

Getting Started

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Launching L-Edit

Before You Begin

In *Unix*, make sure that:

- *Either* the current working directory is where the L-Edit files are installed (the L-Edit directory) and that you have read/write permission in this directory,
- *Or* the L-Edit directory is specified in your operating system's search path.

Startup Files

In Windows, to launch L-Edit without specifying any startup files double-click on the L-Edit icon.

L-Edit attempts to locate the file **ledit.tdb** and read it for setup information. If it is not found in the current directory, then L-Edit searches in the directory where the executable is located. A warning is displayed in the event **ledit.tdb** is not located. With or without setup information from **ledit.tdb**, L-Edit starts up and creates a new file (**Layout0**) with one cell, **Cell0**.

In Windows, to specify a startup file at launch double-click the startup TDB file's icon.

To launch L-Edit in Unix, use the command: **ledit**.

Command-Line Arguments

L-Edit may be launched with or without command-line arguments. If a command-line argument is not specified, L-Edit starts with a new empty layout file modeled after **ledit.tdb**.

The command-line arguments allowed for L-Edit are:

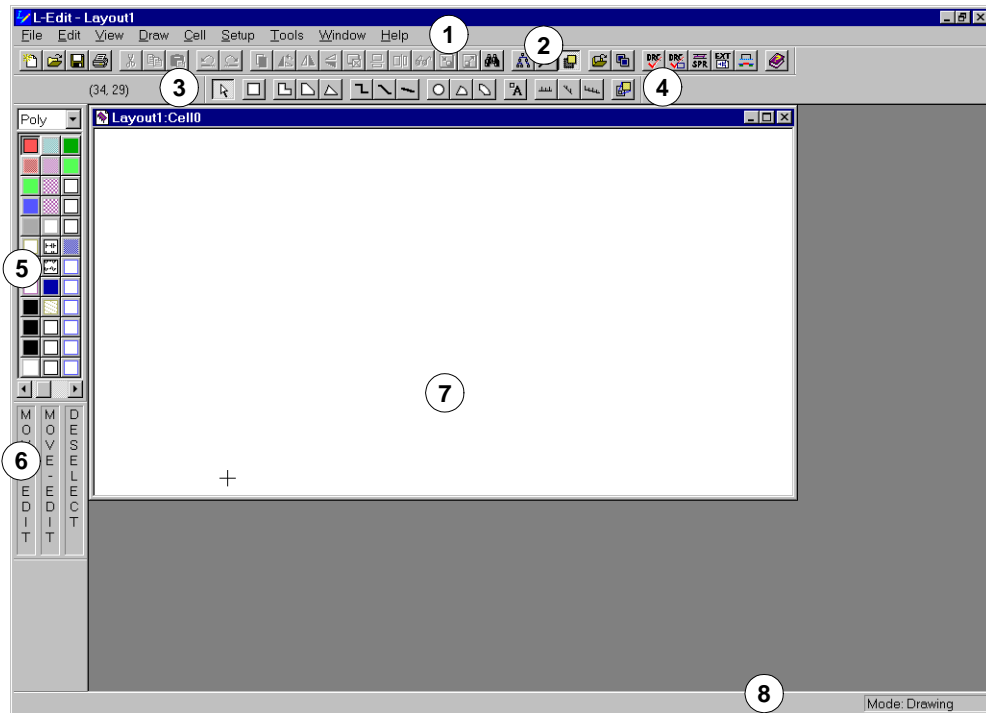
- The names of the TDB files to open. TDB files specified on the command line will be opened with the number of the layout windows with which you viewed the file the last time it was opened.
- The **-f** option to ignore configuration files. For more information, see [Application Parameters](#).
- The **-f1** option to ignore registry information. The **-f1** option restores all L-Edit settings that are not file specific to their default state.

The Application Interface

The L-Edit interface has eight major components:

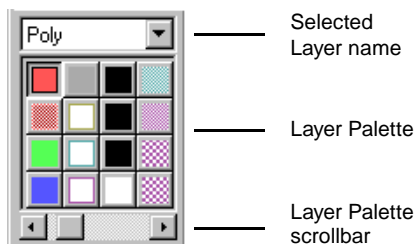
- ① The Menu bar (adjoined to the Title bar).
- ② The Standard toolbar.
- ③ The Locator.
- ④ The Drawing toolbar.
- ⑤ The Layer Palette.
- ⑥ The Mouse Buttons bar.
- ⑦ The Layout Window.
- ⑧ The Status bar.

The application interface is displayed on the next page.



Layer Palette

The *Layer Palette* toolbar is displayed below.



L-Edit supports an unlimited number of technology layers. They are displayed in the Layer Palette as an arrangement of square icons that represents the available layers. The icons are differentiated by color and pattern. As the pointer moves over an icon, the name of the layer appears in the Status bar.

The layers can be selected. The icon for the selected layer is outlined, and the name of the layer appears above the Layer Palette. Any objects that you create during a draw operation will be on the current layer and will take on the layer's color and pattern.

If the desired layer is not visible in the Layer Palette, click the scroll arrows or drag the scroll box, at the bottom of the Layer Palette until the desired layer appears. Clicking the arrows shifts the layers over by one column for each click.

To select a layer from the layers in the file, you have four options:

- Click the icon on the palette for the layer you want. You may need to scroll to the section of the palette with the layer icon.
- Open the layer drop-down menu by clicking on the downward facing arrow in the top right of the Layer Palette and then select the layer you want.
- Click in the box where the selected layer name appears, above the palette itself, and type in the name of the layer you want.
- Use **Draw > Pick Layer**.

Moving the Layer Palette

The Layer Palette toolbar can be moved to another location (see [Moving Toolbars](#)).

Resizing the Layer Palette

The Layer Palette can also be resized. To do this:

- Undock the Layer Palette.
- Place the pointer over an edge of the palette, hold the left mouse button, and drag the palette edge until the Layer Palette is the desired size.
- Release the mouse button.

L-Edit maintains whatever changes you make to the Layer Palette's size.

Hide/Show Layers from the Layer Palette

A context-sensitive menu, invoked by clicking the right mouse button on any of the layers' icons, presents various Hide/Show options.

