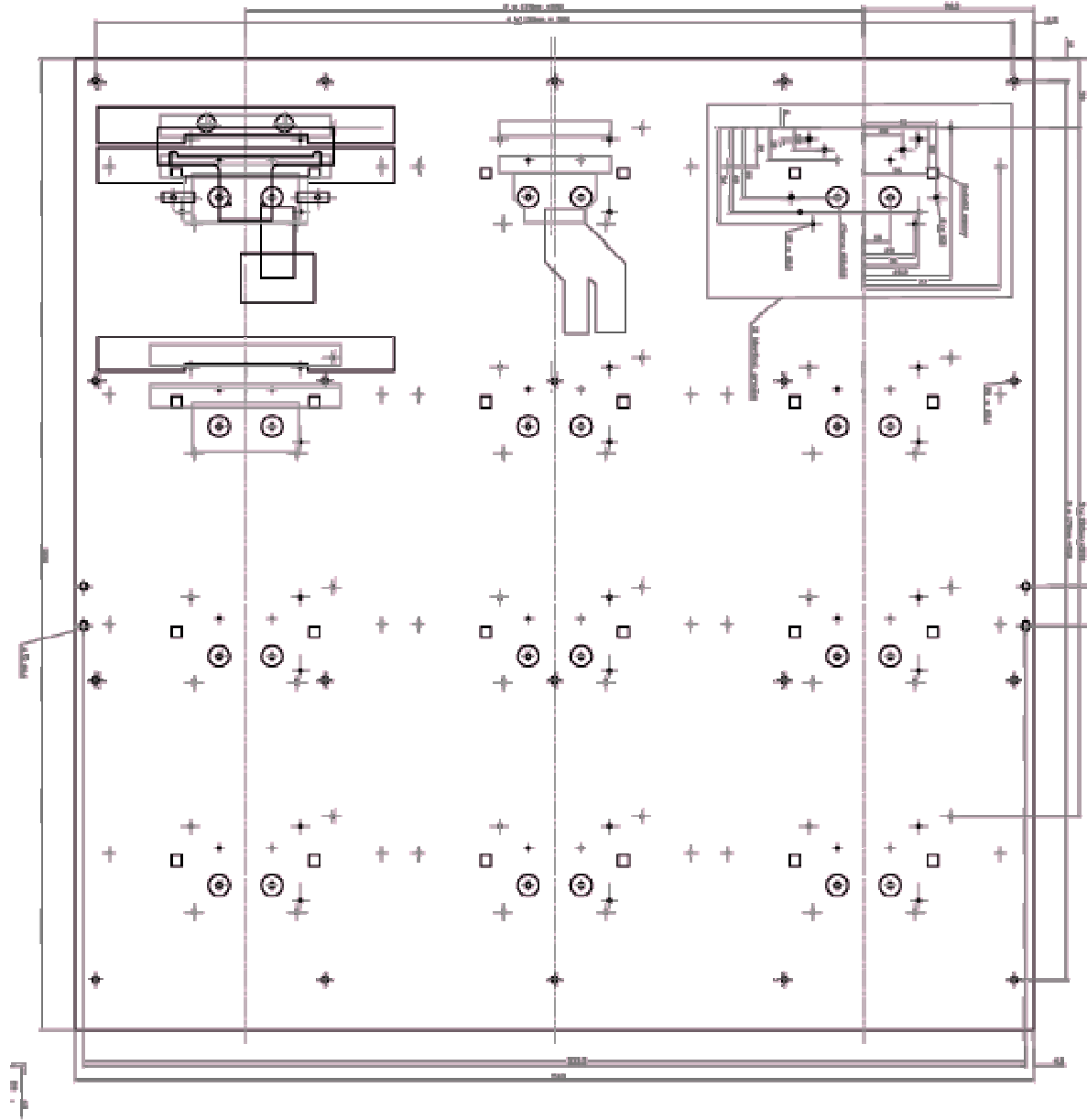


Status of M200 Hybrid Assembly

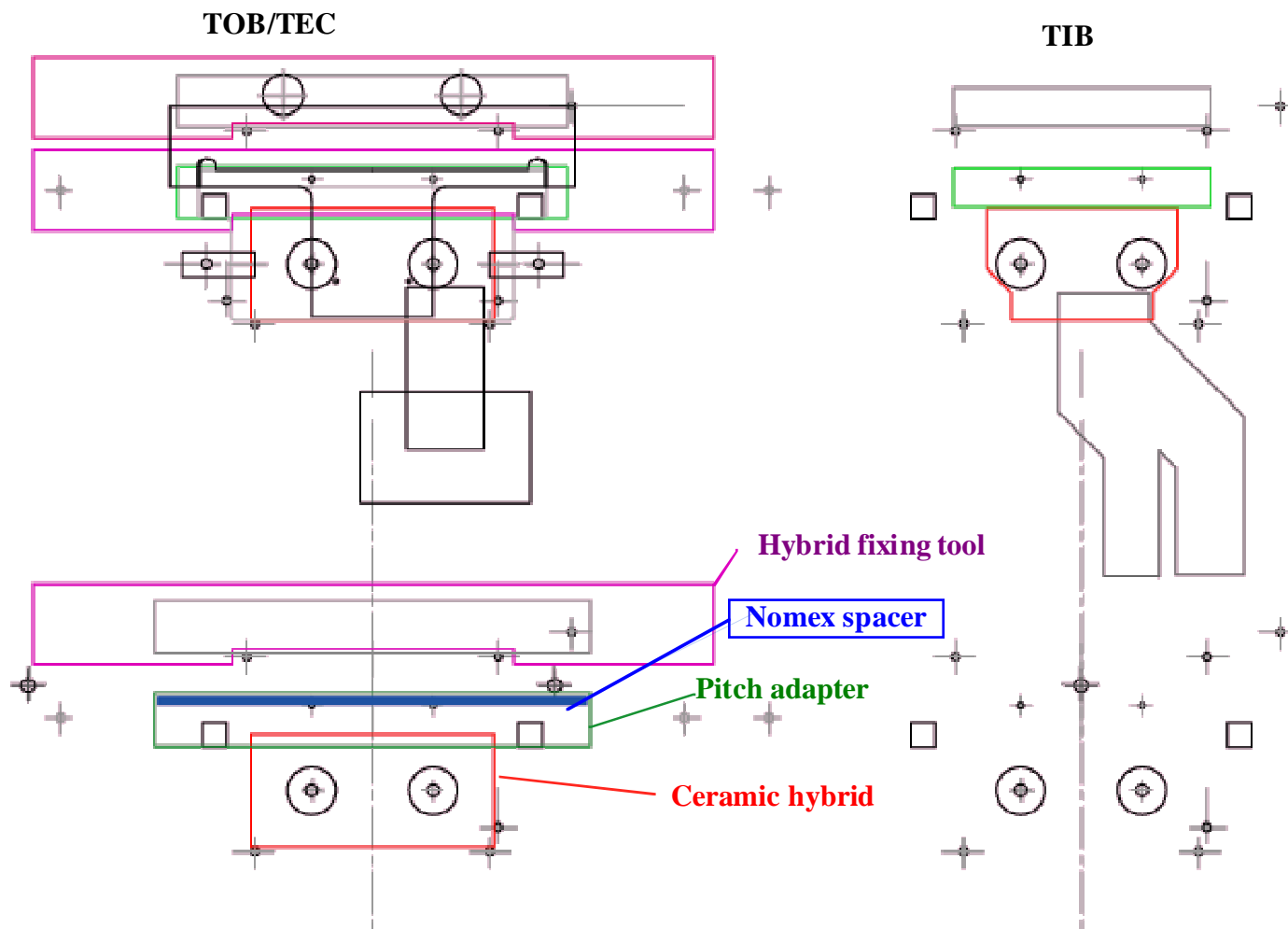
Equipment:

- It appears the module designs are reasonably frozen so work is going ahead on assembly tooling of CERN gantry and development of test station.
- First prototype of assembly platform in progress. The assembly of all hybrid types will first involve pick and place and gluing the PA to the ceramic hybrid and Nomex spacer. The TOB hybrids have the additional step of pick and place of the hybrid+PA onto the graphite carrier plate (probably done the following day). Try for a single assembly platform can be used for all hybrid types (but with many holes drilled for different dowel placement).



