



*ispVM System
User Manual*

Version 9.0.1

Technical Support Line: 1-800-LATTICE or (408) 428-6414
ISP-UM Rev 9.0.1

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LATTICE SEMICONDUCTOR CORPORATION

5555 Northeast Moore Court
Hillsboro, Oregon 97124 U.S.A.
Tel.: (503) 268-8000
FAX: (503) 268-8347
<http://www.latticesemi.com>

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Preface

This user manual describes the capabilities and use of the ispVM™ System software. It is written for design engineers who understand system and logic design and the use of design automation software. You should also understand how to perform basic procedures using your operating system.

What is in This User Manual

This user manual contains chapters on the following topics:

- Overview of the software
- Procedures describing how to use the ispVM System software
- Procedures describing how to use the SVF Debugger software
- Description of the ispVM System software user interface
- Description of the SVF Debugger user interface
- Description of the ispVM command line mode

Where to Look for Information

Chapter 1, “Introduction” – Provides conceptual information about the ispVM System software.

Chapter 2, “The ispVM System Software” – Describes how to use ispVM System software to create and edit Chain Configuration Files.

Chapter 3, “The SVF Debugger” – Describes how debug and edit Serial Vector Format (SVF) files.

Appendix A, “Using the ispVM System GUI” – Describes how to use the ispVM System software Graphical User Interface.

Chapter B, “Using the SVF Debugger GUI” – Describes how to use the SVF Debugger software Graphical User Interface.

Chapter C, “ispVM Command Line Mode” – Describes how to use the ispVM System Software using command line mode.

Related Documentation

In addition to this user manual, the following documentation is useful when using the Lattice Semiconductor ispVM System software:


- *ispDesignEXPERT User Manual*
- *ispDesignEXPERT Installation Notice*
- *ISP Encyclopedia*
- *ISP Daisy Chain Download User Manual (PC only)*
- *ispDOWNLOAD Cable Reference Manual*
- *Lattice/VantisPRO Application Note*

These documents are located in the `..\software\manuals` directory on the CD-ROM. The *ISP Encyclopedia* is located in the `..\databook` directory. These documents can be downloaded to a local drive or accessed on the CD-ROM.

Documentation Conventions

This user manual follows the typographic conventions listed here:

Convention	Definition and Usage
<i>Italics</i>	<p>Italicized text represents variable input. For example:</p> <p><i>filename</i> .svf</p> <p>This means you must replace <i>filename</i> with the file name you used for all the files relevant to your design.</p> <p>Valuable information may be italicized for emphasis. Book titles also appear in italics.</p> <p>The beginning of a procedure appears in italics. For example:</p> <p><i>To scan the device chain:</i></p>
Bold	<p>Valuable information may be boldfaced for emphasis. Commands are shown in boldface. For example:</p> <ol style="list-style-type: none"> 1. Choose Configuration ⇒ Output to open the Output dialog.

Convention	Definition and Usage
Courier Font	Monospaced (Courier) font indicates file and directory names and text that the system displays. For example: In the <code>..\examples\ispLSI_GAL\clock</code> directory, select ...
“Quotes”	Titles of chapters or sections in chapters in this manual are shown in quotation marks. For example: See Chapter 1, “Introduction.”
 NOTE	Indicates a special note .
⇒	Indicates a menu option leading to a submenu option. For example: File ⇒ Import

Chapter 1 *Introduction*

This chapter introduces the ispVM™ System software. Included in this chapter are system and software requirements and conceptual descriptions of the ispVM System software. Included in this chapter are sections describing:

- System Requirements
- Installing ispVM System Software
- About the ispVM System Software
- Programming Basics
- JTAG Scan Chains
- Programming Algorithm Basics
- Programming Times
- USERCODE
- I/O States During Programming
- Programming Hardware
- Programming Software

System Requirements:

- PC running Microsoft Windows 95, Windows 98, Windows 2000, or Windows NT 4.0 or greater.
- Parallel Port
- Parallel Port Driver (for Windows NT and Windows 2000)
- Lattice ispDOWNLOAD Cable or Vantis Cable

Installing ispVM System Software

The ispVM System software is automatically installed when you install ispDesignEXPERT. Refer to the “ispDesignEXPERT Installation Notice” for information about installing the entire suite of ispDesignEXPERT software, including the ispVM System software. You will be given the option of installing a parallel port driver for Windows NT and Windows 2000, which is required for programming devices with ispVM System software, during ispDesignEXPERT installation.

About the ispVM System Software

The ispVM System software is a comprehensive design download package that provides an efficient method of programming ISP devices using JEDEC files generated from Lattice Semiconductor software tools. This complete device programming tool allows you to quickly and easily download your designs to your devices.

The ispVM System software supports both serial and concurrent (turbo) programming of all Lattice devices in a PC environment, and is built around a graphical user interface. Device chains can be scanned automatically. Any required JEDEC files are selected by browsing with a built-in file manager.

Non-Lattice devices that are compliant with IEEE 1149.1 can be bypassed once their instruction register length is defined in the chain configuration file (.xcf). Using Lattice’s ispVM System software, programmable devices from other vendors can be programmed through the vendor-supplied SVF file.

Once the design has been compiled to a JEDEC file and device programming is necessary, the fuse map data must be serially shifted into the device along with the appropriate addresses and commands.

Traditionally, programmable logic devices have been programmed on PLD/PROM programmers, so the programmer generates all the programming signals and algorithms. The programmer also generates the external super voltage or high voltage

required by non-ISP devices (typically 12-14 volts). This super voltage requirement is one of the reasons dedicated programmers are used to program conventional PLDs.

With In-System Programmable (ISP™) devices, the ISP programming super voltage is generated within the device from the power supply. Lattice ISP devices use nonvolatile electrically erasable (E²) CMOS technology and require only V_{cc}-level

programming signals. An integrated state machine controls the sequence of programming operations such as identifying the ISP device, shifting in the appropriate data and commands and controlling internal signals to program and erase the E² cells in the device. Programming consists of serially shifting the logic implementation stored in a JEDEC file into the device along with appropriate addresses and commands, programming the data into the E² CMOS logic elements, and shifting the data from the logic array out for device programming verification.

Most of Lattice's devices use the IEEE 1149.1-1993 Boundary Scan Test Access Port (TAP) as the primary interface for in-system programming.

Programming Basics

To successfully program devices in-system, devices on the board must be correctly connected into an 1149.1 scan chain. This scan chain can be used for either programming or testing the board. To program using the ispVM System software, a description of the scan chain needs to be developed. This description is called a chain configuration file (.xcf) and contains basic information about all of the devices in the chain. For the Lattice devices, this includes the device type, the operation to be performed and the JEDEC file, if required by the operation. Additional information in the chain configuration file can include the state of the I/O pins during programming, along with security requirements and user options. If non-Lattice devices are present in the chain, the instruction register length is required for these devices. The instruction register length can be found from the BSDL file or the SVF file for the device.

Another requirement for successful programming is thoughtful board design. The signals used in a scan chain (TCK, TMS, TDI, and TDO) rarely operate as fast as the data path signals on the board. However, correct board layout methodologies such as buffering for large chains, termination resistors, etc. are required to ensure trouble-free operation. Some Lattice devices have some additional pins (TRST, ENABLE, ispEN, bscanEN, EPEN and TOE) that can affect boundary scan programming and test if not taken care of properly.

After these requirements have been met, it should be relatively straightforward to program any number of devices on a board. This programming can be done using a PC with either:

- A Lattice ispDOWNLOAD cable with the 8-pin AMP connector or the 10-Pin JEDEC connector attached to the board, and a board test system
- A Vantis cable

JTAG Scan Chains

A scan chain can include any IEEE-1149.1 compliant, programmable or non-programmable device. It can also include any programmable devices that are compatible with IEEE-1149.1 but do not have a boundary scan register. This is a decision that should be made based on the test methodology being employed for the board. If the test methodology employed is the traditional bed-of-nails approach used on board test systems, all the devices can be included in the same chain.

All scan chains use the simple four-wire TAP. The TCK and TMS pins are common to all devices included in the chain. TDI and TDO are daisy-chained from one device to the next. The input to the chain is TDI and the output from the chain is TDO. A diagram demonstrating a simple scan chain is shown in Figure 1-1.

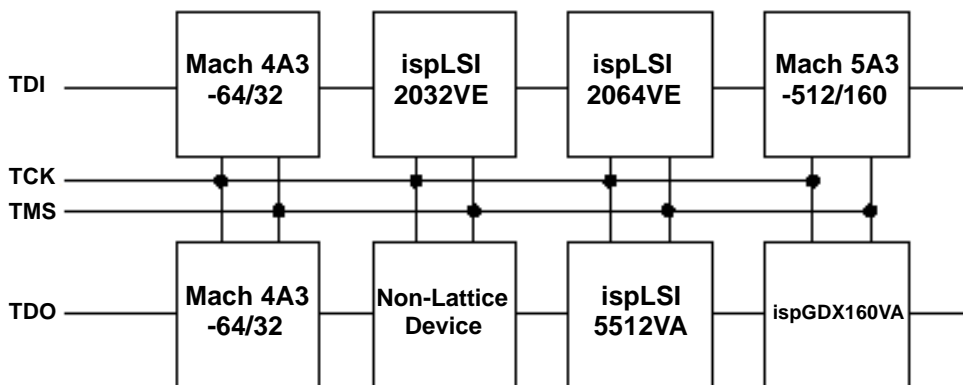


Figure 1-1. Example JTAG Scan Chain

Programming Algorithm Basics

Programming a CPLD is similar to programming any piece of memory such as an EPROM or FLASH memory. The device can be thought of as an array that is programmed one row at a time. The programming information is provided to the software in the form of a standard JEDEC file that needs to be converted into the row and column fuse map data. Before an EEPROM device can be programmed, it first has to be erased. After the device has been erased, the programming data can be loaded and the device programmed. After the device has been programmed, it will be verified by reading out the data in the device and comparing it against the original.

Figure 1-2 shows the basic programming flow for the device. It does not include JEDEC file data conversion into fuse map data, as it assumes that has already been done. This programming flow will be the same regardless of the programming hardware used. The primary difference between programming on different hardware platforms (PC vs. Workstation) is the type of hardware (parallel port vs. serial port) and the driver associated with it.

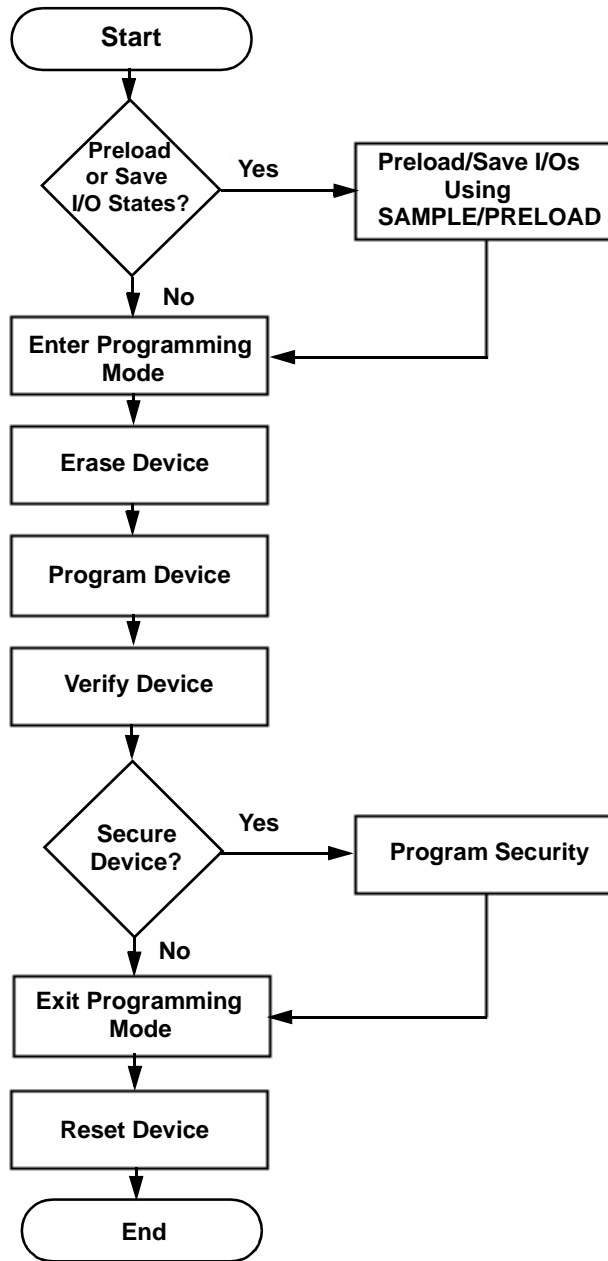


Figure 1-2. Programming Routine Flow

Programming Times

The time it takes to program a device can often be a determining factor of where in the manufacturing process a device, or group of devices, is programmed. A board test system costing hundreds of thousands of dollars to purchase and costing as much as one dollar per minute to operate can be an expensive alternative for programming if programming times are too long. In many instances, it is more cost effective to buy a couple of PCs and program the devices using these much cheaper systems.

The time it takes to completely program a device is based on the time it takes to first erase the device, then program each row in the device, and then finally to verify the device. The erase time for all devices is between 100 and 200ms. A single row is programmed in 10 to 50ms, depending on the device. The Verify process is the quickest of the required steps in the programming sequence and is mainly dependent on the time required to shift the verify data out of any given device.

To minimize the total programming time of a daisy chain of ISP devices, a programming method called Turbo ispDOWNLOAD™ can be used to program all the ISP devices in the chain concurrently. Turbo ispDOWNLOAD allows any number of ISP devices to be programmed at the same time. When programming a chain concurrently, the chain can be programmed in the time it takes to program only the largest device plus some extra time in order to shift instructions and data for multiple devices. For example, a chain of three devices with programming times of 10, 7, and 7 seconds can be programmed with Turbo ispDOWNLOAD in a total of about 10 seconds (the time it takes to program the largest device). Serially, the programming time would be 24 seconds for all three devices. Turbo ispDOWNLOAD is incorporated into the ispVM software. This valuable feature of Lattice device technology is not available with many other ISP CPLD device technologies.

The benefit of minimal programming times will be much more obvious on board test systems because they are included as a part of the test program and are running at the fastest speed possible. Additionally, there is no translation needed to or from JEDEC formatted data as this has already been done by the ispVM System software.

USERCODE

User-programmable identification can ease problems associated with document control and device traceability. The ispLSI 1000EA, 2000E, 2000VE, 2000VL, 2000V, 5000V, 8000/V, MACH 4/A, ispGDX/A and ispGDXV families contain a 32-bit register accessible through the optional IEEE 1149.1 USERCODE instruction. This user-programmable ID register is basically a user's "notepad" provided in electrically erasable (E²) cells on each device.

In the course of system development and production, the proliferation of PLD architectures and patterns can be significant. To further complicate the record-keeping process, design changes often occur, especially in the early stages of product development. The task of maintaining which pattern goes into what device for which socket becomes exceedingly difficult. Once a manufacturing flow has been set, it becomes important to “label” each PLD with pertinent manufacturing information, which is beneficial in the event of a customer problem or return. A USERCODE register is incorporated into ISP devices to store such design and manufacturing data as the manufacturer’s ID, programming date, programmer make, pattern code, checksum, PCB location, revision number, and/or product flow. This assists users with the complex chore of record maintenance and product flow control. In practice, the user-programmable USERCODE register can be used for any of a number of ID functions.

Within 32 bits available for data storage, users may find it helpful to define specific fields to make better use of the available storage. A field may use only one bit (or all bits), and can store a wide variety of information. The possibilities for these fields are endless, and their definition is completely up to the user.

Even with the device’s security feature enabled, the USERCODE register can still be read. With a pattern code stored in the USERCODE register, the user can always identify which pattern has been used in a given device. As a second safety feature, when a device is erased and re-patterned, the USERCODE identification is automatically erased. This prevents any situation in which an old USERCODE might be associated with a new pattern.

It is the user’s responsibility to update the USERCODE when reprogramming. It should be noted that the USERCODE information will not be included in the fuse map checksum reading.

Loading of the USERCODE instruction makes the USERCODE available to be shifted out in the Shift-DR state of the TAP controller. The USERCODE register can be read while the device is in normal functional operation, allowing the device to be scanned while operating.

I/O States During Programming

During a programming cycle, all ispJTAG devices default to having their I/Os tri-stated. In most situations, this probably will be acceptable and will not cause any problems. However, there are situations that arise where it may cause some contention. Through the boundary scan cells of Lattice devices, the ispVM System software offers the ability to set all I/O pins to a state of “1”, “0”, HIGHZ, or don’t care, and to set the state of each I/O pin individually.

