

ZeBu DRAM Installation Guide

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Preface

About this Guide

The ZeBu DRAM Installation Guide contains information about hardware and software prerequisites for the correct installation, the steps to install ZeBu DRAM Memory Model, and contents of the package after installation.

Intended Audience

This manual is intended for experienced EDA hardware and software engineers to help with the installation of ZeBu transactors. and engineers should have experience with the Linux operating system.

Related Documentation

For an overview of ZeBu transactors, see *ZeBu Vertical Solutions User Manual*.

For information about the new features and enhancements in the ZeBu DRAM Library for this release, see *ZeBu DRAM Library Release Notes*.

For details about the ZeBu supported features and limitations, see the *ZeBu Release Notes* in the ZeBu documentation package which corresponds to the software version you are using.

Synopsys Statement on Inclusivity and Diversity

Synopsys is committed to creating an inclusive environment where every employee, customer, and partner feels welcomed. We are reviewing and removing exclusionary language from our products and supporting customer-facing collateral. Our effort also includes internal initiatives to remove biased language from our engineering and working environment, including terms that are embedded in our software and IPs. At the same time, we are working to ensure that our web content and software applications are usable to people of varying abilities. You may still find examples of non-inclusive language in our software or documentation as our IPs implement industry-standard specifications that are currently under review to remove exclusionary language.

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Introduction

ZeBu Vertical Solutions also offers off-the-shelf memory models for most standard DRAM memories such as SDRAM, DDR, DDR2, DDR3, DDR4, LPDDR2, LPDDR3, GDDR5. These models leverage on-board memory resources of ZeBu and are completely synchronized with emulated design, eliminating any issues with timing or refresh cycles. They are configurable and different ZeBu memory families can be implemented in the same ZeBu hardware. No cards/DIMMs need to be plugged or unplugged/added or removed to switch between models. For memories larger than 4 GB, memory transactors that leverage the storage on the host computer are also available.

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Installing ZeBu DRAM Memory Models

This section explains the following topics:

- [Knowledge](#)
- [Software](#)

Knowledge

You must be familiar with the ZeBu products and should have a good knowledge of the transactors' architecture and setup.

Ideally, you should have previously attended Synopsys' training about *Using Memory Models* and/or succeeded in the *ZeBu Tutorials* concerning transactors and memory models.

Software

You need the following software elements with appropriate licenses, if required:

- ZeBu V-2024.03-1-TZ release correctly installed.
- One of the following:
 - RHEL 8+
 - CentOS: 7.3.1611+
 - Suse
 - C/C++ compiler: GCC 9.5.0 and above for 64-bit environments

Installing ZeBu DRAM Memory Models

Prerequisite

WRITE permissions on the IP directory and the current directory.

Installation Process

To install a DRAM package, perform the following steps:

1. Download the respective DRAM compressed shell archive (.sh).
2. Install the respective DRAM using the following command:

```
$ sh <DRAM Memory Model_Name>.<version>.sh install [ZEBU_IP_ROOT]
```

where *[ZEBU_IP_ROOT]* is the path to your ZeBu IP directory. The following are the exceptions to specifying this input:

- If no path is specified, the *ZEBU_IP_ROOT* environment variable is used automatically.
- If the path is specified and a *ZEBU_IP_ROOT* environment variable is also set, DRAM is installed at the defined path and the environment variable is ignored.

The installation process is complete and successful when the following message is displayed:

```
<DRAM_Memory_Model> v.<version> has been successfully installed.
```

If an error occurred during the installation, a message is displayed to point out the error as shown in the following example:

```
ERROR: /auto/path/directory is not a valid directory.
```

Package Description

Once correctly installed, the DRAM package comes with the following elements:

- *\$ZEBU_IP_ROOT/doc/foss*: Contains FOSS documents
- *\$ZEBU_IP_ROOT/doc*: *Contains user guide for the DRAM Memory Model.*
- *\$ZEBU_IP_ROOT/third_party_sw*: The third party libraries used in the DRAM library are available as part of the installation.

Packages in ZeBu DRAM Library

The following table lists the ZeBu DRAM titles available as part of the library and their respective package names.

Table 1 ZeBu DRAM Library

XTOR Title	Package Name
ZeBu CellularRAM Memory Model	ZCellularRAM_V-2024.03-SP1.sh

Table 1 ZeBu DRAM Library (Continued)

XTOR Title	Package Name
ZeBu Fast DDR2 SDRAM Dual in-line Memory Model	ZDDR2_SP_DIMM_V-2024.03-SP1.sh
ZeBu Fast DDR2 SDRAM Memory Model	ZDDR2_SP_V-2024.03-SP1.sh
ZeBu Fast DDR3 SDRAM Dual in-line Memory Model	ZDDR3_DIMM_V-2024.03-SP1.sh
ZeBu Fast DDR3 SDRAM Dual in-line SPD Memory Model	ZDDR3_DIMM_SPD_V-2024.03-SP1.sh
ZeBu Fast DDR3 SDRAM SP Memory Model	ZDDR3_SP_V-2024.03-SP1.sh
ZeBu Fast DDR4 SDRAM Dual in-line Memory Model	ZDDR4_DIMM_V-2024.03-SP1.sh
ZeBu Fast DDR4 SDRAM Dual in-line SPD Memory Model	ZDDR4_DIMM_SPD_V-2024.03-SP1.sh
ZeBu Fast DDR4 SDRAM Memory Model	ZDDR4_V-2024.03-SP1.sh
ZeBu Fast DDR5 SDRAM Memory Model	ZDDR5_V-2024.03-SP1.sh
ZeBu Fast DDR5 SDRAM Dual in-line Memory Model	ZDDR5_DIMM_V-2024.03-SP1.sh
ZeBu DFI Interface	ZDFI.V-2024.03-SP1.sh
ZeBu Embedded DRAM Memory Model	ZEDRAM_V-2024.03-SP1.sh
ZeBu EEPROM Memory Model	ZEEPROM_V-2024.03-SP1.sh
ZeBu Graphics DDR5 Memory Model	ZGDDR5_V-2024.03-SP1.sh
ZeBu Graphics DDR6 Memory Model	ZGDDR6_V-2024.03-SP1.sh
ZeBu High Bandwidth Memory Model (HBM3)	ZHBM3_V-2024.03-SP1.sh
ZeBu High Bandwidth Memory Model	ZHBM_V-2024.03-SP1.sh
ZeBu Fast LPDDR2 SDRAM SP Memory Model	ZLPDDR2_SP_V-2024.03-SP1.sh
ZeBu Fast LPDDR3 SDRAM Memory Model	ZLPDDR3_V-2024.03-SP1.sh
ZeBu LPDDR4 SDRAM Memory Model	ZLPDDR4_V-2024.03-SP1.sh
ZeBu LPDDR5 SDRAM Memory Model	ZLPDDR5_V-2024.03-SP1.sh

Table 1 ZeBu DRAM Library (Continued)

XTOR Title	Package Name
ZeBu PSRAM Memory Model	ZPSRAM_V-2024.03-SP1.sh
ZeBu Reduced Latency DRAM Memory Model	ZRLDRAM_V-2024.03-SP1.sh
ZeBu SDRAM Memory Model	ZSDRAM_V-2024.03-SP1.sh
ZeBu Wide IO Memory Model	ZWIDEIO_V-2024.03-SP1.sh
ZeBu Wide IO2 Memory Model	ZWIDEIO2_V-2024.03-SP1.sh