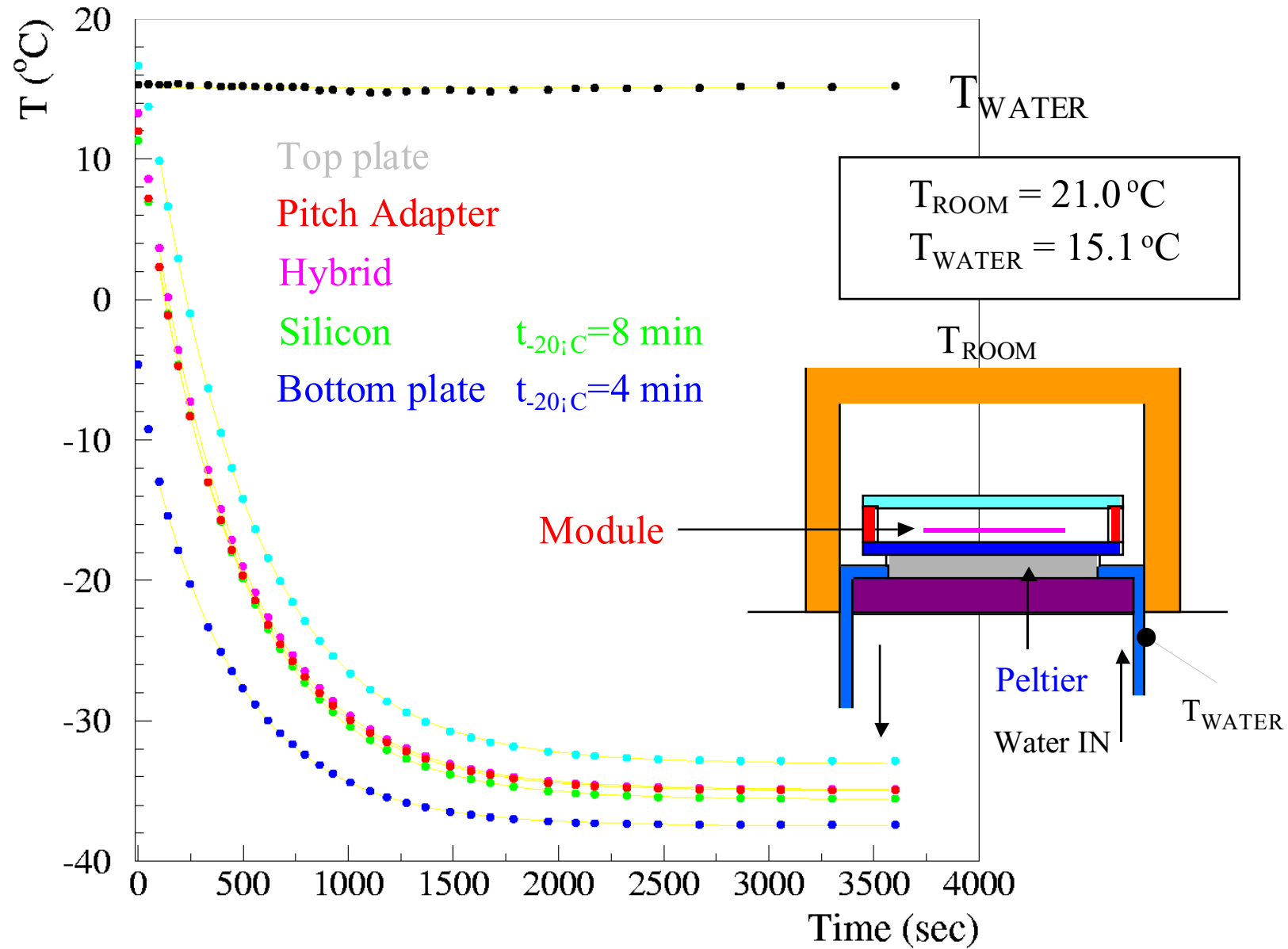
**12 position
hybrid
assembly
gantry
platform**

