

# ANNIE Pickoff/Splitter/ Attenuator Box

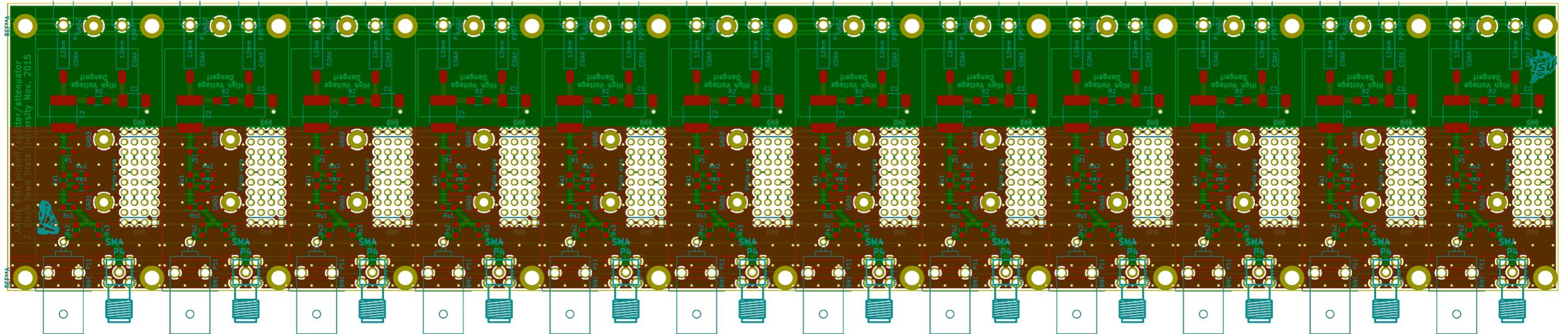
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Iowa State University

November 30, 2015

# Device purpose

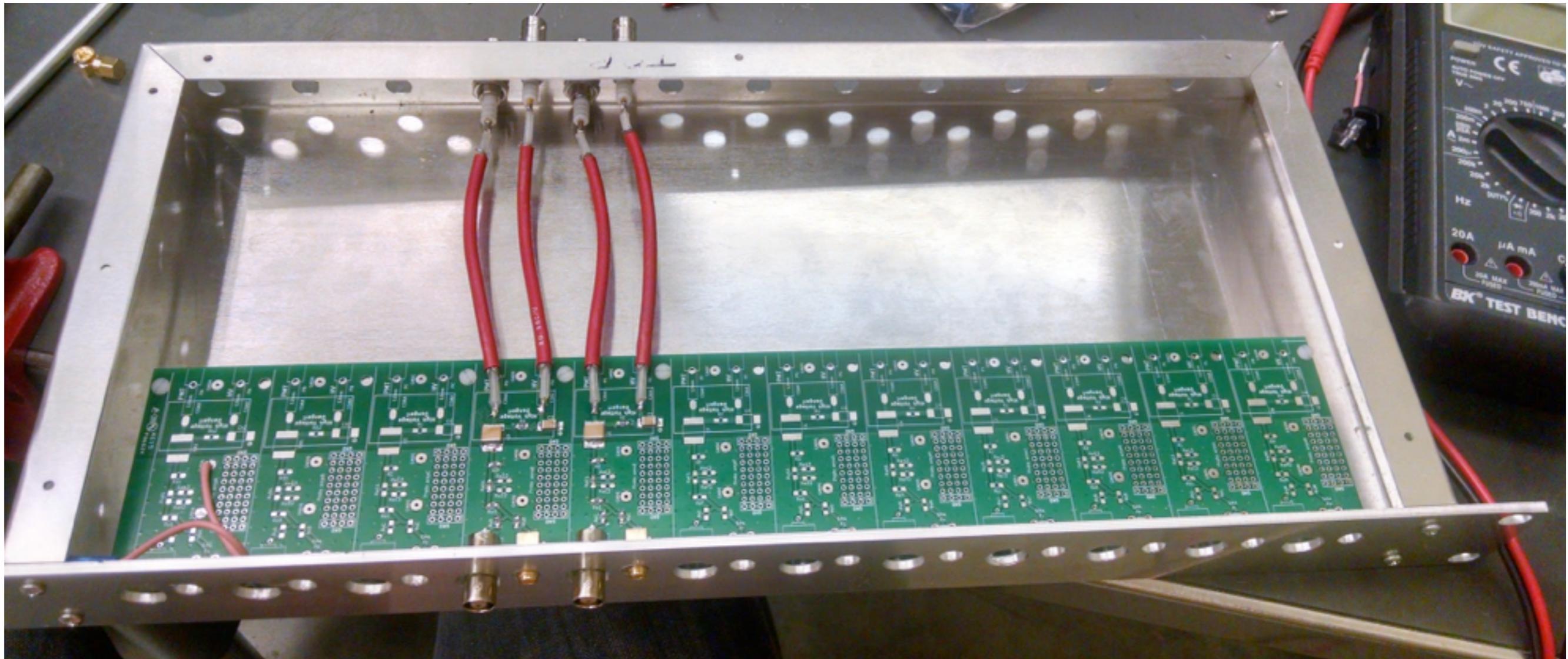
- The ANNIE water-volume PMTs are positive-high voltage type and have the anode directly attached to the HV supply cable. The signal (3ns rise time) from the PMT rides on top of the HV supply voltage.
- This device has SHV connections for the HV supply and the PMT. The PMT signal is capacitively coupled to an output circuit, which also (optionally) attenuates and splits the signal.

