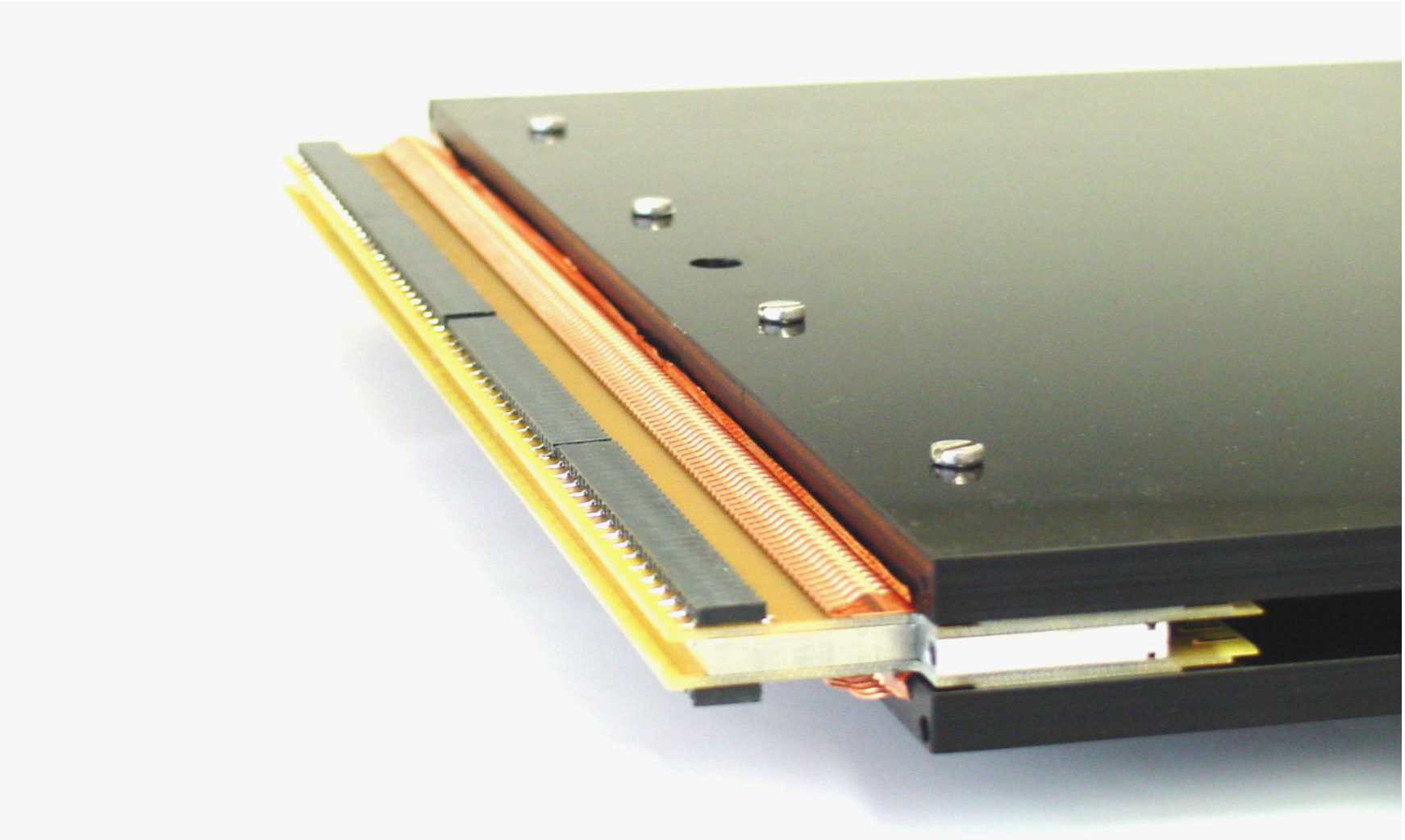
FE electronic box

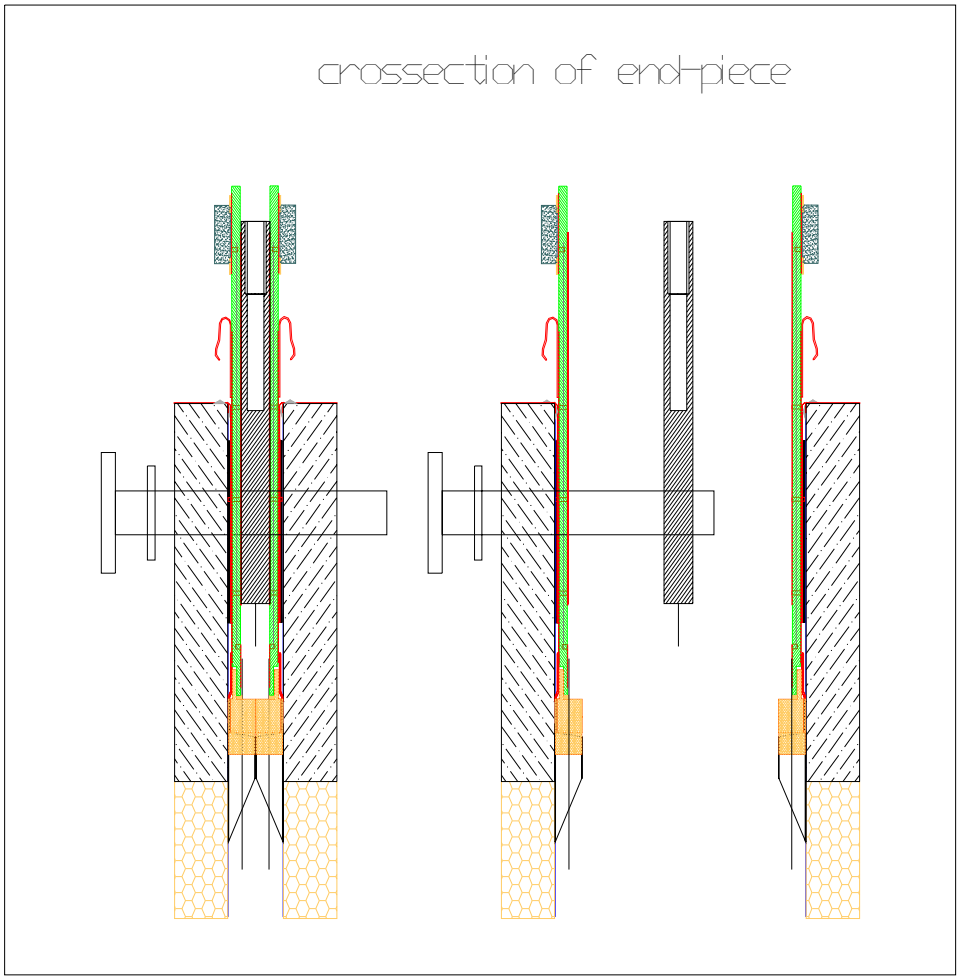
- Construction of end piece OT module
- Electronic components
- Mechanics
- Cooling

