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TRIGGER SYSTEM CHANGES FOR THE HERMES III ACCELERATOR

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This paper describes the hardware changes made to the triggering systems of the HERMES III accelerator at the Simulation Technology Laboratory (STL) at Sandia National Laboratories, New Mexico. The HERMES III accelerator is a gamma ray simulator producing 100kRad dose per shot with a full width half max pulse duration of ˜25 nanoseconds and averages six shots per day. For each accelerator test approximately 400 probe signals are recorded over approximately 65 digitizers. The original digitizer trigger system employed numerous independent legacy signal generators resulting in non-referenceable digitizer time bases. Also, the HERMES III accelerator is operated as a "work for others" and some users want the HERMES III x-ray pulse to occur at pre-determined times with respect to their local time reference thereby requiring these users initiate the triggering of the HERMES III accelerator. Our solution to these issues is twofold. First, to reference the digitizer time bases together we employed a modular and scalable approach using commercial off the shelf components. Second we added an inhibit-able trigger system that users may access allowing them to safely trigger the HERMES III accelerator. This upgraded trigger system presently measures a maximum scope trigger time spread of less than two nanoseconds across the 65+ scopes.

This document details the hardware changes, provides a summary of the accelerator charging process, presents "one-line" trigger system diagrams and summarizes the times of interest for a typical HERMES accelerator shot.

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