Design, Production, Burn-in and Tests of the hybrid circuits of the Upstream Tracker at the LHCb detector

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Abstract: We present a detailed description of the design, prototyping and production of the hybrid circuits for the front-end electronics of the Upstream Tracker at LHCb. The multilayer flexible circuits are design to host the front-end chips, ensure a low radiation length and withstand the harsh environment conditions of the data taking.

Summary (500 words)

The Upstream Tracker is a tracking detector at the LHCb experiment, placed just upstream of the dipole magnet. It consists of four layers of silicon strip sensors with high granularity and low radiation length. We have designed produced and delivered the hybrid circuits that host the ASICs developed for the detector front end. The inner part is read out by 8-chip hybrids (80 in total), while the outer part of the detector uses 4-chip circuits (888 in total). This contribution covers the design and prototyping process of those flexible circuits, organized in "panels", and the challenges deriving from their mass production and delivery to the final assembly laboratory. The full chain of electronics tests and burnin process in order to avoid early failures on chips is also described.

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