SYNOPSYS®

Pre-Installation Information for ZeBu® Server-3

ZeBu Application Note

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About This Manual

Overview

This document is applicable for ZeBu Server-3.

Intended Audience

This document is intended ZeBu Server-3 prospects who need to plan their infrastructure for later installation of the ZeBu system.

History

This table gives information about the content of each revision of this manual, with indication of specific applicable version:

Doc Revision	ZeBu Version	Date	Evolution
a		Jul 13	First Edition

Related Documentation

Relevant information is available in the following documents:

- ZeBu Server-2 Installation Manual
- ZeBu Release Note for V7_1_0 (ZeBu Server-2/ZeBu Blade-2)
- V800_ReadMe.txt

1 Technical Data

1.1 Size and weight

Table 1: Size and Weight

	Weight		W x D x H (*)	
ZeBu Server-3 2-slot unit	< 30 kg	< 65 lbs	50cm x 50cm x 22cm	19.7″ x 19.7″ x 8.7″
ZeBu Server-3 5-slot unit	< 70 kg	< 155 lbs	50cm x 50cm x 51cm	19.7″ x 19.7″ x 20.1″
ZeBu Server-3 Hub	< 10 kg	< 22 lbs	40cm x 40cm x 8.5cm	15.7″ x 15.7″ x 3.3″
PCIe interconnection board			16.8cm x 11.2cm	6.6″ x 4.4″
			(*) including handles & feet	

Note ZeBu Server-3 units can be placed on shelves in a rack at least 24″ wide. For 5-slot units, the shelf must be carefully chosen to support the weight of the system.

Table 2: Lateral and Front Clearance Recommendations

Lateral Clearance	10 cm (4″) on each side
Front Clearance (for maintenance)	1 m (39.3″)
Rear Clearance (for maintenance)	1m (39.3″) - depends on lab organization and number of interconnection cables.

1.2 Power supply

The current limitations of the system due to the power supply fuse are:

- 10 Amp for a 2-slot ZeBu Server-3 unit
- 15 Amp for a 5-slot ZeBu Server-3 unit

Table 3: Electrical characteristics for a system with up to 3 modules

Voltage Range (single phase supply)	100–240 V, 50-60 Hz
Mean Power Consumption	800 W
Maximum Power Consumption*	1,500 W

Table 4: Electrical characteristics for a system with 4 or more modules

Voltage Range (single phase supply)	200–240 V, 50-60 Hz
Mean Power Consumption	1,200 W
Maximum Power Consumption*	2,500 W

* Estimated Instantaneous Power

The mean and maximum power consumptions of your ZeBu Server-3 unit depend on:

- The number of FPGAs in the unit
- The number of used FPGAs for the DUT
- The fill rate and toggle rate of your DUT FPGAs
- The initial state of the design, the memory requirements
- The system clock and design clocks frequencies

For a given application, the mean power measurement can give variable results, always lower than the values given in the tables above, but the mains supply must be chosen according to maximum consumption.

1.3 PCIe interconnection board and cable

The PCIe interconnection board for ZeBu Server-3 is compliant with PCI Express 2.0 standard.

Table 5: Dimensions of the PCIe interconnection board

	L x W	
PCIe interconnection board	16.8cm x 11.2cm	6.6″ x 4.4″

The PCIe board has 8 physical lanes but only 4 are used. It can fit into:

- Any 8- or 16-lane PCIe slot
- Some 4-lane PCIe slots

The PCIe cable length is 3 meters (9.8 ft).

1.4 Environmental constraints

The operating temperature is a critical point for ZeBu Server-3. For a proper air circulation on the ZeBu Server-3, Synopsys recommends installing it in an air-conditioned room with sufficient clearances on both left and right sides.

Table 6: Environmental constraints

Operating ambient temperature	10°C to 20°C (50°F to 68°F)
Operating relative humidity	Up to 80% non-condensing
Cooling for a 2-slot unit	2,720 BTUs (for total power of 1 kW)
Cooling for a 5-slot unit	6,800 BTUs (for total power of 2 kW)
Cooling for a 2-unit system	14,200 BTUs (for total power of 4 kW)
Cooling for a 3-unit system	21,000 BTUs (for total power of 6 kW)
Cooling for a 4-unit system	27,800 BTUs (for total power of 8 kW)
Cooling for a 5-unit system	34,600 BTUs (for total power of 10 kW)
Noise generated by a 2-slot unit	60 dB
Noise generated by a 5-slot unit	70 dB
Operating altitude	Up to 2,000 m (up to 6,500 ft)
Installation	Category II
Pollution	Pollution degree 2
RoHS	Compliant with Directive 2002/95/EC

2 PC Requirements for Installation

The ZeBu Server-3 hardware and software can be installed on most Linux-operated PCs. Read this chapter before installing the ZeBu Server-3 software and hardware to ensure that the chosen PC is suitable for installation.