# 12-Channel Board



- Output signals are board-mount BNC and SMA
- Ground plane on the bottom, no HV through-hole
- All components 0805 (2012 metric) or larger.
- Board: 0.062" FR4, 1oz copper, Lead-Free Solder finish
- Finished dimensions: 15.300" x 2.850"

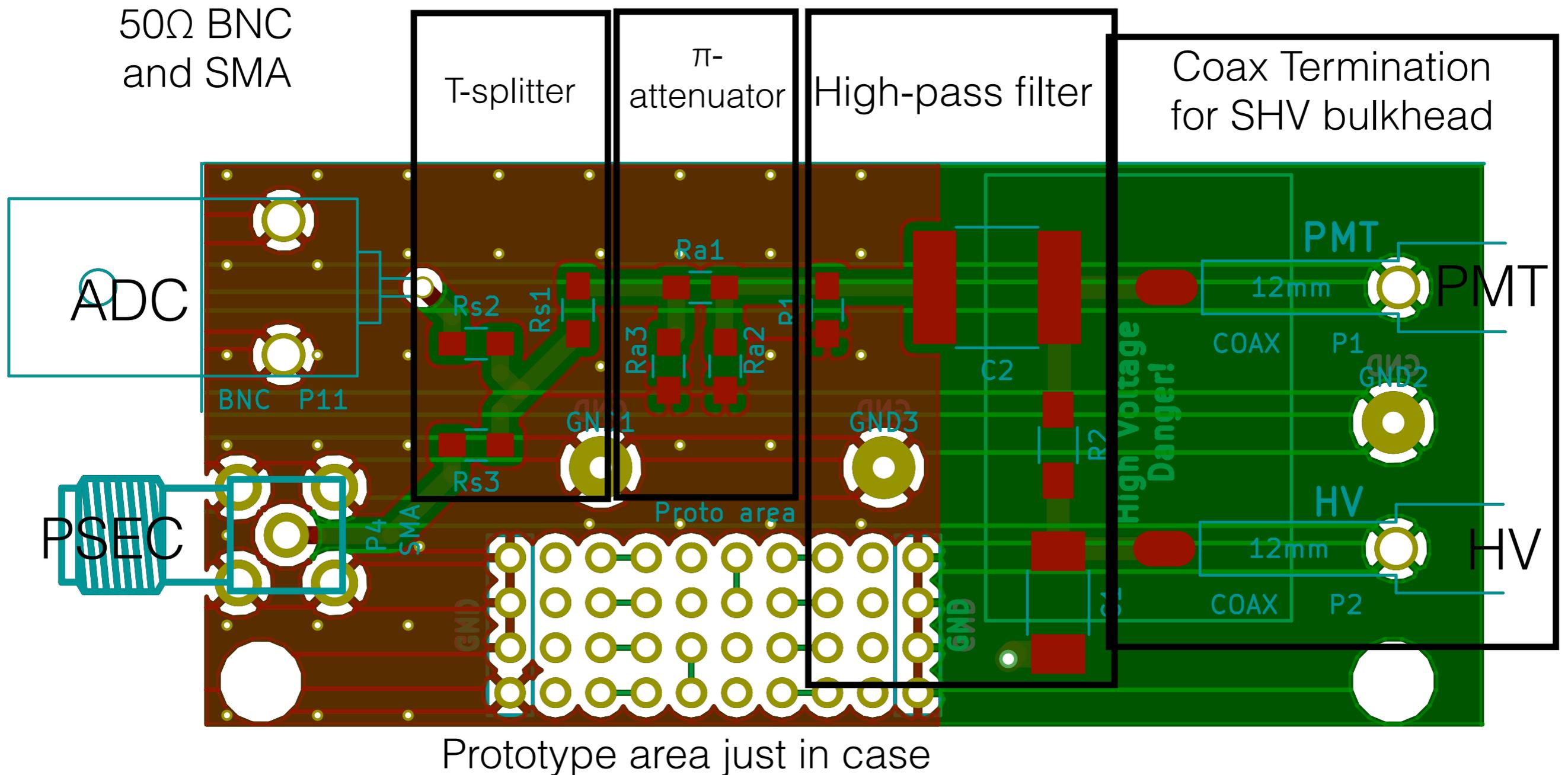
# Top Overview



Board will be grounded to case with brass standoffs and at the SHV bulkhead attachment point.

Top cover will be installed

# Single Channel



1.6mm FR4. Continuous ground-plane on bottom, traces only on top.

