

December 2013

## Model 300 Overview

The Model 300 programmer supports JTAG programming of all Lattice devices that feature non-volatile configuration elements. The Model 300 is used when a device must be programmed prior to being soldered onto a printed circuit board.

*Figure 1. The ISP Engineering Kit - Model 300*



## Device Support

All Lattice products that feature non-volatile configuration elements are supported. This includes devices with a  $V_{CC}$  of 1.2V, 1.8V, 2.5V, 3.3V and 5V.

## Socket Adapters

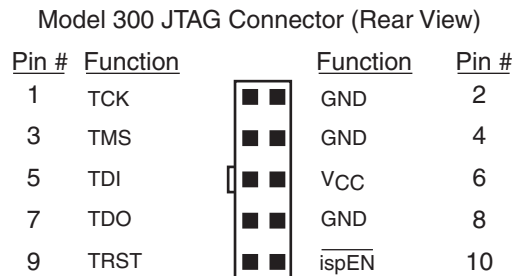
Individual devices are supported via device/package-specific socket adapters, which interface to the 28-pin DIP on the Model 300. For a complete list of supported devices and socket adapters, see the Socket Adapter list on the Lattice web site at <http://www.latticesemi.com/en/Products/DevelopmentBoardsAndKits/SocketAdaptersforDesktopProgramming.aspx>.

## Connection to PC

The Model 300 programmer is shipped with both a PC Parallel port cable (HW-DLN-3C) and a USB port cable (HW-USB-2A or HW-USB-2B). The cable connects between the appropriate port on your PC and the 2x5 connector on the Model 300. The programming operation is controlled with Lattice programming software, as described below.

The orientation of the wires on the 2x5 connector is shown in Figure 2.

**Figure 2. ispDOWNLOAD Cable In-System Programming Interface for the PC**



When connecting to the Model 300 programmer JTAG connector, eight wires must be connected from the programming cable: TCK, TMS, TDI, TDO, TRST, ispEN, Vcc and GND. It is sufficient to connect the programming cable GND wire to a single JTAG connector GND pin: 2, 4 or 8. See UG48, [ispDOWNLOAD Cables User's Guide](#) for the full specifications of the cable and 10-pin connector.

## Power Supply Support

The Model 300 programmer requires 9V DC at 1A minimum, to provide power for the programmer itself and for programming the target device. A 9V power adapter is included with each kit. This power adapter accepts 110V to 220V inputs, and includes interchangeable physical plugs for use worldwide.

## Programming Software Support

The Model 300 programmer is supported by both Diamond Programmer (version 3.0 and later), and the legacy ispVM System (version 9.0.4d and later) software. Diamond Programmer is available as a stand-alone download or bundled with Lattice Diamond™ Software, and is available from the Lattice website at <http://www.latticesemi.com/Products/DesignSoftwareAndIP/ProgrammingAndConfigurationSw/Programmer.aspx>. Lattice ispVM System is available from the Software archive section of the Lattice website at <http://www.latticesemi.com/Support/SoftwareArchive.aspx>.

## Special Features

With the exception of programmer power, the Model 300 programmer is controlled entirely by the programming software. The user simply selects the device, programming adapter configuration and the target device V<sub>CC</sub>. LEDs indicate the power status and the selected V<sub>CC</sub> level.

## Installation Procedure

To install the Model 300 programming software, install the latest version of ispVM System software. If you are running Windows NT or Windows 2000, you will need to install the ISP NT driver. The ispVM installation will prompt you to install the ISP NT driver.

## Operation Procedure

### Setting Up the Hardware

Before you can use the Model 300 programmer, you must connect a download cable to your PC.

To set up your Model 300 programmer:

1. Turn on and boot up the PC. (**Important:** Do not boot or restart the PC when the Model 300 is on and has a device in the programming adapter socket. Its behavior is not ensured if it is on when the PC tests the parallel port).
2. With the Model 300 programmer in the power off position, connect the download cable between the PC parallel port and the Model 300 programmer.
3. Connect the power supply to a properly grounded AC outlet and to the AC plug at the rear of the Model 300 programmer.
4. Make sure the PC has booted up completely, and then turn on the Model 300 programmer.
5. Place the device in the programming adapter socket. The 1.8V and PWR RDY LED indicators illuminate, indicating that the Model 300 is ready for programming. The LEDs are shown in Figure 3.