Programming Hardware

All ISP programming specifications such as the programming cycle and data retention are guaranteed when programming ISP devices over the commercial temperature range (0 to 70° C). It is critical that the programming and bulk erase pulse width specifications are met by the programming platform to insure proper in-system programming. The details of device programming are transparent to the user if Lattice ISP programming hardware and software are used.

PC Hardware

Programming is most commonly done on a PC through a download cable attached to the parallel port using the ispVM System software.

ispDOWNLOAD Cable

The ispDOWNLOAD cable is designed to facilitate in-system programming of all Lattice ISP devices on a printed circuit board directly from the parallel port of a PC. The ispVM System software generates programming signals directly from the parallel port of a PC, which then pass through the ispDOWNLOAD cable to the device(s). With this cable and a connector on the board, no additional components are required to program a device. Refer to the *ispDOWNLOAD Cable Data Sheet*, available in the *Lattice/Vantis Data Book*, for more detailed specifications and ordering information.

Hardware design considerations for new boards include whether the hardware designer will be using boundary scan test operations or low voltage (3.3V) devices. In a system using 3.3V ISP devices, the ispDOWNLOAD cable version 2.0 should be used. The cable operates with either a 3.3V or 5V Vcc source.

ISP Engineering Kit Model 300

The ISP Engineering Kit Model 300 provides designers with a quick and inexpensive means of evaluating and prototyping new designs using Lattice devices when compared to a standalone programmer. This kit is designed for engineering purposes only and is not intended for production use. The kit programs devices from the parallel printer port of a host PC. By connecting a system cable (included) from the host PC to the ISP Engineering Kit with the proper socket adapter, a device can be easily programmed using the ispVM System software. See Figure 1-3.

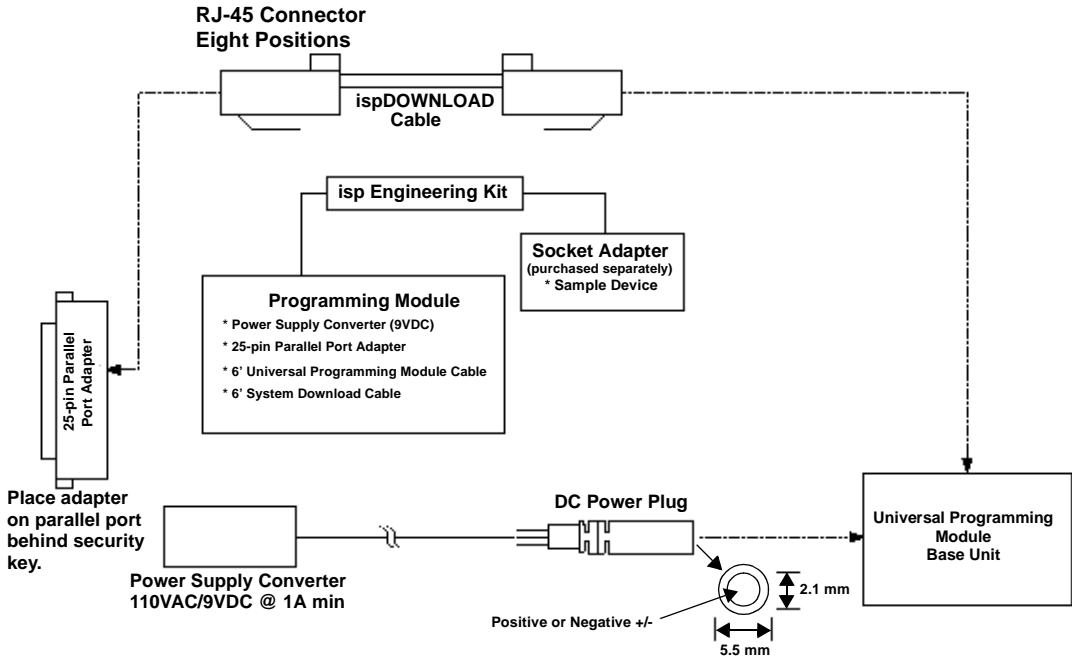


Figure 1-3. ISP Engineering Kit Model 300

Programming Software

The ispVM System software supports programming of all Lattice ISP devices in a serial daisy chain programming configuration in a PC environment. The software is built around a graphical user interface. Any required JEDEC files are selected by browsing with a built-in file manager. This software supports both serial and concurrent (turbo) programming of all Lattice devices. Any non-Lattice devices that are compliant with IEEE 1149.1 can be bypassed once their instruction register length is defined in the chain configuration file. Using the ispVM System software, programmable devices from other vendors can be programmed through the vendor supplied SVF file.

Programming on a Board Test System

Programming on a board test system is made possible by using the ATE feature to generate the necessary programming files needed for the different platforms. The platforms supported include GenRad, Hewlett Packard, and Teradyne board test systems. A generic JEDEC vector format is generated to help support any ATE not directly supported.

Programming on JTAG Test Systems

JTAG test systems differ from traditional board test systems in their basic test methodology. These systems use only the four wire JTAG TAP to perform any interconnect and functional tests. A simple language has been developed to interface with the TAP and is used by most major JTAG test system vendors. This language is known as the Serial Vector Format (SVF) and is supported by the ispVM System software. Current SVF specifications are available from the Asset-Intertech website at www.asset-intertech.com.

Embedded Programming

The ispVM embedded source code is available for programming devices in an embedded or customized environment. The programming source code is written in ANSI-standard C language and can be easily incorporated into embedded system or tester software to support programming of ISP devices. This code supports such common operations as Program, Verify, Erase, and Secure. After completion of the logic design and creation of a JEDEC file(s), the ispVM System software creates the data files required for in-system programming on customer-specific hardware: PCs, testers, or embedded systems.

Chapter 2 *The ispVM System Software*

The ispVM System software allows you to program Lattice devices with a download cable using a PC running Windows 95, Windows 98, Windows 2000, or Windows NT operating system. The ispVM System Software also includes the SVF Debugger software, which allows you to debug Serial Vector Format (SVF) files. The SVF Debugger Software is described in more detail in *Chapter 3, “The SVF Debugger”*.

This chapter describes in detail how to use the ispVM System software. Included in this chapter are sections that describe:

- How to start the ispVM System software
- Getting started using the ispVM System software
- Editing Chains and Devices
- Setting the User Environment
- Changing ispVM System Software Settings
- Using ispVM System Software Utilities
- Setting ispVM System Software Options

Starting ispVM System Software

To start the ispVM System software, choose the **Start** menu. In the **Start** menu, select the menu item **Programs** ⇒ **Lattice Semiconductor** ⇒ **ispVM system** to open the ispVM System window (Figure 2-1). You can use the pull-down menus or the tool bar icons to perform various functions needed to download JEDEC files to the devices in the chain.

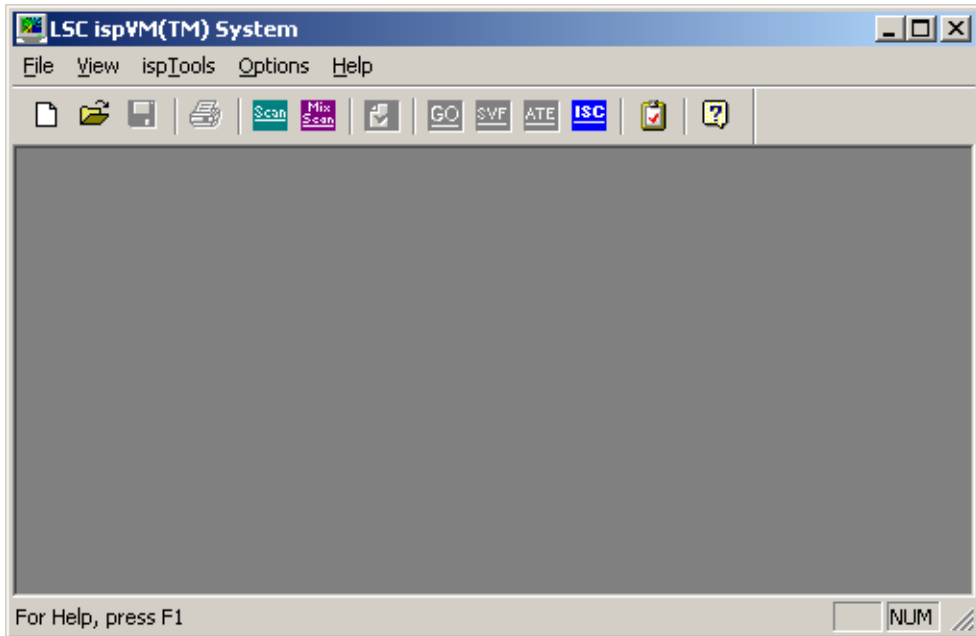


Figure 2-1. ispVM System Window

Getting Started

When you start the ispVM System software for the first time, you must create a new project, or chain configuration file (.xcf). After that, ispVM System starts with the last project that was open. There are four ways to create a chain configuration file:


- Create a new chain configuration
- Open an existing chain configuration file
- Import an ISP or LatticePRO file
- Scan a device chain

Creating a New Chain Configuration

There are several ways you can start a new chain configuration. One way is to create a new chain configuration file (.xcf) and add devices.

To create a new chain configuration file:

1. Choose **File** ⇒ **New**. The ispVM System software opens an empty chain configuration window (Figure 2-2).

 **NOTE** For more information about the ispVM System software Graphical User Interface (GUI), refer to *Appendix A, “Using the ispVM System GUI”*.

2. Choose **Edit** ⇒ **Add Device** to add devices to the new chain file as needed.

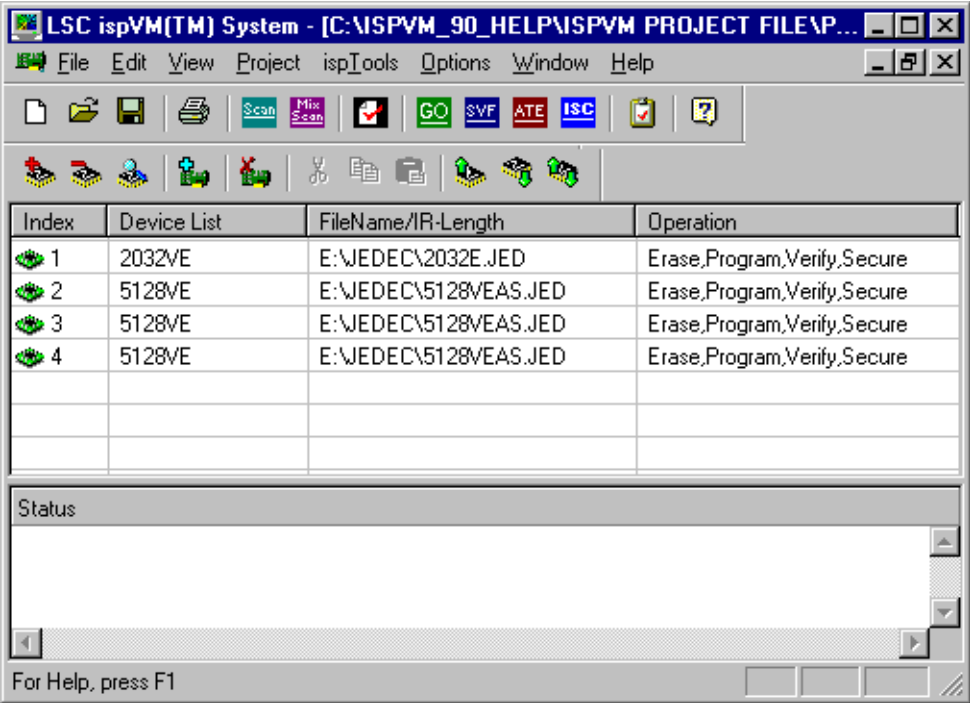


Figure 2-2. Single Chain Configuration Window and Status Window

Opening an Existing Chain File

You can open an existing configuration file (.xcf) with the ispVM System Software. The daisy chain configuration must be the same as that for which the chain configuration file (.xcf) was created. Each unique chain configuration requires a unique chain configuration file.

To open an existing configuration file:

1. Choose **File** ⇒ **Open** to open the Open XCF File dialog.
2. Use the dialog to locate and select the desired XCF file, and then click **Open**. The selected configuration file opens in a new Chain Configuration window.

Importing an ispDCD or LatticePRO File

You can import an existing ispDCD download configuration file (.dld) or LatticePRO download configuration file (.wch) with the ispVM System Software using the **Import** command.

To import an existing ispDCD or LatticePRO configuration file:

1. Choose **File** ⇒ **Import** to open the Open Import File dialog.
2. Use the dialog to locate and select the desired file, and then click **Open**. The selected configuration file opens in a new Chain Configuration window.

Scanning a Device Chain

You can scan the device chain on the board connected to your PC with a download cable to start a new chain configuration.

To scan the device chain:

- Choose **ispTools** ⇒ **Scan Chain**. The ispVM System software opens a new chain configuration file (.xcf), scans the printed circuit board properly connected to your computer with a download cable, and lists the devices in the new chain file. You can also use this method for scanning a mixed chain using the **ispTools** ⇒ **Scan Mixed Chain**.



NOTE

You must assign a JEDEC file to the devices in the chain configuration file, as well as possibly editing other device information, to have a “valid” chain file.

Editing Chains and Devices

You can edit device chain configuration with the ispVM System software. You can:

- Add a new device chain
- Remove a device chain
- Add a device to a device chain
- Remove a device from a device chain
- Edit device information
- Move a device up or down in the chain
- Reverse the order of devices in the chain

Adding a New Device Chain

You can add another chain to a chain configuration file (.xcf) to create a mixed JTAG and ISP chain configuration. You do this by first adding a mark (chain mark) to indicate the beginning of the new chain, as shown in Figure 2-3.

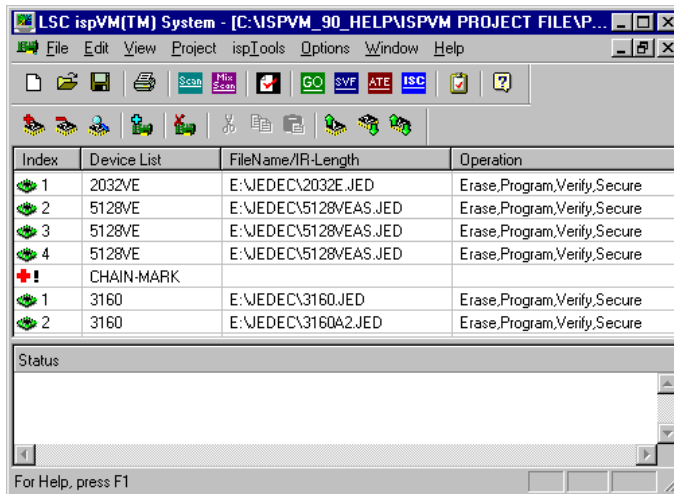


Figure 2-3. Mixed Chain Configuration

To add a new device chain to an existing chain configuration file:

1. Select the last device in the existing chain. You cannot add a new chain to the middle of another chain.
2. Choose **Edit** ⇒ **Add Chain Mark** to add the chain mark.
3. Choose **Edit** ⇒ **Add Device** to create the new chain.

Removing a Device Chain

The ispVM System software lets you have two chains in the same chain configuration file (.xcf). Sometimes you will want to remove a chain from a chain configuration file. You might think that you could just select the chain mark and delete it. However, to remove a device chain you have to delete all the devices in the chain—one by one—and then delete the chain mark.

To remove a device chain:

1. Select a device in the chain that you want to remove.
2. Choose **Edit** ⇒ **Delete Device** to delete the selected device.
3. Repeat the above step until you have deleted all the devices from the chain that you want to remove.
4. In the configuration file, select the Chain Mark.
5. Choose **Edit** ⇒ **Delete Chain Mark**.

Adding a Device to a Device Chain

You can add devices to an existing chain using the Device Information dialog.

To add a device:

1. Select the device directly above the position of the device that you want to add.
2. Choose **Edit** ⇒ **Add Device** to open the Device Information dialog (Figure 2-4).

- Complete the requested information on the dialog and then click **OK**. The software inserts the new device into the active chain, below the currently selected device, as specified in the Device Information dialog.

