L6 Status Report

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A few update since Onuki-san's report in the last SVD meeting, on Sep. 1st.

L6 Ladders

- **After the 7th VXDWS up to the L6 QCG review**
  - **Class-C ladder**
    - **L6.903 … called "class-C++" in the L6**
  - **Class-B⁻ ladder**
    - **L6.901 … called "class-B⁻" in the L6**

Reviewed by the QCG on Jul.27th, 2015

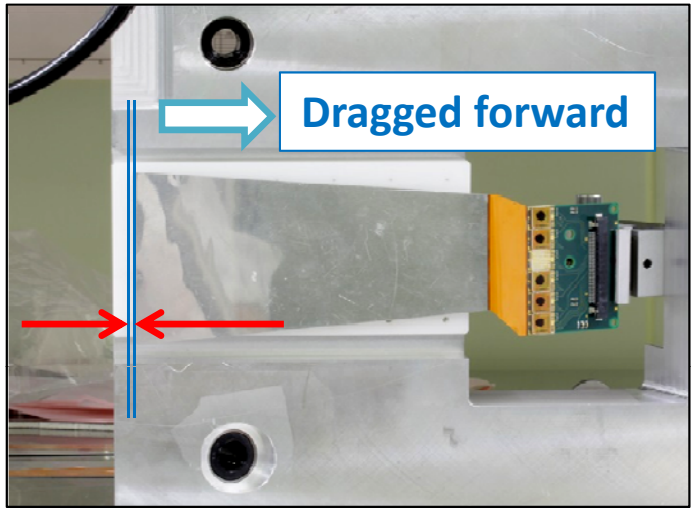
- **After the L6 QCG review**
  - **Class-C ladder (ongoing)**
    - **L6.905 … started from Sep.4th with the SVD group approval.**

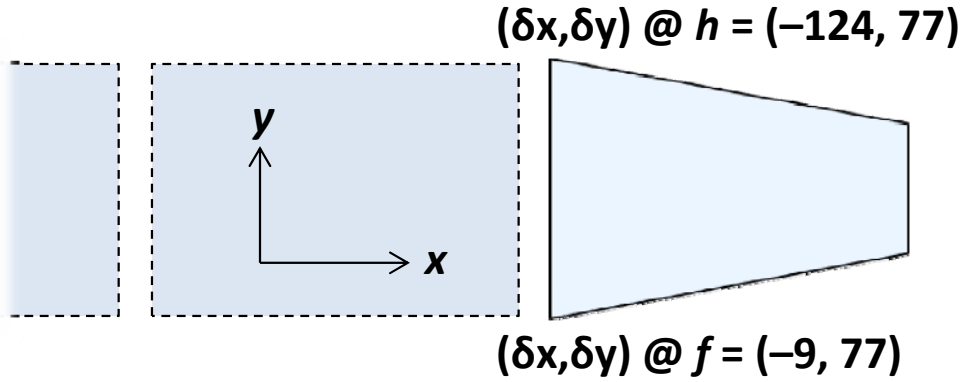
L6 QCG Review Report

- **Summary of the review report summary**
  - The procedures should be adjusted and finalized.
    - In particular, the issue related to the large shift in the SFW.
  - The procedure changes should be reflected in the document.
  - Produce one class-C.
    - The mechanical results should be reported to the QCG.
  - Produce one class-B using the final procedures.
  - The final review should be held right before the class-A start.

Actions for the Recommendations

- **FW sensor shift**
  - Reason: the FW sensor was dragged forward (even the vacuum chuck) if the HB was moved beyond the critical region in the HB position adjustment.
  - Solution: limit the HB positioning within the allowed region.
  - Verification: the sensor movement has become much smaller than that was observed in the B^-.

