



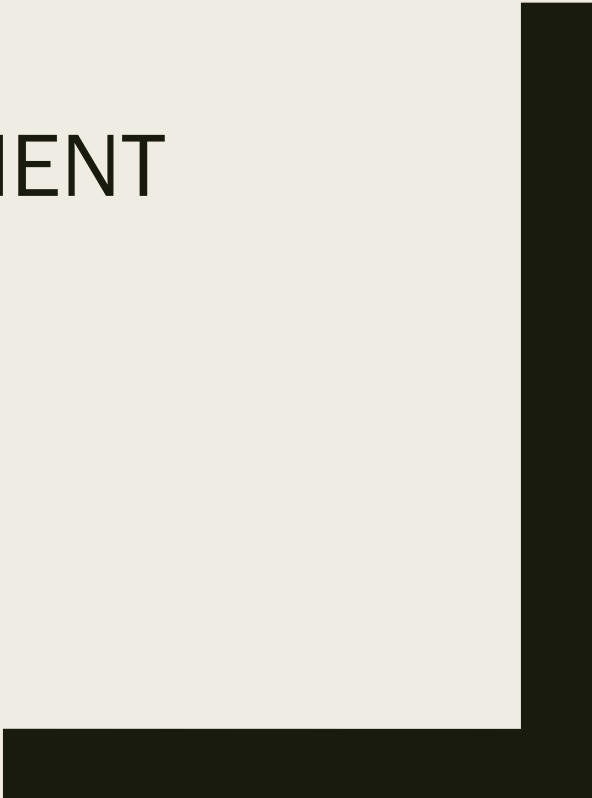
PÉPITES DE LA SEMAINE

Semaines 20 (= 12 mai) à 27 (= 30 juin)





GOOGLE DOC ÉQUIPEMENT



Modules plenary : jeudi 7 mai – 17h <https://indico.cern.ch/event/882704/>

- Whoever needed the Bergen test system (box) had to fill a google doc (?)
- Quads will go first to labs which have experience (traveling module exercise mentionned again)

ITK_Pixel_Module

Speaking: Richard Bates

File Edit View Window Help

Home Tools RD53AHybridQC.pdf Module cooling uni... ITKPixV1-Quad-150... LabsReopening.pdf x

3 / 12 67.2%

Component & tooling status

- RD53A Quad hybrid
 - Circa 100 hybrids in Glasgow waiting for QC tests
 - Another 150 ordered
 - Basic QC next week on limited number of hybrids
- RD53A quad assembly tooling
 - Tooling set delivered to each lab
 - All dummy items delivered
 - Bonding jigs designed
 - Limited dummy modules made
- Carriers distributed
- RD53A triplet ring hybrid
 - Produced and loaded
 - Waiting at LBNL for module build
 - A couple of unpopulated in Italy
- RD53A triplet linear hybrid
 - Discussing with manufacturer
 - Bit slow at present
- RD53A triplet assembly tooling
 - Assembly process defined
 - Limited number of dummies made
 - Need official triplet drawings to finalise tooling
- Carriers at CERN for distribution

Richard Bates 14/05/2020 3

Component & tooling status

- RD53A test systems
 - Adapter cards need formal sign-off with digital module
 - Started before lockdown but not complete
 - Mass production after acceptance tests
- Quad test system exists
 - https://docs.google.com/spreadsheets/d/1QIYu1vtluNCn45b-82T0tgTdOupyo_6s9KyqVxXW-gc/edit#gid=0
 - Foam insulation case
 - 11 in Bergen.
 - Looking at commercial vendor: evaluation set in the next 2-3 weeks
 - Will place order via CERN
 - Hard parts – shipping soon to CERN
 - POM baseplate
 - Vacuum chuck
 - Cold plate

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OB workshop modules session : jeudi 25 juin – <https://indico.cern.ch/event/914853/#day-2020-06-25>

~ 20-25 RD53A OB quad assembly over summer.

France: LPNHE, LAL, Saclay
+ CERN → module production

Power pigtail in production

Design of adapter board in progress (z-ray)

The screenshot shows a Zoom window for a meeting titled "Outer_Barrel_Workshop". On the left is a participant list with names like Marco Bomben, Matthias Hamer, Megh, Oliver Thielmann, Patrick Stassi, Pierre, Rafael Cama, Shunyu Yao, Silke, Susanne Kuehn, Taishi Shoji, Vigeolas Eric, and yikogami. The main window displays a presentation slide titled "RD53A Modules: Testing boards and cables". The slide content includes:

- Adapter boards:**
 - Data Adapter card (Lakmin): modifying to add high ohmic resistors on the data lines since AC coupling capacitors are on the module and DAQ
 - Power adapter card (Lakmin): molex (LV), lemo (HV), Samtec CLM connector
 - Design validation in progress
 - Batch fabrication ~end June/mid-July
- Data Pigtail (two options):**
 - Both delivered at CERN
 - Ilya's design: 20 cm long
 - Molex: 15 cm long
 - Needs cross-talk verification ~few weeks at LBL
- Power pigtail (Ilya):** 15 cm length, stiffener (8x8mm)

The slide also features several images: a photo of a blue adapter board with a ribbon cable, a technical diagram of a pigtail with dimensions (5.4, 10, 8.00), a photo of a green circuit board, and a photo of a black connector. The bottom of the slide has the text "ITK Pixel OB Workshop", "June 25th, 2020", and the "ATLAS ITK" logo.

