



Electronic Design Automation Tools

ESP Design Environment

User's Guide

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THE ESP DESIGN ENVIRONMENT is a graphical interface designed specifically for OrCAD tools. Its purpose is to improve the efficiency of the design process. In the ESP design environment, you don't have to type commands or remember a string of configurations, parameters, and filenames.

As a result, you focus on the design instead of the tools and the operating system. You can set up and run complex tasks with the click of a button. Tools and design data are organized and presented consistently, so you don't have to search all over for the files you need.

Understanding a few important concepts will get you up and running quickly in the ESP design environment so you can take full advantage of its features.

Tools

Each button on a ESP design environment screen represents a *tool*. A tool may be a single executable or a chain of executables that make up a process.

Tool sets

The tools are organized into groups called *tool sets*. Tool sets are organized around particular aspects of the overall design process. For example, **Schematic Design Tools** includes the tools you use when creating a schematic to describe your design; **Digital Simulation Tools** includes the tools you use when simulating and verifying a digital design. Within each tool set, tools are further grouped by function so you can easily locate the right tool for each task.

Transfers

Transfers are special tools that transform design data as needed and pass it from one tool set to another. Typically, a transfer tool configures and runs several tools in the correct order and transfers control to the next tool set.

For example, when you have completed a schematic description of your design and you're ready to create the PCB description of your design, you use the **To PCB** transfer tool. **To PCB** runs a series of processes that annotate your schematic, generate the PCB netlist, and transfer control to **PC Board Layout Tools**.

During a transfer several executables may be called, each with its own command line and data to find. As you can see, the ESP design environment does a considerable amount of work for you behind the scenes.

Tool set configuration

Each tool set has a configuration screen where you set various options for the entire tool set. The options correspond to entries in the tool's configuration file. You can set these *global configurations* to be used with all designs. You can also store specific changes with a particular design.

Local configuration

You use *local configurations* to set up options and parameters for individual tools. The options and parameters correspond to the command line parameters passed to the individual tools. Like global configurations, local configurations can be set up so they apply to every new design you create and modified in individual designs as needed.

Designs

A *design* is essentially a container used to store related data. In the ESP design environment, the container is a directory. Each design has data and configuration files which distinguish it from other designs; this data is stored by the ESP design environment in one directory making data management simple.

Template design

The *template design* is a special design: changes you make to the template design are reflected in every design you create after making the change. The template design provides a handy way to centralize global information and to make sure that information and configurations required by every design are available.

Design Management Tools

Design Management Tools is a special tool set, available from within every other tool set, that you use to specify which design you want to work on. It includes all the tools you need to set up and manage the data and configurations for all your designs. With **Design Management Tools** you can create, copy, delete, back up, and restore designs and the files within them.

Design directory prefix

Normally, all design directories are kept in one parent directory that you define during the installation process. The *design directory prefix* allows you to use data that is not in this directory, making the ESP design environment more flexible than ever.

Root sheet

The *root sheet* is the file currently in focus for all of the tools. If you have several schematics in a design, you can focus on drafting, netlisting, and printing one sheet or group of linked sheets by making that sheet the root sheet. All of the local configurations are automatically set up to use that file as the source. This saves you time because now you don't need to modify local configurations just to change a filename. Together, the root sheet and design directory prefix give you complete freedom in how you organize your work.

What's next

Now that you have a better idea of what the ESP design environment does, you are ready to learn how to put it to work for you.



Welcome to the ESP design environment

The ESP design environment is designed specially for electronics designers. It links the tools appropriate for different stages of the design process, providing a common and intuitive human interface to the tools. You use the built-in design management commands to make new design directories, delete old ones, archive designs, and transfer the database of a design.

Under the ESP design environment, information management focuses on the design. All the files that belong to a design—schematics, netlists, PLD logic equations, custom libraries, and so on—are stored in one directory.

The ESP design environment is very flexible. Nearly every aspect can be tailored to meet your requirements using local configuration options. You don't have to memorize complex character-based command line sequences unnecessary: simply make the appropriate selections on the graphic configuration screens. Configuration information is stored with your design files, so you can have different configurations for different designs.

The ESP design environment is set up so that you can easily extend it to include your own (non-OrCAD) design tools. For example, a basic text editor is included, but you can easily substitute another editor, if you prefer.

The ESP design environment increases your productivity by providing the following features:

- ❖ An intuitive and easy-to-learn interface
- ❖ Full mouse and keyboard support
- ❖ Support for expanded memory
- ❖ Full color control

Tools and tool sets

A *tool set* is a collection of tools designed to perform a set of electronic design automation tasks. This grouping makes selecting an action easier. You use the tool sets to view and manipulate the same design in different ways. There are currently four OrCAD tool sets:

- ❖ Schematic Design Tools
- ❖ Programmable Logic Design Tools
- ❖ Digital Simulation Tools
- ❖ PC Board Layout Tools

The ESP design environment main screen includes buttons for all of OrCAD's tool sets, even if you have only one tool set installed on your system.

When you select a tool set, the main screen for that tool set displays. For example, the tools that make up the **Schematic Design Tools** are shown in figure 1-1.

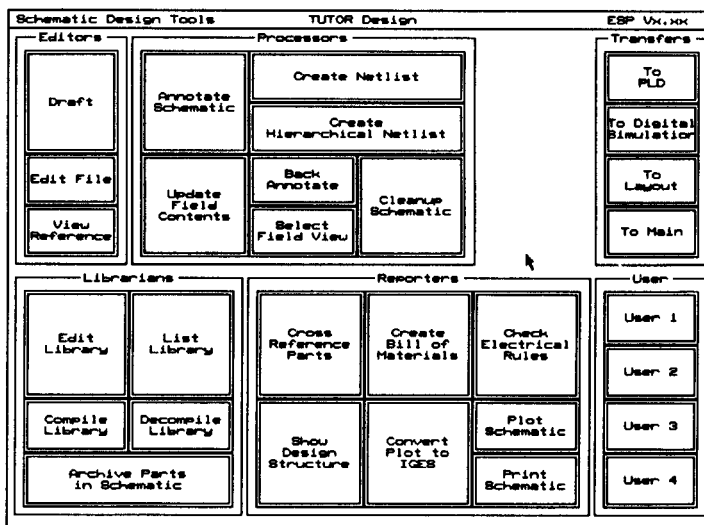


Figure 1-1. Schematic Design Tools screen.

The tools in a tool set are grouped by function:

- ◆ Editors
- ◆ Processors
- ◆ Librarians
- ◆ Reporters
- ◆ Transfers
- ◆ User buttons

For information about the tools within each of the OrCAD tool sets, see the manuals that accompany that product.

Editors	Editors modify or create some part of the design database. An example is the schematic editor, Draft ; another is the text editor, Edit File , used to view reports and enter text.
Processors	Processors subject a design file to a specific process. For example, Annotate Schematic on the Schematic Design Tools screen is a processor. Processors generally create or modify database information, and may also create reports.
Librarians	Librarians create and manage objects that can be used by all designs, not just the current design. For example, you use Edit Library on the Schematic Design Tools screen to create new schematic symbols for parts. Stored in the library database, these parts are available to all designs.
Reporters	Reporters create reports but generally do not modify design data. For example, Create Bill of Materials creates a list of all the components used in the design. Reporters may create files for use by tools outside the ESP design environment.

Transfers Transfer tools manage the steps needed to move design information from one tool set to another. Transfers have two parts. The first updates the database used by the current tool set so that it is current in every respect. The second part changes to the new tool set used to view the design. The transfer tools take care of intermediate steps so that you do not have to.

For example, **To Digital Simulation on the Schematic Design Tools** screen performs these steps:

- ❖ Annotates the reference designators in the design
- ❖ Builds the connectivity database
- ❖ Builds the link between the schematic and the simulator, so that the stimulus and trace directives inserted in the schematic can be accessed by the simulator
- ❖ Transfers control to **Digital Simulation Tools**

User buttons A user button can be set up to run any system command or any .EXE, .COM, or .BAT file. A user button is the simplest way in which the ESP design environment can be extended to fit your particular requirements. As an example, you can set up a user button to run a spreadsheet program, which you can then use to analyze design information. If you depend on a particular set of operating system utility programs, you can assign a user button to call them up. See *Chapter 4: Defining a user button* for detailed instructions.

Finding the information you need

These manuals accompany the ESP design environment:

- ◆ *Installation and Technical Support Guide*
- ◆ *Stony Brook M2EDIT Text Editor User's Guide*

Installation

Before you begin to explore the ESP design environment, take a few minutes to install the software and register for technical support. Just follow the instructions in the *Installation & Technical Support Guide*.

About this guide

This guide provides step-by-step instructions for all the tasks you are likely to perform using the ESP design environment. You should use this book with your computer turned on and the ESP design environment running.

Once you have mastered the basics, refer to the rest of this guide for information that will help you use the ESP design environment to its full extent. Chapters 3 through 5 explain how to tailor the configuration of the software to match your personal requirements, and provide technical information about the ESP design environment. They are designed to be a continuing source of instruction and reference as you use the ESP design environment.

Conventions

The conventions used in this guide are as follows:

Bold	Bold indicates a command.
Courier bold	Bold monospace indicates text you enter exactly as shown.
<i>Italics</i>	Italics indicate a reference to another section or chapter of this guide or to another publication.
	Angle brackets enclose a key that you press. For example, <Esc> indicates the escape key.
"Prompt"	Quotation marks indicate program prompts and messages.

"Enter" and "type" In OrCAD manuals, the terms "enter" and "type" mean two different things. When the instructions tell you to *enter* something, press the appropriate keys and end by pressing <Enter>. When the instructions tell you to *type* something, press the appropriate keys but *do not* press <Enter>.

Boxes The box shown below represents a system prompt. Any bold type following the prompt indicates text that you enter.

C:> **orcad**

A box like the one shown at right represents an OrCAD menu.

A box like the one shown below represents a text entry box. Entry boxes appear on configuration screens, and can be empty or contain information you can edit.

Execute
Local Configuration
Assign Hot Key
Configure ESP
Help

Wildcard *. *

△ **NOTE:** Notes contain important reminders or hints.

▲ **CAUTION:** Cautions contain information about preventing damage to equipment, software, or data.

About entry boxes



You use all the entry boxes in the ESP design environment in the same way:

- ◆ Place the pointer inside the box and press <Enter> to enter insert mode. The pointer changes shape to become an underline cursor (⎵). In insert mode, the characters you type are inserted in any existing text at the point the cursor marks.
- ◆ To change to overtype mode, press <Insert>. The cursor becomes a square (■). In overtype mode, the characters you type replace any characters already there. You can toggle between insert and overtype modes as needed.
- ◆ Press <Enter> again to leave the entry box. The square cursor is replaced by the pointer.

You can also use the editing keys on your keyboard to move around the entry box and edit its contents:

- ◆ <Home> moves the cursor to the beginning of the entry box.
- ◆ <End> moves the cursor to the end of the entry box.
- ◆ The arrow keys <→> and <←> move right and left one character at a time, without erasing what you typed.
- ◆ <Backspace> backs up one character and deletes it.
- ◆ erases the character at the cursor's position without moving the cursor.
- ◆ The <Ctrl> combination deletes the entire contents of the entry box.
- ◆ <Esc> aborts any changes to the entry box and changes the cursor back to a pointer.



