

# MR2A16A – 256K x 16 MRAM

## VHDL Model Readme File

### Introduction

This is the VHDL model of the MR2A16A – a 256K x 16 MRAM Product from Everspin. This is a high level abstraction of this product.

### Device Summary

The **MR2A16A** is a 4,194,304-bit magnetoresistive random access memory (MRAM) device organized as 262,144 words of 16 bits. This device offers SRAM Compatible 35ns read/write operation and every data bit written into the memory is automatically protected in the MRAM array. Data retention of greater than 20 years is guaranteed. This device is offered in a 44 Pin TSOP II package and a 48 0.75mm Pitch BGA package.

### Model Release Notes

Product Datasheet: [http://www.everspin.com/PDF/EST\\_MR2A16A\\_prod.pdf](http://www.everspin.com/PDF/EST_MR2A16A_prod.pdf)

Model Revision: 1.0

Model Release Data: August 2010

Model Test Tools: Mentor Graphics ModelSim, Symphony Sonata

### Files

- |                        |   |
|------------------------|---|
| 1. Readme_MR2A16A      | - This File                                     |
| 2. MR2A16A.vhdl        | - Device Model                                  |
| 3. Package_Utility     | - Standard Conversion Utilities                 |
| 4. Benchtest.vhdl      | - Top Level Test Bench                          |
| 5. MR2A16A_Driver.vhdl | - Sample Test Vectors used for the Verification |
| 6. MR2A16A.txt         | - Memory Initialization File                    |

### VHDL Model

MR2A16A.vhdl is the abstracted model of the 256K x 16 MRAM. The model is setup for 35ns operation.

### Test Bench

Benchtest.vhdl and MR2A16A\_driver.vhdl form the example test bench used to verify this model. This is not a complete test bench and has been provided to give information on model usage.

### Memory Initialization

MR2A16A.txt is used to initialize the memory on startup. This file is updated on every memory write depending on the state of the MemoryWrite Flag. The MemoryWrite flag can be turned off to improve simulation speed or when data written into the MRAM array need not be saved.

The memory initialization file has the following format

```
FFFF FFFF FFFF FFFF .....FFFFF
FFFF FFFF FFFF FFFF .....FFFFF
```

Each row in the file has 1024 words (x16 each) of data. The MR2A16A.txt has 256 rows.

**Warning:** These VHDL models are provided “as is” without warranty of any kind, including, but not limited to, any implied warranty of merchantability and fitness for a particular purpose.

## Revision History

Date	Revision	Changes
8/4/2010	1.0	New Model – Initial Release

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