



SuperB FDIRC



PMTs positioning ROb to backplane connection

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SuperB FDIRC backplane requirements



Backplane (Mboard):

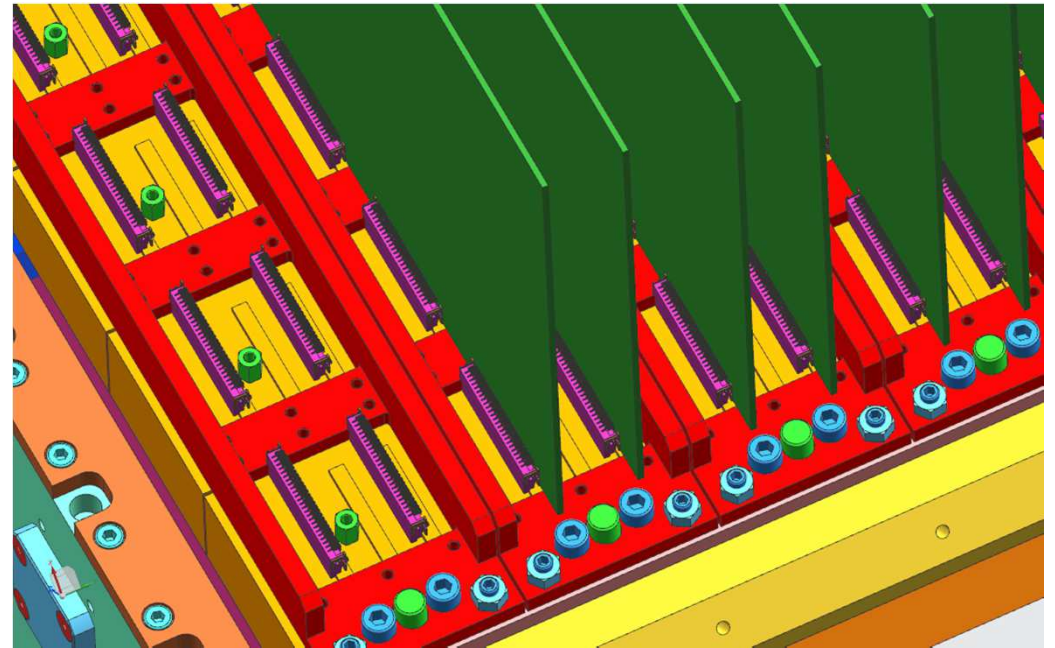
Quite limited «electric/electronic» purpose

No HV distribution

Mechanical purposes:

- Support PMTs in precise position in all directions (perpendicular and parallel to quartz window)
- Position driven by connectors/pcb/ pcb bar positions / orientation
- Allow RObs insertion without transmit compression forces on PMTs

Backplane: simple structure with onboard pcbs. Precision given by precise small pcbs mounted precisely on the bars structure

