1 Introduction: Design Verification

Design Verification in L-Edit

This volume of the *L-Edit User Guide* describes the design verification features of L-Edit:

- L-Edit/DRC—a design rule checker
- L-Edit/Extract—a netlist extraction tool
- LVS—a layout-vs.-schematic comparison application

The chapter Checking Design Rules on page 3-10 describes L-Edit/DRC. DRC features user-programmable rules and handles minimum width, exact width, minimum space, minimum surround, non-exist, overlap, and extension rules. It can handle full-chip and region-only DRC. Error markers allow you to quickly and easily locate design rule violations.

The chapter Extracting Layout on page 3-84 describes L-Edit/Extract, the netlist extractor. L-Edit/Extract creates SPICE-compatible circuit netlists from L-Edit layouts. It can recognize active and passive devices, subcircuits, and the most common device parameters, including resistance, capacitance, length, width, area, and source and drain area.

The chapters Getting Started with LVS on page 3-143, Netlist Comparison on page 3-195, LVS Output Tutorial on page 3-214, and LVS Command-Line Syntax on page 3-241 discuss LVS, or *layout versus schematic*, a tool that

compares two netlists to determine whether they describe the same circuit. When they do not, LVS works in conjunction with L-Edit to identify and correct errors.

Each chapter includes field descriptions for the dialogs used with the feature under discussion.

Syntax and usage for the following file formats are detailed in the chapter File Formats—Design Verification on page 3-259:

- Element description files—an LVS input file listing the statements defining all non-SPICE devices present in the netlists to be compared by LVS.
- Extract definition files—an L-Edit/Extract input file listing the comments, connection statements, and device statements that define the elements to be extracted from the layout
- Prematch files—an LVS input file that specifies pairs of nodes and elements that are to be considered equal.
- Node and element list—an LVS output file that names matching and unresolved nodes and elements, by iteration, in the two compared netlists.
- SPICE files—an Extract output used to describe an entire circuit and all contained devices.

Documentation Conventions

This section contains information about the typographical and stylistic conventions used in this user guide.

Special Fonts

The following inline references are represented by a bold font:

- Menu and simulation commands (For example: **.print tran v(out)**.)
- Literal user input (For example: Enter **14.5**.)
- Program output (For example: S-Edit generates names for the ports on the symbol based on the **PAD** string.)
- All dialog elements—fields, checkboxes, drop-down menus, titles, etc. (For example: Click **Add**.)

Freestanding quotations of input examples, file listings, and output messages are represented by a constant-width font—for example:

```
.ac DEC 5 1MEG 100MEG
```

Variables for which context-specific substitutions should be made are represented by bold italics—for example, ***myfile*.tdb**.

Sequential steps in a tutorial are set off with a checkbox (☑) in the margin.

References to mouse buttons are given in all capitals—for example, MOVE/EDIT. When a key is to be pressed and held while a mouse button is used, the key and button are adjoined by a plus sign (+). For example, **Shift**+SELECT means that the **Shift** key is pressed and held while the SELECT mouse button is used.

The terms “left-click,” “right-click,” and “middle-click” all assume default mappings for mouse buttons.

Text omitted for clarity or brevity is indicated by an ellipsis (**...**).

Menu Commands and Dialog Titles

Elements in hierarchical menu paths are separated by a **>** sign. For example, **File > Open** means the **Open** command in the **File** menu.

Tabs in dialog boxes are set off from the command name or dialog box title by a dash. For example, **Setup > Layers—General** and **Setup Layers—General** both refer to the **General** tab of the **Setup Layers** dialog.

Special Keys

Special keys are represented by the following abbreviations:

Key	*Abbreviation*
Shift	**Shift**
Enter	**Enter**
Control	**Ctrl**
Alternate	**Alt**
Backspace	**Back**
Delete	**Del**
Escape	**Esc**
Insert	**Ins**
Tab	**Tab**
Home	**Home**
End	**End**
Page Up	**PgUp**
Page Down	**PgDn**

Key	*Abbreviation*
Function Keys	**F1 F2 F3** …
Arrow Keys	↓, ←, →, ↑

When certain keys are to be pressed simultaneously, their abbreviations are adjoined by a plus sign (+). For example, **Ctrl**+**R** means that the **Ctrl** and **R** keys are pressed at the same time.

When certain keys are to be pressed in sequence, their abbreviations are separated by a space ( ). For example, **Alt**+**E** **R** means that the **Alt** and **E** keys are pressed at the same time and then released, immediately after which the **R** key is pressed.

Abbreviations for alternative key-presses are separated by a slash (/). For example, **Shift**+↑ / ↓ means that the **Shift** key can be pressed together with either the up (↑) arrow key or the down (↓) arrow key.

Online User Guide Conventions

Text	Chapter title
Text or **Text**	Indicates a hypertext link
Contents/Search	Indicates a link to the Table of Contents file
Index	Indicates a link to the Index file
	Indicates a link to the previous/ next page

Acrobat Reader Toolbar Tips

Go to previous/next page

Go to start/end of chapter

Go back/forward through pages viewed

Perform a full-text search

Open the search results list

Go to previous/next search result item