You can use the mouse like the <←> and <→> arrow keys to move the cursor inside the entry box.

Mouse techniques



You can do all your work in the ESP design environment (except typing text and numbers) using the mouse.

You *point* to an object by moving the pointer until the tip of the arrow touches the object. Do this by moving the mouse.

You select an object by pointing to it and *clicking* (pressing and then releasing) the left mouse button once. When you select a button, it becomes highlighted and a menu pops up in the upper left corner of the screen.

Left and right mouse buttons

- ◆ Clicking the left mouse button is the same as pressing the <Enter> key. In OrCAD guides, when you are instructed to press <Enter>, you can either press the <Enter> key or click the left mouse button.
- ◆ Clicking the right mouse button is the same as pressing the <Esc> key. In OrCAD guides, when you are instructed to press <Esc>, you can either press the <Esc> key or click the right mouse button.

Keyboard equivalents



Many of the explanations and instructions in this book use the mouse terminology explained on the previous page. If you prefer to use the keyboard, however, there are keyboard equivalents to nearly every mouse operation. Instead of using the mouse to move the pointer and select items, you can:

- ❖ Press <Tab> to move the pointer to the first button in the next area on a tool set screen.
- ❖ Press <Shift><Tab> to move the pointer backwards to the first button in the previous area.
- ❖ Press the <Space bar> to move the pointer from button to button within a group of tools, a set of radio buttons, or the scroll buttons associated with a list box.
- ❖ Press <Enter> to select the item the pointer rests on.
- ❖ Press <Home> to move the pointer to the first button in the area, or, on configuration screens, to the OK button.
- ❖ Press <End> to move the pointer to the first user button or, on configuration screens, to the last button in the last area.
- ❖ Press <Esc> to close a menu without selecting any of the commands or to cancel any changes to a text entry box.
- ❖ Press <Page Up> and <Page Down> to pan up and down on configuration screens.

You can also assign keys or key combinations, called *hot keys*, to tools so you can select tools from the keyboard. For information about assigning hot keys, see *Chapter 3: Customizing the ESP design environment*.

About the TEMPLATE design

Before you begin using the ESP design environment, there's a very powerful feature you should know about.

It's the *template*. You'll see it the first time you start the ESP design environment after installation. The title "TEMPLATE Design" displays in the center of the title bar.

The template design is a set of patterns the ESP design environment uses to create new designs. Anything added to or taken away from the template will be added to or withheld from designs you make in the future using the **Create Design** tool. Changes you make to configurations in the template become part of all new designs, too.

Various files are placed in the template design when you install each OrCAD tool set. To find out about these files and how the ESP design environment uses them, see *Chapter 5: ESP design environment technical information* in this guide.

Here are some tips for making the best use of the template:

- ❖ Remember the TEMPLATE design is just that—a template for new designs. To save disk space, only the files you want to include in *every* new design should be stored in TEMPLATE. Keep the number of files in TEMPLATE to a minimum.
- ❖ If you use certain configurations routinely, save them in TEMPLATE. They will automatically become part of every new design, eliminating the need to configure tools again and again. For example, if you always want **Create Netlist** to produce one particular netlist format, set this up in the TEMPLATE.
- ❖ As soon as the configurations in TEMPLATE are set to match your requirements, create a new design, then select **Configure ESP** from the **Design Management Tools** menu. Under **Design Options**, enter the name of the design you just created in the **Startup Design** entry box. From now on, running the ESP design environment automatically takes you to the design you configured as the startup design. Work in TEMPLATE only if you need to change configuration settings for *all* future designs.

Running the ESP design environment

Start the ESP design environment after installation by entering the command shown below in bold at the system prompt:

```
C:\> orcad [ designName ]
```

After a moment, the ESP design environment main screen displays (figure 1-2).

Title bar
Shows the name of the tool set, the current design directory, and the software version number.

Buttons
Pushbutton-like images that you select to initiate an action.

Logo

Pointer
An arrow on the screen that moves as you move the mouse.

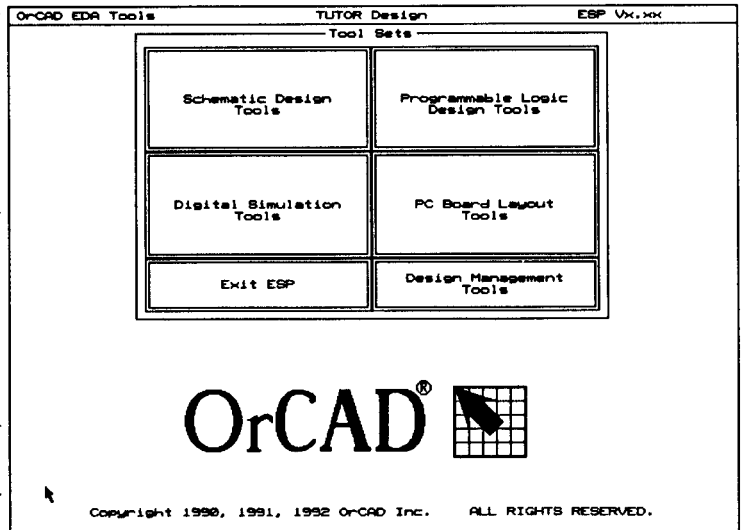


Figure 1-2. ESP design environment main screen.



NOTE: To start running the design environment on a design other than the startup design, just enter **ORCAD** followed by a blank space and the name of the design. If you don't include a path, the ESP design environment looks for the design in the directory named by the **ORCADPROJ** environment variable. For an explanation of the environment variables used by OrCAD software, see Chapter 5: ESP design environment technical information.

Configuration screens

The various tools in the ESP design environment have many configuration screens. Some configuration screens apply only to a specific tool. These are called *local configuration* screens. Other configuration screens—such as the **Configure Digital Simulation** screen—are global in nature.

About “.” in pathnames

Many configuration screens have entry boxes that specify path and filenames. Labels for these entry boxes include **Prefix/Wildcard**, **Source**, and **Destination**, among others.

When you specify a pathname, you can use a period and a backslash (.\) as a convenient shortcut to specify the current design directory.

For example, if the current design is **TEMPLATE** then “.*.LIB” means \ORCAD\TEMPLATE*.LIB.

Prefix/Wildcard entry boxes

Many configuration screens have a **Prefix/Wildcard** entry box. These entry boxes contain a pathname and possibly a filename with a wildcard to indicate which files to display in a list box. The asterisk can be used as a wildcard in a filename.

This example lists all files in the directory C:\ORCADESP\SDT\LIBRARY that have a .LIB extension:

Prefix/Wildcard C:\ORCADESP\SDT\LIBRARY*.LIB

List boxes Many configuration screens have *list boxes* containing lists of items from which to choose. Items with “.” are found in the current design directory. Items without “.” are found in the path given in the **Prefix/Wildcard** entry box. When you place the pointer on a filename in a list box and press <Enter> or click the left mouse button, the item automatically displays in the related entry box.

△ **NOTE:** Although there is no limit to the number of files you can have in a design directory, list boxes on local configuration screens can display no more than 400 files at one time. The number of files shown depends on the length of the filenames. If you have a design with more than 400 files, it is a good idea to use wildcards to reduce the number of files shown.

Filename entry boxes Most local configuration screens have a **Source** entry box. Many have other filename entry boxes as well.

The first time you display a local configuration screen, its **Source** and **Destination** entry boxes contain—where appropriate—the name of the root sheet (specified in **Design Management Tools**) followed by a default extension. You can, however, change this to suit your needs.

If you change the filename extension in the **Source** entry box, when you select **OK** to leave the configuration screen and save the changes, the extension in the **Prefix/Wildcard** entry box also automatically changes to the same extension.

On many configuration screens, you can use a question mark (?) as a shorthand notation for the name of the root sheet. For example, if the current root sheet is **TUTOR** and you enter **? .LIB**, the ESP design environment interprets the “?” as “**TUTOR**” when you select **OK** to leave the configuration screen and save your changes. See the section *Using Design View* in **Chapter 2: Using Design Management Tools** for a description of the root sheet and how it controls filenames in configuration screens.



Using Design Management Tools

As you work with OrCAD EDA tools and create designs, you will want to organize your work to make it easier to find what you need. As with most computer programs, OrCAD EDA tools use files to create, save, and retrieve your work on a hard disk. Within the ESP design environment, you can:

- ◆ Organize files belonging to a design
- ◆ Add descriptions to designs and files to make locating a particular design or file easy
- ◆ Protect your work with backup copies

The design itself is the foundation of your organization.

In the ESP design environment, designs work the same way as a folder in a file cabinet. You decide how many folders you need and what they are called. Each folder contains all the documents, or files, for a design.

You use **Design Management Tools** to manage your designs. This chapter describes how to use these tools.

Running Design Management Tools

The next sections describe how to run **Design Management Tools**. To begin, follow these steps:

1. If you do not already have the ESP design environment running, enter this command at the system prompt:

```
C:\> orcad
```

The ESP design environment main screen displays.

2. Run **Design Management Tools** by either of these methods:

- ◆ Select **Design Management Tools** from the ESP design environment main screen. Select **Execute** from the menu shown at right.

Design Management Tools

```
Execute
Local Configuration
Assign Hot Key
Configure ESP
Help
```

- ◆ Place the pointer in the title bar or anywhere else on the screen except on a button and press <Enter>. Select **Design Management Tools** from the menu shown above. You can use the **Design Commands** menu from the ESP design environment main screen or from any tool set's main screen.

Design Commands

```
Design Management Tools
Suspend to System
Vendor Selection
Show Hot Key Assignments
Exit
```

When you select **Execute** or **Design Management Tools**, depending on which method you used, the **Design View** window displays as shown in figure 2-1.

The following paragraphs describe the commands on the **Design Management Tools** and **Design Commands** menus.

Design Management Tools menu	<p>Execute opens the tool set. This is always the first command on the ESP design environment menus. When you are more familiar with it, you can open tool sets in the ESP design environment more quickly by <i>double-clicking</i> on buttons or using hot keys, which are described in <i>Chapter 3: Customizing the ESP design environment</i>.</p> <p>Local Configuration displays a screen of options that you use to control the action the ESP design environment takes when you select the tool. If the tool's behavior is always the same—that is, there are no configurable options: it always does the same thing—the message “Nothing to Configure” appears when you select this command.</p> <p>Assign Hot Key prompts you for a key or key combination and assigns it to a tool so you can select the tool more quickly from the keyboard. For more information about using hot keys, see <i>Chapter 3: Customizing the ESP design environment</i>.</p> <p>Configure ESP displays configuration options that you use to tailor characteristics of the ESP design environment (such as screen colors) to suit your personal preferences. <i>Chapter 3: Customizing the ESP design environment</i> contains configuration information.</p> <p>Help tells you about the commands found on a menu and where you can find more information. All ESP design environment menus have Help commands.</p>
Design Commands menu	<p>Design Management Tools is equivalent to Execute on the Design Management Tools menu.</p> <p>Suspend to System temporarily suspends to the operating system. For more about suspending, see the section <i>Suspend to System</i> later in this chapter.</p> <p>Show Hot Key Assignments displays a window containing a list of hot keys for the current screen.</p> <p>Exit quits the ESP design environment.</p>

Using Design View

Design Management Tools includes two groups of tools for managing design file:

- ❖ **Design View**, where you perform tasks that affect the entire design
- ❖ **File View**, where you perform tasks that affect individual files

Figure 2-1 shows the **Design View** window. You can change between the **Design View** and **File View** windows by selecting one of the buttons at the top of the window.