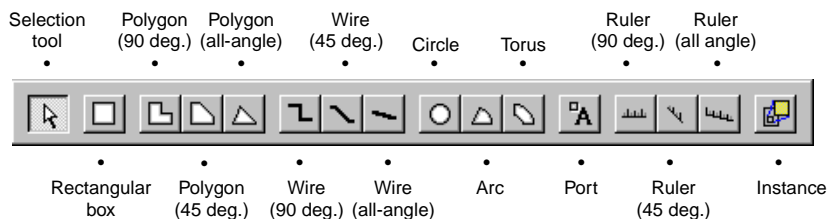


Following is a description of the menu items.

Show	Toggles the visibility of the objects on the selected layer.
Show All	Shows all objects on all layers.
Hide All	Hides objects on all mask layers except for the selected layer.
Show Generated	Toggles the visibility of objects on all generated layers.
Hide Generated	Hides all generated layers except for the selected layer.
Setup	Invokes Setup Layers dialog for the selected layer.
Standard Drawing Layers Locator Mouse Buttons	Toggles the visibility of L-Edit toolbars.
Increase Icon Size	Increases the size of the layer icons by two pixels.
Decrease Icon Size	Decreases the size of the layer icons by two pixels.

Drawing Toolbar

The *Drawing* toolbar is displayed below.



For more information on drawing objects, see [Drawing Layout](#).

Moving the Drawing Toolbar

The Drawing toolbar can be moved to another location (see [Moving Toolbars](#)).

Hide/Show Objects from the Drawing Toolbar

Each item on the Drawing Toolbar has a context-sensitive Hide/Show menu which can be invoked by clicking the right mouse button on any of the toolbar's buttons.

The Hide/Show menu is displayed below.



Following is a description of the menu items.

Show

Toggles the visibility of objects of the selected type in a file.

Show All

Shows all objects for a file.

Hide All

Hides all object types other than the object type over which the pointer is located. For example, if **Hide All** is performed while the pointer is over the 45-degree wire button, all objects in the layout are hidden except for wires of any type.

**Standard
Drawing
Layers
Locator
Mouse Buttons**

Controls the visibility of individual toolbars.

**Orthogonal
45 Degrees
All Angle**

Controls the visibility of tool buttons on the Drawing toolbar according to possible angles.

Mouse Buttons Bar

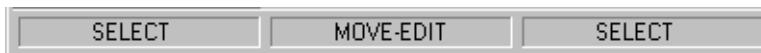
Possible mouse button functions appear in the Mouse Buttons bar. The mouse buttons function differently depending on the location of the mouse in the application and the current mode (drawing, editing, zooming, etc.).

There are 18 different arrangements of the mouse buttons. Each arrangement is central to using various features of L-Edit.

Arrangement 1

For example, in the figure below, the mouse buttons have the following functionalities:

- **Select** (left).
- **Move-Edit** (middle).
- **Select** (right).



This arrangement of buttons occurs when the pointer has been selected in the Drawing toolbar and the pointer is in the Work Area. With two-button mice, the middle button function is emulated by clicking the left and right buttons simultaneously. Holding the **Alt** key switches the middle mouse button function to the left button.

The **Select** buttons act as toggles to select or deselect objects. A selected object appears with a dark line around its perimeter. When the object is deselected, the dark line disappears.

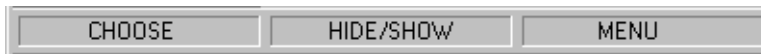
You can move a selected object by depressing the **Move-Edit** button and dragging the object.

Pressing the **Alt** key gives you the option to deselect objects. For more information, see [Selecting and Deselecting Layout](#).

Arrangement 2

If the pointer is over the Layer Palette, the Mouse Buttons bar displays the following:

- **Choose** (left).
- **Hide/Show** (middle)
- **Menu** (right).



Clicking the **Choose** button over a Layer Palette layer icon chooses that layer as the current layer.

Clicking the **Hide/Show** button:

- Will hide objects on the selected layer if the layer is visible.
- Will show objects on the selected layer if the layer is hidden.

If the **Ctrl** key is held, the middle button turns into the **H/S All** button. Clicking the **H/S All** button:

- Will hide all objects except those on the selected layer.
- Will show all objects on all layers.

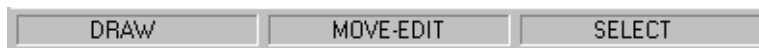
Clicking the **Menu** button opens a context-sensitive menu. See [Hide/Show Layers from the Layer Palette](#) for more information on this menu.

Arrangement 3

When one of the drawing tools is selected in the Drawing toolbar and the pointer is in the Work Area, the Mouse Buttons Bar displays the following:

- **Draw** (left).
- **Move-Edit** (middle).
- **Select** (right).

The **Select** mouse button acts as a toggle to select objects.



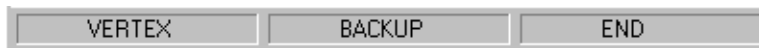
Holding the **Draw** button and dragging the pointer in the Work Area initiates the creation of an object of the type selected in the Drawing toolbar.

When you drag the pointer, you create a line for every drawing object in the Drawing toolbar except for the circle and the box and port. In the case of a circle, dragging the drawing cursor establishes the radius of your circle. When you release the **Draw** button, your circle is finalized. For boxes, dragging the pointer establishes the upper left and lower right of the box.

To move a selected object, hold the **Move-Edit** button and move the mouse. To edit a selected object, double-click on the **Move-Edit** button to open the dialog for editing an object of that type (see [Textual Editing](#)).

Arrangement 4

As you begin to draw polygons or wires, the mouse buttons change as follows.



Your **Draw** button has changed into the **Vertex** button. When you release this button, you create a vertex for the object you are drawing. Dragging the pointer creates a new line, and the figure you are drawing appears. You complete your figure by drawing lines and clicking the **Vertex** button as many times as is necessary to complete your figure.

The **Backup** button deletes the last vertex that you created. After deleting a vertex, you can then continue to draw your object by following the procedure just outlined.

When you have completed your drawing, click the **End** button.

Zoom Mouse Buttons

The **View > Zoom > Mouse** command changes the functions of the mouse buttons for a single operation. See [Mouse-Controlled Viewing](#) for more information.

Moving the Mouse Buttons Bar

The Mouse Buttons bar can be moved to another location (see [Moving Toolbars](#)).