Adapter boards (and a lot more) **requests spread sheet !!!!**

<https://docs.google.com/spreadsheets/d/1MqLbbcRGtGeY9Q2LPRWwK9YI-r-75IraKJGnC4jUZ6w/edit#gid=1445606114>

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Dummy RD53A Part Requests



Un peu partout, confusion habituelle entre

- "cell" et "local support" loading
- building & testing

Pas nous

Site qualification for RD53A Quads: 5 dummy modules in a row that meet specs.			
verify order quantity with final price			
Quad Modules		Institute/person responsible for procurement:	
		Estimated Cost (all numbers to be confirmed):	
Institution	point of contact	email	Assembly or loading site?
Argonne	Jessica Metcalfe	jmetcalfe@anl.gov	assembly
LAL/LPNHE/Sac	Reina Camacho / Dimitris Varouchas	Reina.Camacho@cern.ch / Dimitris.Varouchas@cern.ch / julien.giraud@cea.fr	assembly
SLAC	Caterina Vernieri	caterina@slac.stanford.edu	loading
Oxford	Richard Plackett	richard.plackett@physics.ox.ac.uk	assembly
Siegen	Alexey Petrukhin	petrukhin@hep.physik.uni-siegen.de	assembly
Japan	Manabu Togawa	manabu.togawa@kek.jp	assembly + loading
MPP	Francesco Guescini	guescini@mpp.mpg.de	assembly
Milano(+Lecce)	Attilio Andreazza	attilio.andreazza@mi.infn.it	assembly(+loading)
CERN	Susanne Kuehn	susanne.kuehn@cern.ch	assembly
Glasgow	Liam Cunningham	william.cunningham@glasgow.ac.uk	Assembly
CERN	Diego Alvarez	d.alvarez.feito@cern.ch	Loading
Unige	Sébastien Michal	sebastien.michal@cern.ch	Loading
LPSC	Patrick Stassi	stassi@lpsc.in2p3.fr	Loading
Wuppertal	Wolfgang Wagner	wagner@uni-wuppertal.de	Loading
Liverpool	Jon Taylor	jon.taylor@cern.ch	assembly
RAL	John Matheson	john.matheson@stfc.ac.uk	Loading
LBL	Elisabetta Pianori	elisabetta.pianori@lbl.gov	assembly
Bonn	Fabian Huegging	huegging@physik.uni-bonn.de	assembly + loading
Oxford	Kirk Arndt	kirk.arndt@physics.ox.ac.uk	encapsulation tests
Göttingen	Jörn Grosse-Knetter	jgrosse1@uni-goettingen.de	assembly
Genova	Alessandro Lapertosa	alessandro.lapertosa@cern.ch	assembly + loading
LPI Moscow	Polina Netchaeva	polina.netchaeva@cern.ch	assembly
Oslo	Ole Rohne	ole.rohne@cern.ch	assembly
IFAE Spain	Sebastian Grinstein	sgrinstein@ifae.es	assembly
SUM			



Quads ▾

Stencils ▾

Duals ▾

Singles ▾

Spend Register ▾

Quad Testing ▾

Parylene Coating ▾

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30/06/2020

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Dummy RD53A Part Requests



- 1) On n'y est pas, Marseille et Grenoble non plus
- 2) Quel nom on met ?

Item			??	??	
Contact/responsible			Carrier	Data cable	Power pigtail
variant					
cost (\$/Eur/CHF equiv)					
Institute	Contact name	email			
Milano	Saverio D'Auria	saverio.dauria@mi.infn.it	2		
Glasgow	Richard bates	richard.bates@glasgow.ac.uk	4		
Argonne	Jessica Metcalfe	jmetcalfe@anl.gov			
Liverpool			1		
LPNHE/LAL/IRFU	Marco Bomben	marco.bomben@cern.ch		3	
LBL					
Edinburgh					
CERN	Lingxin Meng	lmeng@cern.ch			
UCSC	Giordon Stark	gstark@cern.ch			
Siegen	Alexey Petrukhin	petrukhin@hep.physik.uni-siegen.de			
Göttingen	Joern Grosse-Kr	kgrosse1@uni-goettingen.de			
Lecce	Gabriele Chiodini	gabriele.chiodini@le.infn.it	1	1	
RAL	Ben Smart	ben.smart@stfc.ac.uk			
SLAC	Caterina Vernieri	caterina@slac.stanford.edu			
OKState	Steven Welch	Steven.Welch@okstate.edu			
Bologna	Carla Sbarra	carla.sbarra@bo.infn.it			
Genova					
Japan					
Lancaster	Daniel Muenster	Daniel.Muenstermann@cern.ch			
LPI Moscow	Polina Nechaeva	Polina.Netchaeva@cern.ch			
MPP	Francesco Guescini				
Okstate	Steven Welch	Steven.Welch@okstate.edu	2	2	



Quads ▾

Stencils ▾

Duals ▾

Singles ▾

Spend Register ▾

Quad Testing ▾

Parylene Coating ▾



RD53A Adapter Cards

- Status

Sign Up Spreadsheet

Tab: **Singles** (Triplet adapter cards + pigtails)

