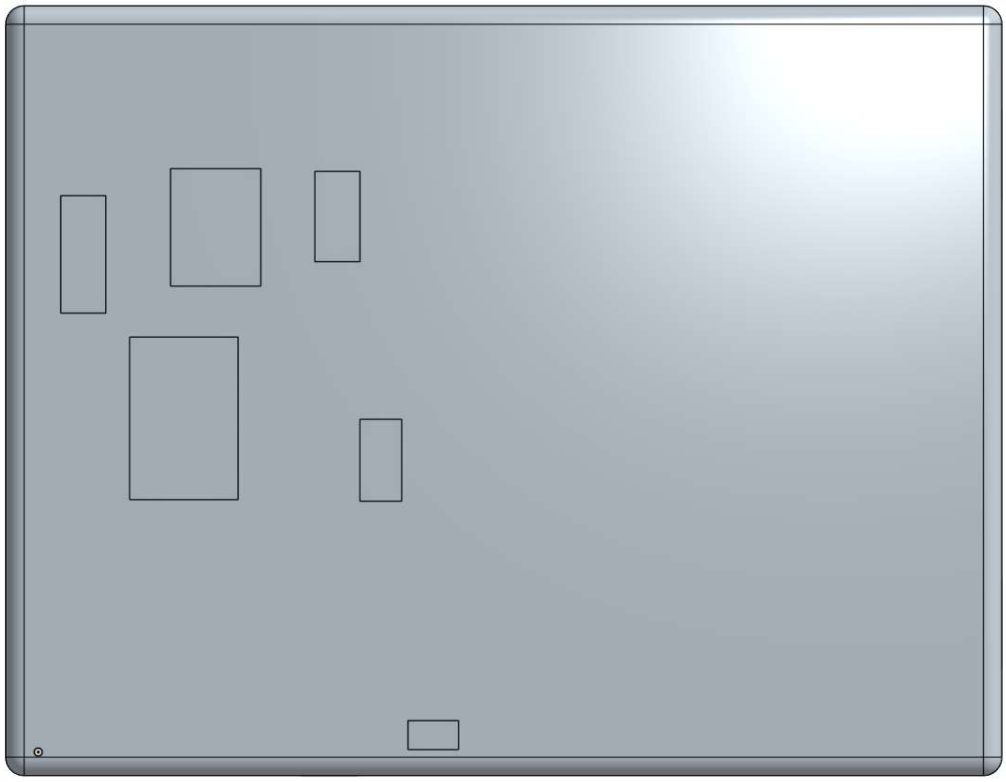

Figura 11: Vista Superior

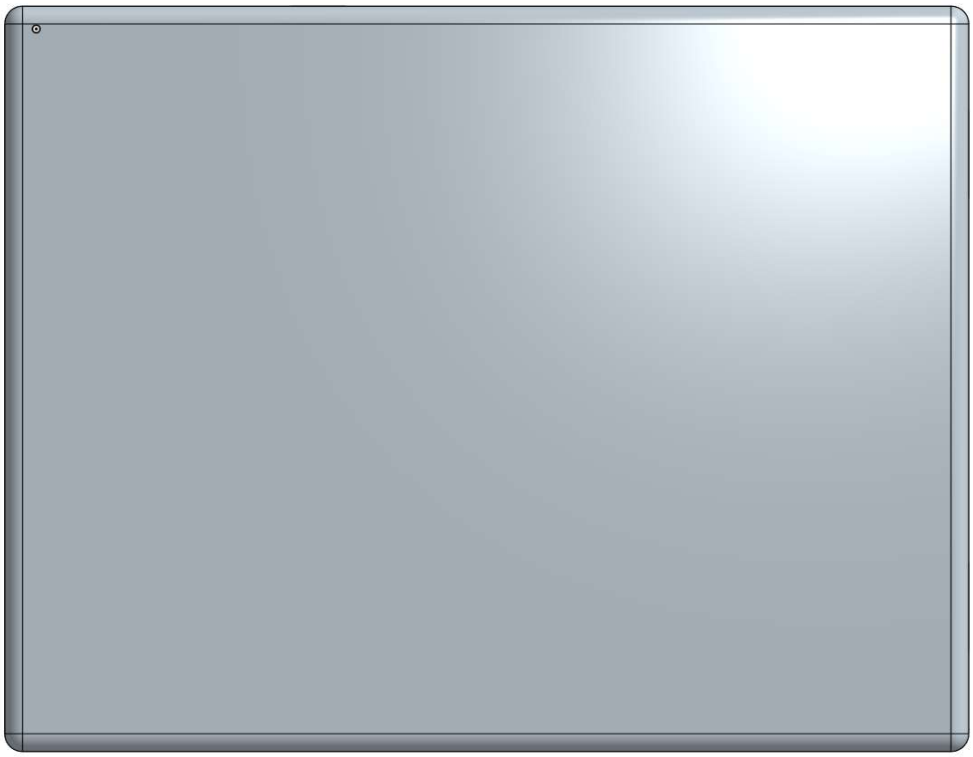

Figura 12: Vista Inferior

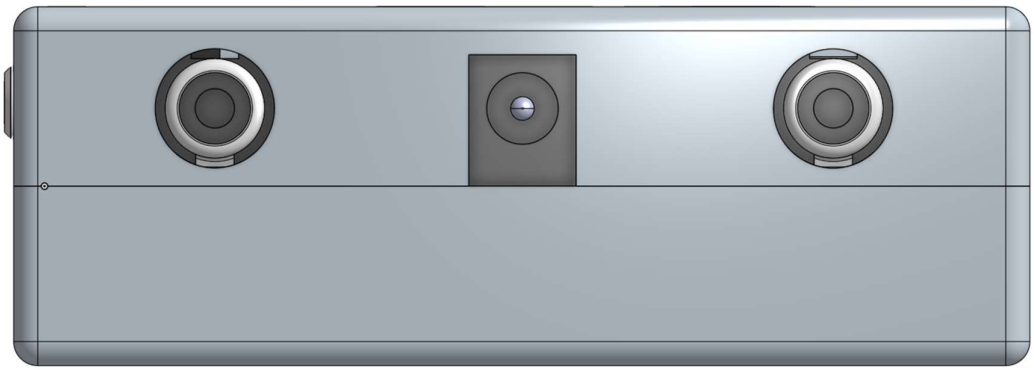

Figura 13: Vista Frontal

