Geometry of HRPPD darkbox

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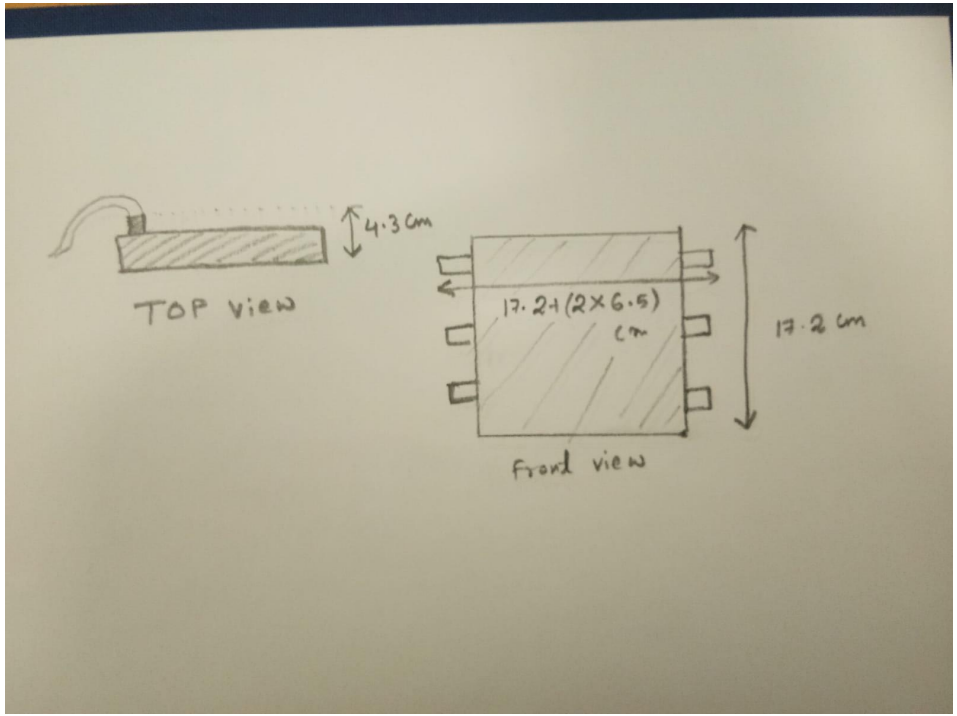
HRPPD dimensions

- sides X=17.2 cm
- HV connectors dX=2*6.5 cm
- height H=4.3 cm



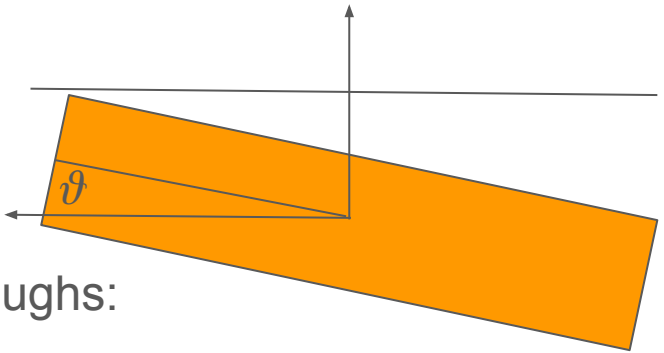
Global Geometry

- maximum inclination angle:

$$\sin\theta = \frac{ZX \pm H\sqrt{X^2 + H^2 - Z^2}}{X^2 + H^2}$$

- for M113 magnet Z=17 cm:

$$\theta \simeq 25.8^o$$

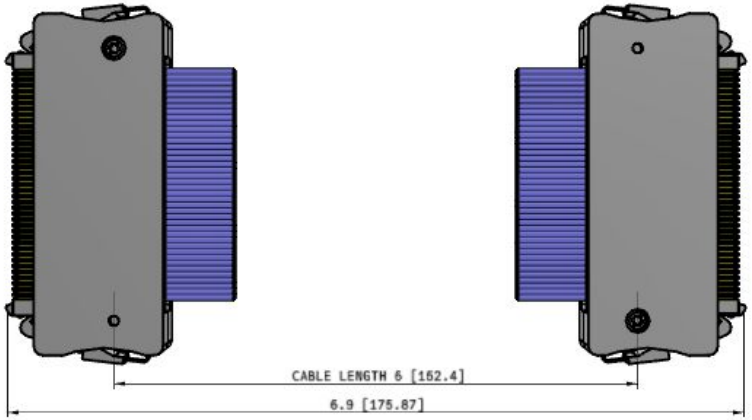


- above ignores darkbox thickness and feedthroughs:

dX~2*2 cm, dH=2*0.5 cm

$$\theta \simeq 20.6^o$$

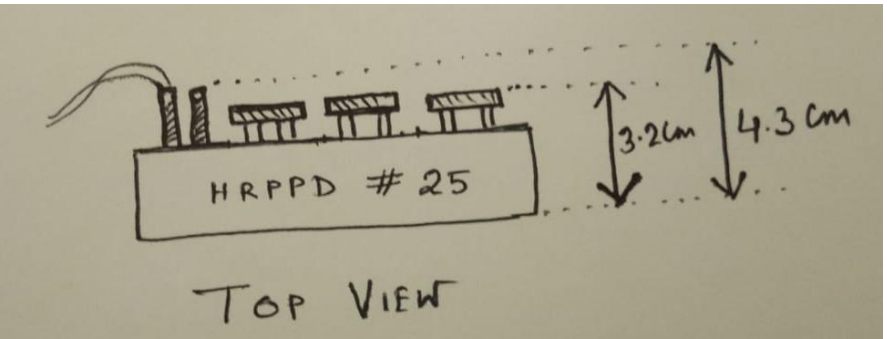
SAMTEC connector



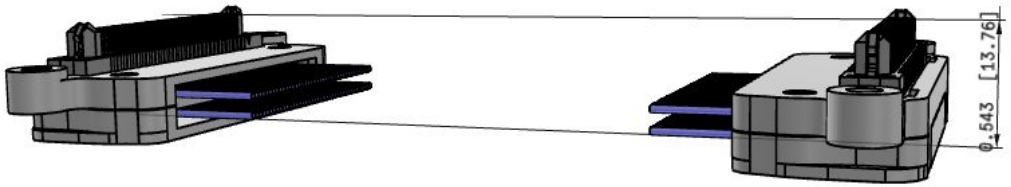
height ~1.9+0.6=2.5 cm

Total HRPPD height without connector:
4.3-2.5=1.8 cm - but GND taps have height of 3.2 cm, thus improvement is small:

$$\theta \simeq 22.6^{o}$$



height 1.4 cm



HV connectors

- if HV connectors and the plate could be substituted with cables soldered directly to the feedthroughs on the box edges:

2*6.5 cm → 2*2.3cm → X=17.2+2*2.3=21.8 (includes already SMA feedthroughs)

$$\theta \simeq 35.6^o$$

- together with SAMTEC 90 deg. connector (H=1.8+1.4+1=4.2 cm - same height for GND taps):

$$\theta \simeq 39.1^o$$