



CC-218 DIVERSITY

Design

2023/06/27

Revised: 2025/03/20

Layout & Wiring

Additional Components

In addition to components and modules selected in the previous phases, the following components are required.

* AC/DC converter for digital circuits

CUI PSK-10D-5-T: 5V 2A (10W)

CC-218 has 30 LEDs in total, and they consume max 0.6A.

To make margin of the power supply, I've decided to use another AC/DC converter for digital circuits.



* AC Inlet

Bulgin PF0001/28 (w/ fuse holder)

Originally, I planned to place a fuse holder inside the enclosure, but it is wiser to use AC inlet w/ fuse holder.

PF0001/28 is used instead of Schurter 6100-3.



* Stand-off terminal

MAC 8 FN-1-1

Used for high voltage wiring



Contents

[AC Power Line](#)

[MCU Board \(BD3\)](#)

[VOL \(Volume\) Board \(BD4\)](#)

[EQ \(Phono Equalizer\) Board \(BD5\)](#)

[DISP \(Display\) Board \(BD1\)](#)

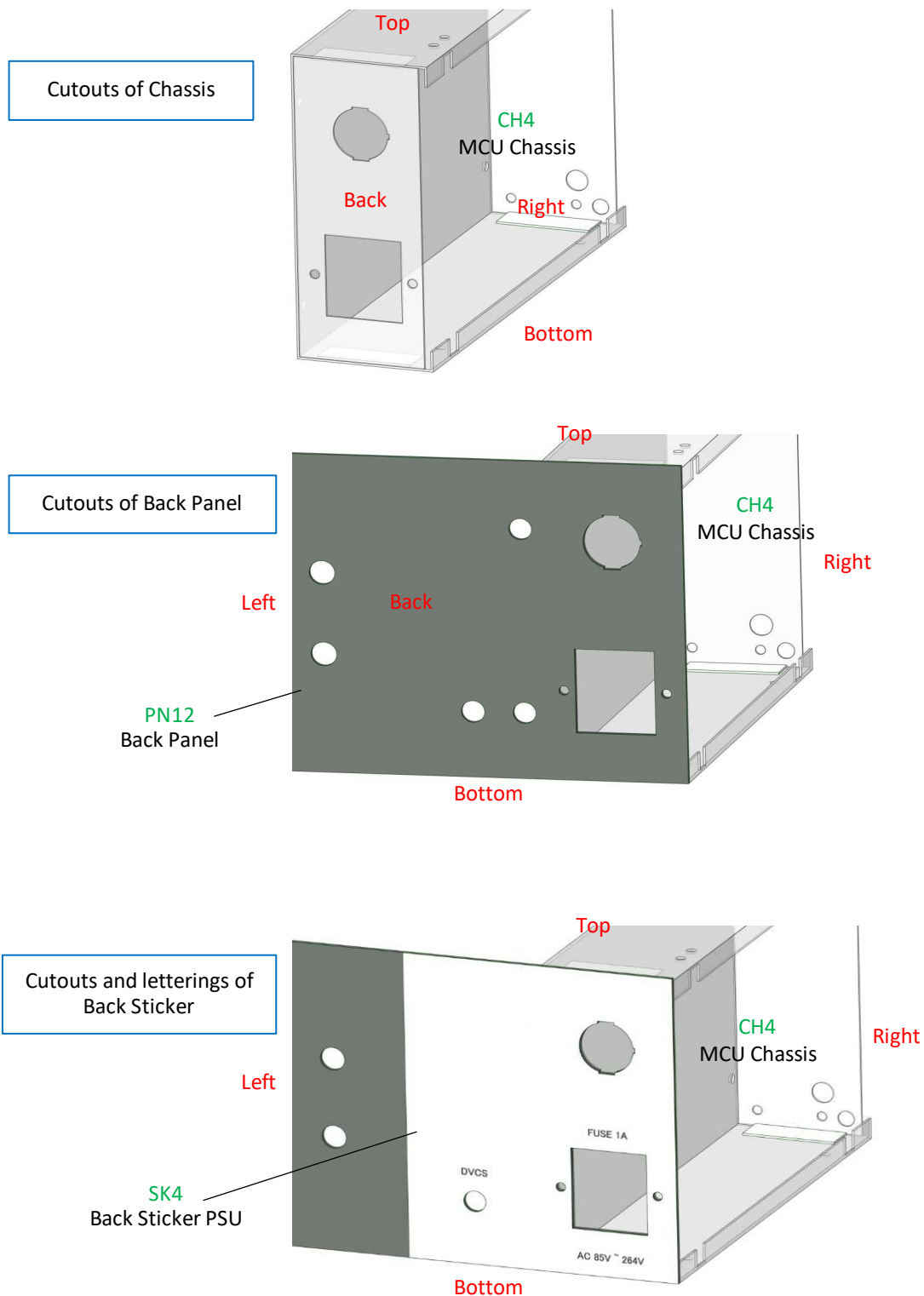
[Wires from RCA jacks to VOL Board \(BD4\) and EQ Board \(BD5\)](#)

[Total Lengths of Wires](#)

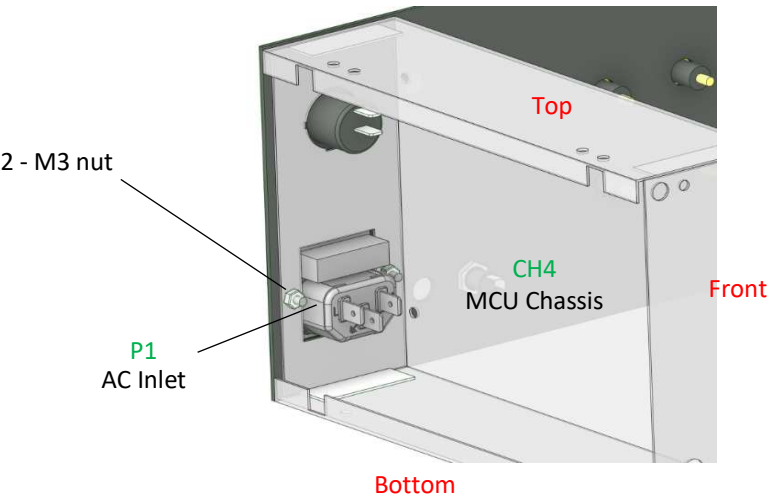
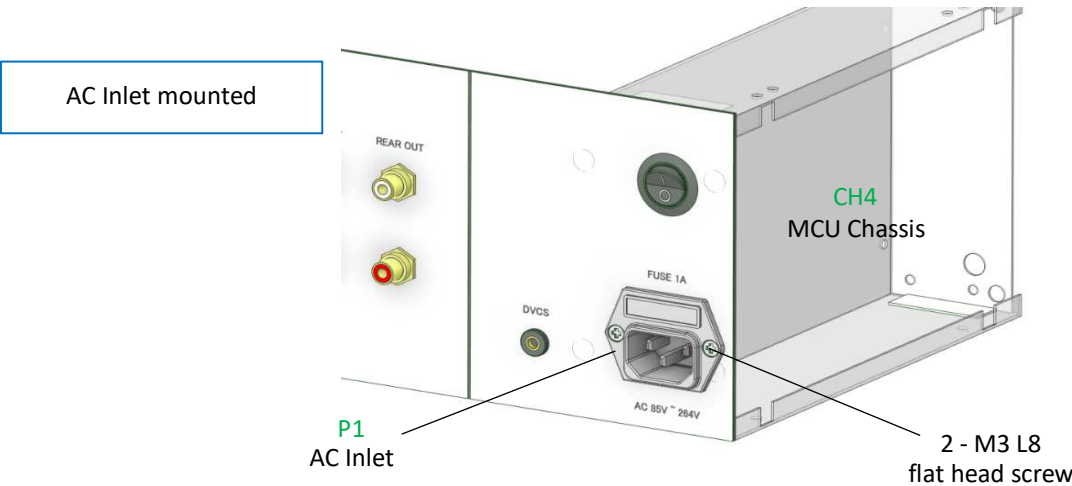
AC Power Line

* AC Inlet

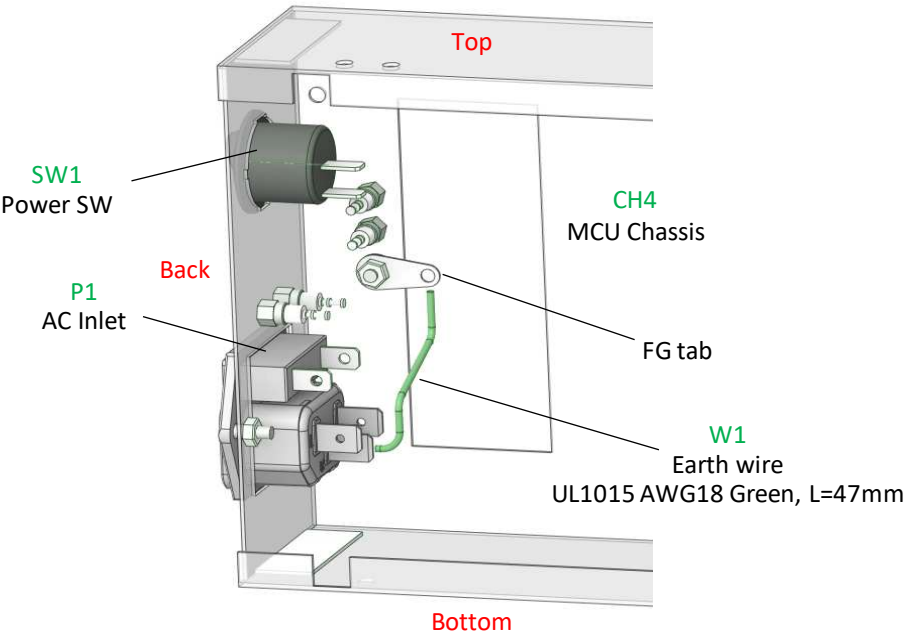
For the new inlet, MCU chassis CH4, Back Panel PN12 and sticker SK4 are modified.



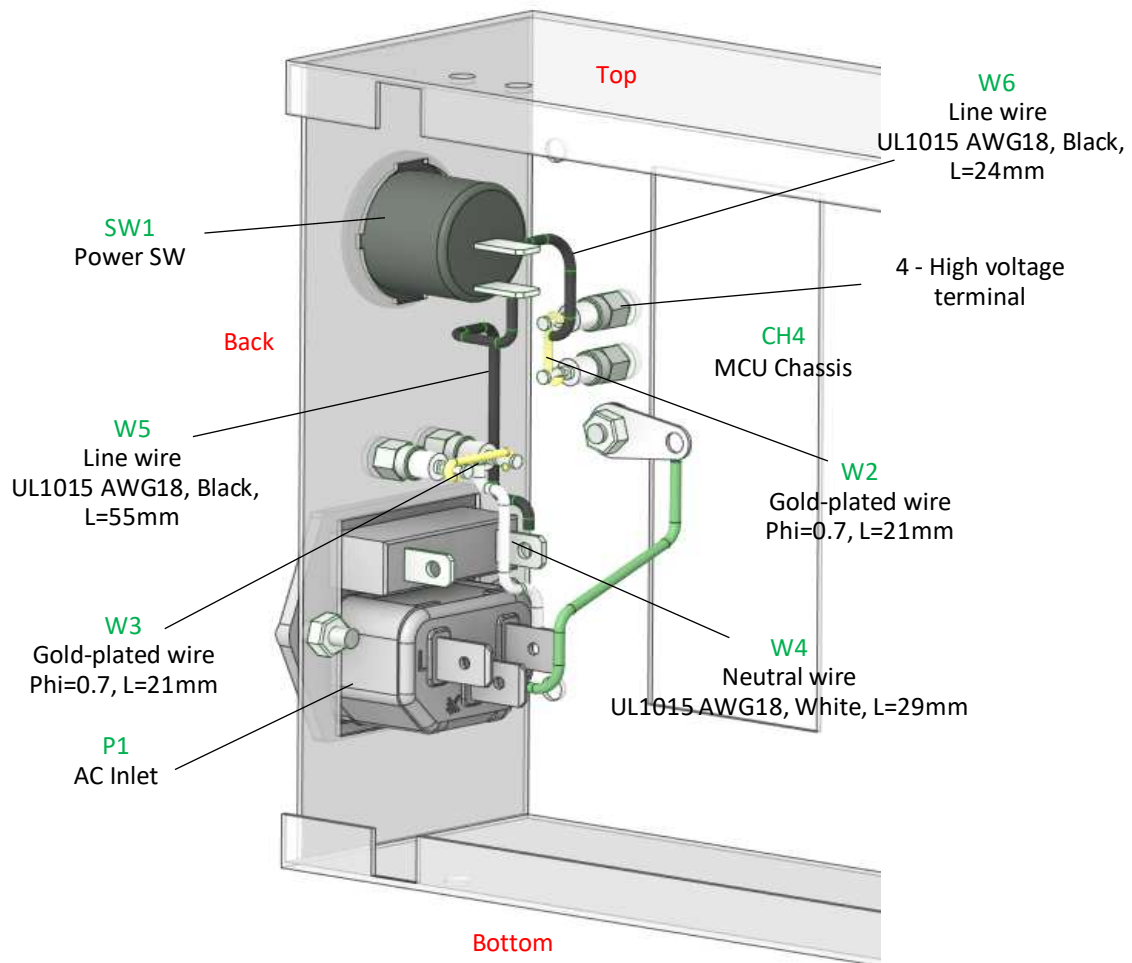
"FUSE 1A" replaced "AC IN".