2.1 Hardware requirements

2.1.1 Physical connection in the PC

The ZeBu Server-3 interconnection board is plugged in a PCIe slot in the host PC. For debug purposes, it may be interesting to use a PC with a RESET button to restart the system without powering OFF.

Note You must have as many host PCs as testbenches that may run simultaneously on a ZeBu Server-3 unit.

2.1.2 PC platform compatibility

The ZeBu compilation and runtime tools are 64-bit software which can only be used on 64-bit PC configurations. The ZeBu Server-3 unit has been successfully tested on various PC configurations.

For the host PC, the emulation runtime requires PC configurations with at least four cores. Additional cores are required when using advanced debugging functions or when using multi-threaded verification environments.

It is recommended to use only PC configurations previously tested by Synopsys. When using another PC configuration, you may encounter malfunction during installation and at runtime.

You should inform Synopsys if you want to use a PC configuration which is not part of the list of PC configurations tested and recommended by Synopsys. It is important that Synopsys has enough time to test this new PC before you use it with ZeBu Server-3.

The following PC configurations are recommended for this version of ZeBu software:

- Compilation:
  - Dell PowerEdge M610 (RHEL 5.7)
  - Dell PowerEdge R610 (RHEL 5.7)
  - Dell PowerEdge 1950 (RHEL 5.7)
  - HP Proliant DL360p Gen8 (RHEL 5.7)
  - Dell PowerEdge 2950 (SUSE 10 SP4 / SUSE 11 SP2)
- Emulation Runtime:
  - HP Z420 (RHEL 5.7)
  - HP Z620 (RHEL 5.7)

2.1.3 Memory requirements

Memory requirements when using ZeBu Server-3 vary according to design size:

- For ZeBu compilation tools the size of the design impacts the memory requirements, as indicated in Table 7.
  For any ZeBu Server-3 configuration, it is strongly recommended to compile the design in parallel on a PC farm instead of compiling on a single PC.
- Xilinx Vivado Place & Route software requires 16 GBytes RAM to avoid swapping when compiling one FPGA.
- For runtime, the PC must have enough memory to load the runtime database, as listed in Table 7. According to your verification environment (in particular for an HDL simulator) and the architecture of your testbench, you may need to increase the memory capacity to get performance.

Table 7: Memory requirements for ZeBu Server-3

Design Size	FPGA resources in the system	RAM Size for ZeBu Compilation	RAM Size for ZeBu Runtime
60 MGates	1x 9F module	32 GB	16 GB
300 MGates	5x 9F module	64 GB	32 GB

To verify the total available memory on the PC, type the following command in your shell:

```
$ free
```

The total listed under `Mem` gives the total memory available.

2.1.4 Hard disk requirements

The ZeBu software with the additional packages requires a maximum of 5 GBytes on your hard disk after installation.

The Xilinx Vivado Place & Route software requires ~10 GBytes on your hard disk after installation.

Temporary data stored during the software installation process requires ~2GBytes.

To get the total available disk space in each partition of the PC, type the following command in your shell:

```
$ df -k
```

When compiling the design for ZeBu, the estimated necessary disk space is about 1GByte per FPGA.

2.2 Software requirements

The ZeBu software for compilation and runtime runs under the Linux operating system.

Some additional third-party tools such as synthesizer (when not using **zFAST**, the ZeBu Fast Synthesis) and Xilinx Vivado Place & Route software should be installed also to have a working configuration, as described in Section 2.2.2.

2.2.1 Linux operating system requirements

Installing and upgrading the Linux operating system is typically carried out by the system administrator.