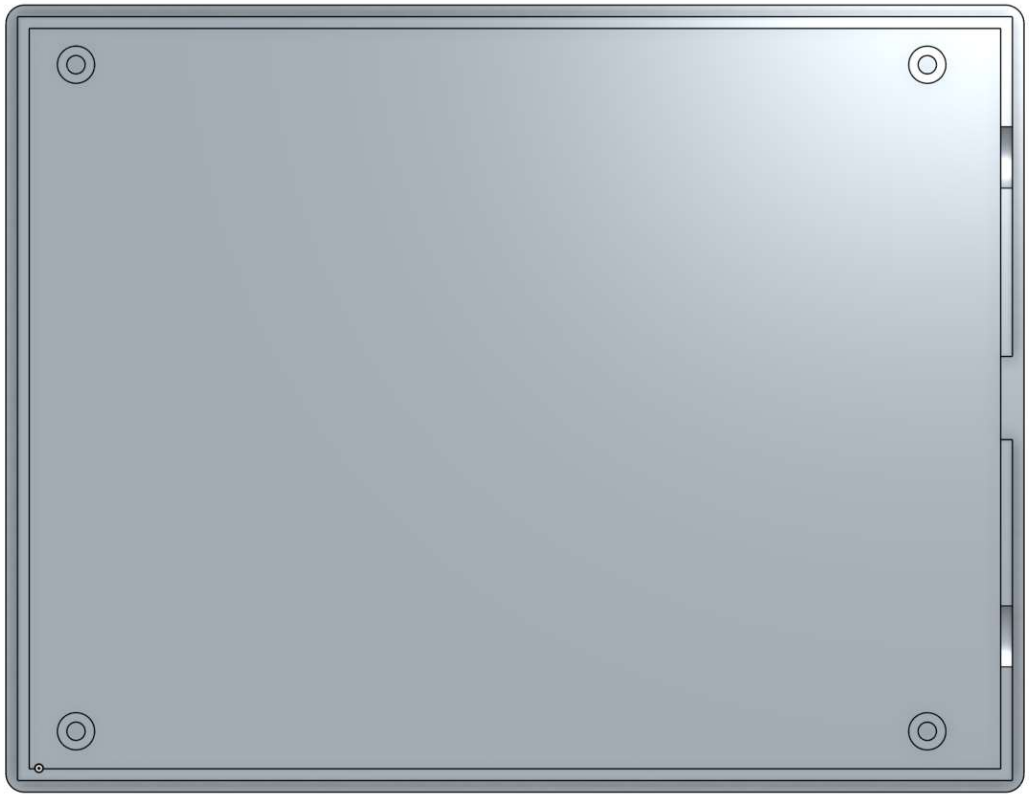

Figura 14: Vista Superior sin tapa

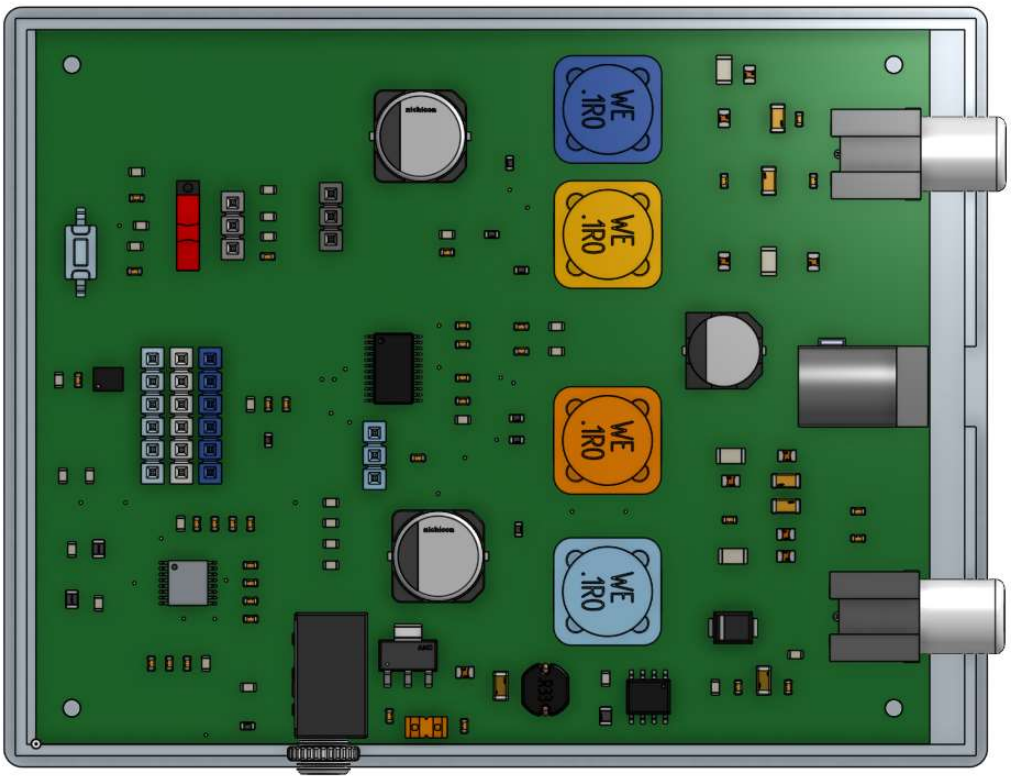

Figura 15: Vista Superior con PCB sin tapa

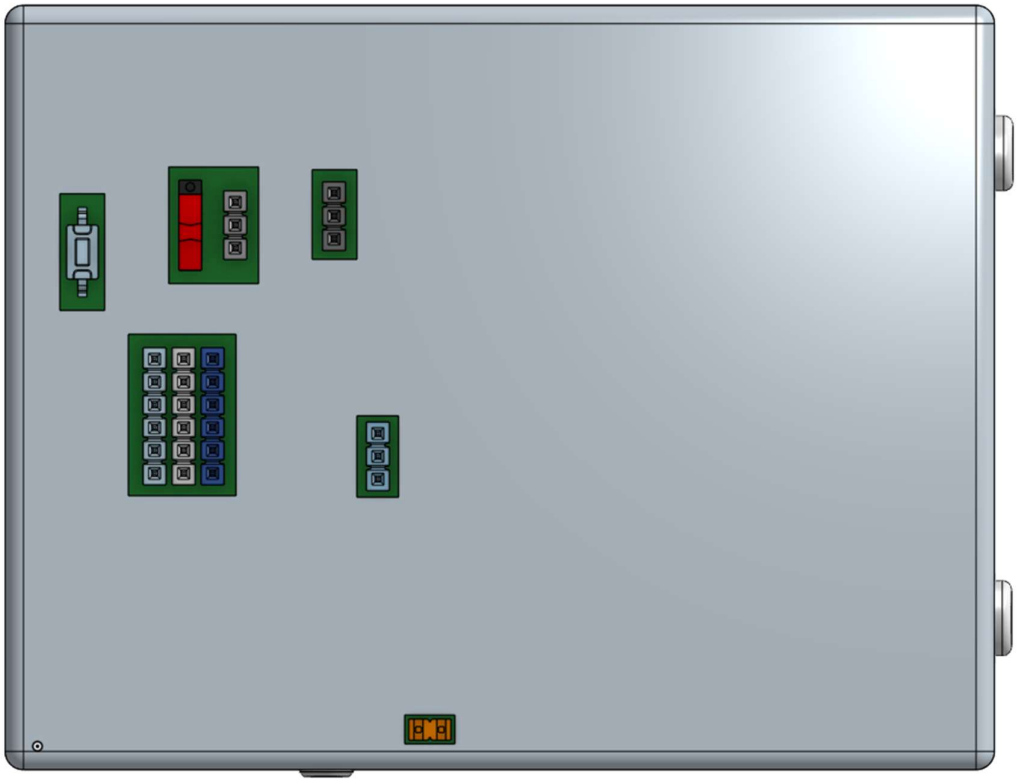