**Figure 3. Model 300 LEDs**

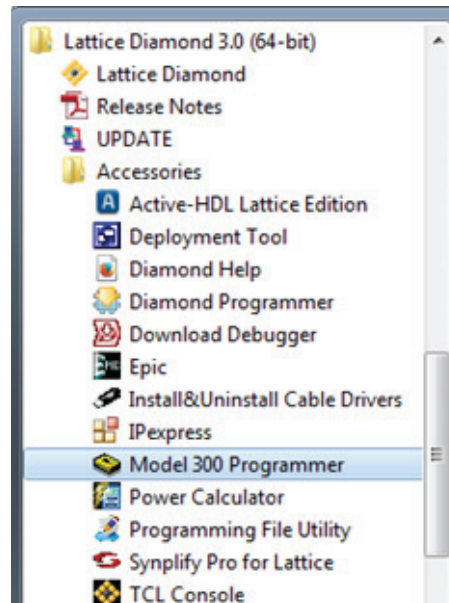


## Starting the Model 300 Programmer Software (Diamond Programmer)

To open the Model 300 programmer software:

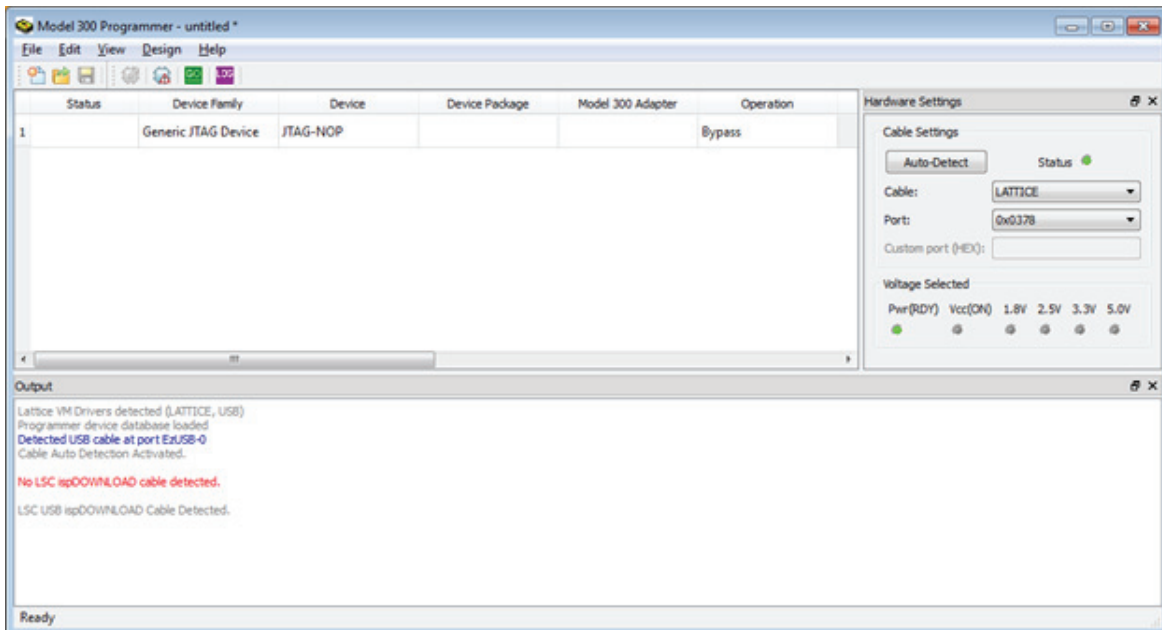
1. Make sure the Model 300 programmer is connected and on.
2. The Model 300 Programmer is a stand-alone application. Launch the tool from the Windows Start menu:

**Figure 4. Launching Model 300 Programmer from Windows Start Menu**



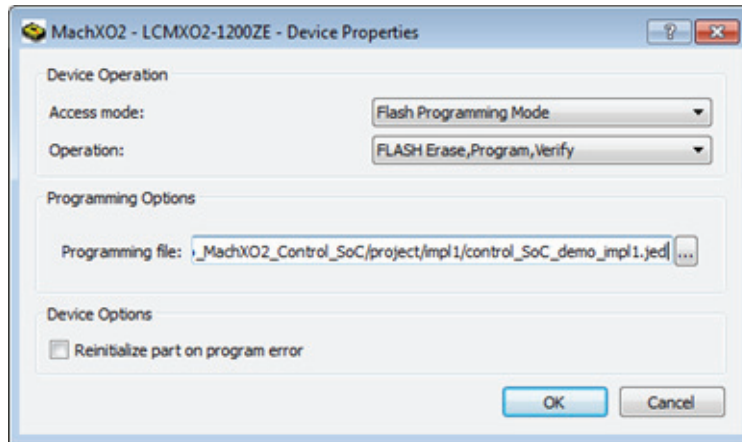
The Model 300 user interface opens, as shown in Figure 5. The output box shows the results of the driver and cable scan (LSC USB ispDOWNLOAD Cable Detected). The Status indicator in the Cable Settings box is Green. Fix any issues before proceeding.