Radio buttons

Small round buttons show selections. Only one in a group can be selected at a time.

List box with scroll buttons

Scroll buttons move a directory in its list box so that other names are visible. The four scroll buttons are:

- ▲ Line Up
- ▲ Page Up
- ▼ Page Down
- ▼ Line Down

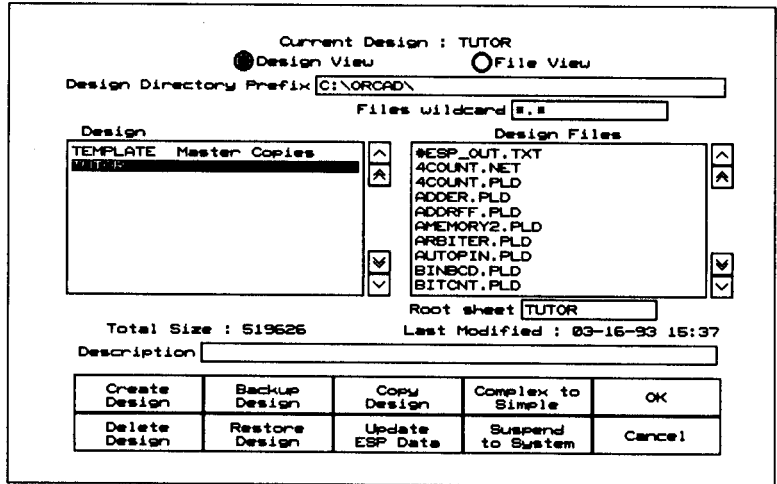


Figure 2-1. Design View window.

The **Design** list box on the left displays the names of design directories in the directory specified in the **Design Directory Prefix** entry box. If you are using the ESP design environment for the first time, the design directory prefix is set to the value of the ORCADPROJ environment variable, and only two designs—TUTOR and TEMPLATE—appear in the list.



NOTE: You can change the design directory prefix to list designs in other directories, but TEMPLATE must be in the directory specified by the ORCADPROJ environment variable. For an explanation of environment variables, see Chapter 5: ESP design environment technical information.

The TUTOR design contains all of the files you need to complete the tutorials in the user's guide for each tool set. For more information about the TEMPLATE design, see the section *About the TEMPLATE design* in Chapter 1: *Welcome to the ESP design environment*.

▲ **CAUTION:** *The files in the TEMPLATE design are the master copies the ESP design environment uses to create new designs. Changes you make to the TEMPLATE design become part of new designs. Therefore be careful about what you add and change in the TEMPLATE design.*

The **Design Files** list box on the right displays the names of files in the selected design directory. Although there is no limit to the number of files you can have in a design directory, the **Design Files** list box can display no more than 1600 files at one time. The number of files shown depends on the length of the filenames. You can use the **Files wildcard** entry box to reduce the number of files that display.

The **Root sheet** entry box shows the filename from which the ESP design environment builds default filenames in local configuration screens. When you select a new design directory in the **Design** list box, its name displays in the **Root sheet** entry box.

You can enter a different root sheet or select a file from the **Design Files** list box. The file's name and extension display in the **Root sheet** entry box, but the extension is ignored when the ESP design environment builds default filenames for local configuration screens.

For example, if you select ADDER.PLD from the **Design Files** list box in figure 2-1, the **Root sheet** entry box changes to show ADDER.PLD. Only the filename portion, ADDER, is used in default configuration screens, though: ADDER.SCH, ADDER.NET, ADDER.BRD, and so on.

△ **NOTE:** If needed, you can change a filename in a local configuration screen, so that the name (excluding the extension) is not the same as the name of the root sheet. If you do, though, the root sheet setting no longer “controls” that filename. You can return control of the filename to the root sheet by changing it to either the same name as the root sheet or a question mark (?), and then selecting **OK** in the local configuration screen. For more information about filename entry boxes, see the sections **About entry boxes** and **Configuration screens** in Chapter 1: Welcome to the ESP design environment.

Across the bottom of the **Design View** window are ten design manipulation tools, as shown in figure 2-2. The following sections describe how to use these tools.

Create Design	Backup Design	Copy Design	Complex to Simple	OK
Delete Design	Restore Design	Update ESP Data	Suspend to System	Cancel

Figure 2-2. Design manipulation tools.

Create Design

You can create as many as 150 design directories in the ESP design environment. Follow these steps to create a new design directory:

1. To create a new design directory anywhere other than in the directory specified by the **ORCADPROJ** environment variable, enter the full path in the **Design Directory Prefix** entry box.
 - ❖ Do not include the name of the design directory you want to create.
 - ❖ Make sure the design directory prefix ends with a backslash (\).
2. Select **Create Design**. The window shown in figure 2-3 displays.

△ **NOTE:** For an explanation of environment variables, see Chapter 5: ESP design environment technical information.

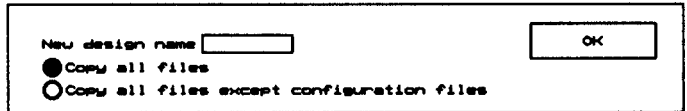


Figure 2-3. *New design name window.*

3. Place the pointer inside the **New design name** entry box and press <Enter>. The pointer becomes an underline cursor.
4. Type in a name for the design. The name may not be longer than eight characters and cannot contain periods, colons, or other special characters.

The design name must be unique. The ESP design environment cannot create two designs with the same name, nor can it create a design with the same name as an existing directory.

For more information about entry boxes, see the section *About entry boxes* in *Chapter 1: Welcome to the ESP design environment*.

5. Press <Enter> when you finish with the name.
6. Select either **Copy all files** or **Copy all files except configuration files**. These options have the following effects:
 - ◆ **Copy all files** causes **Design Management Tools** to copy every file in the **TEMPLATE** design to the new design.
 - ◆ **Copy all files except configuration files** causes **Design Management Tools** to copy every file in the **TEMPLATE** design except files with .CFG, .BCF, and .DAT extensions. When you work on the new design, the ESP design environment uses the configuration settings in the **TEMPLATE** design. If you use the same configuration options for multiple designs, this option can save space on your hard disk.

7. Select **OK**. While the tool creates the new design you have named, the messages "Working . . ." and "Checking *.CFG" display at the top of the screen. When the new design is complete, its name appears in the **Design** list box.

△ **NOTE:** If you enter a design name that already exists or that duplicates the name of a directory, the ESP design environment displays the message "A design with this name already exists" and does not create a new design.

If **Create Design** fails (for example, if it runs out of disk space before all the design files are placed in the new design), the window shown in figure 2-4 displays.

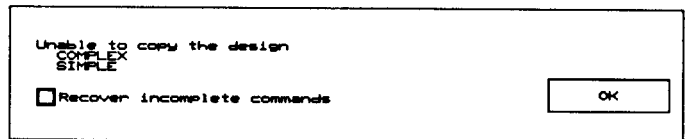


Figure 2-4. "Unable to copy design" message.

- ❖ Select **Recover incomplete commands** from the window and select **OK** to delete the incomplete design.
 - ❖ Select **OK** without selecting **Recover incomplete commands** to leave the incomplete design intact.
8. When you finish creating designs, select **Cancel**. The **Design View** window displays.

Backup Design

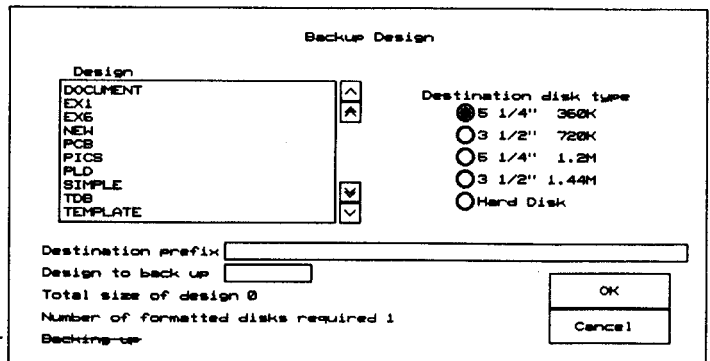
If you have a regular procedure for backing up your hard disk that adequately protects your data, you do not need a separate procedure for backing up your design files. If you do need to back up your design data, use this tool.

Backup Design backs up all the files belonging to a design onto floppy disks or to another part of your hard disk. The backup files are named *designName.n*, where *designName* is the name of the design and *n* is a number. When you back up onto a hard drive, **Backup Design** creates one file called *designName.1*. When you back up onto floppy disks and the file is too big to fit on a single disk, **Backup Design** creates several files with sequentially numbered extensions.

To restore the files to their normal format, you use the **Restore Design** tool described later in this chapter.

To back up a design, follow these steps:

1. Select **Backup Design**. The window shown in figure 2-5 displays.



Unavailable options

On monochrome monitors and in OrCAD guides, options that are not available are shown with a line through them. On color monitors, the options are dimmed.

Figure 2-5. Backup Design window.

2. Select the design to back up from the **Design** list box.
3. Move the pointer to the **Destination prefix** entry box and press <Enter>.
4. Enter the path to use for the backup. For example, to back up the design on a floppy disk, type the destination prefix **A:** and press <Enter>.

△ **NOTE:** If you want to back up to the root directory of the same disk the design is on, be sure to include the backslash in the **Destination prefix** entry box; otherwise, the backup file is placed in the current design directory.

The ESP design environment looks at the disk or directory specified as the destination. If the disk specified is not available (for example, if you have forgotten to insert the disk in the drive), the ESP design environment displays the message shown in figure 2-6.

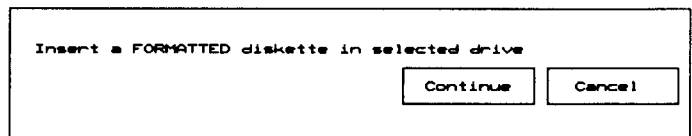


Figure 2-6. "Empty drive" message.

Insert a properly formatted disk in the specified drive and select **Continue**. Select **Cancel** if you want to cancel the backup for the time being.

If the disk in the specified drive already contains a backup of the design you selected, the ESP design environment displays the warning shown in figure 2-7.

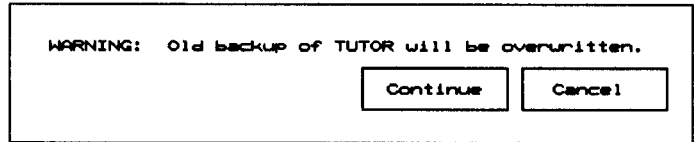


Figure 2-7. Warning to prevent accidentally overwriting previous backup.

Select **Cancel** if you want to remove the disk and insert another. Select **Continue** to proceed with the backup.

5. Select **OK** from the **Backup design** window. The ESP design environment makes a backup copy of the selected design in the disk or directory specified. The message shown in figure 2-8 displays.

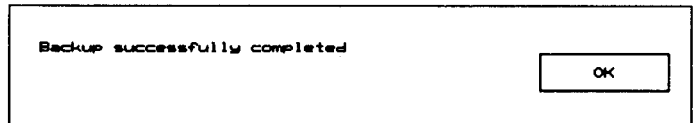


Figure 2-8. "Backup completed" message.