End-piece
Feed trough boards at dummy

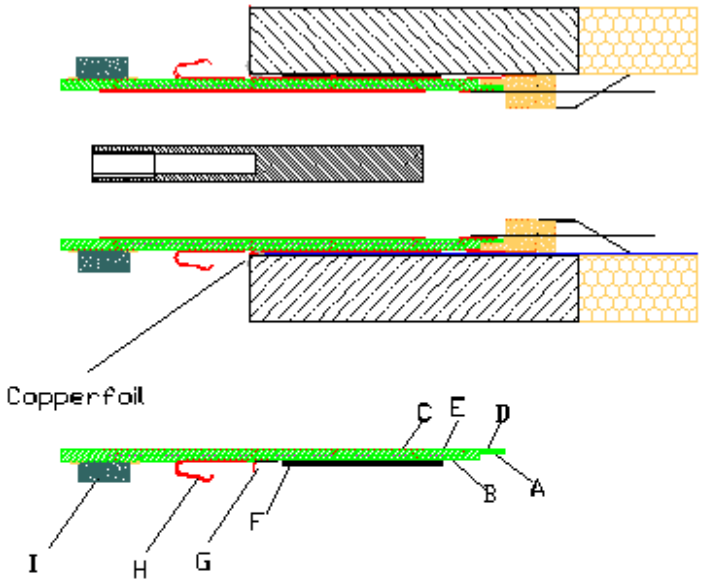


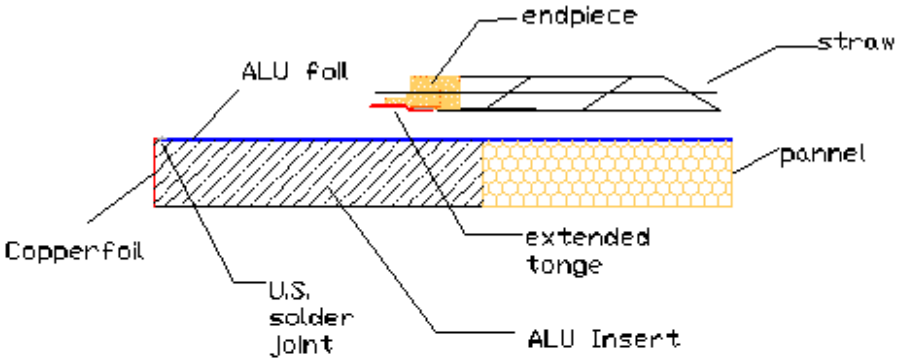
End piece

- The OT module exists out of two identical panels holding 64 straws.
- 2 Feed trough boards connecting HV and gnd over full width to outside world

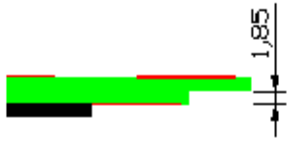


End-piece construction

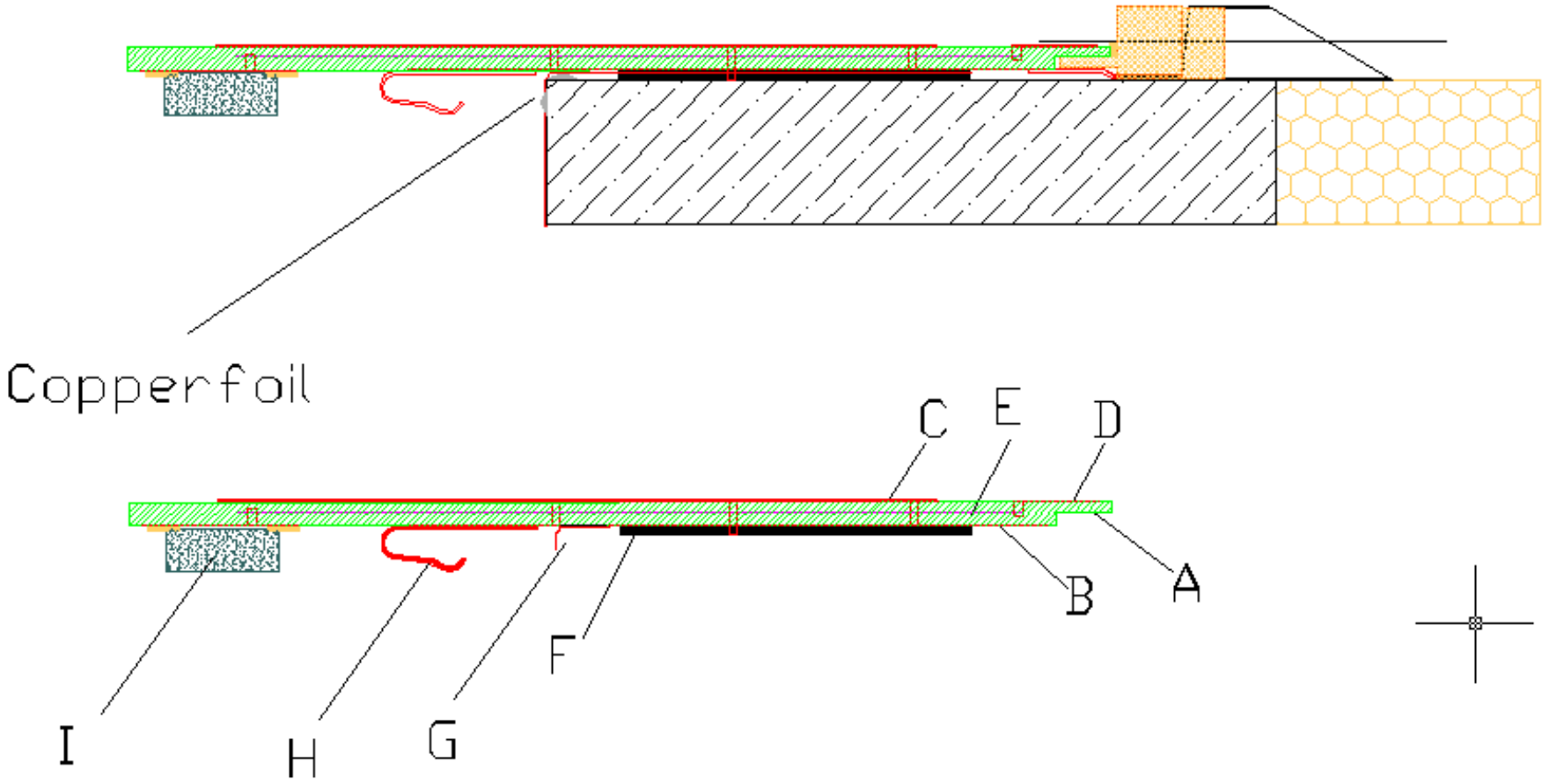




A step for end piece
B gnd pads connecting straw
C gnd shielding
D wire pad
E signal wire midle of board
F board spacer creating room for gnd soldering
G gnd foil to connect pannel gnd
H contact spring connecting FE-box gnd
I HV connector