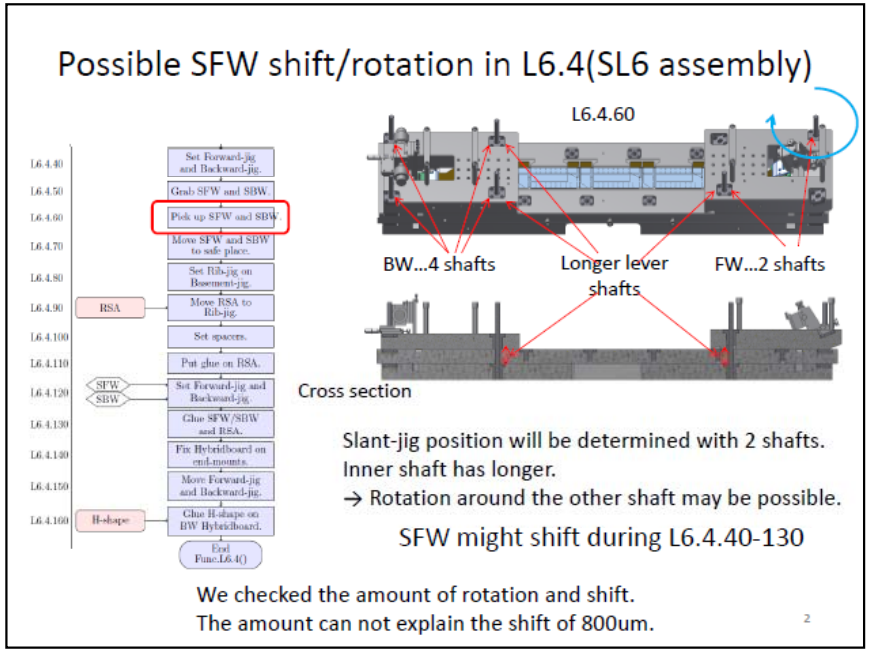




See Onuki-san's slides in the SVD meetings on Aug.25th and Sep.1st for more detail.

FW Sensor Shift

- **So far, we got aware of the following sources**
  - The hybrid dragging presented in the previous page.
  - Fixing pin precision:



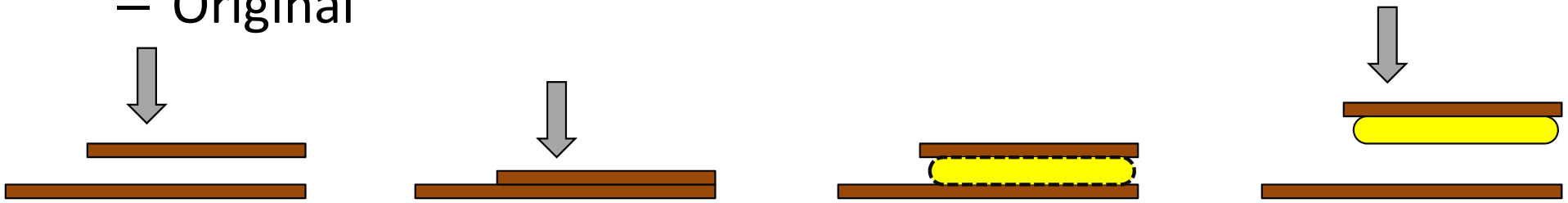
Loose pin precision can introduce the ~100µm shift. We ruled it out from reasons of our particular issue; however, we will replace the pins with tighter ones.

Y. Onuki (Aug.18th)

  - ***If you have aware of the other points to be cared, please let us share them.***

Actions for the Recommendations

- **Wrapping procedure finalization**
  - Original



Lower the FlexPA downward

Record the FlexPA height touching the PA0

Preset the target height = recorded height + glue thickness (50µm)

Lower the glued FlexPA downward to the target height

  - Issue: glue spread was not reproducible.
  - Solution: take the preset value just as a hint; the stop position is determined by watching the actual glue spread.
  - Verification: the wrapping becomes stably reproducible with giving the ε_{WB} = 100%.

