

PinEditor (non-MVN) v6.3 User's Guide



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Table of Contents

PinEditor (non-MVN)	5
Starting PinEditor	5
Components of PinEditor (non-MVN)	5
Package window	7
Colors and symbols.....	7
Assigned and Unassigned list boxes	7
I/O Attribute Editor window.....	8
World View window.....	8
Status bar	8
Assigning pins	9
Unassigning pins	9
Locking and unlocking pins	10
Closing and committing pin assignments.....	10
Customizing Assigned and Unassigned list boxes.....	11
Scripting commands.....	11
Assigning I/O macros	11
Editing multiple rows	12
Sorting I/O attributes.....	12
Common I/O attributes (All Families).....	12
Setting an I/O standard.....	13

Setting the power-up state	13
Setting the Slew	13
Specifying capacitance.....	13
Specifying I/O Threshold	14
Setting hot swap	14
Specifying Loading.....	14
Menus, Toolbar Buttons, and Shortcut Keys	15
File menu	15
Edit menu	15
View menu	16
Help menu	16
Contacting Actel	17
Technical Support	17
Customer Service.....	18

PinEditor (non-MVN)

PinEditor is a graphical application for assigning I/O ports to package pins.

Note: PinEditor (non-MVN) supports only the SX, MX, 3200DX, ACT3, ACT2, and ACT1 families. If you are designing for other, newer families, use PinEditor in MultiView Navigator. See the MultiView Navigator User's Guide for more information.

Use PinEditor to:

- Assign I/O macros to pins
- Lock pin assignments that have been automatically assigned during layout
- View and print pin assignments
- Assign I/O standards to banks (for families that use I/O banks)
- Edit I/O attributes
- Assign VREF pins (for I/O standards that require an input reference voltage)

Starting PinEditor

To start PinEditor from Designer, either click the **PinEditor** icon in the Designer Design Flow window, or from the **Tools** menu, choose **PinEditor**. PinEditor displays the pins and I/O macros in your design.

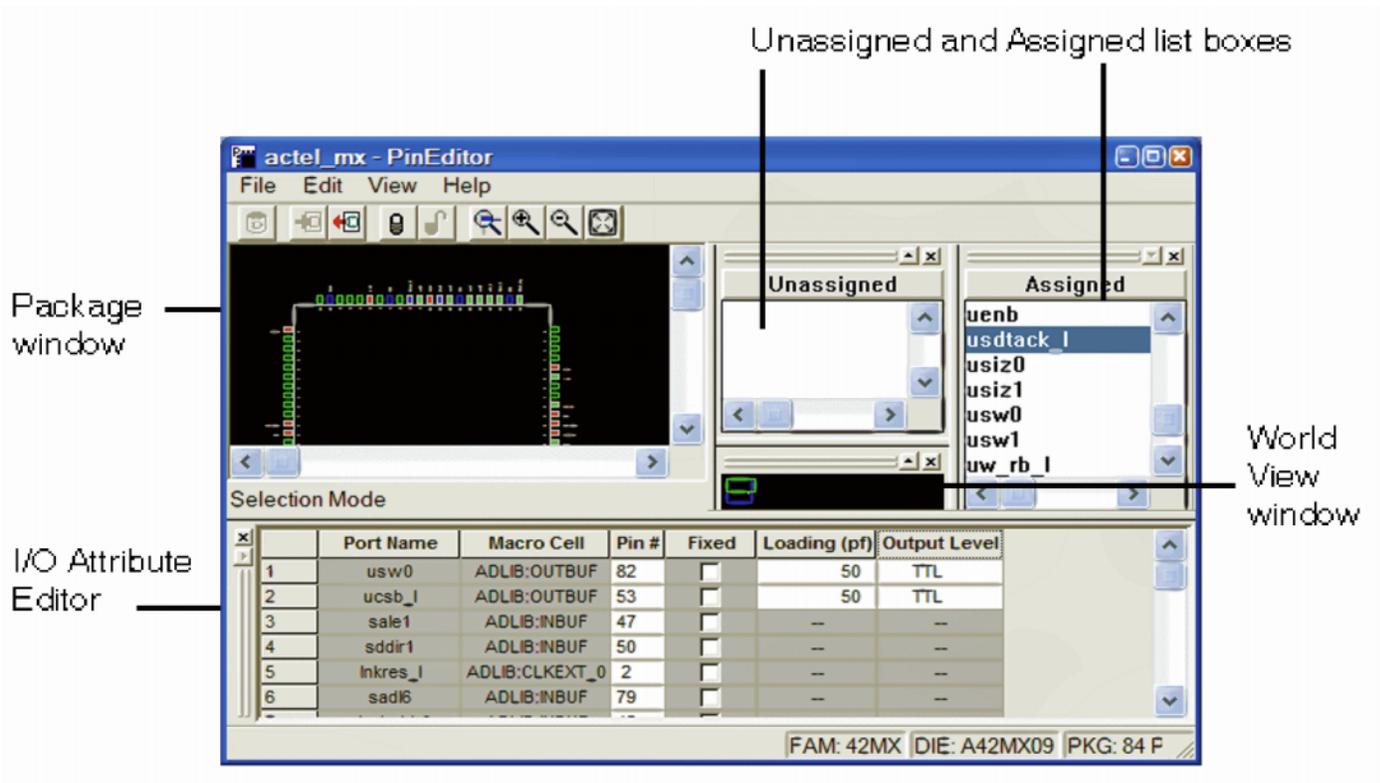
Components of PinEditor (non-MVN)