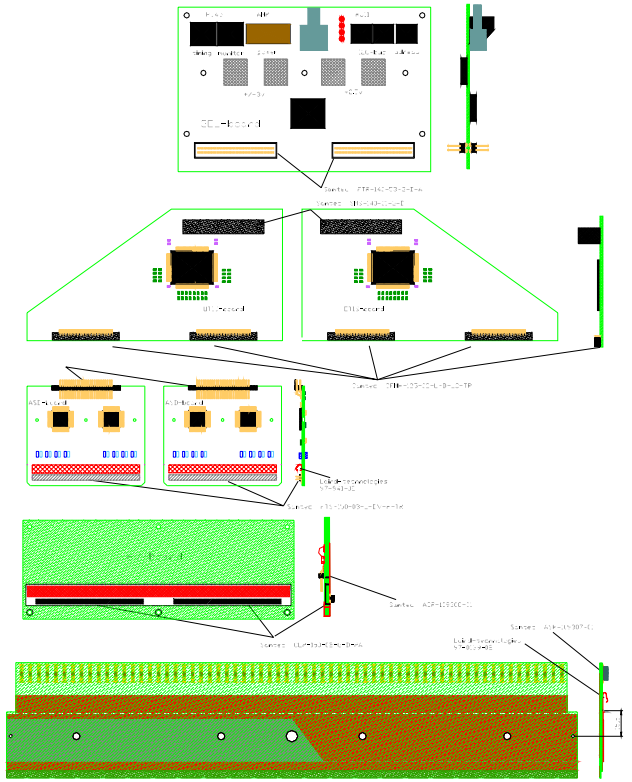


Feed-trough boards

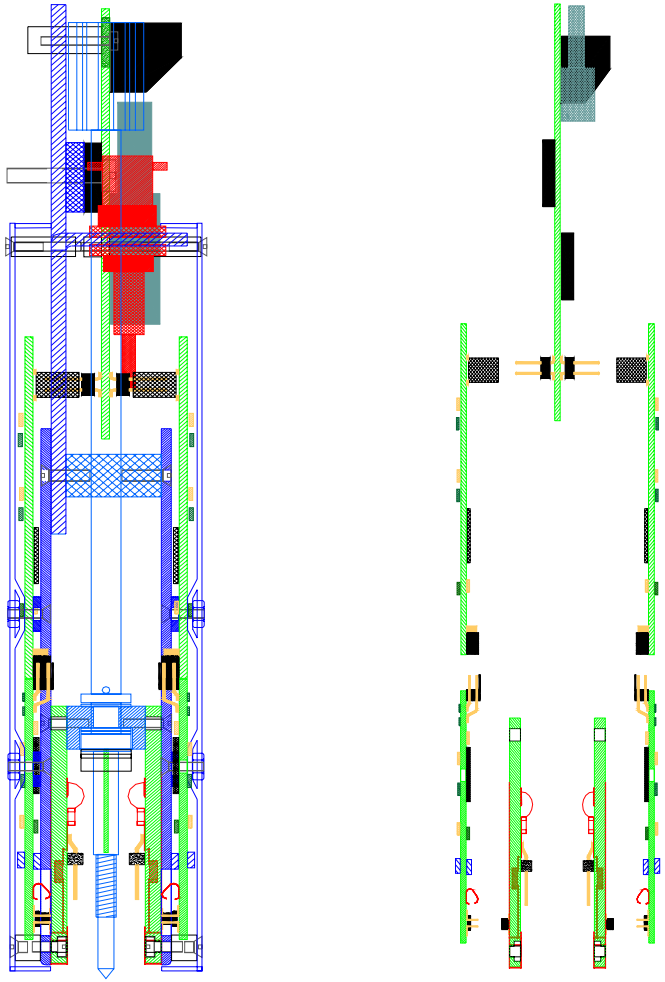


Electronic components

- Feed-trough board 2x
- HV-board 4x
- ASD-board 8x
- OTIS-board 4x
- GOL-board 1x

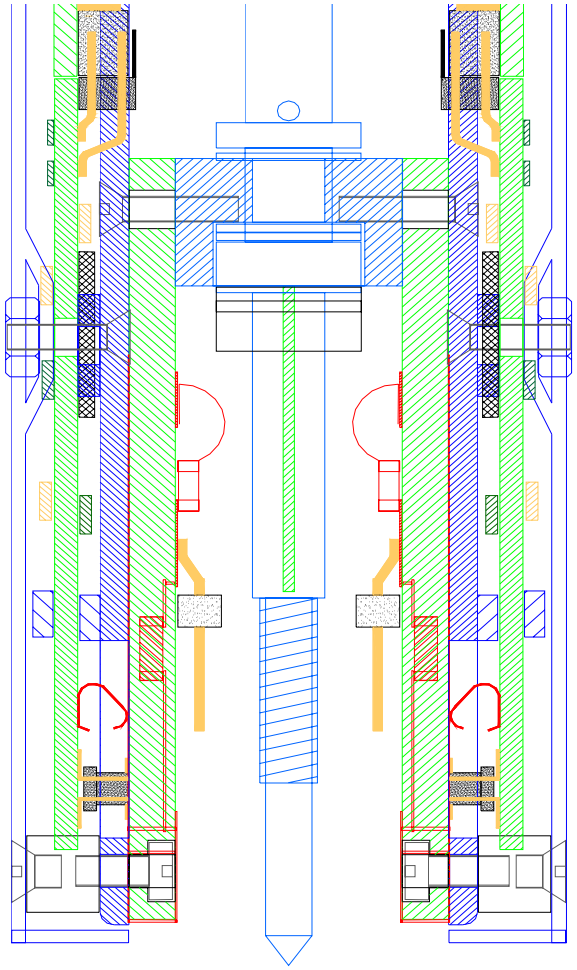


Stacking of boards



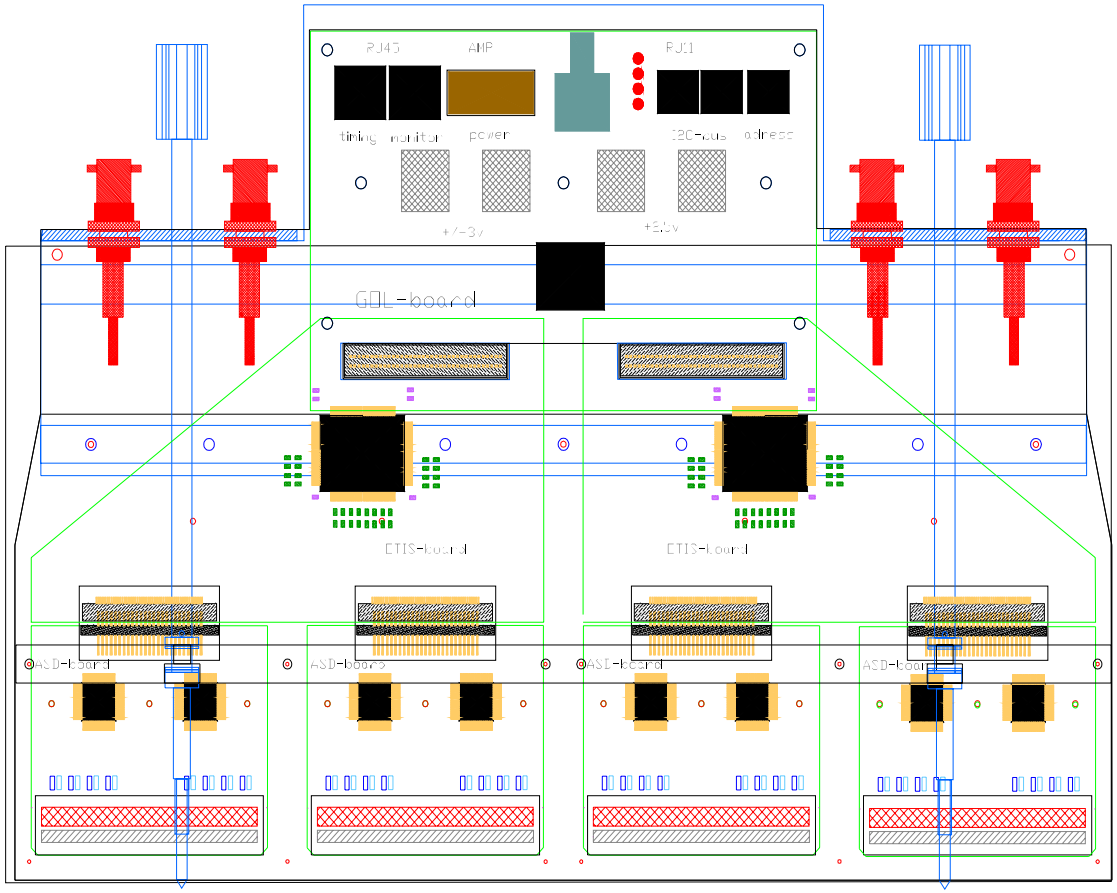
- 2 planes of 64 channels
- 32 channel HV-boards
- Each HV-board connects 2 ASD-boards
- 2 ASD-boards connect L or R OTIS
- OTIS-board L and R version
- GOL-board connects 4 OTIS-boards front and back plane