# Components

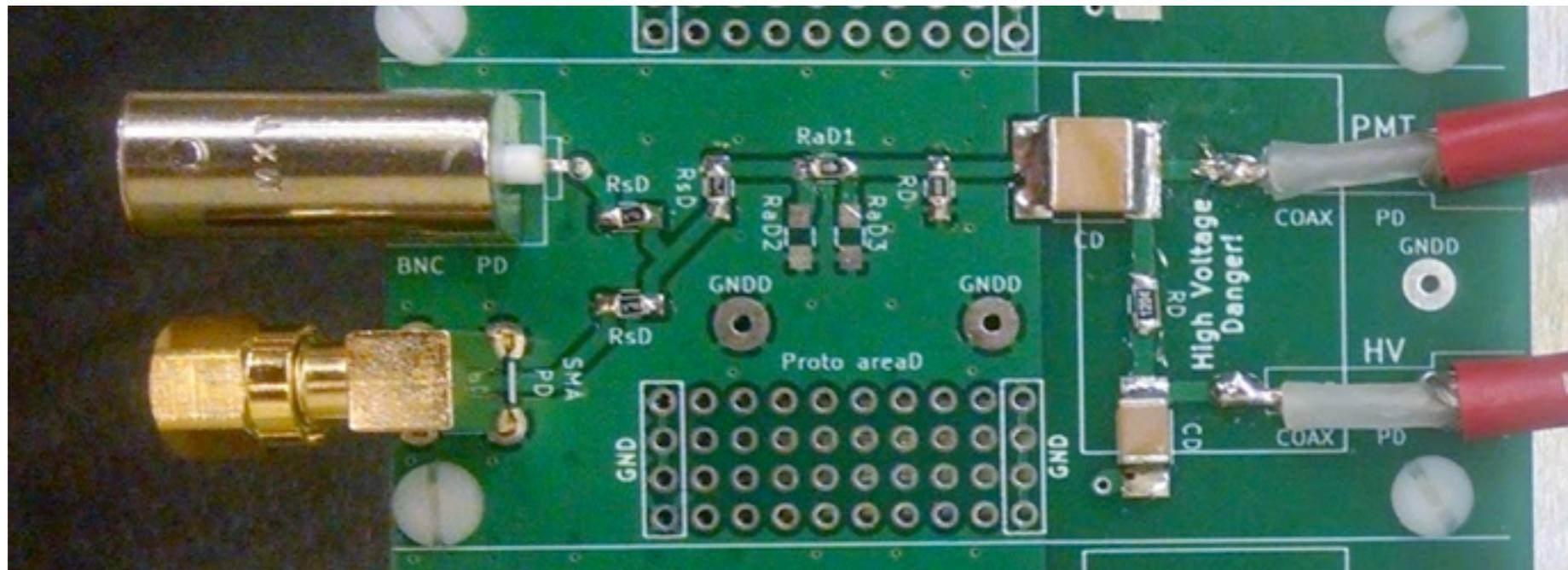
Component	Value	PN	Description
C1	1 nF	302S43W102KV4E	CAP CER 1000PF 3KV X7R 1812
C2	10 nF	2225HC103KAT1A	CAP CER 10000PF 3KV X7R 2225
R1	300 ohm	ERJ-6ENF3000V	RES SMD 300 OHM 1% 1/8W 0805
R2	1.2 Mohm	ERJ-8ENF1204V	RES SMD 1.2M OHM 1% 1/4W 1206
Ra1	0 ohm	ERJ-6GEY0R00V	RES SMD 0.0 OHM JUMPER 1/8W 0805
Ra2, Ra3	-	(not populated)	-
Rs1, Rs2, Rs3	16.9 Ohm	ERJ-6ENF16R9V	RES SMD 16.9 OHM 1% 1/8W 0805