Detail of corner of hybrid assembly platform

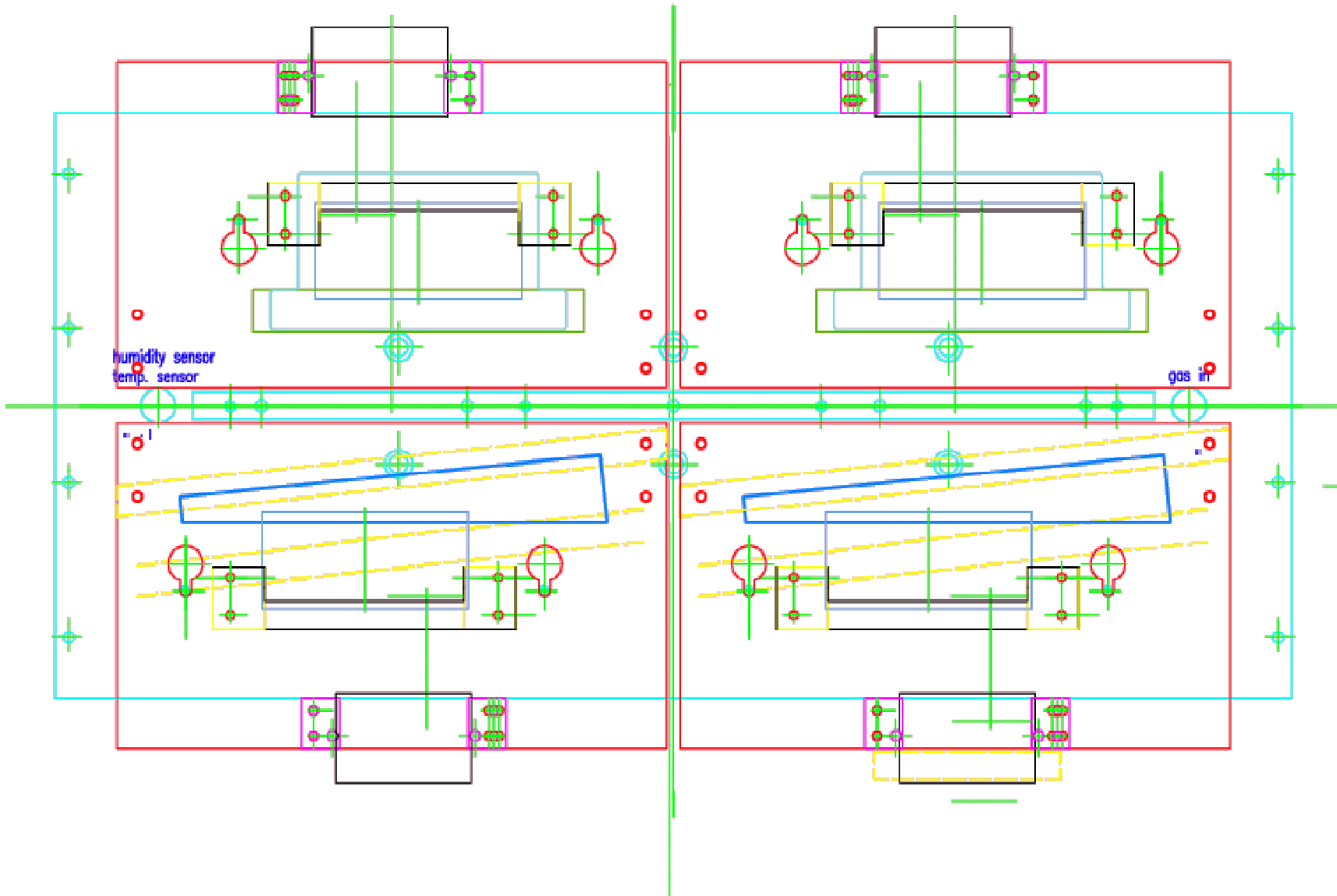


- The CERN gantry will make **all** hybrid assemblies. CERN can do at least 50% of bonding and testing but will need help for rest (no agreed arrangement yet). Recent bonding studies have shown very good results with 25 micron wire on the APVs (including rework) so my original feeling that 17.5 micron wire was needed may be dropped. This would allow for FNAL/UCSB bonding help.
- Progress had been made on the hybrid assembly test station (with active thermal cycle). A prototype Peltier system has been tested and a thermal cycle from room temperature down to -20°C and back in about 10 minutes has been demonstrated. A first design of the mechanics of the test station exists and a first prototype is about to be started. The possibility of pulsing the inputs via capacitive coupling to the PA bond pads will be investigated when the basic design of the system is qualified. The ARC system (already commissioned) will be used and the control and monitoring software for the thermal cycling equipment will be interfaced with the ARC software.