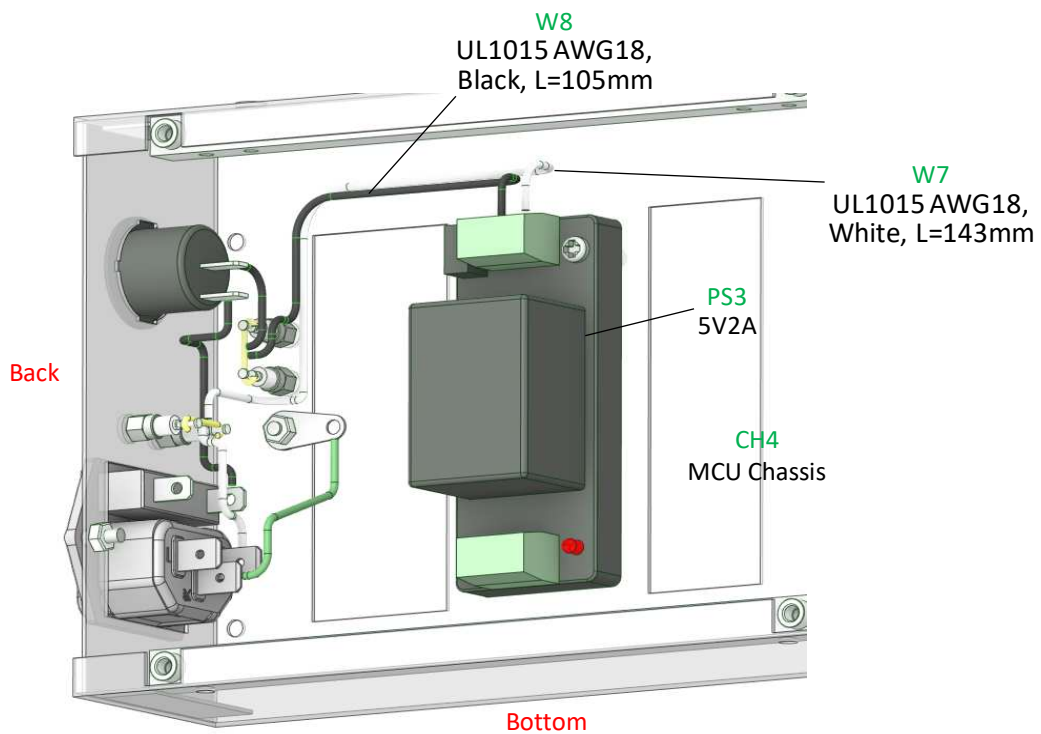
*** Earth - FG**

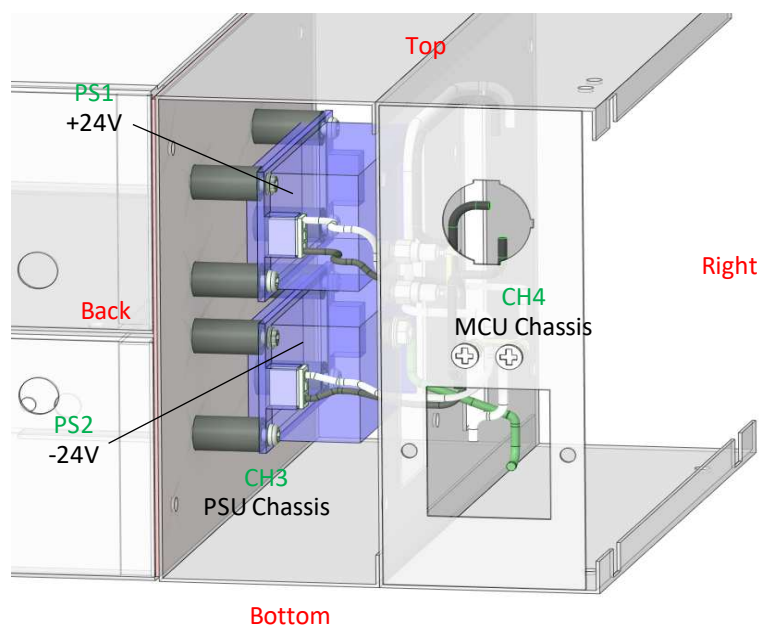
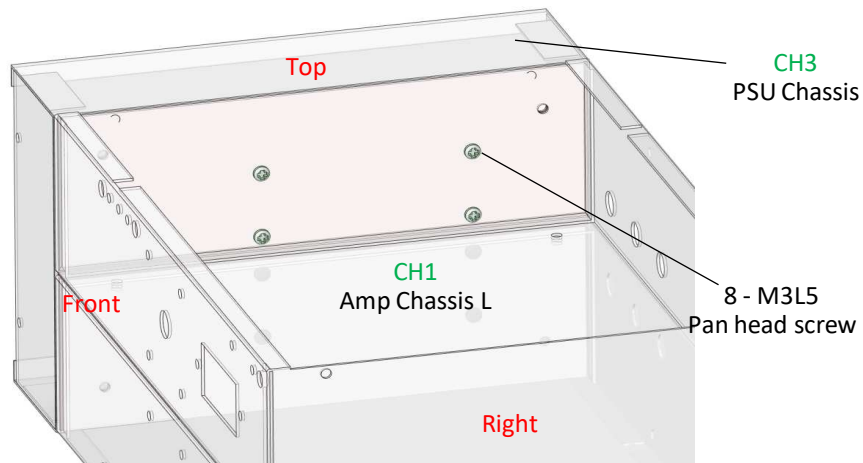
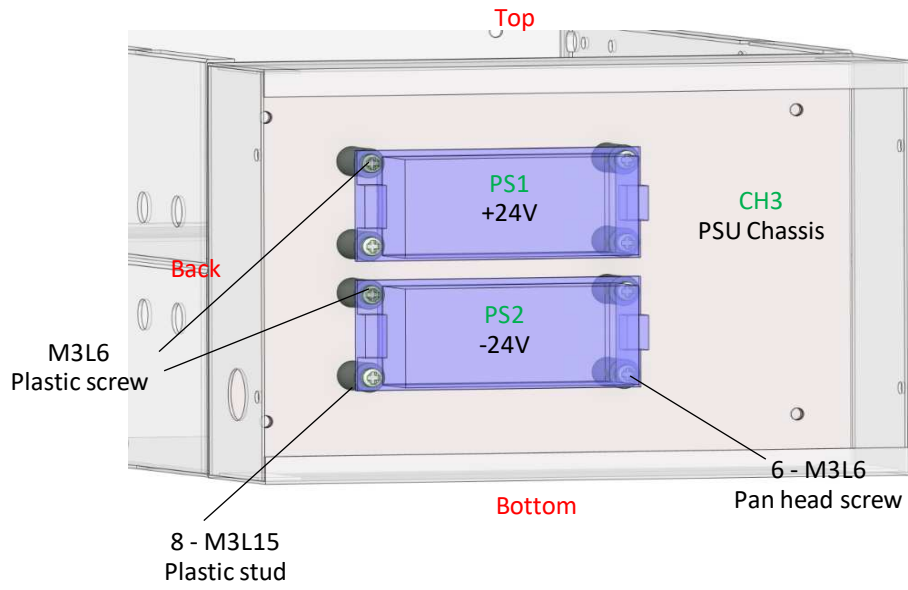


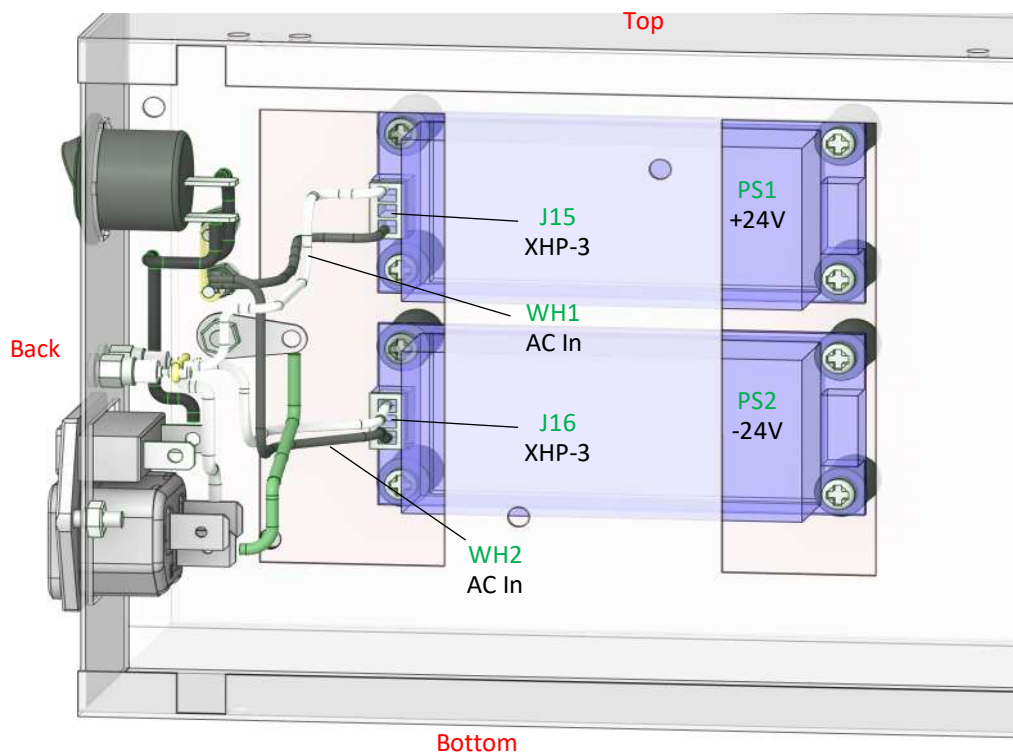
* AC supply lines



Line input is internally connected to the fuse.







WH1: AC_In

No.	Inlet end	Wire		Length	Signal	PS1 end
		Res def	Spec			
1	Stripped core	W9	AWG22 Black	57mm	Line	XHP-3 (J15)
2	(blank)					
3	Stripped core	W10	AWG22 White	84mm	Neutral	

WH2: AC_In

No.	Inlet end	Wire		Length	Signal	PS2 end
		Ref des	Spec			
1	Stripped core	W11	AWG22 Black	81mm	Line	XHP-3 (J16)
2	(blank)					
3	Stripped core	W12	AWG22 White	71mm	Neutral	

Wire spec: UL1007
Contact of XHP-3: SHX-001T-P0.6

MCU Board (BD3)

* Wire Harness from PS3 to MCU Board (BD3)

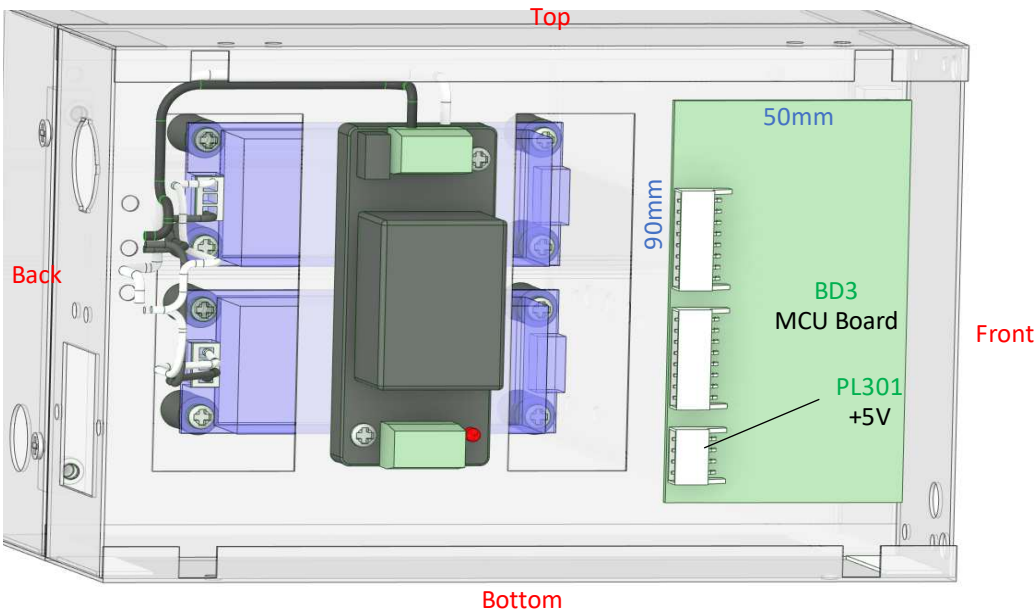
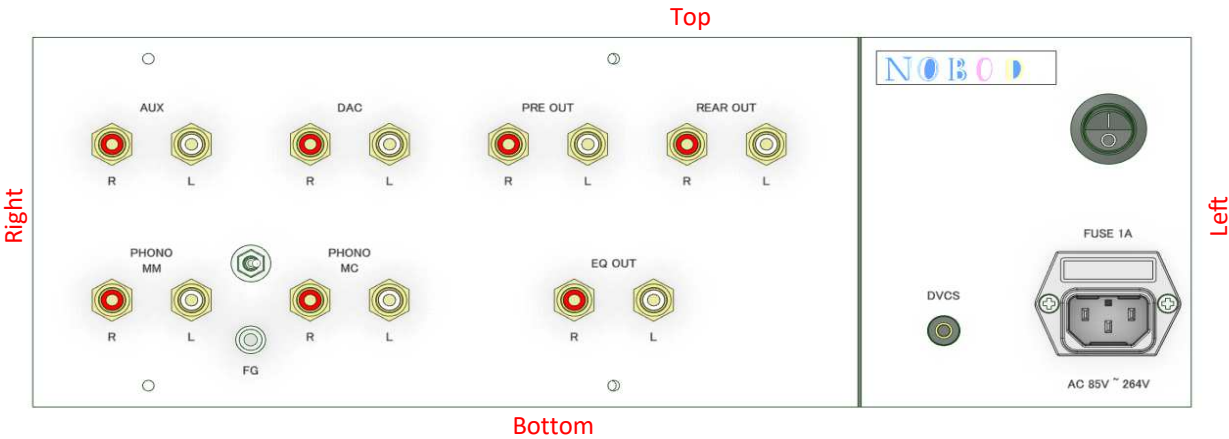
WH3: +5V

No.	PSU end	Wire		Length	Signal	MCU end
		Ref des	Spec			
1	Stripped core	W13	AWG22 Black	76mm	DGND	XHP-4 (J301)
2	Stripped core	W14	AWG22 Black	79mm	DGND	
3	Stripped core	W15	AWG22 Red	60mm	+5V	
4	Stripped core	W16	AWG22 Red	62mm	+5V	

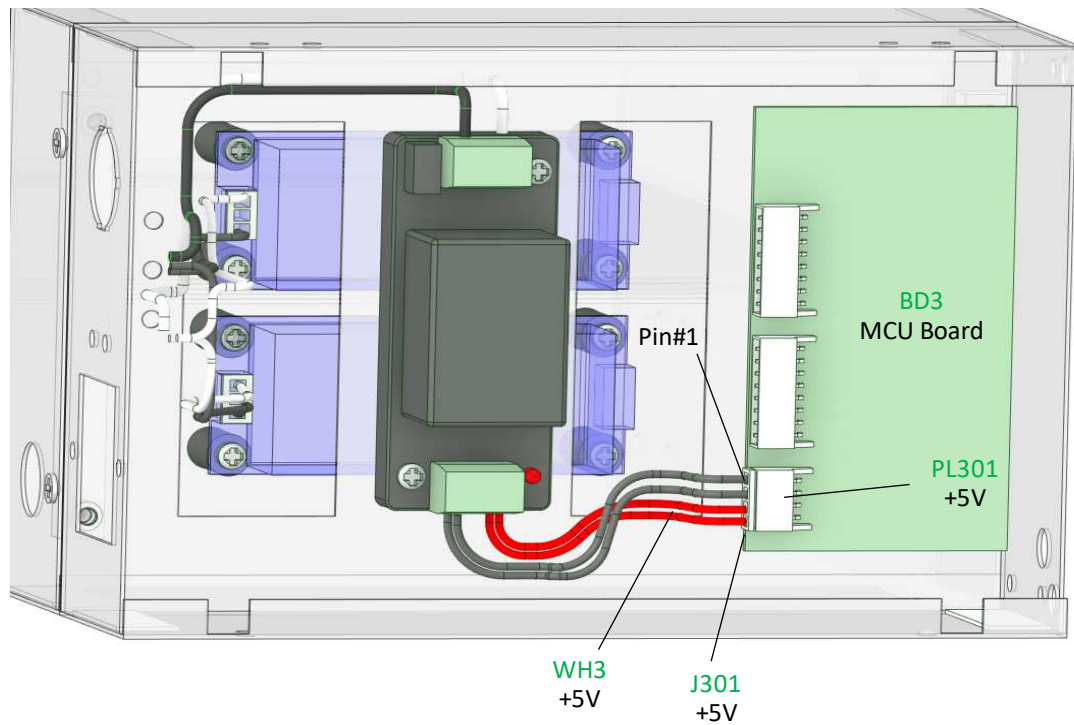
Wire spec: UL1007
Contact of XHP-4: SHX-001T-P0.6

Interrupt

I realized the amp compartment shouldn't be divided into L-ch and R-ch.
It causes a ground loop, unless PSU is divided into two for channel-dependent configuration.
It should be Low-level and High-level.
I re-designed Back Panel for the new construction.



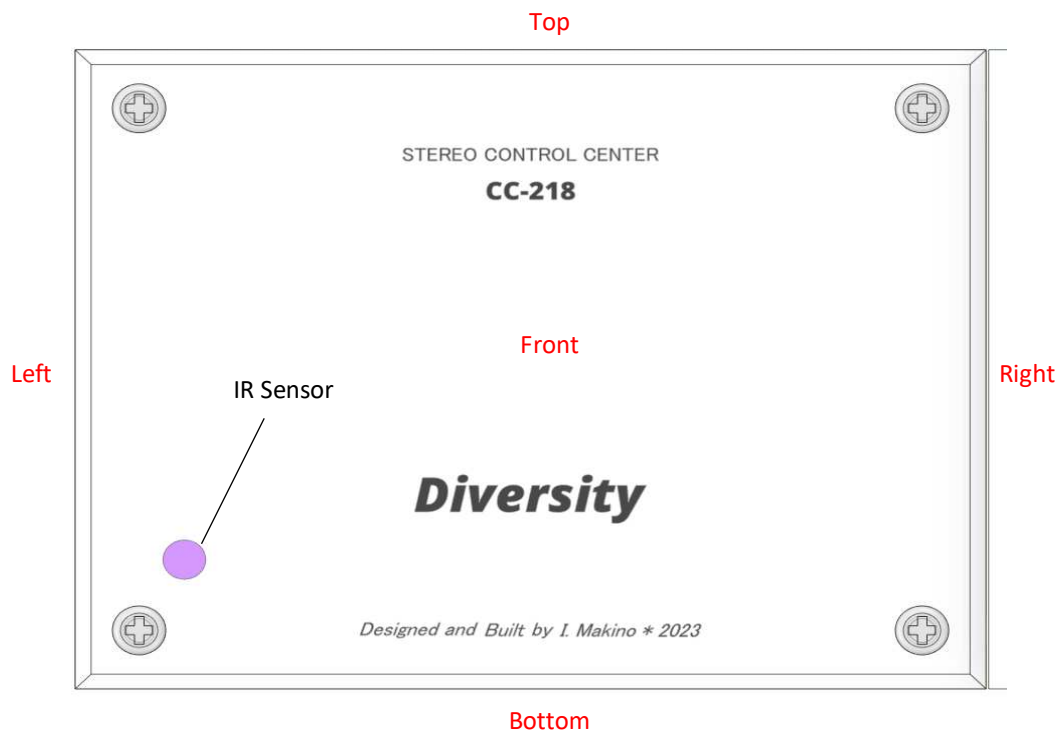
Interrupt



* Wire Harness from MCU Board (BD3) to Display Board (BD1)

Interrupt

I realized the position of the IR sensor wasn't good.
I moved the IR sensor upward by 5mm.



