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The Associative Memory System Infrastructure of the ATLAS Fast Tracker

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The Associative Memory (AM) system of the Fast Tracker (FTK) processor has been designed to perform pattern matching using the hit information of the ATLAS experiment silicon tracker. The AM is the heart of FTK and is mainly based on the use of ASICs (AM chips) designed on purpose to execute pattern matching with a high degree of parallelism. It finds track candidates at low resolution that are seeds for a full resolution track fitting. The AM system implementation is based on a collection of boards, named "Serial Link Processor" (AMBSLP), since it is based on a network of 900 2 Gb/s serial links to sustain huge data traffic. The AMBSLP has high power consumption (~250 W) and the AM system needs custom power and cooling.

This presentation reports on the integration of the AMBSLP inside FTK, the infrastructure needed to run and cool the system which foresees many AMBSLPs in the same crate, the performance of the produced prototypes tested in the global FTK integration, an important milestone to be satisfied before the FTK production.

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