

FIRMWARE DEVELOPMENT FOR THE
ATLAS LEVEL-1 CALORIMETER
TRIGGER CLUSTER PROCESSOR
MODULE

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Synopsis

The first chapter of this thesis introduces the motivation behind the Large Hadron Collider (LHC) at CERN - the Standard Model of Particle Physics and possible physics beyond the Standard Model. The second chapter gives an overview of the LHC, and the ATLAS detector in particular, with a focus on calorimetry which provides the input for the Level-1 Calorimeter Trigger. Chapter three explains the ATLAS Trigger system and focuses on the Level-1 Calorimeter Trigger and Chapter four provides more detail about the Level-1 Calorimeter Trigger Cluster Processor Module, and discusses the logic within the FPGAs on the board. Chapter five describes the testing environment used for the CPM, including the software tools for firmware development and the hardware modules designed specifically for aiding tests. Chapter six goes into detail about testing of the CPM and specifically firmware-based testing using the chips on the board, and Chapter seven describes integration tests with the full Level-1 Trigger, focusing on the H8 CERN testbeam during the autumn of 2004.