Interrupt

Interrupt

I realized accomodating 2 different phono EQ boards make the layout and wiring complex.
I've decided to omit the phono EQ for MM (PE-114).



Amp_EQ compartment is much simpler.

Interrupt

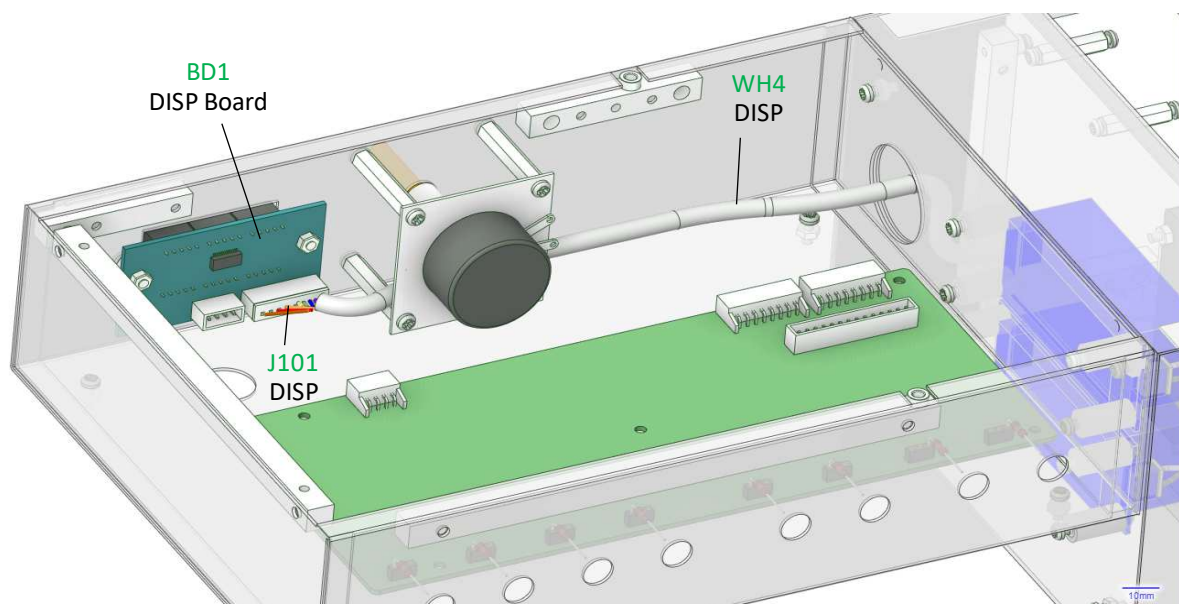
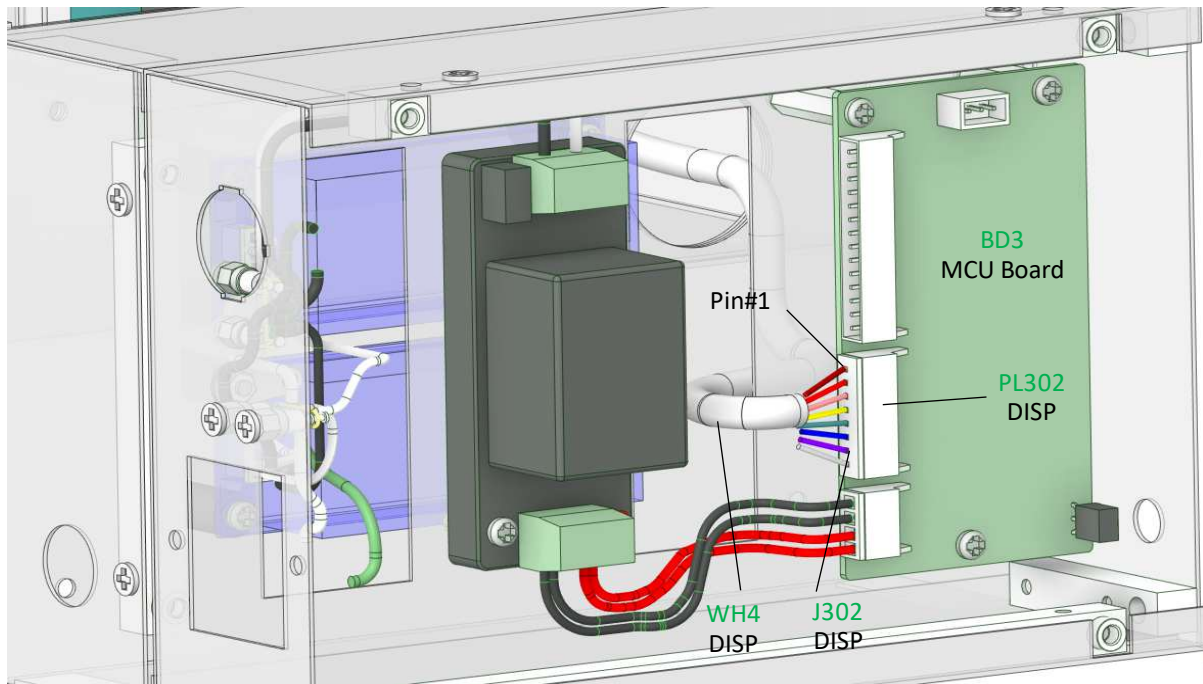
WH4: DISP

No.	BD3 end	Wire	Wire Ref Des	Signal	BD1 end
1	XHP-8 (J302)	AWG22 Brown	W17	DGND	XHP-8 (J101)
2		AWG22 Red	W18	SDA	
3		AWG22 Orange	W19	SCL	
4		AWG22 Yellow	W20	IRQ	
5		AWG22 Green	W21	+5V	
6		AWG22 Blue	W22	+5V	
7		AWG22 Violet	W23	DGND	
8		AWG22 Grey	W24	DGND	

Wire spec: UL1007

Contact of XHP-8: SHX-001T-P0.6

Length: ~~305~~255mm (sleeve length) + alpha [2023/08/31]

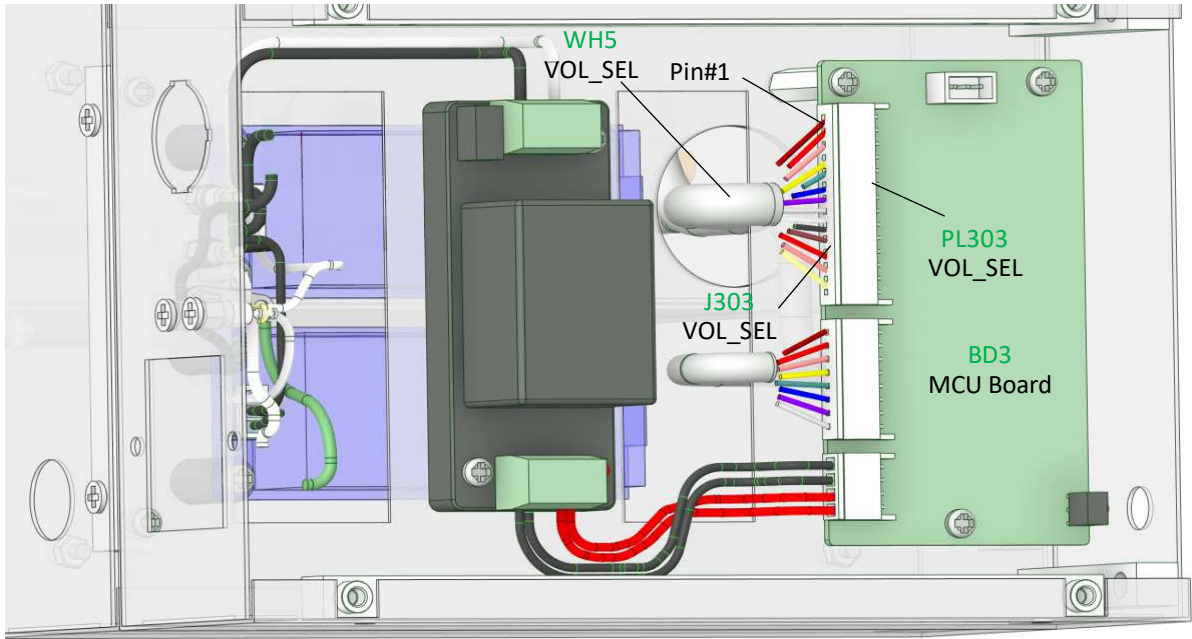


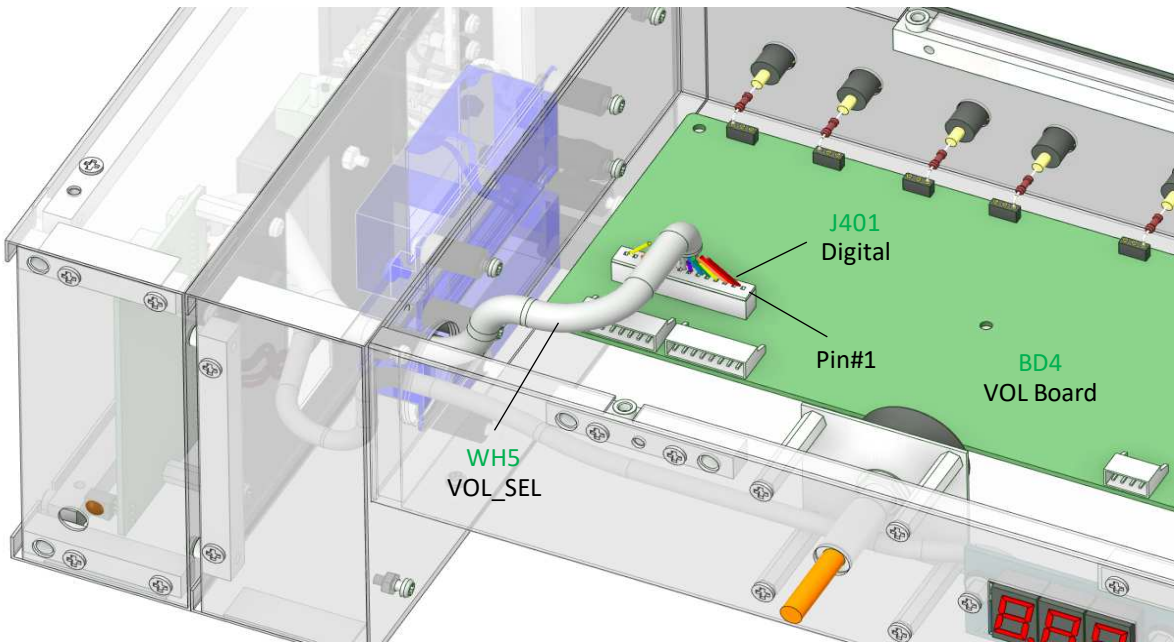
* Wire Harness from MCU Board (BD3) to VOL Board (BD4)

WH5: VOL_SEL

No.	BD3 end	Wire	Wire Ref Des	Signal	BD4 end
1	XHP-14 (J303)	AWG22 Brown	W25	nMUTE	XHP-14 (J401)
2		AWG22 Red	W26	ZCEN	
3		AWG22 Orange	W27	nCS	
4		AWG22 Yellow	W28	SCLK	
5		AWG22 Green	W29	SDI	
6		AWG22 Blue	W30	SDO	
7		AWG22 Violet	W31	+5V	
8		AWG22 Grey	W32	+5V	
9		AWG22 White	W33	DGND	
10		AWG22 Black	W34	DGND	
11		AWG22 Brown	W35	nSEL_PHONO	
12		AWG22 Red	W36	nSEL_DAC	
13		AWG22 Orange	W37	nSEL_AUX	
14		AWG22 Yellow	W38	DGND	

Wire spec: UL1007
Contact of XHP-14: SHX-001T-P0.6
Length: 196mm (sleeve length) + alpha





Interrupt

I realized the 7-seg LED, ROHM LA-601EL has poor quality (2023/08/08).
When one segment is on, (an) adjacent segnemnt(s) is half bright.
I've decided to employ Broadcom HDSP-H153. But orange isn't available. I selected AlGaAs red.



The appearance has changed a bit.

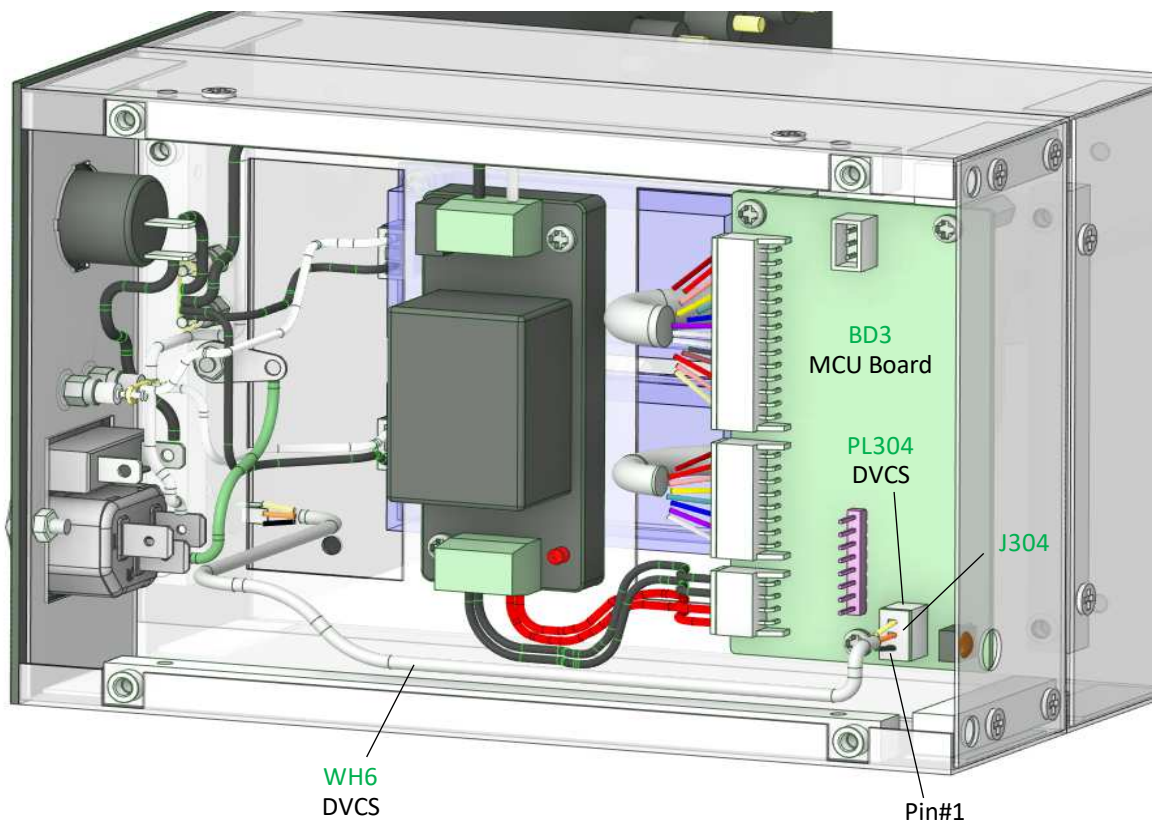
Interrupt

* Wire Harness from MCU Board (BD3) to DVCS jack (J14) Back Panel

WH6: DVCS

No.	BD3 end	Wire	Wire Ref Des	Signal	J14 end
1	XHP-3 (J304)	Shied	-	DGND	Soldered
2		AWG25 Red	-	TX	
3		AWG25 White	-	RX	

Wire: L-2B2AT (Canare)
Contact of XHP-3: SHX-001T-P0.6
Length: 224mm (sleeve length) + alpha (=16+16mm)