- Data adapter card (1 card per module, 3 cards per triplet)
- Power adapter card (same as for the quad, 1 per triplet)
- LV breakout board (1 per triplet)

Tab: Quad Testing (Quad adapter cards + pigtails)

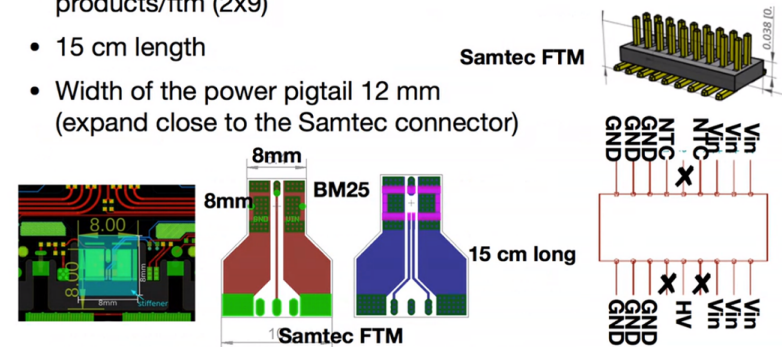
- Data adapter card 4DP
(each FE in the module is read with 3 data lines)
- Data adapter card 1DP
(each FE in the module is read with 1 data line)
- 20 cm data pigtail (custom design, 1 per quad)
- 15 cm power pigtail (BM25 - Samtec, 1 per quad)
- Power adapter card (1 per quad)
- lever for unmating BM25 (1 per assembly/loading site)

3

RD53A Quad - Power Pigtail

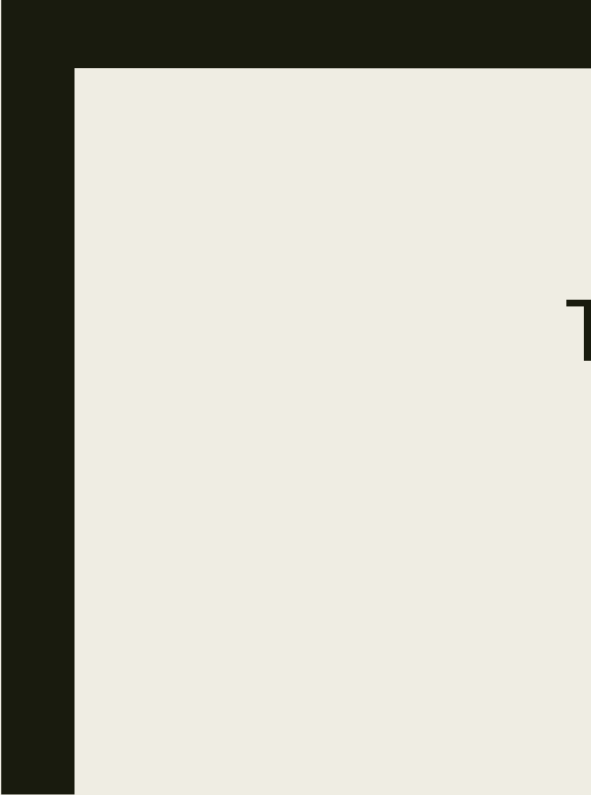
Volunteer Needed

- Power Pigtail: BM25 -> Samtec FTM
- BM25 on module side, 8x8 mm with stiffener
- 18 pin Samtec FTM connector: <https://www.samtec.com/products/ftm> (2x9)
- 15 cm length
- Width of the power pigtail 12 mm (expand close to the Samtec connector)

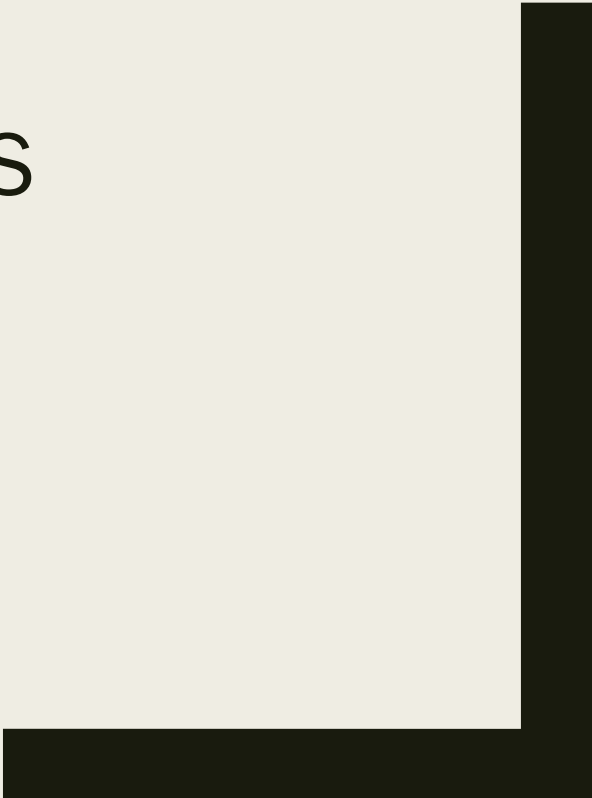


AD

Aleksandra Dimitrievska



TESTS ÉLECTRIQUES



Modules plenary : jeudi 25 juin – 17h

<https://indico.cern.ch/event/925352/>

CERN received and tested the first quad from Glasgow !