Figura 16: Vista Superior con PCB y tapa

PLANOS DEL GABINETE

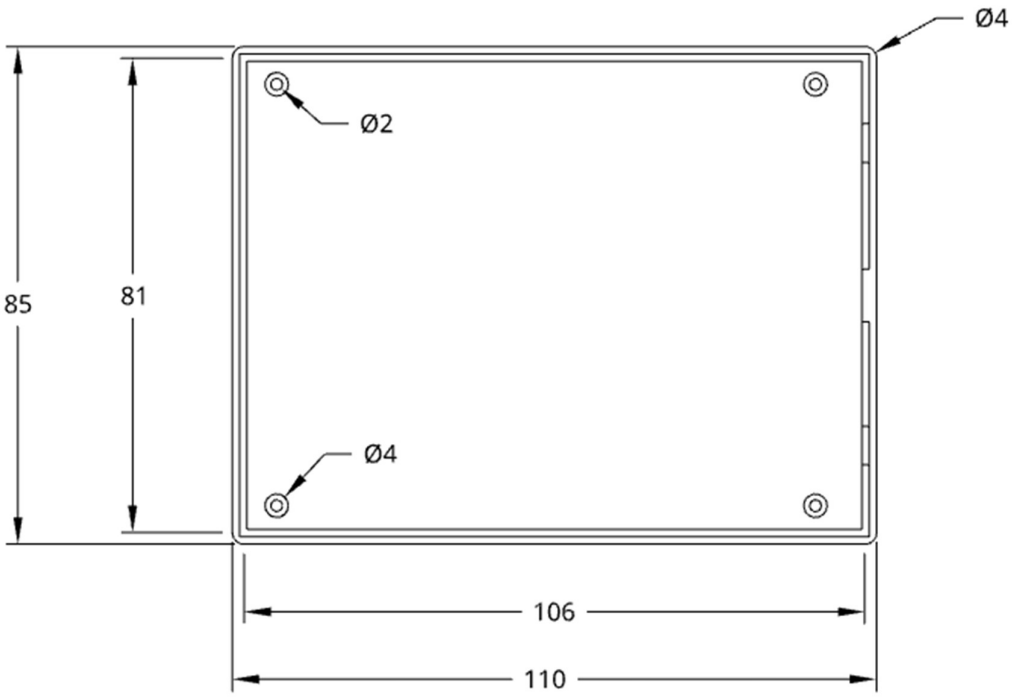

Figura 17: Dimensiones de la base

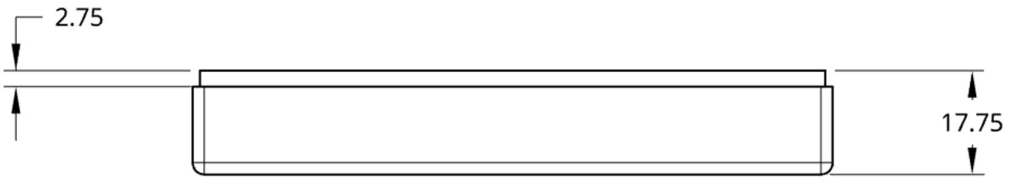

