

Variables in prototyping hardware enclosures around MD4000 configurations for MIMO 3 X 3 radios

Boards
[Gateworks](#) provides a modular family of industrial temperature embedded products, running Linux. We show 5300 and 5400:

Radios
[Compex](#) provides a family of high throughput a/b/g/m/ac wifi modules in a compact PCI-E foot print

Enclosures

[ABTECH](#) provides a modular family of Hardened die cast enclosures. OEM customization available.

Two exemplary layouts are shown for two ZAG die cast enclosures from ABTECH.

The designs use a cover plate to hold antenna arrays. The board mounting plate attaches to the cover plate. The cover plate sub assembly is then lowered into the die cast enclosure. Changing hole patterns does not affect the enclosure.

Fans on the mounting plate circulate the air in the box to eliminate hot spots generated by radios and board.

The two enclosures and intended applications are:

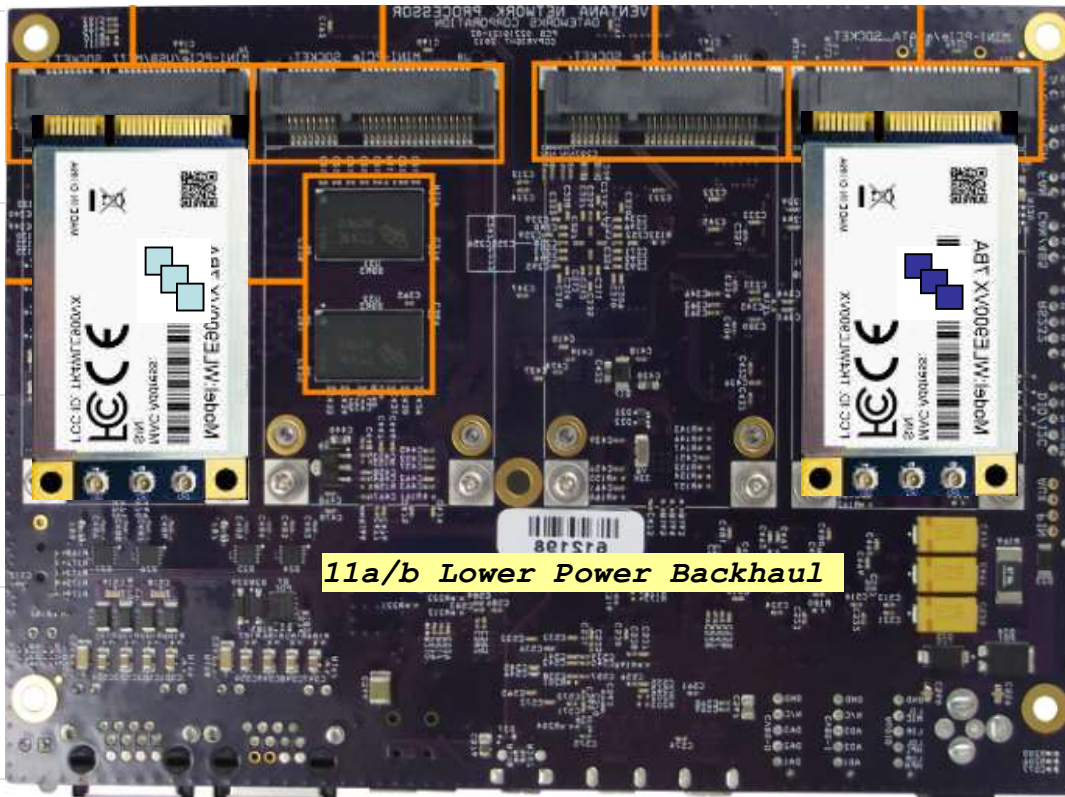
ZAG09, Dimensions (220 X 120 X 90) (deeper cover). This is intended for portable, vehicle mount, It supports one board and up to 6 radios + GPS. It has two Ethernet ports and 15 N-Female connectors.

ZAG15 Dimensions (245 X 220 X 110). This is an dual board unit in one enclosure, with space for auxiliary boards.

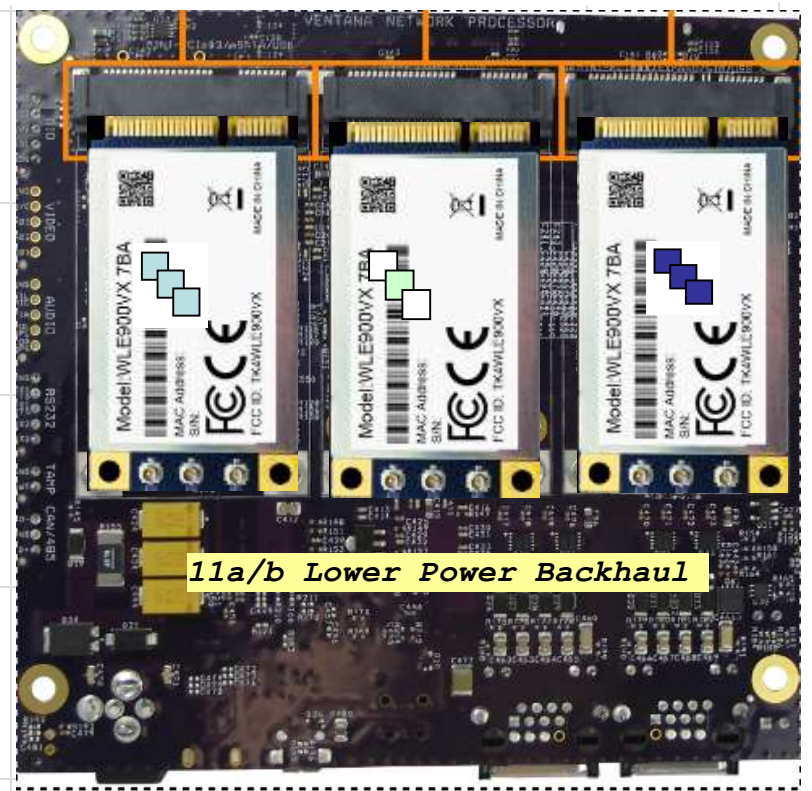
Two board and radio assemblies operate concurrently in identical RF environment. It is intended for redundant last mile mission critical wireless backhauls. It is also used for A/B comparisons between boards, radio, antennas, software.

These sketches are provided for discussion purposes. AUTOCAD drawings available.

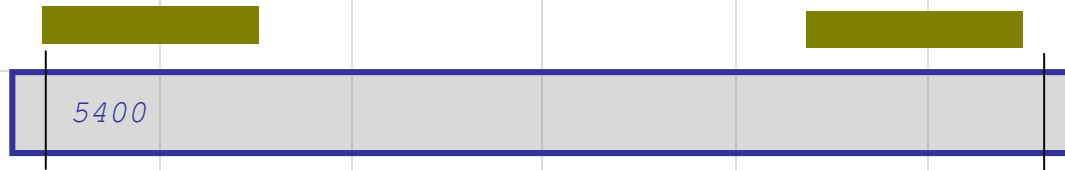
A. Gateworks boards shown are:	
5400 5300 2388	http://www.gateworks.com/product/item/ventana-gw5400-network-processor http://www.gateworks.com/product/item/ventana-gw5310-network-processor http://www.gateworks.com/product/item/laguna-gw2388-4-network-processor
B. Abgn/ac Radios options shown here are:	
51 X 30 X 03 U.FL 3 x 3 51 x 30 x 13 U.FL 4 x 4 51 x 30 x 13 U.FL 4 x 4	https://www.compex.com.sg/product/wle900vx-industrial-grade/ 5.8G and 2.4G https://www.compex.com.sg/product/wle1216v5-20 for 5.8G https://www.compex.com.sg/product/wle1216v2-20 for 2.4G
C. Die cast enclosure options are at	http://www.abtech.eu/download/zag%20range%20.pdf
ZAG10R shows 1 boards, ZAG15 shows 2 boards,	cover plate + board mount plate approach. (220 X 120 X 90) (deeper cover) cover plate + board mount plate approach. (245 X 220 X 110)
D. Board mounting plate.	Made per layouts attached. Customizable
E. Pigtail U.FL Pigtail for MMMCX See also shorter pig tail options at :	https://shop.gateworks.com/index.php?route=product/product&path=70_75&product_id=36 https://shop.gateworks.com/index.php?route=product/product&product_id=55&search=mmcx www.data-alliance.net
F. Ethernet connector :	http://www.l-com.com/ethernet-category-6-ip67-rj45-bulkhead-panel-mount-coupler-shielded-feed-thru-with-dust-cap
	Does not come with cable, solder needed
G. Fan	https://www.digikey.com/products/en?keywords=CFM-4010-03-10 Fan Bracket made per drawing
H. Antennas option using dual band:	https://www.data-alliance.net/antenna-dual-band-outdoor-omni-fiberglas-2-4ghz-5dbi-5ghz-9dbi/
I. Prototyping/Validations Kit contains,	
	Cover plate with 15 N-FEMALE bulkheads holes, Die cast box with 2 Ethernet ports. Board Mounting plate. 1 Fan + Bracket, ½ standoffs for board and two sets of standoffs for cover plate attachment,
J. Assembly instructions:	
	The pigtails are made into 3/4 bundles. The pigtails bundles are then mounted to the radios. The board is attached to the mounting plate. The fans are attached where needed. The radios are fastened to the board mounts for them and antenna N-Female inserted into cover plate. The pigtail antenna ends are then attached to cover plate. The board mounting plate is then attached to cover plate and tie wraps on pigtails so they are secure with board. Ethernet cables are attached from the die cast body. Cover plate is mounted to the box. Unit tested and shipped.