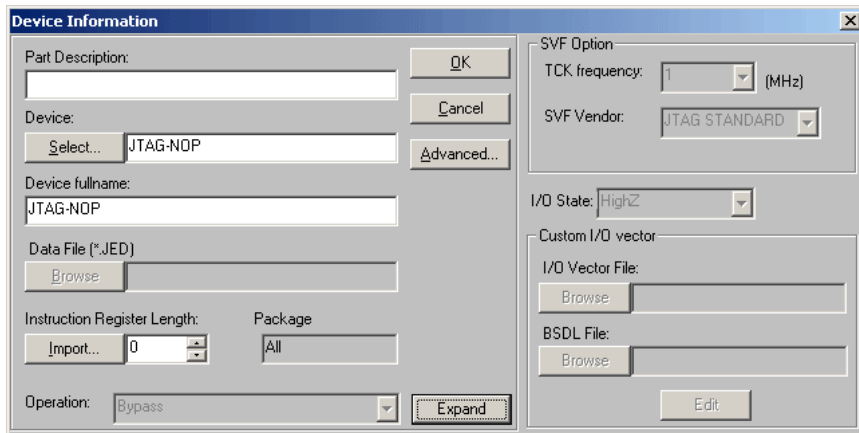


Figure 2-4. Device Information Dialog

Table 2-1 describes the features of the Device Information Dialog.

Table 2-1. Device Information Dialog Features

Feature	Description
Select...	Opens the Select Device dialog, which lets you select a device and its package that you want to add to the chain.
Part Description	Allows user to enter comments for the device.
Device fullname	Displays the name of the device that corresponds to the Device Number field. This field is enabled when you select the Build SVF file for single device option above.
Data File (*.JED)	Use the Browse button to locate the JEDEC file that goes with the chosen part.
Instruction Register Length	Lets you specify the instruction register length by either importing it from the BSDL (.bsm or .bsd) file or the SVF file. You can also manually specify a value from 0-50. This option is available only when you select the JTAG-NOP device.
Package	Displays the package description for the selected device. This field is automatically filled in when you select the device using the Select Device dialog.

Table 2-1. Device Information Dialog Features (Continued)

Feature	Description
Operation	Lists the operation mode for each file. The default is Erase, Program & Verify.

Table 2-2 describes the features of the Device Information Dialog Expanded Options.

Table 2-2. Device Information Dialog Expanded Options

Feature	Description
TCK Frequency	Lets you specify the clock frequency for the chosen device. This option is available for JTAG devices only.
SVF Vendor	Let's you choose the SVF vendor for the chosen device. Choices are: <ul style="list-style-type: none"> • JTAG STANDARD • LATTICE • ALTERA • XILINX <p>This option is available for JTAG devices only.</p>
I/O State	<ul style="list-style-type: none"> • I/O State • Lets you specify the state of the I/O pins during programming. Choices are: <ul style="list-style-type: none"> • HighZ • All 1's • All 0's • Custom • Leave Alone
I/O Vector File	Lets you specify the location and name of the I/O Vector file. This field is available when you select the Custom I/O State option above.
BSDL File	Lets you specify the location and name of the BSDL file. This field is available when you select the Custom I/O State option above.
Edit	Lets you edit the I/O Vector file using the I/O Vector Editor.
Advanced	Opens the Advanced Device Information dialog, which lets you specify advanced configuration parameters for the selected device.

Removing a Device From a Device Chain

You can remove the currently selected device from the active chain file using the **Delete Device** command. There is no undo for this command.

To remove a device:

1. Select the device that you want to delete.
2. Choose **Edit** ⇒ **Delete Device**.

Editing Device Information

You can change various information about a device in the chain using the Device Information dialog.

To edit device information:

1. Select the device that you want to edit.
2. Choose **Edit** ⇒ **Edit Device** to open the Device Information dialog.
3. In the dialog, change the device information that you want and then click **OK**.

Moving a Device Up or Down

You can change the position of a device up or down, one position at a time.

To move a device up:

1. Select the device that you want to move.
2. Choose **Edit** ⇒ **Move Device Up** to move the device up one position in the chain.

To move a device down:

1. Select the device that you want to move.
2. Choose **Edit** ⇒ **Move Device Down** to move the device down one position in the chain.

Reversing the Order of Devices

If you get the input device confused with the output device, the ispVM System software gives you an easy way to correct this by reversing the order of the devices in the chain with the **Reverse Chain Order** command.

To reverse the order of devices:

- Choose **Edit** ⇒ **Reverse Chain Order**.

Setting Chain Operations

The ispVM System software lets you choose from several chain operations for each device in the chain.

To set a chain operation in a device:

1. Select the device that you want to set the operation.
2. Choose **Edit** ⇒ **Set Chain Operations**, and then choose the specific operation for the device.

Setting Advanced Device Parameters

You can use the Advanced Device Information dialog to specify advanced configuration parameters for the selected device that you are adding to a device chain. You can open the Advanced Device Information dialog by clicking the **Advanced** button of the Device Information dialog. Refer to “Adding a Device to a Device Chain” for information about opening the Advanced Device Information dialog.

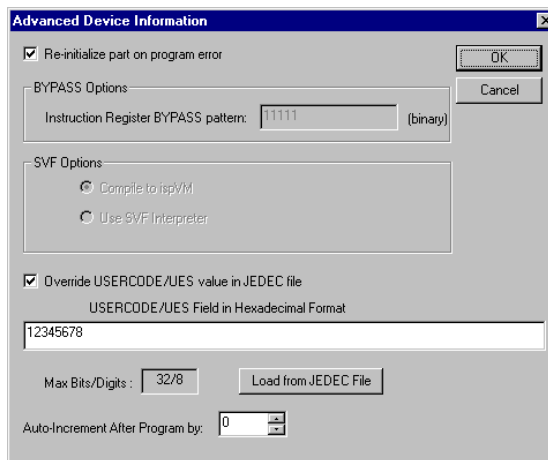


Figure 2-5. Advanced Device Information dialog

Table 2-3 describes the features of the Advanced Device Information dialog.

Table 2-3. Advanced Device Information Dialog Features

Feature	Description
Re-initialize part...	When selected, the software will erase the device if programming failed.
BYPASS Options	Lets you specify the BYPASS instruction for the selected device.
SVF Options	Lets you choose which SVF processor the ispVM System software will use when running the SVF file. If you select ispVM, the SVF file is compiled and will run faster. If you select the SVF Interpreter, each line is interpreted and processed one line at a time and will run slower. In either case, the end result will be the same.
Override USERCODE/UES...	Lets you override the USERCODE/UES value in the JEDEC file with the value in the field below.
Max Bits/Digits	Displays the maximum number of bits/digits you can enter in the USERCODE/UES field, shown above.
Auto-Increment...	Lets you specify the incremental step (0-100) for the USERCODE/UES after successful programming.

Overriding Device Operations

You can use the Project Setting dialog to override the operations in a chain file. The advantage to this method as opposed to “changing” the operation using the Device Information dialog or the **Set Chain Operations** command is that you can easily restore the chain file to its original operation settings.

To override device operations:

1. With a chain file open, choose **Project** ⇒ **Project Settings** to open the Project Setting dialog (Figure 2-6).
2. Under Operation Override, select the operation that you want to be the overriding operation.
3. Click **OK**. Notice that the operation descriptions for all the devices in the chain file are now set to the overriding operation.

If you selected **Entire Chain**, when you download the file all of the devices will use the overriding operation.

If you selected **Selected Device**, when you download the file only the selected device will use the overriding operation.

4. To restore the original operations, choose **Project** ⇒ **Project Settings** to open the dialog again.
5. Under Operation Override, select **No Override**.
6. Click **OK**. A message asks “Do you want to reload the original setup?”
7. Click **Yes** to restore the original settings in the chain file.

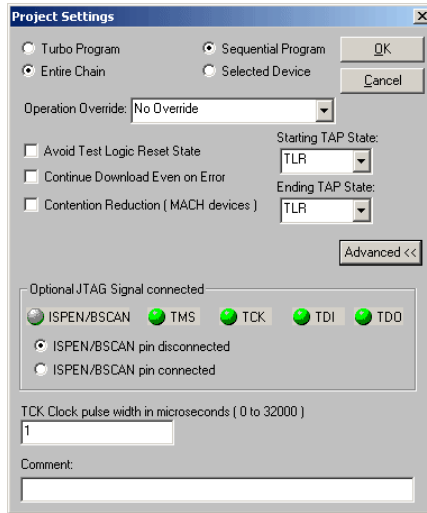


Figure 2-6. Project Setting Dialog

Table 2-4 describes the features of the Project Settings Dialog.

Table 2-4. Project Settings Dialog Features

Feature	Description
Turbo Program	<p>Programs all the devices on the board in parallel. If an Operation Override is selected, all Operation descriptions in the chain file are temporarily changed to the override setting. These process operations are supported:</p> <ul style="list-style-type: none"> • Erase, Program, Verify • Erase, Program, Verify, Secure • Program Only • Verify Only • Erase Only • Bypass
Sequential Program	<p>Programs all the devices on the board one at a time. If an Operation Override is selected, all Operation descriptions in the chain file are temporarily changed to the override setting. These process operations are supported:</p> <ul style="list-style-type: none"> • Erase, Program, Verify • Erase, Program, Verify, Secure • Program Only • Verify Only • Erase Only • Bypass • Calculate Checksum • Display ID • Display USERCODE • Read and Save JEDEC • Secure Device
Entire Chain	Processes the entire chain with the operations specified in the chain configuration window.
Selected Device	Processes the selected device with the operations specified in the chain configuration window.
Operation Override	Lets you override the operations in the chain configuration window. You can restore the original operations by setting the Override Operation to No Override.

Table 2-4. Project Settings Dialog Features (Continued)

Feature	Description
Avoid Test Logic Reset State	Lets you specify that the ispVM System will avoid the Test Logic Reset State of the JTAG State Machine during download.
Continue Download Even on Error	Lets you specify that the ispVM System will ignore any errors while downloading and will continue running.
Contention Reduction (MACH Devices)	Lets you specify that the Boundary Scan Register will always drive the device I/O during download. This option causes the download speed to be slower. If your design can tolerate the I/Os from becoming temporary active for 1ms, you can ignore this setting. However, using this option does not avoid the I/O from becoming active at the beginning and end of the download process. ("Active" refers to the period when the core logic of the user design is driving the I/Os.)
Starting TAP State	Lets you specify the starting JTAG state of the JTAG State Machine for download. Only two states are available: TLR and RTI.
Ending TAP State	Lets you specify the ending JTAG state of the JTAG State Machine for download. Only two states are available: TLR and RTI.
Advanced	Opens advanced options for Project Settings dialog.
Optional JTAG Signal Connected	<p>ISPEN/BSCAN – Indicates the device requires the signal. If required, you cannot disconnect the signal.</p> <p>ISPEN/BSCAN pin disconnected – Lets you disconnect the signal</p> <p>ISPEN/BSCAN pin connected - Lets you connect the signal</p> <p>TMS - Indicates the device requires the signal.</p> <p>TCK - Indicates the device requires the signal.</p> <p>TDI - Indicates the device requires the signal.</p> <p>TDO - Indicates the device requires the signal.</p>
TCK Clock Pulse Width...	Lets you specify the TCK pulse width in microseconds.
Comment	Lets you add comments to the chain file. There is no limit on the number of characters.

Viewing the Status Window

The ispVM System software displays various feedback messages about your project in the Status window, which is located in the Single Chain Configuration Window and Status Window (Figure 2-2).

After processing your chain configuration file, you can clear the contents of the Status window.

To clear the status window:

- Choose **Edit** ⇒ **Clear Status Window**.

Viewing the Log File

You can use the **View Log File** command to open the project log file, which is an ASCII text report file summarizing the results of the ispVM System software operations.

To view the log file:

- Choose **Project** ⇒ **View Log File**.

To clear the contents to the log file:

- Choose **Edit** ⇒ **Clear Log File**.

Setting the User Environment

You can set the ispVM System software user environment to your preference. You can:

- Customize the main window background
- Set display font styles

Customizing the Main Window Background

You can customize the background of the ispVM System software main window by specifying a background graphic and setting various display options, as well as specifying a standard or custom background color.

To customize the background:

1. Choose **View** ⇒ **Background** to open the Background dialog (Figure 2-7).

2. On the dialog, do the following:
 - If you want to select a graphic for the background, click Browse.
 - Select a **Display** setting for the graphic.
 - If you want the graphic to be offset, set an **X** and **Y** value.
 - If you want to specify a background color, click **Back Color**. Note that if you selected either Tile or Stretch as the Display setting, you will not be able to see the background color.
3. Click **OK**.

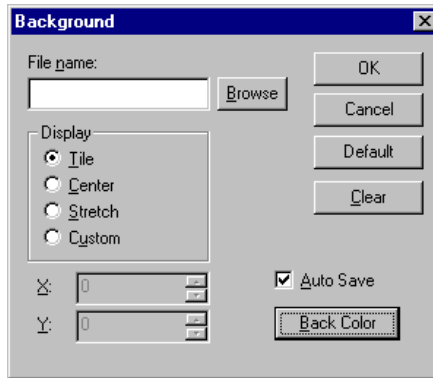


Figure 2-7. Background Dialog

Table 2-5 describes the features of the Background Dialog Box.

Table 2-5. Background Dialog Box Features

Feature	Description
Background File Name	Browse for a file to use as a background graphic.
Browse	Browse for a file to use as a background graphic.
Display	Allows you to change the way the background graphics is displayed. <ul style="list-style-type: none"> • Tile causes the background to be displayed repeatedly. • Center centers the graphic in the window. • Stretch stretches the graphic to fit the window. • Custom allows you to specify X and Y axis points to position the graphic.
X and Y	Set an X and Y offset value for the background graphic, if one is specified. This parameter is available only when Custom display parameter is selected.
Default	Returns the dialog to its default settings.

Table 2-5. Background Dialog Box Features (Continued)

Feature	Description
Clear	Clears the current user settings and sets the background color to gray. You must use this button to remove a background graphic.
Auto Save	Automatically saves the current settings so they are available the next time you open the ispVM System software.
Back Color	Opens the Color dialog, which lets you choose a basic or custom color for the background.

Setting the Display Font Styles

You can specify the font, font style, and size of the font for text appearing in the Chain Configuration window.

To set display font styles:

1. Choose **View** ⇒ **Font** to open the Font dialog (Figure 2-8).
2. Choose the options you want, and then click **OK**.

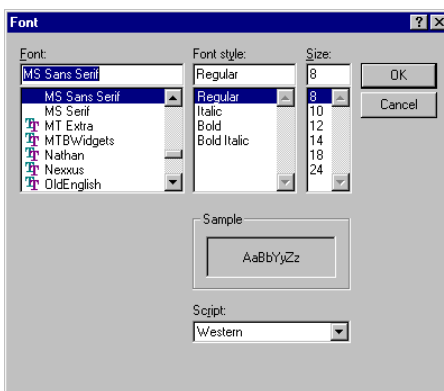


Figure 2-8. Font Dialog

Changing ispVM System Software Settings

You can specify how the ispVM System software will process the active chain configuration using the Project Setting dialog. For example, you can tell the ispVM System software to process the whole chain or only a single device, override selected operations of all the devices in the chain or the selected device, as well as other options.

Setting ispVM System Process Characteristics

You can set ispVM System software process characteristics with the Project Settings dialog.

To specify ispVM System processing options:

1. Choose **Project** ⇒ **Project Settings** to open the Project Settings dialog.
2. Choose the options you want, and then click **OK**.

Checking the Configuration Status

You can use the **Check Configuration Setup** command to verify that each device has a .jed file attached and check the operation selection for each device. This command prints the configuration status (pass/fail) for each device in the configuration. A successful message appears in the Messages window.

To check the configuration status:

- Choose **Project** ⇒ **Check Configuration Setup**.

Downloading Design Files

After you have specified all of the processing options, you can use the **Download** command to download the design files to the daisy-chained devices.

To download design files:

- Choose **Project** ⇒ **Download**.

Generating SVF and ATE Files

You can generate Serial Vector Format (SVF) files and GTE Files with ispVM System software. SVF files are ASCII files that stores programming data for programming one or more fixed algorithm devices in Automated Test Equipment (ATE)-type programming environments. ATE files are test files formatted for Genrad, HP, and Teradyne testers, as well as a Generic Vector format.

Generating an SVF File

SVF files allow you to exchange data between the Automated Test Equipment (ATE)-type programming environment and the software driving it. You can use the Generate SVF File dialog to set options for building an SVF file,

To generate an SVF file:

1. Choose **Project** ⇒ **Generate SVF File** to open the Generate SVF File dialog (Figure 2-9).
2. Choose the options you want, and then click **OK**.