Actions for the Recommendations

- **Documentation**
  - All of the final procedures have been reflected in the flowchart and working manuals.

1.	Flowchart	7.	Sensor alignment
2.	Housekeeping	8.	FW/BW gluing to the RSA
3.	Parts preparation	9.	AIREX/Origami gluing
4.	incoming item check	10.	Wrapping
5.	SPA production	11.	Ground wire soldering
6.	RSA production		

The final procedures have been reflected.

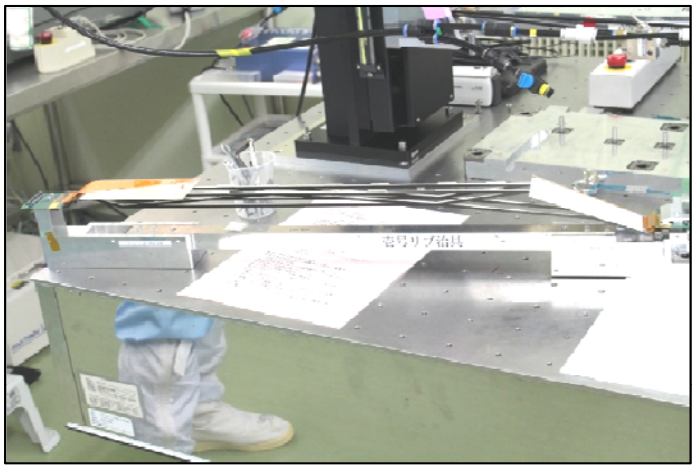
Actions for the Recommendations

- **Documentation**
  - The visual check points are discussed and implemented in the working manuals.
  - The photographing points are as well.
  - Printed working manuals are ready in the clean room.
    - They are being referred to in the ongoing class-C assembly.

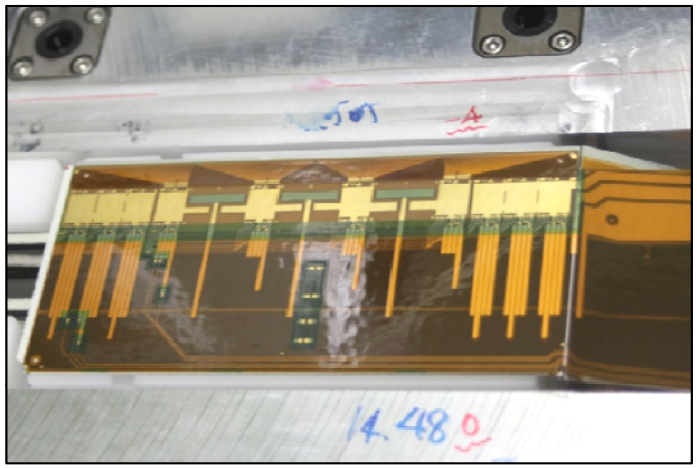
Additional Study – Origami Bending

- **Origami_+Z bending**
  - The bending procedure must be justified before the class-B, because the class-B is our first/last R&D ladder with the Origami_+Z bent by the latest procedure.
    - The class-C will employ the crack-PA0 Origami.
  - The last mockup Origami_+Z was bent by the latest procedure; it was glued to the “partial” ladder assembled for the FW sensor shift study.