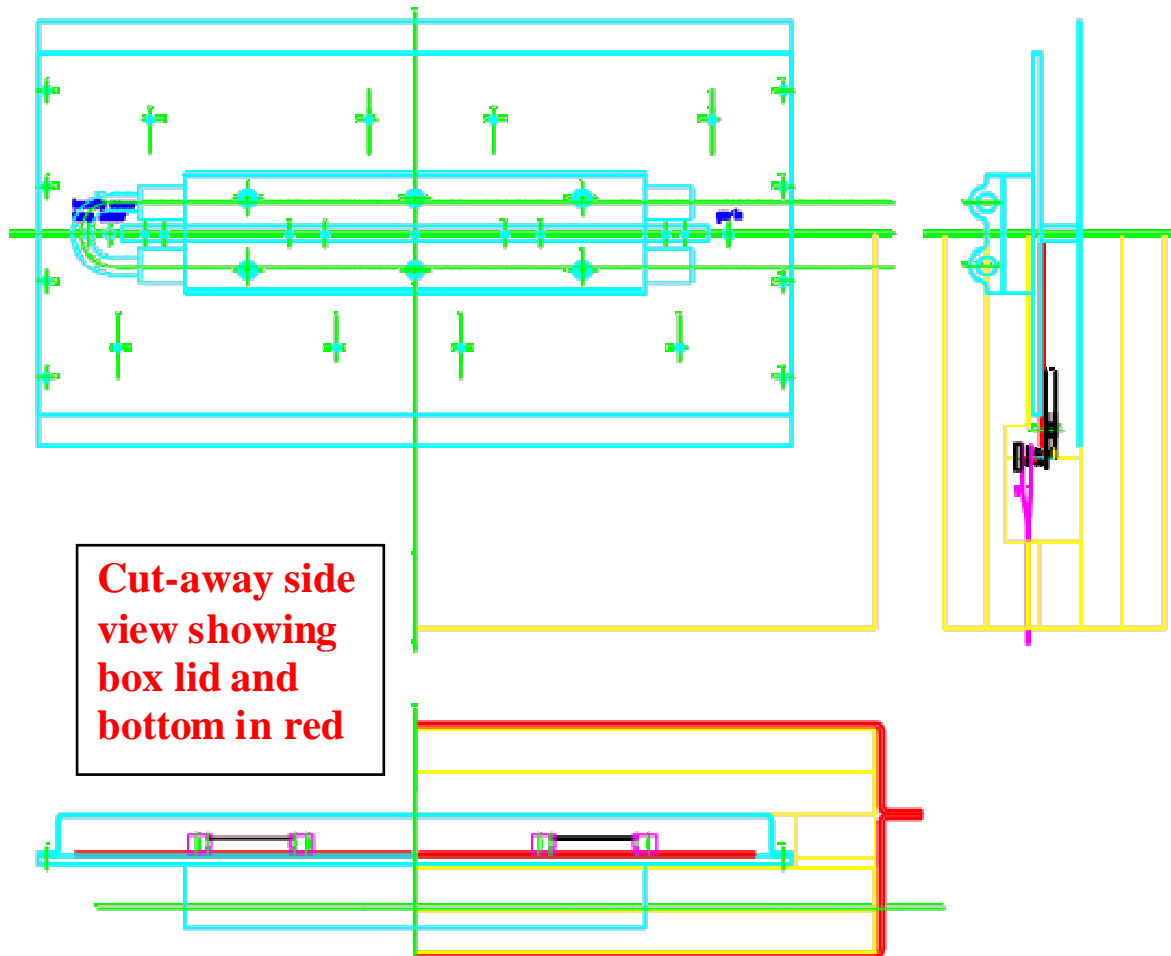
Cooldown speed of peltier system envisaged for hybrid testing



4 position hybrid assembly thermal cycling test system



Underneath view of test system showing peltier cooling element



Cut-away side view showing box lid and bottom in red

Transport boxes/plates

- Initial designs for the TIB and TEC hybrid transport have been made. First prototypes will be made soon. TOB hybrid transport has not yet been addressed but will be much more straightforward due to the existence of the graphite carrier plate which allows for easier handling and packaging.
- Not clear yet about hybrid transport from manufacturer to CERN.

Time estimates:

- Gantry assembly system: March for prototype system.
- Wire bonding: bonding lab is ready but there may be scheduling conflicts and interference with displacement of bonding machines.
- Test station: March for prototype system.

List of concerns

- Not clear yet about graphite hybrid carrier (TOB), problems with coating and gluing to be resolved.

- No hybrid burn-in at CERN has been assumed. Will it be done by manufacturer? How much QC will be done prior to delivery to us?
- Assume tested PAs arriving at CERN. If we go with lowest bidder will we need extensive testing? M200 PAs did not meet specs, this required measurements.
- Need to get help on the TOB hybrid bonding and testing.

Effect of FR4 hybrid on hybrid assembly work:

- May need silicone glue between PA and hybrid (large differential CTE)
- Risks of handling much reduced by packaged ASICs
- Positioning of chips and PA should be more accurate (better on-hybrid fiducials)
- Should be able to obtain better power bond placement accuracy (centre group)
- No worry about flattening concave hybrid, but may have to deal with convex!