

ePIC SVT WP3 Electrical Interfaces Meeting  
September 12, 2024

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# Prototypes of ePIC SVT L4 multilayered multicomponent FPC from LTU: current status

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# Outline

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- ❖ Base approach and features (reminder)
- ❖ ePIC SVT L4 FPC prototypes: current status
  - M-FPC
  - B-FPCs
- ❖ Next steps
- ❖ Conclusions

# Base approach and features (reminder)

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## Base layout and cross-section

Latest schematic layout (based on latest information from STFC team, v03)

Composition of the ePIC SVT FPC:  
 a) Main FPC (M-FPC in short) – 1 pc  
 b.1) Bridge FPC type A (B-FPC-A) – 2 pcs  
 b.2) Bridge FPC type B (B-FPC-B) – 2 pcs

Schematic cross-section of assembled ePIC SVT FPC M-FPC

Design features (diff. pairs):  
 Edge-coupled Surface Microstrip

Notes:  
 > Base approach, design etc. discussed within biweekly STFC-LTU ePIC SVT meetings within January-May 2024  
 > Design approved in the end of May, 2024  
 > All design and assembly features are verifying by creating technological FPC

Cross-section of M-FPC and B-FPCs:  
 Cover layer (insulating) Kapton  
 Signal Layer FDI-A-24  
 Spacer Layer Kapton  
 GND Layer FDI-A-24  
 Total thickness ~110um

Height (H):	69
Height1 (H1):	45
Width (W):	60
Width1 (W1):	70
Separation (S):	130
Thickness (T):	14
Dielectric Constant (E):	3.4
Differential Impedance (Zo):	99.10

Width of traces – 70um  
 Space between traces – 130um  
 Pitch of traces – 200um

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## Technological ePIC SVT L4 FPCs

Set of multilayered FPCs (M-FPC+ B-FPCs) for ePIC SVT multilayered multicomponent FPC

Assembly steps M-FPC+B-FPCs:  
 > Aligning and laminating M-FPC to B-FPC  
 > SpTABing Signal Layer M-FPC to Signal Layer B-FPC-A  
 > Electrical tests (circuits integrity), visual inspection  
 > Protecting SpTAB joints (glue)  
 > Electrical tests (circuits integrity), visual inspection

Assembled technological multilayered multicomponent ePIC SVT L4 FPC

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## Assembling technological M-FPC

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## Assembling technological B-FPCs

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## Technological M-FPC: flexible layers

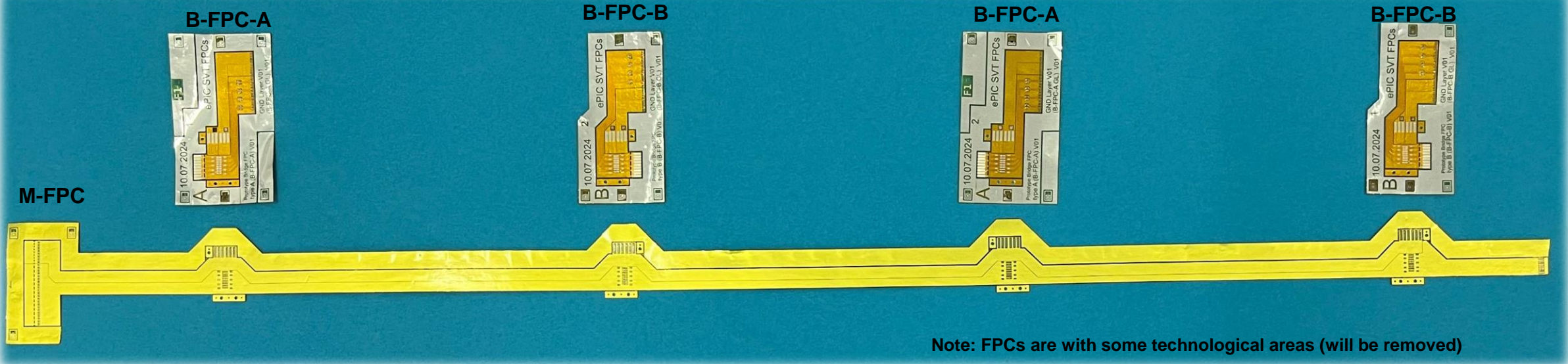
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## Technological B-FPCs: flexible layers

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# ePIC SVT L4 FPC prototype: composition/set

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Planned delivery:

- 4 prototypes of assembled ePIC SVT-L4 FPC
- 4 sets of FPC prototypes for ePIC SVT-L4 FPCs (4 M-FPCs+ 16 B-FPCs)