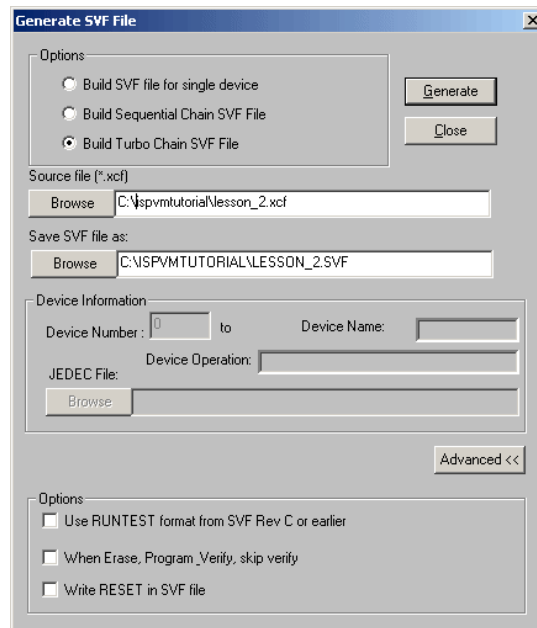


Figure 2-9. Generate SVF File Dialog

Table 2-6 describes the features of the Generate SVF File Dialog.

Table 2-6. Generate SVF File Dialog Features

Feature	Description
Build SVF file for single device	Lets you generate an SVF file for a single device, as specified in the Device Number field below.
Build Sequential Chain SVF File	Lets you generate a single SVF file for the entire chain, programming each device sequentially.
Build Turbo Chain SVF File	Lets you generate a single SVF file for the entire chain, programming all the devices at one time. For a one-device chain, defaults to sequential mode.
Source File (*.xcf)	Lets you specify the project file.
Save SVF File as:	Lets you save the SVF to the specified name and location.
Device Number	Lets you select a device in the chain for which you want to generate an SVF file. This field is enabled when you select the Build SVF file for single device option above.
Device Name	Displays the name of the device that corresponds to the Device Number field. This field is enabled when you select the Build SVF file for single device option above.
Device Operation	Displays the operation of the device that corresponds to the Device Number field. This field is enabled when you select the Build SVF file for single device option above.
JEDEC File	Lets you select the JEDEC file that the ispVM System software will use to generate the SVF file. This field is enabled when you select the Build SVF file for single device option above.
Advanced	Opens advanced options for Generate SVF File dialog.
Use RUNTEST...	When selected, tells the ispVM System software to generate the SVF file using the format specified in the SVF file specification, revision C or earlier.
When Erase, Program, Verify...	When selected, globally skips the verification step of the Erase, Program, and Verify operation.
Write RESET in SVF file	When checked, writes STATE RESET at the beginning of the SVF file.

Generating an ATE File

You can use the Generate ATE dialog to build a test file formatted for Genrad, HP, and Teradyne testers, as well as a Generic Vector format.

To generate an ATE file:

1. Choose **Project** ⇒ **Generate ATE File** to open the Generate ATE File dialog (Figure 2-10).
2. Choose the options you want, and then click **OK**.

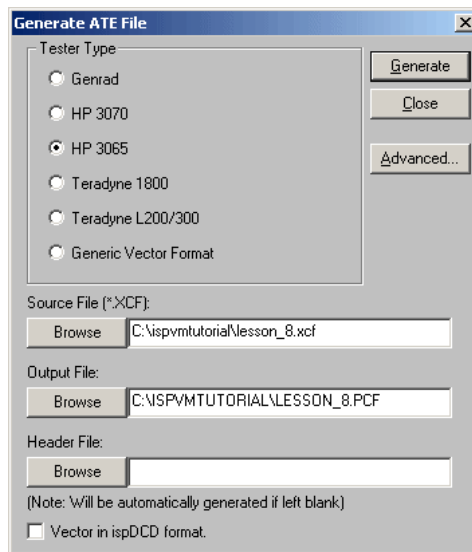


Figure 2-10. Generate ATE Dialog

Table 2-7 describes the features of the Generate ATE File Dialog.

Table 2-7. Generate ATE File Dialog Features

Feature	Description
Tester Type	Lets you specify the target tester for the ATE file.
Source File	Lets you specify the project file used to create the ATE vector files.

Table 2-7. Generate ATE File Dialog Features (Continued)

Feature	Description
Output File	Lets you specify the file name base (eight characters or less) that will be appended incrementally by the ATE generation process. For example, if you enter “vec” as the base name and 128 files are created, the file names will appear as vec0, vec1, vec2, etc. The dot extension depends on the ATE vendor.
Header File	Lets you specify the name and location of the Header file. The header data can include the author name, the type of configuration setup that this header will appear with, pin definitions, signal names, timing information, etc. The ispVM System software will affix this header data to the head of each ATE vector file it generates.
Advanced	Opens the Generate ATE Information dialog, which lets you specify the content and format of the ATE file.

Setting Advanced ATE Features

You can set advanced ATE features with the Advanced ATE Options dialog (Figure 2-11). You can open the Generate ATE Information dialog by clicking the **Advanced** button of the Generate ATE File dialog. Refer to “Generating an ATE File” for information about opening the Generate ATE File dialog.

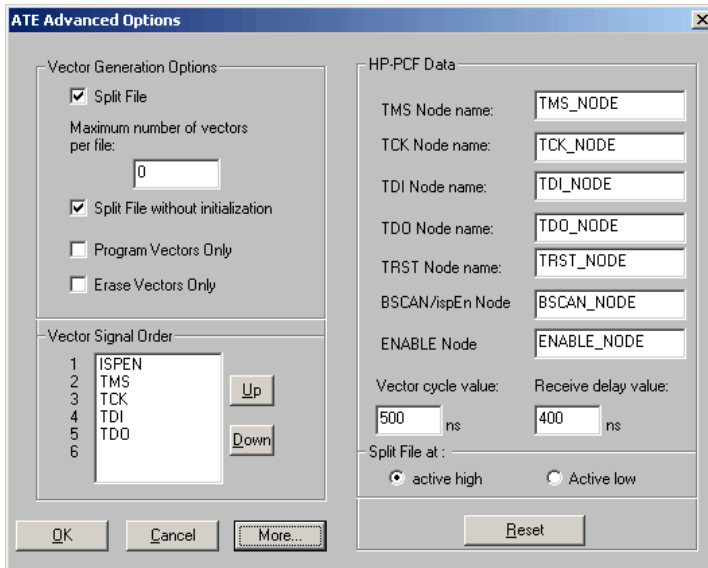


Figure 2-11. Advanced ATE Options

Table 2-8 describes the features of the Advanced ATE Options Dialog.

Table 2-8. Advanced ATE Options Dialog Features

Feature	Description
Split file	Allows the vector files to be split to reduce file size.
Split File without Initialization	Allows the vector files to be split to reduce file size. Pull down resistors on ispEN, MODE and SCLK are mandatory to use this option.
Maximum number of vectors per file	Lets you specify the maximum number of vectors allowed in each vector file. This data can be obtained from the ATE vendor. The default setting of 0 builds one ispVECTOR file.
Program Vectors Only	When selected, skips the verification stage of the operation.
Erase Vectors Only	When selected, creates an ATE file with the Erase operation only. This overrides individual device operation settings in the chain file.
Vector Signal Order	Lets you specify the signal order in each vector. You can use the Up and Down buttons to manually change the location of the selected signal.
Up / Down	Moves the location of the selected pin up or down within the vector.
HP-PCF Data	Shows initial programming pin names and vector read and write delay values. You can edit these values by typing the new value in each field.
More	Opens more options for Advanced ATE Options dialog.

Converting a JEDEC File to a ISC Data File

You can use the JEDEC to ISC Data File Converter dialog to convert JEDEC files (*.JED) to ISC Data files (*.ISC).

To convert a JED file to ISC File:

1. Choose **Project > Generate ISC File** to open the JEDEC to ISC Data File Converter dialog (Figure 2-12).
2. In the **Device box**, select device.
3. Ensure the entity name in the **Entity Name** box matches the entity name in the BSDL file of the selected device and package.
4. In the **Data File (*.JED)** box, select the JED file you wish to convert to ISC Data File.

5. In the **ISC File (*.ISC)** box, name and location of the ISC Data file that you wish to convert.
6. Click **OK**.
7. Click **View** to view the result of the conversion.

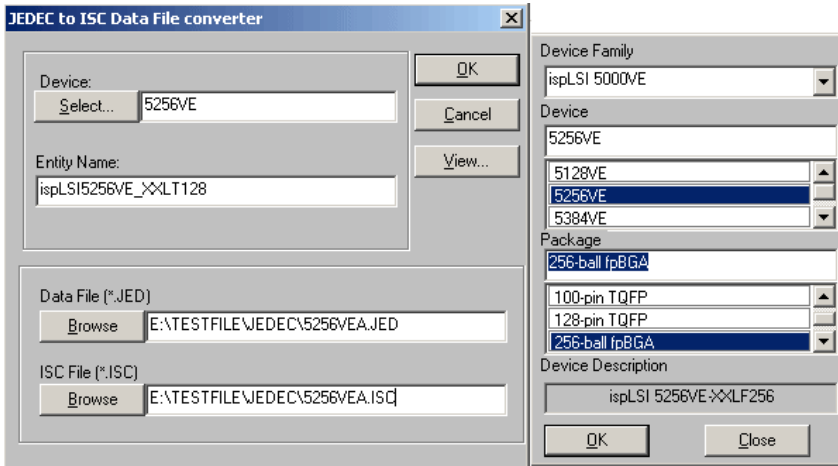


Figure 2-12. JEDEC to ISC Data File Converter Dialog

Table 2-9 describes the features of the JEDEC to ISC Data File Converter dialog.

Table 2-9. JEDEC to ISC Data File Converter Dialog Features

Feature	Description
Device	Lets you specify the device in the selected Device Family.
Entity Name	Entity name for the selected device and package
Data File (*.JED)	Use the Browse button to locate the JEDEC file that goes with the chosen part.
ISC File (*.ISC)	Use the Browse button to locate the directory where you want to place the ISC file.
View	Opens a text browser and allows you to view the resultant ISC file.

Table 2-9. JEDEC to ISC Data File Converter Dialog Features (Continued)

Feature	Description
Device Family	Lets you specify the device family: <ul style="list-style-type: none"> • Generic JTAG - Non-Lattice device • ispLSI • ispGDS • ispGDX • ispGAL • MACH
Device	Lets you specify the device in the selected Device Family.
Package	Displays the package description for the selected device. This field is automatically filled in when you select the device using the Select Device dialog.

Converting a Composite File to a JEDEC File

You can use the Convert Composite Files to JEDEC Files dialog (Figure 2-13) to convert Composite files (*.CMP) to JEDEC files.

To convert a CMP file to a JED file:

1. Choose ispTools > Convert Composite to JEDEC File to open the Convert Composite Files to JEDEC Files dialog.
2. In the Composite File (*.CMP) box, select the CMP file you wish to convert to JED file.
3. In the JEDEC File (*.JED) box, enter name and location of the JED file you wish to convert.
4. Click Convert.

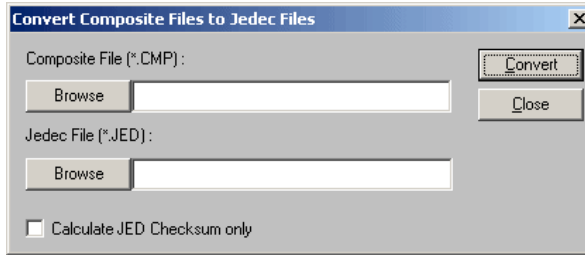


Figure 2-13. Convert Composite Files to JEDEC Files

Table 2-10 describes the features of the Convert Composite Files to JEDEC dialog.

Table 2-10. Convert Composite Files to JEDEC Files features

Feature	Description
Composite File (*.CMP)	Browse to Composite File (*.CMP).
JEDEC File (*.JED)	Browse to JEDEC File (*.JED).
Calculate JED Checksum only	Calculate checksum and write to JEDEC file.
Convert	Click to Convert Composite File (*.CMP) to JEDEC File (*.JED).

Using ispVM System Software Utilities

The ispVM System software has numerous utilities, including:

- SVF Interpreter
- USERCODES/UES Editor

Using the SVF Interpreter

You can use the SVF Interpreter dialog (Figure 2-14) to specify the single device SVF file for processing by the SVF Interpreter. You can also open the SVF Debugger from this dialog. Refer to “The SVF Debugger” on page 3-1 for more information about the SVF Debugger.

To open the SVF Interpreter dialog:

- Choose **ispTools**⇒ **SVF Interpreter**.

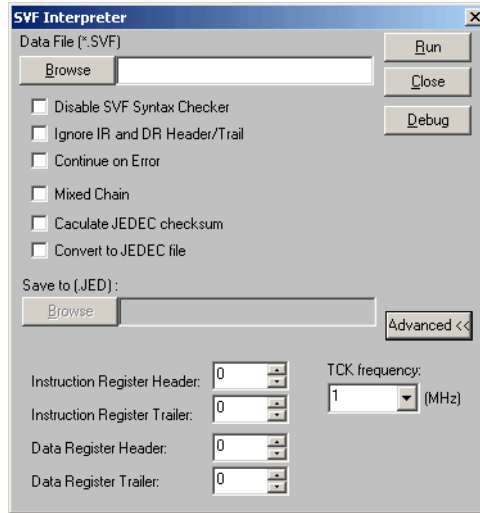


Figure 2-14. SVF Interpreter Dialog

Table 2-11 describes the features of the SVF Interpreter.

Table 2-11. SVF Interpreter Dialog Features

Feature	Description
Data File	Lets you select the SVF file to process.
Disable SVF Syntax Checker	Disables tool that checks syntax of SVF file.
Ignore IR and DR	Ignores the header and trailer information of the Instruction Register and Data Register when processing the SVF file.
Continue on Error	Continue processing the SVF file even if there is an error.
Mixed Chain	Tells the SVF Interpreter that the hardware configuration is a mixed chain, therefore disabling the ISP chain when processing the SVF file.
Calculate JEDEC checksum	Calculate and return checksum from the SVF file.
Convert to JEDEC file	Convert the SVF file to a JEDEC file. The resulting JEDEC file name is the same as the SVF, but with the *.jed extension.

Table 2-11. SVF Interpreter Dialog Features (Continued)

Feature	Description
Instruction Register Header	Set the IR header length in number of bits (1-100).
Instruction Register Trailer	Set the IR trailer length in number of bits (1-100).
Data Register Header	Set the DR header length in number of bits (1-100).
Data Register Trailer	Set the DR trailer length in number of bits (1-100).
TCK Frequency	Set the TCK clock frequency (1-30 MHz). This value affects the processing speed of the SVF Interpreter.
Run	Runs the SVF Interpreter.
Debug	Opens the SVF Debugger. Refer to “The SVF Debugger” on page 3-1 for more information about the SVF Debugger.
Advanced	Opens advanced options for SVF Interpreter dialog.

Using the USERCODE/UES Editor

You can use the ispVM System USERCODE/UES Editor to add information to your JEDEC file, such as serial code number, design code, or lot number. This information is written to the USERCODE/UES field (U), after the fuse map data. The signature must be in either decimal (0-9) or hexadecimal (A-F) characters.

To use the USERCODE/UES Editor:

1. Choose **ispTools** ⇒ **USERCODE/UES Editor** to open the USERCODE/UES Editor (Figure 2-15).
2. Navigate to the JEDEC file that you want to edit, select it, and then click **Open**. The editor opens with the selected .JED file.

Table 2-12. USERCODE/UES Editor Features (Continued)

Feature	Description
Device	Lists the possible devices that can be matched with the JEDEC file. You must choose a device from this list and then click Read to get the correct Max Bits/Digits information.
Digit Edit Position	Shows the position of the cursor in the UES display field.
Read	Reads the USERCODE/UES field in the JEDEC file and displays it in the UES display field.
Write	Writes the value in the UES display field to the JEDEC file.
Browse	Lets you browse for the JEDEC file.
Close	Closes the USERCODE/UES Editor.

Specifying the Number of Times a Chain is Processed

You can use the Repetitive Download dialog to specify a number of times that the ispVM System software will download the design chain. Use this feature as a test to make sure all of your cable connections are properly made.

To specify the number of times a chain is processed:

1. Choose **ispTools** ⇒ **Repetitive Download** to open the Repetitive Download dialog (Figure 2-16).
2. In the Number of repetitions field, select a number between 1-10.
3. In the Stop on number of Errors field, select a number between 1-10.
4. Click **OK**.

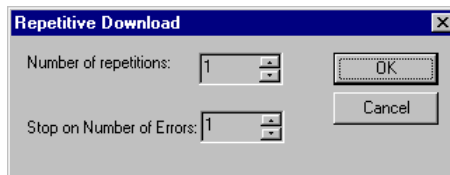


Figure 2-16. Repetitive Download Dialog

Table 2-13 describes the features of the Repetitive Download Dialog.