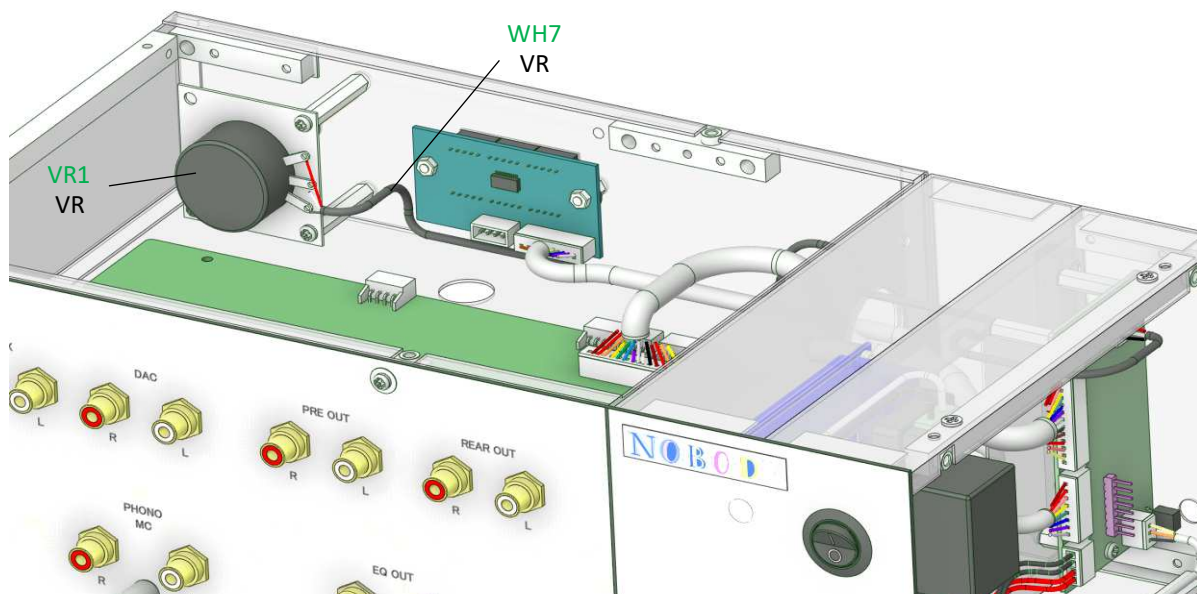
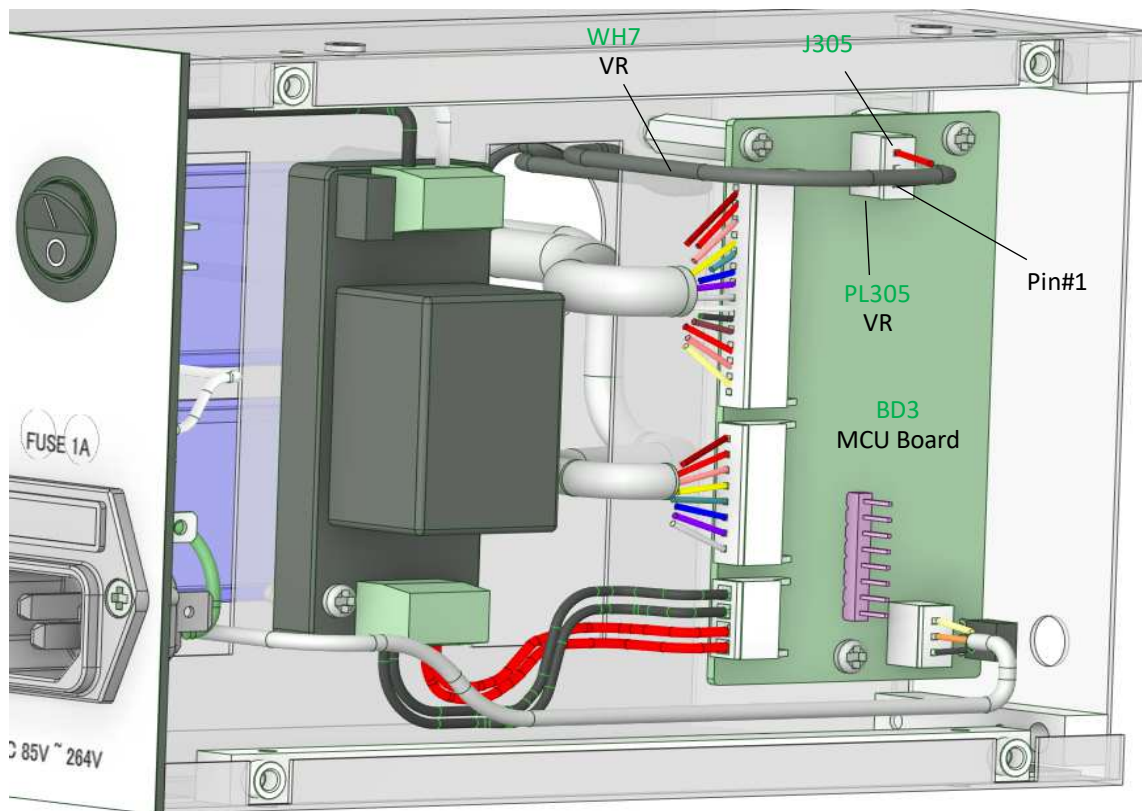


*** Shielded Wire from MCU Board (BD3) to Variable Resistor**

WH7: VR

No.	BD3 end	Wire	Wire Ref Des	Signal	VR end
1	XHP-3 (J305)	Shied	-	COLD	Soldered
2		AWG25 White	-	WIPER	
3		AWG25 Red	-	HOT	

Wire: L-2B2AT (Canare)
Contact of XHP-3: SHX-001T-P0.6
Length: 398mm (sheath length) + alpha (16+28mm)



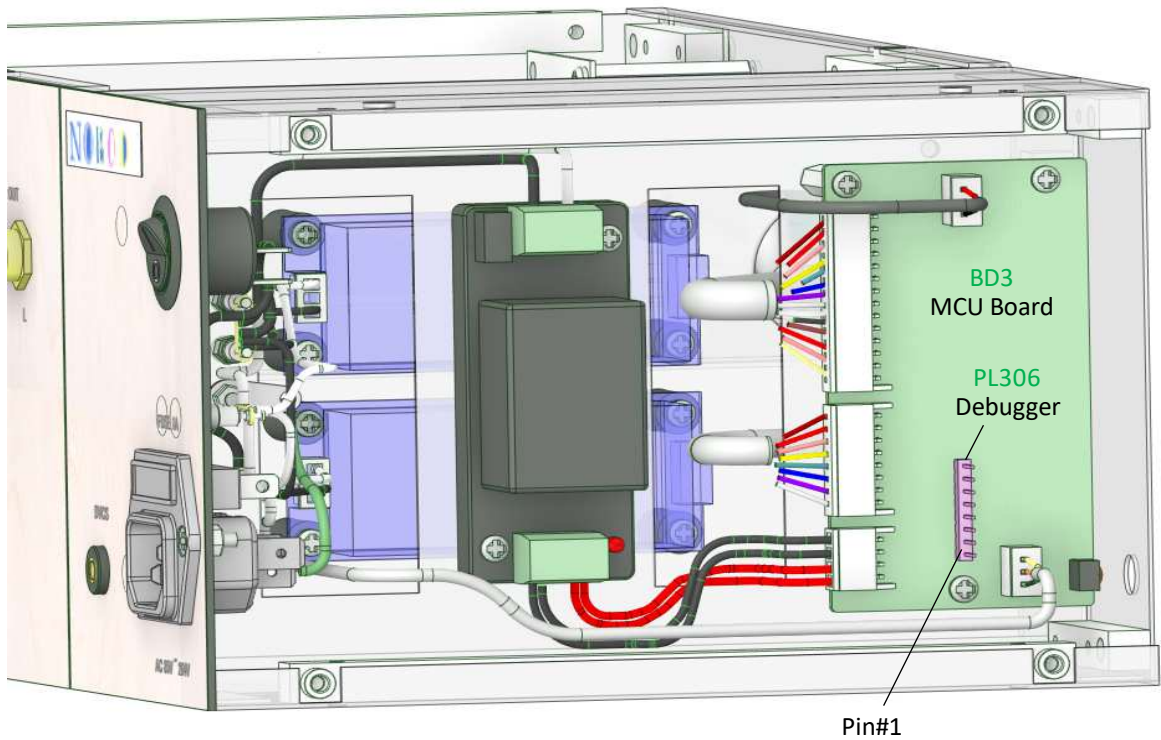
*** Debugger Connector on MCU Board (BD3)**

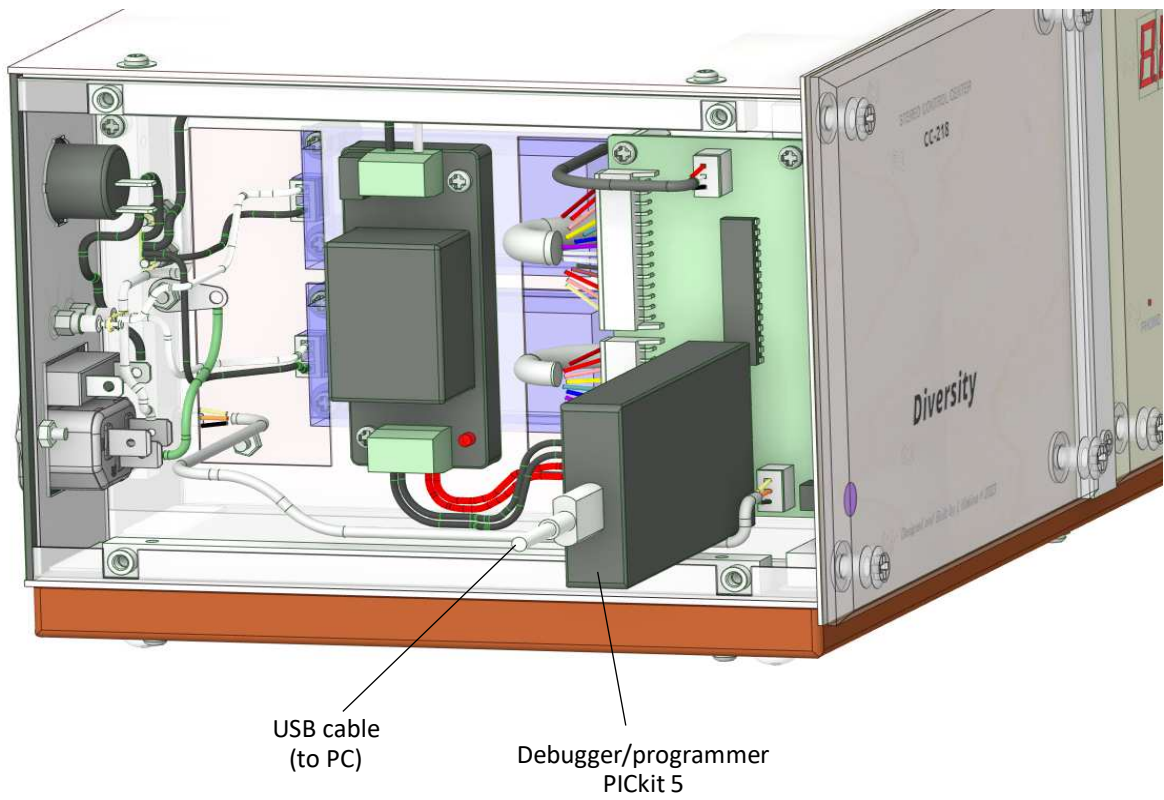
Debugger: Microchip PICkit 5, In-Circuit Debugger/Programmer

PL306: Debugger

Pin#	Debugger side	Traget side	MCU Pin#
1	TVPP	VPP, PGM	1, 26
2	TVDD	VDD	-
3	GND	GND	-
4	PGD	PGD	28
5	PGC	PGC	27
6	TAUX	-	-
7	TIDI	-	-
8	TIMS	-	-

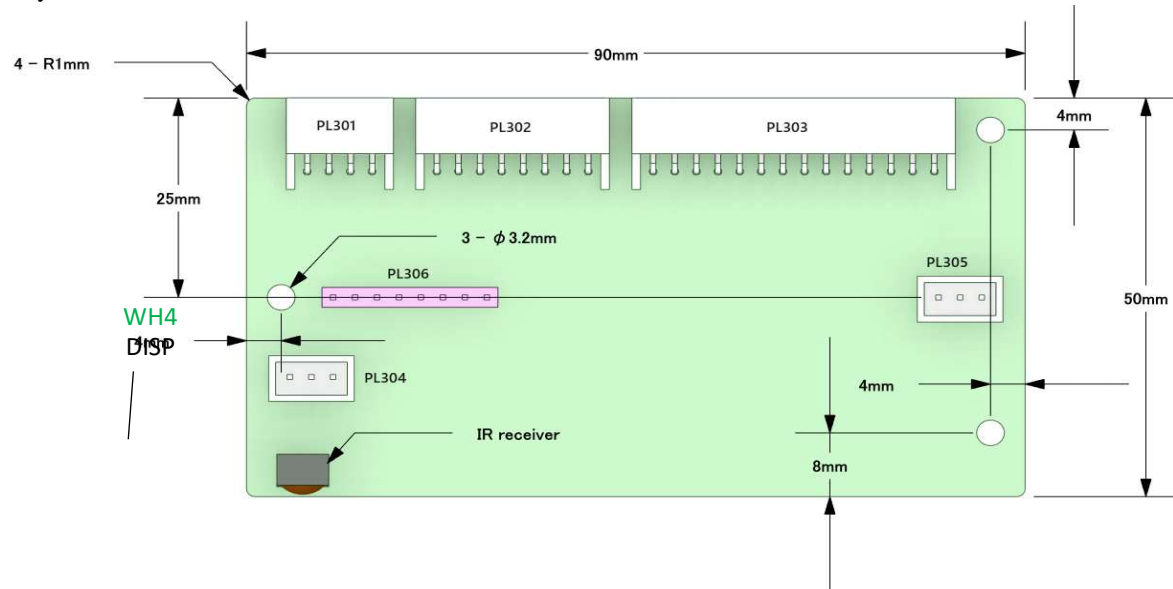
Connector: 8-pin SIL pin header, 2.54mm pitch



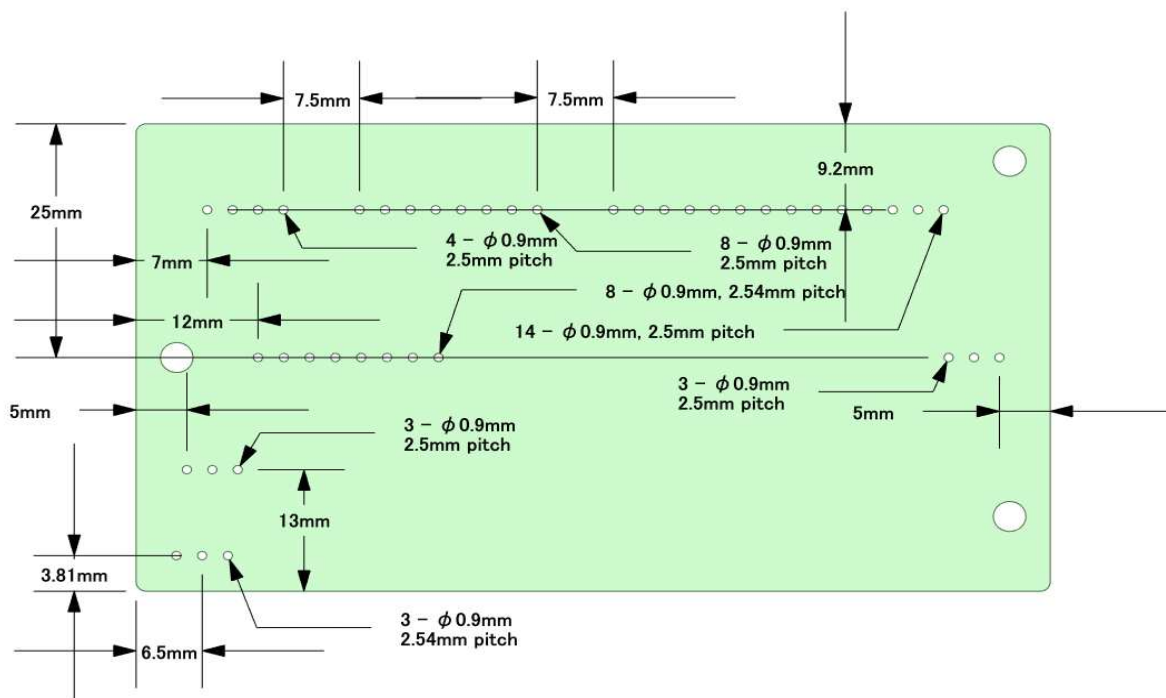


* Dimension of PCB3 MCU

Layout



Through hole positions



VOL (Volume) Board (BD4)