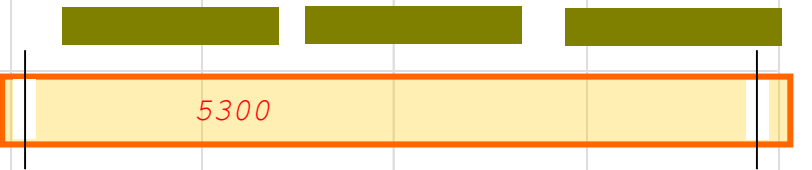
11a/b Lower Power Backhaul



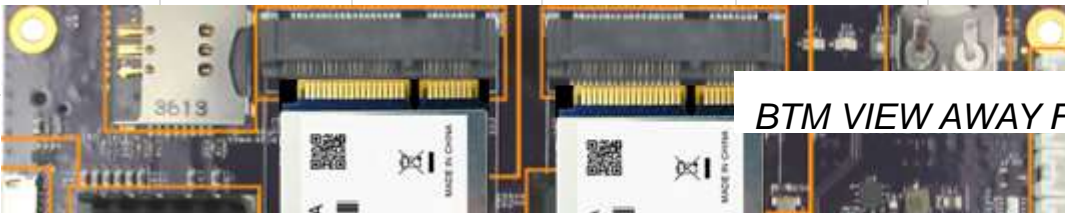
11a/b Lower Power Backhaul



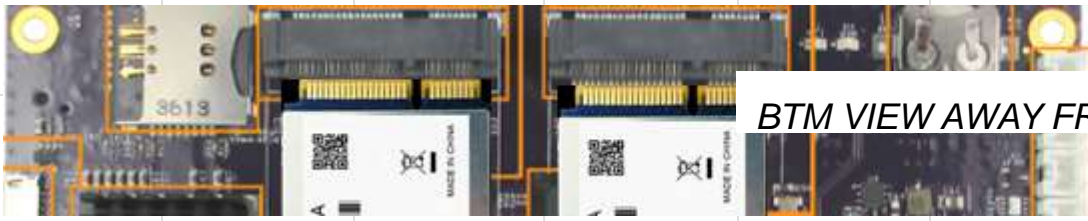
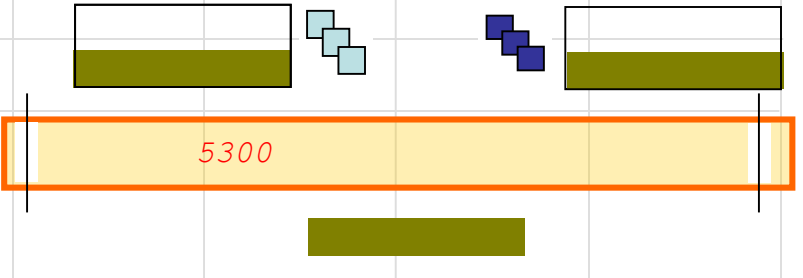
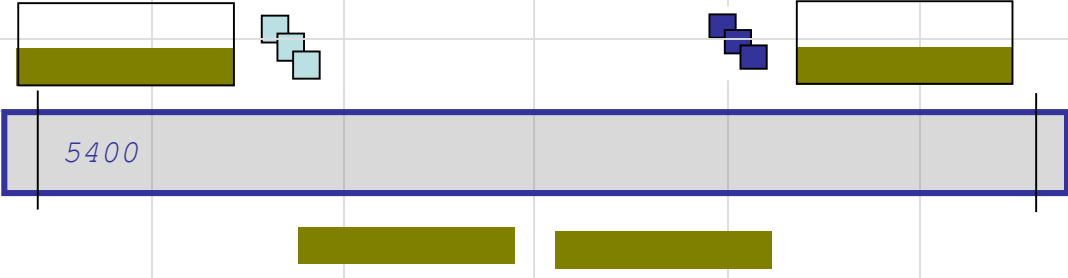
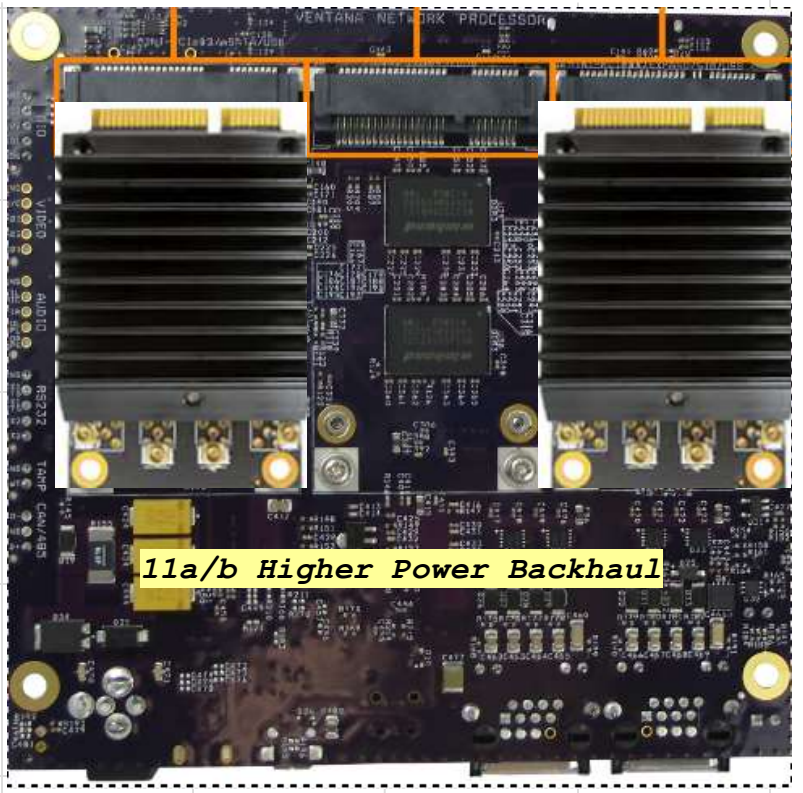
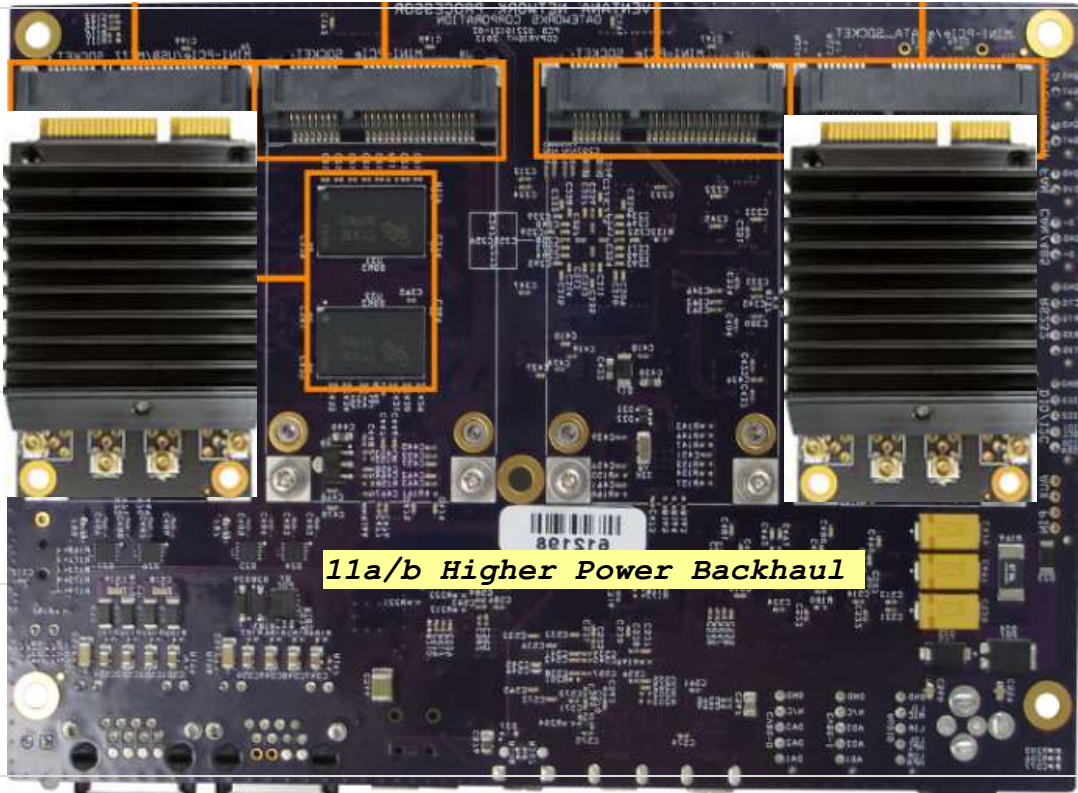
5400