Note: some test/technological M-FPCs and B-FPCs will be provided also for tuning-up assembly and test procedures



# ePIC SVT L4 FPC prototypes: M-FPCs

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Current status:

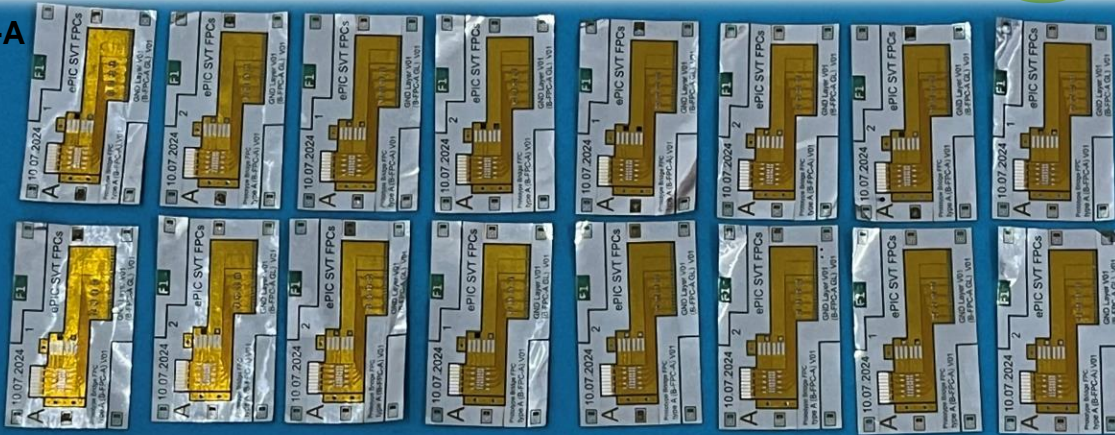
- 8 M-FPCs are assembled

Note: FPCs are with some technological areas (will be removed)

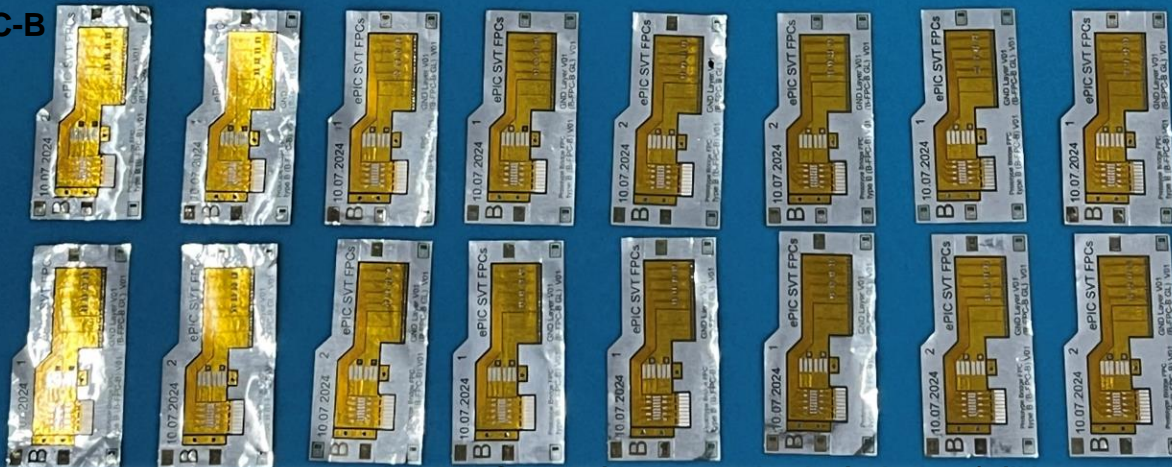
# ePIC SVT L4 FPC prototypes: B-FPCs

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B-FPC-A



B-FPC-B



Note: FPCs are with some technological areas (will be removed)

Current status:

- 16 B-FPC-A are assembled
- 16 B-FPC-B are assembled



# Next steps/plan/updates

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## ❖ Technical part (8 prototypes of FPC):

- *Modifying design (based on manufacturing technological FPCs)* – **DONE**
- *Designing and ordering photomasks for FPC prototypes* – **DONE**
- *Manufacturing flexible layers* – **DONE**
- *Assembling M-FPCs and B-FPCs* – **DONE**
- *Assembling ePIC SVT FPCs* – **ongoing**