- Long & detailed slides by L.Meng
- Discussion on the need for cooling: the module heats up to ~45 degrees by itself, so cooled it with a pelletier at -10 deg to be on the safe side
- Discussion on the need for dry air flushing: she did not have any, which is "ok as the module was not irradiated" (sic ???)

30/06/2020

Testing of A Digital RD53A Quad

Lingxin Meng

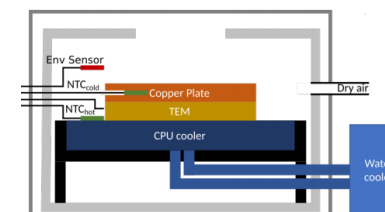
Thanks to Aleksandra, Timon and Dima for discussions

Module Meeting

CERN, 25.06.2020

Setup Overview

- Received digital quad #3 from Glasgow
- Will try to register to the prodDB after sorting out module ID
- Have parts for common cooling unit, but not yet fully built and commissioned
- Modify existing FEI4 setup to adapt to RD53A modules
 - FEI4 setup described [here](#) and presented [here](#)
 - CPU water cooler ([alphacool XPX Eisblock](#))
 - Peltier (LairdTech CP10) powered from a computer PSU
 - PID through Arduino Uno
 - Firmware and readout script on [git](#)
 - Made a perspex sheet to fit different FEI4 and RD53A test PCBs
 - Use module carrier, fix baseplate
 - Low voltage power supply
 - TTI PL303QMD-P: 6 A output in parallel mode (didn't deliver)
 - Agilent E3631A: 5 A output @ 0–6 V
 - SW: YARR [v1.2](#)
 - FW: latest from last week, XpressK7 325, 4×4 lanes, 160 Mbps



25.06.2020

Lingxin Meng (lmeng@cern.ch) — RD53A Digital Quad Testing

1/25

Testing : mardi 19 mai – 17h <https://indico.cern.ch/event/921020/>

- Update on the cold boxes by Magne from Bergen
- Discussion du Code for pelletier control

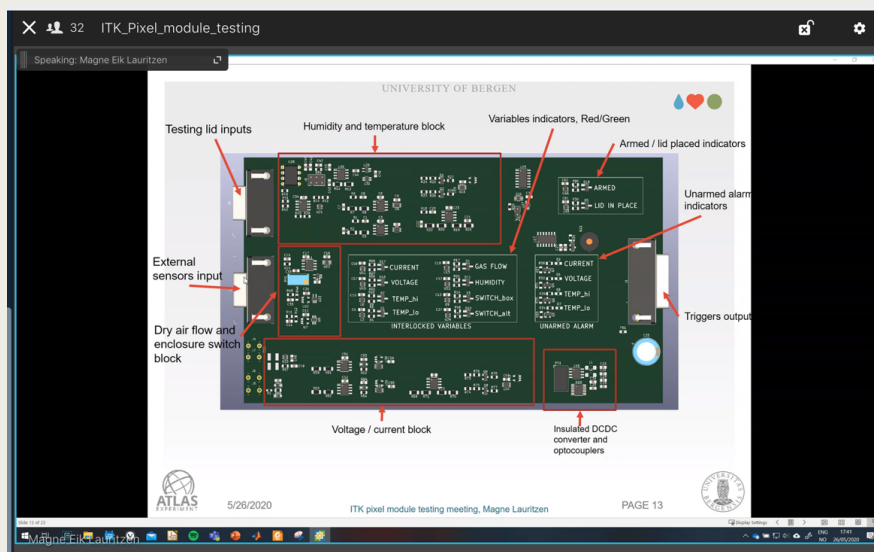
The screenshot shows a Zoom meeting interface. The title bar at the top reads 'ITK_Pixel_module_testing'. Below it, a status bar indicates 'Speaking: Magne Eik Lauritzen'. The main content area displays a PowerPoint slide from the University of Bergen. The slide title is 'Cooling units'. The text on the slide describes the procurement of 41 sets of 'hard' parts for cooling units, listing 'Vacuum chucks', 'Coldplates', and 'POM base plates'. It mentions that these parts have arrived at CERN and are being forwarded to the University of Bergen. It also states that the University of Bergen has enough foam parts for 11 cooling units, which are made from machined XPS foam and are not cleanroom safe. A photograph of the cooling units is shown on the right side of the slide. The slide footer includes the ATLAS Experiment logo, the date '5/19/2020', the meeting title 'ITK Pixel Module Testing Meeting, Magne Lauritzen', and 'PAGE 2'. The Zoom interface shows 'Magne Eik Lauritzen' as the current speaker in a circular profile picture at the bottom.