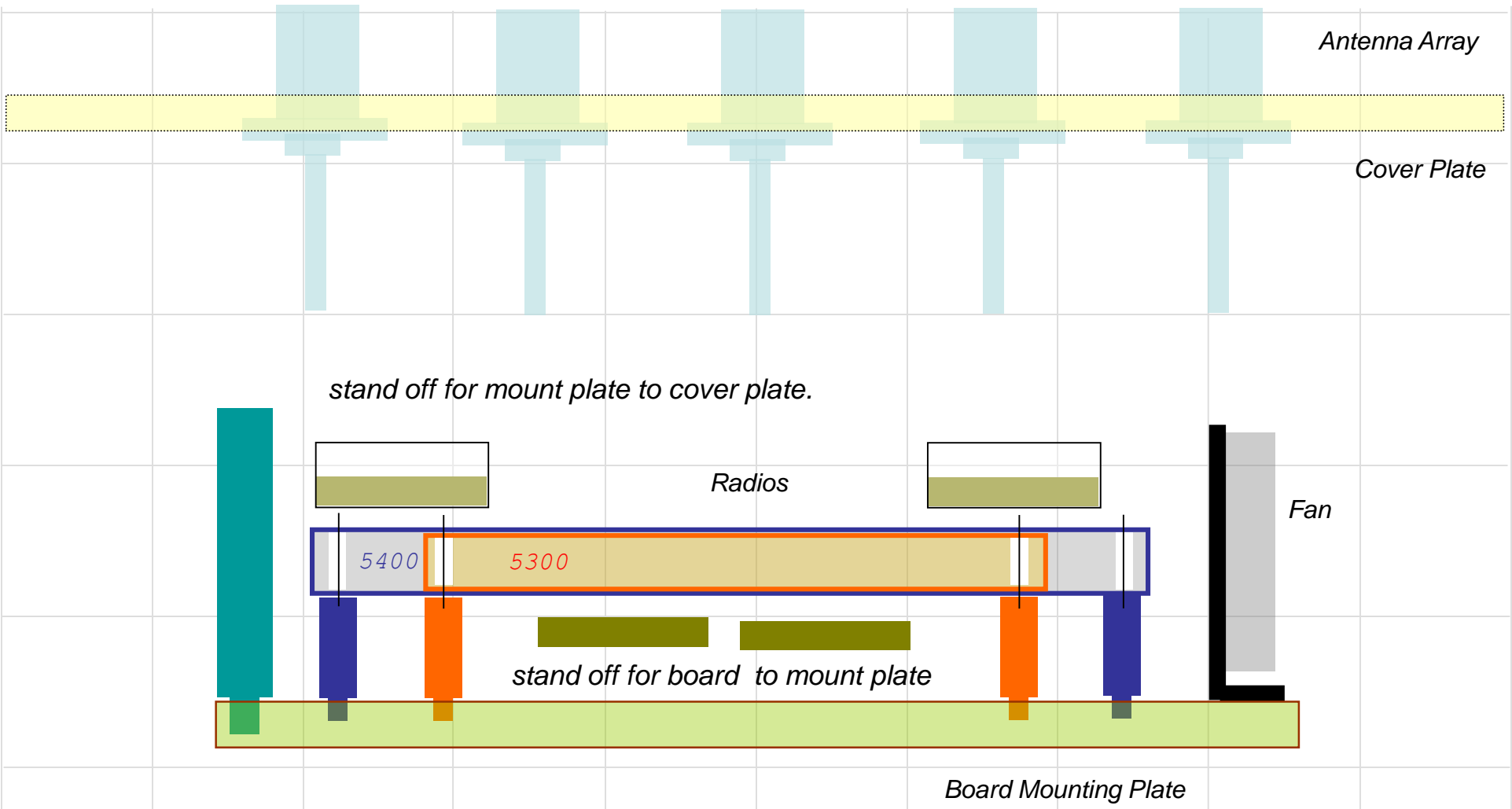
5300



BTM VIEW AWAY FROM COVER PLATE



Cover Plate Approach



Standoff (dark green) fastens plate (green) to cover plate (yellow)
Clearances on plate for air flow and cable access when inside box.

The subassembly of board, radios and mounting plate attaches to cover plate



Pigtail + radio sub assembly



3 X 3

4 X 4

50.95 x 30 x 03 mm (H x W x D)

50.95 x 30 x 13 mm (H x W x D)

Bundle three with tie wraps and attach to radio.

Fasten Pig tail to radios.

Mount radios on board

Mount board + radios+ pigtails on mounting plate.

Fasten pig tails securely to board mounting plate stand offs..

4 locations available around boundary of board.

Pigtails may use tie wraps as shown

Leave slack on Antenna end for different placement options.

Leave slack for easy dismounting/mounting of connections to radios

Movement of antennas end of cables should not affect radio end.

Fasten pig tail antenna as to cover plate.