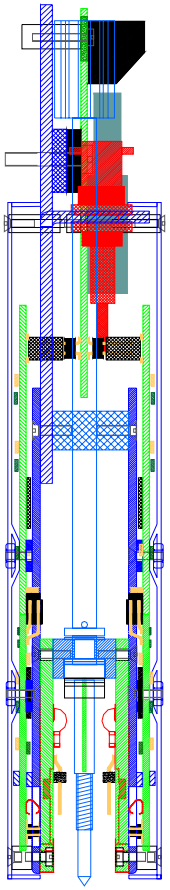
HV connector-section



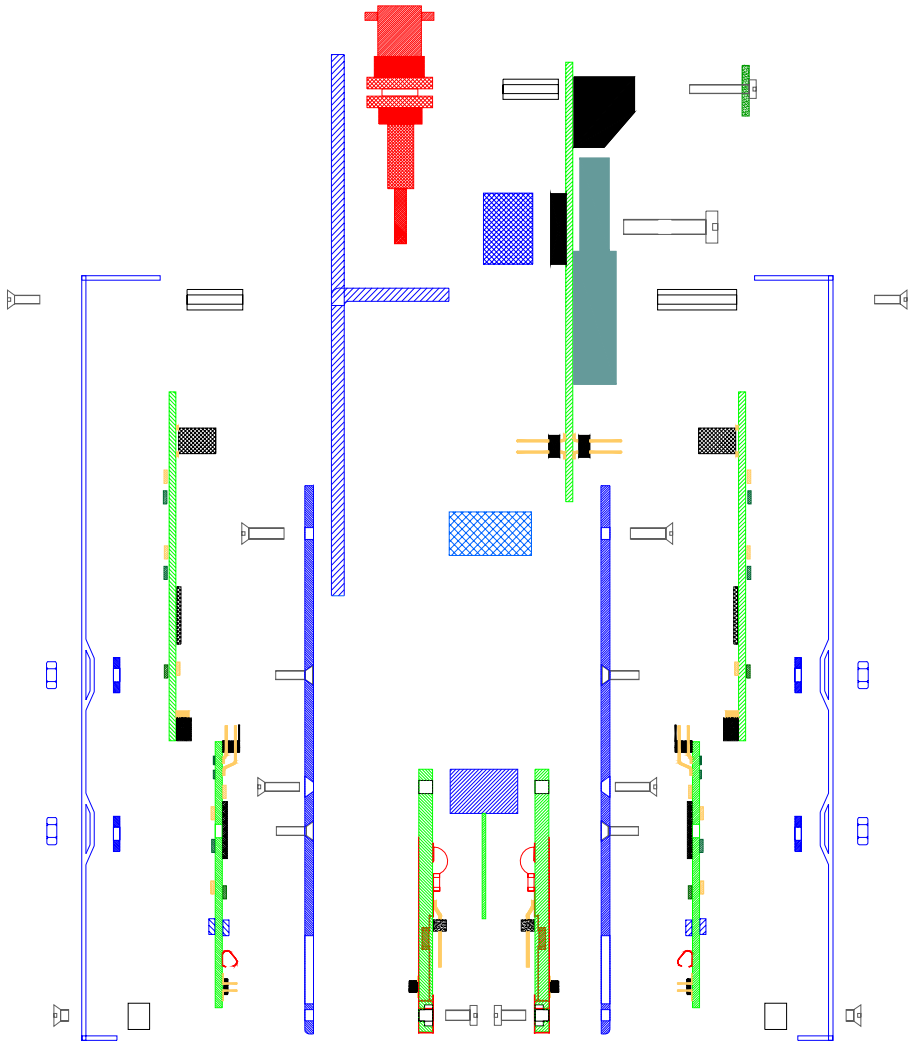
- 4 HV-boards make an enclosure so HV is completely shielded from other electronic parts
- HV space contains 4 boards carrying 32 cap each that are integrated in the board
- One side HV is coming in other side is low voltage and couples to ASD board trough frame plate.

