

MSL RAD Sensor Head PIN Detector Mount Flex Strips

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The single pixel PIN detectors of the RAD instrument will be connected via small flex strips to the preamplifier electronics.

One end of the strip has a square rigid base, which will be glued onto the surface of the detector. Three contacts of the detector will be wirebonded to gold pads on the flex strip.

The other end of the strip will be glued onto the edge of an electronics board, and small wire bridges soldered from the strip to the electronics board will provide electrical contact.

The end of the strip fits into a flex strip connector with 1 mm contact pitch. The transport trays for the detectors will be equipped with such a connector, such that the detectors can be tested while contained inside the tray.

The strips are 4 mm wide. The square base is $4 \times 4 \text{ mm}^2$. For the neutron channel and bottom anticoincidence readout (E and F detectors) the strip will be 20 mm long, with straight traces. The CsI readout (D detectors) strips are 16 mm long, turning 90 deg to the right from the bond pads.

1 Fabrication

1.1 Material

The flex strips shall be made of polyimide base material, including the rigid parts. Copper thickness **TBD**. Surface finish **TBD**. Bond pads **TBD**.

1.2 Quantity

The RAD instrument needs three of each D, E, and F detectors. Detectors will be made for six instruments, and we need a couple of spare flex strips. Each detector of a give type shall be identified by a unique serial number, which shall be visible on the flex strip.

Fig. 4 show a proposed assembly of 48 E/F strips and 24 D strips on a single board, each with a unique number on a copper layer.

1.3 Design Rules

The traces are 0.7 mm wide, at a pitch of 1 mm.

1.4 Layers

The design provides Gerber layers for each Capton outline, the copper trace layer, copser serial number, the bond pads, and for the solder pads. The layer order is defined in the following table.

	Material	Thickness		Gerber file
1	copper	35 μm	serial number	*.group0.gbr
2	Capton	TBD	rigid top	*.group1.gbr
3	Capton	TBD	flex insulation	*.group2.gbr
4a	Gold	TBD	wirebond pad	*.group3.gbr
4b	TBD	TBD	solder pad	*.frontpaste.gbr
5	copper	35 μm	copper routing	*.group4.gbr
6	Capton	TBD	flex strip	*.group5.gbr
7	Capton	TBD	rigid base	*.group6.gbr

1.5 Layout

There is a design file for the E/F strips (Fig. 2) and another one for the D strips (Fig. 3). Fig. 1 shows the designs in true size.

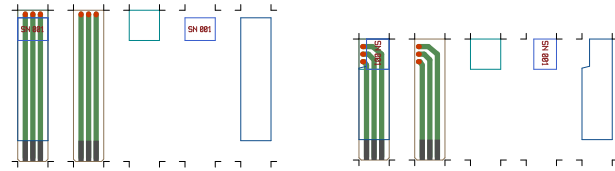


Figure 1: Detector strips, actual size

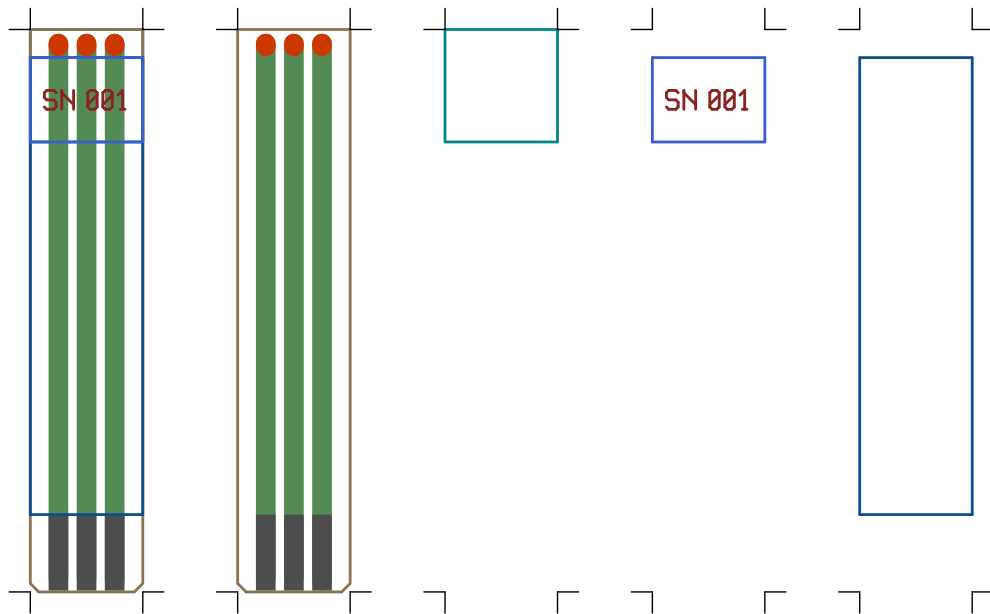


Figure 2: Detector E/F strips: overview, flex layer, rigid base, rigid top, strip insulation

