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# MFT production database

### Miniworkshop difrakce a UPC 2019

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### Introduction



#### What for:

- Store information about the different components of the MFT.
- Keep track of the different steps of the production of the detector.
- Databases:
  - Testing database.
  - Production database.
- Structure definition:
  - Based on the AIT (Assembly, Integration and Testing) document.
- How implemented:
  - Web interface.
  - API script control.

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#### Data to be put in priority

- ALPIDE sensors & trays:
  - Trays of sensors delivered by ITS
  - Data already present in the ITS Database
    - Transfer those data to the MFT DB Person in charge: Killian Laforge (student)



- Ladders:
  - HIC: assembly of FPC, ALPIDE sensors
  - Ladder: HIC after wire-bonding sensors to the FPC
    - Define structure (components & activities) in DB
    - Write scripts to fill in the DB





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# Browser Control of the Database

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### Database setup



- Following AIT.
- Designed to be simple.
- Only 3 components:
  - ALPIDEB chip,
  - flexible printing circuit (FPC),
  - ladder made of FPC and chips.
- Components are further divided according to number of possessed chips (2-5)
- 3 types of activities:
  - Check component,
  - modify component,
  - assembly component.

New FPC EQU CHK CLEAN 3		With bino help: check if all SMD are OK, elimination of any bump, excess varnish, solder paste with a scalpel Cleaning procedure of equiped FPC - FPC for 3 chips	
New FPC EQU CHK ELEC 3		Verification of the electrical continuity of all FPC tracks and vias after soldering - FPC for 3 chips	
New FPC EQU CHK METR 3		Measurement of FPC overall dimensions and position of reference points - FPC for 3 chips	
New FPC EQU CHK VISU 3	U CHK VISU 3 Intensive visual inspection of the equiped FPC quality RECTO VERSO: check for obvious damag defects of FPC and SMD components and severe planarity issues after soldering - FPC with 3 ch		्री
New FPC RAW CHK ELEC 3	Verification of the electrical continuity of all FPC tracks and vias - FPC for 3 chips		ø
New FPC RAW CHK METR 3	Measurement of FPC overall dimensions and position of reference points - FPC for 3 chips		φī
New FPC RAW CHK VISU 3	Visual inspenction of the FPC quality: check for obvious damage, defects and severe planarity issue FPC for 3 chips		¢٩
New FPC SOLD 3			đ٦
New Ladder BOND 3	Bonding of 3 ALPIDEB chips on ladder		đ
New Ladder CHK ELEC 3			¢۳
New Ladder CHK FUNC 3	Assess the performances of the ladder (noise, threshold, high speed link, noisy/dead pixels, endurance) - ladder with 3 chips		ŵ
New Ladder CHK SMOKE 3	Verify the response of the ladder to power supply (no shorts, uniform temperature distribution) - ladder with 3 chips		φĮ
New Ladder CHK VISBON 3	Visual inspection of all wire bonds - ladder with 3 chips		ø
New Ladder CHK VISU 3	inspection of eventual damage, glue contamination RECTO VERSO, relative alignment of FPC and chips (4 openings per sensor), pads degradation or oxidation RECTO - Ladder with 3 chips $\frac{1}{22}$		φī
New Ladder COND 3	HIC transfer from bonding chuck to ICL-equiped storage box - ladder with 3 chips		đ
New Ladder GLUE 3	Gluing ALPIDES on FPC for 3 chips		d7

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## Activity - Attributes I

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### Input/Output:

- Assembly activities different input/output.
  - I.e. Input: 3 chips, 1 FPC; Output: 1 Ladder
- Other activities same input/output.

#### Parameters:

- Keep simple.
- All have UNIX Timestamp.
- Component checking activities in addition have Link to a result of the test and Classification category:
  - Gold,
  - silver,
  - bronze,
  - bad.

Activity Type				
General Output Component Types Input Component Types				
Mat. Conformity Activity Status Activity Result				
Component Type	_	Amount	• Unit	Valid From
ALPIDEB Chip	٠	з 🗘	рс	26.03.2019
new_FPC_3	•	1 🗘	рс	26.03.2019
Activity Type				
General Output Component Types Input Component Types Parameters Location				
Mat. Conformity Activity Status Activity Result				
Pa	rame	ter	_	Unit
Link to Test Result				• N/A
UNIX Timestamp				• N/A
Classification Category				• N/A

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# Activity - Attributes II



### Material conformity:

- EMPTY allows accept new component.
- Other allows accept already tested component.
- Activity status:
  - Can be open/closed.
  - Closed activity cannot be opened again.
- Activity result:
  - Can result OK/Not OK.
  - When OK, functional status is undefined, unless last activity for component is done then functional status is ok.