FE box overview

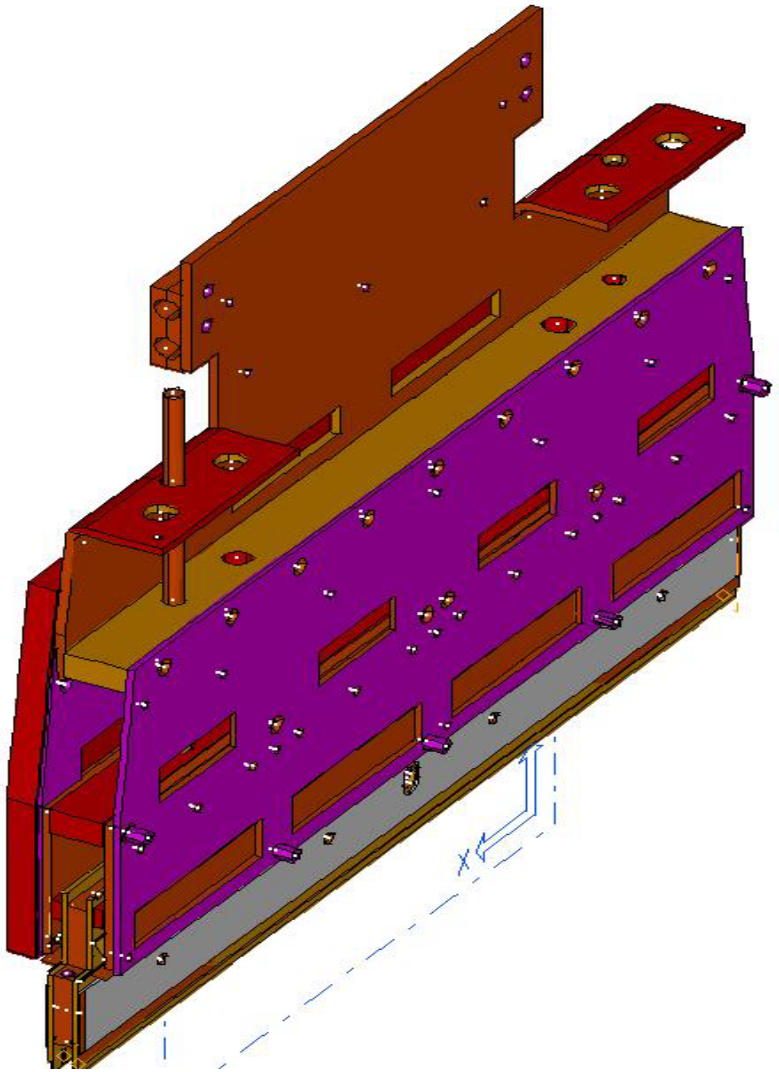




FE-box exploded view

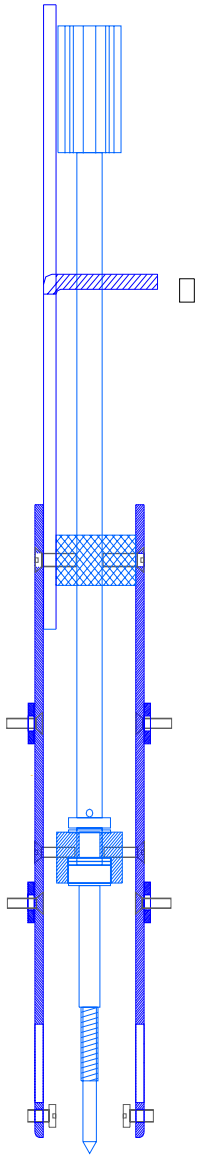


Frame 3D

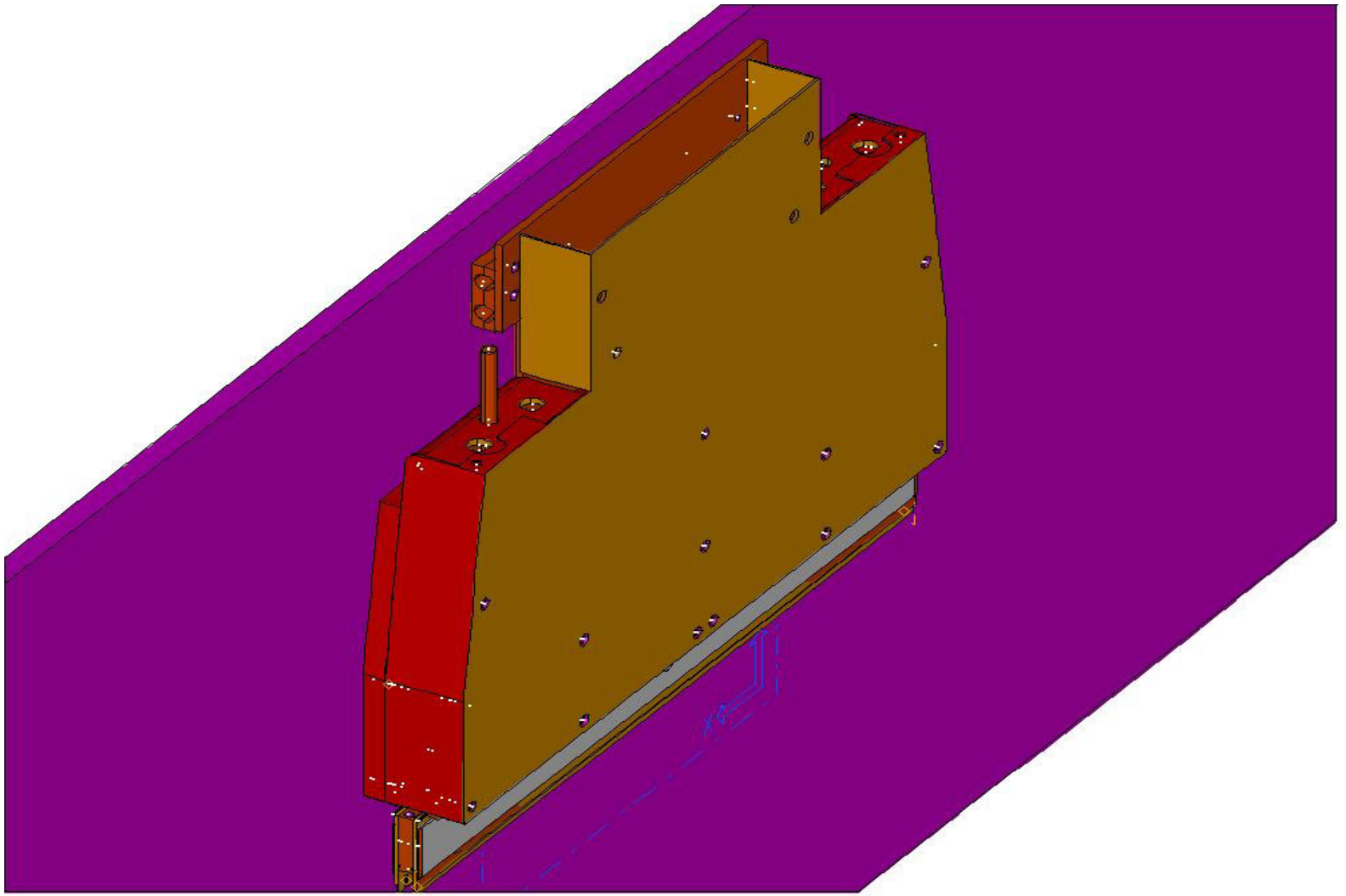


main mechanic parts

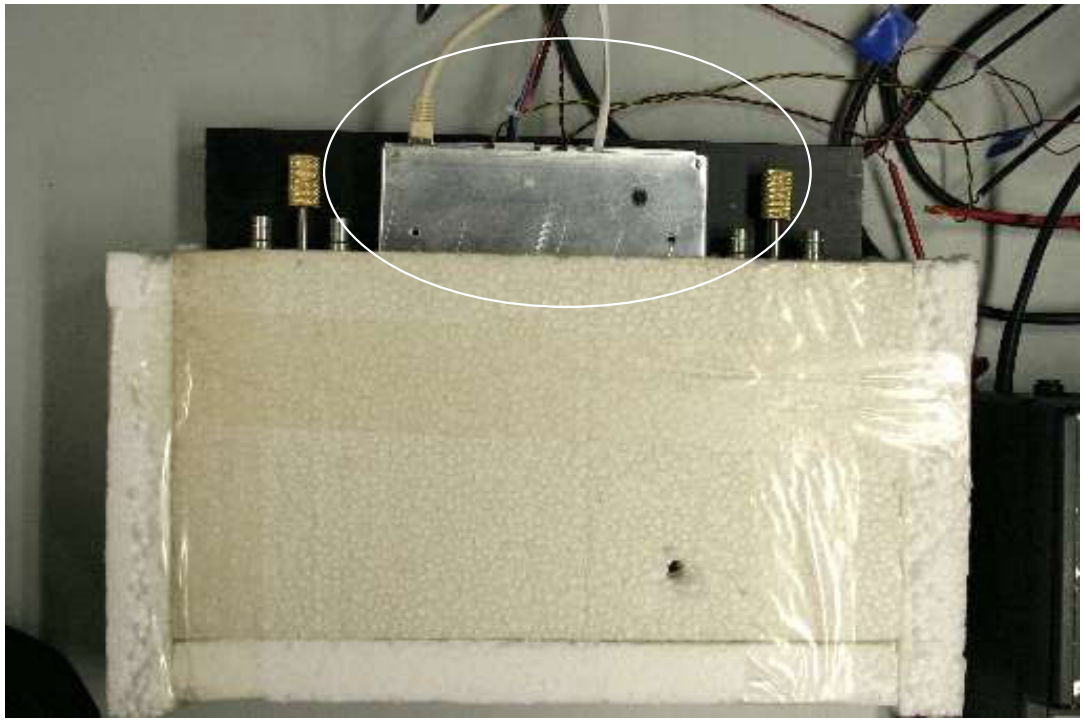
- One plate supports gol/aux boards
- 2 equal support plates on both sides, supporting HV-boards, ASD boards and Otis board.
- 2 extraction/insertion tools are implemented
- Guiding tip guarantees proper mating with chamber connector