The PinEditor interface is divided into five windows:

- Package window - view your design elements
- Assigned list box - displays macros currently assigned to pins
- Unassigned list box - displays unassigned macros
- World view window - select the area of the design to display in the Package window
- I/O Attribute Editor - view, sort, select, and edit I/O attributes

These windows are highly integrated; anything selected in one is selected or highlighted in all. Commands are accessible from the menu bar and frequently-used commands are on the toolbar.

All the windows and toolbars are independently sizeable, dockable, and closable. To redock or refloat a window, double-click the window's title bar.



PinEditor (non-MVN) Interface

Note: On UNIX systems, floating windows are not sizeable once undocked, and the I/O Editor does not float.

Package window

The PinEditor (non-MVN) Package window displays a graphical interpretation of the pin locations for your selected package type.

The **Package window** is integrated with PinEditor windows and list boxes. If you select an assigned pin in the Package window, the pin location is highlighted in the **World View** window and the I/O macro name is selected in the **Assigned** list box and the **I/O Attribute Editor**.

The Package Window displays detailed information about each pin, including:

- Pin number
- Special pin properties, such as JTAG, clock, ground, or power
- Assigned I/O macro name, if any
- Pin type, represented by color

Colors and symbols

Colors and symbols differentiate the pin and logic I/O macro assignments in PinEditor. The following table indicates the default colors assigned to pins.

Color/Symbol	Definition
White border	A white border denotes a selected, assigned pin.
Green	A green border with a black center denotes a regular, unassigned pin. A pin with a grey or yellow border and a green center denotes a regular, assigned pin.
Blue	A blue border with a black center denotes a special, unassigned pin. A pin with a grey or yellow border and a blue center denotes a special, assigned pin. Special pins are pins that have some additional meaning to them. For example, pins used for JTAG are blue. When unassigned, special pins have additional descriptive text next to the pin number.
Grey with red center	Reserved pin. You use this pin for some specific purpose on the package, and you cannot assign it an I/O macro. Examples of such pins are ground and power.
Yellow	Yellow denotes <i>locked</i> assignments. If the assignment is selected, the symbol appears yellow. If the assignment is unselected, the border appears yellow.
Grey/black	A pin with a grey border and a black center denotes a pin that is not connected. You cannot use these pins, and they have no meaning.

Assigned and Unassigned list boxes

The Assigned and Unassigned list boxes display assigned or unassigned I/O macros in the design. By default, all assigned I/O macros are displayed in the Assigned list box and all unassigned I/O macros are displayed in the Unassigned list box.

You can filter which pins are displayed in these list boxes. To customize the Assign and Unassign list boxes, from the **View** menu, choose **Configure List Boxes**.

See Also

[Customizing Assign and Unassign list boxes](#)

[Assigning pins](#)

I/O Attribute Editor window

The I/O Attribute Editor window appears below the Package and World View windows. It functions much like a spreadsheet with sort, copy, and paste capabilities. This editor allows selection of variables such as I/O Standard, I/O Threshold, slew rate, and I/O Power-Up State, depending on the family targeted. You can also enter the capacitance of the load being driven. You can lock assigned pins for subsequent place-and-route runs allowing parallel development of the printed circuit board (PCB).