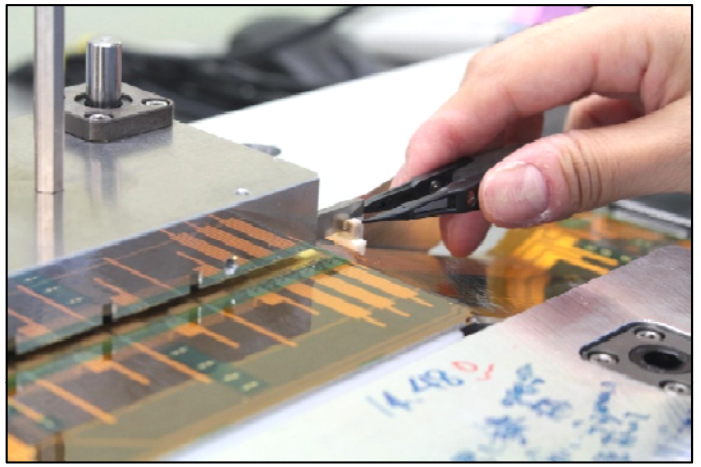
Additional Study – Origami Bending



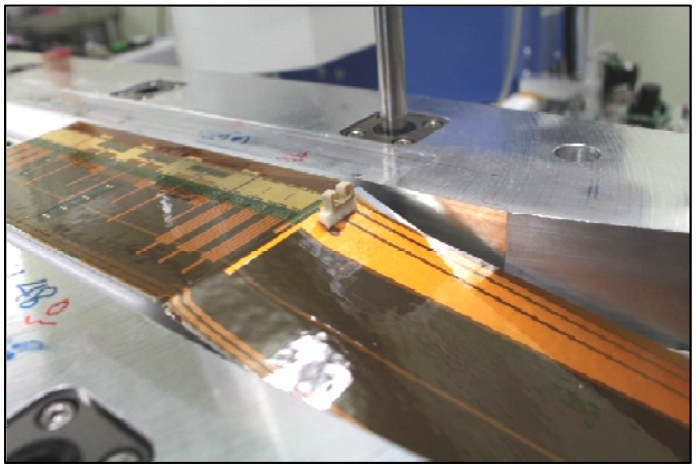
The "partial" assembled used for the FW sensor shift study.



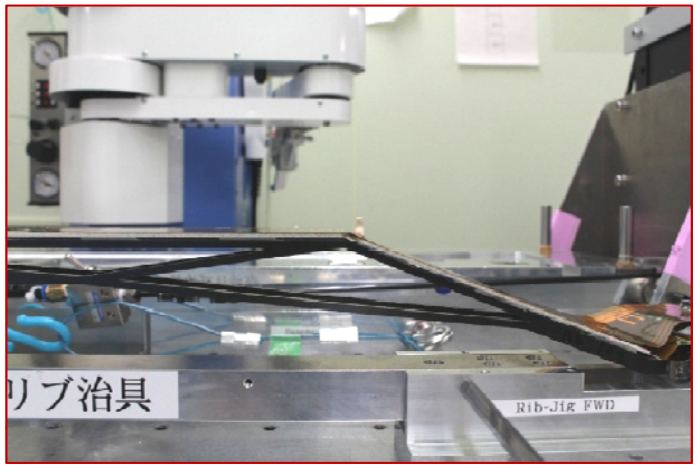
Right after placing the O+Z on the ladder.



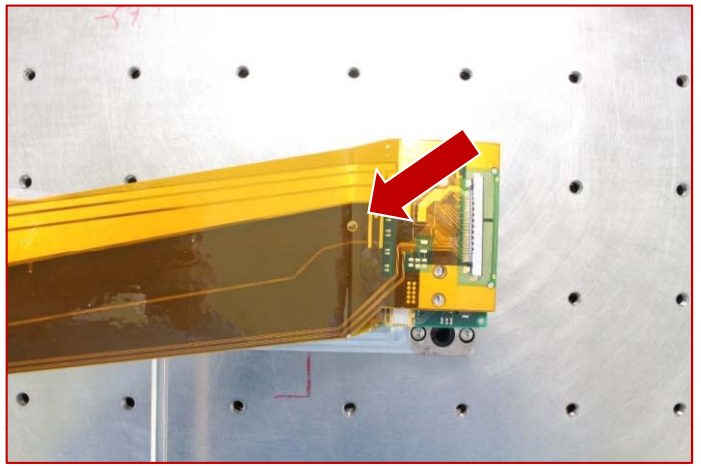
Placing a CO_2 clip on the SFW with an AIREX piece glued.