Attach Ethernet port cables to board

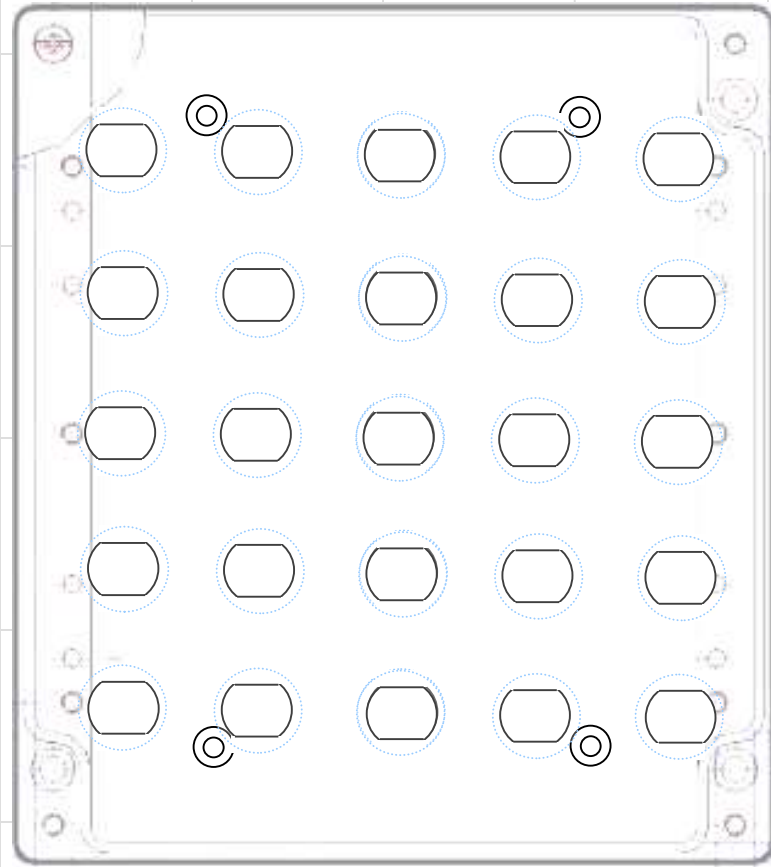
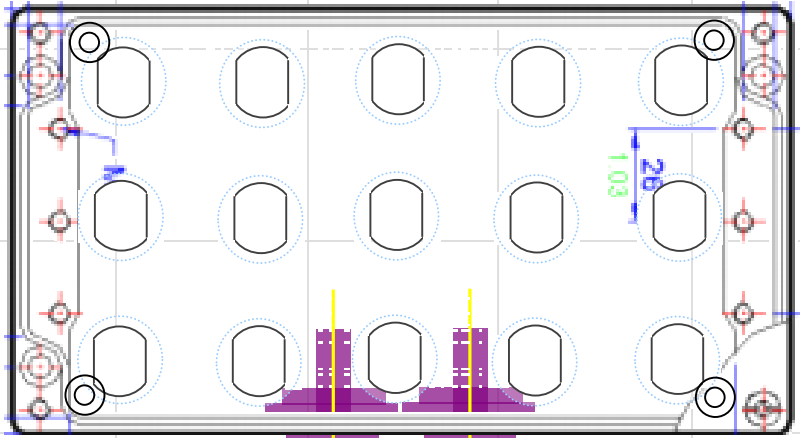
Attach Ethernet ports to die cast box

Lower cover plate to die cast and fasten

TIE WRAP

ZAG 10R (220 X 120 X 90)

ZAG 15 (245 X 220 X 110).