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Testing : mardi 26 mai – 17h <https://indico.cern.ch/event/922954/>

- Timon: proposes a standalone setup (~200 \$) to check signal quality, in case it becomes a part of cell production QC.
- Update +++ de Magne on HW interlock logic card. Time scale for prototype order ~ 2 weeks. Expects "something" within 3 months (for RD53A). Would be happy to get help for, e.g., the logic board





Standalone Eye Tester



TE0714-03-35-2I:

- Artix 7 FPGA
- 4 x GTP lanes
- On-board power regulation
- 16MB Flash memory
- 100\$

<https://www.digikey.com/products/en?keywords=TE0714-03-35-2I>

<https://shop.trenz-electronic.de/en/TE0714-03-35-2I-FPGA-Module-with-Xilinx-Artix-7-XC7A35T-2CSG329I-3-3-V-Configuration-4-x-3-cm>



Daughterboard:

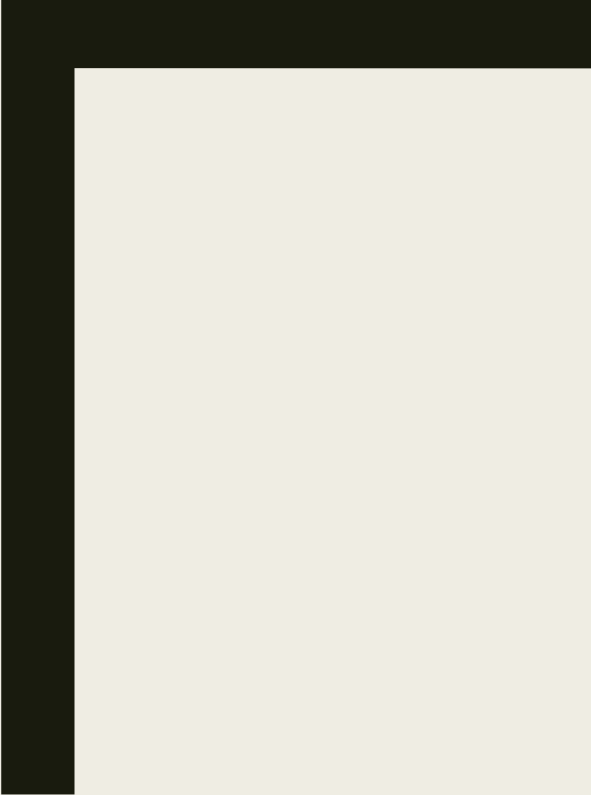
- Custom design - currently work in progress
- DP connector
- JTAG port
- Power input
- Loopback functionality



Timon Heim

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Module Testing Meeting



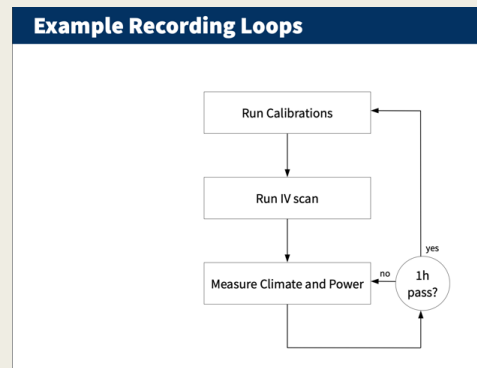
LAB REMOTE



Lab equipment : lundi 18 mai – 17h <https://indico.cern.ch/event/920138/>

Lab equipment : lundi 18 mai – 17h <https://indico.cern.ch/event/920138/>

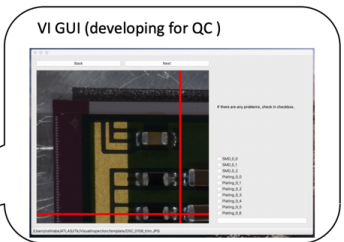
- LabRemote proposal for data recording into DB
- Interface for Visual Inspection (non electrical) tests



Data Flow

Expected data flow of non-electrical test (e.g. Visual inspection)

1. Create results using GUI for VI
2. Write the results in local DB thorough VI GUI
3. Check the results in Local DB viewer
4. Upload the results to ITk PD



2

Lab equipment : lundi 22 juin – 17h

- Japan is planning to run the QC chain on the modules (incl. Quads) by mid / late July
- QC scripts (=policy) to be stored independantly of the labRemote code (=tool) sw