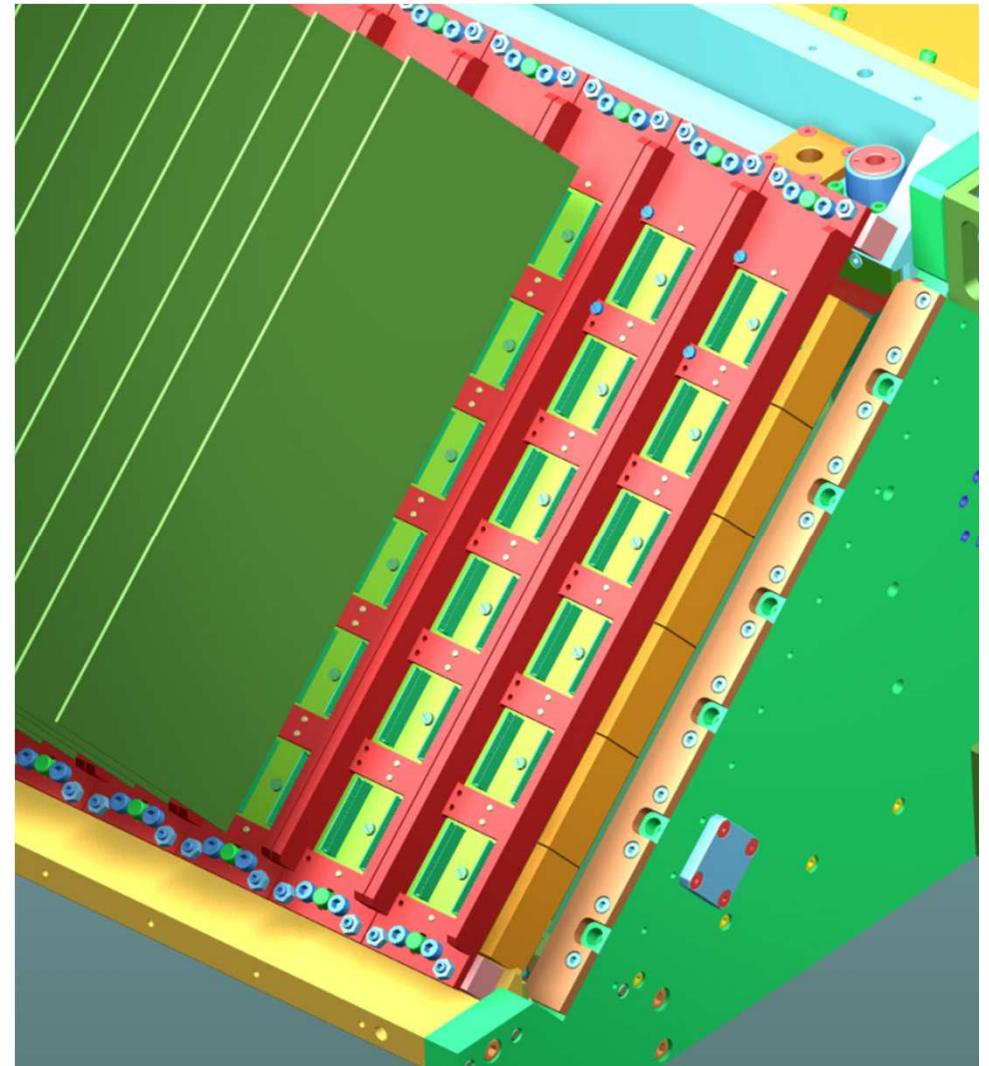




SuperB FDIRC PMTs Backplane baseline



- Backplane made of 8 bars, 6 PMTs each, fixed on top and bottom profiles of Fbox
- Samtec SQT on PMT side
- Connectors on PMTs do not allow elastic mounting
- Thus leave «small» clearance between PMTs and quartz
- Clearance enough to avoid PMTs touching quartz in case of tolerance or bar deformation
- Clearance \simeq 100–200 μm
- PMTs \perp position driven by set-screws acting on PMTs corners
- PMT // position connectors driven
- Each PMT secured by the M3 screw in the center (just 2.5 mm deep!)
- Each bar of 6 PMTs preassembled, tested and measured on CMM





SuperB FDIRC PMTs Backplane



1° layout: Nonzero Insertion Force

ERNI SMC-Q 64004 press fit connector

50 contacts/pc, 100/PMT

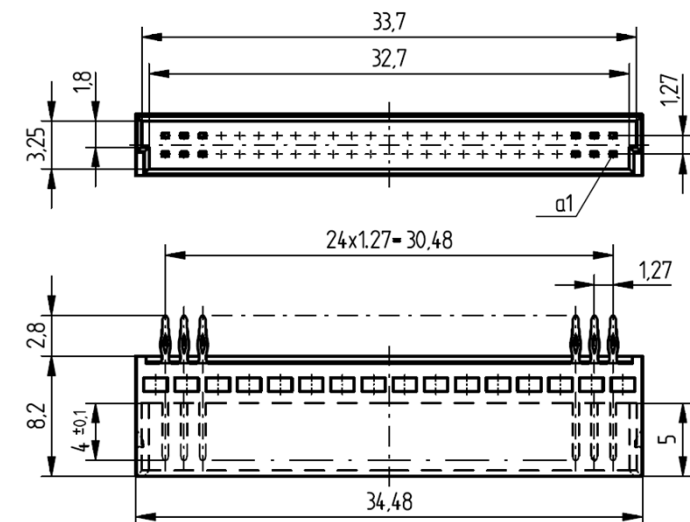
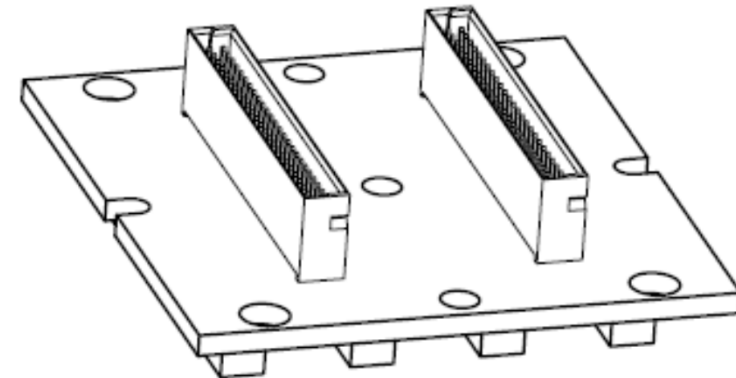
Insertion force 26N each