2.2.1.1 Linux operating system compatibility

ZeBu requires one of the following operating systems (installed in 64 bits) for both compilation and emulation runtime:

- Red Hat Enterprise Linux 5
- SUSE Linux Enterprise Server 10
- SUSE Linux Enterprise Server 11

2.2.1.2 Linux kernel compatibility

ZeBu requires a kernel from the 2.6 series or higher on Red Hat Enterprise Linux and SUSE Linux Enterprise Server.

However, you should check in the ***ZeBu Release Note*** which versions of the Linux kernel have been tested for the targeted ZeBu version.

To get the currently loaded kernel version of your Linux, type the following command in your shell:

```
$ uname -r
```

It is recommended to have the source files for your kernel version installed on the PC so that you can compile the ZeBu loadable kernel module (`zKernel`) if required. These source files are in an additional Linux package: `kernel-devel-<version>.`

2.2.1.3 Package selection

The appropriate Linux packages for software development must be installed on the PC where ZeBu is used (the package names may vary according to the Linux distribution you are using), in particular:

- `XFree86-devel`
- `freetype-devel`
- `fontconfig-devel`
- `compat-readline-4.3` with SUSE Linux Enterprise Server and Red Hat Linux Enterprise 5
- `kernel devel-<version>` for compilation of `zKernel`

If there are no disk space constraints when installing the Linux operating system, it may be easier to install a complete version of it, including all the packages.

If some required packages were not installed on the PC during the initial installation of Linux operating system, they can be installed afterwards.

Note If you previously installed these packages in 32-bit mode, you need to re-install them in 64-bit mode.

2.2.1.4 License software compatibility

The ZeBu software requires a FLEXnet license server to work (version 11 or higher). Three separate vendor daemons exist for the ZeBu software, for Xilinx Vivado Place & Route software and for the Concept Engineering software.

The ZeBu license software runs under the following operating systems:

- 32-bit Sun SPARC configuration:
  - Solaris 7 and above
- 32-bit PC configurations:
  - Red Hat Linux 8
  - Red Hat Enterprise Linux 3
  - Red Hat Enterprise Linux 4
  - Red Hat Enterprise Linux 5
  - SUSE Linux Enterprise Server 9
- 64-bit PC configurations:
  - Red Hat Enterprise Linux 3
  - Red Hat Enterprise Linux 4
  - Red Hat Enterprise Linux 5
  - SUSE Linux Enterprise Server 10

Note The license server and the ZeBu software can run on the same PC or on different PCs according to your IT configuration.

2.2.2 Third-party tools

ZeBu is used in association with third-party tools for synthesis, compilation, co-simulation and debug. Some of these tools are mandatory and others are left to user's choice (for example, one or other synthesis tools may be preferred).

It is recommended that third party tools be installed and run in 64-bit mode on 64-bit PC configurations; this is mandatory for runtime tools such as VCS, ModelSim, gcc, SystemC or NC-Sim.

2.2.2.1 Recommended third-party tools

The following table gives examples of third-party tools that have been successfully tested by Synopsys.

Table 8: Third-party tools with recommended versions

Tool	Tested Versions	Tested OS compatibility *	Remarks
Synplify Pro	2010.09-SP1	RHEL 5.4 SUSE 10	FPGA synthesizer. http://www.synopsys.com
VCS	mx-2011.12	RHEL 5.4 SUSE 10	HDL Simulator. http://www.synopsys.com
ModelSim	6.6b	RHEL 5.4 SUSE 10	HDL Simulator. http://www.mentor.com
NC-Sim	Not Tested		HDL Simulator. NC-Sim should work since ZeBu uses the standard PLI. http://www.cadence.com
SystemC	2.2.0	RHEL 5.4 SUSE 10	Required for SystemC co-simulation. http://www.systemc.org
GTKWave	3.3.26	RHEL 5.4	Waveform viewer. http://gtkwave.sourceforge.net Included in ZeBu software package.
Verdi / Verdi[3]	2012.10	RHEL 5.4 SUSE 10	Debugging platform for iCSA integration. http://www.synopsys.com/
gcc	4.1	RHEL 5 SUSE 10	C compiler. Part of the Linux operating system distribution. Required for C/C++ and SystemC co-simulation and for compilation of the software part of the transactor and of the runtime testbench. http://gcc.gnu.org/
Xilinx Vivado Place & Route	2013.2	RHEL 5.4	Xilinx tools for FPGA Place & Route during ZeBu compilation. http://www.xilinx.com
RTLvision PRO GateVision PRO	5.5	RHEL 5.4	RTL and gate-level netlist analyzers. http://www.concept.de Included in ZeBu software package.