Use the I/O Attribute Editor to view, sort, select, and edit these attributes. Double-click a column heading to sort by that attribute. If you select a macro in the Assigned or Unassigned list box, it will also appear selected in the I/O attribute editor.

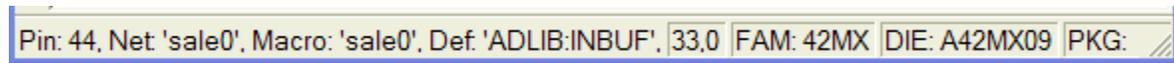
World View window

The World View window's default location is under the Assigned list box. Use the World View window to control which portion of the package is displayed in the Package window. The blue rectangle (known as the Package rectangle) represents the package. The green rectangle (known as the Viewing rectangle) represents the currently displayed area in the Package window.

To display another part of the package, use the left mouse button to drag the **Viewing rectangle** to the area on the **Package rectangle** you would like to display. To specify a new display area, use the right mouse button to drag out a new **Viewing rectangle** on the **Package rectangle**.

Status bar

Family, die, and package information appears in the right corner of the status bar. Additionally, the status bar displays information on commands, pins, and error messages.



To see other information in the status bar:

- Hold your mouse over a pin in the **Package** window to see the pin number, instance name, macro cell, and locked or unlocked status.
- Hold your mouse over a toolbar button or a menu command to see a short description of that command.
- Error messages provide details about invalid assignment attempts. Choose **Extended Error Message** from the **Help** menu for more information.

Assigning pins

Use PinEditor to make and edit I/O macro pin assignments. Edits you make in PinEditor are permanent, provided they are locked and have been committed.

To assign an I/O macro to a pin:

1. Select the macro name in the **Unassigned** list box. The macro is simultaneously selected in the **I/O Attribute Editor**.
2. Assign the selected macro to a pin location using any one of these methods:
3. Drag the selected macro name from the **Unassigned** list box to the pin location in the **Package** window. Valid pin locations are highlighted in the **Package** Window.
4. From the **Edit** menu, choose **Assign** to invoke Assign mode. Then, select the pin location in the **Package** window.
5. Click the **Assign** toolbar button to invoke Assign mode, and then select the pin location in the Package window.
6. If you know the specific pin location, enter the pin assignment in the **Pin#** cell or select a valid placement from the drop-down menu.

If the location is a valid one, the macro is assigned and automatically locked. The status bar displays information about invalid assignments. Choose **Extended Error Messages** from the **Help** menu for more information about specific error messages.

Note: If you assign a macro to a pin that has already been assigned a macro, the previously assigned macro becomes unassigned if it was not locked.

See Also

[Customizing Assign and Unassign list boxes](#), [Unassigning pins](#)

Unassigning pins

Unassign an I/O macro from a locked assignment when its locked position is no longer required. Unassigned macros are automatically placed in optimum locations during layout.

To unassign a macro from a pin:

1. Select the I/O macro in the **Assigned** list box.
2. Unassign the selected macro from a pin location using any one of these methods:
3. Drag the selected macro name from the **Assigned** list box to the **Unassigned** list box.
4. From the **Edit** menu, choose **Unassign**.
5. Click the **Unassign** toolbar button.
6. Press the **DELETE** key.
7. In the I/O Attribute Editor, select Unassign in the Pin # cell.

The macro is unassigned.

See Also

[Customizing Assign and Unassign list boxes](#)

[Assigning pins](#)

Locking and unlocking pins

Designer does not alter locked pins during Layout. Designer recognizes pins as locked when they are assigned in one of the following ways:

- Manually using PinEditor in a design schematic
- Using a pin file (all Antifuse families except for Axcelerator)
- Using a PDC file (ProASIC3E, ProASIC3, and Axcelerator families only)
- Using a GCF file (Flash families only)

Locked pins are permanent, provided that you commit your locked pins to your design before you exit PinEditor. To save changes to disk (in your .adb file), use the **Save** command in Designer before exiting PinEditor.

To lock pins:

1. Select the pin(s) to lock in the **Assigned** list box, **Package** window, or **I/O Attribute Editor**. To select multiple pins, hold down the **CTRL** key and select multiple pins. To select all pins, from the **Edit** menu, choose **Select All**.
2. From the **Edit** menu, choose **Lock**, or select the **Locked** check box in the **I/O Attribute Editor**.