>150N insertion force per ROb (row of 6 connectors)

Require stiff bar structure eg aluminum profile section 50x 20 mm, 2 -3 vertical wings of 4 -5 mm thickness

Backplane bar made of 6 pcbs mounted on the bar structure, reference pins, M3 - M4 screws , 4 set screws per each PMT

Connectors must be precisely mounted wrt reference holes Requirements?





SuperB FDIRC PMTs Backplane



Deformation of aluminum bar, section 50x20, 3 wings 5 mm thick, under 160N of distributed load on pcbs is ≈ 100 μm

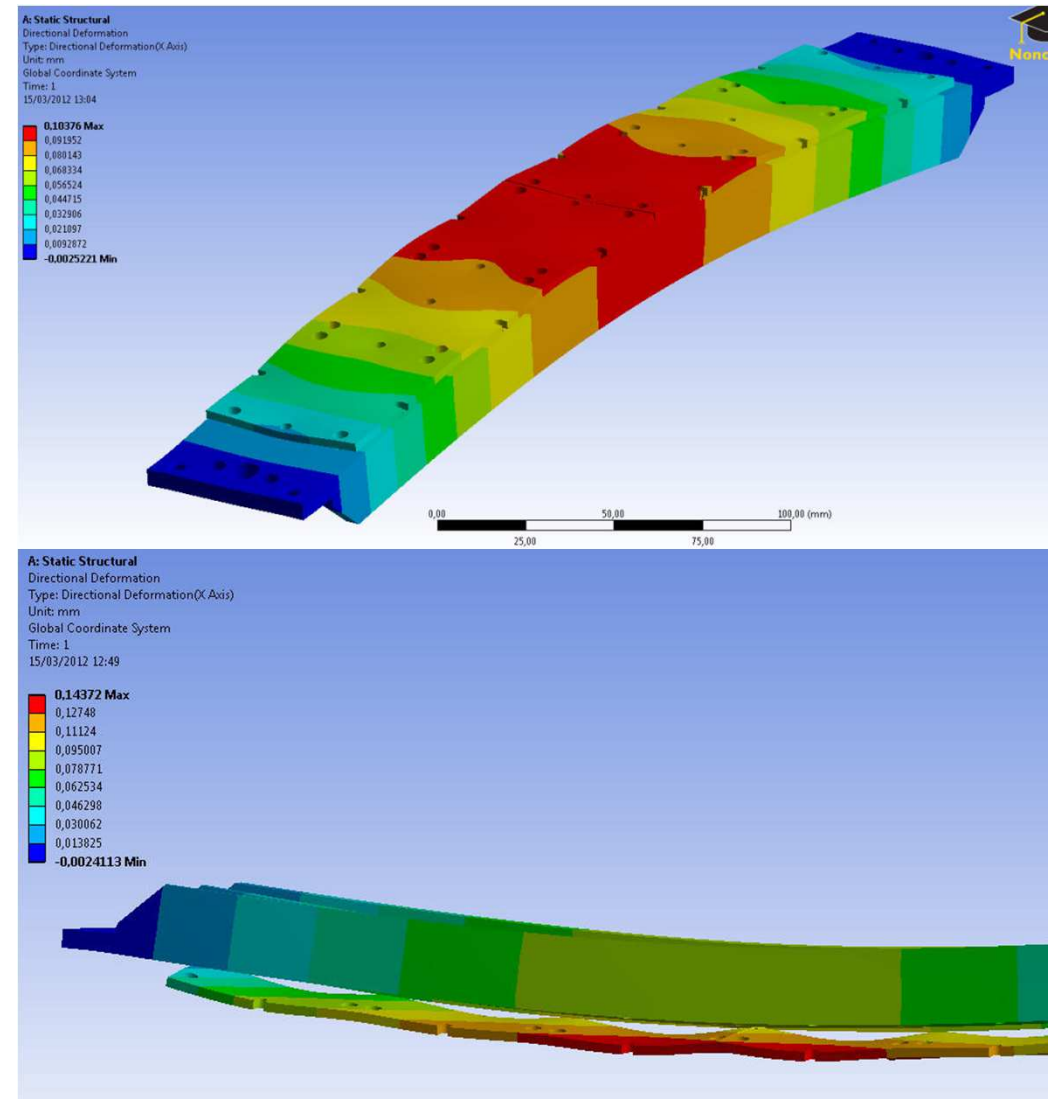
Pcbs can deform up to 50 μm depending on thickness and coupling to bar