Table 2-13. Generate Repetitive Download File Dialog Features

Feature	Description
Number of Repetitions	Lets you specify the number of times a chain is processed when you choose Project ⇒ Download .
Stop on Number of Errors	Lets you specify the number of errors (1-10) that can occur before stopping the download process.

Running Board Diagnostics

You can use the **Board Diagnostic** command to check that the chain description matches the devices on the board.

To run board diagnostics:

1. Choose **ispTools** ⇒ **Board Diagnostics** to run the check and open the Board Diagnostics report.
2. Review the report and compare the Expected Devices column (left) to the Detected Devices column. If they do not match, you can edit the chain configuration file and run the diagnostic again until they match.

Setting ispVM System Software Options

You can change various options in the ispVM System software, including

- Change port assignment
- Change project directories
- Specify Chain File Headings
- Specify Autoscan options
- Specify USERCODE/UES Display Options

Changing the Port Assignment

When you first launch the ispVM System software with the cables properly connected, it connects to the first available port that it detects. You can change the connecting port, as well as other cable options, using the Cable and Port Setting dialog.

To change the port setup:

1. Choose **Options** ⇒ **Cable and I/O Port Setup** to open the Cable and I/O Port Setup dialog (Figure 2-17).
2. Choose the options that you want, and then click **OK**. If the cable is not connected or cannot be detected (if the board power is not on, for example), the ispVM System software displays an error message.

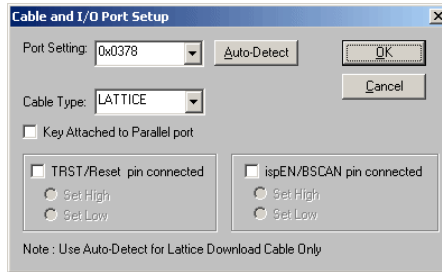


Figure 2-17. Cable and I/O Port Setup Dialog

Table 2-14 describes the features of the Cable and I/O Port Setup Dialog.

Table 2-14. Cable and Port I/O Setup Dialog Features

Feature	Description
Port Setting	Lets you specify the preferred parallel port address (0x0378,0x03BC or 0x0278) for the software to use for download.
Auto-Detect	Automatically detects the parallel port to which the download cable is connected. This feature works only with a Lattice ispDOWNLOAD cable, not a Vantis cable.
Cable Type	Lets you select the download cable type, either Lattice ispDOWNLOAD cable or Vantis cable.
Key Attached to Parallel Port	Select this option if a parallel port security key is attached to the parallel port, so that the ispVM System software will generate signals to communicate with the chain through the key. Otherwise, remove the security key.
TRST/Reset pin connected	If you connect the TRST pin to the download cable, you must select this option. You must also specify whether the pin is active high or active low.
isEN/BSCAN pin connected	If you connect the isEN/BSCAN pin to the download cable, you must select this option. You must also specify whether the pin is active high or active low.

Changing the Project Directories

You can change the default location of the ispVM System software directories using the File Location dialog. These directories are: Device Database location, Start directory, Working directory, and Log File name.

To change the project directory locations:

1. Choose **Options** ⇒ **File Locations** to open the Files Location dialog (Figure 2-18).
2. Edit the file locations that you want and click **OK**.

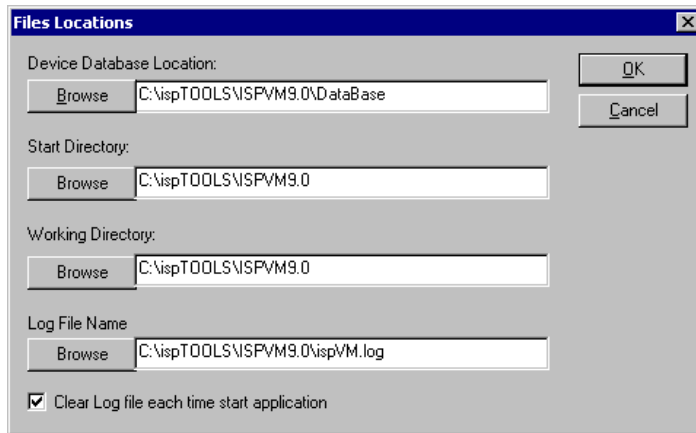


Figure 2-18. Files Location Dialog

Table 2-15 describes the features of the Files Location Dialog.

Table 2-15. Files Location Dialog Features

Feature	Description
Device Database Location	Browse for the location of the Database directory. This directory holds the files describing supported devices.
Start Directory	Browse for the location of the starting directory.
Working Directory	Browse for the location of the working directory.
Log File Name	Browse for the location of the log file.
Clear log file...	If selected, the software automatically clears the contents of the log file every time you start the ispVM System software.

Specifying Chain File Column Headings

There are eight column headings in the chain configuration file (.xcf) available for you to choose. The defaults are: *Index*, *Device List*, *FileName/IR-Length*, and *Operation*. You can change these headings using the Arrange Column dialog.

To specify chain file column headings:

1. Choose **Options** ⇒ **Arrange Column** to open the Arrange Column dialog (Figure 2-19).
2. Choose the options that you want and click **Save**.

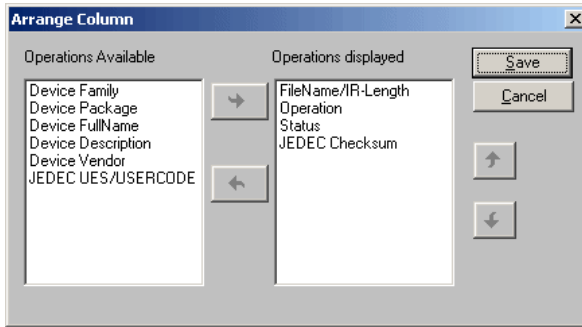


Figure 2-19. Arrange Column dialog

Table 2-16 describes the features of the Arrange Column Dialog.

Table 2-16. Arrange Column Dialog Features

Feature	Description
Operations Available	List of operations available as column headers for the Chain Configuration window. Use the Right arrow to add an operation to the Operations Displayed list.
Operations Displayed	List of operations currently in use as column headers for the Chain Configuration window. Use the Up and Down arrows to move a current header. Use the Left arrow to remove an operation from the list.
Right Arrow	Moves the selected available operation to the Operations Displayed list.
Left Arrow	Removes the selected operation from the Operations Displayed list.
Up Arrow	Moves the selected operation up one position in the Operations Displayed list.

Table 2-16. Arrange Column Dialog Features (Continued)

Feature	Description
Down Arrow	Moves the selected operation down one position in the Operations Displayed list.

Specifying AutoScan Options

When the ispVM System software scans the board, you can specify scanning options.

To specify AutoScan options:

- Choose **Options** ⇒ **Limited Scan** if you want the ispVM System software to scan the board against all possible devices listed in the Select Device dialog (Figure 2-20), except for all ispLSI 3000 and 6000 devices.
- Choose **Options** ⇒ **Full Scan** if you want the ispVM System software to scan the board against all possible devices listed in the Select Device dialog.

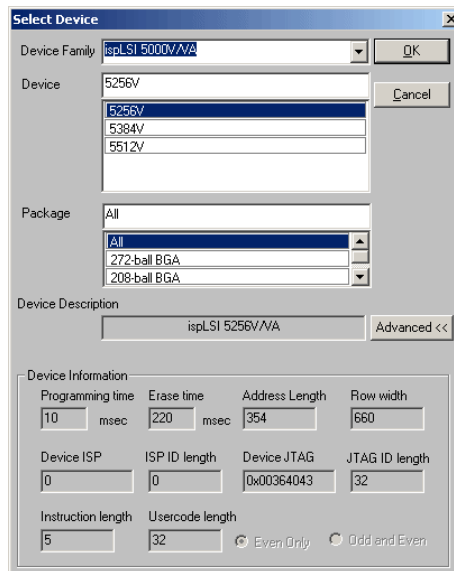


Figure 2-20. Select Device Dialog

Table 2-17 describes the features of the Select Device Dialog.

Table 2-17. Select Device Dialog Features

Feature	Description
Device Family	Lets you specify the device family. Generic JTAG – Non-Lattice device <ul style="list-style-type: none"> • ispLSI • ispGDS • ispGDx • ispGAL • MACH
Device	Lets you specify the device in the selected Device Family.
Package	Lets you specify the package for the selected Device.
Device Description	Shows the device PON (part order number) for the selected device and package.
Device Information	Contains device programming information.

Specifying USERCODE/UES Display Options

When you use the USERCODE/UES Editor, the UES field information in the .JED file can be displayed in either hexadecimal or decimal format. Use the **Display USERCODE/UES Options** command to toggle this setting.

To specify USERCODE/UES display options:

1. Choose **Options** ⇒ **Display USERCODE/UES Options** ⇒ **Hexadecimal** to display the UES field in hexadecimal format.
2. Choose **Options** ⇒ **Display USERCODE/UES Options** ⇒ **Decimal** to display the UES field in decimal format.

Installing/Uninstalling the isp Windows NT Parallel Port Driver

You must install the isp Windows NT Parallel Port driver on Windows NT computers using the ispWinNT Driver dialog (Figure 2-21). You can also use the isp WinNT dialog to uninstall the isp Windows NT Parallel Port driver.

You must have administrator privileges to install or uninstall the isp Windows NT Parallel Port driver.

Installing the isp Windows NT Parallel Port Driver

To install the isp Windows NT Parallel Port driver:

- 1. Choose ispTools > Install/Uninstall LSC NT Driver to open the isp WinNT Driver dialog.
- 2. Click Install, and follow the prompts, to install the isp WinNT driver.

Uninstalling the isp Windows NT Parallel Port Driver

To uninstall the isp Windows NT Parallel Port driver:

1. Choose ispTools > Install/Uninstall LSC NT Driver to open the ispWinNT Driver dialog.
2. Click Uninstall, and follow the prompts, to uninstall the isp WinNT driver.



Figure 2-21. isp WinNT Driver

Table 2-17 describes the features of the isp WinNT Driver.

Table 2-18. isp WinNT Driver features

Feature	Description
Install	Installs the isp WinNT Driver.
Uninstall	Uninstalls the isp WinNT Driver.

Chapter 3 *The SVF Debugger*

SVF Debugger is software, separate from ispVM System software, that helps you debug a Serial Vector Format (SVF) file. SVF Debugger allows you to program a device, and then edit, check syntax, debug and trace the process of an SVF file.

Included in this chapter are sections that describe:

- SVF Files
- Starting the SVF Debugger
- Opening an Existing SVF File
- Creating a New SFV File
- Setting Device Programming Options
- Setting Port Assignments and Options
- Viewing SVF Processing
- Setting and Removing Breakpoints in an SVF File
- Processing an SVF File
- Viewing the Log File
- Editing an SVF File
- Setting Windows Options

About SVF Files

The SVF file is the media for exchanging descriptions of high-level 1149.1 bus operations. The SVF file is defined as an ASCII file, which consists of a set of SVF statements. In general, the 1149.1 bus operations consist of scan operations and movements between deferent stable states. Refer to the Serial Vector Format Specification Rev E for detailed definitions of SVF statement formats. Current SVF specifications are available from the Asset-Intertech website at **www.asset-intertech.com**. A sample SVF File is shown in Figure 3-1.

!Begin Test Program	
TRST OFF;	!Disable Test Reset line
ENDIR IDLE;	!End IR scans in IDLE
ENDDR IDLE;	!End DR scans in IDLE
HIR 8 TDI (00);	!8 bits IR header
HDR 16 TDI (FFFF)	
	! 16 bit DR header
TIR 16 TDI (0000);	!16 bit IR trailer
TDR 8 TDI (12);	!8 bit DR trailer
SIR 8 TDI (41);	!8 bit IR scan
SDR 32 TDI (ABCD1234)	
TDO (11112222);	!32 bit DR scan
STATE DRPAUSE;	!Go to stable state

Figure 3-1. SVF File Example

SVF Debugger Software Support of SVF Operations

The SVF Debugger supports a selective set of SVF operations. Table 3-1 lists SVF operations supported by the SVF Debugger.

Table 3-1. SVF Operations Supported by SVF Debugger

SVF Operation	Description	Support Status
ENDDR	Specifies default end state for DR scan operations.	Full Support
ENDIR	Specifies default end state for IR scan operations.	Full Support
HDR	(Header Data Register) Specifies a header pattern which is placed at the beginning of subsequent DR scan operations.	Supports TDI keyword only. SMASK, TDO and MASK are not supported.
HIR	(Header Instruction Register) Specifies a header pattern which is placed at the beginning of subsequent IR scan operations.	Supports TDI keyword only. SMASK, TDO and MASK are not supported.
RUNTEST	Forces the 1149.1 bus to the RUN_TEST/IDLE state for a specified number of clocks.	Full Support
SDR	(Scan data Register) Performs an 1149.1 Data Register scan.	Supports TDI, TDO and MASK keywords. SMASK is ignored.
SIR	(Scan Instruction Register) Performs an 1149.1 Instruction Register scan.	Supports TDI, TDO and MASK keywords. SMASK is ignored.
STATE	Forces the 1149.1 bus to a specified stable state.	Supports only single target state. The debugger does not allow the user to specify custom traverse path.
TDR	(Trailer Data Register) Specified a trailer pattern which is appended to the end of subsequent DR scan operations.	Supports TDI keyword only. SMASK, TDO and MASK are not supported.
TIR	(Trailer Data Register) Specified a trailer pattern which is appended to the end of subsequent IR scan operations	Supports TDI keyword only. SMASK, TDO and MASK are not supported.

Starting the SVF Debugger

You can start SVF Debugger from within ispVM System software, or you can start SVF Debugger separately from the ispVM System software.

To start the SVF Debugger from within ispVM System software:

1. In the ispVM System software, choose **ispTools** ⇒ **SVF Interpreter** to open the SVF Interpreter dialog (Figure 3-2).

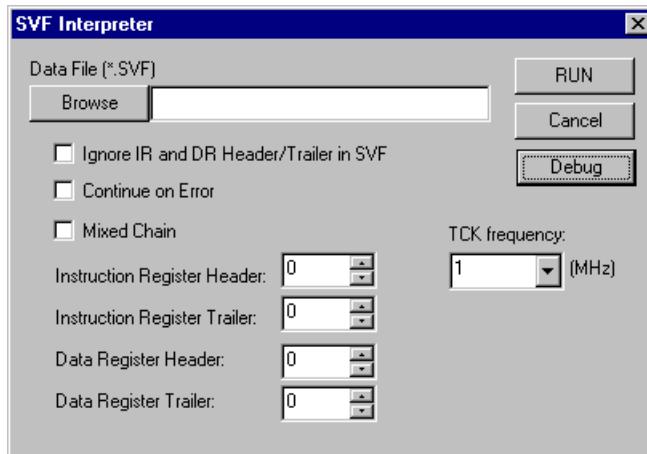


Figure 3-2. SVF Interpreter Dialog

2. Click **Debug**. The SFV Debugger Software main window appears (Figure 3-3).

To start the SVF Debugger separately from the ispVM software:

- Using Windows Explorer (Windows 95/98) or Windows NT Explorer (Windows NT), go to the directory containing your SVF Debugger software, and double-click on the **SVFdebugger.exe** file.

or

- From a DOS prompt or Run box, type:
`<drive>:\<ispVM directory>\svfdebugger.exe.`

The SFV Debugger main window appears (Figure 3-3).

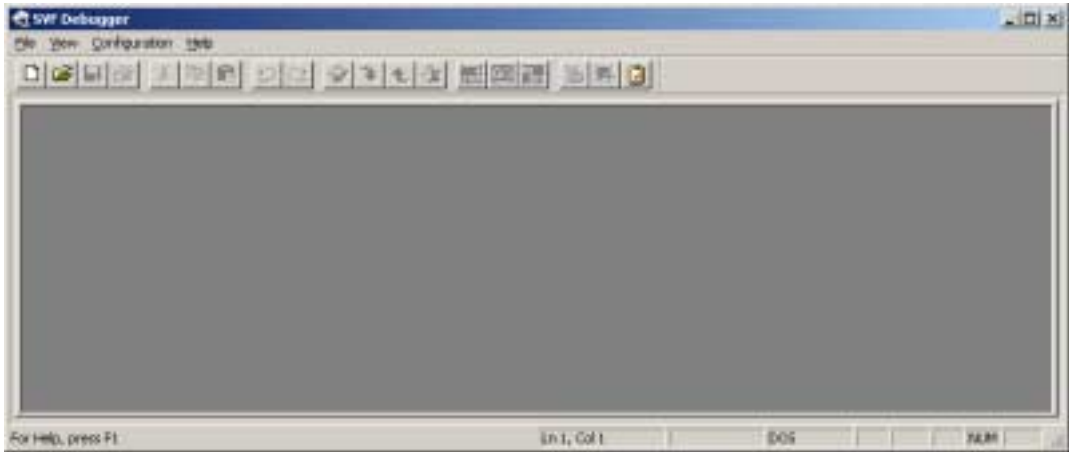


Figure 3-3. SVF Debugger Main Window

Opening an Existing SVF File

You can open an existing SVF file for processing. The SVF Debugger Edit Window allows you to perform various editing functions on your SVF File. You can check, line by line, the SVF file for errors when you program your device.