Activity Type			×
General Output Cor	nponent Types Input Compon	ent Types Parame	ters Location
Mat. Conformity Act	ivity Status Activity Result		
Component Type	Functional Statu	ıs •Phys	ical Status
new_ladder_3	- [EMPTY]	- [EMPTY]	-
new_ladder_3	- Undefined	• ок	•
Activity Type General Output Cor	nponent Types Input Compor	nent Types Param	eters Location
Activity Type General Output Cor Mat. Conformity Act	nponent Types Input Compor ivity Status Activity Result	ient Types Param	eters Location
Activity Type General Output Cor Mat. Conformity Act Electrical_qualification_No	nponent Types Input Compor Ivity Status Activity Result Name DT_OK	nent Types Param	eters Location
Activity Type General Output Cor Mat. Conformity Act Electrical_qualification_NC Component Type	nponent Types Input Componing Initig Status Activity Result Name DT_OK Direction	nent Types Param	eters Location
Ceneral Output Cor Mat. Conformity Act Electrical_qualification_NCC Component Type new_ladder_3	nponent Types Input Componing Input Componing Name DT_OK Direction out	ent Types Param	eters Location
Ceneral Output Cor Mat. Conformity Act Electrical qualification_NC Component Type new_ladder_3 Electrical qualification_Of	nponent Types Input Compor ivity Status Activity Result Name DT_OK Direction out	Functional Status	eters Location
Ceneral Output Cor Mat. Conformity Act Electrical_qualification_NC Component Type new_ladder_3 Electrical_qualification_OP Component Type	nponent Types Input Compor Willy Status Activity Result Name DT_OK Direction	Functional Status	eters Location



Activity	FPC component status: Physical (functional)		
	Input	Output	
VISU RAW CHK	bare ok/empty (undefined/empty)	bare ok (undefined)	
ELEC RAW CHK	bare ok/empty (undefined/empty)	bare ok (undefined)	
METRO RAW CHK	bare ok/empty (undefined/empty)	bare ok (ok)	
SOLDERING	bare ok (undefined/ok)	equipped ok (undefined)	
ELEC EQU CHK	equ ok/empty (undefined/empty)	equ ok (undefined)	
METRO EQU CHK	equ ok/empty (undefined/empty)	equ ok (undefined)	
CLEAN EQU CHK	equ ok/empty (undefined/empty)	equ ok (undefined)	
VISU EQU CHK	equ ok/empty (undefined/empty)	ok (ok)	

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Activity	LADDER component status:	Physical (functional)
	inpat	Output
GLUEING	ALPIDE CHIPS ok (ok)	glued ok (undefined)
	FPC ok (ok)	
VISU CHK	glued ok (undefined)	glued ok (ok)
BONDING	glued ok (undefined/ok)	bonded ok (undefined)
CONDITIONING	bonded ok/ok (undefined/ok)	ok (undefined)
VISBON CHK	ok (undefined)	ok (undefined)
SMOKE CHK	ok (undefined)	ok (undefined)
ELEC CHK	ok (undefined)	ok (undefined)
FUNC CHK	ok (undefined)	ok (ok)

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# API Control of the Database

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# API control of the database



### Purpose:

- Fill database automatically using HIC travelers.
- Setting up all components at once.
- Using any advantage of script control in comparison to manual clicking.
- Implementation:
  - Written in Python3.
  - Using some external modules, including CERN-kerberos authentification.
  - Main database handling divided into 5 modules:
    - Each specialized to one field.
    - API communication, Chips, FPCs, Ladders, Activities.
  - Several auxiliary macros.
  - One main macro to rule them all.
  - KISS tactic used (Keep It Simply Stupid)

### What is missing:

- Rework a bit a system of classification.
- Finish generalization to n chips (currently 3 chip version supported).
- Migration from test database to real database.
- Real usage.