Requires many coupling screws or gluing

Thus suggested clearance of 200 – 300 μm

Thin spacers between bar and quartz or stiffer structure are possible if such clearance not acceptable, but hardly smaller than 100 – 50 μm

(PMTs built-in clearance ... 50 μm ?)





SuperB FDIRC PMTs Backplane



2nd layout ZIF connectors

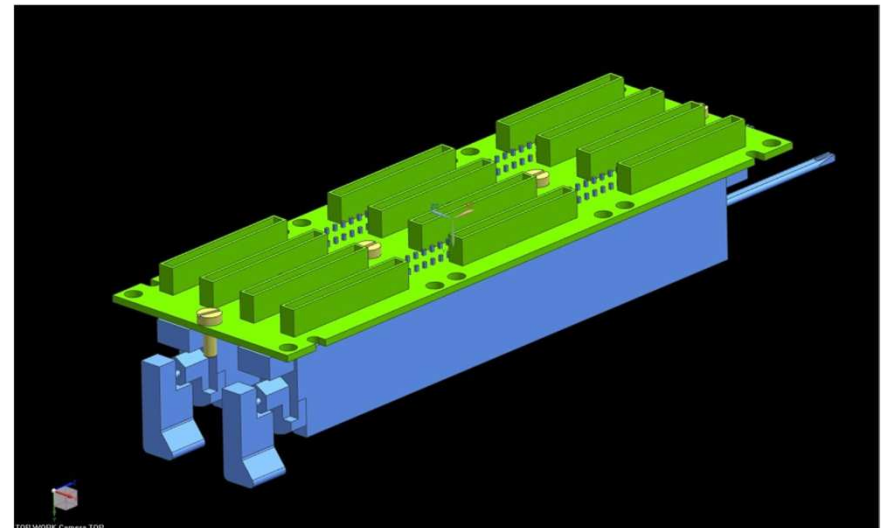
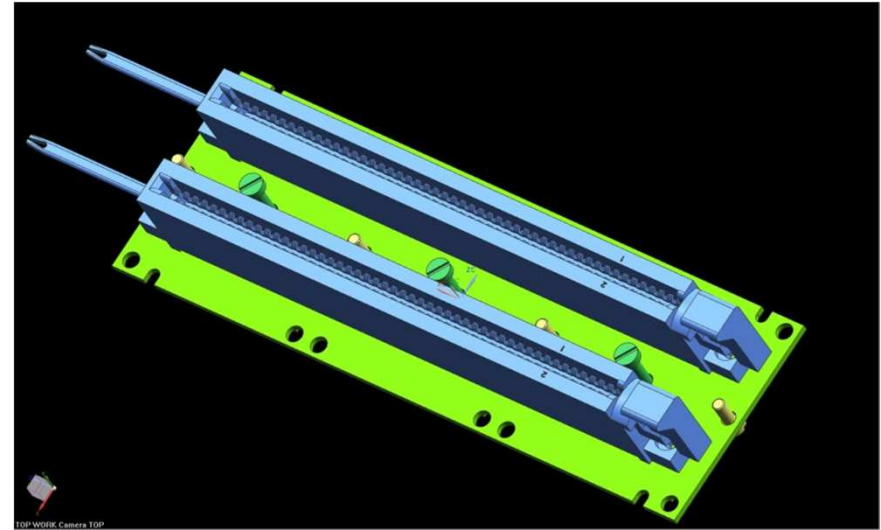
TE rotary ZIF connector 531414 suggested by Jerry, no? insertion force per ROb (row of 2 connectors)

Large dimensions due to pitch of 2.54 mm, 50+50 contacts, length of connector body \approx 150 mm

200 contacts each 3 PMTs

2 PCBs per each bar, 3 PMTs per PCB

Need spacers between connector and MBoard PCB due to pins and soldering of opposite connectors.