Note: When you use the I/O Attribute Editor, you can only lock one pin at a time.

To unlock a pin:

1. Select the pin(s) to unlock in the **Assigned** list box, Package window, or **I/O Attribute Editor**. To select multiple pins, hold down the CTRL key and select multiple pins. To select all pins, from the **Edit** menu, choose **Select All**.
2. From the **Edit** menu, choose **Unlock**, or clear the **Locked** check box in the **I/O Attribute Editor**.

See Also

[Customizing Assign and Unassign list boxes](#)

[Assigning pins](#)

Closing and committing pin assignments

The changes you make to your pin assignments and I/O attributes in PinEditor are temporary until you commit them.

- To commit your pin assignments at any time, from the **File** menu, choose **Commit**.
- To commit your pin assignments when closing PinEditor, click **Yes** when prompted.

Committing your changes saves them to the “working” design for this Designer session only.

To save changes made in PinEditor to disk, you must save your design by choosing **Save** from the **File** menu in Designer.

See Also

[Assigning pins](#)

[Unassigning pins](#)

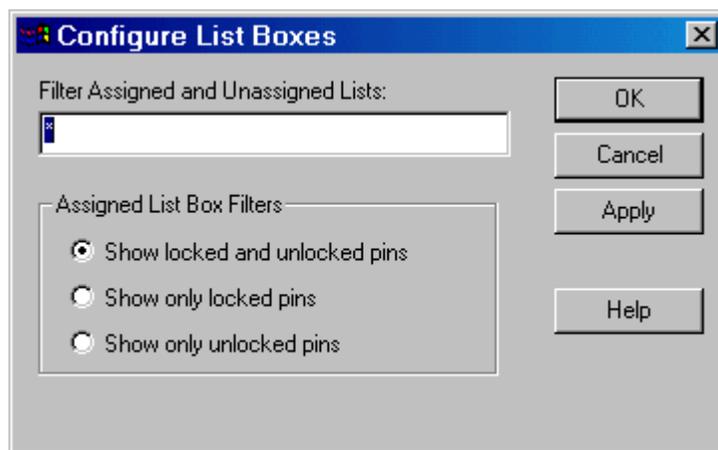
[Locking and unlocking pin assignments](#)

Customizing Assigned and Unassigned list boxes

You can customize which pins are displayed in the **Assigned** and **Unassigned** list boxes.

To customize the list boxes:

- From the **View** menu, choose **Configure List Boxes**.
 - Filter Assigned and Unassigned Lists** - Entering a specific pin name in this field filters out all other pins in the Assigned and Unassigned list boxes. Use the * wildcard to filter for groups.
 - Show locked and unlocked pins** - Select to display all locked and unlocked pins in the Assigned list box
 - Show only locked pins** - Select to filter out all unlocked pins from the Assigned list box
 - Show only unlocked pins** - Select to filter out all locked pins from the Assigned list box
- Click **Apply** to see changes. When done, click **OK**.



Configure List Boxes Dialog Box

Scripting commands

You can make pin assignments, lock and unlock pins, commit pin assignments, and edit I/O attributes by running Tool Command Language (Tcl) scripts. You can run scripts from the Windows or UNIX command line or store and run a series of commands in a .tcl batch file.

For more information on PinEditor Tcl extension commands, see “Tcl Scripting” in the Designer User’s Guide.

Assigning I/O macros

The Pin cell in the **I/O Attribute Editor** displays either the I/O macro’s assigned Pin number or its Unassigned status. If you know the pin number assignment, type the location into the Pin cell.

Edits you make in PinEditor are permanent, as long as they are locked and committed.

To assign an I/O macro using the I/O Attribute Editor:

- Select the **Pin** cell for the desired macro in the **I/O Attribute Editor**.
- In the **Pin** cell, type the pin number or select a valid pin assignment from the drop-down list.

Note: If you assign a macro to a pin that has already been assigned a macro, the previously assigned macro becomes unassigned. Since PinEditor locks all assigned macros, the reassignment unlocks the previous assignment.

Editing multiple rows

To edit multiple rows:

1. Select the rows to edit.

To select consecutive rows, click the first row, press and hold down the **SHIFT** key, and then click the last row.