* Wire Harness from analog power supply (PS1-2) to VOL Board (BD4)

2024/04/26

2025/03/20

WH8: AnalogPower

PS1-2 end	Pin#	Wire	Wire Ref Des	Signal	Pin#	BD4 end
XHP-4 (J001)	1	AWG22 Black	W39	GND	13	XHP-8 (J402)
	2	AWG22 Black	W40	GND	24	
	3	AWG22 Red	W41	+23V+24V	31	
	4	AWG22 Red	W42	+23V+24V	42	
XHP-4 (J002)	1	AWG22 Blue	W43	-23V-24V	7	
	2	AWG22 Blue	W44	-23V-24V	8	
	3	AWG22 Black	W45	GND	5	
	4	AWG22 Black	W46	GND	6	

Wire spec: UL1007

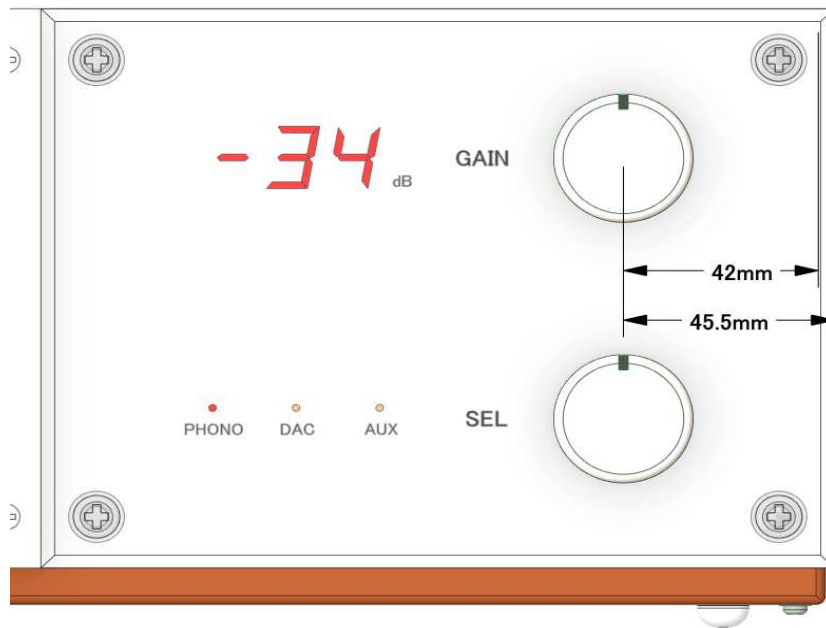
Contact of XHP-4 and XHP-8: SHX-001T-P0.6

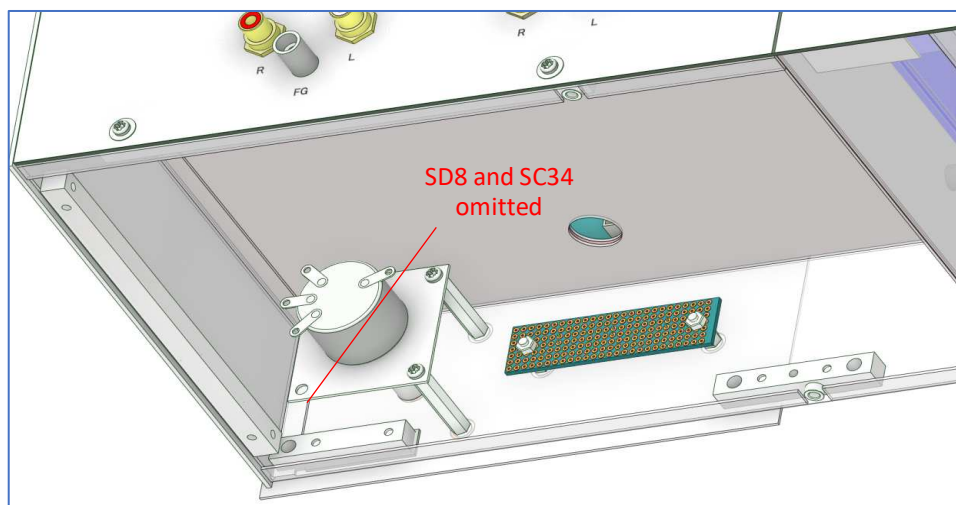
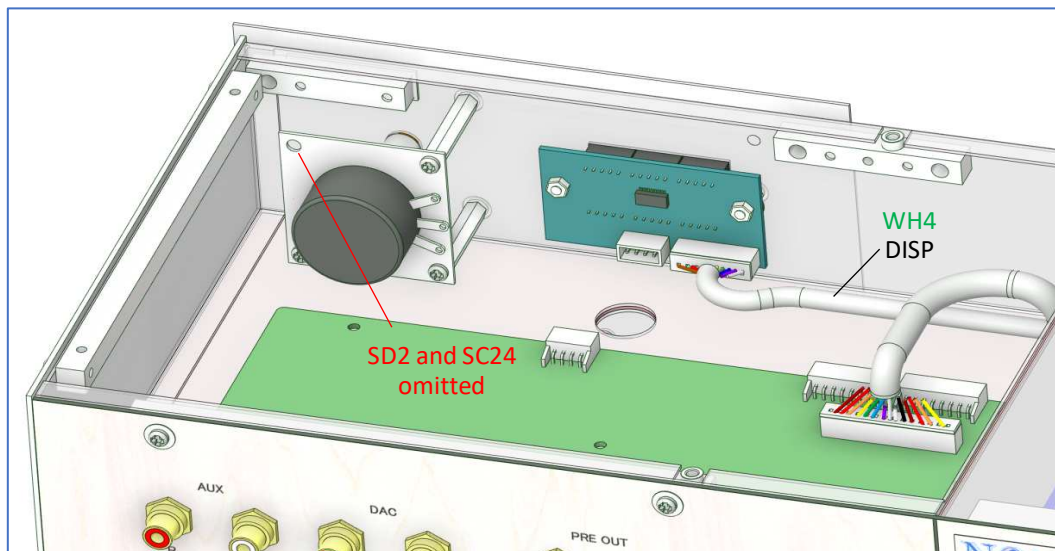
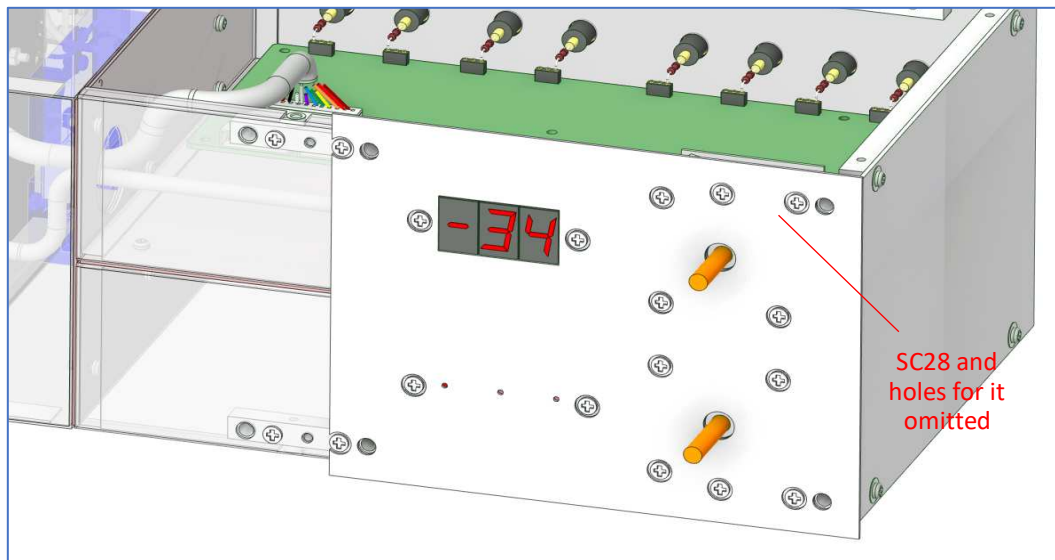
Length: 84mm (common sleeve length) + 36mm (+23V sleeve length) + 55mm (-23V sleeve length)
+ alpha Total: 88mm + alpha

Interrupt

Knobs have been shifted to right hand to improve operability and shorten WH4 Display (2023/08/31).
The sleeve length of WH4 has been shortened from 305mm to 225mm.

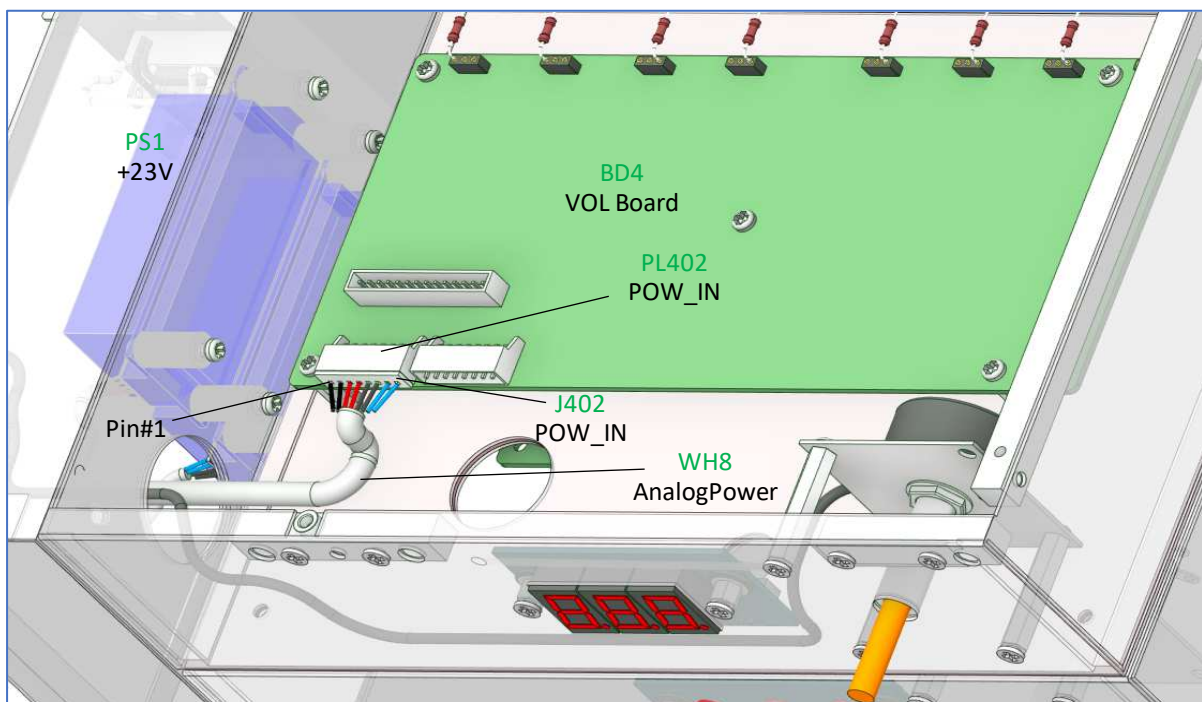
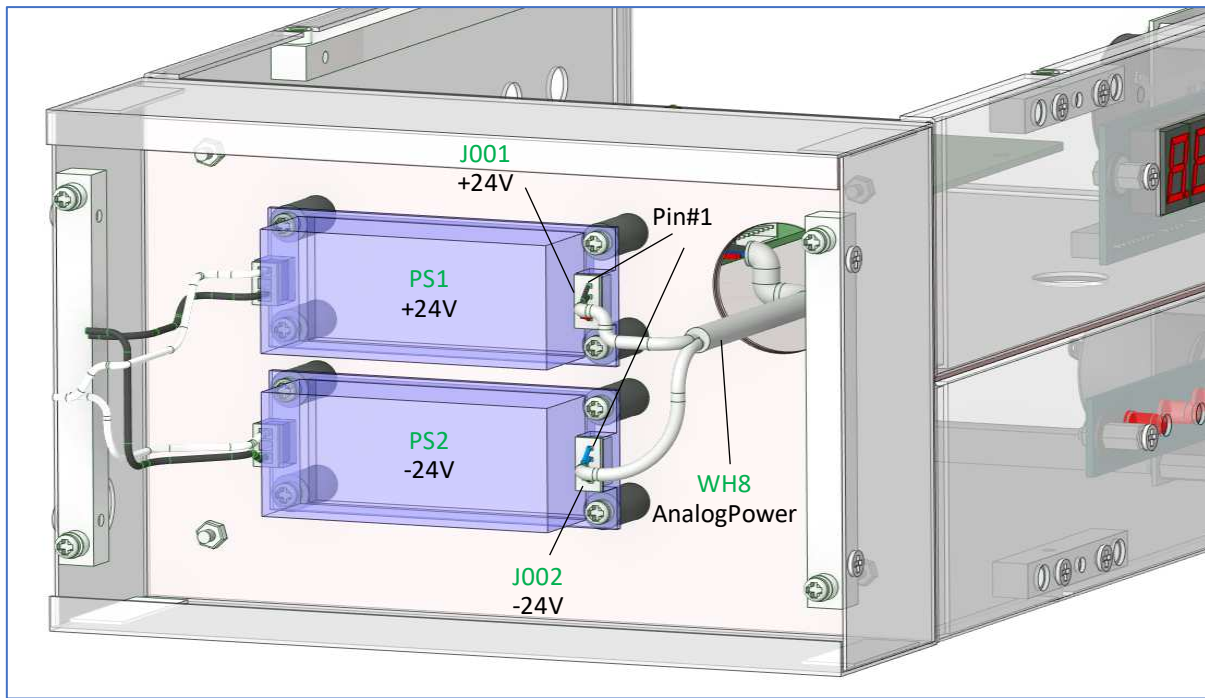






Interrupt

Now let's get back to BD4 (2023/08/31).