SuperB FDIRC PMTs Backplane

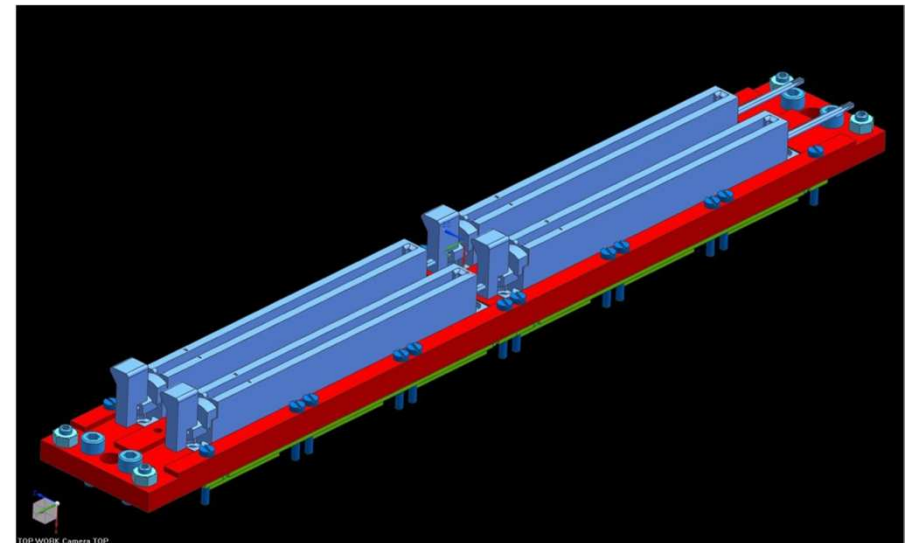
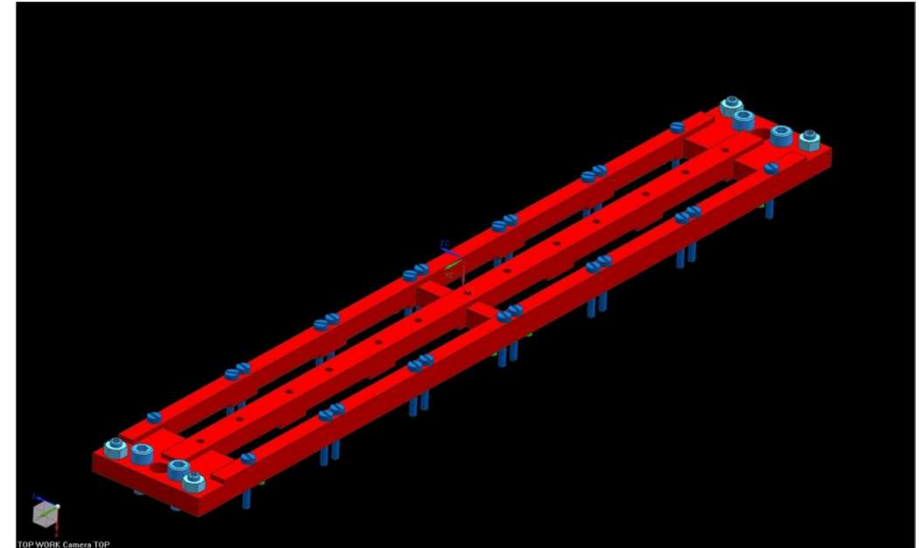
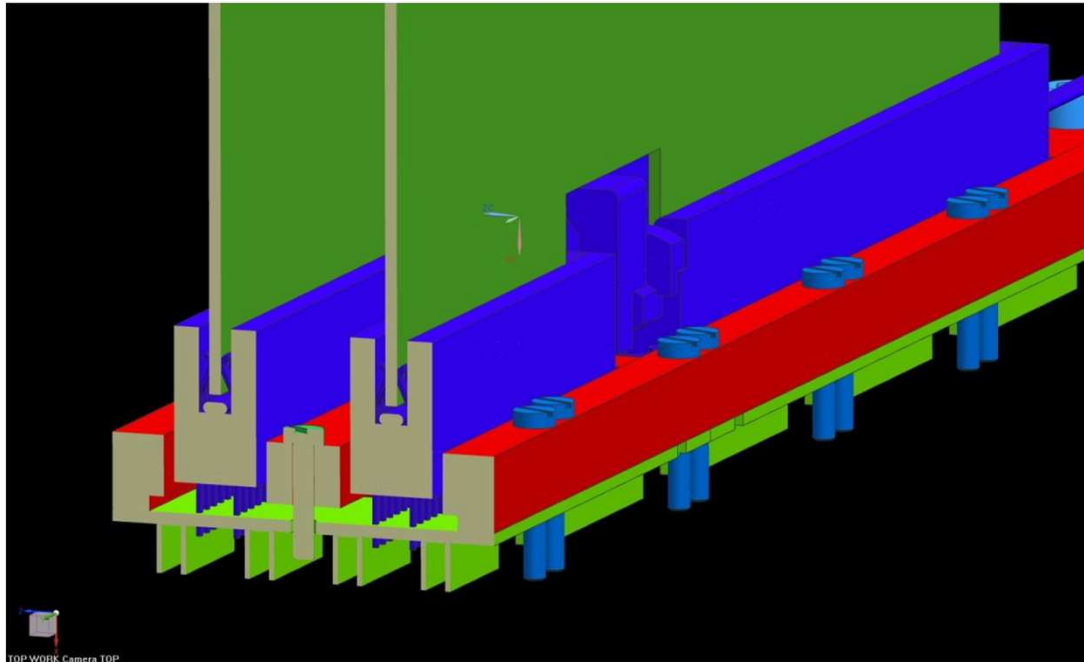