To open an existing SVF file:

1. Choose **File** ⇒ **Open** to open the Open .SVF File dialog.
2. Use the Open .SVF File dialog to locate and select the desired SVF file, and then click **Open**. The SVF file opens in the SVF Debugger Edit Window (Figure 3-4). Some lines are long enough to be truncated in Figure 3-4. Such lines can be viewed in their entirety with the Edit Line dialog box.

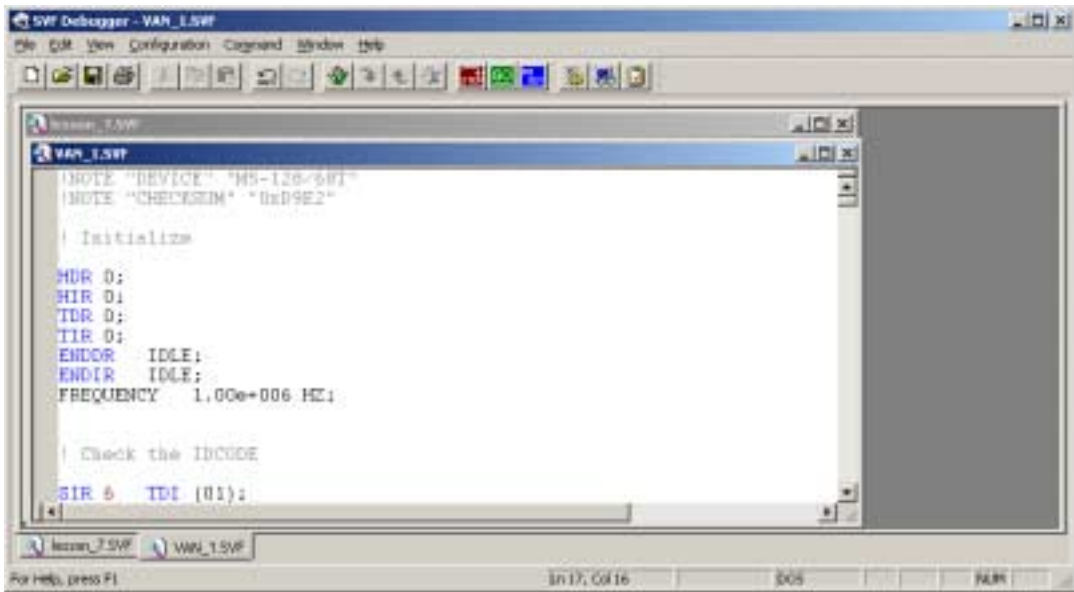


Figure 3-4. SVF Debugger Edit Window.



NOTE

For more information about the SVF Debugger software Graphical User Interface (GUI), refer to Appendix B, “Using the SVF Debugger GUI”.

Creating a New SVF File

You can create a new SVF file in the SVF Debugger.

To create a new empty SVF file:

- Choose **File** ⇒ **New** to open the SVF Debugger Edit Window and create a new empty SVF file. The empty SVF file opens in the SVF Debugger Edit window (Figure 3-5). The SVF Options dialog (Figure 3-6) also opens.

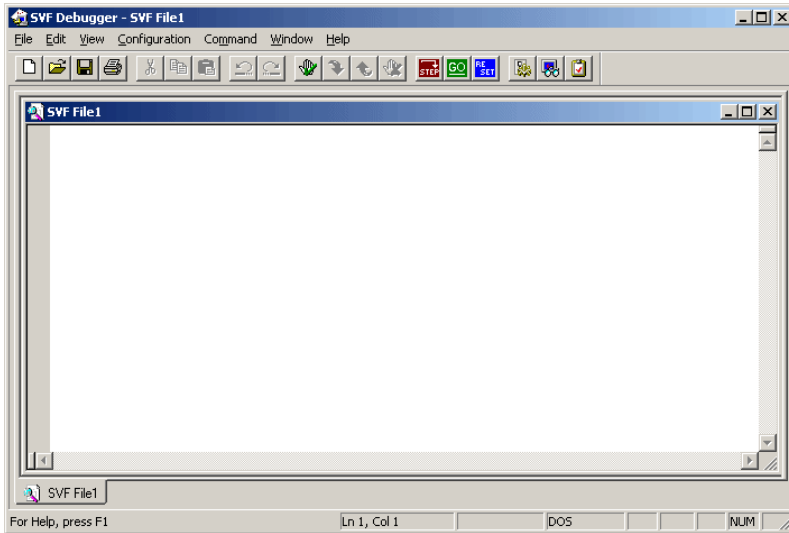


Figure 3-5. Empty SVF File Open in SVF Debugger Edit Window

Setting Device Programming Options

The SVF Options Dialog allows you to set options related to device programming. The SVF Options Dialog opens when you open an existing SVF File or you create a new empty SVF file. You can also open the SVF Options dialog using the **Configuration** ⇒ **SVF Options** command.

To open the SVF Options Dialog:

- Choose **Configuration** ⇒ **SVF Options** to open the SVF Options dialog (Figure 3-6).

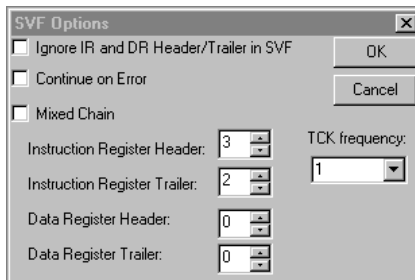


Figure 3-6. SVF Options Dialog

Table 3-2. SVF Option Dialog Features

Feature	Description
Ignore IR and DR Header/Trailer in SVF file	Ignores the HIR TIR HDR and TDR information in SVF file. If users set up the HIR TIR HDR TDR in SVF Option Dialog, the item must be selected.
Continue on Error	Continue process SVF file even if there is an error and print all the information into the log file
Mixed Chain	Tells the SVF processor that the hardware configuration is a mixed chain, therefore disabling the ISP chain.
Instruction Register Header	Sets the HIR in number of bits (0-100)
Instruction Register Trailer	Sets the TIR in number of bits (0-100)
Data Register Header	Sets the HDR in number of bits (0-100)
Data Register Trailer	Sets the TDR in number of bits (0-100)
TCK frequency	Sets the TCK clock frequency (1-30 Mhz). This value effects the speed of SVF processor.

Setting Port Assignments and Options

You use the Cable and I/O Port Setup dialog to specify the preferred parallel port for download, select the port address, and select the download cable type.

To open the Cable and I/O Port Setting Dialog:

- Choose **Configuration** ⇒ **Cable and I/O Port Setup...** to open the Cable and I/O Port Setup dialog (Figure 3-7).

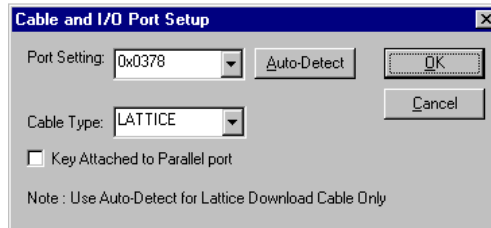


Figure 3-7. Cable and I/O Port Setup dialog

Table 3-3. Cable and I/O Port Setup Dialog Features

Feature	Description
Port Setting	Lets you specify the preferred parallel port address (0x0378,0x03BC or 0x0278) for the software to use for download.
Auto-Detect	Automatically detects the parallel port to which the download cable is connected. This feature works only with a Lattice ispDOWNLOAD cable, not a Vantis cable.
Cable Type	Selects download cable type (Lattice or Vantis)
Key Attached to Parallel Port	Select this option if a parallel port security key is attached to the parallel port, so that the ispVM System software will generate signals to communicate with the chain through the key. Otherwise, remove the security key.

Viewing SVF Processing

You can view the progress of the SVF processing output with the Output dialog. If you wish to view the progress of the SVF processing, you must open the dialog before you begin processing the SVF File.

To open the Output Dialog:

Choose **Configuration** ⇒ **SVF Output** to open the Output dialog (Figure 3-8).

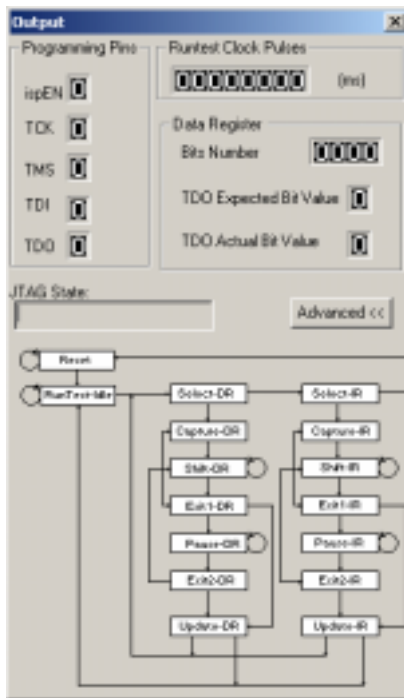


Figure 3-8. Output Dialog

Table 3-4. Output Dialog Features

Feature	Description
Programming Pins	Displays the value of the pins signal, either '1' for HIGH or '0' for LOW
Runttest clock pulses	Displays the number of delay clocks in RUNTEST statement
Data Register	Displays the value of the TDO Signal, one bit at a time, when reading the data from the device. The results are compared with the expected value.
JTAG State	Displays the State of TAP control state machine while processing a line in the SVF file.
Advanced	Displays JTAG State Machine.

Setting and Removing Breakpoints in an SVF File

You can set a breakpoint in your SVF file before processing the SVF file. The process will stop at the line you specify. When the process reaches the line you specify as a breakpoint, the process will stop. A dialog appears telling you that the breakpoint has been reached. After you click OK in the dialog, you can resume the process.

To set a breakpoint in an SVF File:

1. Select a line in your SVF file.
2. Choose **Command** ⇒ **Breakpoint** ⇒ **Set Breakpoint**.

To select next breakpoint:

1. Select a line in your SVF file.
2. Choose **Command** ⇒ **Breakpoint** ⇒ **Next Breakpoint**.

To select previous breakpoint:

1. Select a line in your SVF file.
2. Choose **Command** ⇒ **Breakpoint** ⇒ **Previous Breakpoint**.

To clear all breakpoints

1. Select the breakpoint you wish to remove in your SVF file.
2. Choose **Command** ⇒ **Breakpoint** ⇒ **Clear All Breakpoints**.

Processing an SVF File

After you have set device programming options and port assignments, you can begin to process your SVF File with SVF Debugger. You can program a device with a download cable, and examine the output on the SVF Output dialog. You can step through a process, line by line, using the **Step** command. You can reset all variables and start a process from the beginning using the **Reset** command. You can view the process with the Output dialog. Refer to “Viewing SVF Processing” in this chapter for more information about viewing a process.

To process an SVF File:

- Choose **Command** ⇒ **Go**.

To step through a process, line by line:

- Choose **Command** ⇒ **Step**. The process will step through the SVF file line by line.

To reset a process and start a process from the beginning:

- Choose **Command** ⇒ **Reset**.

Viewing the Log File

The SVF Debugger generates a log file if there are errors during the process, or if the **Continue on Error** option was selected in the SVF Options dialog. You can specify where to save the log file with the **Log File Options** dialog. You can clear the contents of the log file with the **Clear Log File** command.

To view a Log File:

- Choose **View** ⇒ **Log File**. The log file will display in a text editor, as shown in Figure 3-9.

```

-----Line20-----:
SIR 6  TDI(01)
Received TDO(3F)

-----Line23-----:
SDR 32  TDI(FFFFFFFF)
Expected TDO(07815003)
Expected MASK(0FFF1FFE)
Received TDO(FFFFFFFF)
Bits 0003: Expected: 0 Received: 1
Bits 0004: Expected: 0 Received: 1
Bits 0005: Expected: 0 Received: 1
Bits 0006: Expected: 0 Received: 1
Bits 0007: Expected: 0 Received: 1
Bits 0008: Expected: 0 Received: 1
Bits 0009: Expected: 0 Received: 1
Bits 0010: Expected: 0 Received: 1
Bits 0011: Expected: 0 Received: 1
Bits 0012: Expected: 0 Received: 1
Bits 0018: Expected: 0 Received: 1
Bits 0019: Expected: 0 Received: 1
Bits 0020: Expected: 0 Received: 1
Bits 0021: Expected: 0 Received: 1
Bits 0022: Expected: 0 Received: 1
Bits 0023: Expected: 0 Received: 1
Bits 0028: Expected: 0 Received: 1
New Fixed RMASK(07811002)

-----Line25-----:
SIR 6  TDI(02)
Received TDO(3F)

```

Figure 3-9. Sample Log File

You can save your Log File to a directory that you specify on your computer.

To set Log File Options:

1. Choose **Configuration** ⇒ **Log File Options** to open the log file Options dialog (Figure 3-10).
2. Specify the path to the directory that you wish to save your log file. You can use the **Browse** button to navigate to the directory where you would like to save the log file.
3. If you wish to clear the contents of the log file every time that you start SVF Debugger software, check the **Clear Log file each time start application** box.
4. Click **OK**.

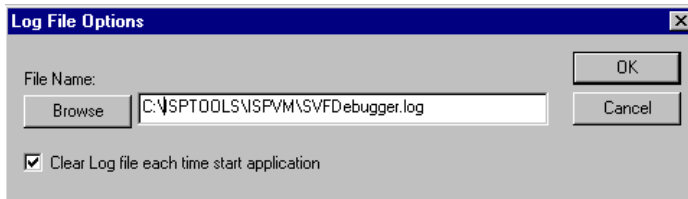


Figure 3-10. Log File Options dialog

To clear the contents of the log file:

Choose **Edit** ⇒ **Clear Log File**.

Editing an SVF File

You can edit your SVF file using the commands in the **Edit** menu.

To edit an SVF file:

1. Select a line in your SVF file.
2. Make the edits using commands in the **Edit** menu, and click **File** ⇒ **Save**.

Setting Windows Options

You can use **Cascade**, **Tile**, and **Arrange Icons** commands to change the way the SVF Debugger software displays on your computer screen.

To arrange open windows in a cascade arrangement:

Choose **Window** ⇒ **Cascade**.

To arrange open windows in a Tile arrangement:

Choose **Window** ⇒ **Tile**.

To arrange minimized open windows:

Choose **Window** ⇒ **Arrange Icons**. Minimized open windows in SVF Debugger will be arranged along the bottom of your computer screen.

Appendix A *Using the ispVM System GUI*

This appendix describes the ispVM System software graphical user interface (GUI) in detail. Included in this appendix are sections that describe:

- ispVM Tool Bar
- ispVM Edit Bar
- ispVM System Window Menus and Commands
- ispVM System Software Chain Configuration Window
- ispVM System Software Status Window
- ispVM System Software Status Bar

About the ispVM System Software User Interface

The ispVM System window (Figure A-1) consists of Menus, Tool Bar, Edit Bar, Chain Configuration window, and Status Window.

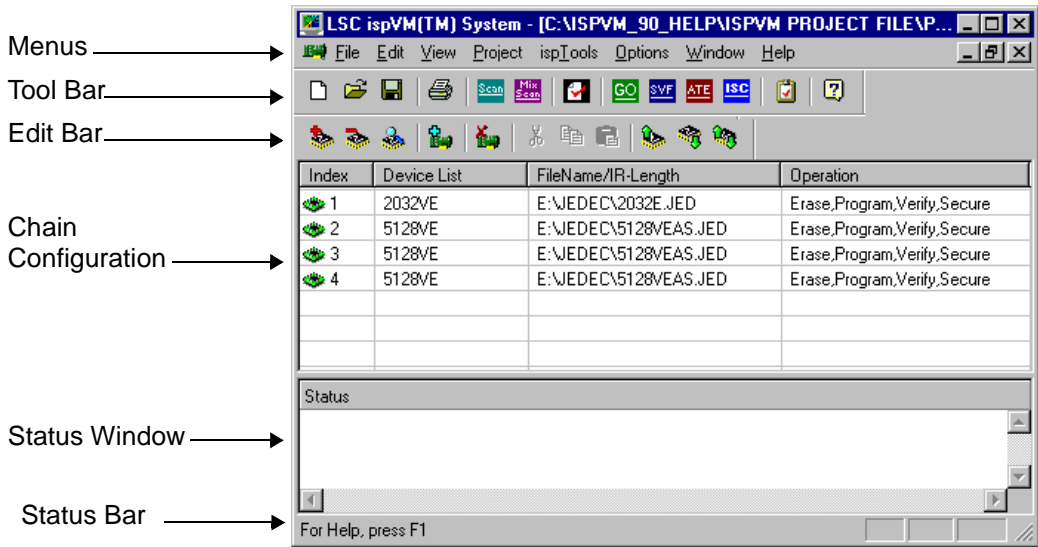



Figure A-1. ispVM System Window.