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# **Practical Show**

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### Main menu



#### \* \*\*\*\*\*\* \* \*\*\*\* \* 2019-09-23 18:50:18,911 12371 INFO /home/ init 2019-09-23 18:50:18,912 12371 INFO 2019-09-23 18:50:18,912 12371 INFO Activity Manager set to use remote database. \* \*\*\*\*\*\* What do you want to do (Choose a number)? Option 0 : Nothing, Close this, Option 1 : Perform an activity. Option 2 : Change an activity. Option 3 : Create in database components from traveler. Option 4 : Get type IDs from database. Enter a number: 🛛

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Děčín 2019

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## Creating activity



What activity do you want?	For how many chips is your component designed? 3
Option 0 : FPC-CHK-RAW-VISU	Enter the FPC number (i.e. 24aA102). Pay attention to input correctly! 24aA102
Option 1 : FPC-CHK-RAW-ELEC	init2019-09-23 18:52:08,049 12371 INF0 /home/rolavick/alidock/alice
Option 2 : FPC-CHK-RAW-METR	init 2019-09-23 18:52:08,049 12371 INFO 364 init 2019-09-23 18:52:08,049 12371 INFO https://test-alucmsapi.web.c
Option 3 : FPC-SOLD	FPC Manager set to use remote database. FPC form 24aA102 opened!
Option 4 : FPC-CHK-EQU-ELEC	What is the location of this activity (Choose a number)?
Option 5 : FPC-CHK-EQU-METR	0 : CERN
Option 6 : FPC-CHK-EQU-CLEA	1 : TPNI
Option 7 : FPC-CHK-EQU-VISU	a anna
Option 8 : LADDER-GLUE	Enter a number: 0
Option 9 : LADDER-CHK-VISU	Is the result of activity OK? (yes/no)y
Option 10 : LADDER-BOND	Should this activity remain open? (yes/no)y
Option 11 : LADDER-COND	What is the classification of this activity (Choose a number)?
Option 12 : LADDER-CHK-VISBON	0 : Gold
Option 13 : LADDER-CHK-SMOKE	1 : Silver
Option 14 : LADDER-CHK-ELEC	2 : Bronze
Option 15 : LADDER-CHK-FUNC	3 : Bad
Your input: 6	4 : Classification not defined - Leave it empty

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# Changing menu



What do you want to change? Option 0 : I changed my mind. Do nothing. /home/ Option 1 : Change status to closed. Option 2 : Change activity result. Option 3 : Change activity location. Option 4 : Change activity classification. Your input: 2 Is the result of this activity ok? (yes/no)y

\_\_init\_\_\_ 2019-09-23 18:50:18,912 12371 INFO 364 \_\_init\_\_ 2019-09-23 18:50:18,912 12371 INFO http Activity Manager set to use remote database.

What do you want to do (Choose a number)?

Option 0 : Nothing. Close this.

Option 1 : Perform an activity.

Option 2 : Change an activity.

Option 3 : Create in database components from traveler.

Option 4 : Get type IDs from database.

Enter a number: 🛛

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### Error handling



What is the classification of this activity (Choose a number)?	
0 : Gold	
1 : Silver	
2 : Bronze	What do you want to do (Choose a number)?
3 : Bad	
4 : Classification not defined - Leave it empty	Option 0 : Nothing. Close this.
Enter a number: w	Option 1 : Perform an activity.
****** ERROR: Enter an integer! ******	
What is the classification of this activity (Choose a number)?	Option 2 : Change an activity.
0 : Gold	Option 3 : Create in database components from traveler.
1 : Silver	
2 : Bronze	Option 4 : Get type IDs from database.
3 : Bad	Enter a number: 3
4 : Classification not defined - Leave it empty	
Enter a number: 5	Creating new ladder and attaching components to it.
****** ERROR: Incorrect choice. Please, choose one in range 0 to 4! ******	Enter the ladder number (i.e. 3154). Pay attention to input correctly! 6951
What is the classification of this activity (Choose a number)?	****** ERROR: Ladder number with 2000 and 6000 expected! ******

Creating activity with name Cleaning ofFPC\_24aA102-test

This Component is being used in one or more opened Activities (Activity ID, Activity Name): 96644, Metrological check of FPC\_24aA102-test Close the activity if you want to attach this component to other activity! This Component is being used in one or more opened Activities (Activity ID, Activity Name): 96644, Metrological check of FPC\_24aA102-test Close the activity if you want to attach this component to other activity! Value of paramater can not be added to the activity erelative relativity and its parameter does not exists.

# back up

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