6. Select **OK**. The **Backup Design** window displays.
7. When you finish backing up designs, select **Cancel**. The **Design View** window displays.

To restore backed-up designs, use **Restore Design**.

Copy Design

This tool copies all the files in a design to a new design. To copy a design, follow these steps:

1. Select **Copy Design**. The window shown in figure 2-9 displays.

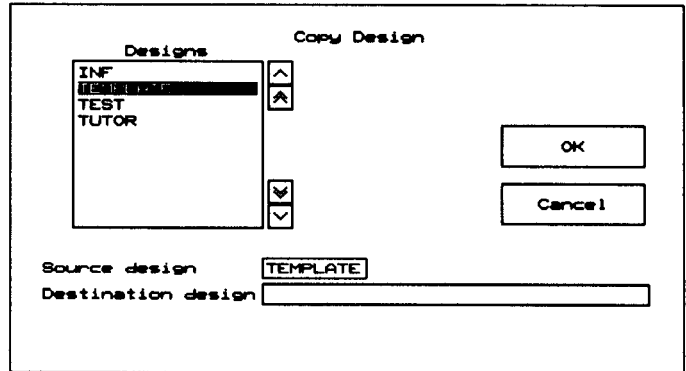


Figure 2-9. *Copy Design* window.

2. Select the design to copy from the **Designs** list box.
3. Move the pointer to the **Destination design** entry box and press <Enter>.
4. Enter the new path and name for the design.
5. Select **OK** to make the copy. If you do not want to copy the design, select **Cancel**.

If the name you enter for the destination is the same as a design or directory that already exists, the message shown in figure 2-10 displays.

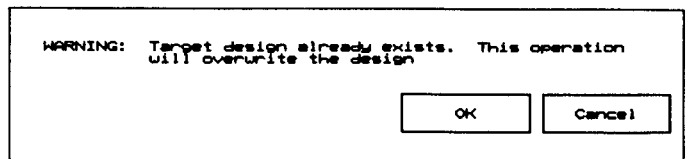


Figure 2-10. "Design already exists" message.

If it is your intention to copy the files to an existing design, select **OK** to proceed with the copy. This will copy the source over an existing design.

If it is *not* your intention to copy the files over an existing design, select **Cancel** to abandon the copy. Enter a unique name in the **Destination Design** entry box and select **OK** again.

If **Copy Design** fails (for example, if it runs out of disk space before all the design files are placed in the new design), the message shown in figure 2-11 displays.

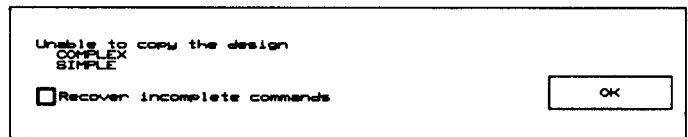


Figure 2-11. “Unable to copy the design” message.

- ❖ Select **Recover incomplete commands** from the window and select **OK** to delete the incomplete design.
- ❖ Select **OK** without selecting **Recover incomplete commands** to leave the incomplete design intact.

When the ESP design environment finishes copying the design, the **Copy Design** window displays.

6. When you finish copying designs, select **Cancel**. The **Design View** window displays.

Complex to Simple

This tool converts a complex hierarchical design structure to a simple one. Complex hierarchical designs are more efficient for the designer to create because repetitive circuitry is drawn only once. However, a simple hierarchy is required whenever the design is to be mapped directly to physical components. When this is the case, a one-to-one relationship is required between the schematic symbols and the physical components so that all symbols can be assigned unique reference designators.

For more information about hierarchical design structures, see the *Schematic Design Tools User's Guide* and the *Schematic Design Tools Reference Guide*.

Complex to Simple creates a new design, scans the complex design files, creates the appropriate simplified design files, and places the new files in the new design. The original complex design files are not changed in any way.

To convert a design structured as a complex hierarchy to a new design with a simple hierarchical structure, follow these steps:

1. Select **Complex to Simple**. The window shown in figure 2-12 displays.

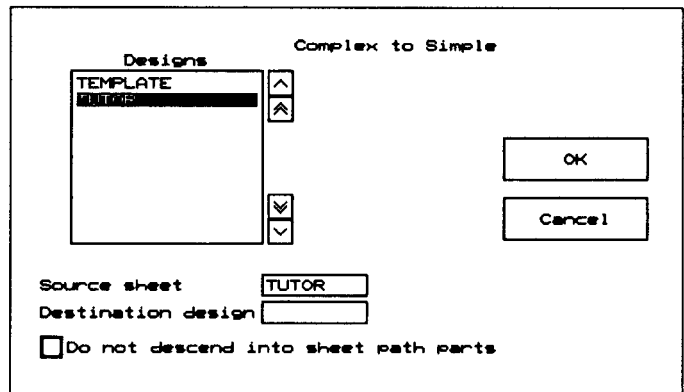


Figure 2-12. *Complex to Simple* window.

The current design is highlighted in the **Designs** list box, and the **Source sheet** entry box shows the current root sheet.

2. To convert a different complex hierarchical design from the current design directory, enter the design name in the **Source sheet** entry box.

To convert a complex hierarchical design from a *different* design directory, select the design directory from the **Designs** list box. If necessary, change the design name in the **Source sheet** entry box.

△ *The **Designs** list box displays the names of design directories under the directory specified in the **Design Directory Prefix** entry box in the **Design View** window.*

3. Move the pointer to the **Destination design** entry box and press <Enter>.
4. Enter the name for the simplified design. This can be a new name or the name of an existing design directory .
5. Select **OK** to convert the design. If you change your mind, select **Cancel** to cancel the conversion.

If **Complex to Simple** fails (for example, if it runs out of disk space before all the design files are placed in the new design), the message shown in figure 2-13 displays.

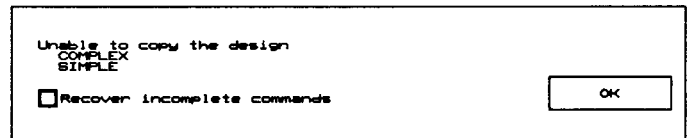


Figure 2-13. *Unable to copy the design window.*

- ❖ Select **Recover incomplete commands** from the window and select **OK** to delete the incomplete design.
 - ❖ Select **OK** without selecting **Recover incomplete commands** to leave the incomplete design intact.
6. When you finish converting designs, select **Cancel**. The **Design View** window displays.

Delete Design This tool deletes a design and all the files it contains.

▲ **CAUTION:** *This command cannot be undone using OrCAD tools. It is possible to undelete subdirectories and files using hard disk utilities, but these are not always successful.*

To delete a design, follow these steps:

1. Select **Delete Design**. The window shown in figure 2-14 displays.

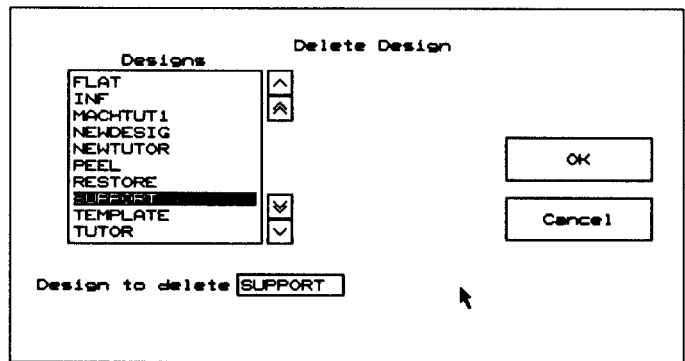


Figure 2-14. *Delete Design* window.

2. Select the design to delete from the **Designs** list box.
3. If you change your mind about deleting the design, select another design or select **Cancel**.
4. To delete the design, select **OK**. When you select **OK**, the message "WARNING: This will delete all files from *designName*" displays.
5. If you still want to delete the design, select **OK**; otherwise, select **Cancel**.
6. When you finish deleting designs, select **Cancel**. The **Design View** window displays.

△ **NOTE:** *You cannot delete the TEMPLATE design directory from within Design Management Tools.*

Restore Design

This tool restores a design that was backed up using the **Backup Design** tool. To restore a design from a backup copy, follow these steps:

1. Select **Restore Design**. The window shown in figure 2-15 displays.

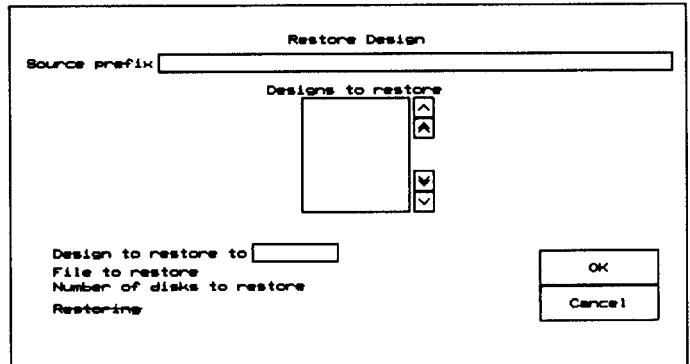


Figure 2-15. *Restore Design* window.

2. Move the pointer to the **Source prefix** entry box and press <Enter>.
3. Enter the path for the backup file in the entry box. For example, if you backed up the design on a floppy disk, type **A:** and then press <Enter>. If you are specifying a directory, be sure to include the backslash at the end of the path.

The software looks for backup files in the location you specified and lists them in the **Designs to restore** list box. If you do not see the design you want to restore listed, try specifying a different source or inserting a different backup disk.

If you change disks, place the pointer in the **Source prefix** entry box and press <Enter> twice to make **Restore Design** check for backup files again.

4. Use the scroll buttons if necessary to display the design name in the **Designs to restore** list box.
5. Select the design to restore.

6. Change the name in the **Design to restore to** entry box if you want to use a new name.
7. Select **Restore** to restore the design, or select **Cancel** to return to the **Design View** window.

If the design takes up more than one disk, **Restore Design** prompts you for the next disk. You can take either of two actions:

- ❖ Change disks and select **Continue** to finish restoring the design.
 - ❖ Select **Cancel** to stop the process. The message "Unable to restore *designName*" displays.
 - Select **Recover incomplete commands** and select **OK** to delete the incomplete design.
 - Select **OK** *without* selecting the **Recover incomplete commands** to leave the incomplete design intact.
8. When you finish restoring designs, select **Cancel**. The **Design View** window displays.
 9. The design you restored appears in the **Design** list box.

Update ESP Data This tool saves the current ESP design environment settings and local configuration options. The ESP design environment saves the information automatically when you open another tool set.

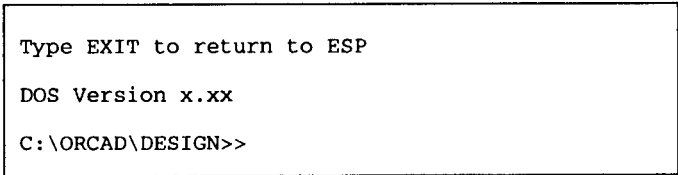
If you select **Update ESP Data** when the ESP design environment main screen ("behind" the **Design View** window) and the **Design** list box show different design names, the ESP design environment displays the message "This will copy local configurations from *designInTitleBar* to *designInListBox*." If you want to copy the local configuration settings, select **OK**; otherwise, select **Cancel**.