Can be mechanically coupled via cam rod, for common tight/release command

Connectors pitch of 3 PMTs = 158.4 mm could require custom cam rod

No pins, contact directly on ROb pcb

Allow lighter structure: e.g. FR peek, lower profile, but deformation could be as previous one.





SuperB FDIRC PMTs Backplane



Both solution are mechanically feasible if the gap PMTs to quartz is allowed.

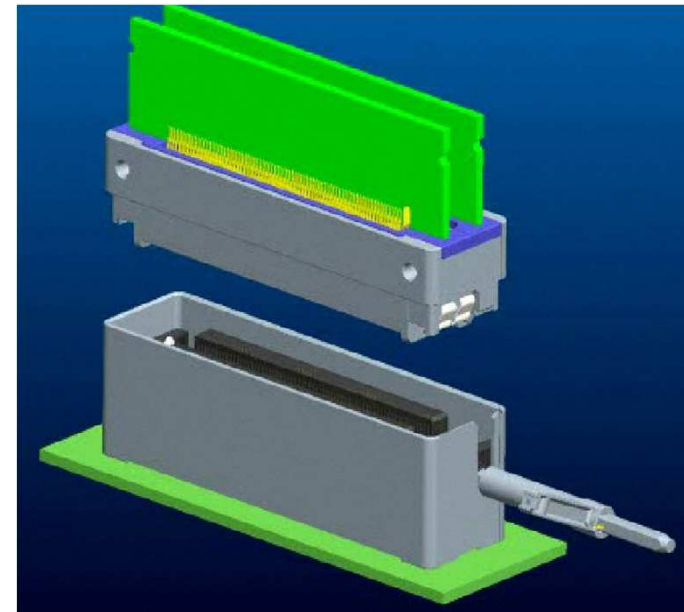
ZIF imply less risk for PMTs and backplane but does not seem mandatory

Connectors should be better defined and choosed based on:

- N. of contacts required per PMT
- pitch
- dimensions
- Locking mechanism serial connection if >2
- “very I speed connector with very low cross talk” (Christophe)
- Possibly ZIF

Appendix:

HV (+ground) connection and cables assumed to run under the pcb structure (7.5 mm gap)





SuperB FDIRC Robs crate