The Locator

In default mode, the Locator provides the location of the pointer relative to the absolute origin in Locator Units. You can set the Locator Unit to any physical unit relationship in the **Technology** and **Grid** tabs of the **Setup Design** dialog.

Through the relationship that you set up between Locator Units and physical units, you can indirectly determine physical lengths in your layout. For example,

if 1 Locator Unit = 1 micron, then a location of (a, b) refers to coordinates in Locator Units and also indirectly in microns.

`{-15, 10}`

Moving the Locator

The Locator can be moved to another location (see [Moving Toolbars](#)).

Relative Coordinate Display

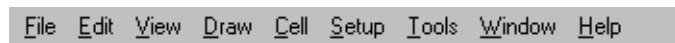
When **Q** is pressed once, the Locator changes to Relative Coordinate Display mode. The Relative Coordinate Display presents the coordinates of the pointer relative to the position where the pointer was when **Q** is pressed. The display toggles back to the Locator mode.

This display also presents the distance in Locator Units.

In the Relative Coordinate Display, the pointer position is displayed in brackets `[]` rather than in parentheses `()`.

Menu Bar

The *Menu bar*, the horizontal space at the top of the screen, contains the titles of the L-Edit command menus.



Following is a description of the menu bar when at least one TDB file is open.

File	Commands for creating, opening, saving, and printing files.
Edit	Commands for copying, deleting, selecting, finding, and textual editing.
View	Commands for expanding, contracting, and shifting the view.
Draw	Commands for transforming design elements.
Cell	Commands for creating, manipulating, and instancing cells.

Setup

Commands for customizing setup parameters for the application, design, layers, color palette, and tools.

Tools

The integrated layout tools.

Window

Lists.

- Display options: cascade, tile horizontally, tile vertically the windows.
- Arrange icons option, that places minimized window icons at the bottom of the application window.

Active window has a check on left of its title.

Help

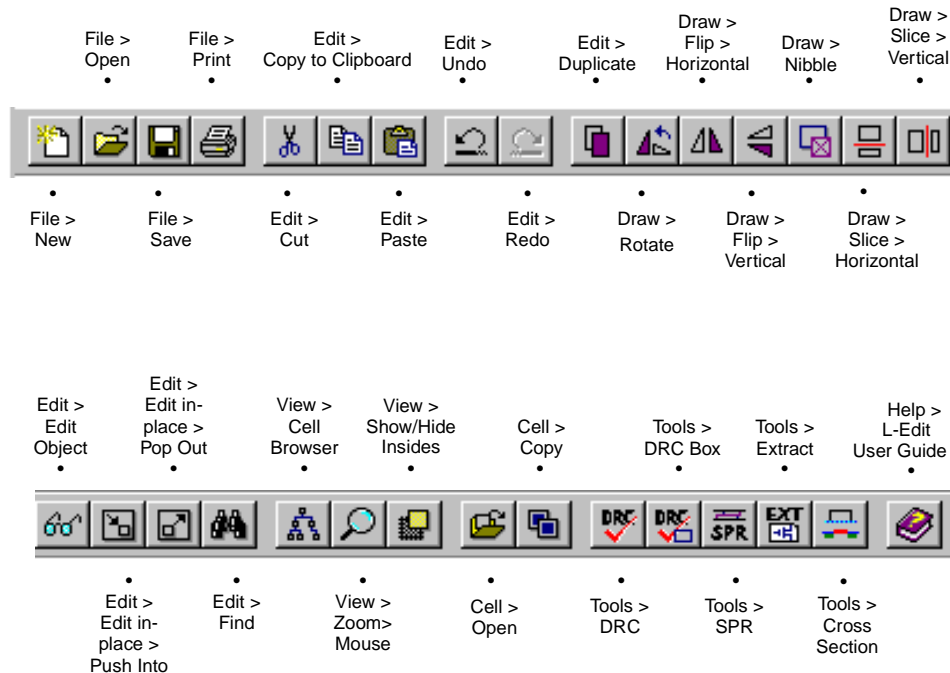
Commands for accessing on-line help and general information about L-Edit and Tanner EDA.

Title Bar

Above the Menu bar is the *Title bar*, which indicates the current file.

Standard Toolbar

Below the Menu bar is the *Standard toolbar* which provides buttons representing the most commonly used menu commands.



Moving the Standard toolbar

The Standard bar can be moved to another location (see [Moving Toolbars](#)).

Status Bar

The *Status bar*, at the bottom of the L-Edit window, is activated or deactivated by toggling the **Status Bar** option with **View > Status Bar**. The Status bar displays context-sensitive information about items in the interface.

The Status bar contains two panes. The left pane displays regular L-Edit status as indicated in the following table.

<i>Action</i>	<i>Description</i>
When the pointer is in the Layer Palette.	The name of the layer pointed to, and for generated layers the Boolean formula for that layer.
When the menu item is highlighted.	A list of the menu's commands.
When a single object is selected.	The type, layer, and size of the object, and, for cell instances and arrays, the name of the instanced cell.
When multiple objects are selected.	The count by type of the selected items (for example, 4 boxes, 1 circle, 3 ports, and 1 instance).
When the pointer is in the Drawing bar.	The function of the pointed-to tool.

<i>Action</i>	<i>Description</i>
When the pointer is in the Shortcut toolbar.	The function of the pointed-to shortcut button.
Otherwise.	Ready.

L-Edit Mode

The L-Edit mode is displayed on the right side of the Status bar. The possible modes are:

- Drawing (default).
- Nibble.
- DRC Box.
- Zoom Box (for **View > Zoom > Mouse** command).

Layout Area

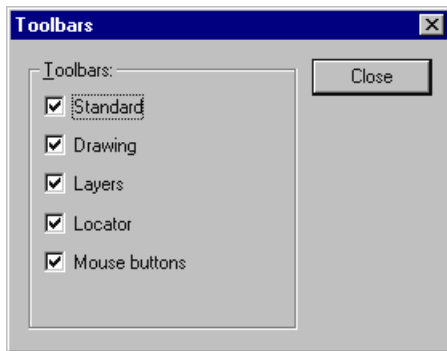
The area for layout is called the *Layout Area*. L-Edit uses *Internal Units* (30-bit signed integers) to construct a coordinate system in the Layout Area. The Layout Area extends from -536,870,912 to +536,870,912 Internal Units in both the *x* (horizontal) and the *y* (vertical) directions.