To select rows that are not consecutive, press and hold down the **CTRL** key, and then click each row to select. Continue to hold down the **SHIFT** or **CTRL** key.

2. While still holding down the **SHIFT** or **CTRL** key, click in the cell containing the value you want to change. Release the **SHIFT** or **CTRL** key, and then release the mouse button.

The change occurs in all selected rows.

Note: You can also select an entire column, which enables you to edit all rows in that column.

See Also

Editing I/O attributes

Sorting attributes

Formatting rows and columns

I/O Attributes by family

Sorting I/O attributes

To sort I/O macros by attributes:

- Double-click a column heading to sort the table rows in ascending order
- Double-click the same column again to sort the table rows in descending order

Common I/O attributes (All Families)

The I/O Attribute Editor displays four common attributes for all I/O macros:

- **Port Name** indicates the I/O macro name.
- **Macro Cell** indicates the type of I/O macro.
- **Pin #** indicates the current pin assignment.
- **Locked**, if checked, indicates that you cannot change the current pin assignment during layout.

Besides the common I/O attributes, the I/O Attribute Editor displays device-specific attributes such as I/O Standard, Skew, and Output Load. Only attributes applicable to a specific device appear in the I/O Attribute Editor table.

Setting an I/O standard

Choosing an I/O Standard enables the software to set the I/O threshold, slew rate, hot-swap compliance, and output loading.

To set an I/O standard, select a value from the **I/O Standard** cell in the macro row you want to edit.

Refer to the appropriate datasheet for more information about the I/O standards available for your device.

Setting the power-up state

All I/Os are equipped with pull-up and pull-down resistors, which are enabled during power-up. These resistors are disabled just before VCCA reaches 2.5V, and then the I/Os behave according to the design. For RTSX-S, the outputs will drive according to the design, when the resistors become disabled regardless of the power-up sequence.

The state of the I/Os during power-up can be configured as High, Low, or None. The default value for Power-Up State in the software is “None.” The only exception to this is an I/O that exists in the netlist as a port, is not connected to the core, and is configured as an Output Buffer. In that case, the default setting will be Low.

To set the power-up state, select a value (High, Low, or None) from the Power Up State cell in the macro row you want to edit.

Setting the Slew

The default slew displayed in the I/O Attribute Editor window is based on the I/O Standard.

The Slew cell indicates the slew rate for output buffers. Generally, available slew rates are high and low. For those devices that support additional slew values, Actel recommends that you use the high and low values and let the software map to the appropriate absolute slew value.

To set the slew rate:

1. Select **CUSTOM** (SX-A and RTSX-S) from the **I/O Standard** cell in the macro row to edit.
2. Select the slew rate (high or low) from the **Slew** cell.

Note: The slow slew rate is incompatible with 3.3V PCI requirements.

Specifying capacitance

The default output capacitance appears in the Loading (pf) column of the I/O Attribute Editor. This default value is based upon the I/O specification set in the I/O Standard cell. If necessary, you can change the output capacitance default setting to improve timing definition and analysis. Both the capacitive loading on the board and the Vil/Vih trip points of driven devices affect output-propagation delay.

The I/O Attribute Editor provides a mechanism for setting the expected capacitance to improve the propagation-delay model. Timer, Timing-Driven Layout, Timing Report, and Back-Annotation will automatically use the modified delay model for delay calculations.

To specify capacitance:

1. Select **CUSTOM** from the **I/O Standard** cell in the desired macro row.
2. Set capacitance in the **Loading** (pf) column. You can modify the capacitance value to any integer value that accurately reflects the capacitive loading on the Actel device pins. Increasing capacitance will increase propagation delays.

Specifying I/O Threshold

The default I/O Threshold displayed is based upon the I/O Standard. If you want to set the I/O Threshold independently of the I/O specification, you must select CUSTOM in the I/O Standard cell.

To specify I/O Threshold:

1. Select **CUSTOM** from the **I/O Standard** cell in the macro row you want to edit.
2. Select **CMOS**, **TTL**, or **PCI** from the **I/O Threshold** cell. CMOS should be faster on high-to-low transitions, and TTL should be faster on low-to-high transitions.

