

## Project Status Report – RMC75E Test Bench

Date: June 23, 2023

Subject: Progress Update: Test Units and Simulation Refinement

### Problem Summary:

The focus of the current project phase is to ensure the correct setup and emulation of the test units in order to accurately simulate and test their behavior. While a good number of the 30 modules in the source code have been configured, many of the larger modules still require correction to meet the necessary conditions for accurate simulation. These corrections involve ensuring the proper initialization and configuration of various signals within the test units.

To achieve accurate simulation, the following general steps need to be followed:

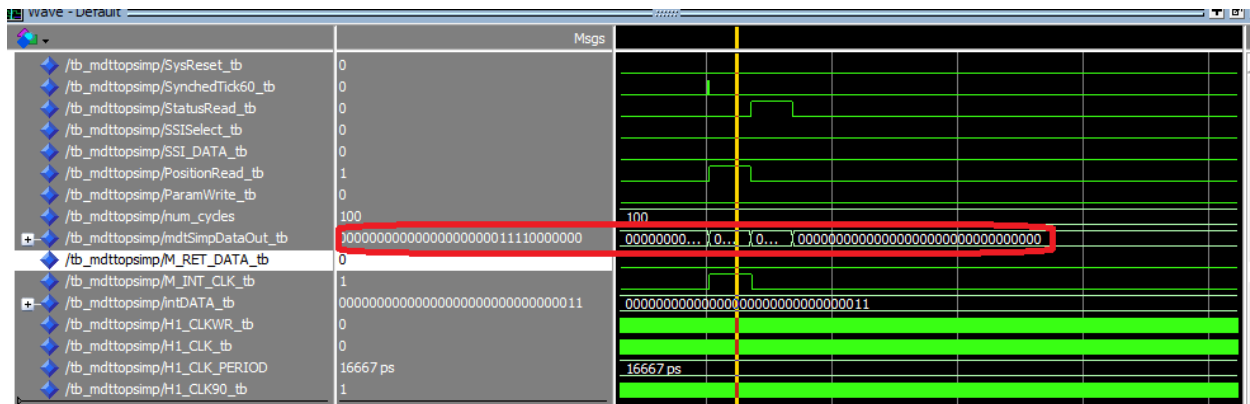
1. Verify the system clock and other clocks operate at the correct frequencies, typically 60MHz for the system clock and 30MHz for the read-write clock.
2. Ensure the synchronization pulses, SynchedTick and SynchedTick60, are sent at the correct times. The pulses should occur at a particular interval. This varies according to module. The second pulse is essential to latch the correct data, as the first pulse captures uninitialized or garbage data.
3. Confirm that the SysReset signal transitions from high to low after one 30MHz clock cycle to initialize the system before any further operations.
4. Validate the proper initialization and configuration of all other signals, which may vary depending on the specific module.

Note that the above steps provide a rough outline, and the requirements for each module will differ. A thorough understanding of the conditions necessary for accurate emulation is crucial during the correction process.

### Progress to Date:

Significant progress has been made thus far, with a solid chunk of the modules now correctly configured as far as I can tell. Notably, the issue regarding the absence of data on the MDTSimpDataOut output line, which receives data from the PositionRead and StatusRead signals, has been resolved. This achievement is particularly noteworthy, as it involved addressing a larger module and ensuring the successful output of data. The approach used to resolve this module has served as a template for updating other test units.

Fig. 1



(When PositionRead signal is sent, we get this data in the 32-bit data output register: "000...11110000000", which in binary corresponds to the value 1984 in base 10. This corresponds with the count recorded by the 12-bit synchronous counter.)

#### Next Steps:

The next steps involve refining the simulation of each test unit and collaborating with David to ensure their compliance with the required standards. Additionally, a skeleton for a golden vector file, containing correct outputs based on specific inputs, has been developed and when finished can be utilized for verification purposes. Furthermore, a rough test bench wrapper has been created, which when complete, should streamline the testing process by allowing the simultaneous execution of all test units, eliminating the need to run them individually.

Continued effort will be dedicated to reviewing the remaining test units and ensuring their correct emulation. Regular consultation with David will ensure comprehensive validation and provide an opportunity for his expertise to be applied. The development of comprehensive documentation, including rationale, explanations, and instructions for future reference, will continue alongside the refinement of source code and revised test units.

By diligently progressing through the remaining test units and refining the simulation process, we aim to achieve an accurate and reliable emulation environment for comprehensive testing and verification of the RMC75E source code.