The finished "partial" ladder.



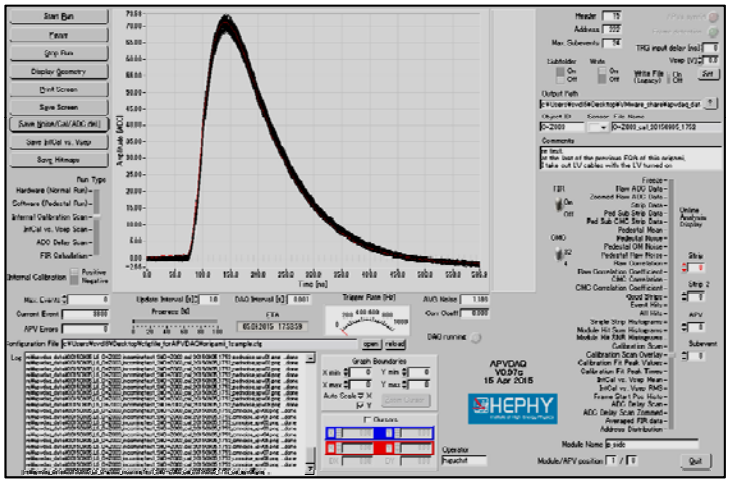
The Origami_+Z is properly sitting on the DSSD+AIREX.



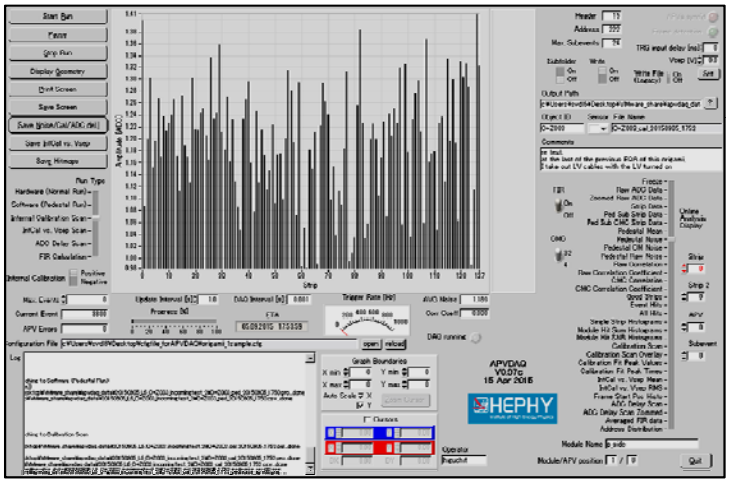
The DSSD F-mark is visible from the F-mark hole.

EQA – Incoming Item Test

- **Origami** (O+Z003, OCE008, O–Z001 of the class-C)
  - "Smooth" curves of the cal. scan and ped. noise ≤2.



Cal. curves of the O+Z003



Ped. noise of the O+Z003

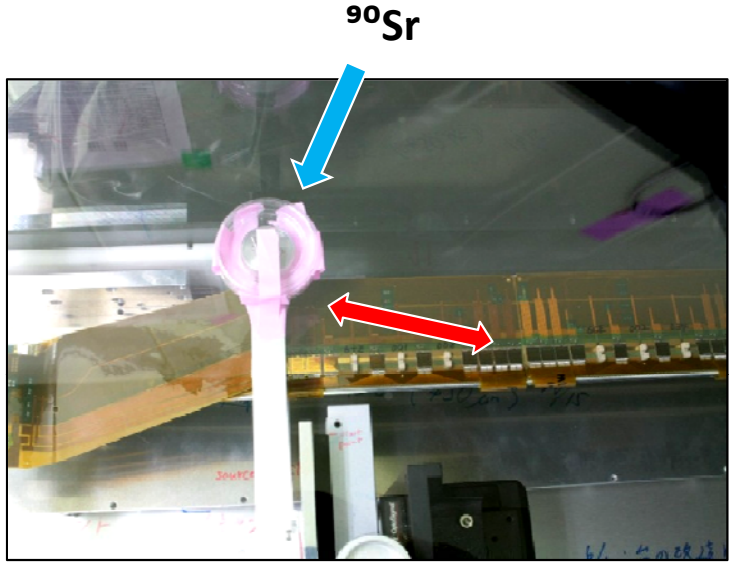
- **SFW/SBW** (SFW991, SBW985 of the class-C)
  - *I-V* curve measurement in addition to the APVDAQ check.