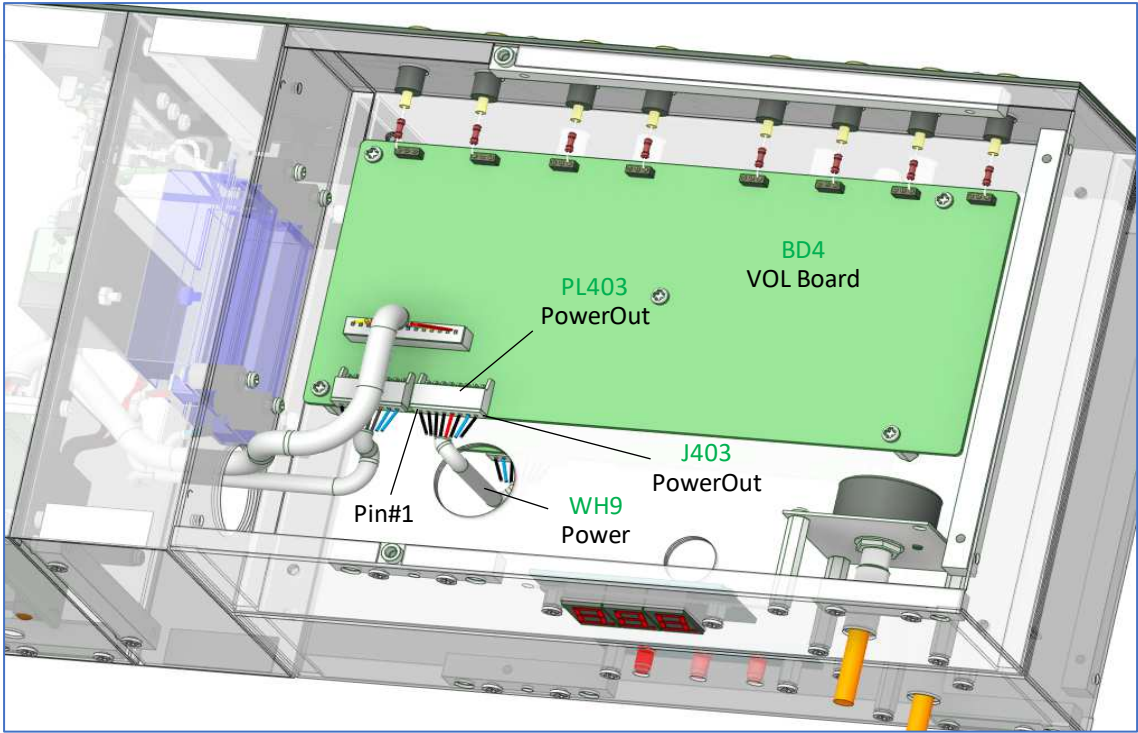


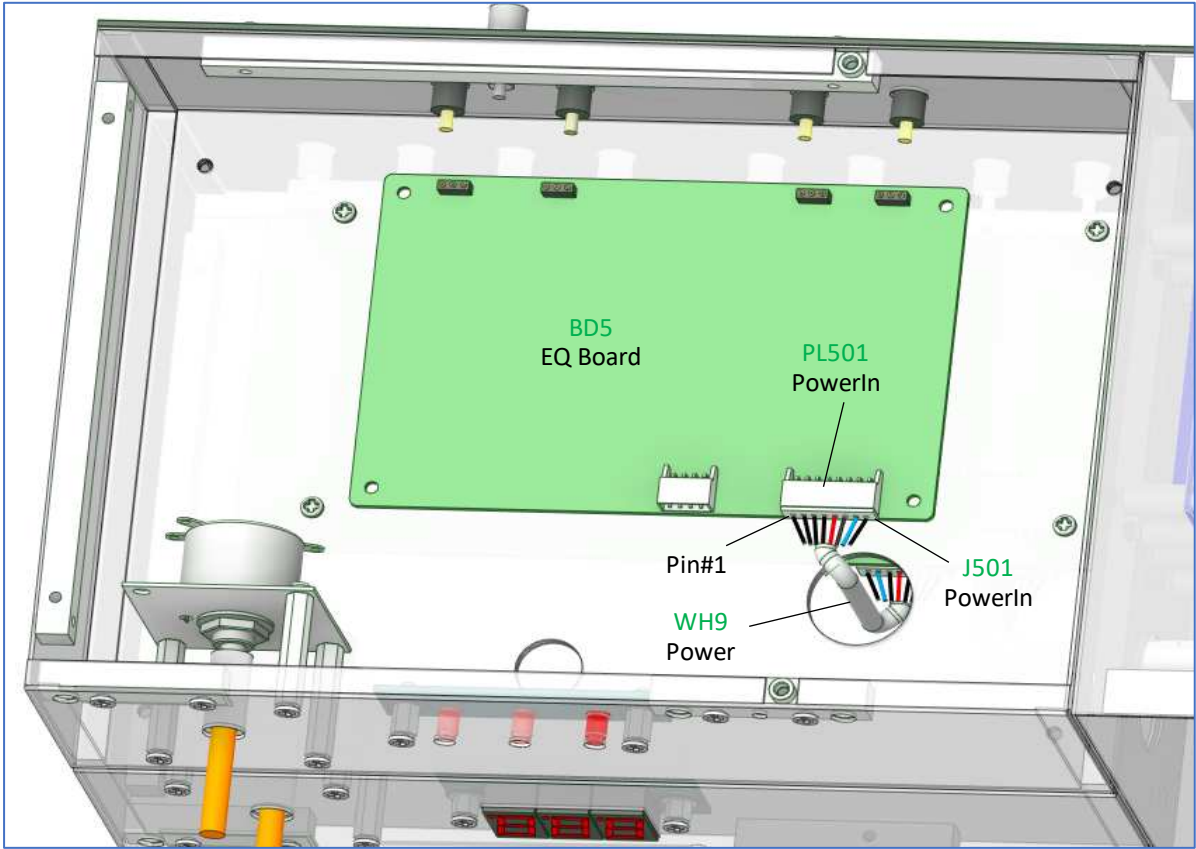
* Wire Harness from VOL Board (BD4) to EQ Board (BD5)

WH9: Power

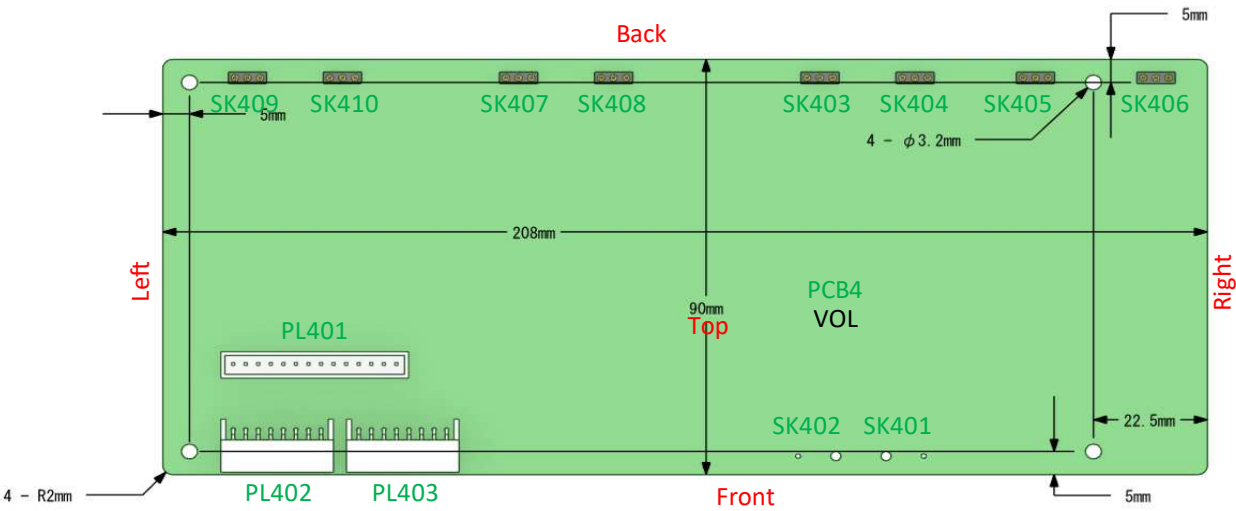
BD4 end	Pin#	Wire	Wire Ref Des	Signal	Pin#	BD5 end
XHP-8 (J403)	1	AWG22 Black	W47	GND	1	XHP-8 (J501)
	2	AWG22 Black	W48	GND	2	
	3	AWG22 Black	W49	GND	3	
	4	AWG22 Black	W50	GND	4	
	5	AWG22 Red	W51	+23V	5	
	6	AWG22 Black	W52	GND	6	
	7	AWG22 Blue	W53	-23V	7	
	8	AWG22 Black	W54	GND	8	

Wire spec: UL1007
Contact of XHP-8: SHX-001T-P0.6
Length: 55mm (sleeve length) + alpha

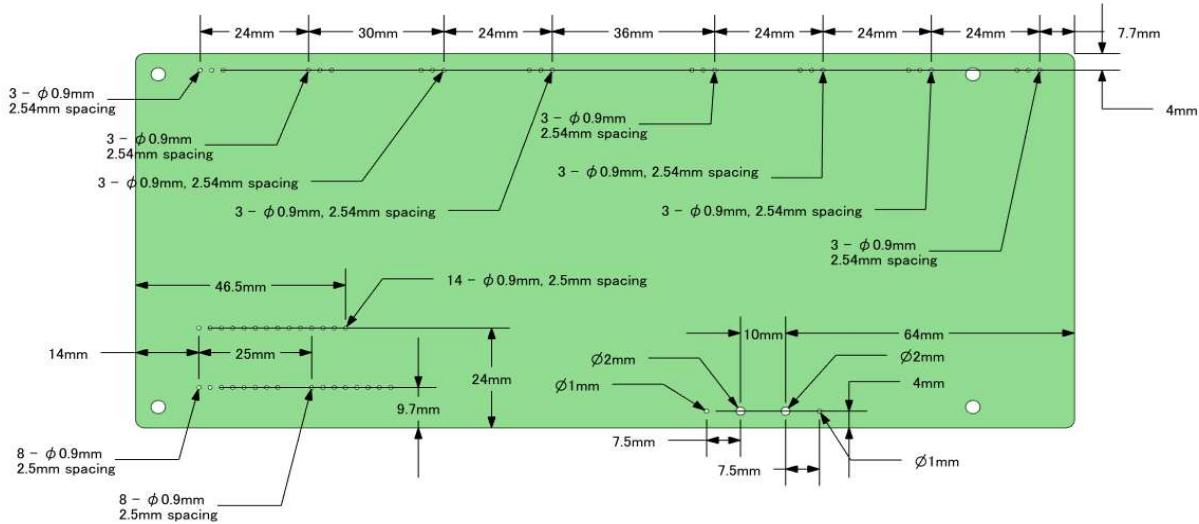




*** Dimension of BD4 VOL**
Size of PCB



Thru holes of connectors



EQ (Phono Equalizer) Board (BD5)

* Wire Harness from EQ Board (BD5) to VOL Board (BD4)

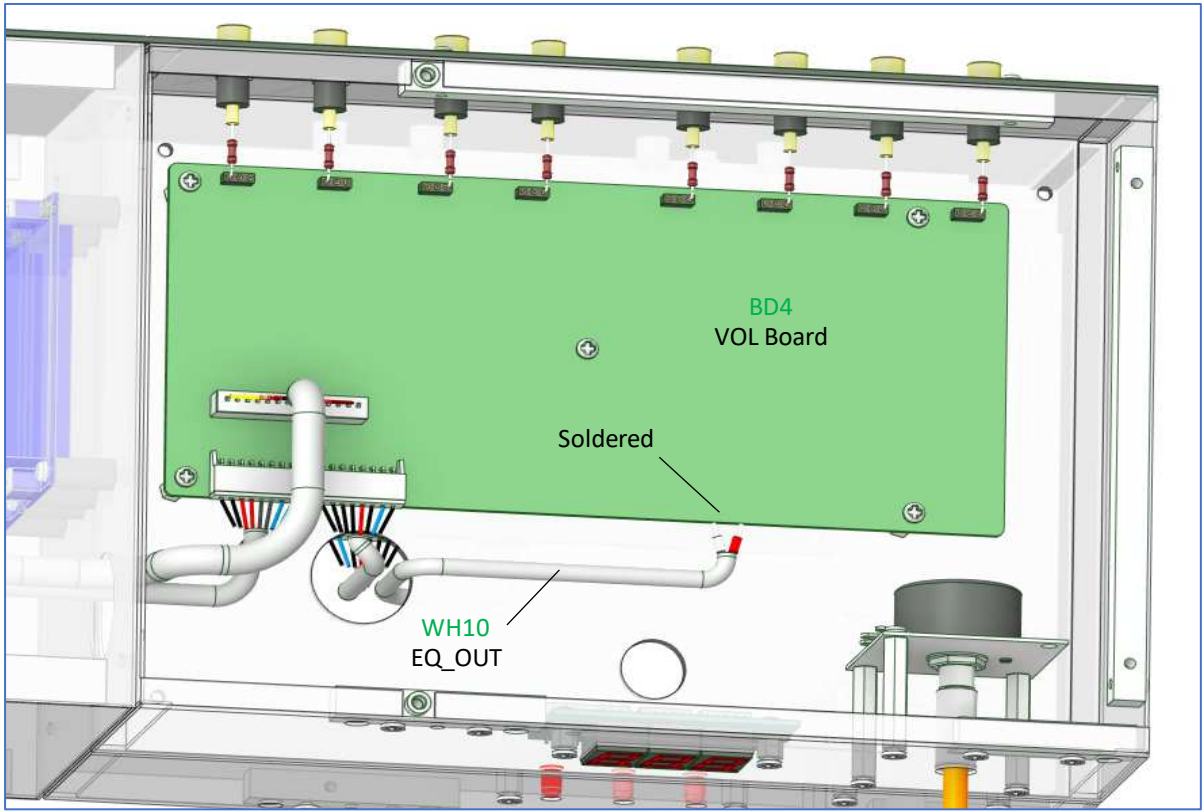
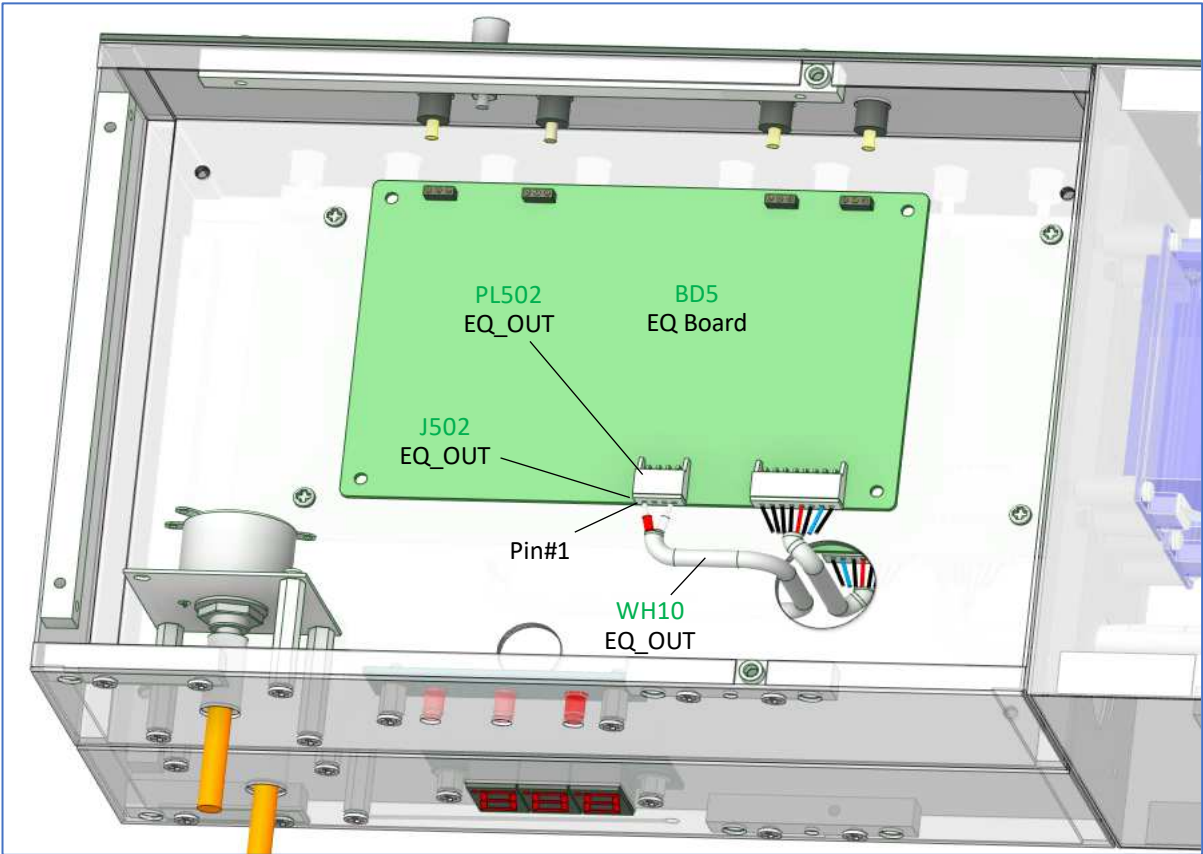
WH10: EQ_OUT

BD5 end	Pin#	Wire	Wire Ref Des	Signal	Pin#	BD4 end
XHP-4 (J502)	1	Red	W55	EQ_R	2	Soldered
	2	-	-	GND	1	(SK402)
	3	-	-	GND	1	Soldered
	4	White	W56	EQ_L	2	(SK401)