* OS compatibility may change. Please visit third-party websites for information.

2.2.2.2 FPGA synthesizers

In addition to ZeBu Fast Synthesis (**zFAST**), ZeBu supports the following third-party FPGA synthesizers:

- Synplify Pro, Synplify Premier and Synplify Premier DP from Synopsys (http://www.synopsys.com)

These third-party FPGA synthesizers can also be used to generate EDIF files out of the ZeBu flow (without **zCui** and without the ZeBu RTL Front-End). The resulting EDIF files can be read by the ZeBu gate-level compilation tools (using EDIF source files in **zCui**).

Notes

- The versions of third-party synthesizers which have been tested with a ZeBu software version are available in Section 2.2.2.
- If you decide not to use **zFAST**, you need to purchase your third-party synthesizer directly from its distributor.

2.2.2.3 Xilinx Vivado Place & Route software

The ZeBu delivery package ships with a ZeBu-dedicated version of Xilinx Vivado Place & Route software.

The standard Xilinx Vivado Place & Route package can be installed by user from the Xilinx website with a license purchased directly from Xilinx, considering that it is the appropriate version for ZeBu as listed in Table 8.

3 ZeBu Licenses

3.1 Overview

License features for V8_0_0 are new licenses that should be requested from Synopsys.

Licenses which were used on older ZeBu platforms cannot be used on ZeBu Server-3 V8_0_0 software.

Specific licenses are required for:

- Xilinx Vivado Place & Route software (mandatory); see Section 3.2 for details about license compatibility.
- Concept Engineering netlist analyzers (optional).

You should contact Synopsys for detailed information.

3.2 Checking the Need for a New Xilinx Vivado License File

The V8_0_0 ZeBu software ships with Xilinx Vivado 2013.2.

3.2.1 Checking that your Xilinx license file supports Vivado

The license features required by Vivado are different from the license features required by ISE. If you previously had a Xilinx license for ISE, you need to check that it can be used for Vivado. For ISE, you could use a license for the Design Suite System Edition software or for the Design Suite Logic Edition software. Vivado requires a license for Design Suite System Edition software only.

To determine whether or not you need a new Xilinx license file, proceed as follows:

1. Open the Xilinx license file, typically:
   `license_CLIENT_CustomerName_Hostid_2010-03-31_XILINX.lic`
2. Look for a line containing `INCREMENT`
   a. In the example below, the feature name is `System_Edition`:
   ```
   INCREMENT System_Edition xilinxd 2013.07 permanent 1 EE39502AC1CB \
   ```
   This license can be used with Xilinx Vivado 2013.2 which is delivered with ZeBu V8_0_0.
   b. In the second example, the feature name is `Logic_Edition`:
   ```
   INCREMENT Logic_Edition xilinxd 2013.07 28-dec-2011 1 956BC4E5D360 \
   ```
   This license cannot be used with Xilinx Vivado 2013.2 which is delivered with ZeBu V8_0_0.

3.2.2 Checking the Version Limit

License files from Xilinx contain a version limit for each feature/increment in the license. The Version Limit corresponds to a year and a month (for example, 2010.04 corresponds to April 2010), as described on the Xilinx website.

The version limit of Xilinx Vivado 2013.2 included in the V8_0_0 ZeBu software is 2013.06.

If the Version Limit of your license file is not 2013.06 or higher, you must request a new Xilinx license file from your usual Synopsys representative.

To determine whether or not you need a new Xilinx license file, proceed as follows:

1. Open the Xilinx license file, typically:
   `license_CLIENT_CustomerName_Hostid_2010-03-31_XILINX.lic`
2. Look for a line containing `INCREMENT System_Edition`:
   a. In the example below, the Version Limit is 2013.07:
   ```
   INCREMENT System_Edition xilinxd 2013.07 permanent 1 EE39502AC1CB \
   ```
   This license can be used with Xilinx Vivado 2013.2 which is delivered with ZeBu V8_0_0.
   b. In the second example, the Version Limit is 2011.04:
   ```
   INCREMENT System_Edition xilinxd 2012.04 28-dec-2011 1 956BC4E5D360 \
   ```
   This license cannot be used with Xilinx Vivado 2013.2 which is delivered with ZeBu V8_0_0.