The origin (0,0) is optionally indicated with a cross-hair marker, and the position of the pointer is indicated by the Locator (not in internal units but in *Locator Units*, which are user-defined in terms of internal units).

Absolute physical units, such as microns, are related to Locator Units. For example, if 1 Locator Unit = 1 internal unit and 1 Locator Unit = 0.001 micron, then the largest possible design is 1,073,741 microns (almost 42.3 inches) on a side.

Viewing Toolbars

Use the **View > Toolbars** command to toggle the visibility of toolbars.

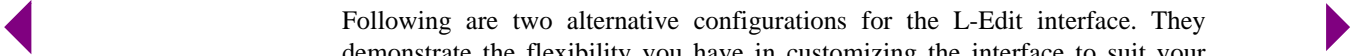


You can show and hide toolbars through a context-sensitive menu that is similar to the dialog activated through the **View > Toolbars** command. The menu is activated by clicking the right mouse button once anywhere in a toolbar area.

Moving Toolbars

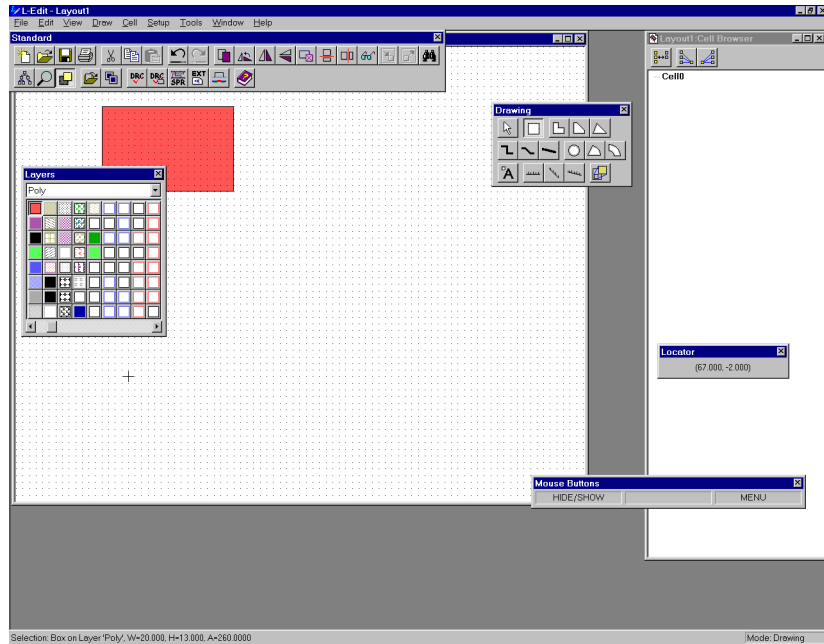
A toolbar can be undocked by double-clicking on one of its edges and then dragged it to another position. L-Edit maintains whatever changes you make to a toolbar's location. All toolbars are resizable except for the mouse definition bar.

Sample Interface Scenarios

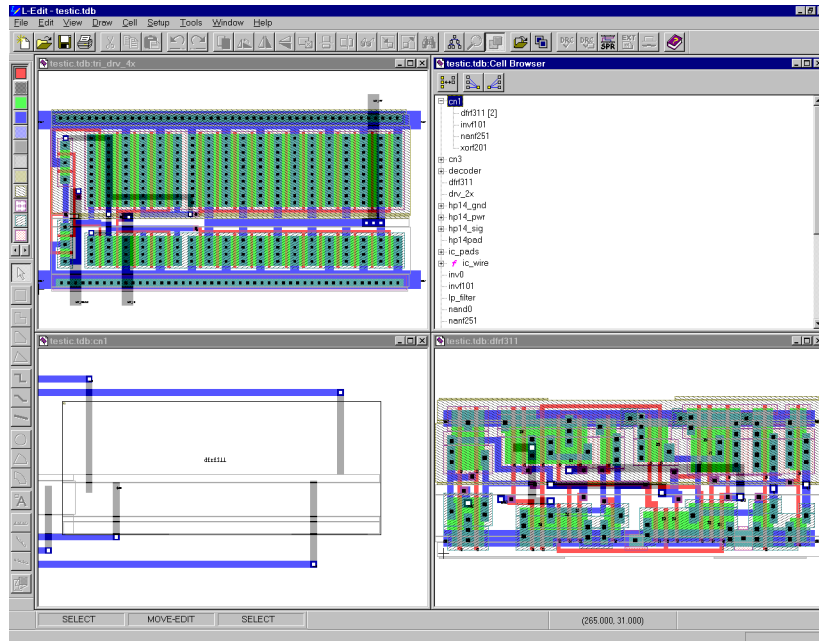


Following are two alternative configurations for the L-Edit interface. They demonstrate the flexibility you have in customizing the interface to suit your needs.

Floating Toolbars



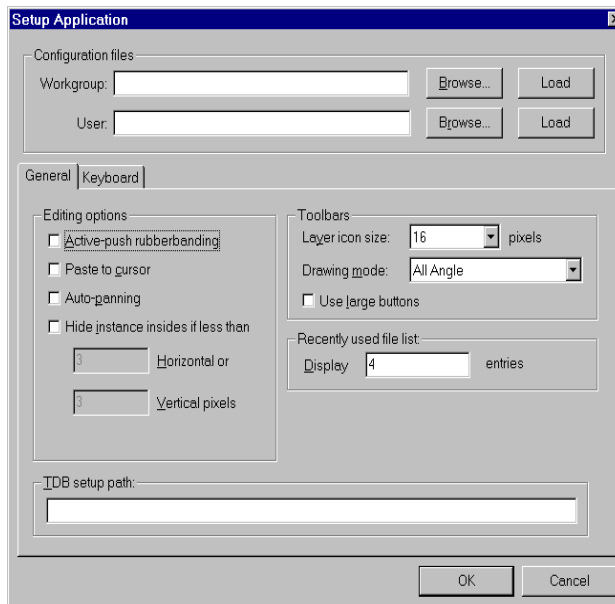
Simultaneous Display of Different Cells and Cell Browser



Application Parameters

Application settings are modified with the **Setup > Application** command.

A **Setup Application** dialog appears below.