Wire spec: Mogami 2520

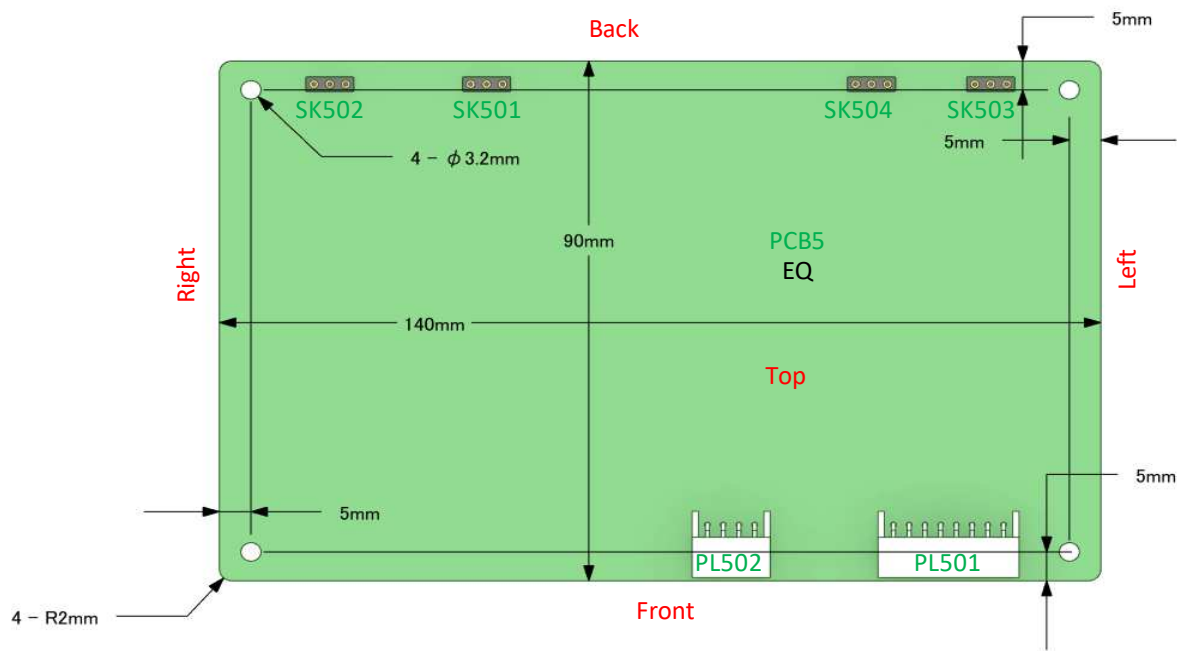
Contact of XHP-4: SHX-001T-P0.6

Length: 153mm (sleeve length) + alpha

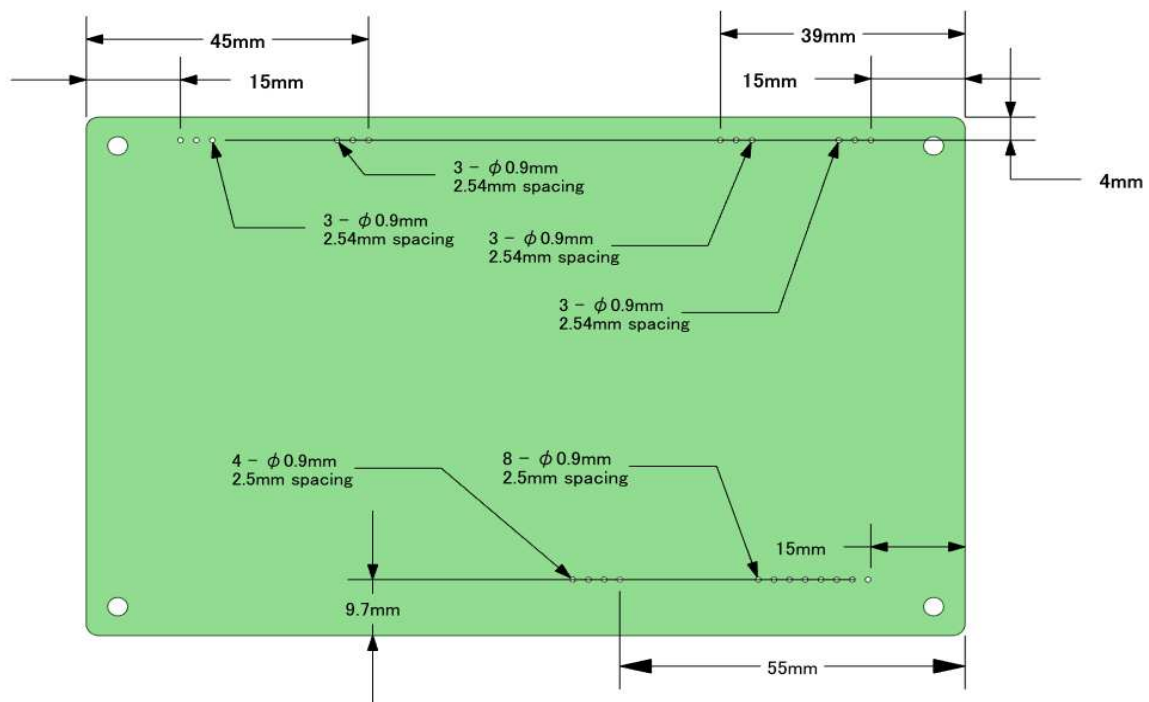


* Dimension of BD5 EQ

Size of PCB



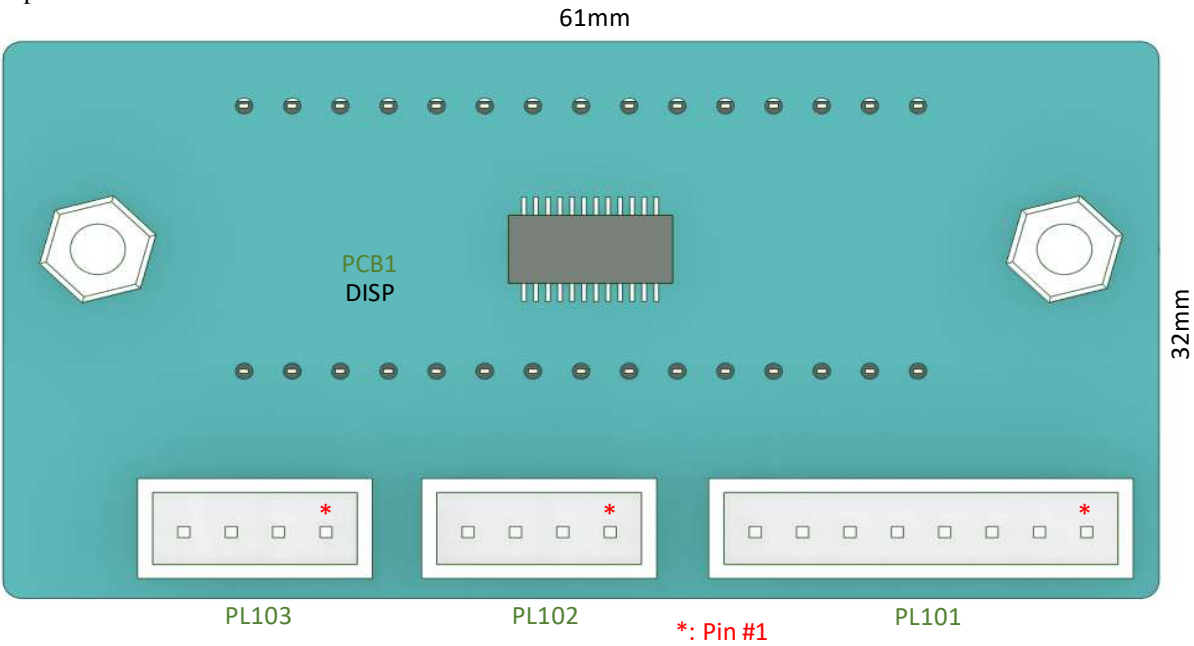
Thru holes of connectors



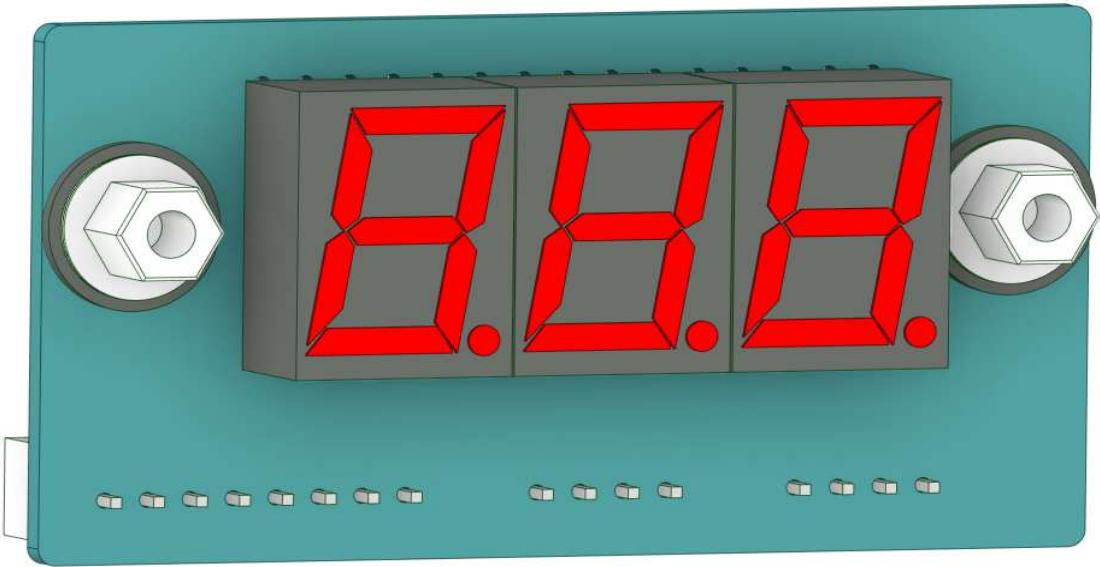
DISP (Display) Board (BD1)

*** Overview**

Top



Bottom



* Wire Harness from DISP Board (BD1) to IND (Indicator) Board (BD2)

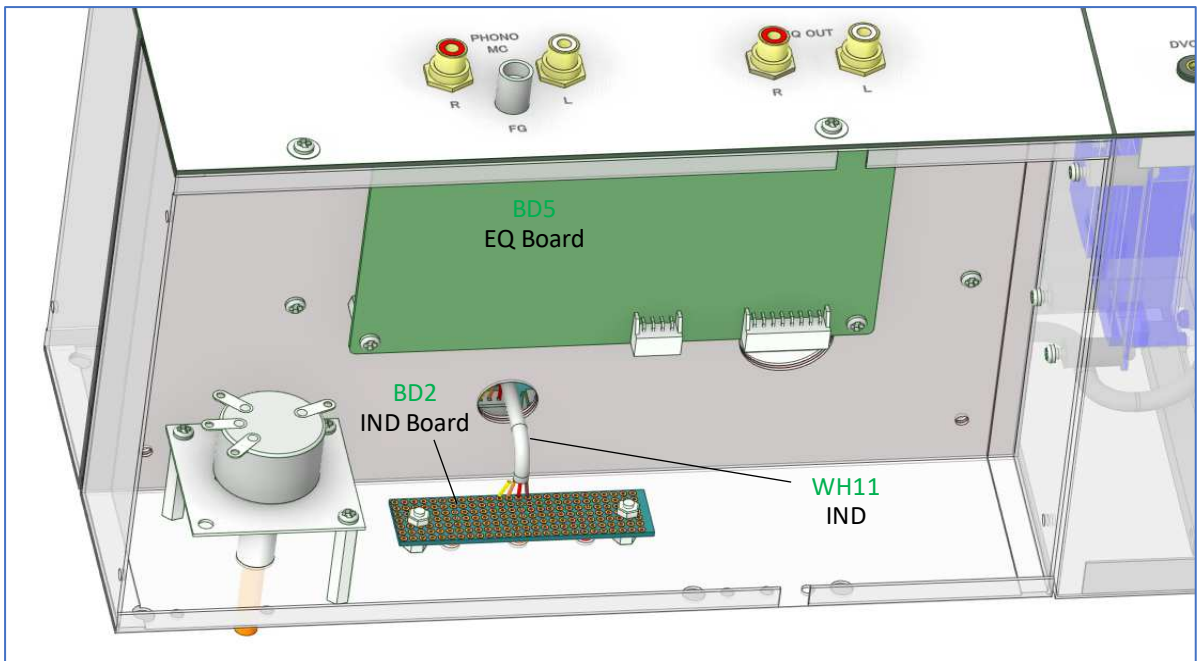
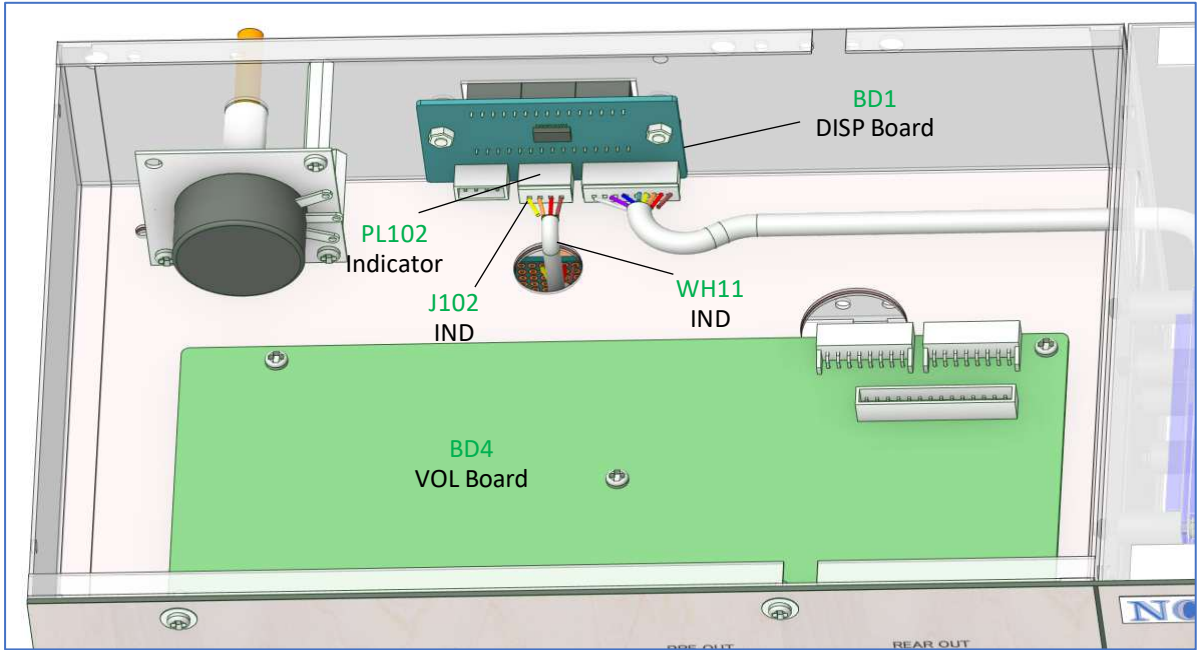
WH11: IND

BD1 end	Pin#	Wire	Wire Ref Des	Signal	Pin#	BD2 end
XHP-4 (J102)	1	AWG22 Brown	W57	LED_PHONO	1	Soldered
	2	AWG22 Red	W58	LED_DAC	2	
	3	AWG22 Orange	W59	LED_AUX	3	
	4	AWG22 Yellow	W60	COM	4	

Wire spec: UL1007

Contact of XHP-4: SHX-001T-P0.6

Length: 47mm (sleeve length) + alpha



* Wire Harness from DISP Board (BD1) to Rotary SW (SW2)