# One Channel Detail

Nylon standoffs, will be replaced with brass for grounding

BNC

SMA



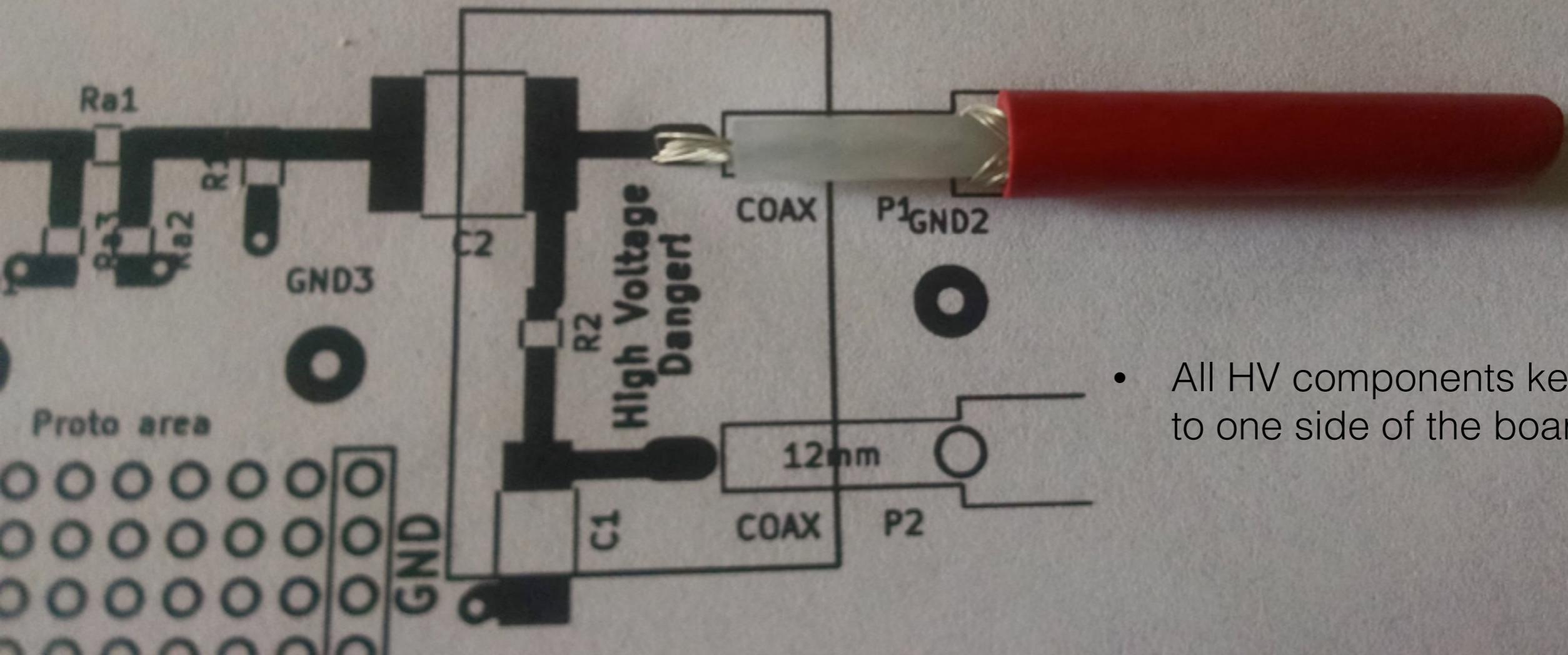
PMT

HV

Attenuator set as pass through

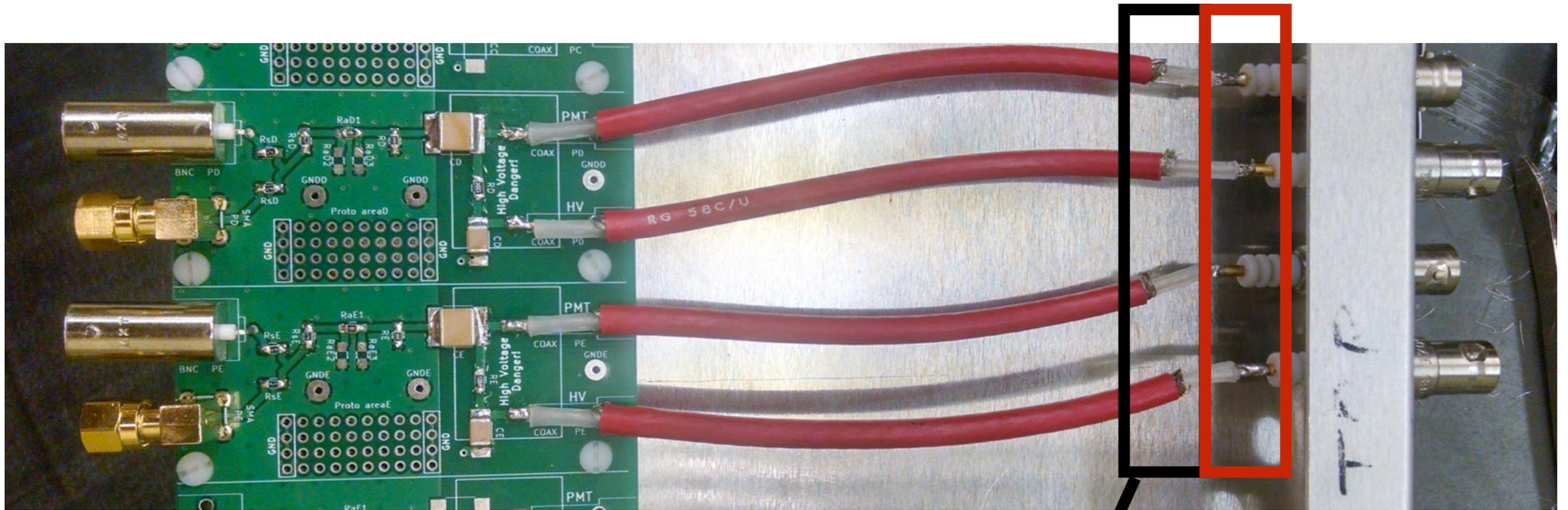
# BNC Attachment

- RG-58C/U stripped to 12mm with a common stripping tool.
- Braid pulled away and twisted.
- Conductor cut to length and tinned.
- Copper braid pulled through, soldered to ground-plane on bottom
- Center conductor soldered to pad on the top.



- All HV components keep to one side of the board.