General

The **General** tab allows you to set parameters in the following areas:

- **Configuration files: Workgroup and User** (personal).
- **Editing options.**
- **TDB setup path.**
- **Toolbars.**
- **Recently used file list** (number of file names displayed).

All changes made to any of the parameters can be saved to the user configuration file specified in the dialog.

The default settings for the **General** tab are shown on the previous page.

Configuration Files

You can specify locations for ASCII configuration files in the **Setup > Application** dialog that store application-wide settings such as keyboard customization.

- The workgroup configuration file is loaded first.

- Settings from the user configuration file override settings from the workgroup configuration file.
- Changes made to the application-wide parameters in the **Setup Application** dialog will be saved to the personal configuration file.

Editing Options

The editing options that can be set in the **Setup Application** dialog are described below.

<i>Option</i>	<i>Description</i>
Active-push rubberbanding	When on, a mouse button does not need to be held down during a drag. For example, when drawing a box, you can click and release the Draw (left mouse) button to start the box, move the pointer to the opposite corner of the box, then click the Draw button again to complete the operation.
Paste to cursor	When on, when the Edit > Paste command is executed, the contents of the paste buffer appear in the Layout Area but move with the pointer until any mouse button is clicked, at which location they are “dropped” into place. Before they are “dropped,” the objects may be rotated or flipped from the keyboard (R, H, V).

<i>Option</i>	<i>Description</i>
Auto-panning	When on, L-Edit automatically pans the view when the pointer touches an edge of a cell window containing layout during a draw, move, or edit operation.
Hide instance insides if less than	This parameter defines the minimum size (in pixels) that an instance must have to be drawn to the screen. If the width of the instance is smaller than the Horizontal parameter <i>or</i> the height of the instance is smaller than the Vertical parameter, then the instance is drawn in outline mode (that is, its insides are not shown). Suppressing the display of instances decreases screen redraw times and serves to clarify the layout if the screen is zoomed out to a relatively small magnification.

TDB Setup Path

In this box, you can specify directories that are searched for TDB files to be used as setup files when creating new files or importing CIF/GDSII files.

Toolbars

The **Toolbars** options that can be set in the **Setup Application** dialog are described below.

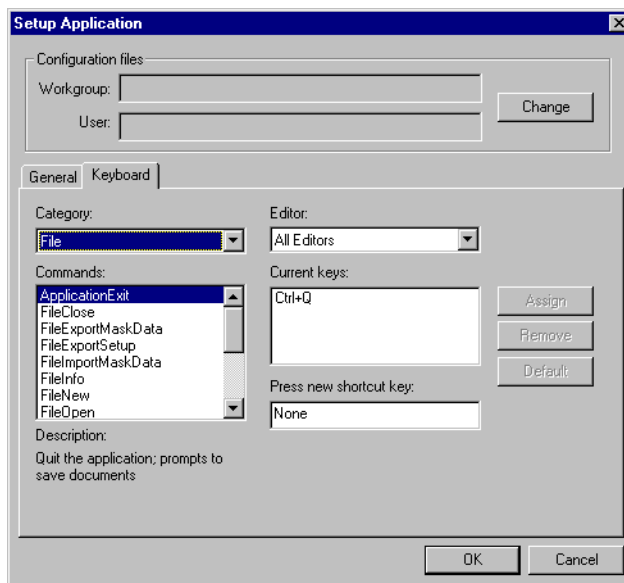
<i>Option</i>	<i>Description</i>
Use large buttons	Indicates the size of the buttons displayed in <i>all</i> toolbars in L-Edit.
Layer icon size	The size of layer icons in the Layer Palette.
Drawing mode	Specifies the tool buttons visible in the Drawing bar.

Recently Used File List

Sets the number (up to 16) of recently used file names displayed in the **File** menu.

Keyboard Customization

The **Keyboard** tab allows you to customize keyboard shortcuts.



Shortcut Keys

Shortcut keys are customized on a per-editor basis. There are three options in L-Edit:

- **Layout** (layout editor).
- **Text** (built-in text editor).
- **All Editors** (layout and text editors).

Any shortcut key assigned in **All Editors** is available in both layout and text editor. Keys assigned in only the text or layout editor are not available in the other editor.

Category

The **Category** drop-down list contains a list of menu titles. When you select a category, L-Edit lists every command that appears under that menu. When you select a command, L-Edit displays the current shortcut in the **Current keys** field.

When in layout or text editor, **All Editors** shortcuts are displayed in gray and can only be removed from **All Editors** directly.

Removing Current Keys

You can select a key from the **Current Keys** list and then click on the **Remove** button to remove the shortcut.

Creating a Shortcut

To create a shortcut:

- Select the editor in which the shortcut will be active from the **Editor** drop-down menu.
- Select the menu category that contains the command for which you want a shortcut from the **Category** drop-down menu.
- Select the command from the **Commands** menu. A description of the command appears below the **Commands** menu.
- Type the shortcut in the **Press new shortcut key** field. A note will appear under the **Press new shortcut key** field letting you know if the proposed shortcut is currently assigned.
- Press the **Assign** button, which is enabled once the shortcut has been entered.

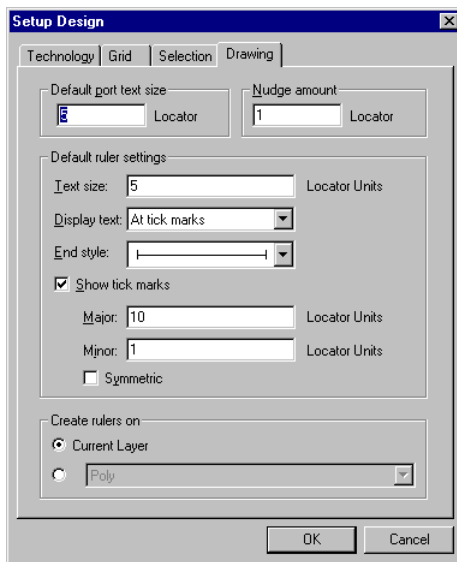
The **Default** button allows you to remove all custom key assignments for a selected editor.

Click **OK** to confirm your custom keyboard assignments, or click **Cancel** to exit the dialog without saving changes.