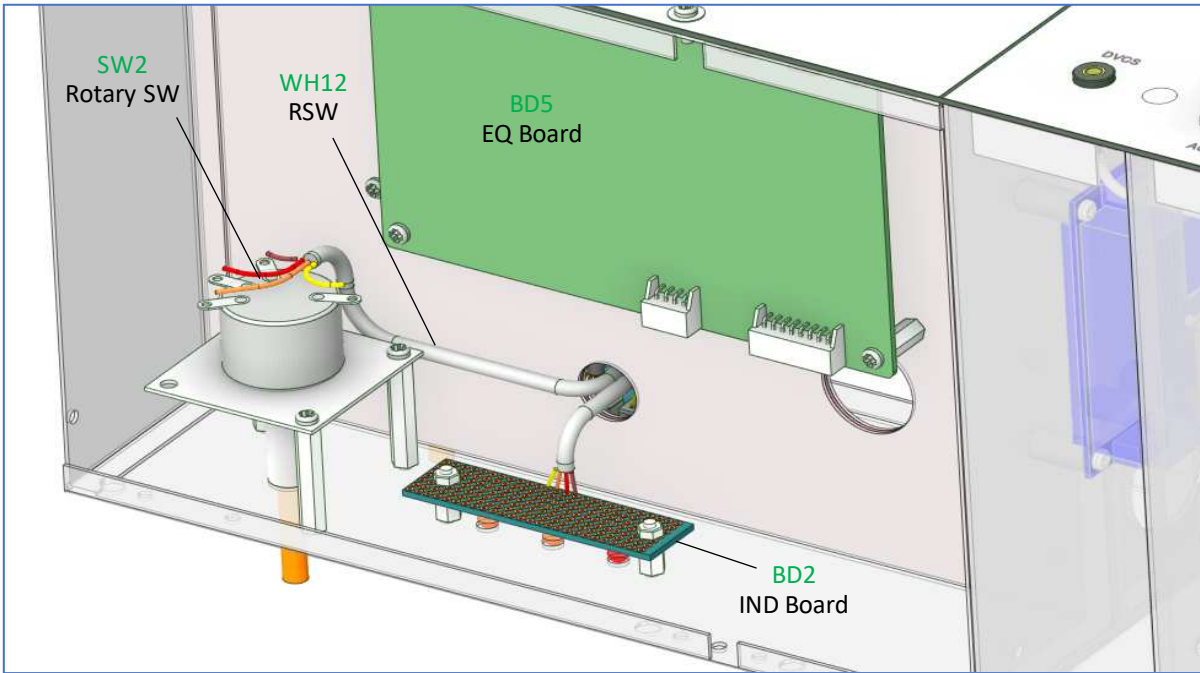
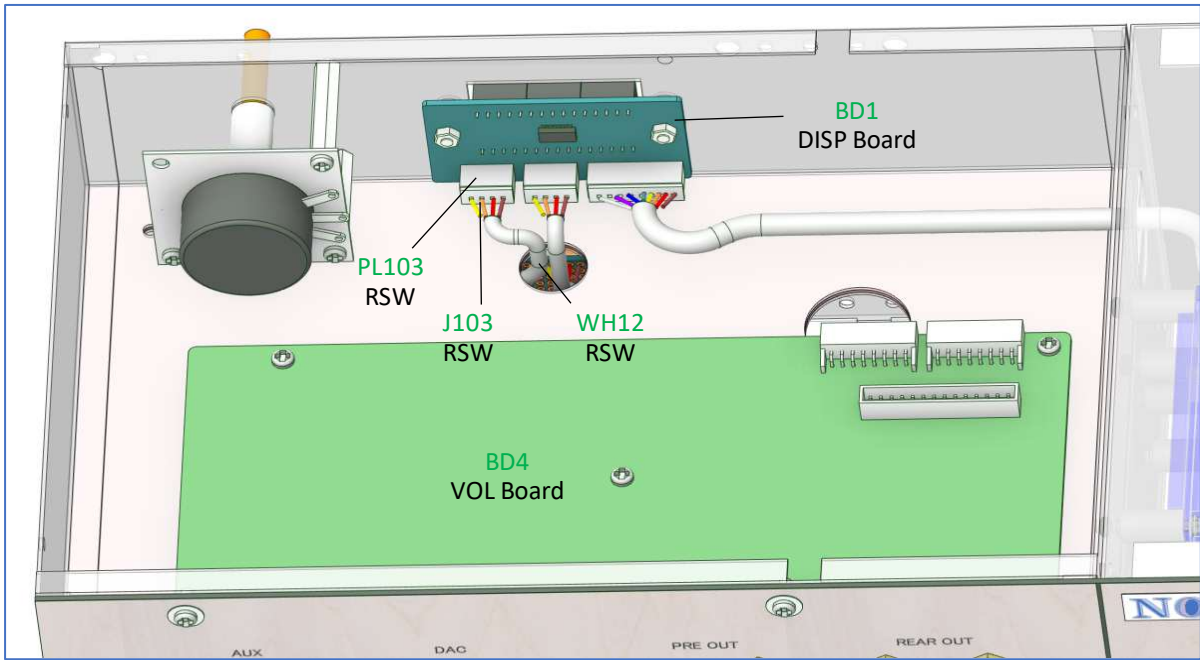
WH12: RSW

BD1 end	Pin#	Wire	Wire Ref Des	Signal	Pin#	SW2 end
XHP-4 (J103)	1	AWG22 Brown	W61	SW_PHONO	1	Soldered
	2	AWG22 Red	W62	SW_DAC	2	
	3	AWG22 Orange	W63	SW_AUX	3	
	4	AWG22 Yellow	W64	KEYB	4	

Wire spec: UL1007

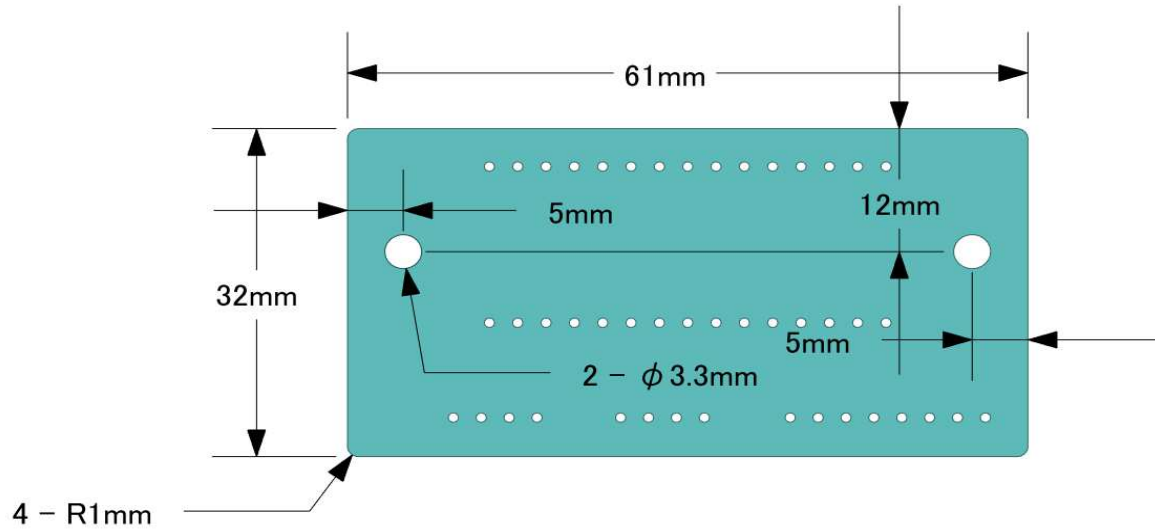
Contact of XHP-4: SHX-001T-P0.6

Length: 123mm (sleeve length) + alphaSW2 end extension: 27mm (max)

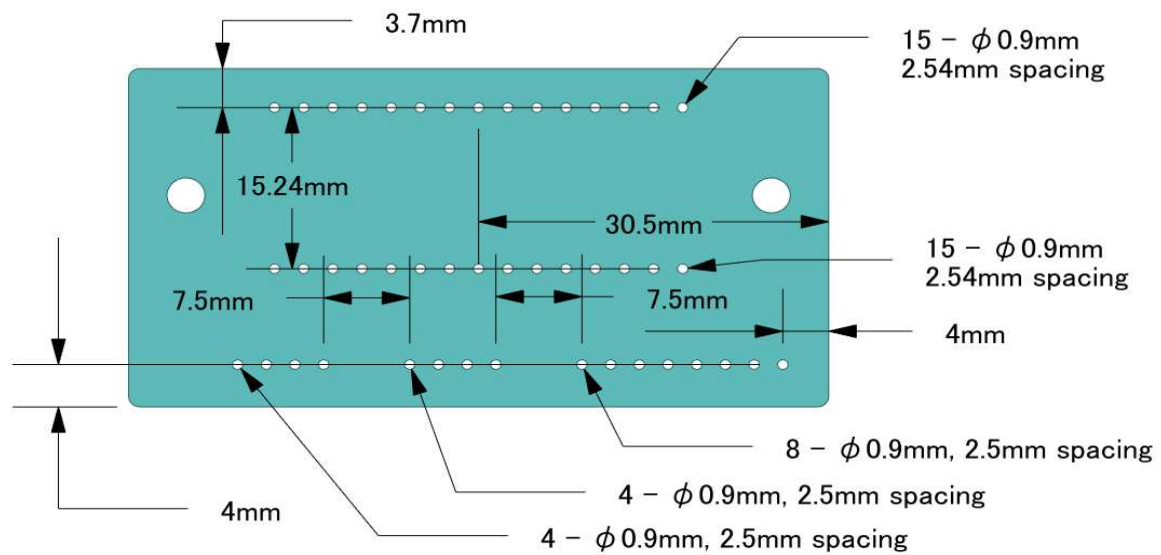


*** Dimension of BD1 DISP**

Size of PCB



Thru holes of connectors



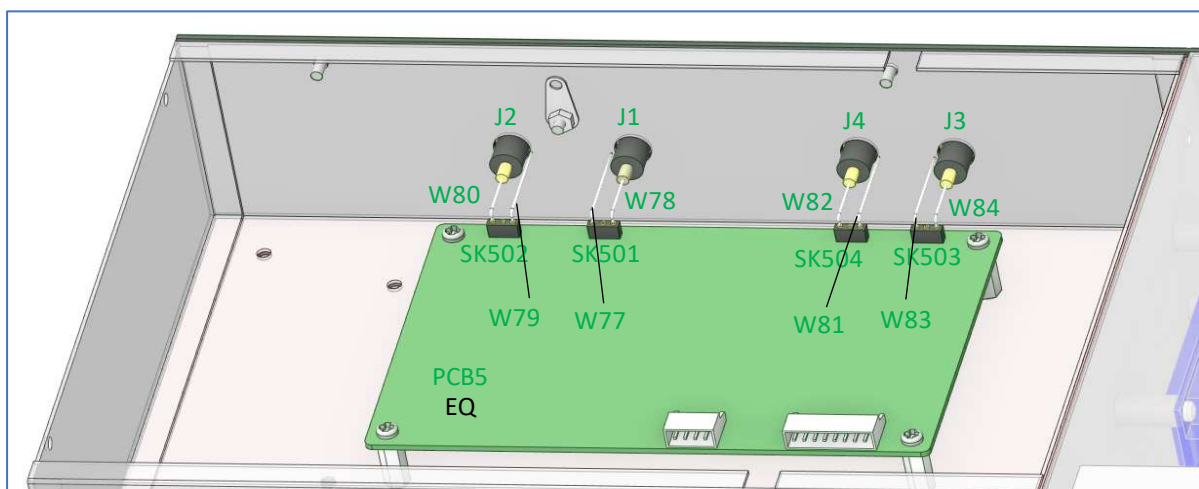
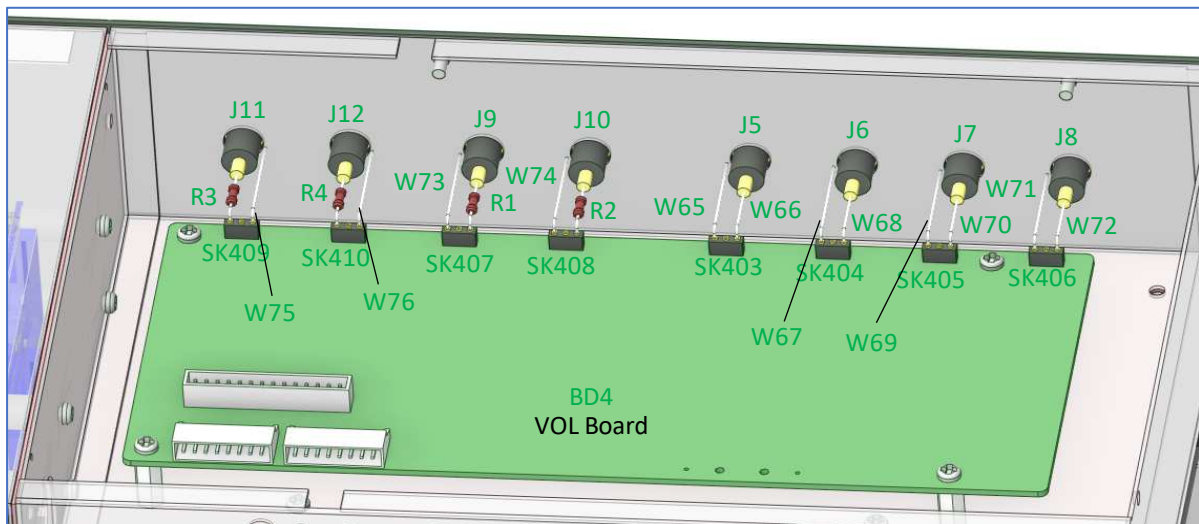
Wires from RCA jacks to VOL Board (BD4) and EQ Board (BD5)**Cold**

Material: Amtrans AMOFC-GMK-05FC
Spec: $\Phi=0.5$, gold-plated OFC
Reference designator: W65,67,69,71,73-77,79,81,83
Length: 28mm
Quantity: 12

Hot

Material: Amtrans AMOFC-GMK-05FC
Spec: $\Phi=0.5$, gold-plated OFC
Reference designator: W66,68,70,72,78,80,82,84
Length: 21mm
Quantity: 8

Total length: 504mm



Total Lengths of Wires

* UL1007/UL1015

[2024/02/04] W51-60 extended by 2mm, W61-64 extended by 5mm

Gauge	Color	Ref des	Sleeve Length	Extension	Harness	Total length
UL1007 AWG22	Black	W9	57mm	16mm	WH1	73mm
		W11	81mm	16mm	WH2	97mm
		W13	76mm	16mm	WH3	92mm
		W14	79mm	16mm	WH3	95mm
		W34	196mm	40mm	WH5	236mm
		W39	120mm	24mm	WH8	144mm
		W40	120mm	24mm	WH8	144mm
		W45	139mm	24mm	WH8	163mm
		W46	139mm	24mm	WH8	163mm
		W47	55mm	32mm	WH8	87mm
		W48	55mm	32mm	WH9	87mm
		W49	55mm	32mm	WH9	87mm
		W50	55mm	32mm	WH9	87mm
		W52	55mm	32mm	WH9	87mm
		W54	55mm	32mm	WH9	87mm
	Total - Black					1729mm
	Brown	W17	255mm	32mm	WH4	287mm
		W25	196mm	40mm	WH5	236mm
		W35	196mm	40mm	WH5	236mm
		W57	49mm	32mm	WH11	81mm
		W61	128mm	43mm	WH12	171mm
	Total - Brown					1011mm
	Red	W15	60mm	18mm	WH3	78mm
		W16	62mm	18mm	WH3	80mm
		W18	255mm	32mm	WH4	287mm
		W26	196mm	40mm	WH5	236mm
		W36	196mm	40mm	WH5	236mm
		W41	120mm	32mm	WH6	152mm
		W42	120mm	32mm	WH7	152mm
		W51	55mm	32mm	WH9	87mm
		W58	49mm	32mm	WH11	81mm
		W62	128mm	43mm	WH12	171mm
	Total - Red					1560mm
	Orange	W19	255mm	32mm	WH4	287mm
		W27	196mm	40mm	WH5	236mm
		W37	196mm	32mm	WH6	228mm
		W59	49mm	32mm	WH11	81mm
		W63	128mm	43mm	WH12	171mm
	Total - Orange					1003mm
	Yellow	W20	255mm	32mm	WH4	287mm
		W28	196mm	40mm	WH5	236mm
		W38	196mm	40mm	WH5	236mm
		W60	49mm	32mm	WH11	81mm
		W64	128mm	43mm	WH12	171mm
	Total - Yellow					1011mm
	Green	W21	255mm	32mm	WH4	287mm
		W29	196mm	40mm	WH5	236mm
	Total - Green					523mm
	Blue	W22	255mm	32mm	WH4	287mm
		W30	196mm	40mm	WH5	236mm
		W43	139mm	32mm	WH8	171mm
		W44	139mm	32mm	WH8	171mm
		W53	55mm	32mm	WH9	87mm

	Total - Blue					952mm
	Violet	W23	255mm	32mm	WH4	287mm
		W31	196mm	40mm	WH5	236mm
	Total - Violet					523mm
	Grey	W24	255mm	32mm	WH4	287mm
		W32	196mm	40mm	WH5	236mm
	Total - Grey					523mm
	White	W10	84mm	26mm	WH1	110mm
		W12	71mm	26mm	WH2	97mm
		W33	196mm	40mm	WH5	236mm
Total - White					443mm	
UL1015 AWG18	Green	W1	80mm	17mm	-	97mm
	Total - Green					97mm
	White	W4	66mm	19mm	-	85mm
		W7	143mm	16mm	-	159mm
	Total - White					244mm
	Black	W5	70mm	19mm	-	89mm
		W6	24mm	16mm	-	40mm
		W8	105mm	16mm	-	121mm
	Total - Black					250mm

* 2-core shielded wire

Type	Ref des	Sleeve length	Extension	Total length
L-2B2AT	WH6	224mm	32mm	256mm
	WH7	398mm	44mm	442mm
	Grand total			698mm

* 1-core shielded wire

Type	Harness	Ref des	Sleeve length	Extension	Total length
2520	WH10	W55	153mm	36mm	189mm
		W56	153mm	36mm	189mm
	Grand total				378mm



[END OF DOCUMENT]