 **NOTE** For more information about using the ispVM System software to create and edit device chains, refer to Chapter 2, “The ispVM System Software.”

ispVM Toolbar

The ispVM System software toolbar (Figure A-2) contains icons that allow you to perform processing operations without the need to use menu commands.

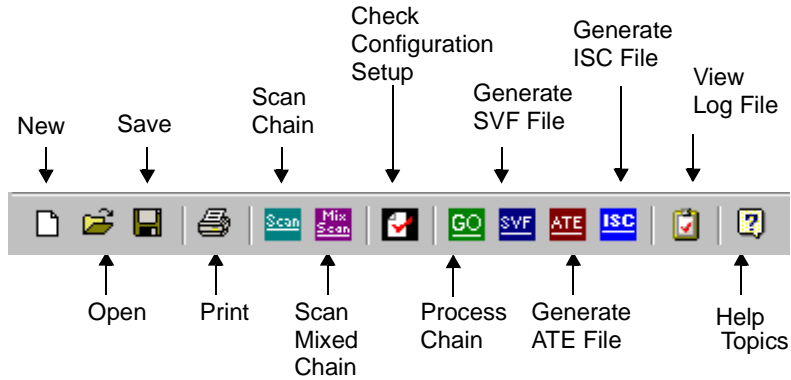


Figure A-2. ispVM System Software Toolbar

ispVM Edit Bar

The ispVM System software edit bar (Figure A-3) contains icons that allow you to perform editing operations without the need to use menu commands.

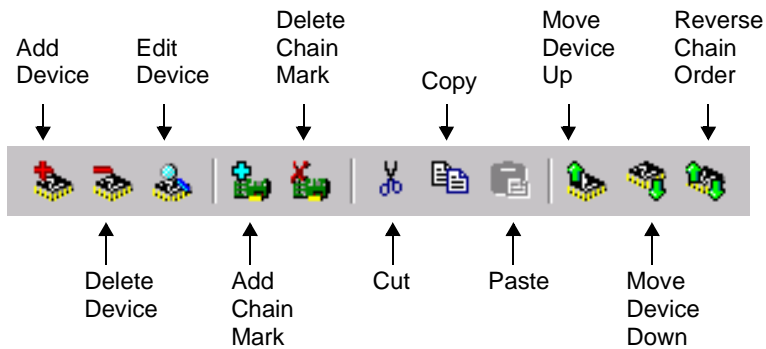


Figure A-3. ispVM System Software Edit Bar

ispVM System Window Menus and Commands

The following tables summarize the ispVM Main Window menu commands and associated tool bar icons, edit bar shortcut icons, and associated shortcuts.

File Menu

The File menu (Figure A-4) contains the **New**, **Open**, **Import File**, **Print Setup**, and **Exit** commands.

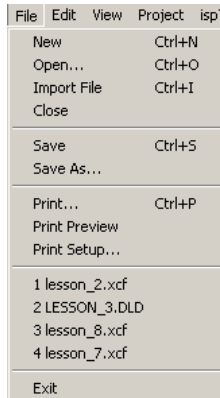


Figure A-4. File Menu

Table A-1 lists and describes commands in the File menu, as well as associated toolbar icon and associated shortcut.

Table A-1. File Menu commands and shortcuts





Command	Icon	Shortcut	Description
New		CTRL+N	Creates an empty, untitled chain file.
Open...		CTRL+O	Opens the Open XCF File dialog, which lets you select an existing chain configuration file (.xcf). You can open multiple files at once. Use the Window menu commands to manage the multiple open files. Legacy chain files must be opened using File ⇒ Import .

Table A-1. File Menu commands and shortcuts (Continued)

Command	Icon	Shortcut	Description
Import File	N/A	CTRL+I	Opens the Open Import File dialog, which lets you select an ispDCD download configuration file (*.dld) or LatticePRO download configuration file (*.wch). You can use this method of starting a project instead of creating a new chain file.
Close	N/A	N/A	Closes the active chain file. You should save changes to your files before you close them. If you attempt to close a file without saving, the software asks you if you want to save the current configuration setup.
Save		CTRL+S	Saves the active chain description to its current name and directory. When you save a chain description for the first time, the software displays the Save As dialog so you can name your chain file.
Save As...	N/A	N/A	Opens the Save as XCF or DLD File dialog, which lets you name and save the active chain file.
Print...		CTRL+P	Opens the Print dialog, which lets you print the active chain file.
Print Preview	N/A	N/A	Displays the active chain file as it would appear when printed. When you choose this command, the software replaces the main window with a print preview window that displays the chain file in its printed format. The print preview toolbar offers options to view either one or two pages at a time, move back and forth through the document, zoom in and out of pages, and initiate a print job.
Print Setup...	N/A	N/A	Opens the Print Setup dialog, which lets you select a printer and a printer connection.
Exit	N/A	N/A	Closes the ispVM System application. You should save changes to your files before you exit. If you attempt to exit without saving, the software asks you if you want to save the current configuration setup.

Edit Menu

The Edit menu (Figure A-5) contains the **Cut, Copy, Paste, Add Chain Mark, Delete Chain Mark, Add Device, Delete Device, Edit Device, Move Device Up, Move Device Down, Reverse Chain Order, Set Chain Operations, Clear Status Window, and Clear Log File** commands.

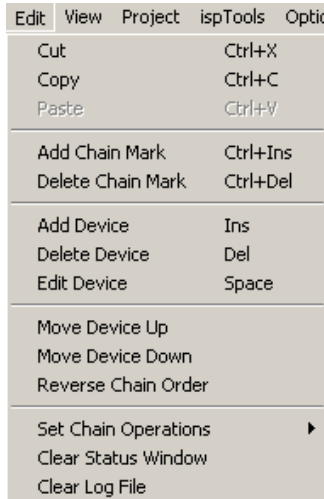


Figure A-5. Edit Menu

Table A-2 lists and describes commands in the **Edit** menu, as well as associated tool bar icon, edit bar icon and associated shortcut.

Table A-2. Edit Menu Commands



Command	Icon	Shortcut	Description
Cut		CTRL+X	Removes the selected device from the active chain file and places it on the clipboard, erasing the previous contents of the clipboard. Then, you can paste the device from the clipboard into the chain file.
Copy		CTRL+C	Makes a copy of the selected device and places it on the clipboard, erasing the previous contents of the clipboard. Then, you can paste the device from the clipboard into the chain file.

Table A-2. Edit Menu Commands (Continued)










Command	Icon	Shortcut	Description
Paste		CTRL+V	Places the contents of the clipboard (a device) into the active chain file, one position below the currently selected device.
Add Chain Mark		CTRL+ Insert	Adds a chain mark into the active chain file, one position below the currently selected device. A chain mark separates a JTAG chain from an ISP chain.
Delete Chain Mark		CTRL+ Delete	Deletes the selected chain mark from the active chain file. Before you can delete the chain mark, you must first delete all its devices using the Delete Device command.
Add Device		Insert	Opens the Device Information dialog, which lets you insert a device into the active chain below the currently selected device and specify the configuration parameters for the device.
Delete Device		Delete	Deletes the currently selected device from the active chain file. There is no Undo for this command.
Edit Device		Space	Opens the Device Information dialog, which lets you change information about the device.
Move Device Up		N/A	Moves the selected device up one position within its chain.
Move Device Down		N/A	Moves the selected device down one position within its chain.
Reverse Chain Order		N/A	Reverses the order of all the devices in the active chain file.

Table A-2. Edit Menu Commands (Continued)

Command	Icon	Shortcut	Description
Set Chain Operations⇒ Erase, Program, Verify	N/A	N/A	Sets the chain operation for the selected device to: <ul style="list-style-type: none"> • Erase the current design pattern and the security fuse • Download a new design pattern to the device. (Requires a JEDEC file to be specified). • Verify the pattern with the original .jed file to ensure the device was programmed correctly.
Set Chain Operations⇒ Erase, Program, Verify, Secure	N/A	N/A	Sets the chain operation for the selected device to: <ul style="list-style-type: none"> • Erase the current design pattern and the security fuse • Download a new design pattern to the device. (Requires a JEDEC file to be specified). • Verify the pattern with the original .jed file to ensure the device was programmed correctly • Set the security bit so that the device cannot be read.
Set Chain Operations ⇒ Program Only	N/A	N/A	Sets the chain operation for the selected device to: <ul style="list-style-type: none"> • Erase the current design pattern and the security fuse • Download a new design pattern to the device. (Requires a JEDEC file to be specified).
Set Chain Operations ⇒ Verify Only	N/A	N/A	Sets the chain operation for the selected device to: <ul style="list-style-type: none"> • Verify the pattern with the original .jed file to ensure the device was programmed correctly. (Requires a JEDEC file to be specified).
Set Chain Operations ⇒ Erase Only	N/A	N/A	Sets the chain operation for the selected device to: <ul style="list-style-type: none"> • Erase the current design pattern and the security fuse
Set Chain Operations ⇒ Bypass	N/A	N/A	Sets the chain operation for the selected device to: <ul style="list-style-type: none"> • No operation will be performed on the device. The device is set to bypass mode.

Table A-2. Edit Menu Commands (Continued)

Command	Icon	Shortcut	Description
Set Chain Operations ⇒ Calculate Checksum	N/A	N/A	Sets the chain operation for the selected device to: <ul style="list-style-type: none"> All operation fields (ISP and JTAG) to the Checksum mode of operation. This function is activated when chain information is available.
Set Chain Operations ⇒ Display ID	N/A	N/A	Sets the chain operation for the selected device to: <ul style="list-style-type: none"> Display the device ID.
Set Chain Operations ⇒ Display USERCODE	N/A	N/A	Sets the chain operation for the selected device to: <ul style="list-style-type: none"> Display the USERCODE in the JEDEC file.
Set Chain Operations ⇒ Read and Save JEDEC	N/A	N/A	Sets the chain operation for the selected device to: <ul style="list-style-type: none"> Read the design pattern from the device and save it to a JEDEC file.
Set Chain Operations ⇒ Secure Device	N/A	N/A	Sets the chain operation for the selected device to: <ul style="list-style-type: none"> Set the security bit so that the device cannot be read.
Clear Status Window	N/A	N/A	Clears the contents of the Message window, located directly above the Status Bar.
Clear Log File	N/A	N/A	Clears the contents of the project log file.

View Menu

The **View** menu (Figure A-6) contains the **Toolbar**, **Status Bar**, **Edit Bar**, **Background**, and **Font** commands.

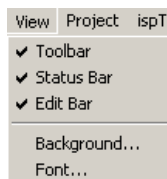


Figure A-6. View Menu

Table A-3 lists and describes commands in the **View** menu,

Table A-3. View Menu Commands

Command	Description
Toolbar	Toggles the display of the Toolbar.
Status Bar	Toggles the display of the Status Bar.
Edit Bar	Toggles the display of the Edit Bar.
Background...	Opens the Background dialog, which lets you specify a background graphic and color for the Main Window, as well as other display attributes.
Font...	Opens the Font dialog, which lets you specify the font, font style, and size of the font for text appearing in the Chain Configuration window.

Project Menu

The **Project** menu (Figure A-7) contains the **Project Settings**, **Check Configuration**, **Download**, **Generate SVF File**, **Generate ATE File**, and **View Log File** commands.

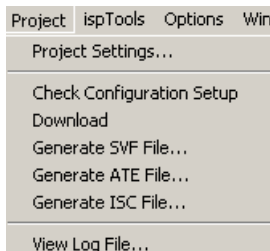








Figure A-7. Project Menu

Table A-4 lists and describes commands in the **Project** menu, as well as associated toolbar icon.

Table A-4. Project Menu Commands

Command	Icon	Description
Project Settings	N/A	Opens the Project Settings dialog, which lets you specify how the ispVM System software will process the active chain configuration.

Table A-4. Project Menu Commands (Continued)

Command	Icon	Description
Check Configuration Setup		Verifies that each device has a .jed file attached and checks the operation selection for each device. Prints the configuration status (pass/fail) for each device in the configuration. A successful message appears in the Messages window.
Download		Downloads the design files to the daisy-chained devices, as specified.
Generate SVF File...		Opens the Generate SVF File dialog, which lets you build an SVF file for a single-device or Sequential Chain.
Generate ATE File...		Opens the Generate ATE File dialog, which lets you build a test file formatted for Genrad, HP, and Teradyne testers, as well as a Generic Vector format.
View Log File		Opens the project log file, which is an ASCII text report file summarizing the results of the ispVM System software operations.
Generate ISC File		Opens the JEDEC to ISC Data File converter dialog which allows you to convert JEDEC files to ISC files.

ispTools Menu

The **ispTools** menu (Figure A-8) contains the **SVF Interpreter**, **Scan Chain**, **Scan Mixed Chain**, **USERCODE/UES Editor**, **Repetitive Download**, and **Board Diagnostics** commands.

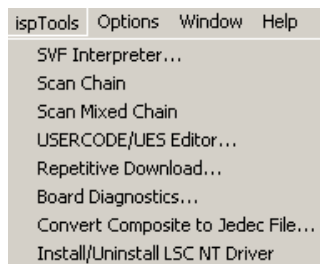




Figure A-8. ispTools Menu

Table A-5 lists and describes commands in the **ispTools** menu, as well as associated toolbar and edit bar icon shortcuts.

Table A-5. ispTools Menu Commands

Command	Icon	Description
SVF Interpreter...	N/A	Opens the SVF Interpreter dialog, which lets you specify the single device SVF file for processing by the SVF Interpreter when you click Run. You can also open the SVF Debugger when you click Debug.
Scan Chain		Automatically scans and detects the devices on the chain.
Scan Mixed Chain		Automatically scans and detects the devices on the mixed chain.
USERCODE/ UES Editor...	N/A	Opens the Open .JED File dialog, which lets you specify the JEDEC file to edit the USERCODE/UES field.
Repetitive Download...	N/A	Opens the Repetitive Download dialog, which lets you specify the number of times a chain is processed, based on values specified in the dialog.
Board Diagnostics...	N/A	Check that the chain description matches the devices on the board.
Convert Composite to JEDEC File	N/A	Opens the Convert Composite to JEDEC Files dialog, which allows you to convert Composite files (*.CMP) to JEDEC files (*.JED).
Install/ Uninstall LSC NT Driver	N/A	Opens the isp WinNT dialog, which allows you to install the NT Parallel Port Driver application.

Options Menu

The **Options** menu (Figure A-9) contains the **Cable and I/O Port Setup**, **File Locations**, **Arrange Column**, **AutoScan Options**, and **Display USERCODE/UES Options** commands.

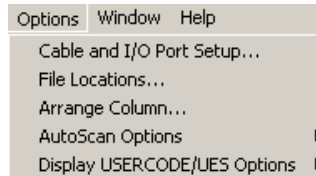


Figure A-9. Options Menu

Table A-6 lists and describes commands in the **Options** menu.

Table A-6. Options Menu Commands

Command	Description
Cable and I/O Port Setup...	Opens the Cable and I/O Port Setup dialog, which lets you specify the preferred parallel port for the ispVM System software to use for download. When you start the program with the cables connected properly, the software detects the default port assignment.
File Locations...	Opens the File Locations dialog, which lets you specify the location of your project directories.
Arrange Column...	Opens the Arrange Column dialog, which lets you rearrange, add, or remove the column headings for the Chain Configuration window.
AutoScan Options ⇒ Limited Scan	The ispVM System software scans the board against all possible devices listed in the Select Device dialog, except for all ispLSI 3000 and 6000 devices. The ispLSI 3K and 6K devices require the ispVM System software to shift in the IDCODE instruction in order to read back the device ID. Depending on the other JTAG devices on the board, you may not want to shift in the IDCODE instruction in case the IDCODE is intrusive to the other non-Lattice devices.
AutoScan Options ⇒ Full Scan	The ispVM System software scans the board against all the possible devices listed in the Select Device dialog.