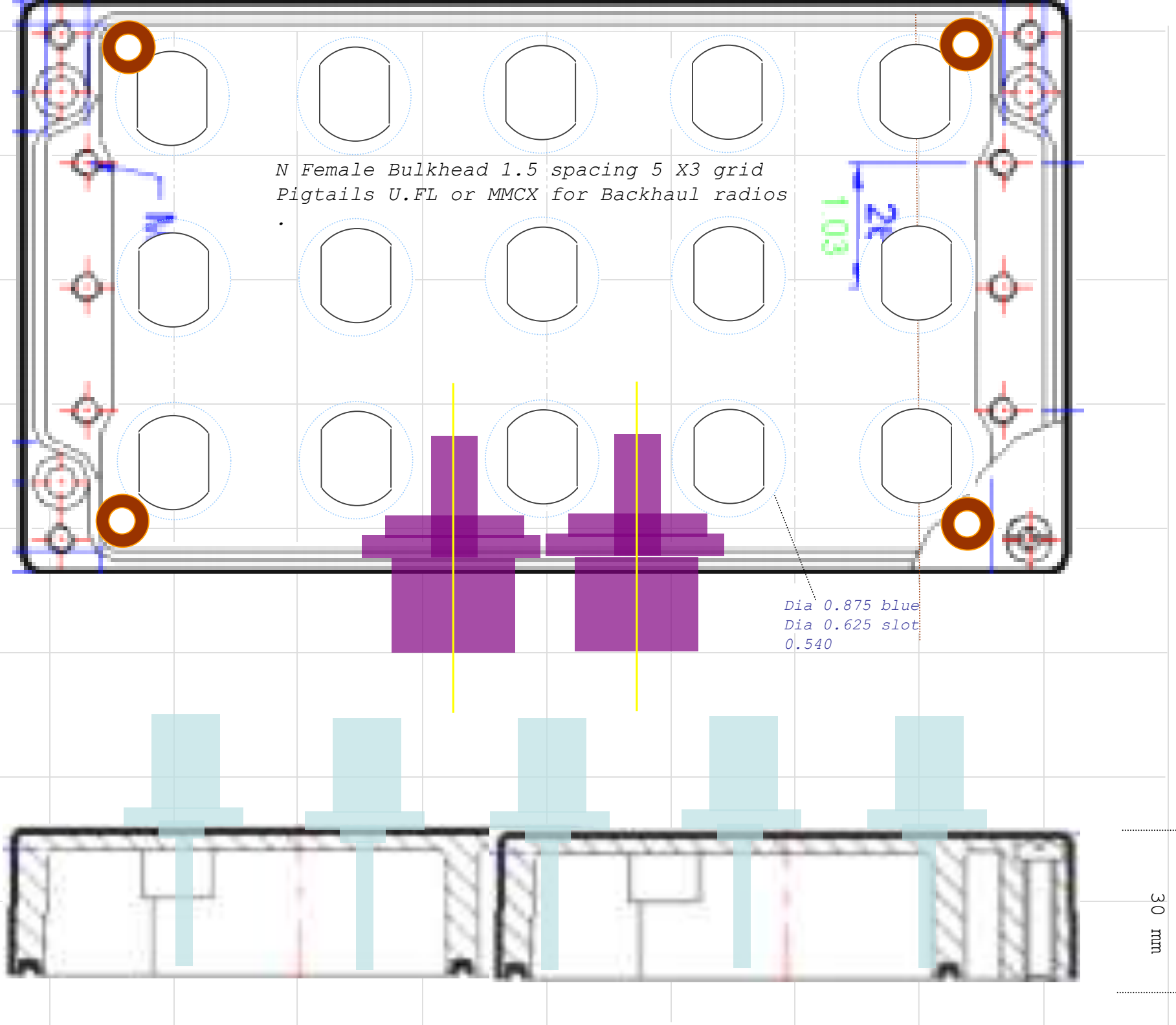
245

220

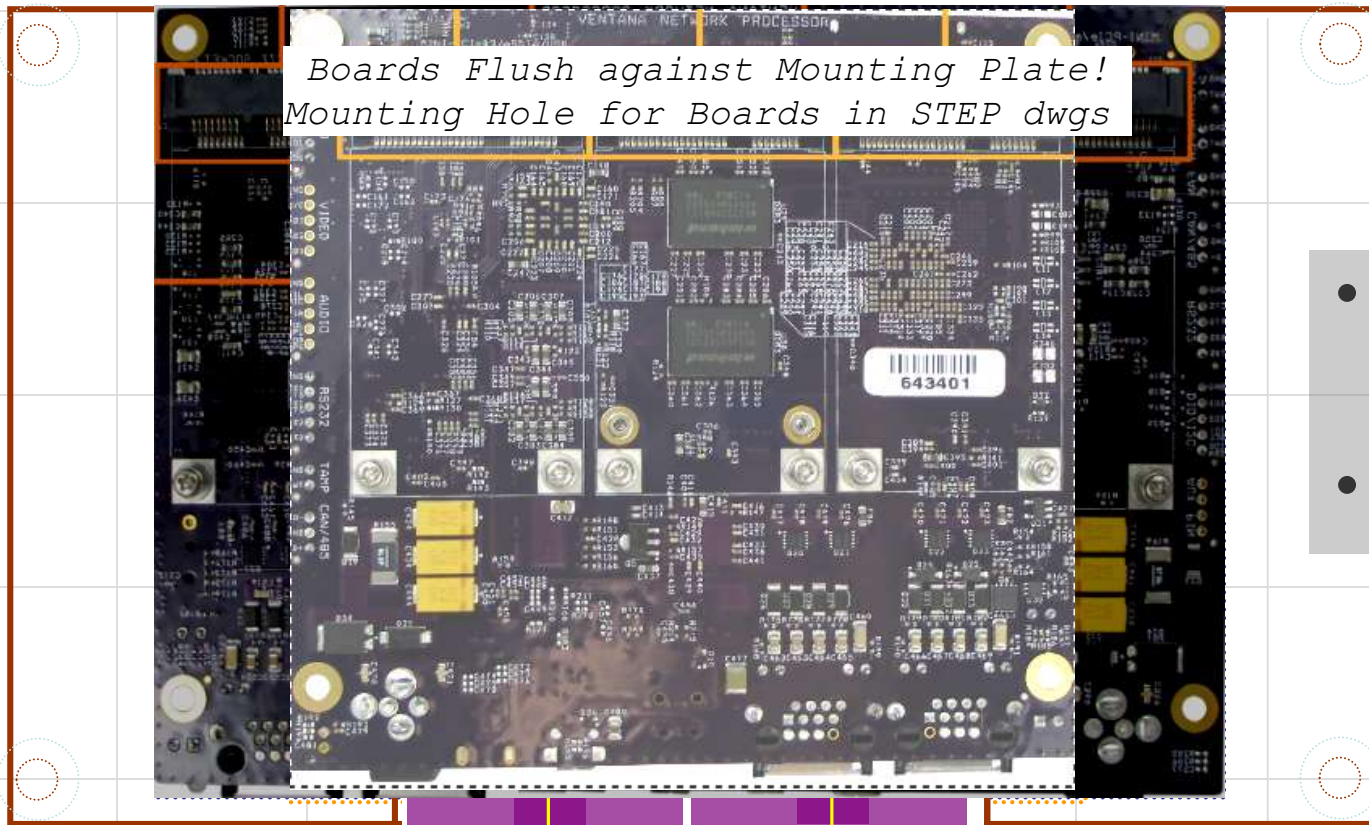
220

Enclosure Options based on ZAG family

ZAG 10 Hole patterns on Cover Plate and Box



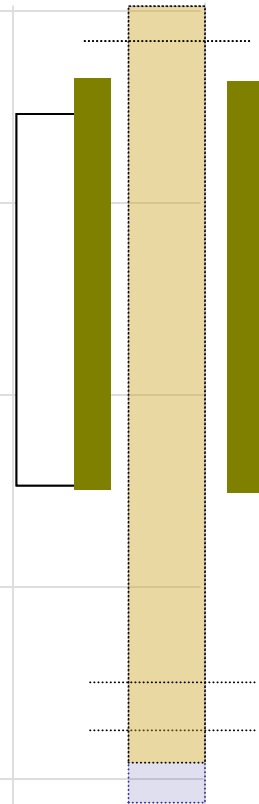
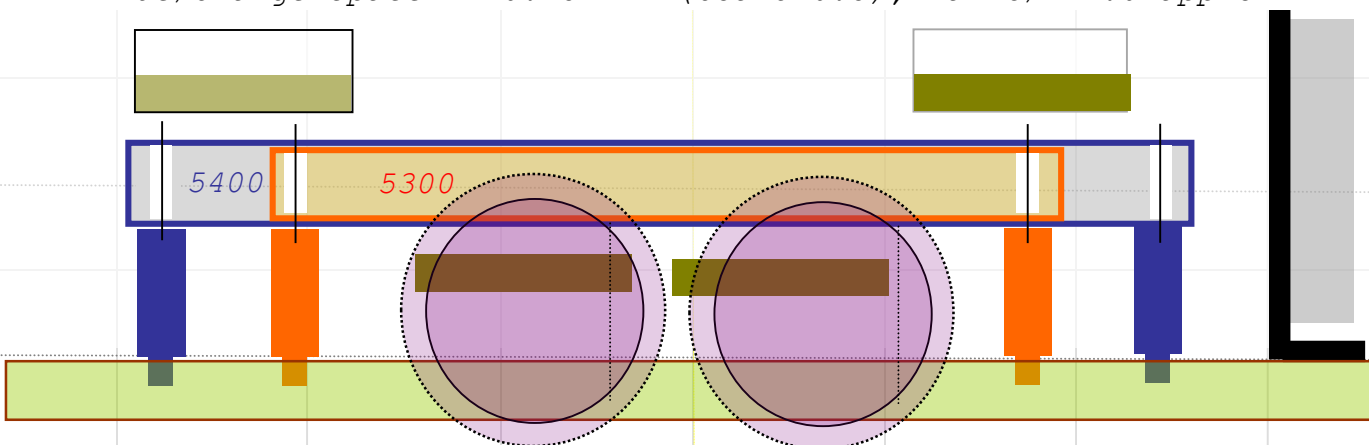
GW 5300 105 x 100 x 13
GW 5400 140 x 100 x 13



Boards Flush against Mounting Plate!
Mounting Hole for Boards in STEP dwgs

1.5 in spacing
(1.25 min)

Board to be central to Fan for circulation both sides of board
Blue/Orange Spacer = 0.75 in (board 0.5), fan C/L 1.0 approx