Box-enclosure

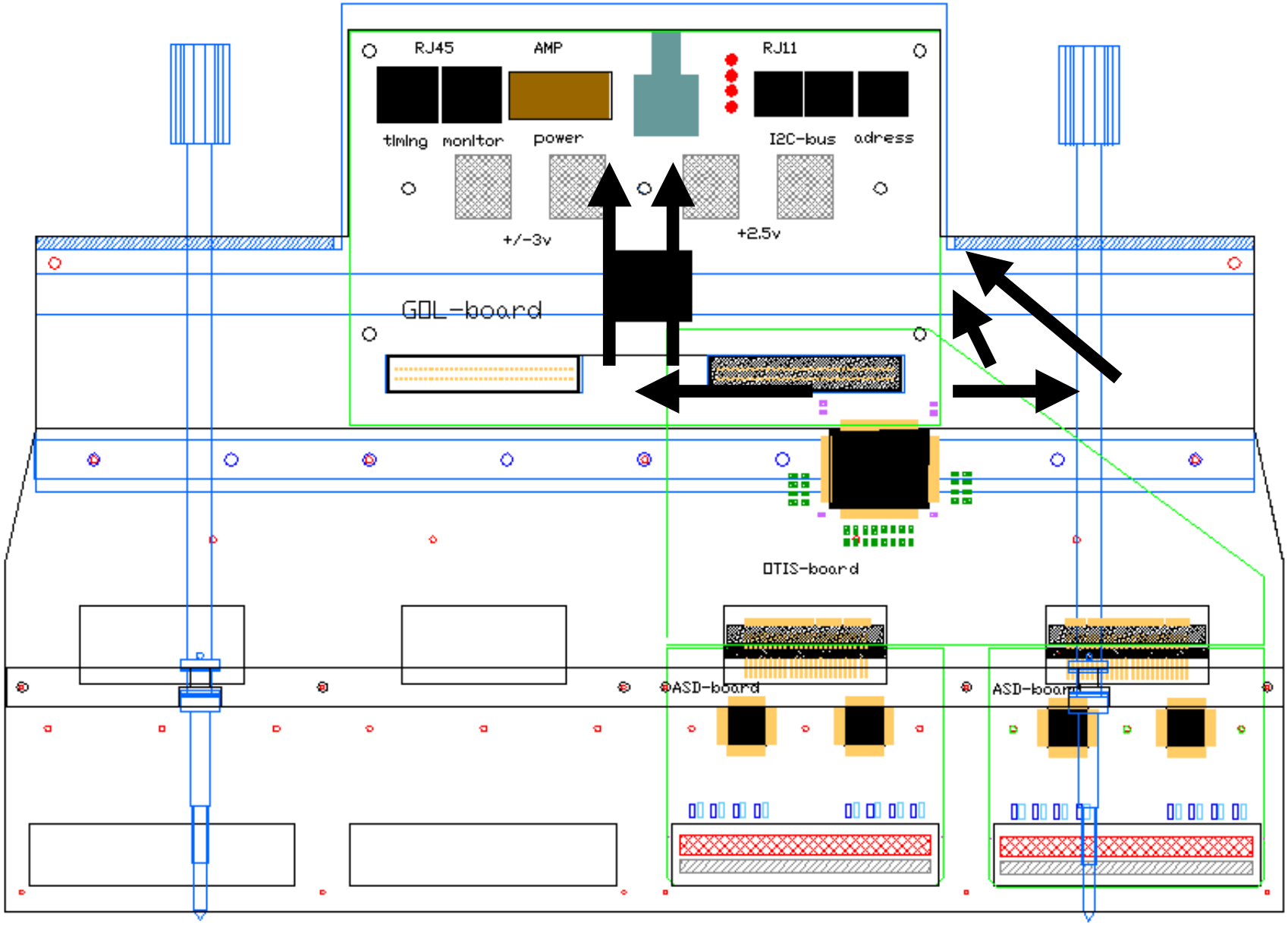


PACKAGED FRONT END COOLING TEST

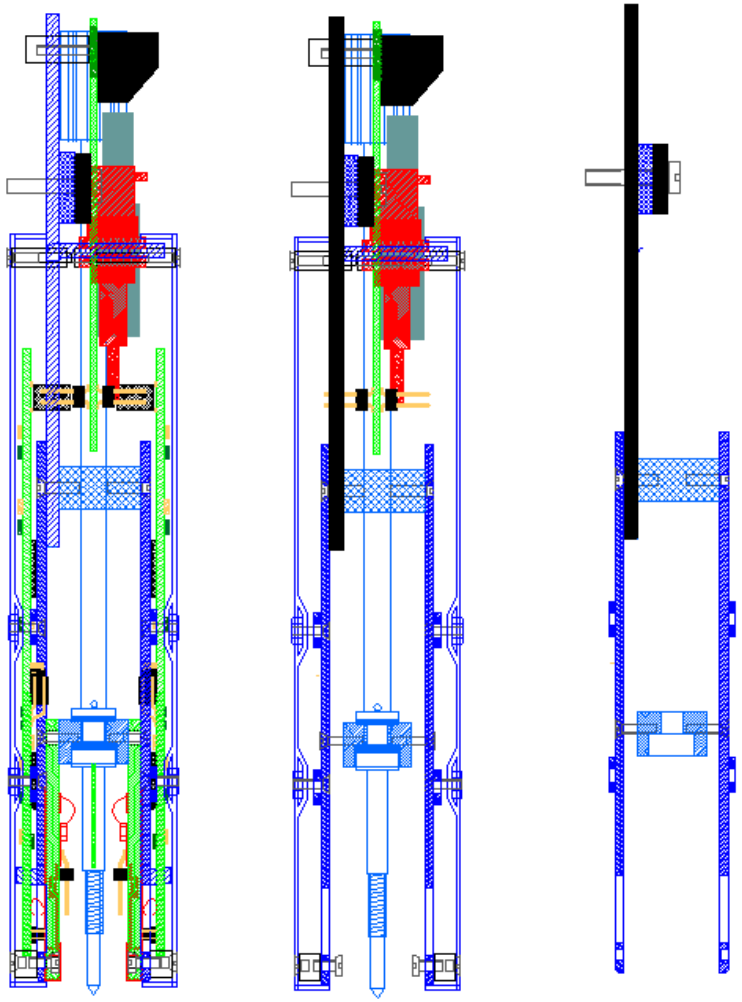


The Front Ends of the Outer Tracker are closely packed, heat must be extracted with cooling water along the Aluminium cooling extension plate. For the test we use a cooling block with forced air Several sensors monitor heatup of components.