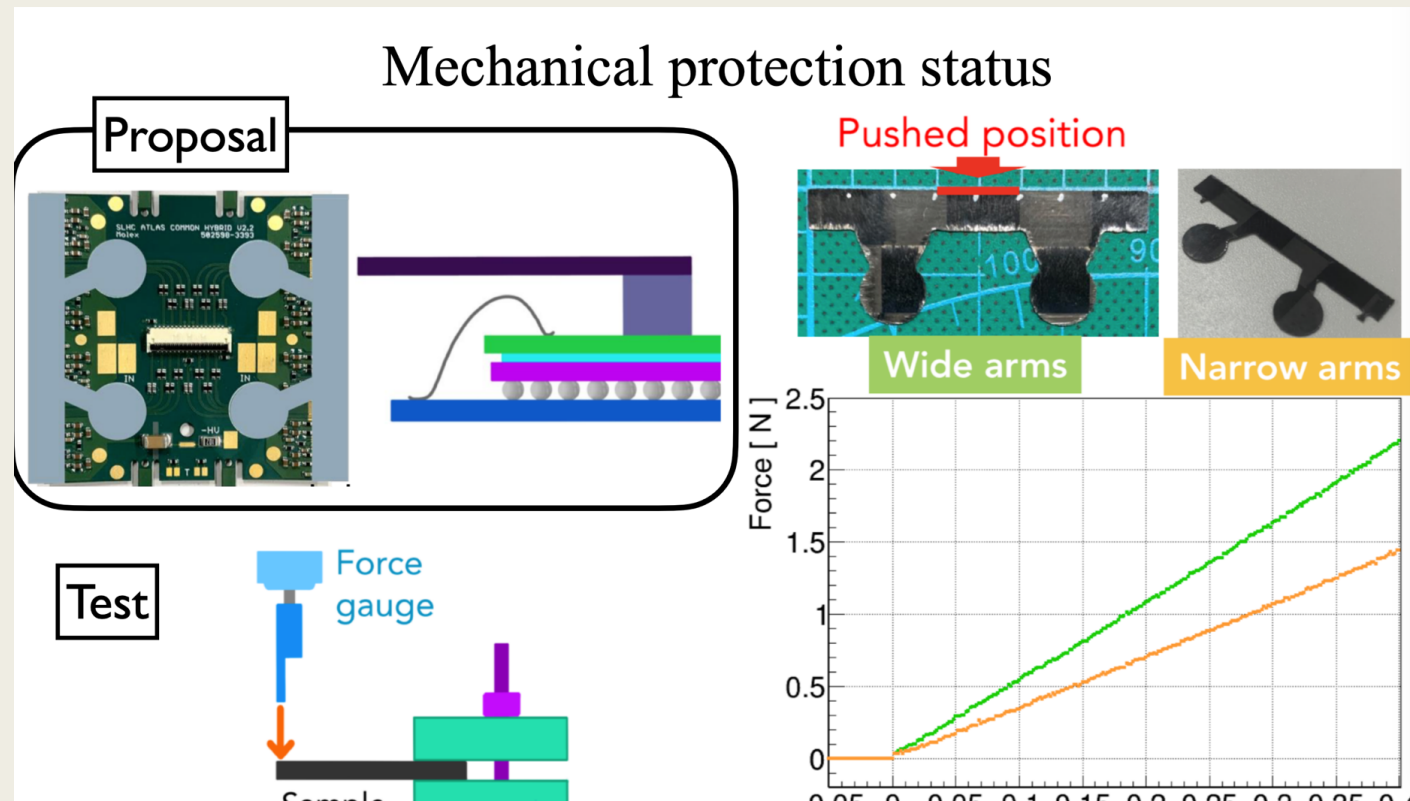


VISUAL INSPECTION



Ai fini par retrouver présentation du schéma dans réunion Modules du 2 avril

<https://indico.cern.ch/event/882698/> talk "wirebond protection" par M.Togawa, p5



Photographic documentation

Modules must be imaged before and after each production and testing step → ~20 pictures per module. See [QC document](#) for more details.

Suggested options:

- Digital camera with simple jig for repeatable alignment
- CCD flatbed scanner with focal point modification (<https://indico.cern.ch/event/883823/>)

Images must be annotated with metadata:

- | | | |
|-----------------|-----------------------------|------------|
| • Module ID | • Production / testing step | • Operator |
| • Date and time | • Institute | • Etc. |



Some studies on image quality with camera has been done:

https://indico.cern.ch/event/871927/contributions/3677283/attachments/1963849/3264944/Man_17_12_19_Indico.pdf

- Images to be manually inspected, using software tools for assistance.
- After inspection and annotation, the images are uploaded to the production database.
- Image format, metadata tags, and other details to be defined.
- Adam Ruby (U. Liverpool) and Shohei Shirabe (Tokyo Institute of Technology) has agreed to collaborate to have this software ready for RD53A production.
- Professional photographer and ITk member Massimiliano Antonello can be contacted for photography expertise.

Contact person: Shohei Shirabe



2/5/2020

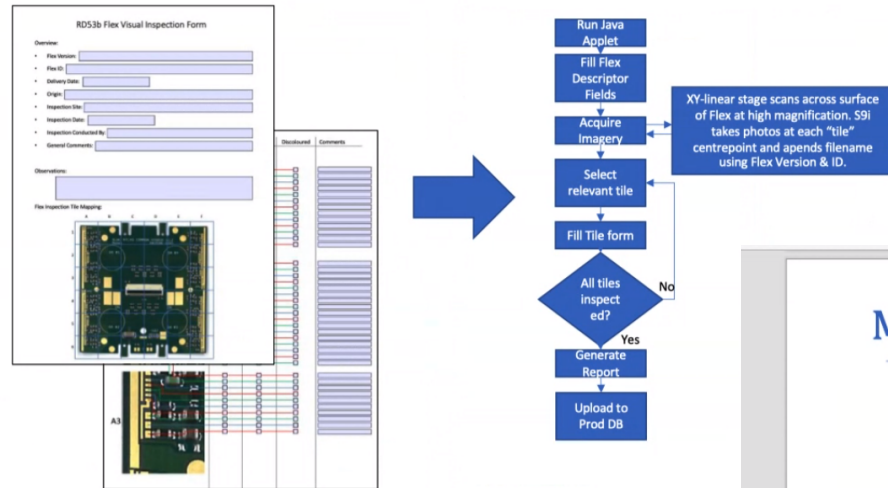
ITk Week, Magne Lauritzen

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Visual Inspection Form into GUI

Preparing a GUI to collect the inspection data, automate imaging & submission to production database.

