

## Installation and Setup Manual

Rev. 2.0

### ispVM System Overview

Lattice's ispVM® System Download software has been the industry standard for supporting In-System Programming on PC, UNIX, and Linux systems, ATE, and the IEEE 1149.1 Tool Suite. Although ispVM System Download software is designed with an intuitive and user-friendly GUI, the user can also execute the program without the GUI display at the prompt as described in the following sections.

#### Compatibility and Compliance

The ispVM System processes JEDEC, ISC Data, and FPGA bitstream files for Lattice devices, as well as SVF files and 1532 compliant BSDL files for any PLD devices.

The ispVM System describes the JTAG/ISP chain configuration, which uses the Extensible Chain Description Format (XCF), by adapting the Extensible Markup Language (XML), an industrial standard. The ispVM System is backward compatible in that it accepts the DLD and WCH files, from ispDCD<sup>1</sup> and LatticePRO<sup>2</sup> respectively, as imported chain files.

#### System Requirements

ispVM System UNIX with parallel port cable	<ul style="list-style-type: none"> <li>• Ultra 5 or better</li> <li>• Solaris 6, Solaris 7, Solaris 8</li> <li>• ispDOWNLOAD Parallel Port Cable</li> <li>• 60 MB disk space</li> </ul>
ispVM System UNIX with serial port cable	<ul style="list-style-type: none"> <li>• SPARC 20 or better</li> <li>• Solaris 6, Solaris 7, Solaris 8</li> <li>• ispDOWNLOAD Serial Port Cable or ORCA Serial Port Cable</li> <li>• 60 MB disk space</li> </ul>

### Installation Procedure

#### Extracting the ispVM System Installation

To extract the ispVM System, move the installation file to the directory where the user wants it installed. The installation file name is `ispvm_va_b_c_os.tar.gz`, where *a* is the major revision number, *b* and *c* are the minor revision numbers, and *os* is the target operating system (either *UNIX* or *Linux*). For example, uncompress and unpack the UNIX archive as follows:

```
gunzip ispvm_v13_1_unix.tar.gz
tar xf ispvm_v13_1_unix.tar
```

After the file has been extracted, it creates the `'isptools/ispvmsystem'` directory and `ispVMInstallation.pdf`. Under the `'ispvmsystem'` directory, the `ispvm`, `model300`, `svfdebugger`, and other ispVM System tools, and the `'Database'`, and `'ispVMEmbedded'` subdirectories are created. The `'Database'` directory contains the device support information. The `'ispVMEmbedded'` directory contains the ispVM embedded source code and executables.

<sup>1</sup> ispDCD is Lattice legacy windows download program.

<sup>2</sup> LatticePRO (VantisPRO) is the legacy windows download program inherited from Vantis after the Lattice-Vantis merger.

# Installation and Setup Manual

Rev. 2.0

## **Extracting the ispVM System Device Support Updates**

Before extracting the device support update, ispVM System must be installed, as discussed above in *Extracting the ispVM System Installation*. To extract the ispVM System device support update, move the update file to the `isptools` directory. The update file name is `ispvm_va_b_c_os_update.tar.gz`, where *a* is the major revision number, *b* and *c* are the minor revision numbers, and *os* is the target operating system (either *UNIX* or *Linux*). For example, uncompress and unpack the UNIX update archive as follows:

```
gunzip ispvms_v13_1_3_unix_update.tar.gz
tar xf ispvms_v13_1_3_unix_update.tar
```

After the file has been extracted, the ispVM System will be updated to the latest version.

## **Setup Procedure**

### **Setting Environment Variables (C Shell)**

Set the following environment variables in the user profile (`.cshrc`) in the user's home directory.

`ISPVM_DIR` – the directory in which the ispVM System is installed.  
`LD_LIBRARY_PATH` – the directory in which the ispVM System's shared libraries are installed.  
`path` – to locate the ispVM System and other ispVM System tools are installed.