Drawing Parameters

Various TDB parameters can be modified in the **Drawing** tab of the **Setup Design** dialog. Access this tab with the **Setup > Design** command. The **Drawing** tab is displayed below.



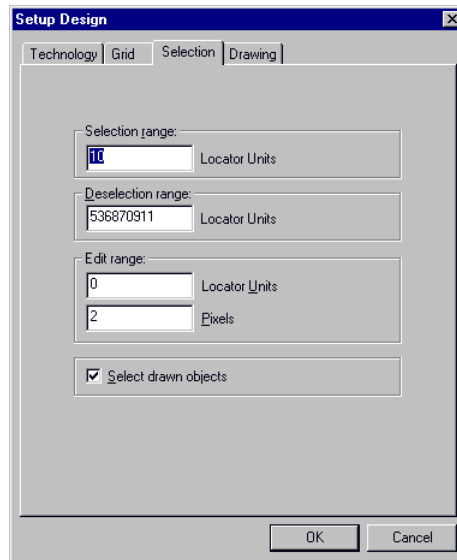
The **Setup File** dialog is used to set the following items:

Default port text size	Default text size in Locator Units for ports.
Nudge amount	Amount (in Locator Units) to nudge objects during the nudge operation.
Default ruler settings	These settings are used when creating new ruler objects.

For more information on these items, see [Setup Design – Drawing](#). All settings are in Locator Units. The default settings are shown in the figure on the previous page.

Selection Parameters

Selection parameters are modified in the **Selection** tab of the **Setup Design** dialog. Access this tab with the **Setup > Design** command. The **Selection** tab is displayed below.



The options are as follows.

Selection range

A positive integer s such that: if the pointer is *outside* an object but is still within s Locator Units of any of the object's edges, then the object can still be selected.

When multiple objects are within the selection range, L-Edit determines which object to select using the following priority: (1) objects the pointer is *inside*, ordered by the closest edge; (2) objects the pointer is *outside*, yet still within the selection range, ordered by the closest edge.

Deselection range

A positive integer d such that: if a mouse button is clicked (for example, to initiate a move, edit, or copy operation) when the distance between the pointer and a selected object is greater than d Locator Units, then the selected object is *deselected*. The deselection range is set by default to the largest possible number (to indicate infinity), so that a selected object is never automatically deselected.

Edit range

A positive integer e such that: if the pointer is within e Locator Units of an edge or vertex of the selected object, then clicking the **Move-Edit** mouse button will execute the edit operation; otherwise it is a move operation. Two numbers are supplied: one in Locator Units, the other in pixels. e takes the value that results in a larger on-screen distance.

Select drawn objects

If this option is checked, L-Edit automatically selects an object after it is created. This is useful for designers who like to position or edit objects after creating them, rather than while drawing them.

Technology and Grid Parameters

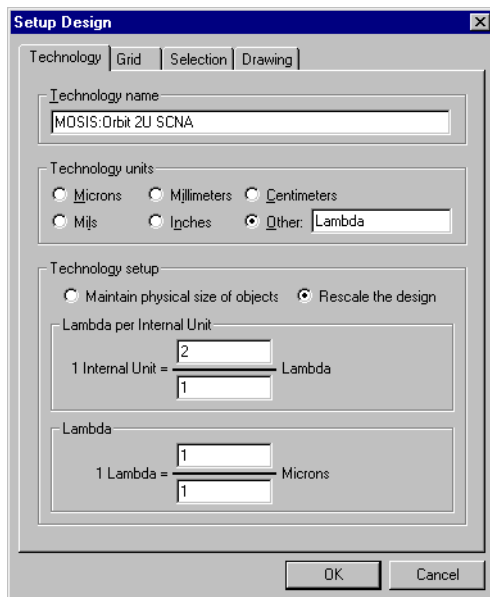
The relationship between L-Edit Locator Units and *physical* or *technology* units must be specified if your design is to be exported (to your fabricator, for example, or to other software).

One Locator Unit might be made equivalent to one-thousandth of a micron, or one mil, or even one inch. Your specification should be made before you begin your design, as it will determine the smallest object that can be drawn. Changing this relationship is equivalent to *scaling* the design file.

The Locator Unit to physical unit relationship is set in the **Technology** and **Grid** tabs of the **Setup Design** dialog. Access this dialog with the **Setup > Design** command. To set up the Locator Unit to physical unit relationship, you first have to set the Internal Unit to physical unit relationship. This is done in the **Technology** tab. The Internal Unit to Locator Unit relationship is set in the **Grid** tab.

Technology

The **Setup Design** dialog with the **Technology** tab displayed is shown on the next page.



The screenshot shows the 'Setup Design' dialog box with the 'Technology' tab selected. The 'Technology name' field contains 'MOSIS:Orbit 2U SCNA'. Under 'Technology units', the 'Other' radio button is selected with 'Lambda' in the adjacent text box. Under 'Technology setup', the 'Rescale the design' radio button is selected. The 'Lambda per Internal Unit' section shows a fraction with '2' in the numerator and '1' in the denominator, followed by the unit 'Lambda'. The 'Lambda' section shows a fraction with '1' in the numerator and '1' in the denominator, followed by the unit 'Microns'. At the bottom are 'OK' and 'Cancel' buttons.

Setup Design

Technology | Grid | Selection | Drawing

Technology name
MOSIS:Orbit 2U SCNA

Technology units
☐ Microns ☐ Millimeters ☐ Centimeters
☐ Mils ☐ Inches ☒ Other: Lambda

Technology setup
☐ Maintain physical size of objects ☒ Rescale the design

Lambda per Internal Unit
$$1 \text{ Internal Unit} = \frac{2}{1} \text{ Lambda}$$

Lambda
$$1 \text{ Lambda} = \frac{1}{1} \text{ Microns}$$

OK Cancel

The parameters are discussed in the following table.

Technology name	Used by L-Edit to determine whether two design files are compatible. If you attempt to copy a cell from a file with a technology name different from that of the current cell, then a warning is presented.
Technology units	A technology is described by a specific unit of measurement. Select one of the predefined units (Microns , Mils , Millimeters , Centimeters , or Inches), or a custom unit (Other). If you choose a custom unit, then you must also specify its equivalent in microns and in Locator Units (for CIF/GDS II output, design rule checking, and other purposes) under Technology Setup . See CIF Files or GDS II Files for more information.

