Introduction

This user guide is provided to help users understand the Hardware and Software requirements needed for evaluation of the EMxxLX Industrial STT MRAM device from Everspin.

This guide will outline the Hardware and Software requirements for the user to setup, configure, initialize, and generate traffic test vectors for the EMxxLX device.

This guide assumes the user has full access to the EMxxLX data sheet and a reasonable understanding of HW and SW usage. This guide makes references and links to other support documents for the user.

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1. EMxxLX Daughter Card

The EMxxLX Daughter Card is populated with Everspin EMxxLX 64Mbit Industrial STT MRAM device. Other EMxxLX densities can be populated as well. This device is obtained through the sample request form on Everspin's website located here:

https://www.everspin.com/xspi-industrial-iot-and-embedded-systems

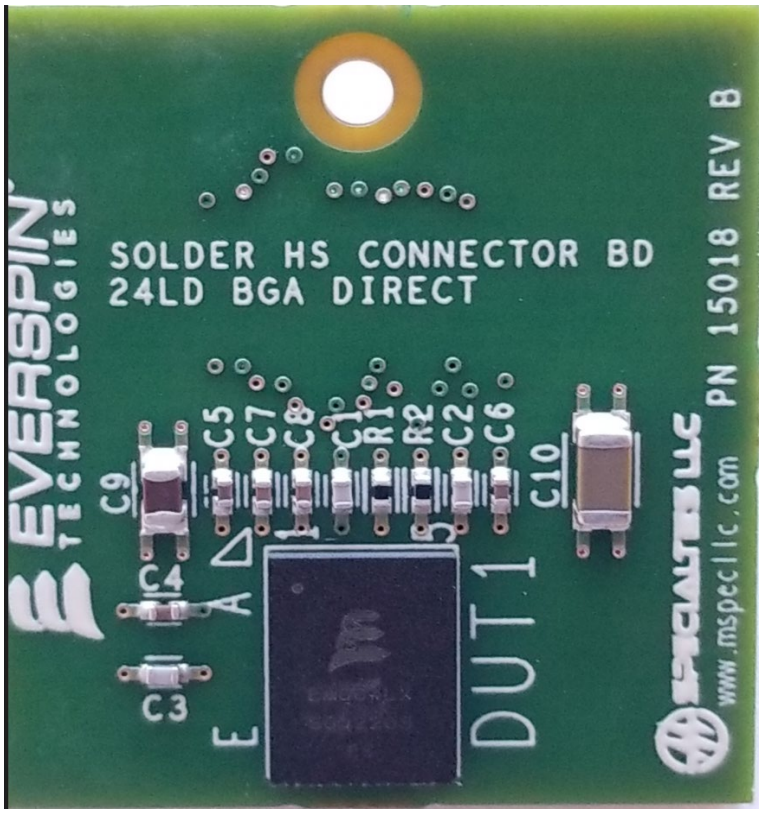

FIGURE 1 EMXXLX DAUGHTER CARD

2. Required Host Board Support

The EMxxLX evaluation board, here in referenced as the EMxxLX daughter card, is designed to connect to the Open FPGA specification Arrow CYC5000 IoT / Maker host board HS (High Speed) slot. This host platform is available to order from Arrow Electronics Inc. website: https://www.arrow.com/en/products/tei0050-01-aah13a/trenz-electronic-gmbh

The following features are available on the CYC5000 board:

- Intel Cyclone V 5CEBA2U15C8N device
- Arrow USB Programmer2 on-board for programming; JTAG Mode
- 64Mbit SDRAM up to 166MHz
- 64Mbit QSPI Configuration flash memory
- CRUVI HS Connector
- USB-to-JTAG
- GPIO-FTDI
- Arduino MKR Header
- 12MHz MEMS Oscillator
- 8x red user LEDs
- 2x board indication LEDs
- 2x user push buttons