Suspend to System This tool temporarily suspends operation of the ESP design environment and returns to the operating system. At the system prompt, you can enter any system commands you like.

▲ **CAUTION:** *As a precaution, always use the **Update ESP Data** tool before suspending to the operating system.*

Follow these steps to suspend to the system:

1. Select **Suspend to System**. After a moment, messages similar to those shown in figure 2-16 display.



```
Type EXIT to return to ESP  
DOS Version x.xx  
C:\ORCAD\DESIGN>>
```

Figure 2-16. Suspend to System messages.

To remind you that the ESP design environment is suspended in the background, a right angle bracket is appended to the system prompt.

2. When you finish, type **exit** and press <Enter>. After a moment, the **Design View** window displays.

- OK** This command exits **Design Management Tools** and returns to the ESP design environment main screen. If you changed the current design, **OK** saves the change.
- Cancel** This command exits **Design Management Tools** and returns to the ESP design environment main screen without changing the current design even if you changed the current design.

Using File View

The ESP design environment offers you complete flexibility in managing your design files.

To use the **File View** tools, follow these steps:

1. Run **Design Management Tools** from the ESP design environment main screen or from any tool set's main screen, as described under *Running Design Management Tools* in this chapter.
2. In the **Design View** window, select the design you wish to work with from the **Design** list box.
3. Select **File View** near the top of the screen. After a moment, the **File View** window appears (figure 2-17).

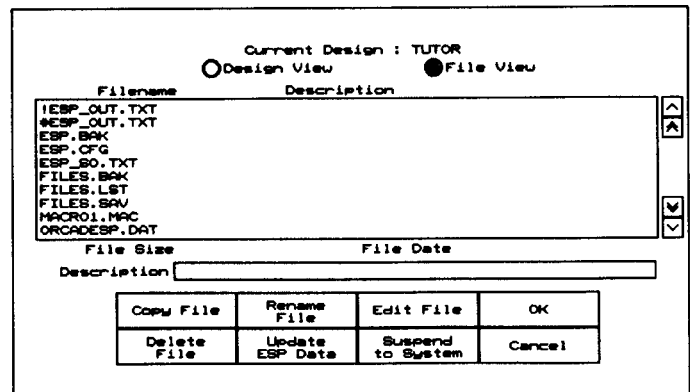


Figure 2-17. *File View* window.

Across the bottom of the **File View** window are eight file manipulation tools. The following sections describe how to use these tools.

Copy File This tool copies a file to another directory or renames and copies a file to any directory or design, including the current design.

To copy a file, follow these steps:

1. Select **Copy File**. The window shown in figure 2-18 displays.

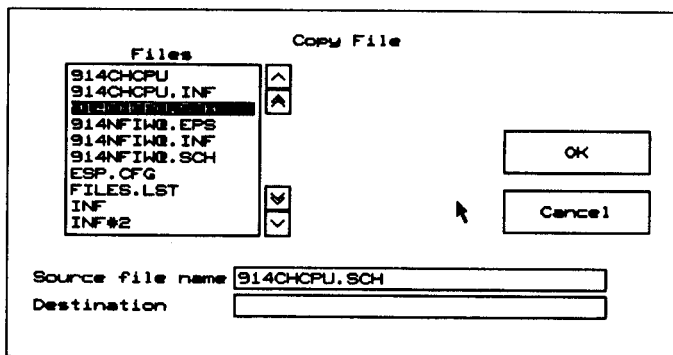


Figure 2-18. *Copy File* window.

2. Move the pointer to the **Files** list box and select a file to copy. Its name then appears in the **Source file name** entry box.
3. Move the pointer to the **Destination** entry box and press <Enter>.
4. Enter a path and filename for the destination file. If you do not specify a path, the ESP design environment copies the file to the current design directory.

5. Select **OK** to copy the file. If you specify a path and no filename in the **Destination** entry box, the ESP design environment copies the file to the current design directory.

If you leave the **Destination** entry box empty or specify a path that does not exist, the ESP design environment displays the message "Unable to open destination file. Possibly a bad path was specified." When you select **OK**, the **Copy File** window displays.

If a file already exists with the name you specified as the destination, the ESP design environment displays the message shown in figure 2-19.

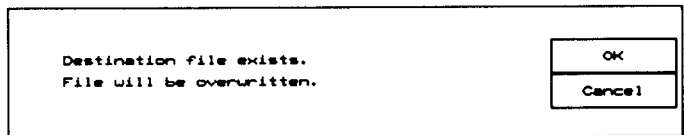


Figure 2-19. "Destination file exists" message.

- ❖ Select **OK** to write over the existing file.
 - ❖ Select **Cancel** to return to the **Copy File** window where you can enter a new destination path and filename.
6. When you finish copying files, select **Cancel**. The **File View** window displays.

Rename File This tool renames one or more files in the current design.

To rename a file, follow these steps:

1. Select **Rename File**. The window shown in figure 2-20 displays.

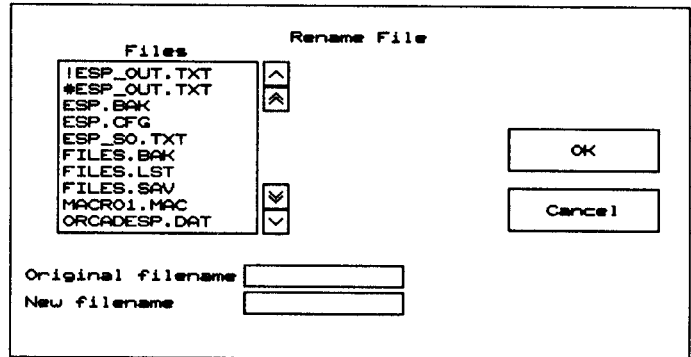


Figure 2-20. *Rename File* window.

2. Select the file to rename from the **Files** list box or enter the filename in the **Original filename** entry box.
3. Move the pointer to the **New filename** entry box and press <Enter>.
4. Enter the new name for the file.
5. Select **OK** to rename the file. If you do not want to rename the file, select **Cancel**.
6. When you finish renaming files, select **Cancel**. The **File View** window displays.

Edit File You view and edit text files with this tool. The ESP design environment includes the M2EDIT text editor and is already configured to run it. For information about its features and commands, see the *Stony Brook M2EDIT Text Editor User's Guide*.

You can also configure the ESP design environment to use a text editor of your choice. *Chapter 3: Customizing the ESP design environment* describes the steps to configure the editor.

To use **Edit File**, follow these steps:

1. Select **Edit File**. The window shown in figure 2-21 displays.

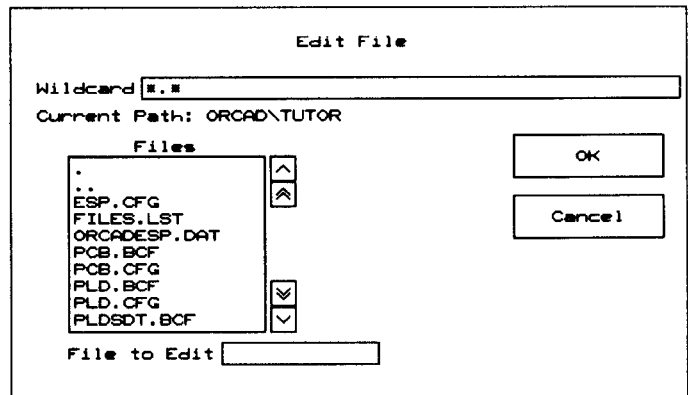


Figure 2-21. *Edit File* window.

2. Select a file from the **Files** list box.
3. Select **OK**. If you do not want to edit or view a file, select **Cancel**.

The editor opens the file you specified. You can now view and edit the file using the editor's commands.

4. When you finish editing or viewing the file, exit the text editor. The **Edit File** window displays.
5. When you finish editing and viewing files, select **Cancel**. The **File View** window displays.

About wildcards

Although there is no limit to the number of files you can have in a directory, the **Files** list box can display no more than 400 files at one time. The number of files shown depends on the length of the filenames.

Wildcards determine which files are displayed in the **Files** list box. A wildcard acts as a filter to display files that match the criteria you specify. Filenames that match the wildcard in the **Wildcard** entry box display in the **Files** list box.

You can use wildcards to specify which files to display in the **Files** list box. The asterisk character (*) represents any number of characters; the question mark (?) represents a single character.

- ❖ If you enter ***.XYZ** in the entry box, all files in the design that have the extension .XYZ display in the list box.
- ❖ If you enter **T*.??**, all files in the design that start with the letter "T" and have a two-character extension display in the list box.
- ❖ If you enter **T*.X?**, all files in the design that start with "T" and have a two-character extension that starts with "X" display in the list box.

The default wildcard is ***.***, which means the first 400 files in the directory specified by the **Current Path** are listed. You can reduce the number of files displayed by making the wildcard more specific to screen out files that you do not want to see. For example, to include only PLD source files in the list box, enter this:

Wildcard

You can specify more than one wildcard at a time. To see library source and PLD source files, enter this:

Wildcard



NOTE: When you specify multiple wildcards, separate them with commas without any space characters.

About single and double dots

In addition to the files in the directory identified by **Current Path**, the **Files** list box shows subdirectories, one period (dot), and two periods (double dot). Selecting one of these has the following results:

- ◆ Selecting a directory name displays the files in that directory in the **Files** list box and updates **Current Path**.
- ◆ Selecting the dot displays the complete path for the current directory if it does not already display.
- ◆ Selecting the double dot displays the files in the parent directory—the directory containing the current directory—in the **Files** list box and updates the **Current Path**.

Using the double dot and directory names, you can edit files in any design or directory without having to change the current design.

About nontext files

OrCAD graphic design files—such as schematics and layouts—display their file types at the top of the document when they are opened by the text editor. If you open a non-OrCAD file containing something other than text, you may see some extended ASCII characters on the text editor's screen. Exactly what you see depends on the file's type. To preserve the file, just exit from the text editor without saving any changes.

Delete File This tool deletes a file from the current design.

▲ **CAUTION:** *This command cannot be undone using OrCAD tools. It is possible to undelete files using hard disk utilities, but it is not always successful.*

To delete a file, follow these steps:

1. Select **Delete File**. The window shown in figure 2-22 displays.

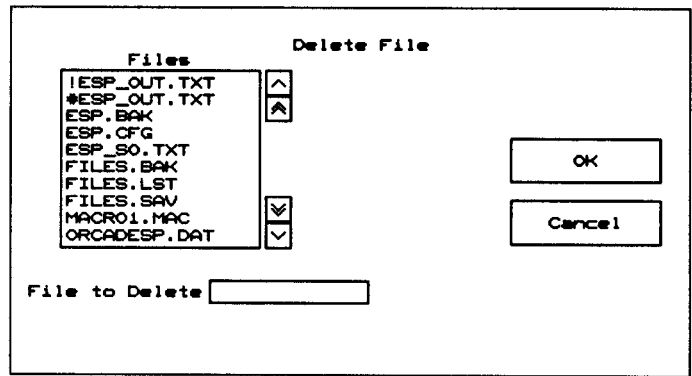


Figure 2-22. Delete File window.

2. Select the file to delete from the **Files** list box or enter the filename in the **File to Delete** entry box.
3. Select **OK** to delete the file. If you do not want to delete the file, select **Cancel**.
4. When you finish deleting files, select **Cancel**. The **File View** window displays.