Technology setup - Maintain physical size of objects

With this radio button enabled, all objects in cells and unit-specific parameters in other L-Edit dialogs are checked to determine if the layout will be truncated when the rescaling is performed. All coordinates and dimensions of objects are stored in Internal Units. The Internal Units are rescaled to maintain the physical size of the object based on the previous relationship of physical units to Internal Units. Warnings may be presented, one for each cell and set of parameters, if a truncation will occur. If **Yes** is answered to all the warnings, or if no truncation will occur, then the rescaling is performed. If **No** is answered to any of the warnings, then the rescaling operation is cancelled and the **Technology** dialog reappears.

Technology setup - Rescale the design

If this radio button is enabled, all objects in cells and unit-specific parameters in other L-Edit dialogs are rescaled in accordance with the changes to the Internal Units per Technology Units relationship. The internal unit representation of all coordinates and dimension of objects does not change. However, the relationship of Internal Units to physical units changes, effectively rescaling the design.

Technology setup - Technology Units per Internal Units

The relationship defined between Internal Units and physical units. Also, for custom units, the relationship defined between microns and the custom unit.

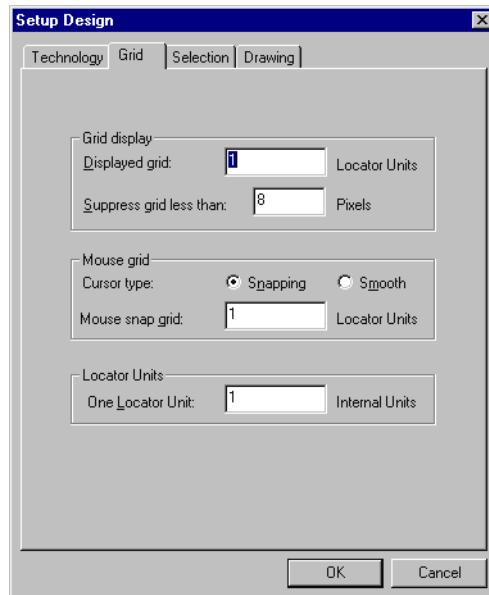
For example, you might choose to define one Internal Unit as one foot (= 12 inches \times 304800 microns). Under **Technology Units**, click **Other** and enter “Foot” as the name of the unit. Then, under **Technology Setup**, define **1 Internal Unit = 1/1 Foot** and **1 Foot = 304800/1 Microns**.

Grid

To aid the viewing, drawing, and editing of objects, L-Edit provides three independent *grids* — the displayed grid, the mouse snap grid, and the locator coordinate system — each of which divides the Layout Area into equal squares whose corners are gridpoints.



- The mouse snap grid determines the pointer's freedom of movement.
- The locator coordinate system are the units in which positions, sizes, and distances are reported.

Grid parameters are specified on the **Grid** tab on the **Setup Design** dialog.



Displayed grid

The absolute spacing of the displayed grid. The value entered in this field is the length, in Locator Units, of a grid square side.



Suppress grid Less than	The apparent spacing of the displayed grid varies with the magnification of the Layout Area. If the number of screen pixels per grid square side falls below the value entered in this field, then the grid is hidden.
Cursor type: Snapping	Sets the only possible positions of the pointer to be at the mouse snap gridpoints.
Cursor type: Smooth	Sets the pointer's position to be unconstrained.
Mouse snap grid	The absolute spacing of the mouse snap grid. The value entered in this field is the length, in Internal Units, of a grid square side.
One Locator Unit	The value entered in this field is the number of Internal Units equivalent to one Locator Unit. Locator Units are the units in which distances and sizes are reported. The Status Bar and Locator show dimensions in Locator Units.

Rescaling by Changing the Technology Units

The following examples illustrate how L-Edit performs rescaling.

Example 1: You are designing for a 2-micron CMOS process (where transistor gate lengths must be at least 2 microns across). Using **Microns** as the Technology

Unit, with 1 Internal Unit = 1/1 microns in the **Technology** tab and 1 Locator Unit = 1 Internal Unit in the **Grid** tab, you have drawn a 10x10 rectangle — that is, a rectangle with 10 Locator Units = 10 microns on a side.

You now decide that you would rather fabricate your design using a 1-micron CMOS process (where transistor gate lengths must be at least 1 micron across). So you change the definition of a Locator Unit by changing 1 Internal Unit = 1/2 micron in the **Technology** tab.

However, you check the **Rescale the design** radio button. The result is that the original rectangle is still 10 Locator Units on a side, but since you have changed the definition of a Locator Unit (1 Locator Unit = 1/2 micron), the rectangle is only 5 microns on a side. You have effectively scaled the rectangle by a factor of 1/2.

Example 2: Again, using **Microns** as the Technology Unit, with 1 Internal Unit = 1/1 microns and 1 Locator Unit = 1 Internal Unit, you have drawn a 10x10 rectangle — that is, a rectangle 10 Locator Units = 10 microns on a side.

Now you discover that you need to draw a rectangle only 1/2 micron square. This cannot be done with the current technology settings, since objects cannot be drawn with dimensions smaller than 1 Locator Unit. You change the definition of a Locator Unit such that 1 Locator Unit = 1/2 micron by changing 1 Internal Unit = 1/2 micron in the **Technology** tab.

You *do* enable the **Maintain object size in Internal Units (Re-scale)** radio button. The result is that the original rectangle is now 20 Locator Units on a side, but it is still only 10 microns on a side.

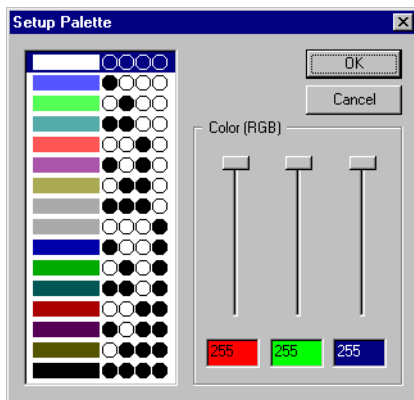


Color Parameters

The L-Edit color palette contains 16 colors. Each color has two attributes:

- A unique 4-bit identifying *code*.
- The amount of the three color components (red, green, and blue).

Color palette parameters are modified with the **Setup > Palette** command.



Following is a description of the options of the **Setup Palette** dialog.