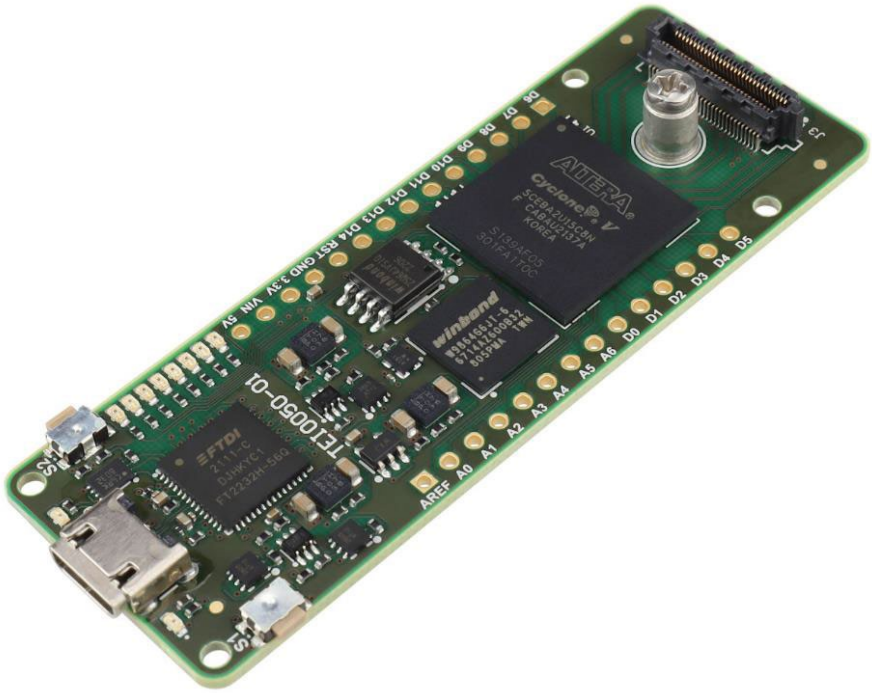

FIGURE 2 CYC5000 IOT/MAKER BOARD

3. IDE (Integrated Development Environment) Support

The Intel Cyclone V FPGA is supported using the Intel ® Quartus Prime Lite Edition Design Software. The LITE edition is a free use IDE and is available for download from Intel ® web site located here: https://www.intel.com/content/www/us/en/software-kit/684216/intel-quartus-prime-lite-edition-design-software-version-21-1-for-windows.html (you can also choose your preferred version)

Along with the IDE it is highly encouraged users to download the Intel ® recommended documentation.

Documentation Links:

- Intel® Quartus® Prime Software User Guides
- Intel® FPGA Software Installation and Licensing Manual
- Intel® Quartus® Prime Software and Device Support Release Notes (PDF)

4. Memory Controller Support

EMxxLX is Everspin's latest Industrial STT MRAM supporting JESD251 Expanded Serial Peripheral Interface (xSPI). To properly support this new JEDEC standard an xSPI compatible memory controller is required. Synaptic Labs LLC MBMC (Multi-Bus Memory Controller) IP is used in this evaluation board.

The Memory Controller IP temporary license (.lic) file is provided by Synaptic Labs LLC. Link for requesting temporary license file is here: https://synaptic-labs.com/free-trial-request/

After contacting and receiving the temporary license file, follow all directions contained in the Synaptic guide for installing and configuring the Memory controller IP.

5. IDE Software Installation and Configuration

To program the FPGA with the correct image Quartus Prime IDE is used in conjunction with Synaptic Labs MBMC (Multi-Bus Memory Controller) IP. Locate the Quartus Prime IDE install file downloaded in section 3. Follow the installation instructions associated with the file. The user guide assumes default file location is used during the installation process.

6. Reading and Writing EMxxLX MRAM

Contained within the Synaptic user guide are instructions for reading and writing the EMxxLX device.

Summary

This Evaluation platform user guide has been provided to give users the ability to evaluate Everspin's EMxxLX Industrial MRAM. After proper configuration, the user can download the required FPGA .SOF and ELF files to test and evaluate EMxxLX industrial MRAM. More detailed steps are provided to the user with the required download of the appropriate CYC5000 User Guide from Arrow Electronics website.

Revision History

Revision	Date	Description of change
1.0	November 06, 2024	Initial Release

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