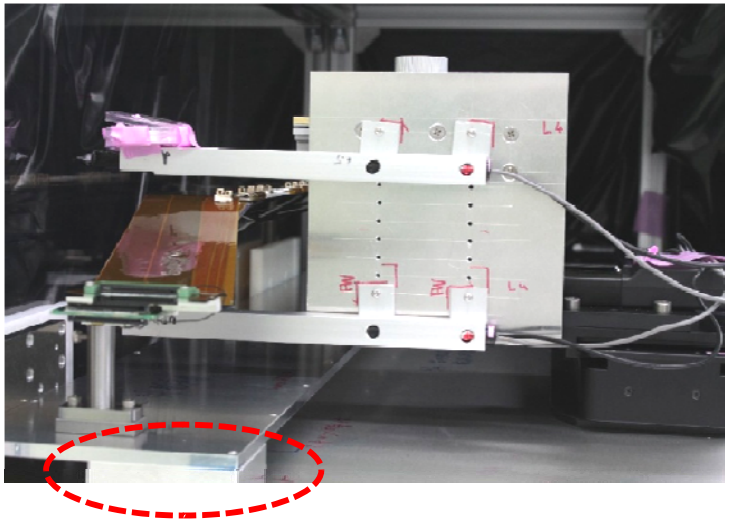
EQA – Radioactive Source Test

- **Radioactive (^{90}Sr) source test**
  - New software to get the strip-by-strip sensor hit map is available … to be used to debug the system.
  - The “aDefectFinder” was tried; the manual is prepared.
  - The 1MBq ^{90}Sr (x100 than now) will be available on Oct.9th.
    - The paper work has been finally finished.
    - Expected source test speed from a 20-hour run using the 10kBq source → 2 hours / sensor for >1k hits / strip.

EQA – Radioactive Source Test

- **Radioactive (^{90}Sr) source test**
  - The diagonal scintillator-arm motion has been implemented.
    - 200 secs per round trip.
    - Origin of the stage controller has been adjusted to the +Z DSSD corner.
  - A 2cm-thick acrylic spacer will be attached to the container bottom to move the ladder upward.
    - The ladder interferes with the scintillator-arms now.





More elaborated spacer is preferred.

EQA

- **Issues**
  - Procedures are being finalized, while we need more experience of countermeasures.
    - Some channels show much smaller heights in the calibration curve of the class-B⁻ SFW989.
      - The SFW passed the incoming parts check properly.
      - The low pulse height suggests short circuits, but we do not see damaged WB in the SFW.
    - Half of a certain APV25 in the class-B ⁻ became silent.
    - There is a single isolated strip that has low noise.
      - Cannot be a short circuit.

Class-C Production

- **The class-C has been started from Sep. 4th.**
  - The L6 class-C production was approved in the SVD meeting on Sep. 1st.
  - Progress so far:

