

Discussion notes on flow of
components and detectors,
including storage and shipping

Component requirements for production (incl. yield)

HDI (~100k)

- Assumed:
 - Inner layers: 18 + 100% spares, overall HDI yield $EY_{\text{HDIs,inner}}$ (assumed as 50% means we need 72 HDIs)
 - Outer layers: 156 + 50% spares, overall HDI yield $EY_{\text{HDIs,outer}}$ (assumed as 60% means we need 390 HDIs)

MuPix11 (thinned and diced) (~300k?)

- Needed:
 - Inner layers: 108 + 100% spares, overall chip yield $EY_{\text{chips,inner}}$ (if assumed 50% need ~ 432 chips or 41 wafers)
 - Outer layers: 2736 + 50% spares, overall chip yield $EY_{\text{chips,outer}}$ (if assumed 60% need ~6840 chips or ~171 wafers)

Swiss PCB flexes (~30-50k??)

Needed:

Inner interposer flexes: 36 + 100% spares, overall yield $EY_{\text{interposers,inner}}$ (if assumed 50% need ~144)

Outer interposer flexes needed: 312 + 50% spares, overall yield $EY_{\text{interposers,outer}}$ (if assumed 60% need ~780)

Outer endpiece flexes needed: 78 + 50% spares, overall yield $EY_{\text{interposers,outer}}$ (if assumed 60% need ~195)

FROM SLIDES ON YIELD

Mupix11

Total need: potentially 200+ wafers

Production at TSI – *then shipped in wafer boxes?*

Thinned and diced at ... *then shipped on tape in ring-frames? Or chip trays packs*

Do we need to pick up to 7k chips from tape?

Wafer probing at Oxford and Heidelberg *then moved to chip trays for assembly?*

Ladder assembly at Oxford and Heidelberg

HDI, interposer and endpiece flexes

HDI

Production at LTU

Sent to Heidelberg (72) and Oxford (390) separately?

Interposer and endpiece flexes (~30-50k??)

Production at SwissPCB

Inner interposer flexes to Heidelberg (~144)

Outer interposer flexes to Oxford (~780)

Outer endpiece flexes to Liverpool (~ 195)

Inner layers

Ladder and module assembly both done in Heidelberg.

Module storage and transport (talk Thomas)

Storage prior to installation, and longer term storage of spares:

- At PSI?
- Environment constraints?
- consider to do some temperature/humidity cycles of a module in the chosen storage box to qualify this as a transport/storage solution

Outer layers

Ladders are shipped from Oxford to Liverpool in the frames as used for assembly. (talk Richard)

- Will ship frames back to Oxford after module assembly, but how many frames are needed at any time?
- do we keep hold of ladders with (minor) QA fails
- We should do a temperature/humidity cycle of a ladder in the frame to qualify this as a transport/storage solution.

Module are stored and transport in dedicated box (3d printed version assembly tool with added lid (talk Carlos)

- Need module boxes for all modules (39 + spares).
- Stored at PSI prior to installation (and longer term for the spares)?
- Environment constraints for transport and storage. We should do a temperature/humidity cycle of a module in this box to qualify this as a transport/storage solution.

Presumably we will not build all spare ladders in to modules. At least not if ladders can be replaced on a module. Hence we also need to store spare ladders:

- In Liverpool?
- Environment constraints?
- Do we need a lower cost storage option for ladders beyond the assembly frame.

Labelling

Components database provides component ID, allows for tracking allows to print QA codes

See: https://indico.psi.ch/event/5773/contributions/12140/attachments/10805/13886/praesMu3eWengen18_PartsDB.pdf

All components must be shipped and stored with an obvious label attached.