For example, in the `.cshrc` file, add the following lines:

```
setenv ISPVM_DIR /usr/local/isptools/ispvmsystem
setenv LD_LIBRARY_PATH $ISPVM_DIR:$LD_LIBRARY_PATH
set path=($ISPVM_DIR $path)
```

If the `LD_LIBRARY_PATH` and the `path` variables are not already defined, add the following lines instead:

```
setenv ISPVM_DIR /usr/local/isptools/ispvmsystem
setenv LD_LIBRARY_PATH $ISPVM_DIR
set path=($ISPVM_DIR)
```

---

**Note:** When setting an `LD_LIBRARY_PATH`, do not use a tilde (~) anywhere in the designated path.

After the `LD_LIBRARY_PATH` and `path` variables are updated, the user is required to login again, or resource the profile before continuing. This will set the environment variables. To resource the user profile, type `source ~/.cshrc` at the prompt. Type `env` and look for the `ISPVM_DIR` and `LD_LIBRARY_PATH` lines to ensure they are pointing to the appropriate directories in which ispVM was extracted to.

# Installation and Setup Manual

Rev. 2.0

## **Setting Environment Variables (BA Shell)**

Set the following environment variables in the user profile (.bashrc) in the user's home directory.

ISPVM\_DIR – the directory in which the ispVM System is installed.  
LD\_LIBRARY\_PATH – the directory in which the ispVM System's shared libraries are installed.  
path – to locate the ispVM System and other ispVM System tools are installed.

For example, in the .bashrc file, add the following lines:

```
ISPVM_DIR = /usr/local/isptools/ispvmsystem
export ISPVM_DIR
LD_LIBRARY_PATH = $LD_LIBRARY_PATH:$ISPVM_DIR
export LD_LIBRARY_PATH
PATH = $PATH:$ISPVM_DIR
export PATH
```

If the LD\_LIBRARY\_PATH and the path variables are not already defined, add the following lines instead:

```
ISPVM_DIR = /usr/local/isptools/ispvmsystem
export ISPVM_DIR
LD_LIBRARY_PATH = $ISPVM_DIR
export LD_LIBRARY_PATH
PATH = $ISPVM_DIR
export PATH
```

---

**Note:** When setting an LD\_LIBRARY\_PATH, do not use a tilde (~) anywhere in the designated path.

After the LD\_LIBRARY\_PATH and path variables are updated, the user is required to login again, or resource the profile before continuing. This will set the environment variables. To resource the user profile, type "source ~/.bashrc" at the prompt. Type env and look for the ISPVM\_DIR and LD\_LIBRARY\_PATH lines to ensure they are pointing to the appropriate directories in which ispVM was extracted to.

## **Setting Up the Hardware**

### **Parallel Port Cable Configuration**

**IMPORTANT:** Before using the ispDOWNLOAD parallel port cable, the workstation's parallel port must be enabled and have the correct read/write permission. Please contact the system administrator if the parallel port is not enabled or does not have the correct read/write permission.

There are two main ways to give read/write permission to the parallel port.

The first is to give read/write permission to the parallel port to anyone that has access to that machine.

The second is more secure, where only selected individuals will have read/write permission to the parallel port that has access to that machine.

# Installation and Setup Manual

Rev. 2.0

Below are the descriptions on how to setup parallel port zero to have read/write permission.

A. How to give parallel port zero read/write permission to everyone.

Log in as root or have root permission to make the following change:

1. Log in as root.

2. Go to the `/dev` directory.

```
cd /dev <return>
```

3. Give read/write permission to parallel port zero (parport0).

```
chmod 666 parport0 <return>
```

B. How to give parallel port zero read/write permission to selected individuals.

There are two files to change on the machine to give selected individuals read/write permission to parallel port zero. Both files are located in the `/etc` directory. The two files are “group” and “nsswitch.conf”.

1. Log in as root.

2. Go to the `/dev` directory.

```
cd /dev <return>
```

3. Give read/write permission to parallel port zero (parport0) to owner and group.

```
chmod 660 parport0 <return>
```

4. Go to the `/etc` directory.

```
cd /etc <return>
```

5. Using your favorite text editor, edit the file “group”.

6. Add the login name for all the users you want to give read/write permission for parallel port zero by adding the login names to the “lp:x:7:” line. This line may vary from system to system. Two examples are shown below.