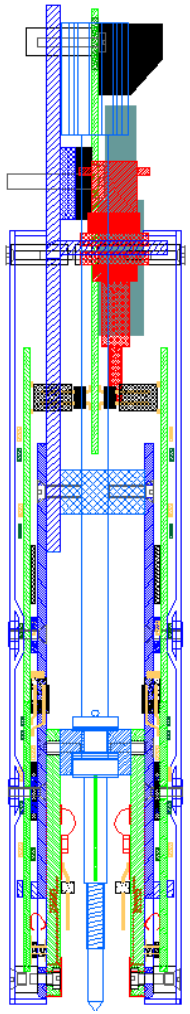
Good heat transport possible

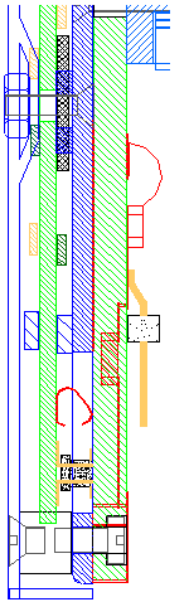


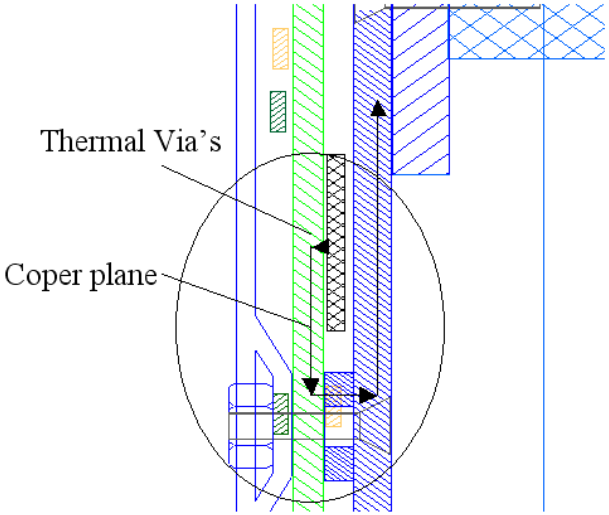
Frame sideview



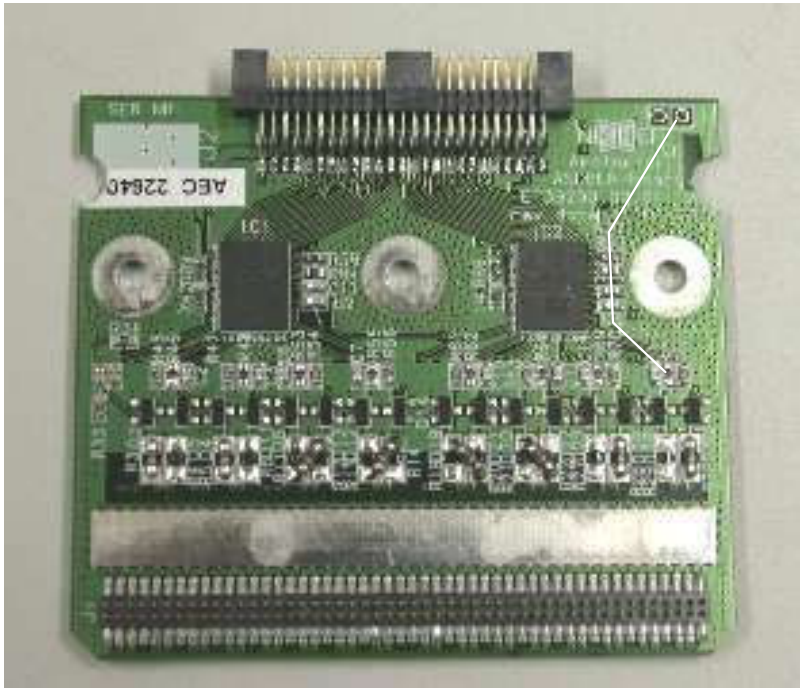
ASDBLR COOLING CONSTRUCTION

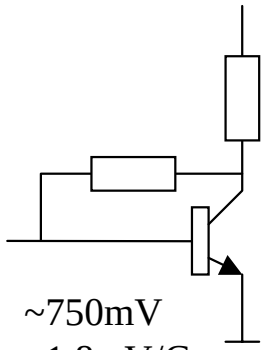






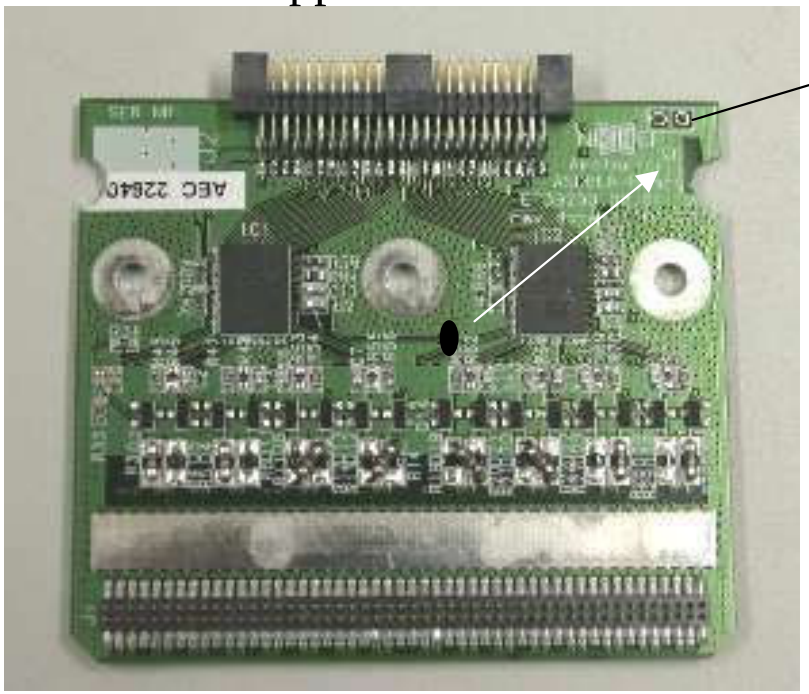
ASDBLR AS TEMPERATURE SENSOR





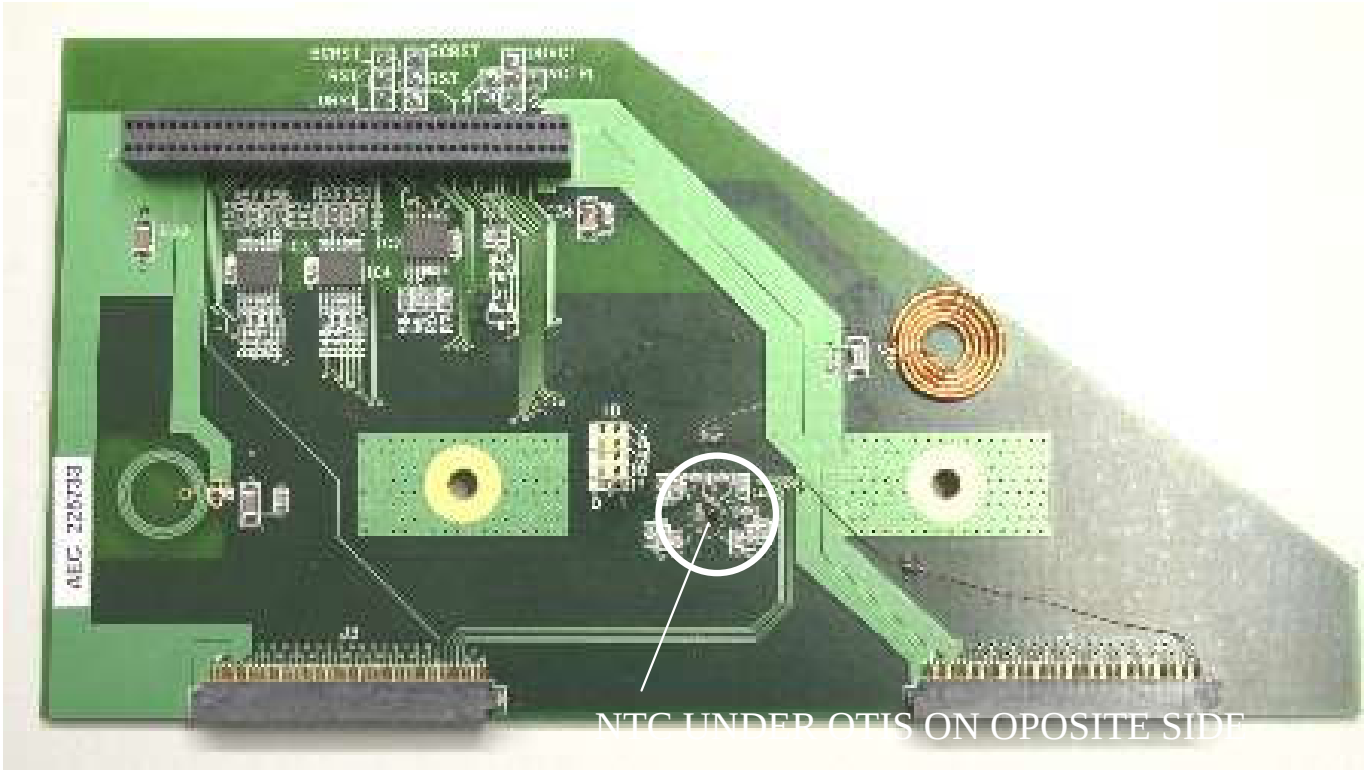
We use a dummy input diode as temperature sensor (Not callibrated yet)