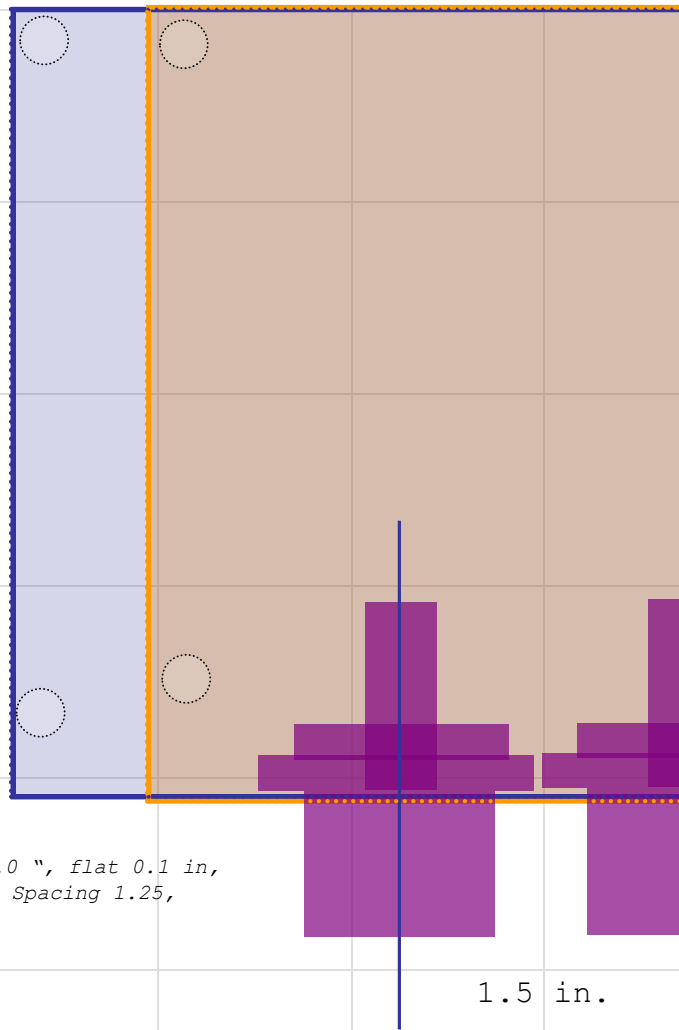


ZAG 10 Hole patterns on Board Plate

GW 5300 105 x 100 x 13
GW 5400 140 x 100 x 13

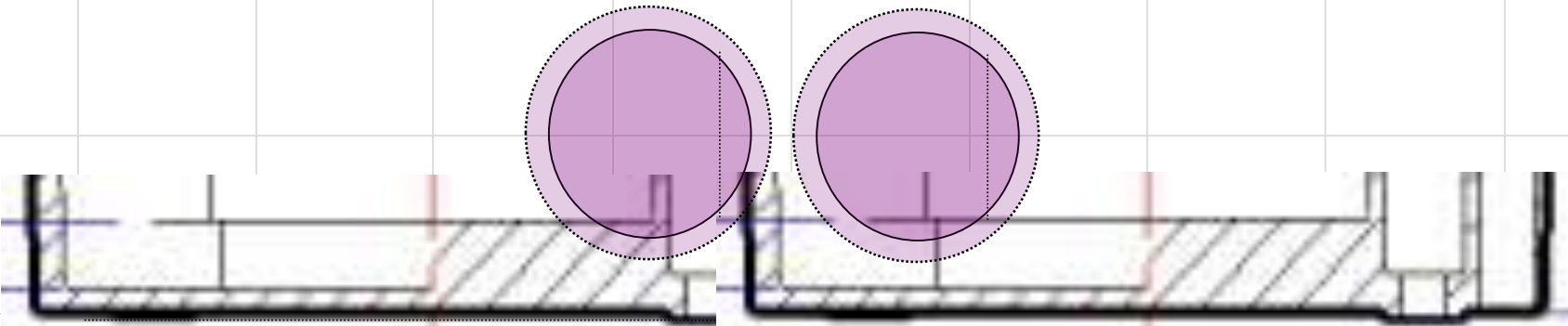
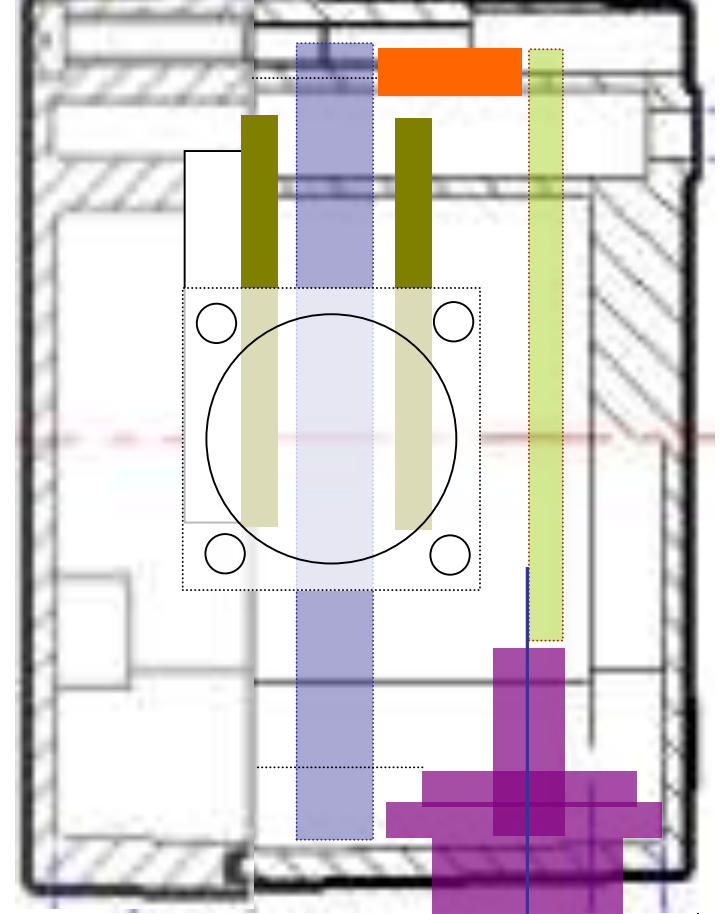


Hole 1.0", flat 0.1 in,
Min Spacing 1.25,



1.5 in.

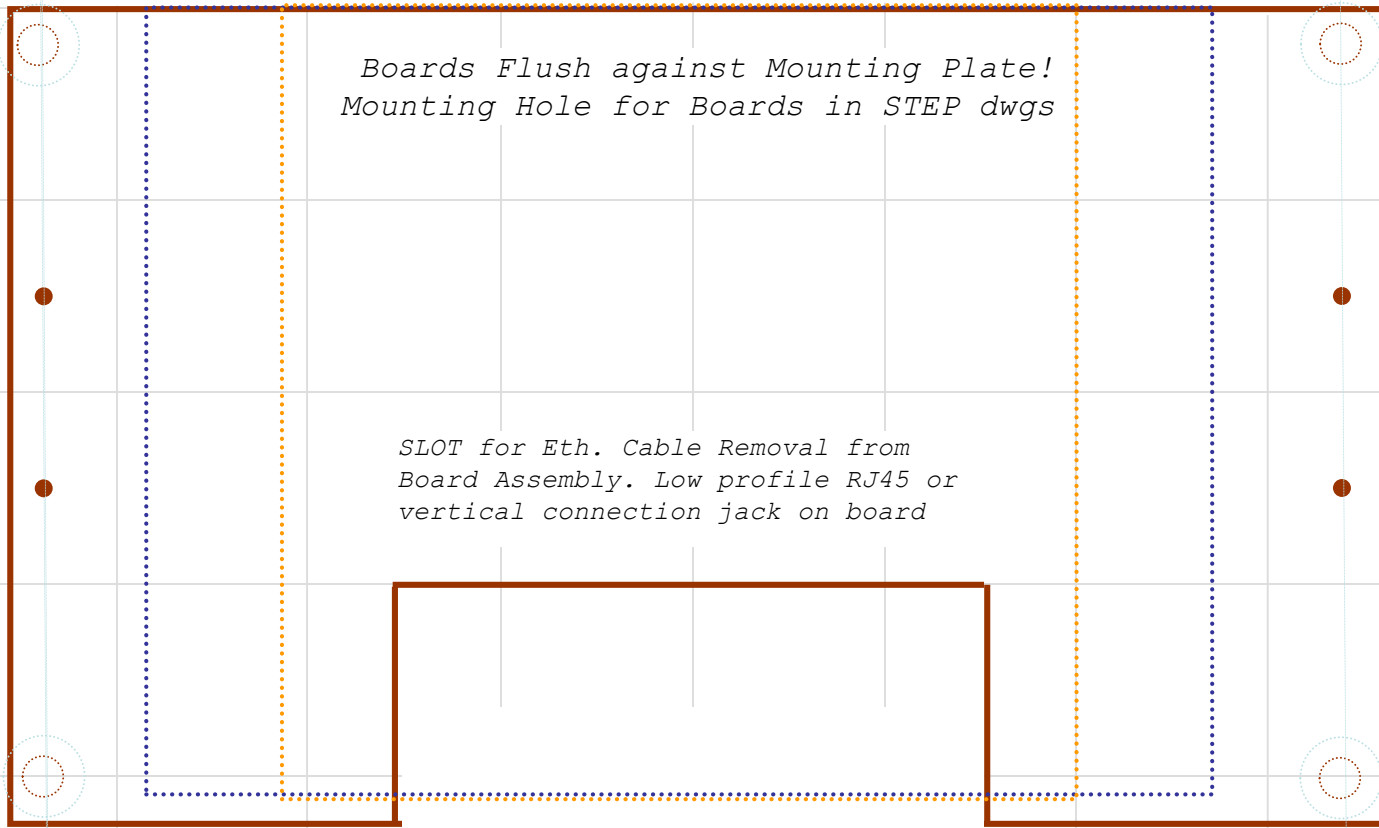
1 in.



1 in.

ZAG 10 Hole patterns on Board Plate

GW 5300 105 x 100 x 13
GW 5400 140 x 100 x 13

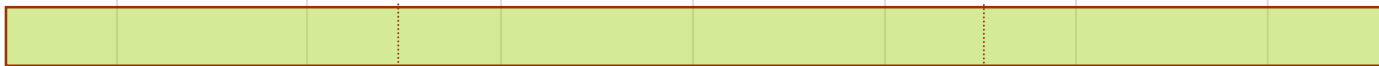


Fan Bracket mounting holes on both sides

Hole Mounting for following boards are supported in standard configuration (rename to .STEP)