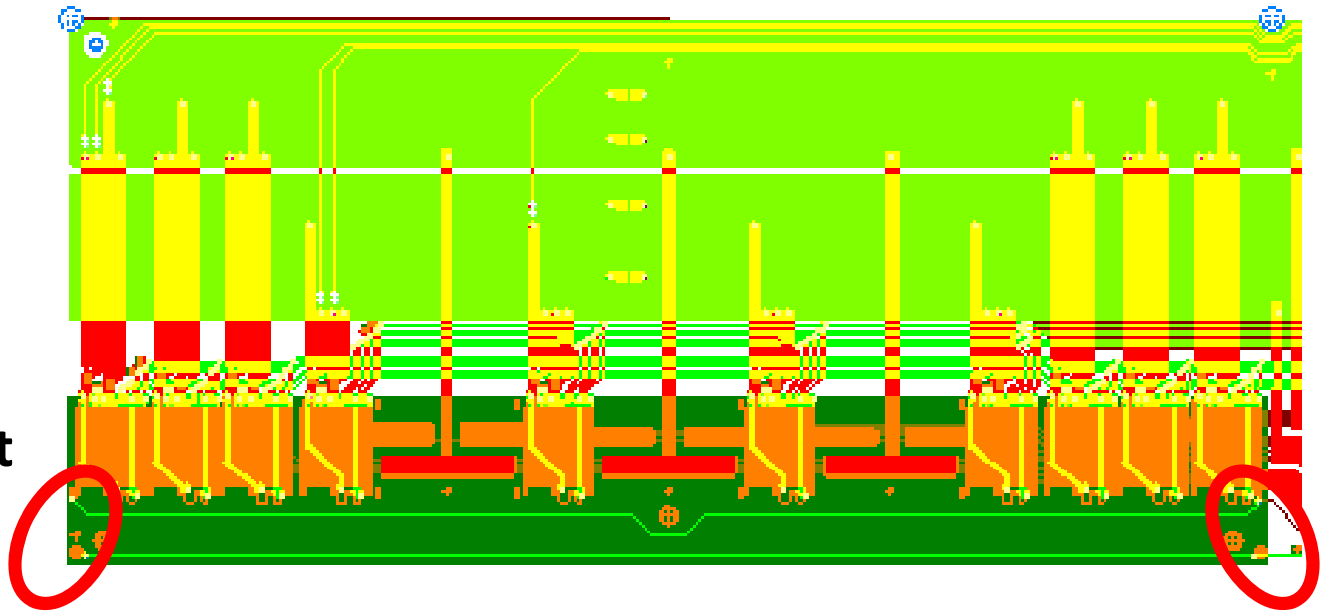
Date	
Sep. 4th (Fri)	• Briefing, inventory check, clean room tidying up • DSSD planarity check
Sep. 5th (Sat)	• Origami incoming check (EQA/visual) … O+Z003, OCE008, O–Z001 • RSA production … RS6.903 • SPA production (gluing) … SPA6.910, SPA6.911, SPA6.912
Sep. 6th (Sun)	• *Break*
Sep.7th (Mon)	• SPA production (WB)
Sep.8th (Tue)	• SFW/SBW incoming check (EQA/visual) … SFW991, SBW985

Schedule

- **The ongoing class-C (L6.905)**
  - We plan to finalize the L6.905 assembly and mechanical survey in the week of Sep.14th.
  - We would report the L6.905 results in the SVD meeting on Sep.22nd if the production will have been completed along the schedule.

Ladder Subgroup Issues (1)

- **Clarify exactly what redundant wire bonds should be done.**
  - [TH] According to the discussion in the L3 site review on Aug.21st, I remember **more than 4 bonds in total for the bias line**. ***Is my understanding correct?***



Left

Right

Example:

(DSSD-N ↔ PA0): Possible (left, right) bonds are … (0,4), (1,3), (2,2), (3,1), (4,0).

Ladder Subgroup Issues (2)

- **Incoming Origami test**
  - Visual inspection of the bonds
  - APVDAQ test
  - Bias and clock line connectivity … use the dedicated card
- **Should define a procedure to verify the proper adjustment of the slider stiffness … L5 report**
- **Should define a procedure to discuss the sensor shift in case the sensor F-marks are covered by something and cannot be viewed by the CMM.**

Thank You