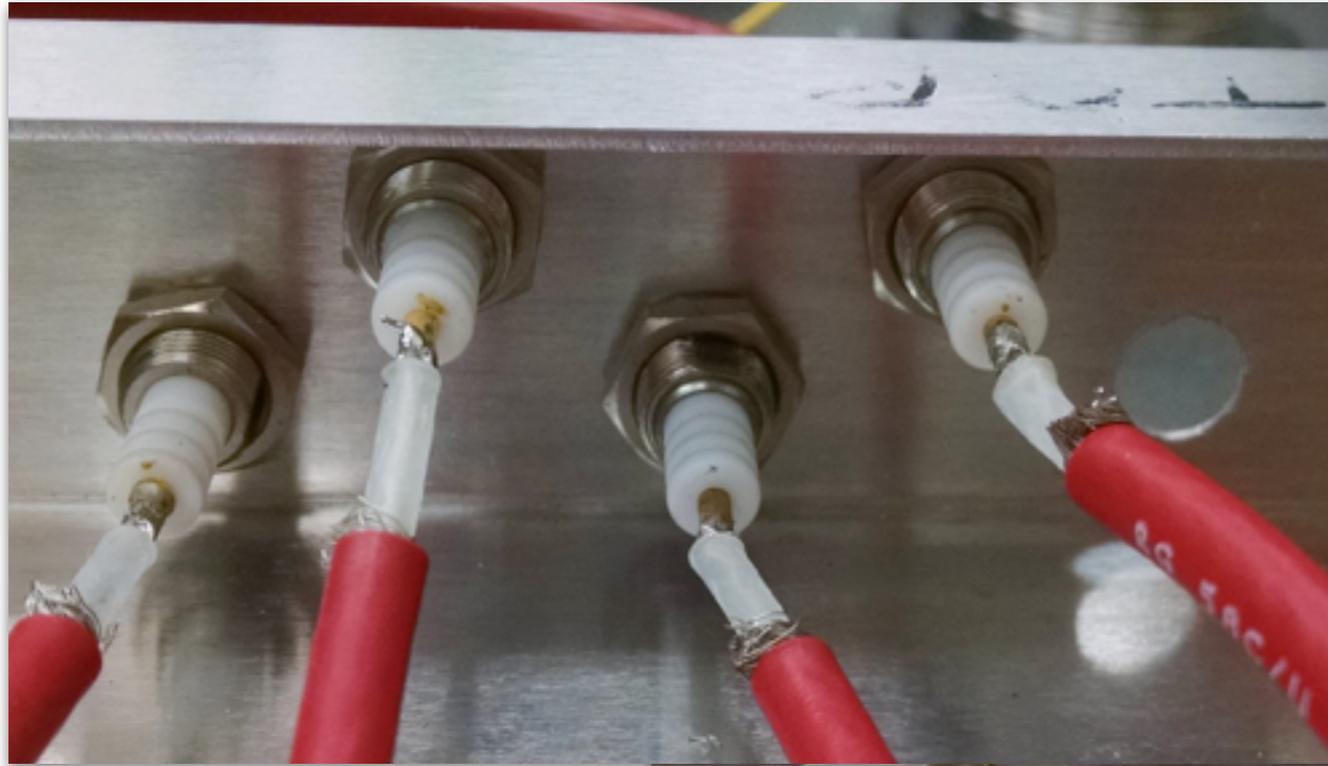
# Two Channel Detail



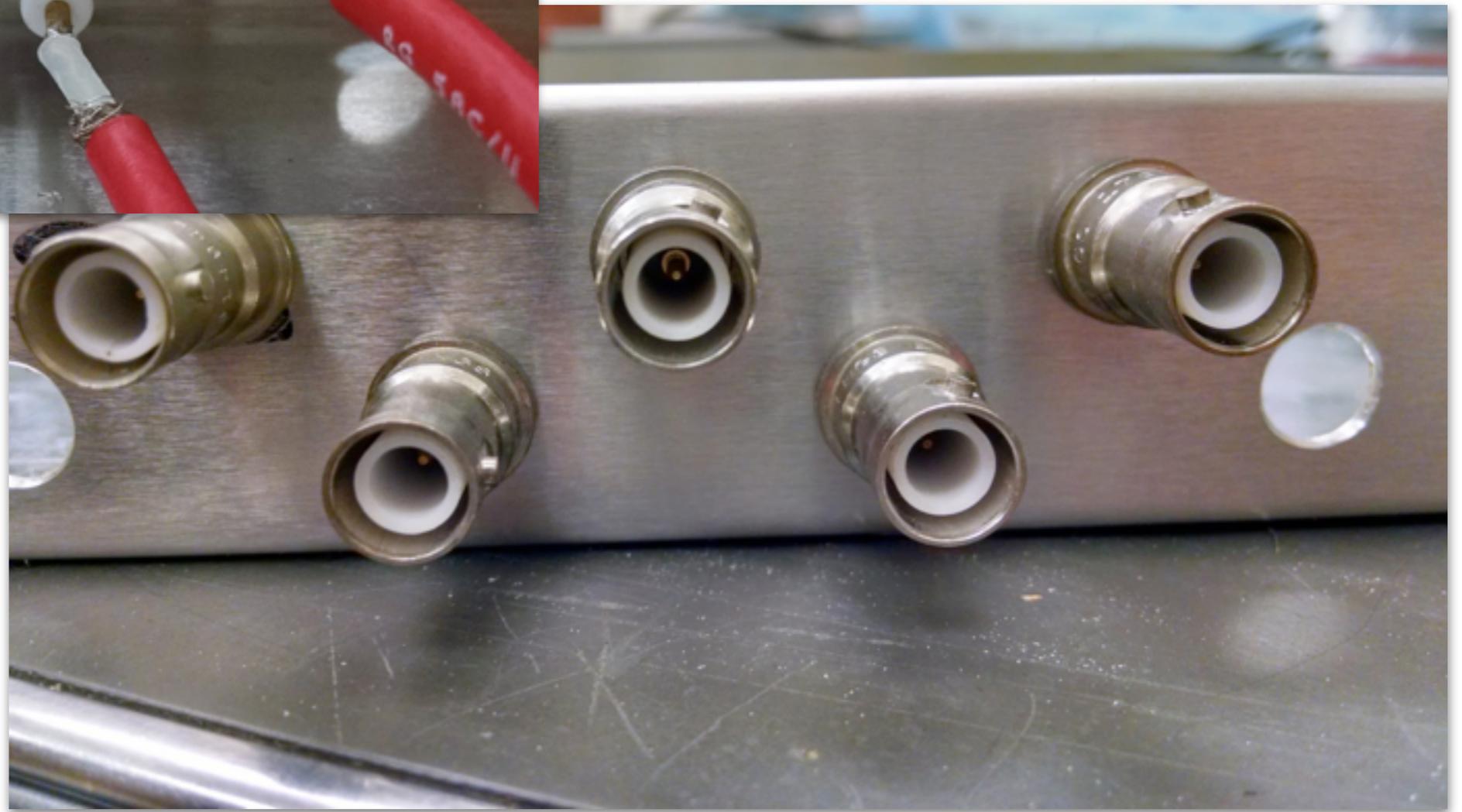
Shield will be grounded to ring lug on bulkhead connector.