NTC 5K on Copper Surface Close to ASDBLR

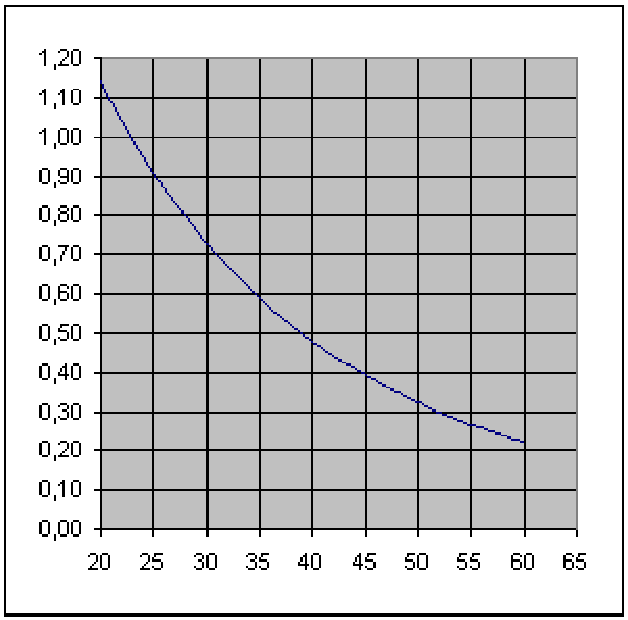


Each oard has a sensor
Connection point

OTIS NTC



NTC GRAPH


1,20
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20
25
30
35
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45
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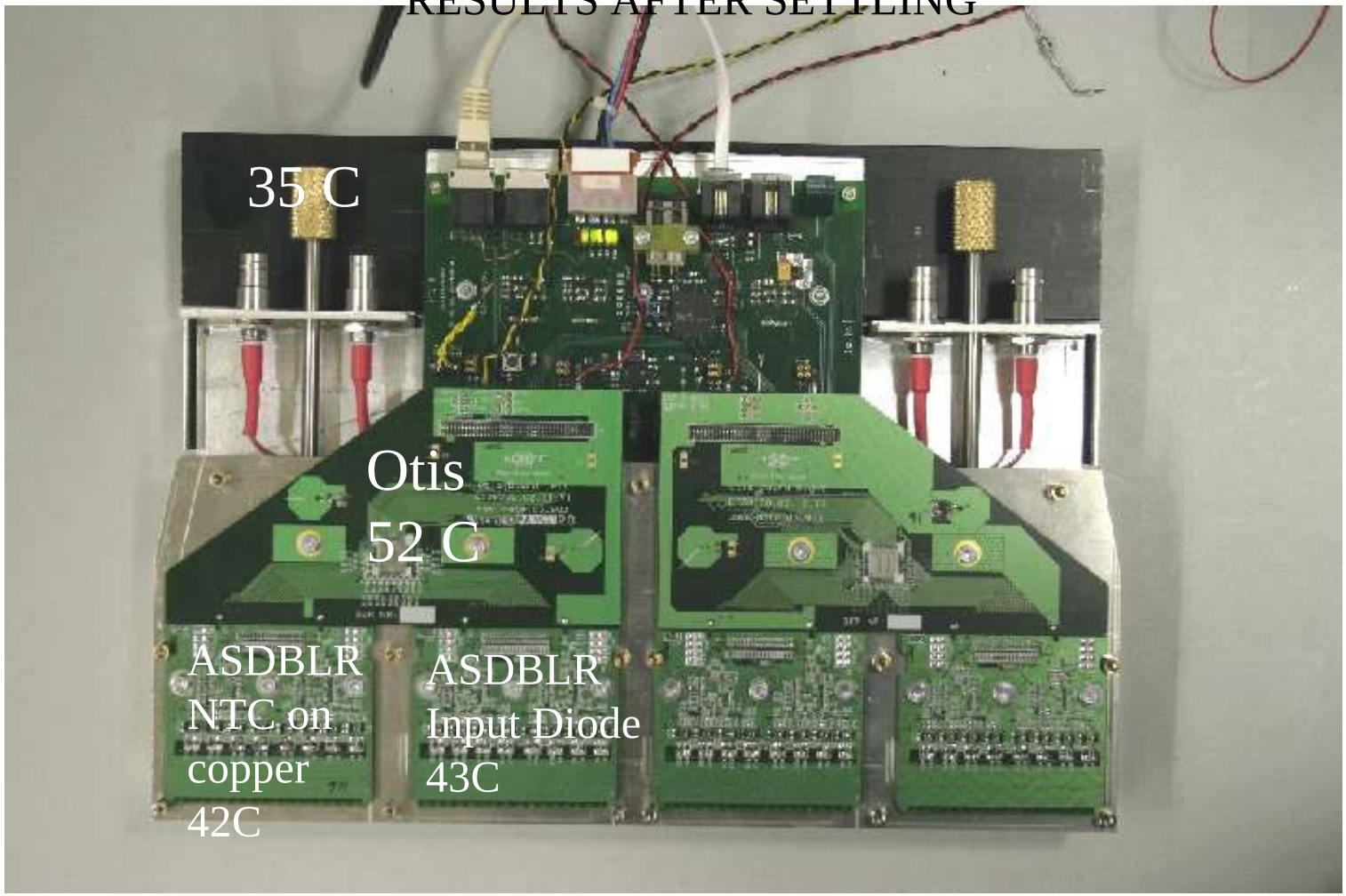
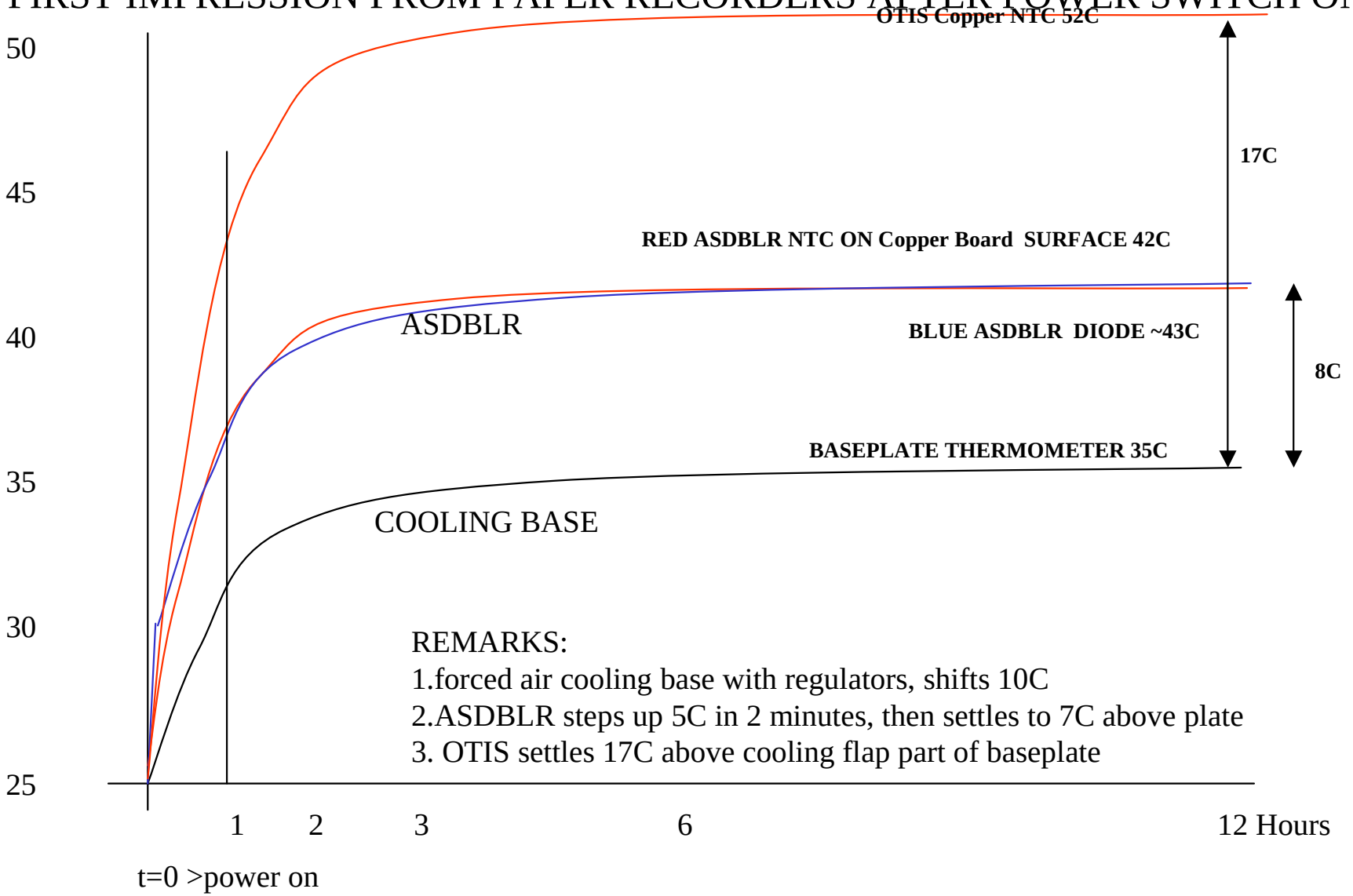
55
60
65

RESULTS AFTER SETTLING



FIRST IMPRESSION FROM PAPER RECORDERS AFTER POWER SWITCH ON



REMARKS:

1.forced air cooling base with regulators, shifts 10C

2.ASDBLR steps up 5C in 2 minutes, then settles to 7C above plate

3. OTIS settles 17C above cooling flap part of baseplate

FIRST CONCLUSIONS

The ASDBLR has low temperature rise thanks to strong thermal coupling trough PCB
Delta T=7 degrees C

The maximum delta T is 17 degrees C for the Otis chip

The regulators are mounted directly on the cooling plate , no internal sensor available, but adequate cooling is ok.