Example 1:

Change:

```
lp:x:7:
```

To:

```
lp:x:7:user_name1,user_name2,etc
```

Example 2:

Change:

```
lp:x:7:daemon,lp
```

To:

```
lp:x:7:daemon,lp,user_name1,user_name2,etc
```

Where `user_name1`, etc. is the login name for all the users you want to give read/write permission for parallel port zero. Save the changes and close the “group” file.

7. Using your favorite text editor, edit the file “nsswitch.conf”.

## Installation and Setup Manual

Rev. 2.0

8. Look at the group line. Make sure “files” is there.

Example:

```
group: files nis
```

9. If “files” is there then you’re done. You may need to reboot for the changes to take affect.

### **Starting the ispVM System Download Software**

To start the ispVM System Download UNIX or Linux GUI, type “ispvm” at the prompt.

Note: ispVM was compiled using gcc version 4.3.6

### **Using the ispVM System Command Line**

The following shows the syntax for the ispVM system UNIX command line:

Syntax:

```
ispvm /i <InputFile> [<process type>] [<process mode>] [<port selection>]  
[<port address>] [<process output>] [<OutputFile>]
```

Example:

```
ispvm /i /usr/local/designs/demo.xcf /t /Parallel
```

Description:

#### **Input File (required)**

/i filename.xcf – Full path and Chain Configuration file name (.xcf).

/i filename.dld – Full path and Configuration Setup file name (.dld).

#### **Process Type (optional)**

/s – Process using Sequential mode

/t – Process Using Turbo mode

Default is process using Sequential mode.

#### **Process Mode (optional)**

/o – Message Mode: Messages displayed in terminal.

/w – Window Mode: GUI displayed.

Default: Silent mode. No message is re turned and no GUI is displayed.

#### **Port Selection (optional)<sup>3</sup>**

/Serial

/Parallel

Default: /Serial

# Installation and Setup Manual

Rev. 2.0

## ***Port Address (optional)***

### **Parallel Port:**

---

---

`0x378`

---

---

`0x3BC`

---

---

`0x278`

---

---

`Default: 0x378`

## ***Process Output (optional)***

`/f` – Generate SVF file`/v10` – Generate VME file version 10.0`/v9` – Generate VME file version 9.0

Default: XCF file setting.

## ***Output File (optional)***

Used with Process Output.

`outputfilename.svf` – Full path and SVF file name (.svf)`outputfilename.vme` – Full path and VME file name (.vme)

# Installation and Setup Manual

Rev. 2.0

## Known Issues

1. A super user is required to change the permissions of the serial and parallel ports if the user does not have proper read/write permission to the ports.
2. Using a serial port cable that is longer than six feet might cause inconsistent results.
3. ispDOWNLOAD Cable TRST Pin

Connecting the board's TRST pin to the cable's TRST pin is not recommended. If the board's TRST pin is connected to the cable's TRST pin, instruct the ispVM System to drive the TRST pin high as follows:

- i. Select the **Options** menu item,
- ii. Select **Cable and I/O Port Setup**,
- iii. Check the **TRST/Reset Pin Connected** check box, and
- iv. Select the **Set High** radio button.

If the proper option is not selected, the TRST pin will be driven low by the ispVM System. Consequently, the BSCAN chain will not work because the chain is locked into RESET state.

4. ispDOWNLOAD Cable ISPEN Pin

The following pins should be grounded: the BSCAN pin of the 2000VE devices and the ENABLE pin of MACH4A3/5-128/64, MACH4A3/5-64/64 and MACH4A3/5-256/128 devices. However, the user has the option of having the BSCAN and ENABLE pins driven by the ISPEN pin from the cable, in which case the ispVM System must be set to drive the ISPEN pin low as follows:

- i. Select the **Options** menu item,
- ii. Select **Cable and I/O Port Setup**,
- iii. Check the **ispEN/BSCAN Pin Connected** check box, and
- iv. Select the **Set Low** radio button.

## Un-implemented Features

1. The I/O Vector Editor is not implemented.
2. Board Diagnostics is not implemented.
3. A processing clock is not implemented.
4. SVF Debugger TAP display is not implemented.