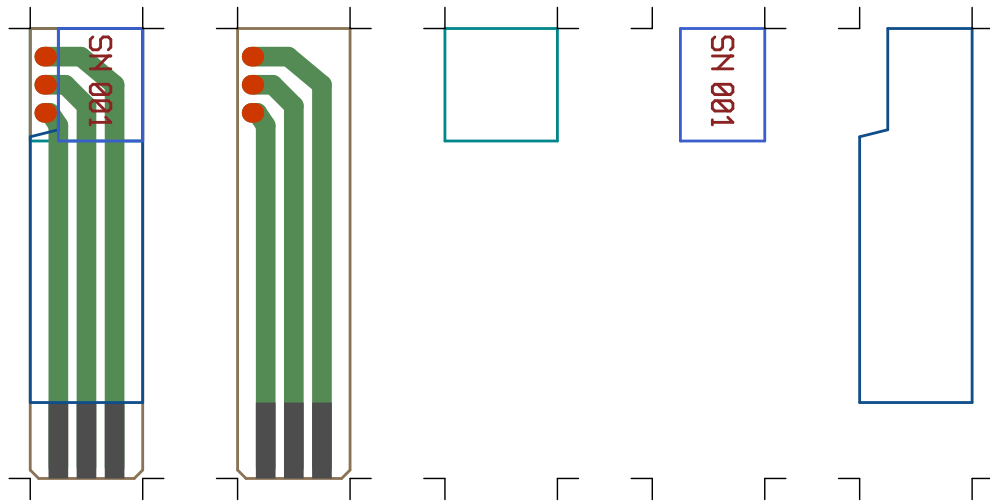


Figure 3: Detector D strips: overview, flex layer, rigid base, rigid top, strip insulation

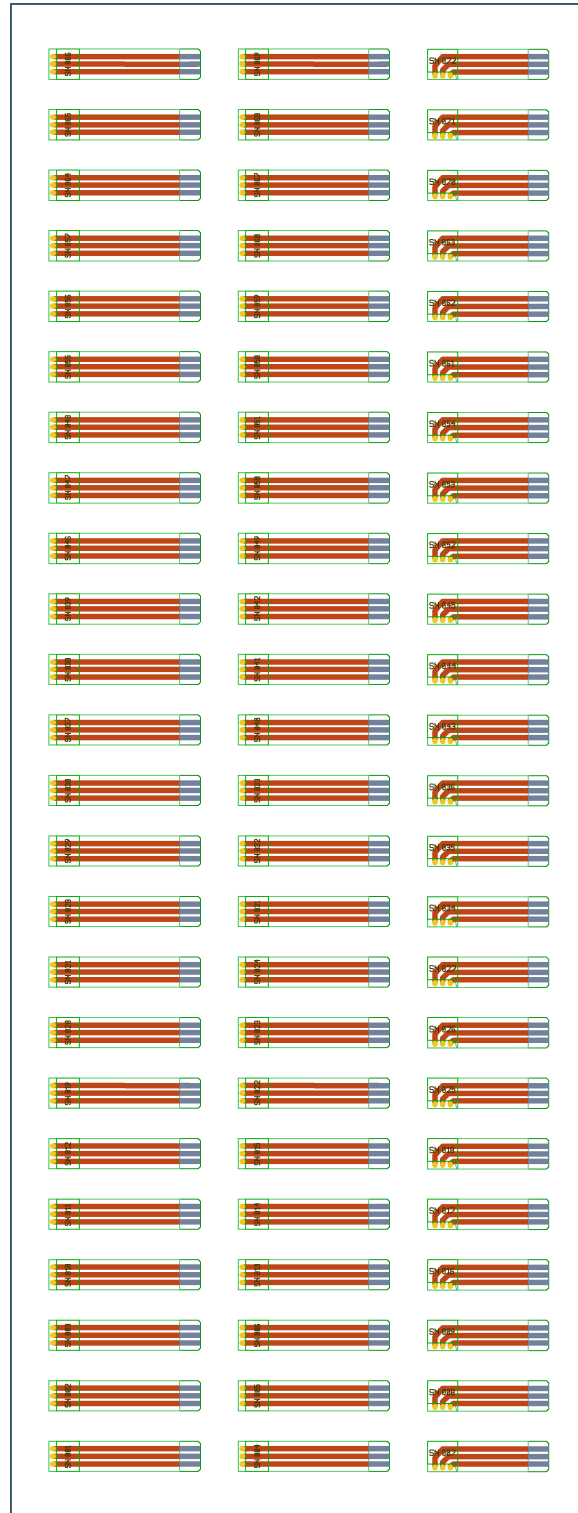


Figure 4: Possible assembly of a full set of strips on a single board