Left side

The numbers from 0 to 15 are represented by 4-bit codes (for example, ●○●○ = 5). Each code is associated with a color, represented by the sample bar to the left of the code.

Color (RGB)

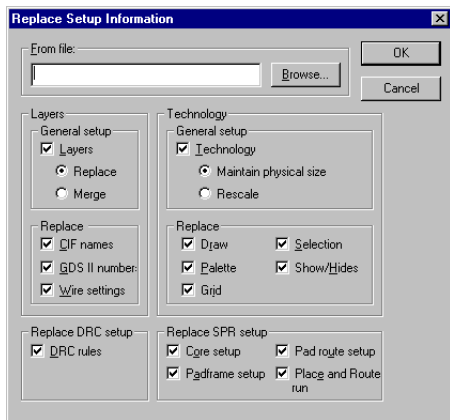
Click the colored box or code to display the corresponding color's composition as a function of **Red**, **Green**, and **Blue**. Each component can be one of 256 levels from 0 to 255. Any component's level can be changed by moving the slider bar. Changing any component's level changes the overall color.

Color Palette Limitations

You can open as many files in L-Edit as you wish. Each file that you open will have a color palette associated with it. The first 13 files will display with true colors. If you attempt to open a fourteenth file, you will be warned that the Windows color resource limit has been reached, and the color palette information in the new file will not be used but the color palette of one of the other opened files will be used.

Replacing the Setup

The **File > Replace Setup** command transfers setup information from a file (the *source* file) to the current file (the *destination* file). You can type in the name of the source file or select it using the **Browse** button. Most of the setup options are toggled using check boxes.



There are four major categories for which information can be transferred: **Layers**, **Technology**, **Replace DRC setup**, **Replace SPR setup**.

Layers

There are two sections in the Layers area of the **Replace Setup Information** dialog. They are **General Setup** and **Replace**.

General Setup

Check the **Layers** check box in this section if you want to replace the layers in your file.

You can **Replace** the layer-related information in the destination file with that from the source file, or you can **Merge** the information of the two files. You choose one of these options by selecting the appropriate radio button. The two options have very different effects.

- *Replacing* deletes the layers from the destination file and adds the new layers from the source file.
- *Merging* adds the layers in the source file after the layers in the destination file. If there is a layer of the same name in the source and destination files, the position of the common layer is that of the destination file.

For example, the source file contains the layers A, B, C (in that order), while the destination file contains the layers B, D, E (in that order). After *replacing*, the destination file contains the layers A, B, C. After *merging*, the destination file

contains the layers B, D, E, A, C. (The destination file's information on layer B is replaced with the source file's information on layer B.)

Replace

Check the appropriate check box in the **Replace** section of the **Layers** area in the **Replace Setup Information** dialog to replace: **CIF names**, **GDS II numbers**, or **Wire settings**. These parameters are set in the **Setup Layers** dialog (see [Layer Setup](#)).

Technology

There are two sections in the Technology area of the **Replace Setup Information** dialog. They are **Technology** and **Replace**.

Technology

In this section you can replace the following setup information:

- **Technology** (see [Technology and Grid Parameters](#)).

If you copy over the technology scaling parameters, then you can choose to rescale everything in the destination file or you can have objects maintain their original physical dimensions.

Replace

In this section you can replace the following setup information:

- **Draw** (see [Drawing Parameters](#)).
- **Palette** (see [Color Parameters](#)).
- **Grid** (see [Grid](#)).
- **Selection** (see [Selection Parameters](#)).
- **Show/Hides** (View settings for grid, origin, ports, etc.).



Replace DRC Setup



When this option is on, the design rules will be replaced (see [Design Rule Sets](#)).

Replace SPR Setup

In this section you can replace the following setup information:

- **Core setup.**
- **Padframe setup.**
- **Pad route setup.**
- **Place and Route run.**

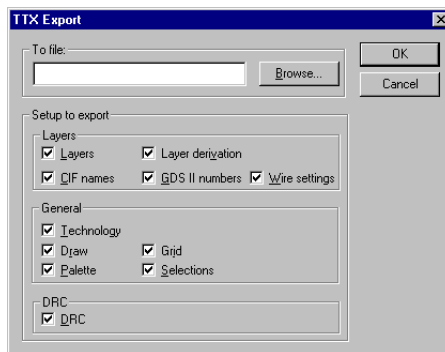
These parameters are set in the **SPR Setup** and **Standard Cell Place and Route** dialogs (see [SPR Setup](#) and [Running SPR](#)).



Exporting the Setup in Text Format

The **File > Export Setup** writes the setup information in text format to a file.

You can type in the name of the destination file or select it using the **Browse** button. The setup options are toggled using check boxes.



There are three categories in the **Setup to export** section of the **TTX Export** dialog. They are: **Layers**, **General**, and **DRC**. Details on the various setup options are available in **File > Export Setup**.

Getting Help

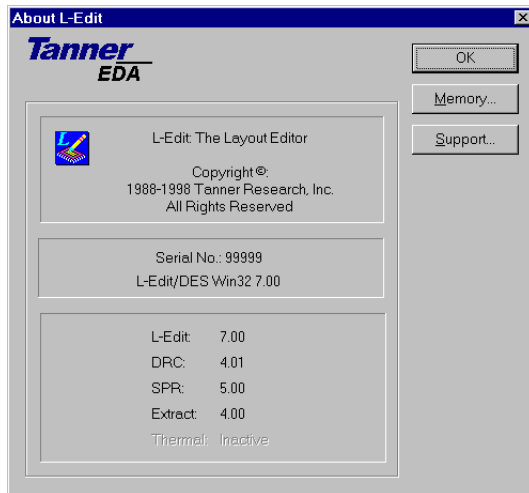
There are two commands associated with the Help menu.

L-Edit User Guide

The L-Edit User Guide is accessed with the **Help > L-Edit User Guide** command.

About L-Edit

The **Help > About L-Edit** command provides program information, including how to contact Tanner EDA technical support.



Clicking the **Memory** button displays system information and computer memory availability. Clicking the **Support** button displays information on how to contact Tanner EDA Technical Support.

Exiting L-Edit

To exit L-Edit, use the **File > Exit** command. If any changes made to the file have not been saved, you will be prompted to save the changes.