Figura 18: Dimensiones de base – Lateral

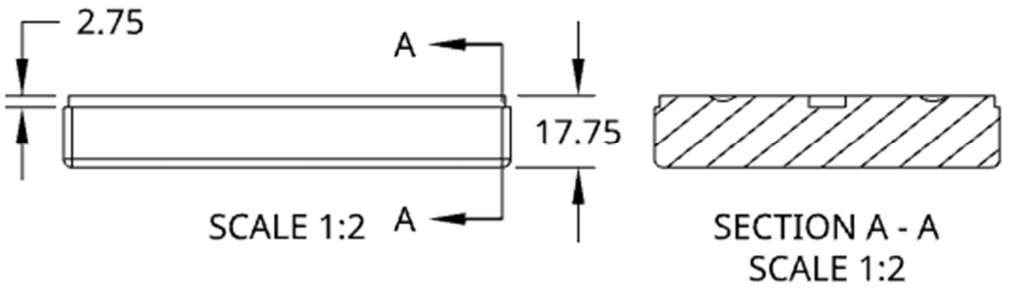

Figura 19: Dimensiones lateral – base; Corte lateral de base

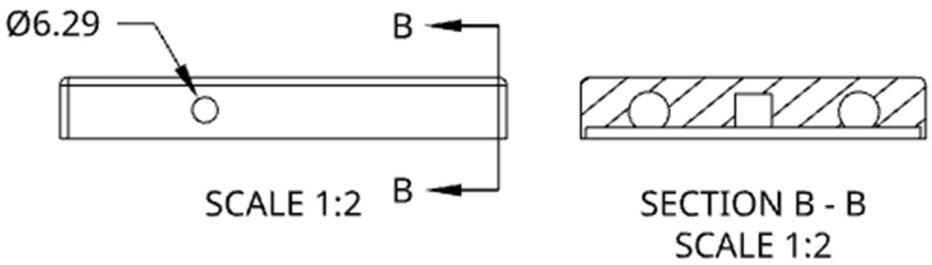