△ **NOTE:** *You cannot delete files from the TEMPLATE design directory from within Design Management Tools.*

Update ESP Data This tool saves the current ESP design environment settings and local configuration options. The ESP design environment saves the information automatically when you open another tool set.

If you select **Update ESP Data** when the ESP design environment main screen ("behind" the **File View** window) and the **Design** list box show different design names, the ESP design environment displays the message "This will copy local configurations from *designInTitleBar* to *designInListBox*." If you want to copy the local configuration settings, select **OK**; otherwise, select **Cancel**.

Suspend to System This tool temporarily suspends operation of the ESP design environment and returns to the operating system. At the system prompt, you can enter any system commands you like.

▲ **CAUTION:** *As a precaution, always use the **Update ESP Data** tool before suspending to the operating system.*

Follow these steps to suspend to the system:

1. Select **Suspend to System**. After a moment, messages similar to those shown in figure 2-23 display.

```
Type EXIT to return to ESP  
DOS Version x.xx  
C:\ORCAD\DESIGN>>
```

Figure 2-23. Suspend to System messages.

To remind you that the ESP design environment is suspended in the background, a right angle bracket is appended to the system prompt.

2. When you finish, type **exit** and press <Enter>. After a moment, the **File View** window displays.

OK This command exits **Design Management Tools** and returns to the ESP design environment main screen. If you changed the current design, **OK** saves the change.

Cancel This command exits **Design Management Tools** and returns to the ESP design environment main screen without changing the current design even if you changed the current design.



Customizing the ESP design environment

Using configuration options and hot keys, you can customize the ESP design environment. This chapter describes how to use the **Configure ESP** screen and **Assign Hot Key**.

Configuring the ESP design environment

The ESP design environment is configured and ready to run when installed on your personal computer's hard disk. However, you may want to customize the configuration. Using the **Configure ESP** screen you can configure:

- ◆ A display driver
- ◆ A text editor
- ◆ <Print Screen> and mouse operation
- ◆ A startup design
- ◆ The image (.IMG) file prefix
- ◆ The name of the redirection file
- ◆ Colors

Displaying the configuration

To display the design environment's configuration options, follow these steps:

1. Select **Design Management Tools**. The menu shown at right displays at the top left corner of the screen.
2. Select **Configure ESP**. The screen shown in figure 3-1 displays.

Design Management Tools

Execute
Local Configuration
Assign Hot Key
Configure ESP
Help

Configure ESP

OK Cancel

Driver Options

Driver Prefix: C:\ORCADESP\DRV\

Available Display Drivers		
Resolution	Colors	Adapter Name
640 x 350	16	EGA Enhanced monitor

Configured Display Driver: VGA2.DRV

Editor Options

Text Editor: C:\ORCADESP\HEDIT.EXE /E

Print Screen Options

☒ Disable print screen

Mouse Options

☐ Reverse "Y" axis operation of the mouse

Design Options

Startup Design: TEMPLATE

Startup Vendor: ORCADESP

Prefix Options

.IMG file creation prefix: C:\ORCADESP\

Redirection Options

ESP redirect file: ESP_OUT.TXT

Text

Active Text: ○○○○○○○○○○○○○○○○○○○○○●

Inactive Text: ○○○○○○○○○○○●○○○○○○○○○○

Screen Header: ○●○○○○○○○○○○○○○○○○○○○○○○

Figure 3-1. Top portion of the *Configure ESP* screen.

The **Configure ESP** screen contains more information than can fit on the screen at one time. The information displays in a long, continuous format, much like a scroll. Your display shows one portion, or "window full," at a time.



Move the pointer down until it touches the lower edge of the display, and the display pans to show more of the options. When you get to the bottom, the display will only pan up.

If you prefer to use keyboard commands, you can press <Page Down> to move the window down part of a screen at a time, and <Page Up> to go up again. Press <End> to go to the bottom of the configuration screen, and <Home> to go to the OK button near the top again.

Driver Options The **Driver Options** area (figure 3-2) defines the driver prefix and display driver the ESP design environment uses.

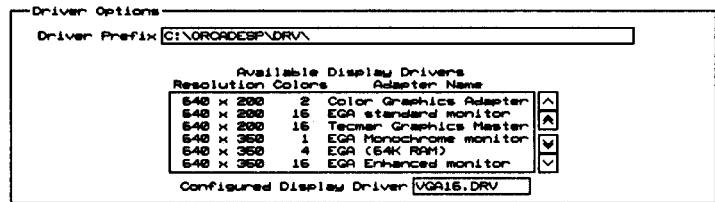


Figure 3-2. *Driver Options* area of the *Configure ESP* screen.

△ **NOTE:** Each OrCAD tool set can be individually configured to use a display driver. For example, you may want to use a 640-by-480 resolution display driver for the ESP design environment, and a higher resolution 800-by-600 display driver for PC board layout.

Driver Prefix The **Driver Prefix** defines the directory path or disk drive where the ESP design environment finds and loads the graphics driver programs.

The default **Driver Prefix** is created during the installation process. If you chose the recommended directory structure when you installed the ESP design environment on your C drive, the prefix is:

Driver Prefix C:\ORCADESP\DRV\

All of the drivers in that directory are listed in the **Available Display Drivers** list box.

To change the driver prefix, place the cursor in the **Driver Prefix** entry box and enter the pathname of the directory containing your device drivers. After you press <Enter>, the drivers in the specified directory are listed in the **Available Display Drivers** list box.

*Available
Display Drivers*

The **Available Display Drivers** list box (figure 3-3) lists the display drivers available in the subdirectory path specified in the **Driver Prefix** entry box.

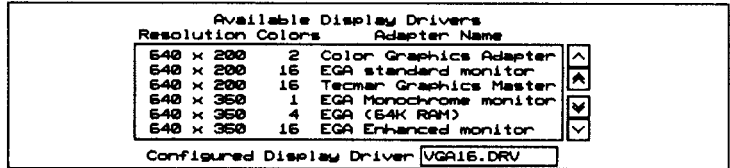


Figure 3-3. *Available Display Drivers* list box.

Select the driver appropriate for your computer from the **Available Display Drivers** list box. If you want to see drivers not visible in the window, use the arrow keys at the right of the window to scroll the list of drivers up and down.

*Configured
Display Driver*

Once you select a display driver, its filename displays in the **Configured Display Driver** entry box. For example, if you select the EGA enhanced monitor from the drivers displayed in figure 3-3, the following displays:

Configured Display Driver: EGA16E.DRV

If you want to use a display driver that is not listed, enter the driver name directly in the **Configured Display Driver** entry box. This driver must be found in the same directory as the other drivers.

△ **NOTE:** If you are updating from an earlier version of OrCAD software, do not mix the new display, printer, and plotter drivers with the old ones. The new drivers are incompatible with older versions of OrCAD software; the old drivers are incompatible with newer versions of the software.

Editor Options

The **Editor Options** area (figure 3-4) defines the text editor the ESP design environment runs when you select **Edit File**. You can use any editor or word processor on your system. The default selection is the OrCAD text editor.

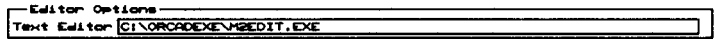
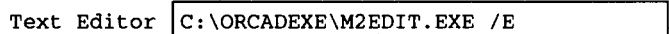


Figure 3-4. *Editor Options* area of the *Configure ESP* screen.

Enter a complete path and editor name in the **Text Editor** entry box. You can also specify switches in the entry box.

Some OrCAD tools create error message files. To take advantage of them with the M2EDIT text editor, specify the /E switch in the **Text Editor** entry box:



Print Screen Options

Select the **Disable print screen** option (figure 3-5) to disable the normal function of the <Print Screen> key. The only time you should select this option is if you have a terminate-and-stay-resident (TSR) program running that uses the interrupt the <Print Screen> key sends. An example of such a TSR is a screen capture program.

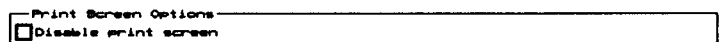


Figure 3-5. *Print Screen Options* area of the *Configure ESP* screen.

Draft and **Simulate** have additional configuration options for disabling the <Print Screen> key.

Mouse Options Select the **Reverse "Y" axis operation of the mouse** option (figure 3-6) to make the pointer travel up instead of down on configuration screens. If you select this option, you must restart the ESP design environment to make the change effective.

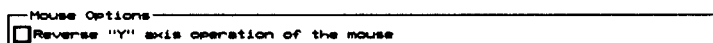


Figure 3-6. *Mouse Options* area of the *Configure ESP* screen.

Design Options Use the **Design Options** area (figure 3-7) to select the design directory you want to work in when you start running OrCAD tools. The default entry is **TEMPLATE**.

In the **Startup Vendor** entry box, you specify which configuration data (.DAT) file the ESP design environment loads. The default entry is **ORCADESP.DAT**.



Figure 3-7. *Design Options* area of the *Configure ESP* screen.

If the design name you enter in the **Startup Design** entry box is not a valid design directory, the ESP design environment starts up with the **TEMPLATE** design.

△ **NOTE:** To start running the design environment on a design other than the startup design, just enter **ORCAD** followed by a blank space and the name of the design. If you don't include a path, the ESP design environment looks for the design in the directory named by the **ORCADPROJ** environment variable. For an explanation of the environment variables used by OrCAD software, see Chapter 5: ESP design environment technical information.

Prefix Options

When you select an OrCAD tool or suspend to the operating system, the ESP design environment creates an image of itself that it uses to “remember” where it was. If you specify a prefix in the **.IMG file creation prefix** entry box, the ESP design environment writes the image file to disk. Figure 3-8 shows the default prefix:

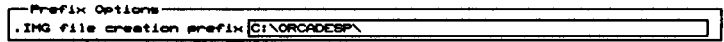


Figure 3-8. *Prefix Options* area of the *Configure ESP* screen.

You must have about 230K free space on the drive where the image file is written. If you do not, change the **.IMG file creation prefix** entry box to specify a drive where there is enough space.

If you cannot display the **Configure ESP** screen, use a text editor to find this line in the file ESP.CFG in every design directory:

```
PIMG = 'C:\ORCADESP\'
```

Change the line so that it points to a disk with enough space for the image file. For example, the following line tells the ESP design environment to write the image file to a directory on drive D:

```
PIMG = 'D:\TEMP\'
```

If you are using the software on a network, make sure you can write to the directory you specify in the **.IMG file creation prefix** entry box.

If you have EMS, delete the text in the **.IMG file creation prefix** entry box, and the ESP design environment will save the image in high memory.

Redirection Options

In this area, you specify the name of the redirection file the ESP design environment creates each time you use a tool. The redirection file includes command line information and status messages. Figure 3-9 shows the default filename.

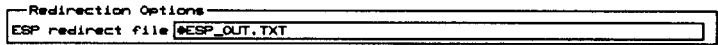


Figure 3-9. Redirection Options area.

The default name is convenient because it displays near the beginning of most lists of filenames.

Color tables

Using the remaining configuration options, you can tailor the colors the ESP design environment displays to match your personal preferences. Figures 3-10 through 3-18 in this section show the default selections for the color configuration options.

To change the color of an item, simply select the corresponding button.