Solder connections will be insulated with Scotch Rubber Splicing Tape 70 or similar.

# SHV Bulkhead connector attachment



Ground-rings to be added

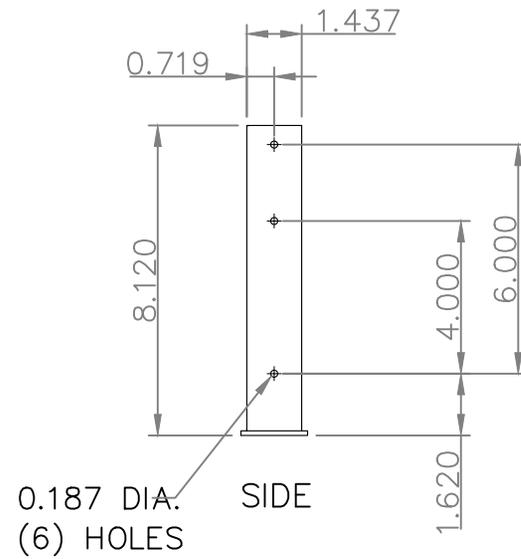
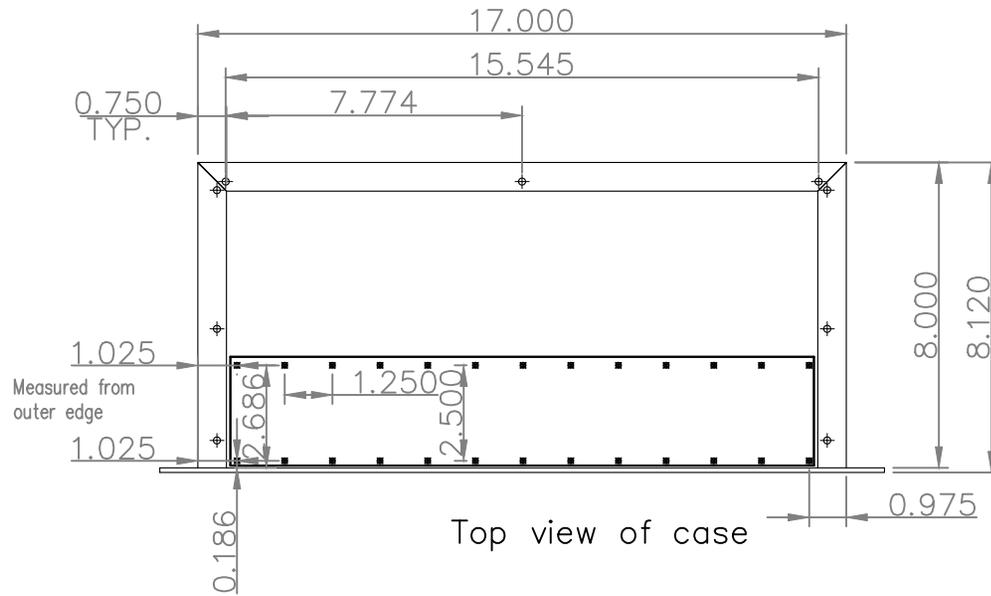
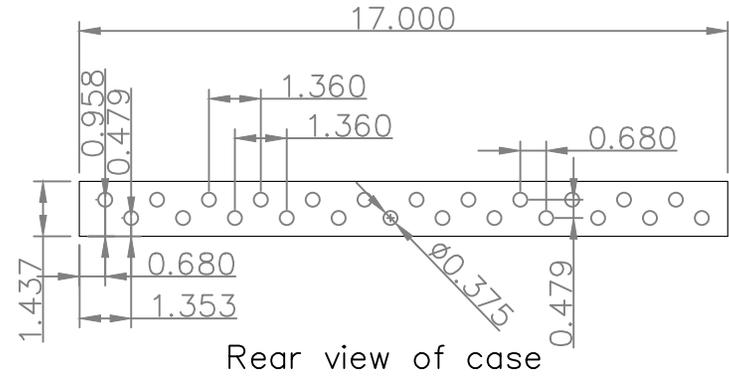
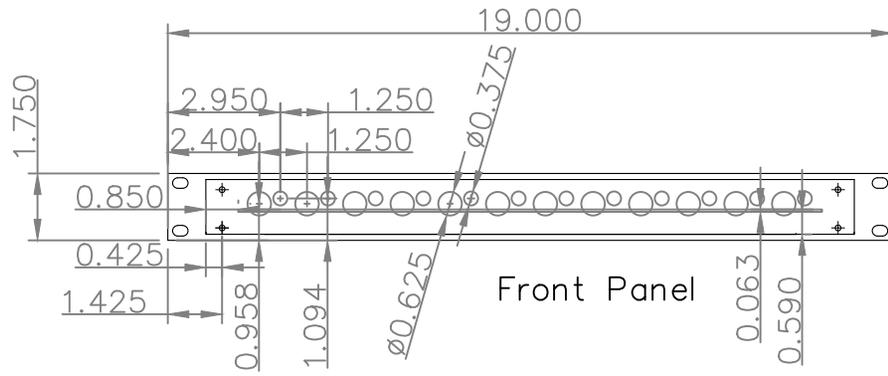