Setting hot swap

The hot swap attribute Indicates whether the pin is hot-swap capable (on or off). This attribute is linked to the I/O threshold because the same fuse controls both functions. If hot swap is on, it means the pull-up clamp diode is off (not present). In that condition, inputs are 5V-tolerant (handle input voltages up to 5.5V), and the device can be used in cold-sparing applications. Note that with a DC input of 5V, the device can draw up to 300 uA per pin. Be sure to also disable the clamp diodes on unused I/Os. Use the dialog box for Generate Programming Files. if hot swap is off, it means that the pull-up clamp diode is on (present), and this is only applicable if the 3.3V PCI I/O standard is selected. Inputs will not be 5Vtolerant and will only support VCCI + 0.5V. The device cannot be used for cold-sparing since the pull-up clamp diode will be forward-biased, if a 5V input is applied.

To set the hot swap, select a value (on or off) from the Hot Swap cell in the macro row you want to edit.

Specifying Loading

Loading determines what Timer will use as the loading on the output pin. The output-capacitance value is based on the I/O standard selected in the I/O Standard cell. This option is not available in ACTgen.

The default loadings for different I/O standards are as follows:

- 35 pf for TTL, LVTTTL, and CMOS
- 50 pf for 5V PCI
- 10 pf for 3.3V PCI

Note: These values are for Timer use only; designers can customize the I/O loading for timing analysis. They do not affect the I/O configuration.

Menus, Toolbar Buttons, and Shortcut Keys

The PC and workstation (UNIX) versions of PinEditor have the same menus. However, some dialog boxes may look slightly different due to the different windowing environments. The functionality is the same, though the locations of the fields and buttons on the dialog boxes may vary. Field names may also vary between platforms.

File menu

Command	Icon	Shortcut	Function
Commit			Saves your changes to the working design for this Designer session only Note: To save changes to disk, you must also save your file in Designer.
Prelayout Check			Ensures that the design can be placed and routed
Print		CTRL + P	Prints the design displayed in the Package window
Close			Closes PinEditor

Edit menu

Command	Icon	Shortcut	Function
Copy		CTRL + C	Copies the selection to the Clipboard
Assign		CTRL + I	Assigns the selected I/O macro to the next selected pin
Unassign		DEL key	Unassigns the selected I/O macro
Lock		CTRL + F	Locks the selected I/O macro
Unlock			Unlocks the selected I/O macro
Select All		CTRL + A	Selects all assigned I/O macros in your design
Configure I/O Banks			Not used

View menu

Command	Icon	Shortcut	Function
Zoom Area			Drag out an area to enlarge
Zoom In		+	Magnifies the view by a factor of 2 (scale = 2x)
Zoom Out		-	Reduces the view by a factor of 2 (scale = .5x)
Fit in Window		CTRL + W	Fits the entire design within the Package window
Redraw		F2	Redraws the design in the Package window
Configure List Boxes...			Displays the Configure List Boxes dialog box, in which you can filter which pins appear in the Assigned and Unassigned list boxes
Color Manager			Displays the Color Manager dialog box, which does nothing in PinEditor but changes the colors of nets, clusters, and SuperClusters in ChipEditor
I/O Banks			Not used
Toolbar			Hides or displays the toolbar buttons
Assigned List Box			Hides or displays the Assigned List Box
Unassigned List Box			Hides or displays the Unassigned List Box
World View			Hides or displays the World View window
I/O Attribute Editor			Hides or displays the I/O Attribute Editor at the bottom of the window
Status bar			Hides or displays the status bar

Help menu

Command	Shortcut	Function
Help Topics		Displays online Help for this version of PinEditor
Reference Manual		Opens the PinEditor User's Guide (.pdf file) in Adobe Acrobat
Extended Error Message		Displays a dialog box with more detailed information

Contacting Actel

Actel Headquarters

Actel Corporation is a supplier of innovative programmable logic solutions, including field-programmable gate arrays (FPGAs) based on Antifuse and Flash technologies, high-performance intellectual property (IP) cores, software development tools, and design services targeted for the high-speed communications, application-specific integrated circuit (ASIC) replacement, and radiation-tolerant markets.

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Technical Support

Highly skilled engineers staff the Technical Support Center from 7:00 AM to 6:00 PM Pacific Time, Monday through Friday.

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For 24-hour support resources, visit Actel Technical Support at <http://www.actel.com/custsup/search.html>.

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Contact us with your technical questions via e-mail or by phone. When sending your request to us, please be sure to include your full name, company name, email address, and telephone number.

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