Text

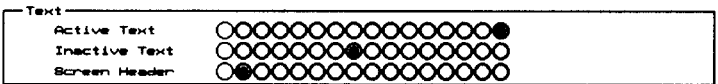


Figure 3-10. Color table for text options.

Configuration

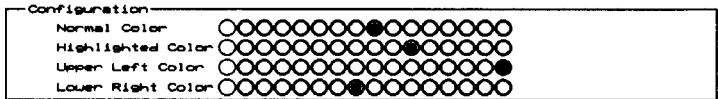


Figure 3-11. Color table for configuration options.

Tool sets

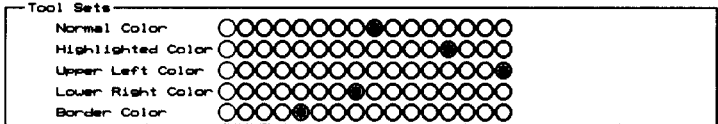


Figure 3-12. Color table for tool sets.

Assigning hot keys

Use the **Assign Hot Key** command to assign a key or key combination to buttons on ESP design environment screens so you can run tools from the keyboard. The **Show Hot Key Assignments** command lists the current hot keys for your convenience.

Hot key assignments, like local configuration options, are design-specific, so you can customize them for each design. You can also assign hot keys in the **TEMPLATE** design so they are already assigned each time you create a design. Hot key assignments are screen-specific, so you can use the same keys or key combinations for several tool sets.

Assign Hot Key appears in tool menus as shown at right. To assign a hot key, follow these steps:

Execute
Local Configuration
Assign Hot Key
Configure ESP
Help

1. Select the tool you want to assign a hot key to. Its menu displays.
2. Select **Assign Hot Key**. The prompt "Press the key/key-combination assignment for this button (ESC to cancel)" displays.
3. Press a key or key combination. You can use <Ctrl>, <Alt>, and <Shift> with most function keys and alphanumeric keys. If you press an invalid combination, the prompt remains at the top of the screen until you press <Esc> or a valid key or key combination.

△ **NOTE:** Hot keys are case-sensitive, so if you assign "a" to a button, "A" doesn't run the tool.

4. Run **Design Management Tools** by placing the pointer anywhere on the screen except on a button and pressing <Enter>.
5. Select **Show Hot Key Assignments**. The hot key you assigned is included in the list.
6. Press <Enter> to dismiss the hot key assignment window.

To delete a hot key, repeat steps 1 and 2, and then press .

Because hot keys are stored as part of a design's local configuration, any hot keys you assign in TEMPLATE are already assigned every time you create a new design.



Defining a user button

Four buttons labeled **User 1**, **User 2**, **User 3**, and **User 4** are found inside every tool set. You can program these buttons to do what you want them to.

When you select a user button, a menu like the one shown at right displays. This chapter explains the commands on this menu and how to use them.

User 1

Execute
Modify
Delete
Assign Hot Key
Help

Execute

This command runs the command defined in the user button. Just select the user button and **Execute**.

Modify

Modify defines a new button or redefines a button that is already defined.

Example

Here is an example of how you would define a user button to list the files in the current directory:

1. Select **User 1** and **Modify**. The window shown in figure 4-1 displays.

Button Name (top line)

Button Name (bottom line)

Help File Name

Command

Parameters

OK Cancel

Figure 4-1. User button *Modify* window.

2. Select the **Button Name (top line)** entry box. Delete the default entry (User 1) and enter **DIRECTORY**.

A **Button Name** line may contain up to ten characters.

3. Enter **dir** in the **Command** entry box.
4. Select **OK** to save the new definition of the button. If you select **Cancel**, the ESP design environment dismisses the window without updating the definition.
5. Test your newly defined user button by selecting it and then selecting **Execute**. If you've entered the command as described, a list of files in the current directory scrolls by and the tool set screen displays.

Add parameters

To define a user button to run a command that requires parameters, you enter the parameters in the **Parameters** entry box. For example, to make the directory listing more readable, you might add the following parameter:

Command	<input type="text" value="dir"/>
Parameters	<input type="text" value=" more"/>

This tells the ESP design environment to pipe the directory listing through the MORE utility, so you can view it a screen at a time.

Select the user button and then select **Execute**. Each screen-full of the directory listing displays until you press a key. The last screen still scrolls by, though, just before the tool set screen displays.

Run multiple commands

A user button runs any valid DOS command. For a user button to run more than one command, you must create a batch file that contains the commands and define the user button to run the batch file. Do this by entering the name of the batch file in the **Command** entry box.

Batch filenames must have a .BAT extension, but you need not include the extension in the **Command** entry box. You can create the batch file using any text editor. For information on creating batch files, see your operating system manual.

For example, to make the last screen-full of the directory listing remain visible until you press a key, you must add a PAUSE command. Create a text file called MYDIR.BAT that contains the following commands:

```
@echo off
dir | more
pause
```

Enter **mydir** in the **Command** entry box, clear the **Parameters** entry box, and select **OK**.

Command

Parameters

Select the user button and then select **Execute**. Even the last screen-full of the directory listing displays until you press a key.

Provide on-screen help

You can use a help file to provide more information about the user button's function than can fit in the **Button Name** entry boxes. This file displays when you select **Help** from the user button menu.

The file *must* be saved in the directory defined by the ORCADESP environment variable for the ESP design environment to find it. Help text can be up to 64 characters wide and up to 16 lines high.

To use the help file, enter the full filename in the **Help File Name** entry box. To view the help text, select the user button and then select **Help**.

Delete

This command deletes the definition of the selected user button and renames the user button to its original name.

To delete the definition of the button you just defined, select the button and then select **Delete**.

Assign Hot Key

This command lets you assign a key or key combination to the user button. See the section *Assigning hot keys* for more information.

Help

This command searches in the directory defined by the ORCADESP environment variable for a text file created by you and displays the file in a window. See the section *Provide on-screen help* for information on creating a help file.



ESP design environment technical information

The ESP design environment embodies the same philosophy as other OrCAD software, while providing more sophisticated design management, faster performance, and support for expanded memory. The ESP design environment requires less base memory than earlier versions, making it easier to run with resident programs such as network software.

Directory structure

The ESP design environment works best when you keep all files for a design—schematics, PLD logic, simulation files, and printed circuit board layouts—in one directory. The recommended directory structure is shown in figure 5-1.

△ ***NOTE:** You can keep multiple designs in one directory; you can also keep designs in directories not specified by the ORCADPROJ environment variable. This reflects a more flexible directory structure than in previous versions of OrCAD software.*

See Chapter 2: Using Design Management Tools for more information about setting the root sheet and the design directory prefix. See the section DOS environment variables in this chapter for an explanation of ORCADPROJ and other environment variables used by OrCAD software.

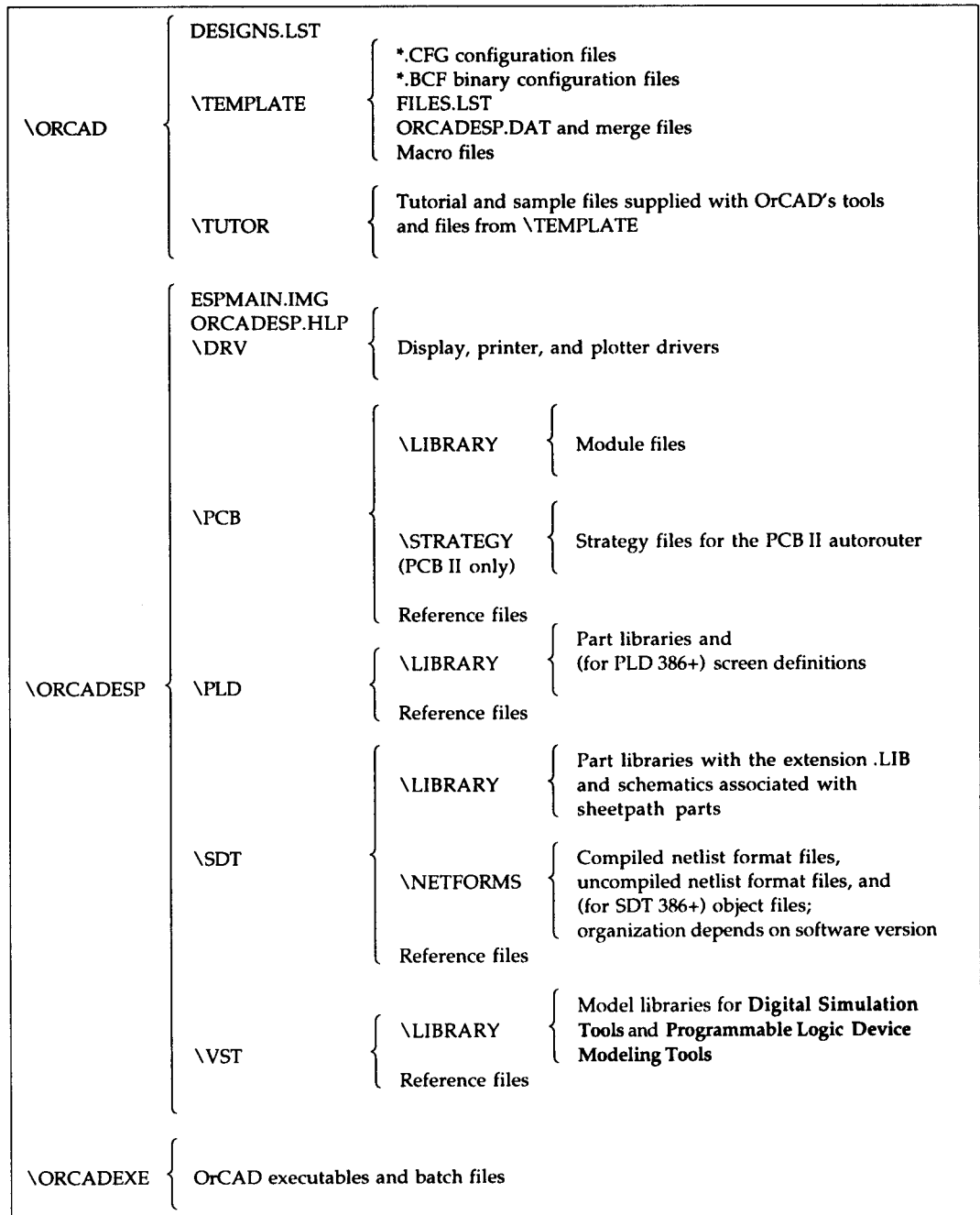


Figure 5-1. OrCAD directory structure.

File descriptions

Many of the files used by the ESP design environment are described below.

Executable software These files are found in the directory named by the ORCADEXE environment variable. In addition to the files listed here, the same directory contains the executable software for the other installed OrCAD products. See the following section, *DOS environment variables*, for more information about setting ORCADEXE.

ESP_C.EXE Configuration program for the ESP design environment.

ESPMAIN.EXE Main program for the ESP design environment.

MERGEDAT.EXE Program for transferring your configuration selections in current ORCADESP.DAT files to new versions of the files. If you use the directory structure recommended by OrCAD, INSTALL updates data files automatically unless you choose to update the files yourself. For information about using MERGEDAT, see *OrCAD Technical Note #45: Updating ORCADESP.DAT files with MERGEDAT*.

ORCAD.EXE Startup program for the ESP design environment.

PCB_C.EXE General configuration program for **PC Board Layout Tools**.