# Front panel



Holes will be slightly larger in production version to allow cable connectors to slightly penetrate the front panel.

B005T5A0GG



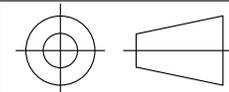
ITEM NAME:  
 BUD Industries CH-14401 Aluminum Small Rack Mount  
 Chassis, 17" Width x 1-3/4" Height x 8" Depth, Natural  
 Finish

ASIN :  
 B005T5A0GG

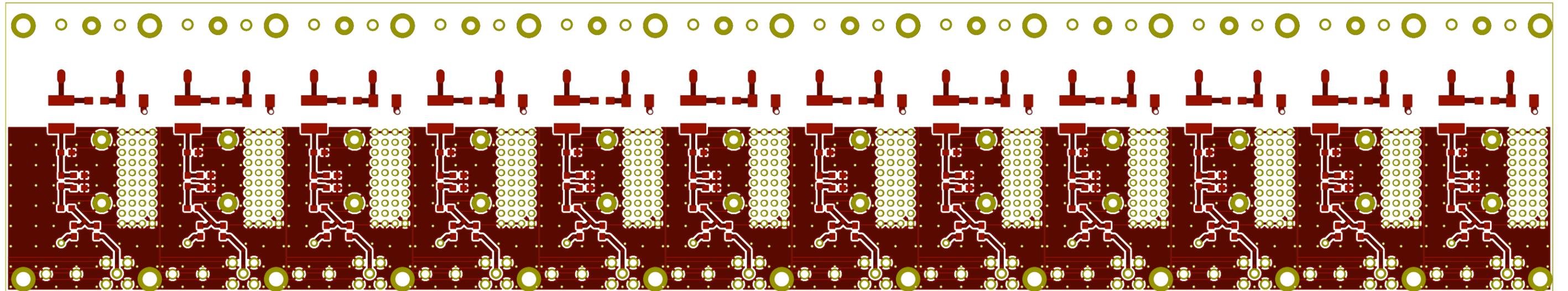
BRAND :  
 BUD Industries

MATERIAL :  
 Aluminum

# UNLESS OTHERWISE SPECIFIED  
 DIMENSIONS ARE IN INCHES  
 # INFORMATION IN THIS DRAWING IS PROVIDED FOR  
 REFERENCE ONLY