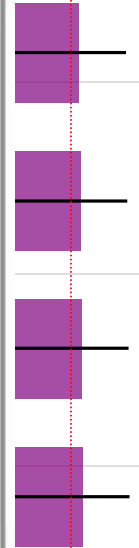
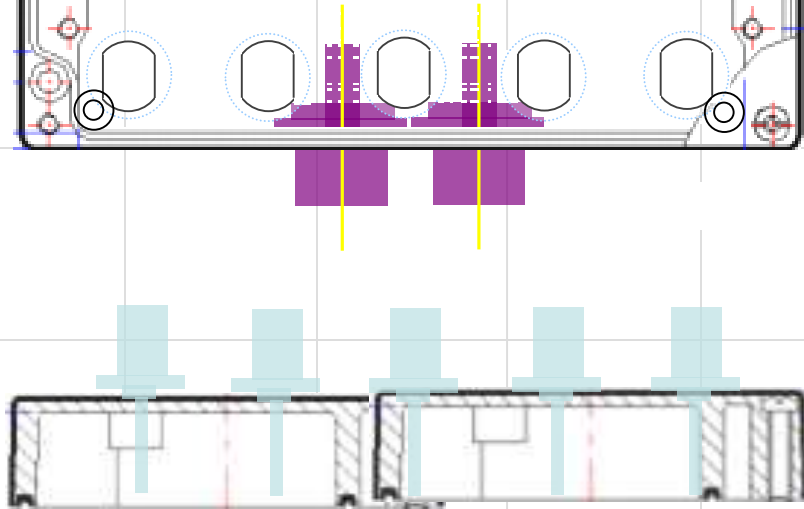
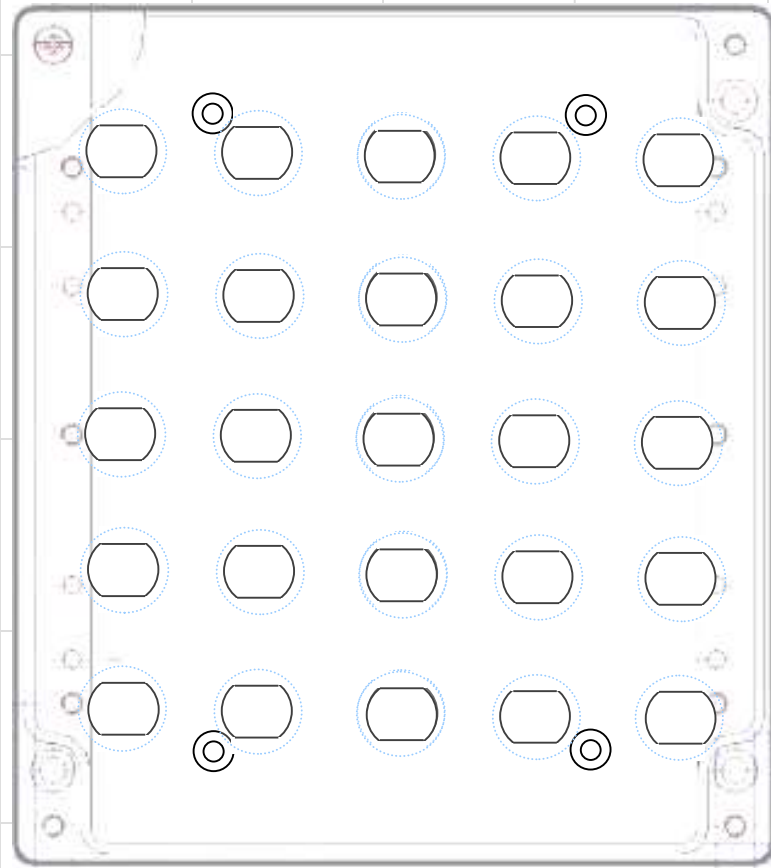
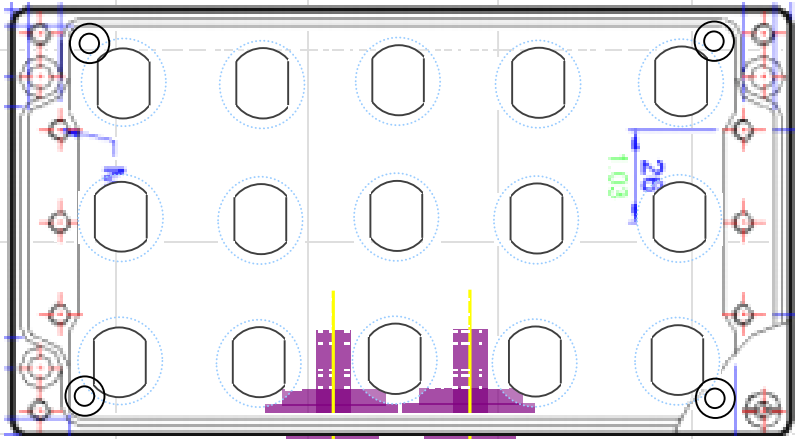
- 5400 GW5400-C.STEP <http://meshdynamics.com/DWG/GW5400-C-STEP.txt>
- 5300 GW5300-F.STEP <http://meshdynamics.com/DWG/GW5300-F-STEP.txt>
- 2388 GW2388-H.STEP <http://meshdynamics.com/DWG/GW2388-H-STEP.txt>

Viewer at <https://viewer.autodesk.com>



ZAG 10R (220 X 120 X 90)

ZAG 15 (245 X 220 X 110).