**Figure 5. Model 300 Programmer User Interface**



Edit **Device Family**, **Device** and **Device Package** to select the appropriate settings. Verify the “Model 300 Adapter” setting. Double click the Operation field to select the desired operation and Programming file:

**Figure 6. Device Properties**



### Starting the Model 300 Programmer Software (ispVM System)

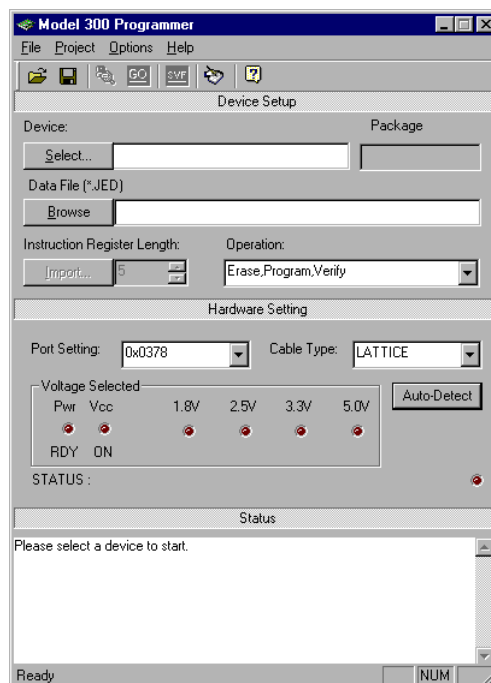
To open the Model 300 programmer software:

1. Make sure the Model 300 programmer is connected and on.
2. Start the ispVM System software, if it is not already running.
3. On the toolbar, click the Model 300 icon.



The Model 300 user interface opens, as shown in Figure 7. The status box at the bottom advises, “Please select a device to start.”

**Figure 7. Model 300 User Interface**

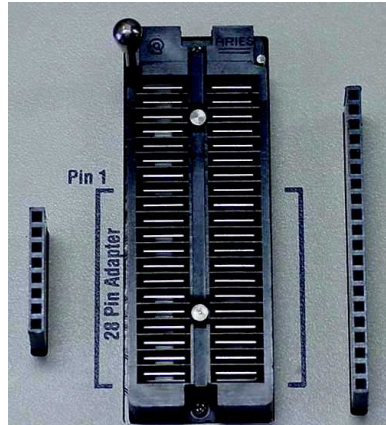


## Programming a Device

1. If using a 28-pin socket adapter, insert the socket adapter into the 40-pin ZIF socket of the Model 300, shown in Figure 8. Make sure that the socket adapter is bottom-justified. (Note: If the socket adapter is not bottom-justified, the Model 300 will not read or program the device).

If using a Lattice socket adapter board, insert the socket adapter board pins into the appropriate connector on both sides of the 40-pin ZIF socket of the Model 300, shown in Figure 8. Make sure that all pins are inserted correctly.

**Figure 8. Model 300 40-pin ZIF Socket and Socket Adapter Board Connectors**



2. Using proper ESD handling procedures, place the device in the programming adapter socket, and ensure the correct alignment of the device.
3. (ispVM) In the Model 300 main window, under Device, click Select, to open the Select Device dialog box. (Programmer) Edit **Device Family**, **Device** and **Device Package** to edit the settings.
4. Select the appropriate device, device family and package, and then click **OK** to return to the main window.

In the Hardware Setting window, the Power and Voltage LED indicators illuminate, and the Status indicates Ready. The LED under Auto Detect illuminates and blinks. The user interface LED's are shown in Figure 7. If the correct LED indicators do not illuminate, you may have selected the wrong device.

1.2V devices are treated as 3.3V devices by both the programmer and software. Lattice socket adapters for these devices contain a internal voltage regulator circuit to supply the appropriate programming voltage.

5. (ispVM) Under Data File, click **Browse** to select the JED (JEDEC) file. (Programmer) Select **Edit > Device Properties** to browse to and select the JED (JEDEC) file. Select the desired Device Operation.
6. Choose **Project > Download** (ispVM), **Design > Program** (Programmer) or click the **GO** button to download the program to the device.