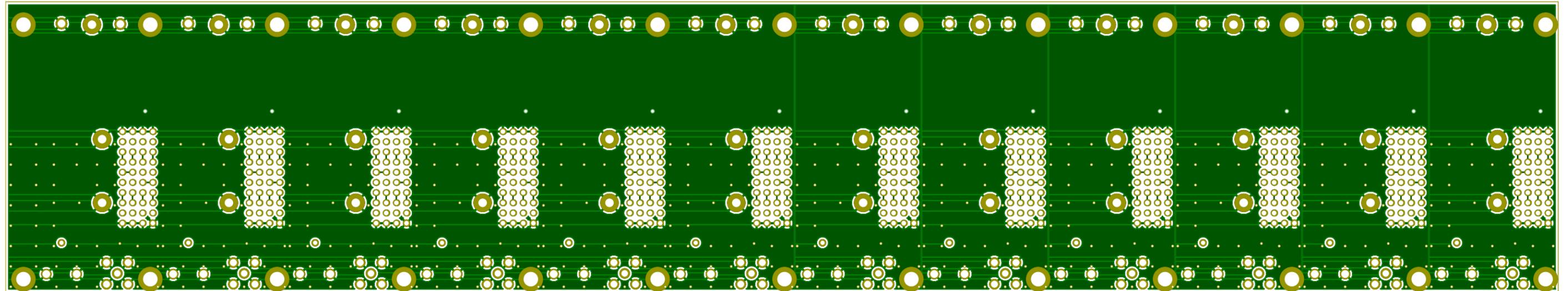


# Front Copper



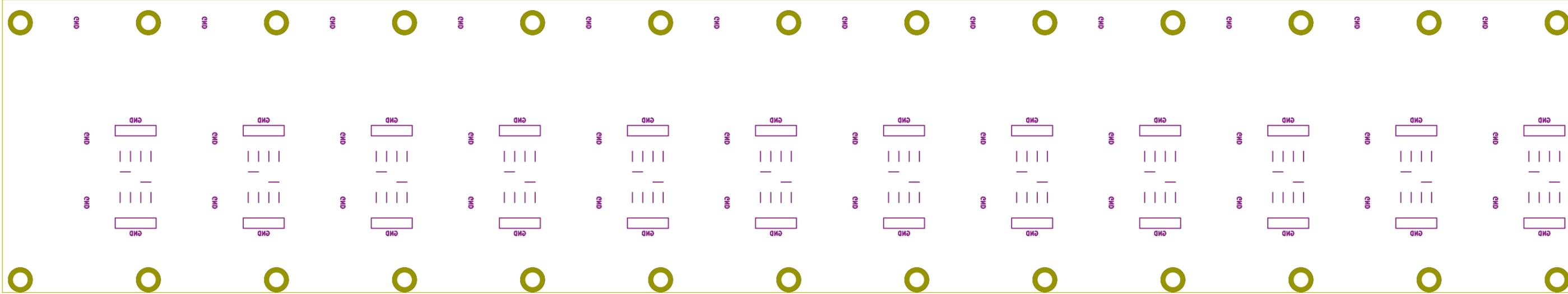
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KiCad E.D.A. pcbnew 4.0.0-rc2-1-stable		Id: 1/1

# Back Copper



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KiCad E.D.A. pcbnew 4.0.0-rc2-1-stable		Id: 1/1

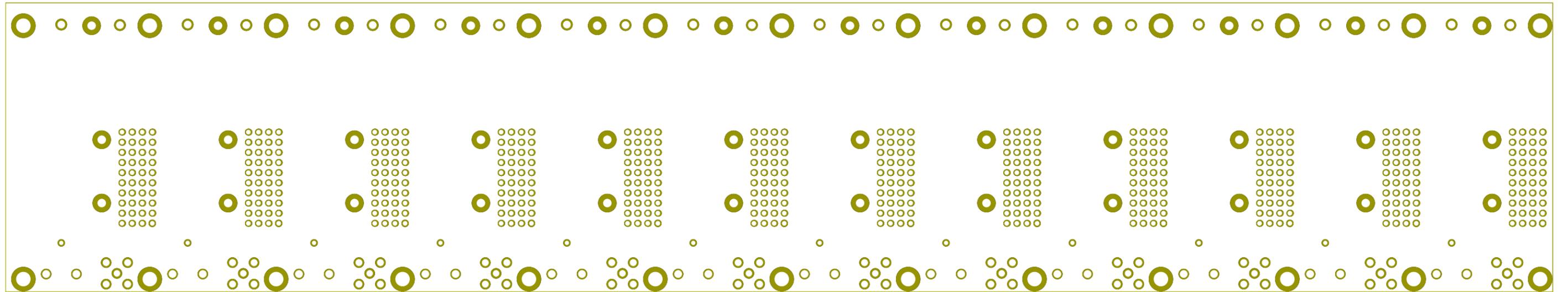
# Back Silk Screen



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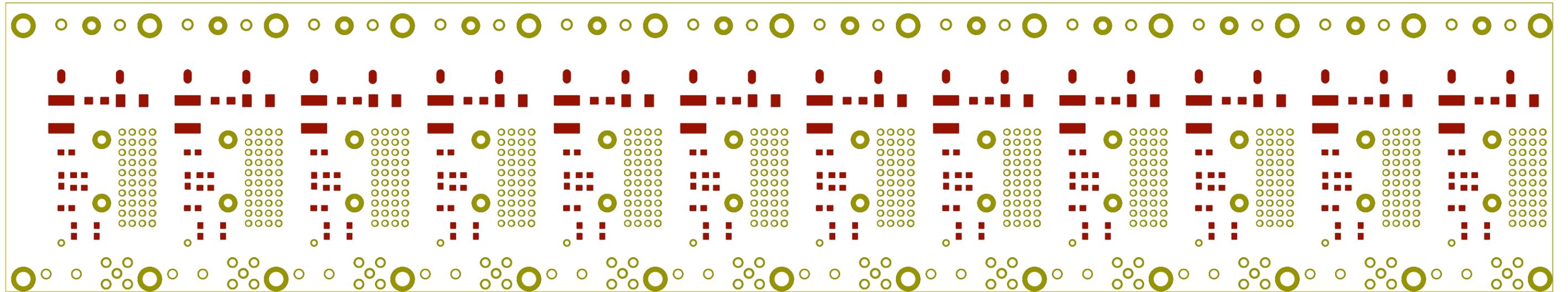


# Back Solder Mask



Sheet:		
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<b>Title:</b>		
Size: USLedger	Date:	<b>Rev:</b>
KiCad E.D.A. pcbnew 4.0.0-rc2-1-stable		Id: 1/1

# Front Solder Mask



Sheet:		
File: panelized.kicad_pcb		
<b>Title:</b>		
Size: USLedger	Date:	Rev:
KiCad E.D.A. pcbnew 4.0.0-rc2-1-stable		Id: 1/1