Figura 20: Dimensiones lateral – tapa; Corte lateral de tapa

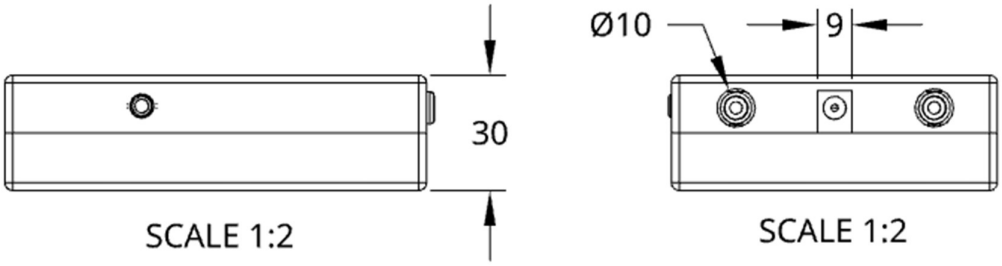

Figura 21: Dimensiones lateral - gabinete

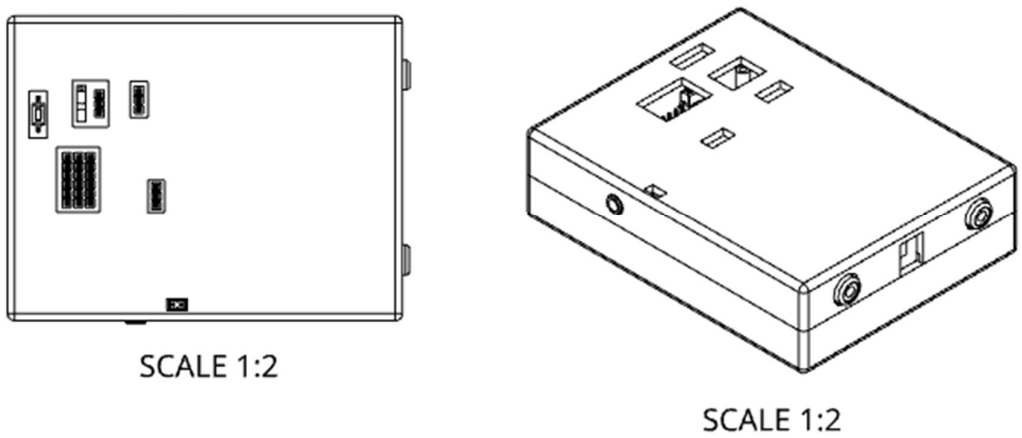

Figura 22: Vista superior; Vista Isométrica