Table A-6. Options Menu Commands (Continued)

Command	Description
Display USERCODE /UES Options ⇒ Hexadecimal	Sets the USERCODE/UES to display in hexadecimal format.
Display USERCODE /UES Options ⇒ ASCII	Sets the USERCODE/UES to display in ASCII format.
Display USERCODE/ UES Options ⇒ Decimal	Sets the USERCODE/UES to display in decimal format.

Window Menu

The **Window** menu (Figure A-10) contains the **Cascade**, **Tile**, and **Arrange Icons** commands.



Figure A-10. Window Menu

Table A-7 lists and describes commands in the **Window** menu.

Table A-7. Window Menu Commands

Command	Description
Cascade	Arranges multiple opened windows in an overlapped fashion.
Tile	Arrange multiple opened windows in a non-overlapped fashion.
Arrange Icons	Arranges the icons for minimized windows at the bottom of the main window. If there is an open configuration chain file window at the bottom of the main window, then some or all of the icons may not be visible because they will be underneath this chain file window.

Help Menu

The **Help** menu (Figure A-11) contains the **Help Topics**, **Tutorials**, **Manual**, and **About ispVM System** commands.

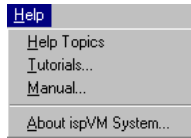



Figure A-11. Help Menu

Table A-8 lists and describes commands in the **Help** menu, as well as associated toolbar and edit bar icon shortcuts.

Table A-8. Menu Commands

Command	Toolbar	Description
Help Topics		Opens the ispVM System Help to the opening screen. Using the Contents tab, you can navigate to ispVM System concepts and background information, step-by-step instructions for using the ispVM System software, and various types of reference information.
Tutorials	N/A	Opens the ispVM System Help Tutorials.
Manual	N/A	Opens the ispVM System User Guide.
About ispVM System	N/A	Opens the ispVM System dialog, which contains software and supported device list version numbers and system resource information.

ispVM System Software Chain Configuration Window

The Chain Configuration Window displays the chain configuration file, and allows you to edit and process the chain configuration file using the ispVM System software.

ispVM System Software Status Window

The Status Window displays the status of your chain configuration file process.

ispVM System Software Status Bar

The Status Bar is displayed at the bottom of the ispVM System software window.

To hide or show the Status Bar:

- Choose **View > Status Bar**.

The left area of the Status Bar describes actions of menu items as you use the arrow keys to navigate through menus. This area similarly shows messages that describe the actions of Toolbar and Edit Bar buttons as you move the mouse over the buttons.

The right areas of the Status Bar indicate which keyboard keys are latched down.

Appendix B *Using the SVF Debugger GUI*

This appendix describes the SVF Debugger graphical user interface (GUI) in detail. Included in this appendix are sections that describe:

- SVF Debugger Toolbar
- SVF Debugger Menus and Commands
- SVF File Window
- SVF Debugger Status Bar

About the SVF Debugger User Interface

The SVF Debugger edit window (Figure B-1) consists of Menus, Tool Bar, SVF File, and Status Bar.

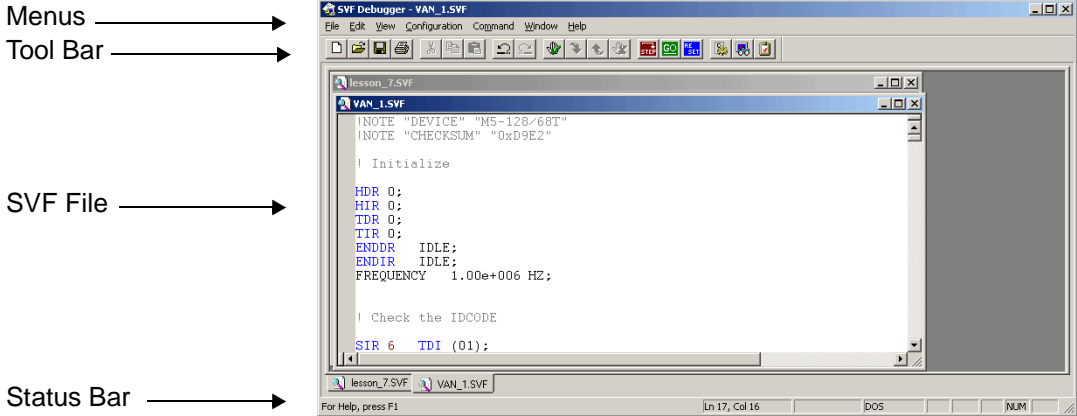



Figure B-1. SVF Debugger Edit Window.

 NOTE	For more information about using the SVF Debugger software to debug and edit SVF files, refer to Chapter 3, “The SVF Debugger.”
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SVF Debugger Toolbar

The SVF Debugger toolbar (Figure B-2) contains shortcut icons that allow you to perform processing operations without the need to use menu commands.

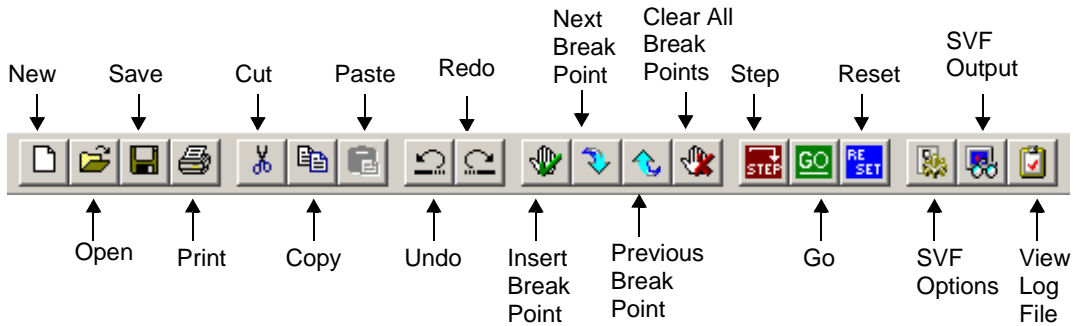


Figure B-2. SVF Debugger Toolbar

SVF Debugger Menus and Commands

The following tables summarize the SVF Debugger menu commands, associated toolbar shortcut icons, and associated shortcuts.

File Menu

The File menu (Figure B-3) contains the **New**, **Open**, **Close**, **Save**, **Save As**, **Print**, **Print Preview**, **Print Setup**, and **Exit** commands.

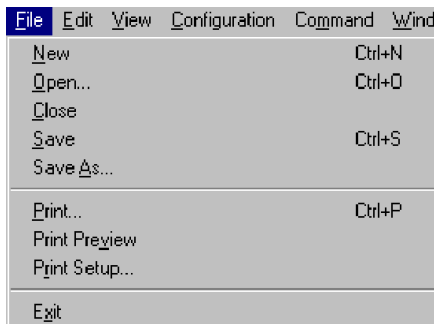






Figure B-3. File Menu

Table B-1 lists and describes commands in the **File** menu, as well as associated toolbar icon and associated shortcut.

Table B-1. File Menu Commands

Command	Toolbar Icon	Shortcut	Description
New		CTRL + N	Creates a new blank SVF file window.
Open...		CTRL + O	Opens the Open .SVF File dialog, which lets you select an existing chain file (.svf). You can open multiple files at once. Use the Window menu commands to manage the multiple open files.
Close	N/A	N/A	Closes the SVF File. You should save changes to your files before you close. If you attempt to close without saving, the software asks you if you want to save the current configuration setup.
Save		CTRL + S	Saves the SVF File. If the SVF file has not been saved before, opens the Save as .SVF File dialog and allows you to save the current SVF File.
Save As...	N/A	N/A	Opens the Save as .SVF File dialog and allows you to save the current SVF File with different file name.
Print...		CTRL + P	Prints the current SVF File.
Print Preview	N/A	N/A	Displays a preview version of the SVF File on your computer screen before you print the SVF File.
Print Setup...	N/A	N/A	Opens the Print Setup dialog, which lets you select a printer and a printer connection.
Exit	N/A	N/A	Closes the SVF Debugger application. You should save changes to your files before you exit. If you attempt to exit without saving, the software asks you if you want to save the current configuration setup.

Edit Menu

The Edit menu (Figure B-4) contains the **Undo**, **Redo**, **Cut**, **Copy**, **Paste**, **Delete**, **Select All**, **Find**, **Find Next**, **Find Previous**, **Replace**, **Go to**, **Read Only**, and **Clear Log File** commands.

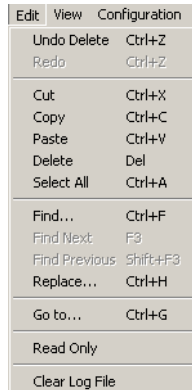


Figure B-4. Edit Menu

Table B-2 lists and describes commands in the **Edit** menu, as well as associated toolbar icon and associated shortcut.

Table B-2. Edit Menu Commands






Command	Toolbar Icon	Shortcut	Description
Undo		CTRL+Z	Cancels the previous action.
Redo		CTRL+Z	Cancels the previous cancellation of an action.
Cut		CTRL+X	Removes selected text from the SVF file and places it on the clipboard, erasing the previous contents of the clipboard. Then, you can paste the text elsewhere in the SVF file, or into another SVF file.
Copy		CTRL+C	Copies selected text.

Table B-2. Edit Menu Commands (Continued)

Command	Toolbar Icon	Shortcut	Description
Paste		CTRL+V	Pastes selected text.
Delete	N/A	Delete	Deletes selected text.
Select All	N/A	CTRL+A	Selects all the text of the SVF file.
Find	N/A	CTRL+F	Finds a string in the SVF file.
Find Next	N/A	F3	Finds the next occurrence of a string in the SVF file.
Find Previous	N/A	SHIFT+F3	Finds the previous occurrence of a string in the SVF file.
Replace	N/A	CTRL+H	Finds each occurrence of a string in the SVF and replaces it with another.
Go to	N/A	CTRL+G	Goes to a specific line in the SVF file.
Read Only	N/A	N/A	Makes the SVF file Read Only.
Clear Log File	N/A	N/A	Clears the contents of a log file.

View Menu

The View menu (Figure B-5) contains the **Toolbar**, **Status Bar**, and **Log File** commands.

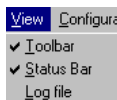



Figure B-5. View Menu

Table B-3 lists and describes commands in the **View** menu, as well as associated toolbar icon.

Table B-3. View Menu Commands

Command	Toolbar Icon	Description
Tool Bar	N/A	Toggles the display of the Toolbar.

Table B-3. View Menu Commands (Continued)

Command	Toolbar Icon	Description
Status Bar	N/A	Toggles the display of the Status Bar.
Log File		View the result file. When problems happen when processing the SVF file or users choose “Continue on Download” option, all of the messages will be printed into the log file.

Configuration Menu

The Configuration menu (Figure B-6) contains the **Cable and I/O Port Setup**, **SVF Options**, **SVF Output**, and **Log File Options** commands.

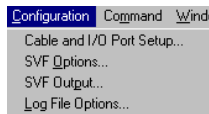


Figure B-6. Configuration Menu

Table B-4 lists and describes commands in the **Configuration** menu, as well as associated toolbar icon.

Table B-4. Configuration Menu Commands



Command	Toolbar Icon	Description
Cable and I/O Port Setup	N/A	Opens the Cable and I/O Port Setup dialog, which lets you specify the preferred parallel port for the ispVM System software to use for download. When you start the program with the cables connected properly, the software detects the default port assignment.
SVF Options		Opens the SVF Options dialog.
SVF Output		Opens the Output dialog.

Table B-4. Configuration Menu Commands (Continued)

Command	Toolbar Icon	Description
Log File Options	N/A	Opens the Log File Options dialog.

Command Menu

The Command menu (Figure B-7) contains the **Insert Breakpoint**, **Remove Breakpoint**, **Step**, **Go**, and **Reset** commands.

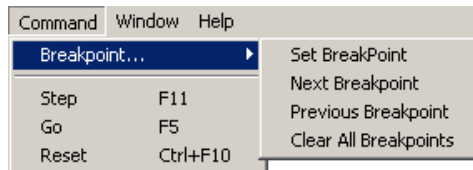


Figure B-7. Command Menu

Table B-5 lists and describes commands in the **Command** menu, as well as associated toolbar and associated shortcut.

Table B-5. Command Menu Commands








Command	Toolbar Icon	Shortcut	Description
Insert Breakpoint		N/A	Insert a breakpoint while processing the SVF file. The process will stop at that line. Only one breakpoint can be used at a time.
		N/A	Jump to the next breakpoint.
		N/A	Jump to the previous breakpoint.
Clear All Breakpoints		N/A	Clear all breakpoints.
Step		F11	User can start from the beginning and process the SVF file step by step though each line. The result will display in Output dialog.

Table B-5. Command Menu Commands (Continued)

Command	Toolbar Icon	Shortcut	Description
Go		F5	Process the SVF file.
Reset		CTRL+F10	Reset all the variables and start from the beginning.

Window Menu

The Window menu (Figure B-8) contains the **Cascade**, **Tile**, and **Arrange Icons** commands.

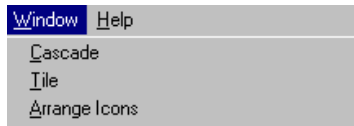


Figure B-8. Window Menu

Table B-6 lists and describes commands in the **Window** menu, as well as associated toolbar icon.

Table B-6. Window Menu Commands

Command	Description
Cascade	Arranges multiple opened windows in an overlapped fashion.
Tile	Arrange multiple opened windows in a non-overlapped fashion.
Arrange Icons	Arranges the icons for minimized windows at the bottom of the main window.

Help Menu

The Help menu (Figure B-9) contains the **Help Topics** and **About SVF Debugger** commands.

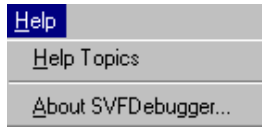


Figure B-9. Help Menu

Table B-7 lists and describes commands in the **Help** menu, as well as associated toolbar icon shortcut.

Table B-7. SVF Edit Window Help Menu Commands

Command	Description
Help Topics	Opens the SVF Debugger Help to the opening screen. Using the Contents tab, you can navigate to SVF Debugger help topics.
About SVF Debugger	Opens the SVF Debugger dialog, which contains software version number.

SVF File Window

The SVF File Window displays the SVF file, and allows you to process, debug, and edit the SVF File using the SVF Debugger software.

SVF Debugger Status Bar

The Status Bar is displayed at the bottom of the SVF Debugger software window.

To hide or show the Status Bar:

- Choose View > Status Bar.

The left area of the Status Bar describes actions of menu items as you use the arrow keys to navigate through menus. This area similarly shows messages that describe the actions of Toolbar and Edit Bar buttons as you move the mouse over the buttons.

The right areas of the Status Bar indicate which keyboard keys are latched down.

Appendix C *ispVM Command Line Mode*

This appendix describes how you can run ispVM System software from a 32-bit DOS command line. You can process chain description files (.xcf) or configuration setup files (.dld) using the command line mode.

Included in this appendix are sections that describe:

- Running ispVM from Command Line
- ispVM System Software Commands
- ispVM System Software Command Line Syntax

Running ispVM from Command Line

The ispVM System software command line syntax runs ispVM System software processes chain configuration files (.xcf) and configuration setup files (.dld). You can specify the following using ispVM System software command line syntax:

- File to be processed (.xcf or .dld)
- Process type (Turbo or Sequential)
- Cable type (Lattice or Vantis)
- One of the following port addresses:
 - 0x0378 (LPT1)
 - 0x0278 (LPT2)
 - 0x03BC (LPT3)
- Output mode (display output messages in output window or run in quiet mode)

ispVM System Software Commands

The following commands are used in ispVM System software command line mode:

File name

filename.xcf - Chain Configuration File (.xcf)

filename.dld - Configuration Setup File (.dld)

Process Type

/t - Process using Turbo mode

/s - Process using Sequential mode

Default is process using Sequential mode

Cable Type

/Lattice - Lattice download cable

/Vantis - Vantis download cable

Default is Lattice download cable

Parallel Port Address

/0x0378 - LPT1 parallel port

/0x0278 - LPT2 parallel port

/0x03BC - LPT3 parallel port

Default is 0x0378 LPT1 parallel port

Output

/o - display output in output window

Default is quiet mode

ispVM System Software Command-Line Syntax

The ispvm System software command-line mode uses the following syntax:

```
<drive>:\<ispvm directory>\ispvm.exe filename.xcf  
  /<process type> /<cable type> /<parallel port address>  
  /<output mode>
```

Command Line Example

The following example shows a chain description file named `demo.xcf`, processed in Turbo mode, using a Lattice download cable, parallel port LPT1 selected, and displaying output in the output window:

```
c:\ispTools\ispvm\ispvm.exe demo.xcf /t /Lattice  
  /0x0378 /o
```


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