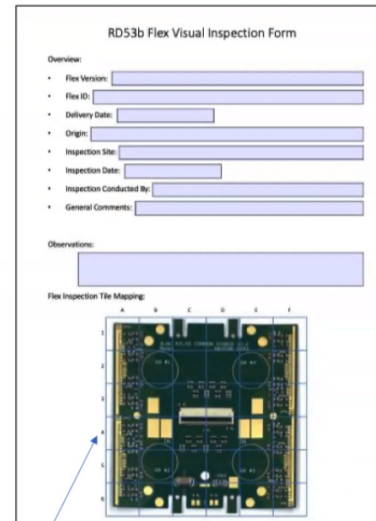


07/05/20

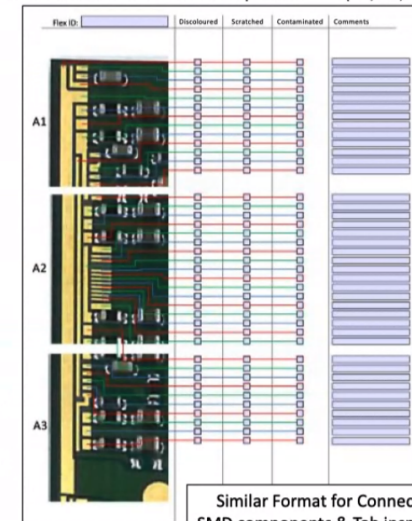
Abhishek Sharma

Manual Visual Inspection Form

Detailed information for each inspection area (A1, A2, ... , F6).



Flex is sub-divided into 6 x 6 areas for inspection



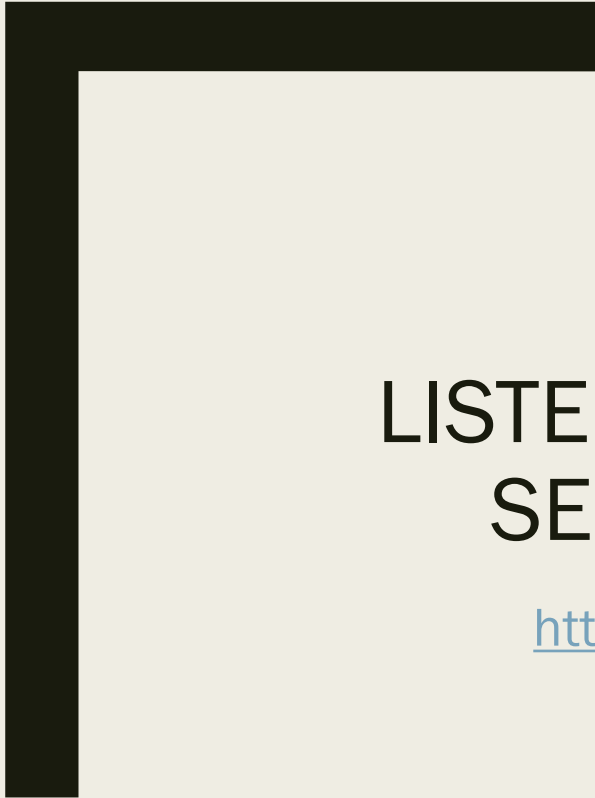
Similar Format for Connectors, SMD components & Tab inspection.

07/05/20

Abhishek Sharma

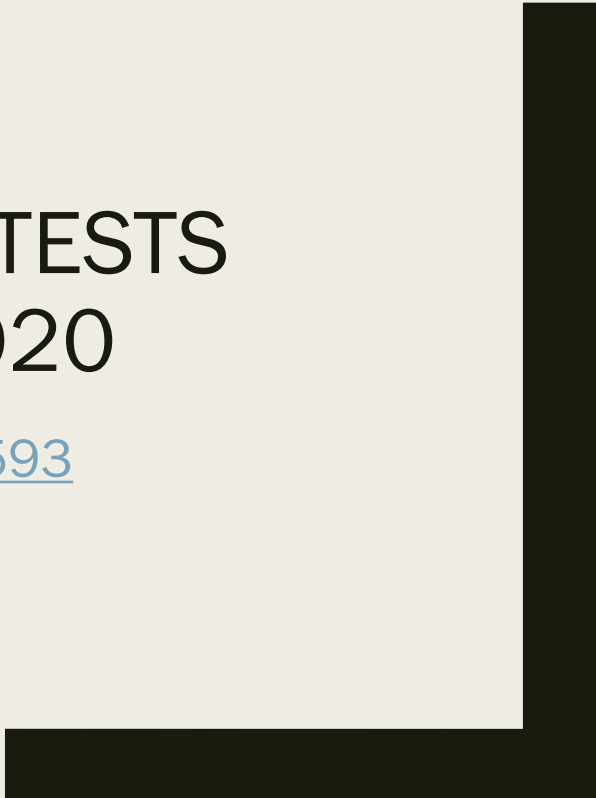
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LISTE ET EQUIPEMENTS TESTS SEMAINE ITK - FEV 2020

<https://indico.cern.ch/event/824593>



Tooling for RD53A module build & test -- Meeting pixel modules semaine ITK de février (mer 9h)

https://indico.cern.ch/event/824593/contributions/3734134/attachments/1982075/3301330/Tooling_status_update_ITK_week_Magne_Lauritzen.pdf

We have roughly the same needs as for the final production: We will use the RD53A module production to evaluate the tools and get valuable experience.