PCB_CLC.EXE Local configuration for each process on each button on the **PC Board Layout Tools** screen.

PLD_C.EXE General configuration program for **Programmable Logic Design Tools**.

PLD_CLC.EXE Local configuration for each process on each button on the **Programmable Logic Design Tools** screen.

SDT_C.EXE	General configuration program for Schematic Design Tools .
SDT_CLC.EXE	Local configuration for each process on each button on the Schematic Design Tools screen.
VST_C.EXE	General configuration program for Digital Simulation Tools .
VST_CLC.EXE	Local configuration for each process on each button on the Digital Simulation Tools screen.
.BCF and .CFG files	<p>The configuration that was stored by previous versions of OrCAD software in .OVL files (or, in the case of OrCAD/VST, in .CNF files) is now stored in file pairs.</p> <ul style="list-style-type: none">*.BCF Configuration information in binary format.*.CFG Configuration information in ASCII format. People who want to write their own utility programs to update configurations can bypass the normal method of entering changes through the ESP design environment. <p>Each OrCAD program checks the date and time the .BCF and .CFG files were last updated. If the .CFG file is newer than the .BCF file, which should only happen if the .CFG file is changed manually, the software automatically translates the .CFG file to binary format and saves it as the .BCF file.</p>
ESP.CFG	The ESP design environment configuration information in ASCII format. This is the central configuration file for the ESP design environment; this file must be located in the TEMPLATE directory.
PCB.BCF	PC Board Layout Tools configuration information in binary format.

PCB.CFG	PC Board Layout Tools configuration information in ASCII format.
PLD.BCF	Programmable Logic Design Tools configuration information in binary format.
PLD.CFG	Programmable Logic Design Tools configuration information in ASCII format.
SDT.BCF	Schematic Design Tools configuration information in binary format.
SDT.CFG	Schematic Design Tools configuration information in ASCII format.
VST.BCF	Digital Simulation Tools configuration information in binary format.
VST.CFG	Digital Simulation Tools configuration information in ASCII format.
Other files	The following files are also used by the ESP design environment.
.MRG and .VDT files	Merge files and vendor files contain the product-specific information that is added to the ORCADESP.DAT data file in each design directory. For more information about ORCADESP.DAT, see its description in this section.
#ESP_OUT.TXT	This file contains the screen output from the last tool executed in the design. This filename is the default; you can configure the software to use any filename you want. For information about configuring the name of the redirection file, see <i>Chapter 3: Customizing the ESP design environment</i> .

DESIGNS.LST	Descriptions of designs, for display in list boxes.
FILES.LST	Descriptions of files, for display in list boxes.
ORCADESP.DAT	Data file that stores configuration information in each design directory. If you use the recommended directory structure, INSTALL automatically updates your data files unless you choose to perform the updates yourself. You can use MERGEDAT to transfer your current configuration options and add product-specific information to data files in your designs. <i>OrCAD Technical Note #45: Updating ORCADESP.DAT files with MERGEDAT</i> describes how.
ORCADESP.HLP	A text file that stores information displayed when you select Help from a tool or user button menu.

DOS environment variables

The ESP design environment uses four DOS environment variables that should be defined in the AUTOEXEC.BAT file, which runs every time you turn on your computer. The OrCAD INSTALL program can add these four lines to your AUTOEXEC.BAT file during installation:

```
SET ORCADEXE=C:\ORCADEXE\  
SET ORCADESP=C:\ORCADESP\  
SET ORCADPROJ=C:\ORCAD\  
SET ORCADUSER=C:\ORCADESP\
```

△ **NOTE:** In the examples above, C is shown as an example. During installation, you specify the drive on which to install the ESP design environment and other OrCAD software. The installation program places the appropriate drive designator in AUTOEXEC.BAT when it adds the commands to set the four environment variables.

By default, DOS reserves a fixed amount of memory for environment variables. Occasionally, adding these four variables to your AUTOEXEC.BAT file means DOS needs more than the default amount of memory in order to load these variables. When this happens, DOS displays the message "Out of environment space" when you reboot your computer following installation of the ESP design environment software.

When this message displays, you need to increase the number of bytes DOS reserves for environment variables by using the DOS SHELL command. Using an editor, add this statement to your CONFIG.SYS file:

```
SHELL=COMMAND.COM /P /E:n
```

/P causes COMMAND.COM to remain loaded and to execute AUTOEXEC.BAT when it is installed.

/E:n indicates the number of bytes to allocate to the environment space. *n* must be a decimal integer in the range 160–32768. Between 700 and 800 bytes is usually plenty. For more information about the SHELL command, see your DOS documentation.

ORCADESP	This variable points to the directory where the ESP design environment files are found, usually \ORCADESP.
ORCADEXE	This points to the directory containing all OrCAD executable programs, usually \ORCADEXE.
ORCADPROJ	This points to the directory containing design directories, usually \ORCAD.
ORCADUSER	This points to the directory containing user button help files, usually \ORCADESP.

A

area ■ A section of a screen containing related buttons or configuration options. Most areas are bordered and named. Examples include the **Editors** area on tool set screens and the **File Options** area on local configuration screens.

ASCII ■ An acronym for *American Standard Code for Information Interchange*; a seven-bit code used to represent letters of the alphabet, the ten decimal digits, and other characters recognized by the computer, such as Backspace, Carriage Return, and Line Feed.

B

button ■ A pushbutton-like image you select to run a tool or a series of tools. See also *configuration*.

byte ■ A piece of computer data composed of eight contiguous bits that are grouped as a single unit.

C

check box ■ A small, square button: ☐. Check boxes are used in lists of options when more than one option can be selected at a time. Compare *radio button*.

complex hierarchy ■ A design in which two or more sheet symbols refer to a single worksheet. See also *hierarchical file structure*, *simple hierarchy*.

configuration ■ The information a tool or tool set uses to operate. Configurations can be tailored to your needs. The configuration for a tool set applies to all tools in the set. Local configuration applies to the tool (or tools) the button runs. See also *local configuration*.

cursor ■ A marker inside an entry box showing where characters typed on the keyboard will appear. The cursor for insert mode is a heavy underline, and the cursor for overtype mode is a square. See also *pointer*.

D

default ■ A preselected parameter.

design ■ *noun*: A set of plans for electronic circuitry; a directory of the files that contain those plans.

digital ■ Circuitry in which information is represented by on and off (or positive and negative) electronic signals.

downloading ■ Receiving a file from another computer.

E

EDA ■ An acronym for *electronic design automation*.

editor ■ A tool used to create or modify a design file.

entry box ■ A box that accepts text or numbers typed at the keyboard:

F

flat file structure ■ A schematic diagram in which output lines of one sheet connect laterally to input lines of another sheet through graphical objects called *module ports*. Flat file structures are practical for small designs of three or fewer sheets. See also *sheet, hierarchical file structure*.

H

hierarchical file structure ■ A schematic design structure in which sheets are interconnected in a tree-like pattern vertically and laterally. At least one sheet, the root sheet, contains symbols representing other sheets, called subsheets. See also *sheet, flat file structure*.

K

K ■ See *kilobyte*.

kilobyte ■ 2^{10} (1,024) bytes. "Kilo" is taken from the metric system, where it is a prefix meaning "one thousand."

L

layout ■ A scale drawing of a printed circuit board, its components, and its electromechanical connections. Also called *artwork*.

library ■ A collection of standard, often-used part symbols stored as templates to speed up design work on the system.

librarian ■ A tool used to manage and create library parts.

list box ■ A box on local configuration screens and in windows that lists files, designs, or directories. You move through the list using *scroll buttons* next to the list box. On local configuration screens, you can specify a *wildcard* so the list box contains files that match the criteria you specify.

local configuration ■ Configuration settings for a particular tool. If the tool runs several processes, each process can be configured locally. A process can have different configurations in different tools. For example, **Annotate** may be configured differently under **To Layout** and **To Digital Simulation**.

M

MB ■ See *megabyte*.

megabyte ■ 2^{20} (1,048,576) bytes. "Mega" is taken from the metric system, where it is a prefix meaning "one million."


N

netlist ■ An ASCII file that lists the interconnections of a schematic diagram by the names of the signals, modules, and pins connected together on a PCB; the nodes in a circuit.

P

PCB ■ An acronym for *printed circuit board*.

PLD ■ An acronym for *programmable logic device*. See *programmable logic device*.


pointer ■ An arrow on the screen that moves as you move the mouse:  . See also *cursor*.

processor ■ A tool that subjects a design file to a specific process.

programmable logic device ■ A type of integrated circuit in which some fuses can be blown, eliminating certain logical operations in the device, and others left intact, giving the device one of many possible logical architectures or logical configurations.

prompt ■ A query from a program asking you to enter specific information.

R

radio button ■ A small, round button:  . Radio buttons are used in groups of mutually exclusive options: only one radio button in a group can be active at a time. Compare *check box*.

redirection file ■ A file the ESP design environment writes each time you run a tool. The file contains command line information and status messages. Unless you change the ESP design environment's configuration, the redirection file is named #ESP_OUT.TXT.

reporter ■ A tool that creates a report, but does not modify design data.


root directory ■ The main directory on your computer; the directory that the computer boots from.

root sheet ■ The sheet at the top of a hierarchy that refers to all other sheets in a schematic diagram. See also *hierarchical file structure*, *schematic*.


S


schematic ■ A graphical representation of a circuit using a standard set of electronics symbols. See *sheet*, *hierarchical file structure*, *root sheet*.

scroll buttons ■ Buttons used to display items "above" and "below" those displayed in a list box. The four scroll buttons are:

 Page Up

 Line Up

 Page Down

 Line Down

sheet ■ A page of a schematic diagram; also called worksheet. Each schematic file contains one sheet. See also *root sheet*, *hierarchical file structure*, *schematic*.

simple hierarchy ■ A design in which each sheet symbol represents a different subsheet. See also *hierarchical file structure*, *complex hierarchy*.

simulation ■ A computer-generated prediction of circuit behavior in response to an event or set of events.

source code ■ The words, phrases, and logical expressions in a high-level computer language that define the logic that a compiler can translate into machine instructions.

T

template ■ A set of patterns used to create new designs. The template is *not* a design itself. See also *design*.

text export ■ The process of copying text from a schematic worksheet to an ASCII file.

text import ■ The process of copying text from an ASCII file to a schematic worksheet.

tool ■ A computer program you can use to do some useful task. OrCAD tools are grouped into five *areas*: editors, processors, reporters, librarians, and transfers.

tool set ■ A collection of tools designed to perform a set of electronic design automation tasks. OrCAD tool sets include **Schematic Design Tools**, **Programmable Logic Design Tools**, **Digital Simulation Tools**, and **PC Board Layout Tools**.

transfer ■ A tool that transfers design information from one tool set to another tool set. Transfer tools also run whatever processes are necessary to go from one tool set to another.

U

uploading ■ Sending a file to another computer.

user button ■ A button that you can configure to perform a command, executable, or batch file. User button configurations are saved with the design files, so you can create design-specific buttons and not worry about overwriting user button configurations for other designs.

W

wildcard ■ A series of characters you specify in a Wildcard entry box to filter the files that display in a list box. For example, *.* filters nothing from a list of files, so all files display.

worksheet ■ See *sheet*.

Z

zooming ■ Changing the view on the screen by making the objects appear larger or smaller.

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