## ❖ Administrative/organization part:

- *Preparing draft of STFC-RPE LTU contract (Frame Contract)* – **DONE (sent)**
- *Agreeing and signing the contract* – **ongoing**
- *Defining required number of the FPCs* – **DONE (4+4)**
- *Preparing offer (for R&D and prototypes)* – **DONE**
- *Sending the offer* – **DONE**
- *Placing/receiving the order* – **ongoing**

*(the order is received but need to be a bit modified)*

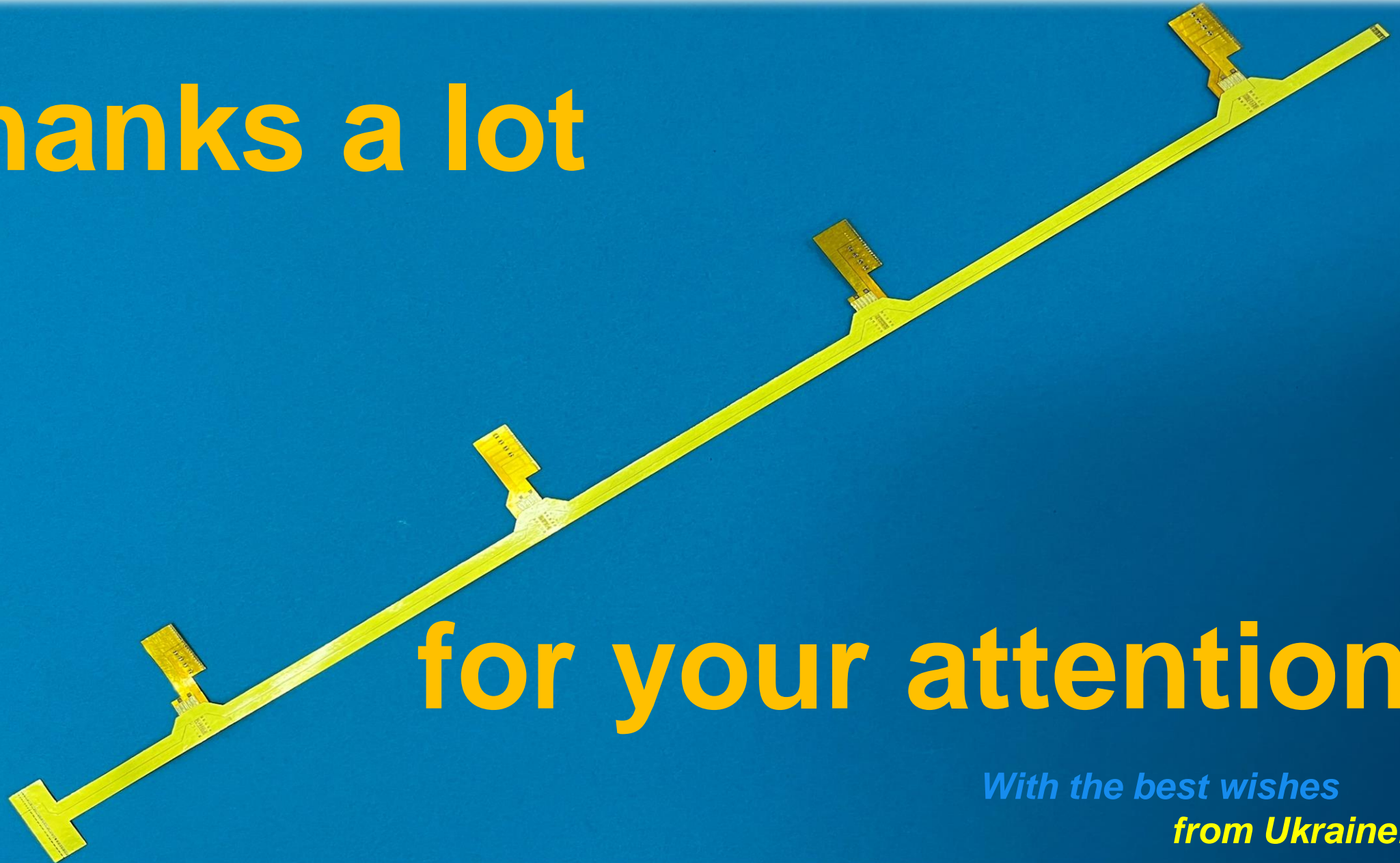
# Conclusions

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- Components (flexible layers) for all FPC are manufactured
- All FPCs (both M-FPCs and B-FPCs) are assembled
- ePIC SVT L4 FPCs are under assembling
- The FPCs will be shipped as soon as the administrative part be completed



# Thanks a lot



# for your attention!

*With the best wishes  
from Ukraine!*