Assembly:

- Gluing stencils
- Assembly jigs
- Data cables
- Powering
- Module carriers

Testing:

- Cooling
- DAQ/DCS system
- Interlock system
- Power boards
- Data boards

Common:

- Photographic documentation
- Shipping box

This talk will try to list all items, their status, and who is responsible for it.

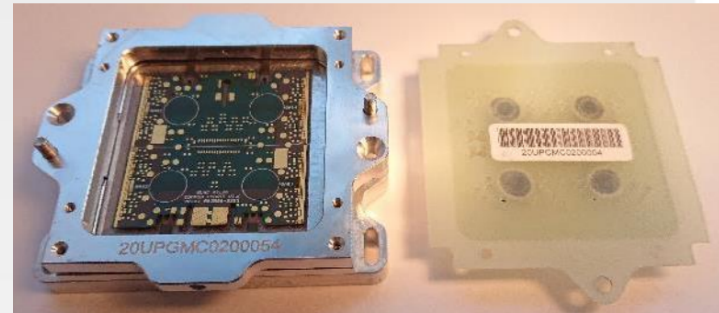
Module carriers

Modules are placed in module carriers after production for safe shipping, handling, and testing.

For quad module production:

- 250 carriers were delivered to CERN in November
- Most have been distributed to institutes based on sign-up sheet. 74 remains at CERN.
- Institutes missing carriers can get them now (at ITk week).

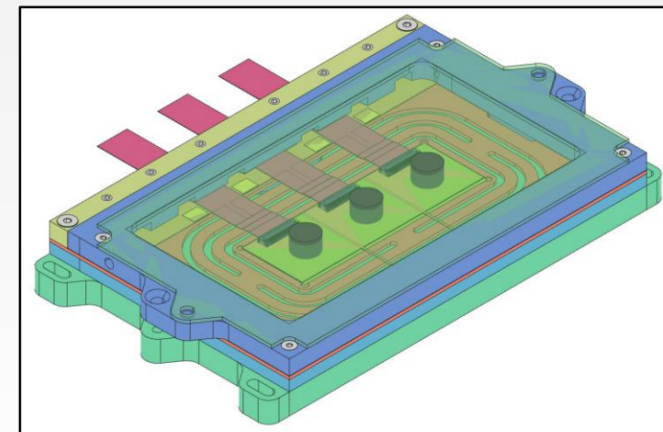
<https://twiki.cern.ch/twiki/bin/view/Atlas/ItkPixModuleCarrier>



Quad module carrier

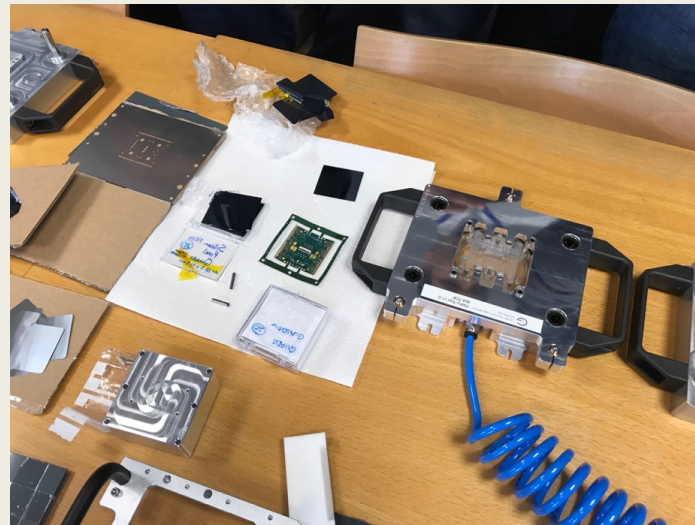
For triplet module production:

- Carrier design has been finalized.
- Production to happen in February, earliest delivery to CERN 15th of March.
- Delivery date has been pushed back due to the Wuhan coronavirus.
- Sign up for triplet carriers on “Singles” page of [RD53A part request sheet](#).



Triplet module carrier

Module carriers are a common order and are produced in industry.



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All items for RD53A module production are either ready or being taken care of.

Item	Status as of 4 th February 2020	Contact person
Gluing stencils	Done, distributed at Itk week	Manabu Togawa
Assembly jigs	Done, a few being distributed at Itk week	Joern Lange
Data cables	Done, distributed	Saverio D'Auria
Powering	To be determined	
Module carriers	Done and distributed for Quads. (Triplet carriers to be produced)	Magne Lauritzen
Cooling	Many designs exists, common cooling unit might be produced.	Magne Lauritzen
DAQ/DCS	HW specifications and recommendations exists. Software under development.	Minoru Hirose
Interlock system	Some specifications done, to be determined	Lingxin Meng
Power boards	To be produced and distributed.	Minoru Hirose
Data adapter boards	Done for Quads, to be distributed. No design for triplets.	Minoru Hirose
Photographic documentation	Hardware recommendations exists, software under development.	Shohei Shirabe
Shipping boxes	To be determined	Richard Plackett