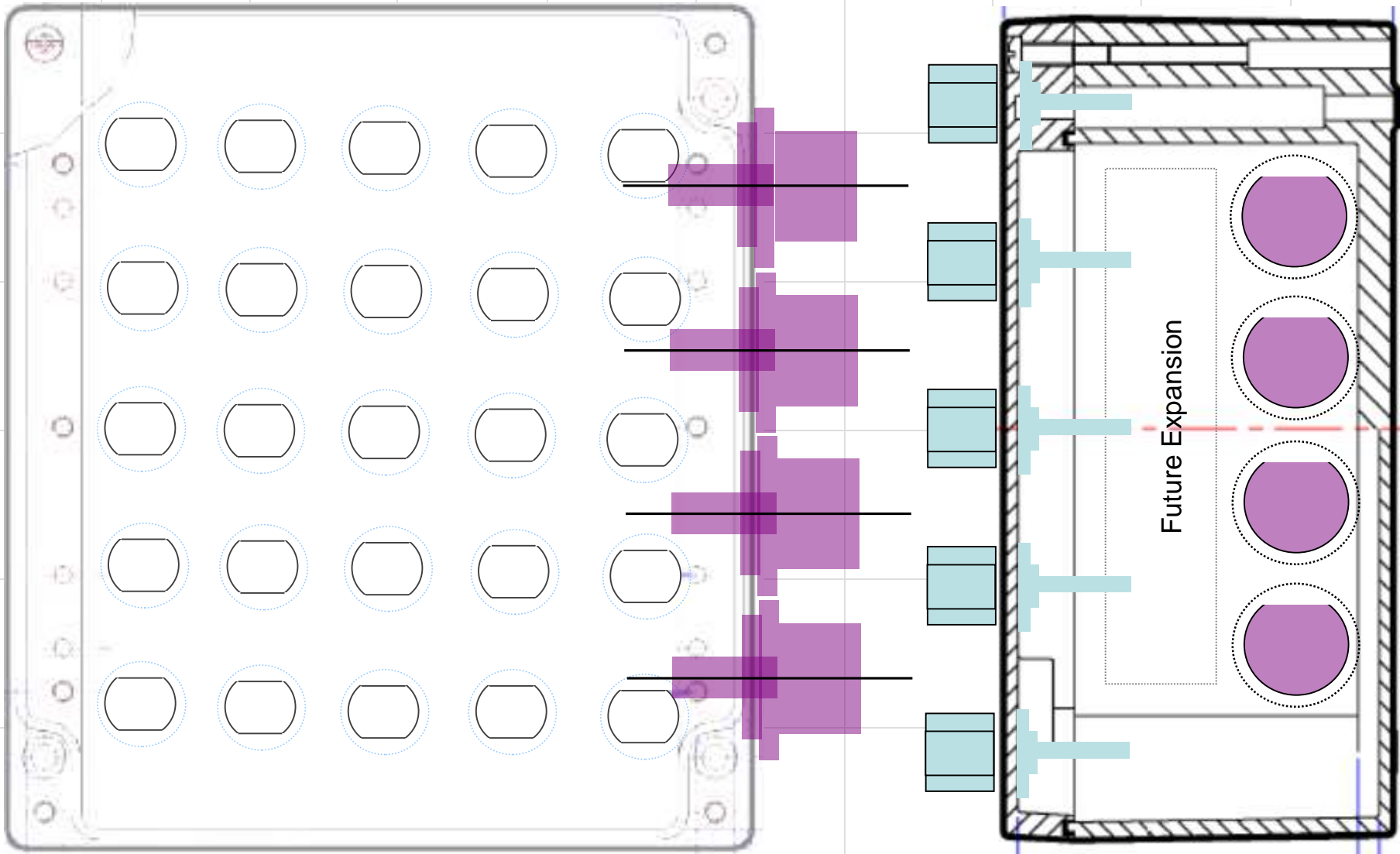
220

220

245

Enclosure Options based on ZAG family

Enclosure Options based on ZAG family

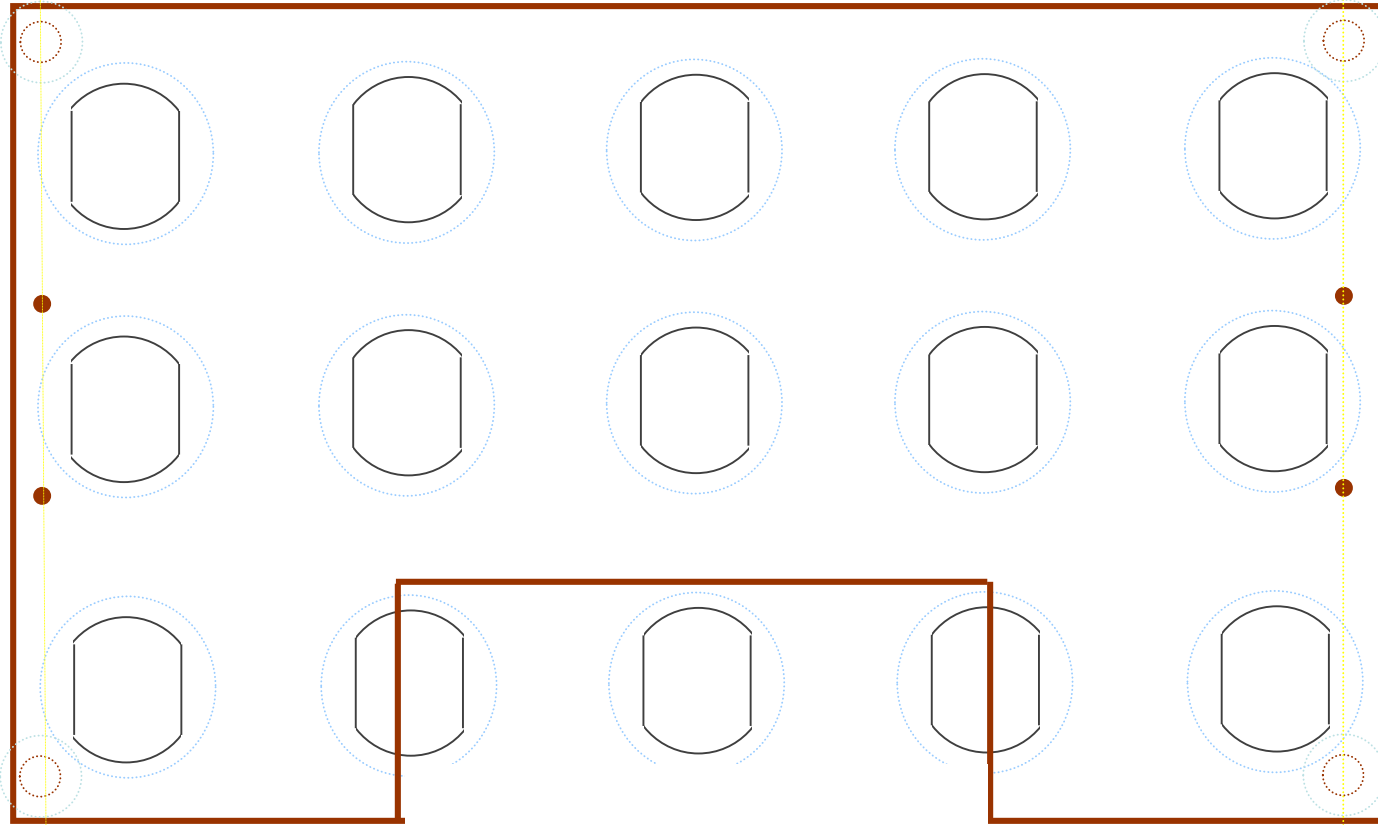


4 inches

1.5 in 1.5 in 1.5 in 1.5 in

9 inches

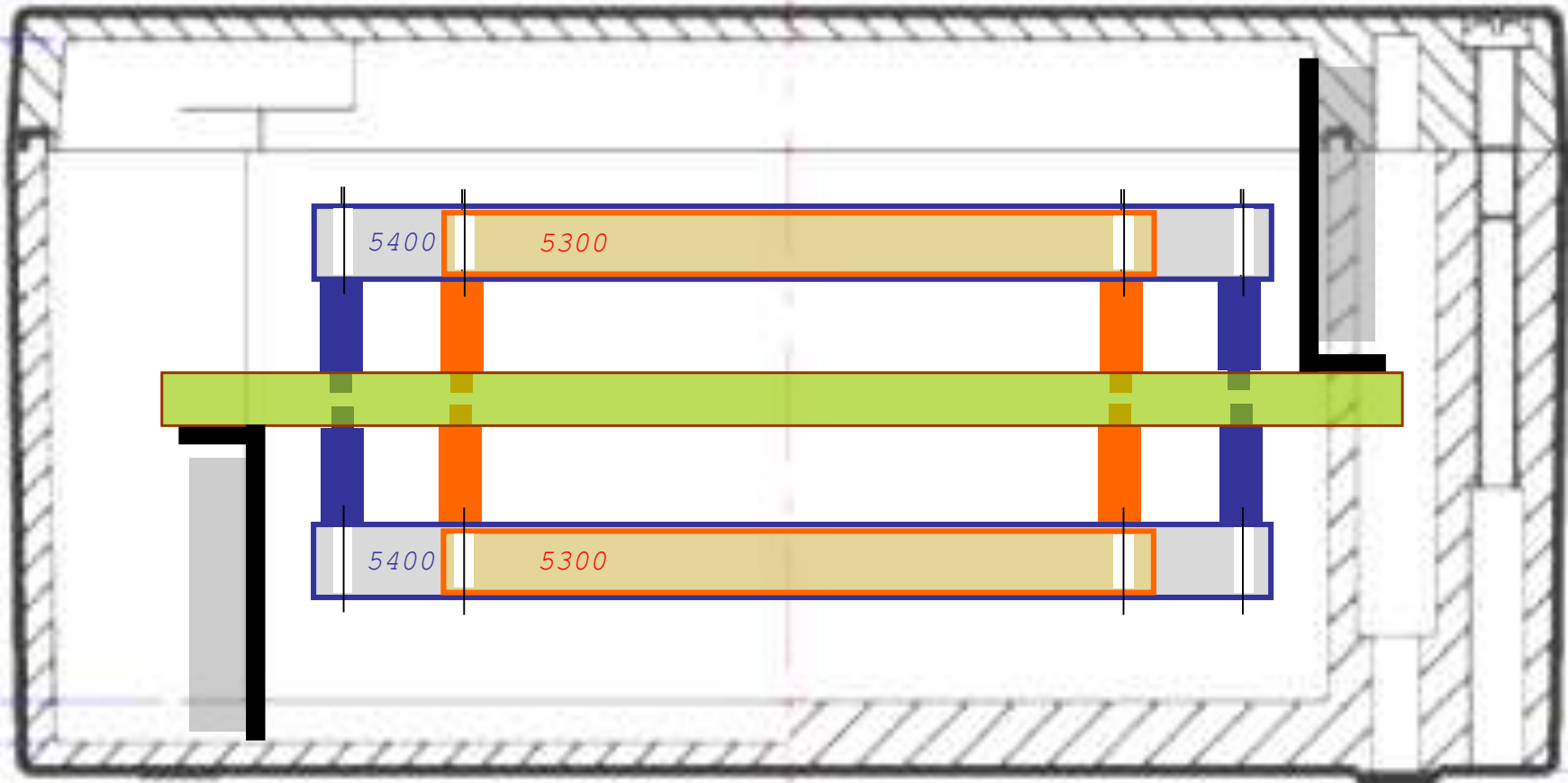
Board and Fan Mounting plate attaches to cover plate



*N Female Bulkhead 1.5 in spacing 5 X5 grid
Pigtails U.FL or MMCX for Backhaul radios*

9.055

Board and Fan Mounting plate Two boards



Two boards for Redundant Networks and A/B comparison between board, radios and antenna ensembles

Work Sheet