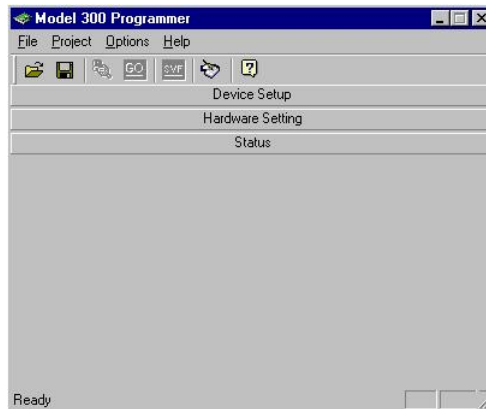
The  $V_{CC}$  ON indicator turns red during the download process. It turns off when the operation is completed. The Status box (ispVM) or Output box (Programmer) indicates the progress of the operation, reports any errors, and shows whether the operation was successful or not.

7. When done, remove the device from the adapter socket.
8. Turn off the Model 300 programmer (optional).

## Hiding and Displaying Panels (ispVM)

You can save desktop space by shortening the main window and toggling the panel bar for the panel you want displayed, as shown in Figure 9.

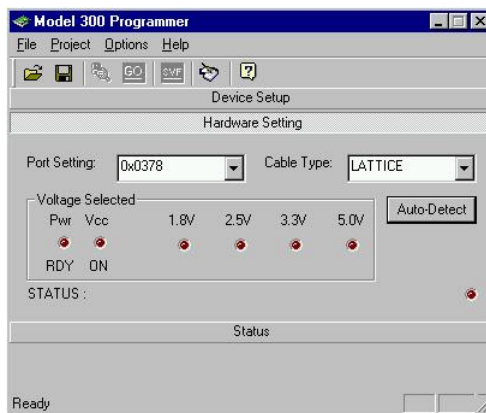
**Figure 9. Shortened Display Area**



To shorten the display area and hide one or more panels:

1. Toggle the panel displays OFF by clicking on each panel bar and drag the bottom edge of the main window upward until it is the desired size (Figure 9).
2. Click the desired panel bar to toggle its display ON (Figure 10).

**Figure 10. Shortened Display Area - Hardware Setting Panel Toggled ON**



## Selecting Project Settings

You can specify how the software will process the active chain configuration by using the Project Settings command.

To select project settings:

1. Choose **Project > Project Settings** (ispVM) or **Edit > Settings > Programming** (Programmer) to open the Project Settings dialog box.
2. Select the appropriate check boxes for the specifications you want to include.
3. Choose between TLR and RTI for the starting and stopping TAP states.
4. To change the TCK clock pulse for an optional JTAG signal, click **Advanced** (ispVM) or **Use custom pulse width delay** (Programmer), then type a different level in the TCK Clock pulse box.
5. Click **OK**.

## Checking the Configuration Setup

To check the current configuration setup:

1. Choose **Project > Configuration Setup** (ispVM) or **Design > Check Model300 Project** (Programmer).  
If the configuration check is successful, you will see a note to that effect in the Status box. If the configuration check is unsuccessful, an error message will appear in a dialog box.
2. If the configuration check is unsuccessful, click **OK**, and then run Board Diagnostics to try to pinpoint the problem.

## Running Diagnostics (ispVM only)

To run diagnostics:

1. Choose **Project > Board Diagnostics** to open the Board Diagnostics dialog box.
2. Compare the expected devices with those detected by the software. If they do not match, edit the chain configuration file and run the diagnostic again.

## Changing File Locations

To change file locations:

1. Choose **Options > File Locations** (ispVM) or **Edit > Settings > General** (Programmer) to open the File Locations dialog box.
2. Browse to change the locations of the database, start and working directories, and log file name.
3. Select **Clear Log File**, if you would like the software to clear the contents of the log file each time you start the Model 300 programmer.

## Repeating the Download (ispVM only)


Specify the number of times you would like the software to process a chain for download.

To specify download repetitions:

1. Choose **Options > Repetitive Download** to open the Repetitive Download dialog box.
2. Select the number of repetitions.
3. Select the number of errors you want to allow before the software stops the download process, and then click **OK**.



**Ordering Information**

Description	Ordering Part Number	China RoHS Environment-Friendly Use Period (EFUP)
Lattice Model 300 Desktop Programmer (RoHS-compliant)	pDS4102-PM300N	
Lattice Model 300 Desktop Programmer (Non-RoHS, replaced by RoHS-compliant version)	pDS4102-PM300 (Obsolete)	